THE PROBLEM OF EMPLOYMENT CREATION AND THE ROLE OF THE AGRICULTURAL SECTOR IN LATIN AMERICA

BY

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Neglect of the rural sector coupled with rapid population growth has made unemployment the most important social and economic problem in Latin America today. A major reorientation in the process of economic growth is indicated, whereby development is defined in terms of the degree to which poverty, unemployment and income inequality are eliminated, and by the opportunity which each individual has to realize his potential as a human being. Basic among these opportunities is that to productive employment.

Motivated by the belief that a lack of capital was the limiting factor in their economic development, the nations of Latin America formulated elaborate fiscal and credit policies so as to encourage increased capital use. While the factor price ratio was thus signalling entrepreneurs to shift to more capital-intensive production techniques, no parallel development occurred in the technological field. The development of production techniques attuned to the particular factor availabilities and employment needs of the developing economies was neglected in favor of wholesale adoption of the highly labor-saving methods of the advanced western nations.

To economists who identified the employment problem as the consequence of factor price distortion, the solution was obvious: simply

re-orient investment incentives so as to favor labor-intensity in production. Such an approach, however, hinges upon the existence, or at the very least, the development of efficient alternative labor-intensive techniques of production.

U.S. Census of Manufactures data are analyzed to determine whether such alternatives exist; the results are not encouraging. Production isoquants for industrial processes are highly discontinuous, particularly in the range of lower capital-labor ratios. However, treating the production process as a sequence of stages, some of which allow for considerable labor absorption, offers interesting possibilities.

Construction activities were found to provide far more flexibility in the manner in which production factors could be combined. Wage constraints, however, were seen as an important condition for increased employment in the building trades.

Public works projects offer several interesting possibilities for productive employment of surplus workers; organization and management of large groups of unskilled workers, however, often poses a practical limitation.

Analysis of the employment generating potential of the service sector is complicated by the heterogeneous nature of these activities.

An attempt is also made to isolate the characteristics which provide scope for technological adaptation in certain areas yet restrain it in others.

The relationship between income distribution and employment generation is investigated at length, as is the vicious circle whereby low levels of income, by constraining market size, simultaneously determine

and are determined by low levels of industrial activity and thereby employment. It is argued that the major approach to breaking out of this vicious circle should be a massive agrarian reform, complemented by government programs in support of the small farm sector and in defense of its share of the market.

Agrarian reform as a solution to unemployment is unique in that it combines the several goals of increased output, employment and equality in income distribution into a single policy. By providing access to the rural income stream for an increased number of workers, agrarian reform serves to enlarge the market for light manufactures, thus providing a sound foundation for a cumulative expansion in the growth of the manufacturing sector while dampening the tendency towards rural out-migration.

The major recommendation offerred is that Latin American governments commit themselves to a basic reorientation in development planning, subscribing to a set of aggressive, well-conceived policies designed to achieve maximum employment generation. An Office for Employment Creation is recommended as the major agency for such a commitment.

To the millions of unemployed and under-employed workers in Latin America and throughout the world this thesis is dedicated in the hope that nations everywhere will come to realize that it is the quality of individual life and not the pursuit of an ever-expanding national product which must become the central focus of development, and of economic activity in general.

PREFACE

The present thesis was developed essentially from secondary data sources available at the University of Wisconsin-Madison, and from my personal and professional experiences in Latin America between 1963 and 1969.

During the formal research phase of the work I have benefitted considerably from a close association with the Land Tenure Center, the influence of which may be apparent in what follows.

Many people have given generously of their time and talents in helping to bring this project to a successful conclusion. In particular I would like to express personal thanks to my major advisor, Professor Peter Dorner, Professors Don Kanel and William Thiesenhusen of the Land Tenure Center, and Professor Dan Bromley of the Department of Agricultural Economics. Thanks are also due Professors Kenneth Parsons and Warren Bilkey.

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CHAPTER I: THE NATURE OF THE UNEMPLOYMENT PROBLEM IN LATIN AMERICA

As recently as 1964 the literature on economic development treated the existence of surplus labor as a valuable resource which could be readily tapped in the process of industrialization.[1] More recently, however, as massive outmigrations from rural areas have served to make unemployment and underemployment a far more visible social problem, and a more highly volatile political problem, economists and development planners have come to recognize the dangers inherent in a growing surplus of unemployed workers such that the productive employment of these workers--both rural and urban--now represents the major developmental riddle for most of the developing nations of the world. The Pearson Commission's Report, Partners in Development, in recognizing the dimensions of the unemployment problem, cited "the failure to create meaningful employment" as "the most tragic failure of development."[2]

Rapid growth of aggregate income indicators has become a false idol to increasing numbers of economists and decision makers as more and more of them discover the dimensions of unemployment, poverty and income inequality. As this process occurs, important qualitative distinctions are employed to distinguish between economic growth on the one hand, and economic development on the other.

Economic growth, the former hero of our piece, but now wearing a black hat, was an ambitious, impersonal hero, concerned only with self-agrandizement and outward appearances. He flourished at a time when the world

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[1] See, for example: John C. H. Fei and Gustav Ranis, Development of the Labor Surplus Economy: Theory and Policy. R. D. Irwin, Homewood, Ill. 1964.

[2] Commission on International Development, Lester B. Pearson, Chairman, Partners in Development, p. 58. Praeger, N.Y., 1969.

was willing to content itself with aggregative measures of economic and social advancement. Economic growth found a "scientific" justification in cost-benefit analysis,--if it could be demonstrated that the gains from a "development" project exceeded the losses, the project was economically justifiable.

Economic development, today's hero, has a social conscience and an analytical mind. He refuses to accept blindly the traditional paradigm that "more is better" and is apt to submit embarassing questions to his benefactors, such as "more of what?", and "for whom?"

Respected members of our profession are now wont to point out vigorously, as has Dudley Seers, that "...economic growth may not merely fail to solve social and political difficulties; certain types of growth can actually cause them."[3] Consequently, and again in the words of Seers, we should be asking the questions:[4]

> "What has been happening to poverty?
> What has been happening to unemployment?
> What has been happening to inequality?"

What we mean by economic development then, is <u>not</u> simply increasing per capita incomes to the $1,000-$2,000 range characteristic of the so-called developed nations. Rather it is defined in terms of the degree to which poverty, unemployment and income inequality are being eliminated, and by the opportunity which each individual has to realize his potential as a human being,...by which definition even the "developed nations" may fall short of the mark.

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[3]"The Meaning of Development", <u>International Development Review</u>, Vol. 11, No. 4, p. 2. December, 1969.

[4]<u>Ibid.</u>, p. 3.

Perhaps the most basic opportunity of all is that to productive employment. Few of the nations of Latin America, however, have sought to implement the high-minded hemispheric goals for "providing more productive employment for underemployed manpower" to which these nations committed themselves in the signing of the Charter of Punta del Este.[5] As a result of this, and the relative neglect of the rural sector, unemployment in Latin America is today the most important social and economic problem which policy makers have to confront. The social unrest which attends high levels of unemployment, especially urban unemployment, creates a political climate which is incompatible with economic development. Without a major realignment in development policies in the direction of employment creating investment, meaningful economic and social progress appears unattainable.[6]

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[5]Section II.2.a. The Charter was signed in Punta del Este, Uruguay, on August 17, 1961. Poblete Troncoso and Burnett note that "increasingly in recent years, Latin American law has looked at labor as having the right to work and, perhaps even more interesting, the obligation of working as a social duty." However, they cite but one example, the Uruguayan Constitution of 1934, which states that every "person has the right to devote himself to work [and every inhabitant] has the obligation of applying his intellectual or physical energies in such form as to redound to the benefit of society, and the latter shall endeavor to offer, with preference to citizens, the possibility of earning a living by means of the development of economic activity." Moises Poblete Troncoso and Ben G. Burnett, The Rise of the Latin American Labor Movement, p. 21. College and University Press, New Haven, Conn., 1960.

[6]An official Peruvian government document, in noting the slow growth of industrial employment, comments as follows: "One does not observe a high rate of open unemployment but it is estimated that underemployment has become more acute and can lead to a crisis." It calls for immediate governmental actions, both in the short-run,--to remove the dangers of social conflicts and tensions--and in the long-run--to achieve a fundamental reorientation in policy with respect to employment objectives. Instituto Nacional de Planificacion, Informe Economico Anual, pp. 23-24. Lima, Peru, Junio, 1968.

The obvious need for such a realignment has sparked an intensive effort to devise means of creating additional new jobs through the development of labor-intensive or labor-using technologies, as alternatives to the more "modern" technologies which are available from the developed countries. The intent of such an effort is to adjust the nation's pattern of development to the productive resources at its disposal. Since most developing nations are capital poor, but have abundant semi- and un-skilled labor resources, the pattern of development called for would require that capital be economized but labor used abundantly.

Some economists, however, feel that labor-intensive technologies may not only be less productive, thereby inhibiting economic growth, but actually wasteful of capital,--the very resource they seek to economize.

This controversy will be considered in a later chapter. For now, let us explore briefly why, during recent decades, the problem of vast numbers of unemployed and underemployed workers has become both more apparent and more acute, and the factors which can be cited as contributory.

A. Background of the Problem

A recent study prepared for the Development Centre of the OECD[7] attributes the sudden appearance of the employment problem to five "disquieting trends in developing countries"--

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[7] David Turnham, The Employment Problem in Less Developed Countries, Development Centre Studies, Employment Series No. 1. Development Centre of the Organisation for Economic Co-operation and Development, Paris, 1971.

1. A massive growth in the labor force of "not less than 25 percent...between 1970 and 1980, while the corresponding figure for developed countries is only about 10 percent."

2. An insufficiency in the growth of new jobs in the "modern" sector.

3. The benefits of a 20-50 percent increase in real national product per capita over the 1950-60 period have been weighed heavily in favor of high productivity urban workers and employers.

4. A massive waste of human potential due to an already high level of "open unemployment" in urban areas, particularly among young people, many of whom are relatively well educated.

5. Explosive urbanization placing a heavy burden on "already hard-pressed development budgets." In Latin America, many urban areas are growing "twice as fast as the population as a whole."[8]

To these we might add additional factors such as--

6. Increased pressure on the land resources due to
   a. population growth in the countryside,
   b. rural labor legislation, which in some cases may lead to
   c. increased farm mechanization.

7. A more humanistic and understanding attitude towards development, and a concern for the social implications of economic growth, have been key factors in the "discovery" of the employment problem.

Historically, the process of economic growth and development has been characterized by a movement of labor off the land and into the growing urban areas where industrialization was providing more lucrative employment opportunities. This was the picture portrayed by the surplus labor models of Lewis and Ranis-Fei.[9] But the "uniqueness" of the

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[8] Ibid., pp. 9-11.

[9] W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor", The Manchester School, xxii (May 1954) pp. 139-191; Gustav Ranis and John C. H. Fei, "A Theory of Economic Development", American Economic Review, Vol. LI, No. 4 (Sept. 1961) pp. 533-565; and Fei and Ranis, op. cit.

industrialization process in Western Europe, compared with what is occurring today in Latin America "lies in the relatively gradual evolution of technology and its equally gradual translation into the manufacture and use of tools designed to enhance the productivity of individual workers."[10] Contemporary conditions characterizing Latin America, however, depart from those of the traditional model in two important respects--

1. Growth of population and labor force, especially the urban labor force, far exceeds the corresponding growth rates which occurred in the now developed countries, and

2. Productive processes, especially in industry, which are available to the economies of Latin America offer entrepreneurs the prospect of quantum increases in the productivity of workers. Where markets are small, and growth in demand is slow, this condition translates directly into too few new jobs in industry.

The combination of opposing trends, rather than allow for the gradual absorption of labor force growth with increased productivity, leads instead to a constantly growing pool of surplus workers and increased inequality in the distribution of income. Although economic growth is occurring in most of the nations of Latin America,--in many cases GDP is growing at an annual rate of 5 percent--"the absolute standard of living of a substantial share of the population is not improving [particularly] in countries characterized by economic dualism."[11] Robert McNamara, as President of the World Bank, noted in a recent address to his Board of Directors that "in the developed countries, rapid growth

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[10] Eric B. Shearer, "The Case Against Indiscriminate Capital Intensity of Investment in Overpopulated Developing Countries", Indian Journal of Economics, Vol. xlvi, Part II, No. 181, p. 191. October, 1965.

[11] Eric Thorbecke and E. Stoutjesdijk, Employment and Output: A Methodology Applied to Peru and Guatemala, Development Centre Studies, Employment Series No. 2, pp. 7-8. OECD, Paris, 1971.

implies full employment, but in the developing countries this is not necessarily the case."[12] To illustrate the point McNamara cited the cases of Venezuela and Jamaica, two countries which experienced average annual growth rates during the decade of the 50's of 8 percent. In Venezuela, unemployment was higher at the close of the decade than at the beginning, and "in Jamaica it was just as high, in spite of the fact that fully 11 percent of the labor force had migrated from this country."[13]

When the numerator and denominator of a measure of aggregate economic activity grow at different rates, the measure changes rapidly. Level of urban employment is such a measure, the denominator of which is the economically active urban population, and the numerator, that part of it which is actually employed. Growth of the urban labor force determines the rate of growth of the denominator while growth in urban employment is the determining factor for the numerator.

Kuznets has pointed out with respect to differential growth rates that so long as the denominator, the urban labor force in our case, grows slowly, or grows only slightly faster than the numerator, which is urban employment, the aggregate measure--the level of urban employment--does not become explosive in the course of one or two decades. However, where high rates of growth occur there is an increased likelihood of large absolute differences between rates, vis-a-vis a situation where, in general, rates of growth are low.[14]

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[12] Address to the Board of Governors of the IBRD, Washington, D.C., Sept. 29, 1970; cited in Ibid., p. 9.

[13] Ibid., p. 9.

[14] Simon Kuznets, Economic Growth of Nations, p. 86. The Belknap Press of Harvard University Press, Cambridge, Mass. 1971.

If, as an illustration of this phenomenon we project into the future a pair of trend lines for growth in urban employment and labor force of 3 and 5 percent respectively, assuming an initial level of urban unemployment of 10 percent, in ten years unemployment will have mounted to 26 percent, and in 15 years it will have reached 33 percent. If, on the other hand, we assume growth rates of 1 and 2 percent, thus allowing the labor force to increase twice as rapidly as employment, yet holding the absolute difference between the two to only 1 percent, the same trend lines ten and 15 years hence give unemployment figures of only 18 percent and 23 percent respectively.[15]

The mathematical explanation of growing levels of unemployment, while interesting in itself, provides few insights into remedying the situation. Far more fruitful would be an inquiry into the causes of the basic opposing trends,--what explains the rapid growth of the urban labor force, and why have urban employment opportunities grown so slowly?

1. Rapid Growth of Urban Labor Force

Urban labor force growth is a lagged function of the growth rate of population, and more immediately, of the process of urbanization.

The first argument, population growth, appears to be little influenced by the direct efforts of development planners. During the decade of the 60's, considerable resources were devoted to efforts to reverse

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[15] If E and F are two initial magnitudes for employment and labor force in the urban area, and their percentage rates of annual increase are e and f respectively, then at the end of t years the initial proportion of those employed, E/F, will have become $E(1+e)^t/F(1+f)^t$. In logarithmic terms, designating the proportion of the urban labor force employed at time t as Z, $\log Z = \log E/F + t[\log (1+e) - \log (1+f)]$. Based upon Ibid., p. 35.

the population growth trends which the developed countries held were defeating their foreign aid efforts.[16] Despite these efforts, population growth rates in the developing countries show little sign of slackening and many development planners are coming to the realization that population growth rates may be more a function of an outlook towards life than a genuine inability to control the size of family.

For the developed countries, high incomes and urbanization appear to be the crucial factors explaining their slow rates of population growth, but the advance of the medical sciences and the consequent decline in death rates in recent decades makes comparison difficult, and in part irrelevant.

The educational level of women of childbearing age appears to be an important variable in the formation of attitudes towards family planning. From studies of several major cities in Latin America it was found that the least educated group, "which may be confidently assumed to correspond to the lowest-income group," had the largest number of offspring[17] (see Table I-1). It was further found that "young women with high education level are most favorable to low fertility while

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[16] Perhaps the most explicit statement of this attitude derived from the work of Stephen Enke, "The Economic Aspects of Slowing Population Growth", The Economic Journal, Vol. LXXVI, No. 301, pp. 44-56, March, 1966, on the basis of which President Johnson could assert that a dollar spent on birth control was equivalent in terms of economic growth to $100.00 spent on development projects.

[17] Organization of American States, Inter-American Economic and Social Council, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies", p. 97. Washington, D. C., August 19, 1971.

older women with low education are the least favorable."[18]

TABLE I-1

Average Offspring per Married Woman at End of Fertile Period*

and by Education Level, 1963-4

	Argentina (B.A.)	Brazil (Rio)	Colombia (Bogota)	Costa Rica (San Jose)	Mexico (Mexico)	Venezuela (Caracas)
No Schooling	3.3	5.4	7.9	6.0**	6.3	5.6
Primary	2.3	3.8	5.1	6.3	5.4	5.0
Secondary	1.9	2.4	4.2	3.9	3.3	3.2
University	-	2.0	3.8**	3.7	3.9	1.0
Total	2.1	3.2	4.9	5.2	5.0	4.4

Notes: * 45-49 years old
** 35-39 years old

Source: CELADE "Programa de Encuestas Comparativas de America Latina, zona urbana" (unpublished), cited in "Transformacion y Desarrollo, La Gran Tarea de America Latina".

Government and private efforts to influence family size are no doubt playing some small role in restraining the growth rate of population in the developing countries, and such efforts should be continued, aimed largely at reaching those couples who want to be reached, especially those who are unaware of the means to control the size of their family. However, population growth rates may be an institutional datum

[18] George Coleman, "Population Growth in Latin America", a review of J. Mayone Stycos, Idealogy, Faith and Family Planning in Latin America, War on Hunger, p. 19. AID, Washington, D.C., December 1971.

which can only be affected with any permanence through increasing income and security.

The second major determinant of the growth of the urban labor force, urbanization, is also the more volatile argument in the equation. Its immediate impact upon the labor force, and the fact that it is susceptible of manipulation, makes it the more likely choice as a policy variable. It is interesting to note, as will be shown in a later section of this paper, that the volume of outmigration from agriculture in Latin America between 1950 and 1965, about 8 million workers, corresponds very closely with estimates of "visible" unemployment for 1965.[19] The implication of the foregoing, although not entirely valid, is this: had rural-urban migrations been contained, the problem of unemployment would be far less severe than it is today.

To some extent, urbanization, which is at the core of the unemployment problem in the developing countries, carries with it the seeds for potentially resolving that problem in the slower rates of population growth which characterize urban families vis-a-vis rural families. There is some evidence that this is so. Urban growth rates, however, are fueled from two sources, as noted above, and any slackening in internal growth may be readily offset by an increased flow of rural migrants.[20]

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[19] See Chapter IV, Section E.

[20] This is implied by the model by Michael P. Todaro, "A Model of Labor Migration and Urban Unemployment in Less Developed Countries", American Economic Review, Vol. LIX, No. 1, pp. 138-148. March, 1969. According to this model, migration is a function of both income differentials and the probability of finding urban employment. Thus, slow growth of the urban labor force will induce increased migration in proportion to the higher probability of finding urban employment.

2. Slow Growth of Urban Employment Opportunities

The possibility of "technological leap-frogging"[21], as distinct from the "gradual evolution of technology" which characterized the development process of the advanced western nations, creates the potential for a situation whereby output can be expanded dramatically with only modest increases in employment. In some cases, specifically where modern factory methods of production supplant existing handicraft industry, net employment in an industry can actually decline, despite rapid growth in output.

The availability of modern production techniques presents the developing nations with the prospect of extremely high levels of worker productivity when compared with more traditional techniques of production. For several reasons, however, these modern techniques are often poorly suited to the needs of the developing nation:

1. The factor proportions which they call for incorporate relations which characterize the economies of the developed nations--abundant capital and scarce labor--but are inappropriate for nations where unemployment is a major problem.

2. The capital needs, and many of the materials inputs, must be imported, placing a heavy burden upon scarce foreign exchange resources.

3. Consequent low levels of employment generation deny to the local consumer-goods industries the mass market which their development requires.

4. Thus, the high levels of output of which the modern techniques are capable far exceed the needs of the local market and, unless export markets can be developed to absorb the potential surplus, underutilization of plant and equipment results.

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[21] The term is Falcon's, from his "The Green Revolution: Generations of Problems", American Journal of Agricultural Economics, Vol. 52, No. 5, p. 705, December, 1970.

Consequently, such techniques offer the developing nation the prospect of severe strains upon its balance of payments, a potential for excess production capacity, and, most importantly, far too few new jobs in industry.

Presumably, what is needed are production techniques which allow for the use of less capital and far more labor,--techniques which are, so to speak, more labor-ward on the production isoquant.

The search for such techniques is being conducted both in the field, where technical study groups are working to develop labor-intensive mechanized techniques of production, and in the Universities, where economists are confirming, albeit tentatively, the relation between unemployment and capital-intensive techniques, and the need to develop an indigenous technology more suited to existing proportions of productive factors.

In reality, the growth of employment in the urban areas of Latin America has not been slow,...except in relation to the unreasonable demands which have been placed upon it. Between 1950 and 1965 non-agricultural activities absorbed more than 70 percent of the total increase in employment during that period; however, three-fifths of these entered "non-basic services"--the catchall for the urban underemployed--and only one-fifth was absorbed by the manufacturing sector (see Table IV-15).[22]

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[22] Esteban Lederman, Los Recursos en el Desarrollo de America Latina, No. 9 in Series III: Anticipos de Investigacion, Cuadernos del Instituto Latinoamericano de Planificacion Economica y Social (ILPES), p. 43. Santiago, 1969. "Non-basic" or "other services" includes commerce, public administration, education, health, as well as the typically underemployed groups such as domestic workers, street vendors, etc.

According to one author,[23] employment figures represent more the financial capacity of sectors to absorb workers--especially certain activities of the public sector and services--than the productive needs for labor derived from increased demand for goods and services. This process leads to a situation in which the labor force enters activities which are progressively less productive and remunerative,--a phenomenon whose formal expression is underemployment.[24]

B. Employment Creation Through Labor-Intensive Technology

A substantial body of literature has been produced on the subject of creating additional employment opportunities through the use of more labor-intensive techniques of production. This literature will be discussed below in succeeding chapters. For the present, the argument can be summarized as follows:

> Despite abundant labor resources and scarce capital, economic policies of the developing nations have been motivated by the belief that development was hampered by a lack of capital. In that belief, elaborate policies were formulated granting fiscal, credit, and foreign exchange advantages to entrepreneurs, thereby lowering considerably the price of capital vis-a-vis labor, and hastening the process of factor substitution. Latin America's employment problems are in no small part due to the capital-intensive bias inherent in her development policies, a bias which has

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[23] Ibid., p. 43.
[24] Ibid., p. 43.

succeeded in making labor redundant and at the same time high-priced relative to capital.

The productive techniques which are available through import to the developing countries embody years of scientific and technical advance, but reflect factor combinations characteristic of the developed societies which design and market them. The impressive gains in labor productivity which these techniques allow, taken within the context of a slowly growing market, implies that such techniques are capable of very modest employment creation.

In the developing nations, small market size poses a major constraint upon industrial expansion; although populations may be large and growing rapidly, effective demand is weak and confined to a small set of basic consumer goods. "Poor people make poor customers." Very little money in the hands of the people means low levels of demand for the products of industry. Consequently, when an entrepreneur avails himself of the various investment incentives offered by government and imports the capital components for a modern manufacturing plant, in direct competition with local artisan industry, he may be importing unemployment if his increased capacity enables him to displace local artisan production. Thus, the major positive employment benefits may accrue, interestingly enough, to the capital exporting nation.

Latin American governments have been slow to recognize (and act upon) the divergence between private profitability and the interests of society, a divergence which frequently leads to

misallocation of resources and the imposition of social costs upon the community. When private entrepreneurial interests fail to coincide with collective economic and social interests, appropriate state intervention may be both convenient and necessary.

As it turns out, however, Latin American governments appear to have taken little action in defense of domestic employment, in part, no doubt, because it is not clear just what concrete steps are available to them. There is little point in discouraging investment simply because it is capital-intensive unless profitable alternative techniques, more consistent with local factor proportions can be made available.

To date, research and development into alternative technologies has come from international groups, typically working on their own in Asia and Africa. Additionally, the United Nations, through FAO, ILO and the regional economic commissions, is studying the prospects for employment creation through labor-intensive technologies. The OAS, a relatively late-entrant into the field, has sponsored a workshop in labor-intensity for Ministers of Agriculture.[25] Despite these efforts, the following observation made fully ten years ago by John P. Lewis still holds true: "There is unfortunately no central inventory of technological alternatives maintained under U.N. auspices or otherwise, to which the authorities of the developing economies can turn for a reasonably reliable and informative summary of the ready-made technical alternatives open to them."[26]

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[25] Sixth Inter-American Conference on Agriculture, Organization of American States, Lima, May 27-June 2, 1971.

[26] Quiet Crisis in India, p. 57. The Brookings Institution, Washington, D.C., 1962.

To the present, the search for alternative techniques has not proven very fruitful. As will be shown subsequently, it has proven least fruitful in the manufacturing industries, and perhaps most fruitful in construction and agriculture,...results which simply confirm what was known from the start,--that construction and agricultural activities provide a wider range of factor substitutability than does manufacturing.

A somewhat separate issue,--the relative advantages and disadvantages of by-passing certain steps along the road to industrialization--seems to have an important bearing upon the developing nations' ability to design profitable alternative techniques. An alternative technique is simply a different technological combination of productive factors capable of producing a given output. In the manufacture of textiles, for example, the power loom is an alternative technique to the hand loom. The former employs more capital per worker while the latter has a higher ratio of workers to output (i.e., lower productivity of labor). Either technique, however, may have the lower capital-output ratio.

Alternative techniques result from invention and innovation. It is essentially an incremental process that leads to the development of new techniques, a process which results from the application of an imaginative mind (and often a skilled craftsman) to a familiar problem. In brief, alternative techniques are indigenous solutions to indigenous problems.

That "necessity mothers invention" has considerable truth in the context of industrial design. "Observation of the invention and innovation process shows that it is very important to expose scientists and technicians to the pressure of need: the mere existence of an opportunity

to exploit a natural resource in Ecuador will not generate the discovery of the process or the design of the proper equipment in the Dupont laboratories."[27]

Strassmann has noted that bottlenecks, as they develop in the production process, become "targets for innovation".[28] Thus, technological change, or at least incremental change, works in the direction of increasing the productivity of factors under stress, that is, those which restrain the production process.

Every nation has its workshop sector. In those nations which have come to rely on imports for their supply of capital equipment, and those which are otherwise trying to find shortcuts to industrial development, the workshop sector may not advance far beyond simple metal transforming activities and machinery repair. Where this occurs, the workshop sector is not motivated to progress towards the more highly skilled activities--pattern making, tool and die making, castings, etc.--which would provide their craftsmen with the necessary skills and familiarity with the production of capital equipment that is required for the development of alternative techniques. Consequently, the quest for short-cuts to industrialization may entail a two-fold penalty for the developing nation, --ensuring its continued dependence upon imported capital equipment, and preventing its workshop sector from achieving mature form, with all that this implies for the process of economic growth.

Rosenberg has stressed the sequence of events in a nation's industrial history as very important in explaining its experience in individual

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[27] OAS, "Employment and Growth...", op. cit., p. 86.

[28] W. Paul Strassmann, Technological Change and Economic Development, pp. 159-160. Cornell University Press, Ithaca, N.Y., 1968.

industries. "The problems encountered and solved in industry A often turn out to provide valuable externalities in the form of knowledge, techniques and labor skills which become available to industries B, C and D. Thus,...the industrial revolution in England owed much to the technical skills which had been developed by generations of craftsmen in the production of clocks and watches."[29]

It is a simple matter to talk about the necessity to develop methods of production which are both labor-intensive and capable of high yields. It is another matter to make significant practical progress in that direction. To date, research in this area has been modest, the techniques developed have typically been devised for application in agriculture and construction. The early fears that manufacturing would not provide a fertile field for the development of alternative techniques has been borne out in fact.

Nevertheless, there may still be scope for employing more labor "in moving things about; in the handling of materials inside the factory; in packaging;" as well in earth moving, mining, and construction.[30] As W. A. Lewis has noted, "the bulldozer, the conveyor belt and the crane usually achieve nothing that labour could not do equally well. They

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[29] Nathan Rosenberg, "The Diffusion of Technology in the Industrial Revolution", Discussion Paper Series in Economic History, LH 72-4, January 1972, University of Wisconsin, Madison. fn. 24. Quoting Bowden, Karpovich and Usher, An Economic History of Europe Since 1750, Rosenberg adds, the lessons learned by the clockmakers "formed the basis for the development of the engineering sciences in the late eighteenth century and the early nineteenth century. ...Much of the work done for Arkwright on the spinning machine was entrusted to a clockmaker. George Stephenson learned much of his mechanics by repairing and studying clocks."

[30] W. Arthur Lewis, Development Planning, p. 60. Harper & Row, N.Y., 1966.

spend scarce foreign exchange solely in order to produce unemployment."[31]

Capital is by no means a dirty word in the context of employment creation. Capital inputs are not to be avoided, although they should be economized, especially imported capital. Most machinery production is manufactured by "technically sophisticated, capital-intensive industries with great economies of scale," and these are the "last of the products that a developing country should start manufacturing."[32] There are cases, however, where the construction of capital locally permits the use of simple, labor-intensive processes, and these we will discuss in Chapter IV.

C. Purpose of the Dissertation

The intent of the present thesis is to attempt to place the present employment problem in Latin America in proper historical and economic perspective so as to see more clearly in what direction possible solutions lie.

The argument that capital-intensity in production has been a major contributor to the employment problem is reviewed in some detail in the belief that the case against capital-intensive industrialization has been overstated.

The several sectors of the economy are examined with respect to their

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[31] Ibid., p. 60. An important point which Lewis overlooks, however, is the prospect of employing domestic labor not so much in the brute tasks of "moving things about", but rather in the manufacture of conveying equipment, for example. The long-run solution to the problem of underdevelopment requires providing productive, as distinct from nominal, employment for all members of the work force. Ultimately this must entail increasing the quantity of capital at the disposal of each worker.

[32] Strassmann, op. cit., p. 184.

capacity for absorbing labor, although the role played by agriculture and the rural sector generally in the process of employment creation is the issue we ultimately want to consider. What must agriculture give up and/or get in order that additional job opportunities can be generated within the domestic economy; what form of farm organization is best suited to maximize absorption of labor?

The analysis which follows seeks to shed light on these questions, as well as the implications for policy which governments in Latin America may wish to consider.

CHAPTER II: INCOME DISTRIBUTION AND EMPLOYMENT CREATION

An understanding of the intimate link between the distribution of income and levels of employment is essential to the process of economic development.

From the point of view of the individual, employment is the means by which one gains access to the economy's income stream. For the economy as a whole, however, caught up in an equilibrium of poverty and high levels of unemployment, changes in the pattern of income distribution represents an important method of breaking out of the vicious circle of poverty and imparting to the economic system a process of cumulative employment expansion and economic growth.

It has long been recognized that the way in which income is distributed has an important bearing upon the demand pattern for goods and services, which in turn influences the level and composition of domestic employment. Perhaps because they have been more concerned with growth than development,[1] theories of economic change have, until recently, failed to treat income distribution either as a policy variable or an objective of policy.[2]

On the other hand, the relationship between income distribution and savings has long been recognized and in fact provides the foundation for classical growth theory. Of far more relevance from the point of view of economic development, however, is the relationship between income

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[1] These terms are defined in chapter I.

[2] Gerald M. Meier, Leading Issues in Economic Development, Studies in International Poverty, 2nd ed., pp. 20-28, Oxford University Press, New York, 1970.

distribution and investment patterns, of which very little seems to be known.

In the present chapter we will be considering the linkage between income distribution and employment, first through the relationship of income distribution and the pattern of demand for final goods and services, and then through its relationship with patterns of saving and investment.

A. Income Distribution, Expenditure Patterns and Employment

It is generally agreed that consumption patterns of households are largely a function of their incomes[3] such that families at the lowest levels of income are able to purchase little more than their basic needs of food and clothing, whereas middle and upper-class families can satisfy these same needs with a far smaller proportion of income, leaving a surplus for simple manufactures, durable consumer goods, automobiles, foreign travel, and savings. In that different goods and services call for different levels of labor and different combinations of materials input--some of which may be imported--the structure of demand for final goods and services stands as a link between income distribution and employment. It is the nature of this link which we will now try to define.

Gini ratios contrasting income concentration for countries of Latin America with several industrialized countries reveal considerably greater income inequality for the Latin American nations (see Table II-1).

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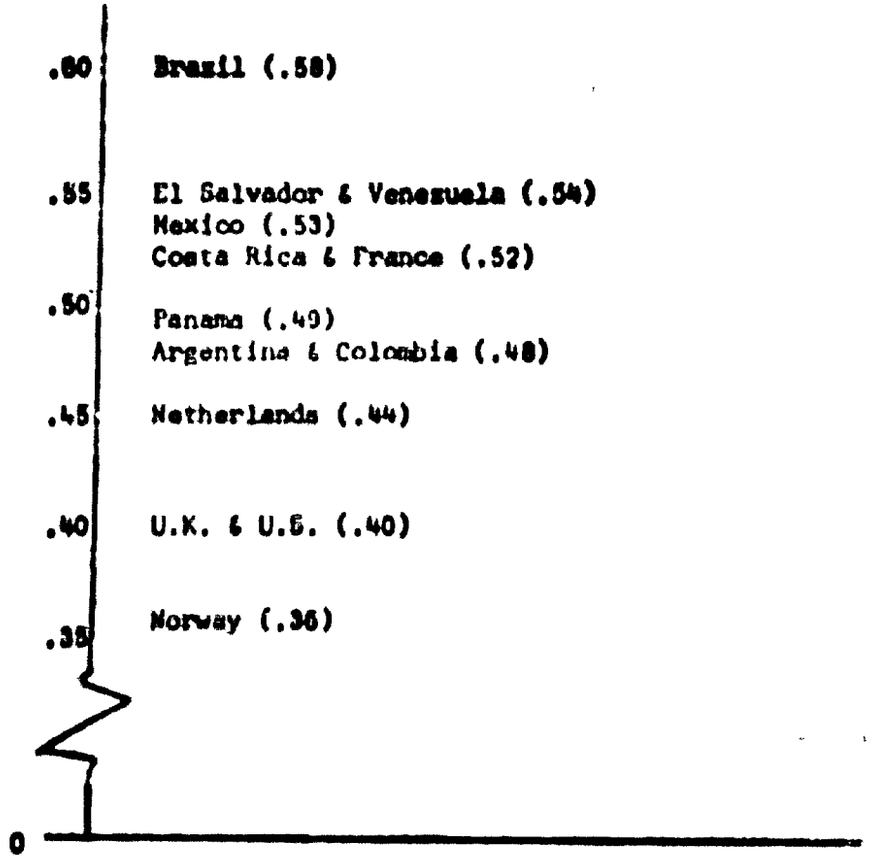
[3] H. S. Houthakker found "similar" elasticities for all countries. "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law", Econometrica, Vol. 25, No. 4, pp. 532-551. (October, 1957).

TABLE II-1

Coefficients of Income Concentration, Selected Latin American and Industrialized Countries



Notes: Coefficients of concentration are based on the formula

$$r = 1 - \frac{\sum_{i=1}^{n} f_i(g_{i-1} + g_i)}{10,000}$$

where n = total number of income groups
i = ordinal number of each group
f = percentage of total population in each income group
g = cumulative percentage of income received

TABLE II-1, continued

Notes (cont.): It is not clear from the source whether or not the Gini Ratios are computed from income data before direct taxes and excluding transfers. In this regard, Kuznets has noted: In that "the burden and progressivity of direct taxes are much greater in developed countries, and since it is in the latter that substantial volumes of free economic assistance are extended to the lower-income groups, a comparison in terms of income net of direct taxes and including government benefits would only accentuate the wider inequality of income distributions in the underdeveloped countries." "Economic Growth and Income Inequality", American Economic Review, Vol. XLV, No. 1, p. 21. March, 1955.

Source: ECLA, Economic Survey of Latin America, 1969, United Nations, New York, 1970. P. 365.

The most distinctive feature of income distribution in Latin America, when contrasted with that of the industrialized countries, is the much larger proportion of total income received by the five percent of the population at the top of the income scale. For the countries of Latin America, this proportion ranges from 25 to 40 percent; for the industrialized nations the range is typically 15 to 25 percent.[4] Although the proportion received by the lowest 20 percent in Latin America does not differ very significantly from that received by corresponding income groups in industrialized countries, "differences in absolute income levels and in the composition of this lowest income group give it a different

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[4] ECLA, op. cit., p. 366. Kuznets found that "the shares of the top ordinal groups are distinctly higher in the underdeveloped than in the developed countries. Thus, the share of the top 5 percent ranges from 30 to 40 percent of total income for underdeveloped, and between 20 and 25 percent for developed countries." Modern Economic Growth: Rate, Structure and Spread, p. 423. Yale University Press, New Haven, 1966.

meaning in Latin America from what it has in the industrialized countries."[5]

Table II-2 presents data on the distribution of income in Latin America for five income groups. The important points to observe are (a) the high proportion of total income, and the absolute and relative level of per capita income, accruing to the top 5 percent; (b) the existence of a sizeable "middle-class", reflected by the fact that the 45 percent of families below the top 5 percent receive 53 percent of total income, and (c) the size of the "lower" and "subsistence" classes, as we might refer to them, and their absolute income levels.

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[5] ECLA, op. cit., p. 365. Referring once again to Kuznets, "the income shares of the larger, low ordinal groups do not show significant differences between the two groups of countries,...the share of the lowest 60 percent of family units is about 30 percent of total income in both the underdeveloped and the developed countries." op. cit., p. 424.

In a 1955 article in the American Economic Review, Kuznets suggested the following explanation of why the proportion of income received by the lower income groups does not differ markedly between developed and underdeveloped countries. Since underdeveloped countries are characterized by low average levels of income, one might infer that the level of income in the lower brackets could not be below a fairly sizeable proportion of average income or the groups could not survive. As an illustration, if we assume that bare subsistence in an underdeveloped country corresponds to 50 percent of the average income level, then the share in total income of the lowest decile could not fall below 5 percent; in developed countries, where average income levels are higher, average income of the lowest decile could be a far smaller fraction of the national average without implying a materially impossible economic situation. Thus, "the lower limit of the proportional share in the secular income structure is higher when the real countryside per capita income is low than when it is high." "Economic Growth and Income Inequality", American Economic Review, Vol. XLV, No. 1, pp. 21-22. March, 1955.

TABLE II-2

Latin America: The Distribution of Income, 1965

Income Groups	Percentage of total income received	Average income (regional average = 100)	Average per capita income ($US)*
lowest 20%	3.1	15.5	60
30% below median	10.3	34.0	130
30% above median	24.1	80.0	310
15% below top 5%	29.2	194.0	750
top 5%	33.4	680.0	2,600

Note: * for 1965, expressed in terms of 1960 dollars.

Source: ECLA, Economic Survey of Latin America, 1969, op. cit. p. III-28.

The fact that only 13.4 percent of total income accrues to the lower 50 percent of all families serves to effectively eliminate this half of the population from all but minimal participation in the market economy. In Colombia, for example, "the domestic market for all but basic consumer goods is largely restricted to the 35 percent of the labor force with annual incomes above 3000 pesos."[6] Weak internal markets,--the consequence of low levels of participation--impede industrial and agricultural expansion and the generation of new and remunerative employment opportunities. Kuznets, upon noting that different consumption patterns characterize nations at different levels of development adds, "since per capita income in the underdeveloped countries is low, most of the output goes into

[6] D. K. Zschock, Manpower Perspectives of Colombia, p. 16. Princeton University, Industrial Relations Section, 1967. Cited in OAS, "The Unemployment Problem in Latin America", p. 14. Washington, D.C., March 3, 1970.

household consumption and most of the latter has to be allocated to foods and other prime necessities that are produced by agriculture and basic manufacturing industries."[7]

For the rural sector, average family incomes lie well below the national average, a fact which is equally true for developed economies.[8] However, disparity in the distribution of rural family incomes in Latin America is far more pronounced, the result of extreme inequality in landholding patterns.

Studies on land tenure and development carried out for seven countries in Latin America by the Interamerican Committee for Agricultural Development (hereinafter referred to as CIDA)[9] indicate that the "modal campesino income is the equivalent of about $300 annually except in the few regions where alternative employment exists or where the tenure structure is unusually good. Cash family incomes are much lower. In the Andean highlands, Brazil's Northeast, and in much of Guatemala cash family incomes are typically far below the equivalent of one hundred dollars annually."[10]

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[7] Modern Economic Growth, op. cit., p. 407.

[8] The differential between rural and urban incomes is discussed in Chapter V.

[9] CIDA is made up of FAO, ECLA, OAS, the Inter-American Institute for Agricultural Sciences and the Inter-American Development Bank. The seven study countries were Argentina, Brazil, Colombia, Chile, Ecuador, Guatemala and Peru.

[10] Solon L. Barraclough and Arthur L. Domike, "Agrarian Structure in Seven Latin American Countries", Land Economics, Vol. XLII, No. 4, p. 405. November, 1966. Reprinted as LTC Reprint No. 25 by the Land Tenure Center, University of Wisconsin-Madison.

Clark has attempted to reconstruct the extent of market participation for a pre-reform Bolivian peasant family of five.[11] In Table II-3 the quantity and value of goods most commonly acquired by such a family in the course of a year is indicated in the columns under 1952.

TABLE II-3

Articles, Quantities and Values of Most Commonly Acquired Goods Among the Bolivian Peasants in the North Highlands, pre-reform (1952) and post-reform (1966)

	1952		1966	
	quantity	value*	quantity	value*
Bartered Articles				
condiments	-	.65	-	.65
cooking grease	3 lbs	.60		
noodles, etc.	15 lbs	1.50		
cooking pots	5	1.65	5	1.65
salt	3 blocks	.75	3 blocks	.75
wool	4 hides with wool	2.70		
other food items in small quantities				2.00
Total value of goods acquired by barter during year:		7.85		5.05

(Continued on page II.9.)

[11] Ronald J. Clark, "Land Reform and Peasant Market Participation on the Northern Highlands of Bolivia", Land Economics, Vol. XLIV, No. 2, pp. 153-172. May, 1968. Reprinted as LTC Reprint No. 42 by the Land Tenure Center, University of Wisconsin-Madison.

TABLE II-3, continued.

	1952		1966	
	quantity	value*	quantity	value*
Purchased Articles				
alcohol	5 quarts	3.50	5 quarts	3.50
soft drinks			20 bottles	1.75
beer			10 bottles	2.50
cooking grease			3 lbs	.60
cooking oil			3 bottles	1.25
fruits & vegetables			various (in season)	2.50
noodles			15 lbs	1.50
bread	30 pieces	1.25	75 pieces	3.15
flour (wheat & corn)			50 lbs	3.40
rice			35 lbs	3.00
sugar	15 lbs	1.25	25 lbs	2.10
coca	10 lbs	4.20	5 lbs	2.10
cigarettes	5 pkgs	.50	20 pkgs	2.00
matches	50 boxes	.86	60 boxes	.95
kerosene	26 bottles	1.10	26 bottles	1.10
cloth of all kinds	10 yards	4.25	15 yards	7.00
dyes	2 lbs	.25	-	.50
shoes			2 pairs	12.50
suits			1	12.50
skirt			1	5.00
sweaters			1	5.50
pants	1 pair	1.50	1 pair	5.00
shirts			2	2.00
hats		4.15	2	8.00
shawls			1	5.00
soap			10 pieces	1.50
Total value of goods acquired by cash during the year:		22.80		95.90
Total value of all goods:		30.65		100.95

Note: * 1966 prices in $U.S.

Source: Clark, op. cit., Tables I & II.

The effect of the pre-reform tenure system, with its personal service obligations and outright prohibitions on what peasants could produce and sell, served to diminish the family's opportunities and capacity for earning a cash income, thus restricting its market praticipation on a cash basis.[12]

With the access to land provided by the agrarian reform, conditions of life for the highland peasant family in Bolivia improved markedly. The columns under 1966 of Table II-3 show the increase in post-reform market participation, and the declining importance of barter transactions. Nevertheless, nearly the entire family income goes for food and clothing leaving "really no surplus income with which to buy the products of infant industries whose growth depends on expanding internal markets."[13]

On the other hand, and taking Chile as an example, the top 3 percent of farm families received 37 percent of total agricultural income in 1960.[14]

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[12] Ibid., p. 160.

[13] Barraclough and Domike, op. cit., p. 405.

[14] Ibid., p. 407. "The conclusion seems inevitable that the seigneurial distribution of income is as antagonistic to economic development in Latin America as it has been in other regions in which large plantations and near-feudal conditions prevail." (p. 406) The authors support this contention by reference to Alfred H. Conrad and John R. Meyer, The Economics of Slavery, and Other Studies in Econometric History, Chicago, Aldine Publishing Co., 1964. "While slavery as an institution appears to have been economically profitable [Conrad and Meyer] concluded that slavery produced an income distribution so skewed that it was difficult to support the mass market necessary for the development of local consumer goods production. 'Seigneurial consumption was not likely to be a substitute for the broad market that could have made it profitable in the South to manufacture consumer goods more sophisticated than the most elemental of subsistence wares,...it is not simply the size but the distribution of income that is crucial for structural change, and it is in respect to the degree of inequality that slavery could have injured the South's early chances for industrialization.'" (fn. p. 406)

Table II-4 presents tentative data for Latin America on aggregate consumption patterns by income class.

An emphasis upon basic wage goods, particularly unprocessed foods, characterizes the consumption of Class I and, to a lesser extent Class II as well. Their strong representation in total demand for petroleum products is probably explained by the heavy use of kerosene as a substitute for electricity in lighting, cooking and, in some cases, heating. Consumption of Classes III and IV dominate throughout Table II-4, with the single exception of unprocessed foods. Between them, these 40 percent of all families account for 84 percent of furniture sales, 93 percent of metal products and machinery, 98 percent of transport equipment, and 83 percent of services. Taken alone, the top 5 percent of families in group IV account for 51 percent of all purchases of metal products and machinery and 56 percent of purchases of transport equipment.

It is essentially through three mechanisms that the distribution of income, through its influence upon consumption patterns, has an impact upon job creation:[15]

1. through the different import content of the expenditures of the rich and poor;
2. through the different labor content of those expenditures, and
3. through the different proprotion of income spent on food.

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[15] ILO, Towards Full Employment, pp. 145-8. A Programme for Colombia, prepared by an inter-agency team organized by the International Labour Office, Geneva, 1970.

TABLE II-4

Latin America: Income Distribution and Aggregate Consumption Patterns

by Income Class

	Income Class			
Income Distribution:	I	II	III	IV
percentage of total population composing group	40	20	35	5
percentage of total personal income received by group	8.8	10.2	49.7	31.3
average personal income per capita, ($US)	77	179	497	2,190
Consumption Patterns:				
percentage of total demand for private consumption of goods and services accounted for by each income class:				
Producing sectors				
unprocessed foods	59	12	26	3
processed foods, beverages, and tobacco	3	15	57	25
clothing and footwear	10	11	53	26
furniture	5	11	69	15
chemical products	7	18	57	18
metal products and machinery	1	3	45	51
transport equipment	-	2	42	56
petroleum products and miscellaneous manufactured goods	26	19	47	8
services	6	11	51	32
importance of the demand of each group as a percentage of total consumption:	10.5	11.5	50.1	27.9

Source: ILPES-CELADE in Marshall Wolfe, "Social Development in Latin America," draft chapter for Report on the World Social Situation, Santiago, 1970. Distributed by Professor William Thiesenhusen in Agricultural Journalism 479, University of Wisconsin-Madison, Fall Semester, 1970.

1. Import Content of Goods

Table II-5 presents data on the ratio of imported to total inputs for selected commodity groupings for Colombia and Peru.

TABLE II-5

Imported Inputs as a Proportion of Total Materials Inputs, Selected Commodity Groupings, Colombia (1964-66) and Peru (1955)

	Imported inputs as a proportion of total inputs	
	Colombia	Peru
unprocessed foods	-	.06
processed foods	.11	.17
beverages	.11	.23
tobacco products	.10	.28
clothing and footwear	.02	.12
furniture and fixtures	.02	.25
metal products	.43	
machinery (non-electrical)	.35	.45
electrical machinery and appliances	.53	
transport equipment	.59	

Source: Colombia: ILO, Towards Full Employment, op. cit. Table 19.

Peru: UN, ECLA, Analysis and Projections of Economic Development. VI. The Industrial Development of Peru, Mexico, D.F. December 1959. Table 174.

The table reveals quite vividly the difference in import content between the basic wage goods--food, clothing, furniture--and the more durable consumer goods which make up a large proportion of total outlays for the upper classes. Import content for domestically produced consumer durables ranges between 35 and 60 percent for the two countries considered. It should be noted, however, that to the extent that domestic inputs may

themselves have an import content, the figures of Table II-5 tend to underestate actual import content of domestic output.[16]

Many of the purchases of consumer durables, especially in the smaller countries, represent imports in finished form. In Chile, for example, nearly 20 percent of expenditures on consumer durables in recent years corresponds to imports, down from 30 percent a decade earlier.[17]

The tendency on the part of upper classes to consume imported goods and goods which embody a high proportion of imported inputs denies to the domestic economy the income and employment generating benefits of these expenditures. For some upper-class consumers, participation in foreign markets may actually exceed that in the domestic market. To the extent that such imports compete for scarce foreign exchange resources, they tend to reduce in direct proportion the nation's ability to import the capital goods and intermediate inputs which are necessary to expand the domestic productive base and thereby employment. Thus, the greater is the degree of income inequality, the greater will be the loss in domestic employment generation as a consequence of import leakages from consumer expenditures.

2. Labor Content of Goods

Due to the fact that the production of light manufactures tends to be labor-intensive while heavy manufactures characteristically use a higher proportion of capital and materials inputs, a given amount of

[16] Ibid., p. 147.

[17] Oscar Munoz G., "Crecimiento Industrial, Estructura del Consumo y Distribucion del Ingreso", p. 12. Estudios de Planificacion, Documento No. 8, Universidad Catolica de Chile, Centro de Estudios de Planificacion Nacional, April, 1971.

income spent on wage goods in a developing economy will generate more employment opportunities than if spent on consumer durables. Put differently, the expenditures of the poor generate more employment than the expenditures of the rich, suggesting that a redistribution of income in favor of the lower classes would exert an expansive influence upon the level of domestic employment, particularly of unskilled and semi-skilled labor.

In a recent paper,[18] OAS economists attempted to explore the impact upon employment of a redistribution of income. Their approach consisted of grouping entire sectors into a labor-intensive category (agriculture, artisan industry, construction and non-basic services) and a "less labor-intensive" category (extractive activities, factory industry and basic services) and then studying the impact upon employment and output of a ten percent increase in the output of the labor-intensive sectors taken at the expense of the "less labor-intensive" sectors, that is, assuming total value of output remains constant. The shift in the composition of output resulted in a 6.1 percent increase in employment.[19]

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[18] OAS, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies", Washington, D.C., August 19, 1971.

[19] Ibid., pp. 46-48. The study uses aggregate data for employment and output in Latin America in 1960:

	labor-intensive	"less labor-intensive"	Total
output ($US,000,000)	47,153	22,947	70,100
employment (000)	54,757	8,109	62,866
output: labor ratio	860/wkr	2,830/wkr	

The 10% increase in the output of the labor-intensive sectors will increase employment in those sectors by 10% or by 5,475,700. The increase in labor-intensive output of $4,715,300,000 represents a reduction of an equal amount in "less labor-intensive" output which, applying an output:labor ratio of $2,830/worker, corresponds to a decline in employment in these latter sectors of 1,670,000. The net increase in employment of 3,810,000 represents a gain of 6.06%.

To determine the nature of the income redistribution required to bring about this change in the structure of final demand the OAS economists considered several approaches. It was calculated, for example, that such a restructuring of demand could be caused by a relative price change of 33 percent between the products of the two broad groupings.[20] If the relative price change was effected through a tax on the output of the "less labor-intensive" sectors, or a subsidy for labor-intensive output, the tax or subsidy would amount to 13 percent of GNP.[21] Alternatively, a transfer of income from high to low income groups such that the share of the former declines from 43 to 20 percent of national income would be required.[22]

The exercise seems to reveal, more than anything else, the magnitude of the income redistribution necessary for a moderate gain in net employment. The policy implications for income redistribution, either through adjusting relative prices or outright transfers between rich and poor,

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[20] Ibid., p. 47. The calculation assumes a unitary elasticity of substitution in demand between sectors. The greater likelihood, however, is that the elasticities will be smaller, necessitating a larger relative price change to bring about the demand shift.

A more fruitful approach, also suggested by the Study, would be to stimulate "demand within given lines of activity within sectors, as distinct from trying to [shift] demand between broad sectors." This approach relies on the presumption that elasticity of substitution within sectors is greater than that between sectors. Substitution in consumption between wood and metal furniture, hand- and machine-made shoes, capital- and labor-intensive agricultural products is greater than that between wood furniture and petroleum products or hand-made shoes and refrigerators. (p. 49)

[21] Ibid., p. 47.

[22] Ibid., pp. 47-48. It is assumed that the upper income group spends 50% of its income in each sector grouping, while the lower income group spends about 80% of its income on labor-intensively produced goods.

are clearly more than most nations would be willing to consider.

We do not want to imply that light consumer goods could not be manufactured by more capital-intensive processes; in many countries, in fact, a variety of productive processes, ranging from the most modern to extremely traditional, characterizes their production. However, the wage goods industries provide at least the opportunity to choose among alternative productive techniques, using varying amounts of labor inputs; as we will see later, this is far less true of many of the industries producing the more sophisticated consumer durables which characterize the expenditure patterns of the upper classes.

3. Expenditures for Food

Engel's Law assures us that as household income increases, the proportion spent on foodstuffs will decline. It would follow therefore that a redistribution of income in favor of the lower classes would serve to transfer purchasing power into the hands of consumers whose marginal propensity to consume foodstuffs is quite high.

Within the context of a strategy for employment creation there are several reasons for seeking to increase the demand for food. First, food production (under a smallholding agriculture) requires a significant input of relatively unskilled labor; it also tends to make little use of conventional forms of capital, particularly imported capital inputs. Second, food production provides inputs for agricultural processing industries and other light manufacturing, thus forming a link between these activities and minimizing the "leakage" due to imports. Furthermore, light manufactures, as we noted earlier, are suitable for labor-intensive

production. In addition, they provide many of the wage goods demanded by the laboring classes.

The FAO "Indicative World Plan" (IWP) for South America regards the demand for food as an important constraint upon rural development and identifies the region's unequal distribution of income as a major contributory factor.[23] The Study found "the demand for food...to be quite sensitive to even moderate proposals to step up consumption by the poorer half of the...population at the expense of a lower rate of consumption by the more fortunate half....[suggesting] that measures which favor the poor specifically are probably the most effective way of removing demand constraints on growth of the agricultural sector, and therefore on potential growth of rural employment."[24]

As the income of households at the bottom of the income scale increases and average expenditures for food decline, a shift in food consumption habits takes place. Items higher on the food chain such as meat and dairy products systematically replace grains and starchy foods; consumption of processed foods is also increased. Table II-6 presents estimates of the arc income elasticity of demand for selected food items in the city of Cali, Colombia. The data indicate the increasing importance of meat, eggs and milk, as well as canned goods, with increasing incomes; lard is identified as an "inferior good".

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[23] Cited in Shlomo Reutlinger, et. al., "Agricultural Development in Relation to the Employment Problem", Economic Staff Working Paper No. 112, p. B-4. IBRD, Washington, D.C., May 25, 1971.

[24] *Ibid.*, p. B-4.

TABLE II-6

Income, Food Expenditures and Estimates of Arc Income Elasticity

for Selected Food Items, Cali, Colombia, 1969

	Family per capita income (Colombian pesos)*			
	$0-125	$125-240	$240-500	over $500
Average monthly income	91.	177.	340.	1064.
Average monthly food expenditures	75.	112.	161.	294.
Food expenditures as a percentage of income	82	63	47	28
Food Items:	Arc elasticities between income groups			
beef	.76	.56	.43	
pork	1.19	1.20	.78	
chicken	1.70	1.76	1.22	
eggs	1.31	.34	.81	
milk	1.32	.90	.42	
rice	.48	.27	.05	
beans	.23	.19	.19	
corn	.08	.13	-.28	
potatoes	.09	-.05	.35	
yuca	.29	.16	.18	
stem onion	.26	.22	.23	
tomato	.75	-.16	.99	
bananas (cooking and eating)	.45	.12	.41	
cabbage	.90	-.08	.28	
oranges	.64	1.09	1.01	
lard	-.14	-.32	-.44	
oil	1.81	.99	.57	
pan-sugar	.15	.00	.07	
sugar	.24	.20	.62	
bread	.19	1.03	.32	
canned goods	3.12	2.30	1.52	

Notes: Income and expenditure data are based upon a random survey of 629 families carried out in February, 1969, in Cali by the Proyecto Integrado de Mercadeo Urbano-Rural (PINUR).

*The official exchange rate between the Colombian peso and the U.S. dollar was 16.90 to 1 in February, 1969.

TABLE II-6, continued.

Notes: Households with low per capita income have larger average family sizes, which in part explains the low per capita income.

	$0 -125	$125-240	$240-500	$500-over
Aver. no. of persons per household	8.0	6.6	5.6	5.5

Some unexplained anomalies exist in the data, particularly for the consumption of potatoes, tomatoes and cabbages between families in the second and third income quartiles. These may reflect unusual consumption patterns but more likely they are the result of problems in data collection.

Despite the high elasticities for canned goods, they are not a very important item in the consumption of any of the income groups. As a percent of total expenditures for food, canned goods ranges from 0.3 percent for the lowest group to about 3% for the highest.

Source: Harold Riley, et. al., Market Coordination in the Development of the Cauca Valley Region-Colombia, Marketing in Developing Communities Series, Research Report No. 5, Latin American Studies Center, Michigan State University, East Lansing, 1970.

The significance upon agricultural employment of the changing consumption pattern for foodstuffs with changing income represents a key area for agricultural policy for, as we will show later, the way in which the demand for food is met has an important bearing upon labor needs in agriculture.

Problems related to rural out-migration and urbanization provide a third reason for seeking to increase the demand for agricultural production. If agricultural output is expanded in such a way as to maximize income and employment for the rural population, improvements in rural living levels implied by the increased income and employment can provide

a check upon migration to urban areas. As we will argue later, a reorganization of agriculture along lines of small family farms may be the necessary condition for minimizing the outflow of agricultural workers.

B. Income Distribution, Savings and Investment

It has long been a classical tradition to view both savings and investment as activities peculiar to the capitalist class,--the top ten percent whose income is derived from profits and rents. Lewis, in his famous essay "Economic Development with Unlimited Supplies of Labour", defines the "central fact of economic development" as the "process by which a community which was previously saving and investing 4 or 5 percent of its national income or less, converts itself into an economy where voluntary savings is running at about 12 to 15 percent of national income or more."[25] This process he attributes not to increased thrift on the part of the saving class, but rather to increased inequality in income distribution;--"saving increases relatively to the national income because the incomes of the savers increase relatively to the national income. The central fact of economic development is that the distribution of incomes is altered in favour of the saving class."[26] Thus, he continues, "If we are interested in savings, we must concentrate attention upon

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[25] Reprinted in A. N. Agarwala and S. P. Singh, The Economics of Underdevelopment, p. 416. Oxford University Press, New York, 1963.
Lewis continues, "we cannot explain any 'industrial' revolution ...until we can explain why saving increased relatively to national income."

[26] Ibid., p. 417.

profits and rents."[27]

While it appears to be generally true, even for developed countries, that the upper income groups hold the potential for the substantial savings[28] from which a nation's capital stock may be enlarged and its productive capacity expanded, there is no guarantee that such savings will either materialize or find their way into the productive and employment-creating forms of investment required for a nation's development. In fact, past performance in Latin America suggests that this simply does not occur. Instead, much of the potential savings are dissipated in the consumption of luxury items imported from the developed countries, foreign travel, foreign savings accounts and other forms of foreign investment, and domestic real estate.

In the present section we want to consider the classical belief that savings depend functionally upon the level of profits in national income, as well as the relationship between savings and investment.

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[27] Ibid., p. 417. Lewis assumes, as did the eighteenth century British economists, that the landlord class in underdeveloped countries is more given to "prodigal consumption" than is the capitalist class,--that "group of men who think in terms of investing capital productively." Thus, "given two countries of equal incomes, in which distribution is more unequal in one than in the other, savings may be greater where distribution is more equal if profits are higher relatively to rents. It is the inequality which goes with profits that favours capital formation, and not the inequality which goes with rents." (pp. 419-20)

[28] Kuznets notes, "According to all recent studies of the apportionment of income between consumption and savings, only the upper-income groups save; the total savings of groups below the top decile are fairly close to zero. For example, the top 5 percent of the units in the United States appear to account for almost two-thirds of individuals' savings; and the top decile comes close to accounting for all of it." "Economic Growth and Income Inequality", op. cit., p. 7.

Modern economics treats the equality of savings and investment as an accounting identity. Classical economics, on the other hand, tends to treat savings and investment as two sides of the same coin, both typically performed by the same enterprising individual. In consequence there is a tendency on the part of development planners schooled in the classical tradition to assume that profits beget investment,...as distinct from the more modern notion that the prospect of profits induces investment.[29]

The growth and sophistication of financial institutions, government taxation, and foreign investment, however, provides for a new reality, although one which, according to Hla Myint, many economists are slow to accept:[30]

> "there is now a greater recognition of the fact that a developing country's ability to save does not depend only on the level of its average national income but also on other factors such as the pattern of income distribution, the ability of the government to mobilize savings through taxation and the ability of the financial institutions making up the capital market to mobilize private savings. Many economists still work on the basis that the chief source of private savings in the underdeveloped countries is the ploughing-back of profits; that is to say, only the capitalists save and the landlords do not... ."

Table II-7 presents data on the structure of gross savings for selected Latin American countries. The data point up the importance in gross savings of the public sector, external financing, and, as is true for developed countries as well, depreciation and retained corporate earnings.

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[29] Lewis notes in his essay, op. cit., "Malthus persisted; why should the capitalists produce more capital to produce a larger surplus which could only be used for producing still more capital and so ad infinitum? To this Marx supplied one answer: capitalists have a passion for accumulating capital." p. 414.

[30] The Economics of the Developing Countries, p. 99. Praeger, New York, 1969.

TABLE II-7

Latin America: Structure of Gross Savings in Selected Groups of Countries

(Percentages for selected years, 1964-1967)

	Public			Private			National	External
	Total	Government	Government Enterprises	Total	House hold	Enter-prises		
Group I								
Argentina	18.0	16.1	2.0	82.0			100.0	-6.5
Brazil		2.8		97.2**			100.0	-3.0
Mexico	28.4	18.8	9.6	71.6			100.0	11.7
Group II								
Chile		37.8	...	63.2	-11.6	73.8*	100.0	5.4
Colombia		24.0		76.0	6.8	69.2*	100.0	9.2
Peru								
Group III								
Costa Rica		11.8		88.2	36.7	51.5*	100.0	34.9
Ecuador	47.4	...		52.6	...		100.0***	19.7
El Salvador	21.2	16.6	4.6	78.8			100.0	34.3

Notes: * public and private enterprises.
** public and private enterprises and household savings.
*** the breakdown of depreciation is as follows: 20 percent for public and 80 percent for private enterprises.

Source: ECLA, "Mobilization of Domestic Resources", Economic Bulletin for Latin America, Vol. XV, No. 2, Table 12 (second half of 1970).

Although the potential for savings increases greatly with economic growth, the level of actual savings may fall far below this potential. In the changeover to an industrialized society, ever-increasing financial resources are needed to enable the system to operate and expand. "As the number of intermediate steps and stages between the production of primary commodities and that of finished goods increases, the coefficient of direct and indirect financial requirements per unit of end products automatically rises with it."[31]

Time deposits, which have increased appreciably in several countries of Latin America,[32] and corporate savings are frequently diverted to the current operational demands of industry, of the consumer credit needs required to move higher priced consumer durables whose market would otherwise be severely circumscribed by generally low levels of income. Failing an effective "cash" market for the domestic manufacture of heavy consumer durables--autos, refrigerators, TV's--"the expansion of the higher-priced consumer durables market tends to depend almost entirely on the extension of greater financial facilities and the expansion of the monetary resources needed to provide them."[33] Thus, to the extent that savings and other

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[31] ECLA, "Mobilization of Domestic Resources", Economic Bulletin for Latin America, Vol. XV, No. 2, pp. 119-20. (second half of 1970).

[32] Accessibility to financial institutions has been a limiting factor in reducing the level of personal savings of the non-metropolitan population. In Peru, for example, between 1955 and 1965 the number of savings accounts increased from 830,000 to 2.1 million, in direct proportion to the number of banking establishments serving the public. Accounts with a minimum balance (less than $US.12.) account for three-fourths of all accounts opened in the period 1955-65 and in 1965 numbered almost a million more than in 1955, revealing that "the more modest sectors of the population have increased their participation in savings transactions." Ibid., p. 134.

[33] Ibid., p. 119.

financial resources become absorbed by these types of expenditures they are not available for more productive, job-creating forms of capital formation.

However, a high rate of capital formation, in itself, is not sufficient to guarantee a rapid rate of growth, ...at least not in the short run. This is made apparent by the ECLA data presented in Table II-8 which contrasts gross fixed capital formation as a percentage of GDP with the annual growth rate of GDP for selected countries of Latin America.

Despite the seeming inconsistencies between growth rates and the level of capital formation, there is still reason for believing that, over the medium- and long-run high and sustained rates of economic growth require high levels of investment. However, the data of Table II-8 do seem to indicate that "although substantial capital formation is a precondition for attaining satisfactory production growth rates,...by itself it is not enough."[34]

The translation of potential savings into productive forms of investment, within the context of a free enterprise society, depends upon the potential investor's perception of profitability. Nurkse posed the question as a variant of Adam Smith's famous thesis about the division of labor, --"the inducement to invest is limited by the size of the market."[35]

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[34] Ibid., p. 95. The more important factors affecting the relationship between rates of investment and economic growth are (1) the prevailing economic situation, (2) the existing infrastructure, and (3) the sectoral or industrial composition of investment. For a discussion of these points, see Ibid., pp. 95-96, and United Nations, World Economic Survey, 1959.

[35] Problems of Capital Formation in Underdeveloped Countries, p. 6. Oxford University Press, New York, 1967.

TABLE II-8

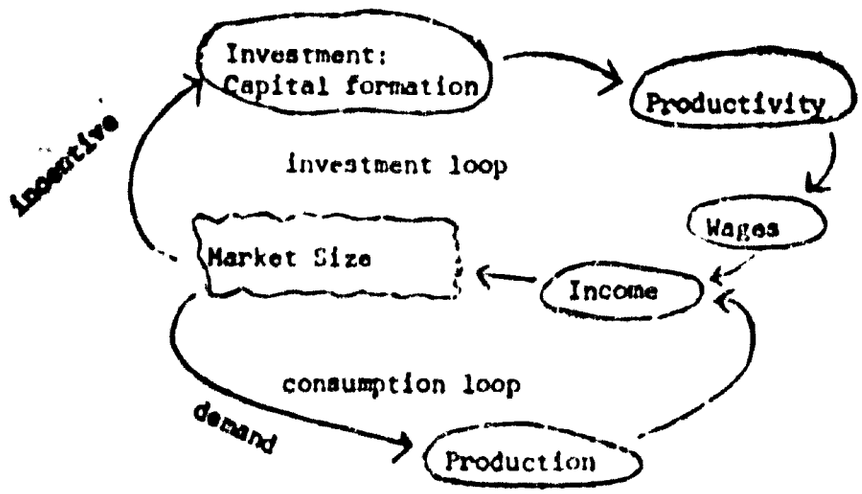
Latin America: Growth Rate of Gross Domestic Product and Investment Coefficients; Selected Countries, 1950-67

	1950-1959		1960-1967	
	Annual Growth Rate of GDP	Gross Fixed Capital Formation as a Percent of GDP	Annual Growth Rate of GDP	Gross Fixed Capital Formation as a Percent of GDP
Group I				
Argentina	2.7	17.2	2.1	19.6
Brazil	5.0	16.1	3.5	14.1
Mexico	5.3	14.4	5.5	15.7
Group II				
Chile	2.9	14.2	4.3	16.4
Colombia	4.1	20.3	3.9	16.9
Peru	3.9	20.8	5.1	22.5
Group III				
Cost Rica	5.6	17.5	5.7	17.7
Ecuador	4.3	11.4	4.1	12.5
El Salvador	-	-	5.4	13.8
Latin America	-	-	3.8	16.2

Source: ECLA, "Mobilization of Domestic Resources", Op. cit., Table 1.

In Nurkse's scheme of things, market size--measured in terms of effective consumer demand--occupies center stage. Market size determines not only capital intensity and hence labor's productivity, but the total volume of production as well. Since "production creates its own demand, ...the size of the market depends on the volume of production."[36]

Nurkse's Vicious Circle of Poverty



Based on Nurkse, op. cit., pp. 4-11.

Nurkse, quite obviously, subscribed to the classic Law, which he maintained was valid in developing countries in a global or economy-wide sense and assuming no leakages.[37] However, he recognized a "constellation of circumstances tending to preserve any backward

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[36] Ibid., p. 9.

[37] "Even though in economically backward areas Say's Law may be valid in the sense that there is no deflationary gap, it never is valid in the sense that the output of any single industry, newly set up with capital equipment, can create its own demand." Ibid., p. 9.

economy in a stationary state, in a state of 'underdevelopment equilibrium', ...automatic forces within the system tending to keep it moored to a given level."[38] The development riddle thus consisted of upsetting this equilibrium in such a way as to impart to the system a process of "circular advance".[39]

For Nurkse, the solution lay in "balanced growth", that is, "a more or less synchronized application of capital to a wide range of different industries [resulting in] an over-all enlargement of the market. People working with more and better tools in a number of complementary projects become each others' customers."[40]

Implicit in Nurkse's doctrine of "balanced growth" is the inverse correlation between economic growth and income inequality, for if the new output of the complementary projects is to be consumed by the workers on these projects, the workers must also receive the bulk of the new purchasing power.[41] Were it otherwise, that is, were the new purchasing power distributed on the basis of existing income patterns, the mass markets necessary to support the new industrial capability would fail to materialize.

Mass markets cannot be founded upon the demand of a small upper class since as incomes rise, "expenditures tend to be more diversified rather than to involve larger purchases of the same items."[42] Highly

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[38] Ibid., p. 10.

[39] Ibid., p. 11.

[40] Ibid., p. 11.

[41] W. Paul Strassmann, "Economic Growth and Income Distribution", Quarterly Journal of Economics, Vol. LXX, No. 3, p. 426. August, 1956.

[42] ECLA, Economic Survey of Latin America, 1969, part III, p. III-17. Special Studies, ECLA Committee of the Whole, fifth Extraordinary Session, New York, 4-6 May, 1970.

skewed patterns of income distribution, as characterize the economies of Latin America, seldom provide the conditions necessary for a cumulative (or simultaneous) investment boom. Instead, workers may be drawn away from the industries producing for the masses as a consequence of a lack of effective demand and into those areas producing luxury items and providing personal services for the small upper class.

Studies of the size distribution of income in underdeveloped countries reveal that only a small group in these countries "commands an income and can afford a standard of living equal to that of the vast majority of the population in the developed countries."[43] If these high income groups were to act in such a way "as to maximize the country's economic growth, the observed inequality may be a more efficient distribution system than a more egalitarian alternative. But the 'if' is important; and the contribution of the top groups in the income pyramid must be weighed against the potential increase in the contribution of the groups below the top that might result from narrower inequality in the income distribution."[44]

Were these top groups "wealth-investing puritans", acting for the greater good of society, inequality in the distribution of income might be associated with only moderate consumption inequality, with essentially only political and social significance. In such a case the "wealth-

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[43] Simon Kuznets, Modern Economic Growth, op. cit., p. 425. "If such income or standard of living is in some way indispensable for the productive performance required by modern economic growth, the smallness of the group in underdeveloped countries with such an income minimum poses grave difficulties.".

[44] Ibid., pp. 425-6.

investing puritans could be regarded as a distinguished caste of tax-collectors, charged with maintenance and growth of a community's capital stock," their high incomes tolerated by the community in anticipation of increased productivity and consumption for all.[45]

The reality in Latin America, and in contemporary western society generally, however, is something else. The prestige of individual 'tax-collectors' originates far more with the amount of taxes collected (income earned) than from the number of productive plants established or jobs created. In this case, tolerance by the community of their high levels of income and consumption derives from the force of law.

That investment and industrialization relies upon growing equality in consumption seems quite logical; not surprisingly, however, the proposition is difficult to document. Using data developed by Kuznets for the United States, Strassmann demonstrates, at the very least, that increased capital formation is not antithetical to growing income and consumption equality.[46]

> "In the United States the rate of capital formation was highest during the years 1884-1898 when, due to the lag in the secular decline of wages behind prices, income appears to have been more evenly distributed than at other times between 1869 and 1914. In these years the rate of capital formation reached 16.1-16.2 percent of national income. The rate of capital formation remained above 13.0 percent throughout the period 1869-1918, but fell to 10.2 percent for the decade 1920-1929. During this decade the incomes of the top 5 percent of spending units

[45] Strassmann, op. cit., p. 431. "As long as the consumption of the wealth-investors does not rise faster than average consumption, the investors cannot be accused of taking unfair advantage of their privileges, or diverting taxes for capital formation to their own amusements." (431)

[46] Ibid., p. 433.

increased by 29 percent, while the lower 95 percent lost 4 percent. From 1929 to the years after World War II (average of 1944, 1946, 1947 and 1950), the share of national income before direct taxes of the top 5 percent fell from 31 percent to 20 percent."

Data from England and Germany also suggest a secular improvement in the relative distribution of income, "with these trends particularly noticeable since the 1920's but beginning perhaps in the period before the first world war."[47]

Oshima has shown for Japan and Taiwan how increased income equality--essentially higher farm incomes--by reducing dissavings, stimulated considerably the growth of capital formation.[48] In 1926-27 about two-thirds of Japanese farm families evidenced some dissaving. By 1963, however, "after land reform and the rapid rise in agricultural productivity (and nonfarm side income), nearly all brackets of farm families showed positive savings."[49] Over the same period private fixed investment as a percentage of GNP nearly tripled, increasing from 8-9 percent in 1926-36 to 23 percent during the period 1960-65.[50] Similar results are suggested by the data from Taiwan.

In contrast, in the Philippines and Ceylon, where land reform has not been instituted and farm incomes average a half to two-thirds of the non-farm level, about 75 percent of farm families appear to have some dissavings.[51]

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[47] Kuznets, "Economic Growth and Income Inequality", op. cit., p. 4.

[48] "Labor-Force 'Explosion' and the Labor-Intensive Sector in Asian Growth", Economic Development and Cultural Change, Vol. 19, No. 2, pp. 161-183. January, 1971.

[49] Ibid., p. 174.

[50] Ibid., p. 174.

[51] Ibid., p. 174.

According to Paul Baran, "the understanding of the factors responsible for the size and mode of utilization of the economic surplus is one of the foremost tasks of a theory of economic development."[52] Economic systems differ essentially in the manner in which the surplus is appropriated in the process of expanding the capital stock and enlarging productive capacity.

In a free enterprise economy the rationalization for inequality in income distribution and the right of the entrepreneur to generous profits lies in the belief--which we would now suggest has more often been only a hope--that such profits will be re-invested, further expanding the nation's productive capacity, output and employment. As we have seen above, however, income inequality cuts two ways; --while it may provide the potential for further investment, it also inhibits the growth of mass markets and thereby precludes the need for further investment in productive capacity.[53]

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[52] The Political Economy of Growth, p. 21. Monthly Review, New York, 1957. Modern Reader paperback edition, 1968.

[53] It is precisely this belief that profits will be re-invested--the assumption of a high propensity to save and invest on the part of entrepreneurs (coupled often with an assumption that the wage bill is entirely consumed)--which enables mathematical economists to "prove" that a maximum rate of employment creation is incompatible with maximum growth since the latter is a function of the economic surplus which, by assumption, can come only from profits. See, for example, A. K. Sen, Choice of Techniques, Basil Blackwell, Oxford, 1962. "Provisional assumption" number 7 of Sen's "Simple Model" is "(7) the wage bill is entirely consumed and the surplus entirely invested." Ibid., p. 22.

Such "simple" models, as their authors often purport them to be, cannot accommodate the less extreme but more meaningful assumptions of economic reality without becoming unwieldy, thus losing their usefulness as models. Stuart Bruchey has argued that the more rigorous a model becomes, the higher its degree of technical success may be, but the greater its inability to explain economic development. The Roots of American Economic Growth, pp. 8-11.

The defense of private profitability also stems from an ingrained tradition among western economists to link together the concepts of private enterprise and democracy to such an extent that it is often difficult to conceive of the one without the other. This type of reasoning is often compounded by the further tendency to confuse freedom of private entrepreneurial decision with political freedom, and the belief that what is best for business is best for the state,--a clear carryover from the Laissez faire doctrine whereby the individual entrepreneur, "by pursuing his own interest...frequently promotes that of the society more effectually than when he really intends to promote it."[54]

Von Hayek, for example, in The Road to Serfdom, warns of the encroachment of socialism in the United States:[55]

> "We have progressively abandoned that freedom in economic affairs without which personal and political freedom has never existed in the past. Although we had been warned by some of the greatest political thinkers of the nineteenth century, by De Tocqueville and Lord Acton, that socialism means slavery, we have steadily moved in the direction of socialism."

Socialist society aims to correct the wastefulness of capitalism--the "underemployment equilibrium" which Keynes identified, the tendency towards overproduction identified by Marx over a hundred years ago, and

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[54] Adam Smith, The Wealth of Nations, p. 423. Modern Library Edition, Random House, New York, 1937.

[55] Friedrich A. Hayek, The Road to Serfdom, University of Chicago Press, Chicago, 1944. Hayek quotes many authors on the subject; Hilaire Belloc (The Servile State, 1913) for example, remarks: "the effect of Socialist doctrine on Capitalist society is to produce a third thing different from either of its two begetters--to wit, the Servile State"; and W. H. Chamberlin (A False Utopia, 1937) notes: "Socialism achieved and maintained by democratic means seems definitely to belong to the world of utopias." (pp. 13 & 28)

the declining attractiveness of investment opportunities for plowing back profits into the system.[56]

In many parts of the developing world, socialist societies are striving to secure for their citizens a more equal share of their nation's growing product by means of a highly regimented economic system. What one does in such a system is dictated by the state and determined by the needs of society. Thus, surplus labor need not be lost to the community, but can be readily employed on infrastructural projects. What one is paid has little bearing to marginal productivity but is presumably determined by the individual's needs. The possibilities for increasing social welfare under such a system are substantial.

Due to high levels of unemployment, industrialization in Latin America has led to increasing maldistribution of income. Despite impressive gains in economic growth and per capita income which the aggregate data reveal, income inequality is growing and the needs for increased social welfare are not being met. Economic growth allows for the possibility of sharing the increased output; economic development, however, implies more than the possibility of sharing; it requires sharing.[57]

Sharing, however, need not mean leveling. Instead it should mean a concern on the part of the upper classes,--or the state--for the rights of all individuals to some form of productive and remunerative employment. If societies functioning as free enterprise economies are unable to provide a minimal level of employment which is acceptable to its citizens,

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[56] Baran, op. cit., pp. 85-86.

[57] Eric B. Shearer, "The Case Against Indiscriminate Capital Intensity of Investment in Overpopulated Developing Countries", Indian Journal of Economics, Vol. XLVI, Part II, No. 181, p. 136. October, 1965.

it seems only likely that those citizens will seek to adopt other forms of organization better suited to their collective economic and social needs.

The example of Mainland China, in particular, is being watched closely by the developing world for the lessons it may provide in dealing with growing unemployment and income inequality. Despite the cost in human values of which statesmen, philosophers and social scientists warn, the developing nations may yet seek to emulate the Chinese model in the belief, as Eric Shearer puts it, "that they have nothing to lose but the value of their marginal product."[58]

C. Conclusion

We have attempted to identify several of the links between inequality in income distribution and low levels of employment. As in many of the vicious circles of poverty, however, it is not clear what the causal sequence is, ...whether from income inequality to low levels of employment, or from low levels of employment to income inequality. Certainly from the individual's point of view employment is the guarantee of access to the stream of income. But from the point of view of society, that is, viewing low levels of employment as an institutional problem, as we have been arguing, the causal sequence appears to run from income inequality, --through a structure of demand which fails to make maximum use of domestic human resources--to low levels of employment generation. The ILO employ--ment study for Colombia notes:

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[58] Ibid., p. 137.

> "...it is hard for us to envisage a fall in the proportion of the population which is unemployed or a real reduction in poverty without policies being adopted which shift the income distribution, both soon and decisively, towards those who would spend it on the goods which can be produced in Colombia."[59]

However, simply taking money from the rich and transferring it to the poor does not provide a viable long-run solution to the problem of low incomes and low levels of employment. The long-run solution requires the establishment of permanent access to the stream of income for the entire work force. The means of acquiring such access is through remunerative and secure employment. But jobs cannot be fabricated out of nothing; labor is rarely demanded as a final product, but rather for the sake of the output of which it is capable of producing. With the important exception of subsistence agriculture, jobs must follow the demand for goods and services.

The policies which can resolve the unemployment problems of developed countries are usually inappropriate to those same needs in the developing countries. For the former--characterized by a highly monetized economy, factor mobility, and a large federal budget--unemployment is usually the consequence of a temporary demand insufficiency in the presence of idle industrial capacity. Stimulating demand exogenously may be both economically feasible and within the capabilities of the central government. For the developing countries, however, unemployment is chronic, ...nor can their economies marshall the resources necessary to stimulate the cumulative demand expansion which results in full employment.

Within the context of economic development, income redistribution

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[59] Towards Full Employment, op. cit., p. 151.

is more in the nature of an "end", the means to which is remunerative and secure employment for the entire workforce. In rural areas, where considerable slack exists in the amount of labor which could be combined with the land resource, agrarian reform must represent the basis for increased employment. Thiesenhusen has argued for a re-invigoration of the light manufacturing sector in Latin America through incorporation of the landless into the market economy, largely by means of agrarian reform.[60] The income redistribution implied by such a reform would place a permanent stream of purchasing power at that point in the economy where it would have maximum impact upon income and employment generation.

In the section on savings and investment we have considered the classical proposition that an increase in savings and investment depends upon profits increasing its share of national income. This proposition appears to us fallacious on two major counts. First, evidence in support of it is completely lacking. ECLA, for example, has reported for Latin America that studies on the relationship between "concentration of income and ...savings coefficients ...seem to afford no statistical evidence of a definite correlation between the two variables."[61] Second, if the classical proposition were true, the increase in the porportion of profits in national income necessary to bring about an increase in savings would, at the same time, serve to further circumscribe the size of the market, thereby dampening the incentive to invest.

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[60] William C. Thiesenhusen, "A Suggested Policy for Industrial Reinvigoration in Latin America", LTC no. 72, Land Tenure Center, University of Wisconsin, Madison, September, 1970.

[61] ECLA, "Income Distribution in Latin America", Economic Bulletin for Latin America, Vol. XII, No. 2, p. 59. October, 1967.

According to the OAS study cited earlier, "the road to full employment...lies in the adoption of policies that result in the development of broad internal markets in which the great masses of Latin Americans can actively participate."[62] ECLA has estimated, however, that for 95 percent of Latin American families, per capita expenditures for manufactured items other than food average only about $50 annually.[63] Insofar as remunerative and secure employment represents the basis for access to the nation's income stream and consequently the key to market participation, a broad policy of employment generation would appear to be the only viable solution to the vicious circle of low incomes and low levels of employment.

True, we are making the obvious assertion that job creation is the solution to the unemployment problem, but not in the Keynesian sense of overcoming a temporary demand insufficiency. We are arguing instead that Latin America's problem of chronic demand insufficiency has resulted from the mass of the population being prevented from participating in national markets by low levels of income, and that the process of increasing the level of market participation,--which in turn will lead to increased demand for output and more jobs--must begin with a national commitment to increasing employment opportunities.

In concluding the present chapter we might do well by quoting the remarks made by Simon Kuznets in closing his Presidential Address to the American Economics Association in late 1954:[64]

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[62]"Employment and Growth...," op. cit., p. 34.

[63]Cited in Thiesenhusen, op. cit., p. 8. For the upper 5% of families, per capita expenditures on manufactured goods average $820.

[64]"Economic Growth and Income Inequality," op. cit., pp. 25-26.

"There is danger in simple analogies; in arguing that because an unequal income distribution in Western Europe in the past led to accumulation of savings and financing of basic capital formation, the preservation or accentuation of present income inequalities in the underdeveloped countries is necessary to secure the same result. Even disregarding the implications for the lower-income groups, we may find that in at least some of these countries today the consumption propensities of upper-income groups are far higher and savings propensities far lower than were those of the more puritanical upper-income groups of the presently developed countries. Because they may have proven favorable in the past, it is dangerous to argue that completely free markets, lack of penalties implicit in progressive taxation, and the like are indispensable for the economic growth of the now underdeveloped countries. Under present conditions the results may be quite the opposite--withdrawal of accumulated assets to relatively 'safe' channels, either by flight abroad or into real estate; and the inability of governments to serve as basic agents in the kind of capital formation that is indispensable to economic growth....Yet it is equally dangerous to take the opposite position and claim that the present problems are entirely new and that we must devise solutions that are the product of imagination unrestrained by knowledge of the past, and therefore full of romantic violence."

CHAPTER III: FACTOR PRICE DISTORTIONS AND UNEMPLOYMENT IN LATIN AMERICA

Economic theory indicates that if a firm can produce a given output by any one of a range of possible combinations of homogeneous capital and labor, that combination or technique will be chosen which minimizes costs, or alternatively, maximizes net return. In the simplistic textbook model, making all the classical assumptions, supply and demand in resource markets are brought into balance through the price mechanism, resulting in full employment.

For the economies of Latin America, scarcity of capital implies its high price; the reverse is true of unskilled labor. Differences in relative factor supplies among countries should result in different factor price ratios and a different organization of economic activity since resource prices guide entrepreneurs in their choice of production techniques. "What is an economic use of resources in one country may be uneconomic in another in which relative factor prices are quite different. A capital-intensive method of production may be most economical and cheapest in an economy in which real wages are high and the rate of interest low; the same method of production need not be economical in another economy in which labor and capital are available in a completely different ratio."[1]

As it turns out, however, equilibrium in the markets for productive resources is not one of the characteristics of the Latin American economies; despite their relative abundance of labor and scarcity of capital, production techniques have tended to converge

[1] Peter Bauer and Basil S. Yamey, The Economics of Under-Developed Countries, p. 118. University of Chicago Press: Chicago, 1957.

towards those used in the developed economies. The result has been severe unemployment of unskilled labor and an excessive demand for capital.

The theory of Selection-of-Techniques, or Choice-of-Techniques as it is also called,[2] seeks to analyze and explain these seemingly contradictory tendencies in resource markets, and by so doing discover the means by which they may be reversed and additional employment opportunities created.

Selection-of-Techniques is not a new approach to dealing with employment problems in the developing nations; it has figured prominantly in the development literature for at least 20 years. The ILO, for example, has long been interested in the impact of changing technologies upon employment. In his report to the Asian Regional Conference in Tokyo in 1953, the Director-General of the ILO made the following very perceptive analysis of the problem:[3]

> "Whatever progress is achieved with capital formation either from domestic sources or from foreign borrowing, it is certain that capital is going to remain scarce for many decades. The methods of production based on high capital investment per unit of labour which prevail in the advanced countries would surely be uneconomic for countries of Asia to-day. These methods of production have been developed in countries where labour is scarce and dear, where savings are high and where effective demand has kept ahead of what can be produced with existing techniques and labour

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[2] As representative of this literature, see Ignacy Sachs, "Selection of Techniques: Problems and Policies for Latin America", Economic Bulletin for Latin America, Vol. XV, No. 1, pp. 1-34, and Amartya Kumar Sen, Choice of Techniques. Basil Blackwell, Oxford, 1962.

[3] ILO, Report of the Director-General, pp. 38-9. Geneva, September 1953. The advice was largely unheeded; industrialization was far more compatible with the prevailing mood of optimism and nationalism.

> forces. It is labour which has to be economised. In Asia labour is plentiful and cheap, and it is capital which has to be economised. This is a new economic problem and demands new technical methods for its solution. The search for these methods, and their application, will not be easy. It calls for a sustained effort of imagination and ingenuity, using the creative efforts of the whole community, to produce new technologies which will be genuine innovations."

Selection-of-Techniques describes precisely that "effort of imagination and ingenuity ...to produce new technologies" so designed as to utilize labor and capital inputs largely in proportion to their social opportunity costs in the nation's economy.

In what follows we shall be examining the employment problem in Latin America largely from a selection-of-techniques point of view, that is to say, from the point of view of factor-price-ratio distortion and consequent resource misallocation.

In the first part of the chapter we will consider some of the policies, programs and attitudes--official and otherwise--which have served to make capital cheaper and labor dearer than would seem to be indicated by their relative availabilities in the Latin American economies.

Following that we will discuss some of the options open to governments for reversing the present bias in Latin America's development process in favor of excessive capital intensity in production.

We conclude the chapter with some brief remarks on the need to develop and adopt production techniques more in line with factor availabilities--the question of alternative techniques. These remarks serve also to introduce the subject matter of the following chapter, which is concerned entirely with the development of alternative techniques.

A. Factors Contributing to the Capital-intensive Bias

During the late 1940's and into the fifties the fashionable diagnosis of economic backwardness was a lack of capital. The success of the Marshall Plan must have reinforced this impression, as did the very obvious correlation between high levels of capital formation and the level of economic activity in the developed nations.

The merits of this proposition provided the substance for a body of development literature during the decade of the fifties which helped place in proper perspective the role of capital in the development process.[4]

Policies and techniques developed in response to the perceived need for increasing the level of capital formation have survived and grown and today serve to promote the introduction and use of techniques in production characterized by excessively high levels of capital intensity. Ironically, the perception of a capital shortage in an earlier decade and the policies designed to deal with it must receive much of the blame for the employment problems which face developing nations in the present decade.

Among the major factors which have served to impart the present bias in favor of capital-intensity to the development process in Latin America have been subsidies for capital equipment, external influences

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[4]See, for example, Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries. Oxford University Press, New York, 1953; Simon Kuznets in United Nations, Processes and Problems of Industrialization in Underdeveloped Countries, p. 3. New York, 1953; and the readings included in Section III.1 of Gerald M. Meier, Leading Issues in Development Economics. Oxford University Press, New York, 1964.

upon capital-intensity in production, and wage policies. The more important of these factors are discussed below.

1. Subsidies for Capital Equipment

Celso Furtado has noted that capital subsidies in the form of exchange and credit policies, "designed and executed without taking account of the possibility of choice between production processes, ...have created conditions artificially favorable to automation and over-investment in fixed capital."[5] With respect to the Brazilian case, Furtado concludes that "had the industrialization policy been based upon long term credits, but at realistic rates of interest, with subsidies for industrial production during an initial period (of five, ten or fifteen years), the results, with respect to choice of technological processes, could have been more in accord with the interest of the entire national economy."[6]

Several mechanisms which have the effect of reducing the costs of capital are being utilized by Latin American governments in their efforts to industrialize. Among such mechanisms must be included the following:

a. interest rates which are artificially low. The excess demand for credit which is the natural concommitant of low rates is met by rationing the limited supply of loanable funds. The larger, well-established firms, which are counted as "better risks", typically benefit from this process, and these are often precisely the firms which already are

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[5] Um Projeto Para O Brasil, 3'd edition, pp. 43-4. Editora Saga, S.A., Rio de Janeiro, 1968. Translated by the author.

[6] Ibid., p. 44.

highly mechanized and likely to continue using capital-intensive techniques.[7]

The ILO employment study for Colombia notes:[8]

> "In the long run, unduly low interest rates may, by penalising savings, actually act as a brake on the rate of capital formation, outweighing the stimulus they seem to provide. From the point of view of employment, the result of too low interest rates can thus be doubly harmful: capital investment can be discouraged and what investment there is tends to bring labour-saving technology."

b. inflation, which may lower the real rate of interest below the nominal rate, thus serving to subsidize the costs of capital. At times, negative real rates of interest can result if government restricts nominal rates to limits which are exceeded by the actual rate of inflation. An investment bias in favor of short gestation projects often results, discouraging "investment in price-rigid economic overhead services, such as power, transport, and communications."[9] The change in the investment pattern which inflation causes, however,--from long- to short-gestation projects--may not in itself have an important bearing upon levels of capital intensity.[10] Investment in inventory accumulation and construction are favored in the process, although capital rationing will most likely be required to keep demand and supply for loanable funds in balance.

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[7] ILO, Towards Full Employment, A programme for Colombia, prepared by an inter-agency team organised by the International Labour Office, pp. 178-9. Geneva, 1970.

[8] Ibid., p. 178.

[9] Roberto de Oliveira Campos, "Inflation and Balanced Growth", in Howard S. Ellis and Henry C. Wallich (eds.), Economic Development for Latin America, p. 102. Macmillan & Co., Ltd., London, 1961.

[10] Werner Baer, Industrialization and Economic Development in Brazil, pp. 128-30. Richard D. Irwin, Homewood, Illinois, 1965.

Inflation may also influence the capital-labor ratio through a quite different mechanism--by the differential impact it has upon the cost of the various factors of production. If, as an example, investors anticipate a chronic tendency for wages to lag behind capital costs, they may choose to substitute some labor for capital in future production plans. Different combinations of assumptions with regard to (a) investor expectations of the duration and intensity of the inflation; (b) workers' ability to defend their level of living against the inflation; and (c) the long-term outlook for the ratio of capital costs to labor costs; can lead to different conclusions about the level of capital-intensity in production, all of which, however, must be treated as extremely tentative and simplistic.

c. exchange rates, often "multiple" or "preferential", which serve to encourage the importation of certain types of capital equipment. Nations may also overvalue their currency with respect to foreign currencies, thereby reducing the domestic price for all imports, not only capital equipment. A further means of subsidizing capital imports through exchange rate adjustments is by making foreign exchange readily available at fair or favored rates for the servicing of loans from overseas equipment suppliers.[11]

Brazil, for example, held the value of the cruzeiro at the "completely unrealistic level" of 18.5 to the dollar from June, 1947, until January, 1953, during which time internal prices rose continuously,

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[11] Gerald M. Meier, Leading Issues in Economic Development, Studies in International Poverty, 2'd edition, p. 436. Oxford University Press, New York, 1970.

ending the period about two-thirds higher.[12] The effect of such controls was to discourage exports and encourage imports, making a system of import licensing necessary to keep demand in check. While this system favored essential goods, capital equipment, and intermediate inputs, the main criterion for distributing the licenses was tradition--"each importer was given the right to a certain quota of foreign exchange proportional to his volume of transactions before the introduction of the licensing system."[13] The effect of this static policy was to provide, often wastefully, for the foreign exchange needs of established industries, but to discount the "needs of new industries, which depended very much on supplies from abroad in their initial state of operation."[14]

d. duty-free or otherwise preferential tariff treatment on imports of capital equipment. "Virtually all developing countries offer inducements to approved enterprises in the form of reductions or exemptions from income taxes and import duties on raw materials and capital goods for periods of five to ten years."[15] When used wisely, corporate exemptions from taxes and tariffs can be an important policy tool in attracting foreign investment; however, when such exemptions have no stronger foundation in economic rationality than the fact that neighboring nations are making similar offers, excesses can easily result.

The nations of Central America have for years competed among themselves for foreign investment capital, each striving to offer

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[12] Baer, op. cit., p. 49.

[13] Ibid., pp. 49-50.

[14] Ibid., p. 50.

[15] Clark Joel, "Tax Incentives in Central American Development," Economic Development and Cultural Change, Vol. 19, No. 2, p. 231. January 1971.

investors a package of incentives at least as attractive as that of its neighbors. To rationalize the system of competitive incentives which had been causing unjustifiable losses in central government revenue, the five members of the Central American Common Market adopted the Central American Agreement on Fiscal Incentives for Industrial Development.[16] The incentives, however, continue to be very generous, as can be seen from Table III-1.

e. tax laws allowing accelerated depreciation and investment allowances, the most notable of which is probably SUDENE's[17] article 34/18 of 1961. Under this law, Brazilian corporations can reduce their tax liability by 50 percent, provided this amount, accompanied by an equal amount of "fresh funds", is invested in a SUDENE-approved development project in the Northeast. To sweeten the package still more, the Bank of the Northeast of Brazil will lend up to 50 percent of the required "fresh funds" at the very favorable rate of 12 percent (compare with commercial bank rates of 30-40 percent).[18]

As might be expected, article 34/18 is quickly leading to the conversion of the industrial structure of the Northeast from one characterized by an emphasis on consumer goods--the processing of

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[16] Ibid., p. 233. The agreement was drafted in July, 1962, but was not adopted until March, 1969, due to Honduras' insistence that it be allowed to offer more generous tax benefits than the other four members in order to compensate it for being the least developed of the CACM countries. Honduras approved the Agreement in March, 1969, after the other members agreed to allow her to offer more generous benefits.

[17] SUDENE is the government development agency for the Northeast of Brazil.

[18] A. O. Hirschman, "Desenvolvimento Industrial no Nordeste Brasileira e o Mecanismo de Credito Fiscal do Artigo 34/18", Revista Brasileira de Economia, Vol. XXI, No. 4, pp. 5-8. December, 1967. 34/18 funds are also available to SUDAM, the development agency for the Amazon.

TABLE III-1

Central American Agreement on Fiscal Incentives for Industrial Development, Principal Benefits under the Agreement Allowed to New and Existing Industry under Group A

	For New Industry	For Existing Industry
1. Exemption from import duties on machinery.....	100% for 10 years	100% for 6 years
2. Exemption from import duties on raw materials and semifinished products....	100% for first 5 years; 80% for following 3 years; 50% for following 2 years	No exemption granted
3. Fuels other than gasoline....	100% for 5 years	No exemption granted
4. Exemption from income tax....	100% for 8 years	100% for 2 years
5. Exemption from tax on assets and net worth.....	100% for 10 years	100% for 4 years

Notes: "New" industry "produces a product not heretofore produced in significant amounts in the country or that did not meet satisfactory standards with respect to quality and efficiency of productive techniques."

"Enterprises classified under Group A include all producers of raw materials and capital goods, and those producers of consumer and semifinished foods utilizing at least 50 percent of materials of Central American origin."

Source: Joel, op. cit., p. 233.

agricultural products such as sugarcane and vegetable oils, cotton textiles, and light manufactures--to an equally heavy emphasis on the manufacture of capital and intermediate goods and durable consumer goods, more characteristic of the national industrial structure as a whole (see Table III-2). "The projects subsidized by the mechanism of article 34/18 are making the industrial structure of the Northeast more diversified and sophisticated due to the growing presence of industries which are both dynamic and rich in backward and forward linkages."[19]

Hirschman defends a subsidy devoted wholly to capital (as distinct from one for labor, or divided between capital and operating (labor) costs), as a more efficient stimulus in attracting new investment since "outlays for capital precede expenditures for labor."[20] It is also true, however, that many types of capital purchases determine labor needs. With such an attractive investment package in the offing, it would appear that SUDENE could have insisted upon a minimal level of employment creation, perhaps in the form of minimum labor-capital ratios. As it turns out, however, the average cost for creating the 67,800 new jobs in industry (to May 31, 1967) has exceeded $6,000[21]

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[19] Ibid., p. 21. Translated by the author.

[20] Ibid, p. 29.

[21] In the article referred to in Ibid., the average cost per job was mistakenly given as $600.

According to an article in the Wall Street Journal, 152 projects were approved by SUDENE in 1971 under article 34/18. These projects worth $108 million, are expected to create 11,000 jobs directly and 41,000 indirectly, according to the Government. Everett G. Martin, "Turnabout Nation: While Brazil Booms, Big Areas Stay Poor, Millions Barely Subsist", The Wall Street Journal, p. 25, April 21, 1972.

TABLE III-2

Brazil's Northeast: Structure of Industrial Output

	installed industrial capacity, 1959*	investments resulting from projects under Article 34/18**
	- - - - - - percent of total - - - - - -	
Capital and Intermediate goods	30.2	67.4
non-ferrous metals	10.0	9.4
metallurgy	2.3	8.7
electrical & communications eqpt	0.12	3.3
transportation eqpt	1.3	6.7
metal working	0.2	2.3
wood products	2.4	1.6
paper and products	2.8	0.5
rubber	0.2	0.5
leather, hides	1.5	0.1
chemical & pharmeceutical	10.5	34.3
Consumer goods	69.3	32.7
furniture	0.9	0.4
textiles	26.8	18.2
clothing & footwear	0.2	1.4
foodstuffs	30.8	7.9
beverages	1.5	3.9
tobacco	0.3	-
printing & publishing	0.7	0.4
miscellaneous	0.1	0.5

Notes: * SUDENE was created in 1959.
** to May 31, 1967.

For his measure of existing capacity in 1959 Hirschman uses installed capacity, rather than value added, since the former is more comparable with the data on fixed investment in new projects.

Source: Hirschman, op. cit., Table 8.

(NCr$20,580)--a ratio which Hirschman admits is "certainly not ... encouraging ... for a region with problems of unemployment," but nevertheless, the "inevitable complement of changes in industrial structure" in the direction of intermediate and capital goods production.[22]

"I have the impression," says Hirschman, "that the bias in favor of capital caused by the [34/18] system does not give rise to serious distortions in the technology of the firms which choose to establish in the Northeast. With or without the system, the fact is that firms tend to utilize the most advanced technology, without significant modifications to make it more labor absorbing."[23]

The cost to the national treasury in terms of revenue foregone for article 34/18 projects exceeds 50 percent of total project costs. Surely such a high price should allow the government more than just a passive acceptance of the right of private firms to choose the technology they consider most profitable, regardless of the best interests of the society subsidizing their start-up costs. Most likely those interests would be served far better if SUDENE were to analyze the employment effects of 34/18 projects in light of their social opportunity costs to the Northeast, and what might otherwise be purchased in terms of employment creation through alternative projects and programs.

2. External Influence upon Capital-Intensity in Production

External factors, operating upon the domestic economy of the developing nation through its trade and aid relations with developed

[22] Hirschman, op. cit., pp. 21-2. "The industries which will develop to provide services for the 34/18 industries, however, will be characterized by labor-capital ratios much higher than the basic industries of 34/18."

[23] Ibid., p. 29.

countries, have also played an important contributory role in determining the present high levels of capital intensity which characterize Latin American economic growth. Among these factors are the following:

a. Supplier Credits. Such credits and other inducements, provided by equipment exporters in the developed nations, facilitate the purchase of foreign-made capital equipment. In fairness to entrepreneurs it must be noted that highly capital-intensive techniques are frequently adopted simply because of the lack of readily available alternatives. But in other cases, where it should be possible to choose from among a variety of efficient alternative techniques, such choice is precluded by the organization of the technological market in Latin America.

This "highly imperfect sellers' market" is dominated by dealers representing foreign equipment manufacturers who enjoy a monopoly-by-default situation due to the absence of a local engineering, design and equipment producing capability.[24] A "false concept of modernity" is thus promoted by these powerful vested interests through the skillful use of advertising and other forms of propaganda which play up arguments such as the need for catching up with the newest technology and becoming competitive in international markets. Great prestige is assigned to the trade marks of the developed industrial economies, coupled with a "mood of pessimism and a complex of inferiority with respect to all products of local science and industry."[25]

b. Direct Private Foreign Investment. A similar situation can result from the activities of private foreign investors who, quite naturally, think in terms of the capital-labor proportions to which they are accustomed.

[24] Sachs, "Selection of Techniques ...", op. cit., pp. 7, 20.

[25] Ibid., pp. 7, 20.

Foreign investors may be quite insensitive to--even disinterested in--the problems of the local economy, particularly the need to create additional employment opportunities. The Pearson Commission, noting this, commented: "Foreign-owned companies, and companies employing engineers trained abroad, normally have an in-built tendency to prefer the capital-intensive methods of production with which they are familiar."[26]

Reynolds and Gregory, studying industrialization in Puerto Rico, note that "with a few notable exceptions, mainland firms establishing branch plants in Puerto Rico did not adopt production techniques different from those employed in mainland plants." "Where exceptions were made", the authors continue, "they were generally in the employment of more labor intensive methods of materials handling."[27]

Private foreign investment and the bias toward high capital-labor ratios which it can imply may also be facilitated by the development policies of the capital importing nation. A case in point is Brazil's "Instruction 113" of 1955 which, in order to stimulate industrialization while at the same time economizing on foreign exchange, required foreign equipment suppliers to agree to accept payment in the form of a cruzeiro

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[26] Commission on International Development, Partners in Development, p. 111. Praeger, New York, 1965.

[27] Lloyd G. Reynolds and Peter Gregory, Wages, Productivity and Industrialization in Puerto Rico, p. 92. Richard D. Irwin Inc., Homewood, Illinois, 1965.

equity participation in the firm making the capital import.[28]

c. Foreign Aid. Through a number of different mechanisms, foreign aid has aggravated the unemployment problem in the developing countries by contributing to excessive capital deepening. The "concessionary" terms at which such aid is made available encourages a wasteful overuse of capital, frequently accompanied by an offsetting decline in domestic savings. Chenery, for example, notes that "...aid has been a substitute for savings, not an addition to investment. The savings rate has decreased and there has been no increase in the overall rate of growth of the gross national product."[29]

The policy of aid-givers to finance only the imported component of an investment project constitutes a strong incentive for the aid-receiving nation--often short of investment resources--to make more extensive use of imported capital and materials than actually necessary.[30]

The institution of "tied loans", common in bilateral aid agreements,

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[28] Baer, op. cit., p. 56.

[29] "Trade, Aid and Economic Development", in S. H. Robock and L. M. Solomon (eds.), International Development 1965, (Proceedings of the World Conference of the Society for International Development), p. 187, 1966, cited in Keith Griffin, Underdevelopment in Spanish America, pp. 122-3. George Allen and Unwin, Ltd., London, 1969.

Griffin advises that we should not be surprised to find an inverse association between foreign aid and domestic savings. Given a target rate of growth (which implies a corresponding target rate of savings) "foreign aid will permit high consumption and domestic savings will simply be a residual, i.e. the difference between required investment and whatever amount of foreign aid is available." (p. 122)

[30] Organization of American States, Inter-American Economic and Social Council, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies", pp. 112-3. Washington, D.C., August 19, 1971.

tends to increase the cost, or alternatively, to "reduce the worth of foreign aid to recipient countries by something between 10 and 20 percent."[31] The recipient of untied aid is free to "shop around", purchasing needed imported materials and equipment from whatever country makes the best offer. Under "tied aid", however, such materials and equipment must be purchased in the lending country, and in some cases shipped in boats flying the lending country's flag, all of which can increase the costs of procurement above what they would be under competitive bidding.

The net effect of tied aid to the developing economy is thus (a) to increase the use of capital because of the seemingly "concessionary" terms at which it is made available, and (b) to reduce the efficiency of capital (the output-capital ratio) as a consequence of its high real cost.

Regrettably, many aid agreements prohibit the purchase of used equipment which, "in a world where equipment manufacturers offer little or no choice between more and less capital-intensive models ...may well

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[31] Ian Little, Tibor Scitovsky and Maurice Scott, Industry and Trade in Some Developing Countries, published for the Development Centre of the OECD, p. 56. Oxford University, London, 1970.

"The average excess cost of equipment due to the tying of foreign loans has been estimated in Pakistan for a sample of twenty projects at 51 percent; a similar estimate for India ...yields an average excess cost of 49 percent." p. 56.

"A country receiving tied loans from several donors and unrestricted loans in addition can, of course, reduce the excess to some extent by suitably matching projects (or goods) with donors." For example, an Indian study of non-project tied aid shows the excess of cost of chemicals to be 15% in the case of tied USAID loans, and 24% in the case of Rupee Payments Area loans from the Socialist countries. Without the freedom to "match", the excess cost would have been 29% from the US and 26% from Socialist countries. (pp. 56-7)

be the best way of adapting production techniques to the low labor and high capital costs of developing countries."[32]

The provision of technical assistance which is not tailored to the specific needs of the developing economy also serves to impart a capital-intensive bias to the development process. The observation made by the Pearson Commission and quoted above--that foreign trained engineers and consultants tend to think in terms of the (capital-intensive) techniques with which they are familiar--applies equally to investment projects undertaken by the public sector. Relatively uncritical acceptance of such recommendations reinforces the labor-saving bias, thus aggravating the problem of unemployment. In agriculture, for example, there is the danger that aid technicians, experienced in dealing with the problems of a labor-scarce rural economy, who naturally think in terms of maximizing the returns to labor, may apply that same reasoning to the rural problems of a labor-abundant developing economy.[33]

Keith Griffin has documented how foreign aid, through a wasteful use of capital, led to severe unemployment in Central Anatolia in Turkey.[34] Shortly after the close of World War II the U.S. entered

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[32] Ibid., p. 57. Most countries resent the introduction of secondhand equipment and some--Pakistan and Taiwan, e.g.--actually prohibit its import. The reasons for this resistance include the frequency of breakdown of such equipment and the difficulty of maintenance, the difficulty of checking market value (and therefore the invoiced value) of such equipment, and the false argument that if such equipment is no longer competitive in developed countries it is not likely to be competitive in developing countries either. (p. 57 and fn. p. 57)

[33] John R. Eriksson, "Employment and Development: The Problem and Some Policy Alternatives", AID (mimeo), pp. 13-4. Washington, D. C., October 12, 1971.

[34] K. B. Griffin, "Investment Allocation and Development in Turkey", AID (mimeo), September 1966.

into an ambitious aid program with the Turkish Government initially designed to modernize Turkey's agriculture through a program of tractorization. During the period 1948-57 the number of tractors in the country increased from 1,700 to 44,000. In Central Anatolia the tractors were used to clear and cultivate marginal land which had previously been used for grazing livestock and for forestry. The disastrous effects of overgrazing the remaining pasture lands, and over-cultivating the new lands was to accelerate erosion on the land and force 350,000 agricultural workers to become migrants; that is, each tractor was responsible for the unemployment of about eight people.[35]

In the last analysis, the burden of economic development rests with the aid-receiver, not the aid-giver. Thus, the developing nations must learn not only to distinguish between those forms of aid which are beneficial to its economic development and those which are not, but to begin to refuse the latter as well. Developing this capacity will require a far better understanding of the process of employment generation, and a considerably higher level of economic sophistication than most nations have demonstrated to date.

3. Wage Policies

Policies which serve to produce a bias toward capital-intensity in the production process operate through the denominator of the capital-

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[35] Griffin, Underdevelopment in Spanish America, op. cit., p. 120.
The second phase of AID's development efforts in Turkey included a massive road construction effort during the decade of the 50's. However, having done nothing to resolve the technological unemployment in rural areas, and not having increased agricultural output, the peasants used the new roads to migrate out of rural areas and into urban slums. (p. 120)

labor ratio as well as the numerator, that is to say, labor costs are driven up simultaneous with policies which make capital relatively cheap and abundant.

a. The imposition of social charges and taxes proportional to the wage bill widen the margin between labor costs as viewed by the employer and the wages which workers actually receive. "Both entrepreneurs and workers complain, the former because labor costs are high when compared with the productivity level, the latter because they are underpaid, as far as wages are concerned, while fringe benefits financed out of 'social charges' are of very poor quality and add little to the worker's level of living."[36] Receipts from the taxes and social charges may at times be "altogether diverted to aims which have little to do with their original purpose."[37]

Social legislation frequently proceeds far more rapidly than economic development. Under these circumstances, premature attempts by developing nations to imitate the social programs of economically advanced countries--"elaborate social security legislation and aggressive government-encouraged union movements"--are often counterproductive.[38] Since there is "little or no scope for such devices for raising wages except in the more advanced and well-organized sectors ...new industrial projects may face the prospect of wage rates quite different from those

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[36] Sachs, op. cit., p. 24.

[37] Ibid., p. 24.

[38] R. S. Eckaus, "The Factor Proportions Problem in Underdeveloped Areas", American Economic Review, Vo. XLV, No. 4, p. 542. September 1955.

prevailing in the handicraft and agrarian sectors and thus may be compelled to use different factor proportions."[39] The project which showed a profit when wages were computed at traditional levels may have to be totally redesigned to take account of labor costs in the modern sector. There is evidence from Chile, Brazil and Colombia, among other countries, that union pressure and minimum wage legislation have forced labor costs beyond its opportunity cost, inducing investors to turn to more highly mechanized modes of production.[40]

b. Foreign Employers. Wages may also be driven up as a consequence of the good intentions of foreign employers whose generous margins allow them to provide, in part at least, the same social benefits which they have traditionally provided their workers in the home country. Once such programs are established, they serve to fuel the demands of workers in other firms and industries, obliging the latter to move into more capital-intensive positions so as to reduce their personnel and increase the margins from which such benefits can be paid.

B. Policies to Reverse the Capital-Intensive Bias in Latin American Economic Development

Thus far we have been developing the thesis that capital-intensive techniques of production have contributed in an important way to the present unemployment problem in Latin America. We said that the bias toward capital intensity in production could, to a large extent, be explained in terms of the factors discussed under

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[39] Ibid., p. 542.

[40] K. B. Griffin, "Latin American Development: Further Thoughts", Oxford Economic Papers, Vol. 20, No. 1, p. 129. March 1968.

A. 1. Subsidies for Capital Equipment,
2. External Influence upon Capital Intensity in Production, and
3. Wage Policies.

If this thesis is true, one obvious solution to the problem of unemployment is to use, to the extent possible, these same fiscal, monetary and wage instruments but in policy measures redesigned so as to maximize employment generation.

However simple such a solution may seem, its success requires that Latin American governments not only be convinced of the necessity to deal aggressively with problems of unemployment, but that they approach these problems with a dedication and commitment uncommon among most nations. Essentially, the nations of Latin America must commit themselves, both in words and actions, to a basic reorientation in development planning, explicitly subscribing, in the broadest sense, to a set of policies designed to achieve maximum employment generation.

1. Institutionalizing the Employment Problem

One very important means of restraining the level of capital-intensity is the establishment of an Office for Employment Creation. Such an Office or Agency would be charged with specific responsibility for reviewing all economic policies and decisions with respect to their impact upon employment creation and income distribution--from setting interest rates to granting import licenses. In each of its reviews, the Office of Employment Creation would be guided in its judgment by the way in which the action under consideration scored on the three questions we tentatively accepted in Chapter I as criteria for judging progress in economic development:

what effect will this action have upon poverty?
what effect will this action have upon unemployment?
what effect will this action have upon income inequality?

The Office for Employment Creation would be staffed by highly competent industrial engineers, economists and other technicians chosen in such a way as to minimize the possibility for conflict of interest and outside influence. The Office must have a strong leader, willing and able to do battle at ministerial- and cabinet-level meetings. Most importantly, the Office for Employment Creation must enjoy complete autonomy--it must not be allowed to fall victim to the common fate of having its governing board composed of such "appropriate" members as the President of the Industrial Bank, the Minister of Economy, the President of the local manufacturers association, etc., each with virtual veto power over the board's well-intentioned judgments on behalf of increased employment opportunities. Such an arrangement could only be self-defeating.

The Office for Employment Creation should have a political strength comparable to that of the strongest ministries--typically Finance, Economy and Defense. While this is obviously a tall order, it is at the same time a measure of the nation's commitment and dedication to the task of employment creation which, as we noted above, is essential if serious inroads into the elimination of unemployment are to be gained.

2. Policy Measures Operating upon the Cost of Capital

In a laissez faire economy, profit maximization is the criterion par excellence for project evaluation. Given the wage rate, it is the cost of capital, that is the interest rate, which determines the level of capital-intensity in production and along with it the amount of

employment generation.

For the centrally-planned economy, or the public sector of a mixed economy, it is theoretically possible, on the basis of macro-economic and macro-social cost-benefit analysis, to choose an appropriate interest rate for each investment project so as to optimize the utilization of the available factors of production. Thus, the choice of factor proportions, seemingly a matter of straightforward calculation for the individual firm, can be an important area for decision-making in the public sector.

By means of a similar analysis, it should be theoretically possible to influence the private entrepreneurial decision-making process as well, thus making the decision of capital intensity an integral part of development planning policies.

Where an investor is confronted with a variety of alternative production techniques among which to choose, such a policy could be of obvious value if it "forces" his investment choice to coincide with the interests of the community. Where the scope for choice of techniques is constrained, as is true of many industrial processes, it becomes that much more important not to miss the opportunities for increased labor utilization where they do exist, as in agriculture, construction, etc.[41] By altering the entrepreneur's perception of profitability through changes in the factor-price ratio--essentially by increasing his cost of capital--his choice of a production technique can be influenced so as to bring private entrepreneurial costs more in line with the cost to

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[41] Sachs, op. cit., p. 2.

society of entrepreneurial decisions.

There is, quite literally, an infinity of policy combinations for attempting to deal with the disequilibrium in factor markets in Latin America. In the present section we shall try to deal in a general way with the major fiscal and monetary tools available to government decision-makers which, through their influence upon private profitability, can play a role in altering the capital-budgeting decision of entrepreneurs.

a. Exchange Rates. To the extent that a nation's capital equipment and intermediate inputs are supplied from abroad, exchange rates will have an important bearing upon domestic costs of production and thus entrepreneurial perception of profitability.

The Report of the ILO Team studying Colombia's employment problem endorsed the Colombian system of "frequent but small devaluations" allowing the exchange rate to "rise at a slightly faster pace than the internal price level."[42] The squeeze on domestic capital costs is reinforced by a decline in the real value of foreign exchange as FOB equipment prices in the industrialized countries rise due to inflation abroad.

If a nation bases its employment strategy upon imported capital goods, the corresponding export drive necessary to finance the capital imports "will need all the help it can get from the exchange rate."[43]

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[42] Towards Full Employment, op. cit., p. 176. Actually, Colombia has "what essentially amounts to a set of flexible--although closely regulated--exchange rates, which move together."

[43] Ibid., p. 177.

Simultaneously, however, those consumer, capital and intermediate goods with a high import content are made more costly, encouraging a reduction in their demand, or the substitution of domestic for imported sources of inputs.

According to the ILO Report, a "tacit gradual devaluation of this kind" is a "central element in employment strategy, [helping] to make market prices of all types 'signal' social costs more accurately."[44] The Report continues, "since central banks and administration have, all over the world, tried to maintain exchange rates until they were driven to a shotgun devaluation, we cannot emphasize too strongly the case for determining the exchange rate according to the needs of employment strategy, and not according to mistaken ideas of prestige, or to short-term fluctuations in trade."[45]

b. Interest Rates. As we noted earlier, unduly low rates of interest may lead to excessive levels of mechanization and the need to ration credit--often implying that available funds will go to the larger, better-established firms, ...those more likely to use capital-intensive techniques of production. We have been suggesting the proposition that present interest rate policies--characterized by "safe" loans at low rates--have served to accelerate the introduction of labor-saving techniques of production, thus aggravating the employment problem. If we accept this proposition, there are essentially two basic policy alternatives available, ...a free market, and selective lending policies oriented towards employment generation.

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[44] Ibid., p. 177.

[45] Ibid., p. 178.

According to the first approach, interest rates would be allowed to seek their equilibrium level, ...or alternatively raised by decree. The higher rates, by benefitting savers, would attract an increased supply of savings, while at the same time increased costs of credit would lead to substitution of labor for capital...at least this is what the classical model suggests.

It is not at all clear, however, that a mechanism is actually operative by which higher rates of interest do lead to increased employment opportunities. Much of industry is characterized by a limited ability to make small adjustments in factor proportions in response to changes in the factor price ratio. If interest rates do rise, firms may simply treat it as an increase in the cost of production, reflected in reduced profits and/or increased prices for its output. If this be the case, a policy of generally higher interest rates would not have the desired effect upon productive techniques of established industrial operations, nor would it provide the necessary inducement for new firms to adopt labor-intensive techniques of production.

The second approach, which is the interest rate policy suggested by the ILO Study Team for Colombia, has more to recommend it. This approach allows for a continuation of low cost credit, but would replace the present conservative banking criteria for rationing loan funds by a set of guidelines oriented towards a strategy for employment generation. Instead of trusting to the discretion of established financial institutions, with their concern for channeling funds to the larger and better established firms, an alternative set of criteria would be introduced into lending policies, the aim of which should be to make credit available

to those firms most likely to use it in a way that will make a significant contribution to the creation of new employment opportunities.

This interest rate strategy could be designed and administered by the Office for Employment Creation as one among several fiscal and monetary tools for dealing with the employment problem.

c. Other Mechanisms Operating upon the Cost of Capital. There are numerous other mechanisms available to Latin American governments by which they can influence the cost of capital to the private sector and thereby capital intensity in production. Like the interest rate policy just discussed, however, most of these mechanisms must be administered selectively so as to induce employment-creating investment and stimulate activity in the capital goods producing sector, while at the same time discouraging projects inconsistent with the nation's employment strategy.

Tariff policies, for example, could be reformulated along the lines of a national employment strategy by eliminating completely all preferential tariff treatment, but reserving to the Office for Employment Creation authority to selectively permit exceptions where these are considered necessary to further the employment objective. It should be noted that the element of selectivity increases considerably the demands upon administration, invariably giving rise to charges of favoritism and arbitrary decisions. For this reason, and because of the increased requirements for data collection and analysis, the use of selective controls should be held to a minimum.[46]

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[46] We need look no further than the Price Commission and Pay Board recently created by President Nixon's Economic Stabilization Act for examples of the difficulties in attempting to deal objectively with the needs of individual firms and labor organizations.

The treatment of depreciation and other deductions against taxable income offer a further opportunity for development planners to restrain the level of capital-intensity in production. Reducing the percentage of depreciation allowable as a tax write-off, and increasing the period over which such depreciation must be charged, could have some bearing upon the choice of a production technique.[47] But again, selectivity must be employed so as not to endanger the competitive position of exporting firms, or burden those industries which have no alternative means of production, or which are producing capital goods for the domestic economy.

Celso Furtado has suggested a differential tax upon value added, distinguishing between returns to capital and remuneration of labor.[48] To illustrate, he posits two textile firms, each with value added equal to 50 percent of gross output. Firm A utilizes the less capital intensive technique--three-fifths of its value added is attributable to labor costs and two-fifths to capital (including depreciation). For Firm B, one-fifth of value added is attributable to labor and four-fifths to capital. If value added is then taxed according to its origin, say 5 percent for labor and 50 percent for capital, firm A would be subject to a levy equal to 11.5 percent of gross output (1.5% on value added by labor and 10% on value added by capital) and firm B a 20.5 percent levy (0.5% on labor and 20% on capital). The reduction in its profits after taxes might thus be sufficient to dissuade firm B

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[47] Towards Full Employment, op. cit., p. 179.

[48] Um Projeto para o Brasil, op. cit., pp. 46-8.

from electing the more capital-intensive technology.[49]

This approach would also require selective application since it tends to discriminate blindly against the use of capital, penalizing its use in employment creation equally with uses which are labor-saving.

3. Policies Operating upon the Cost of Labor

In the preceding section we discussed some of the mechanisms for increasing capital costs to the private sector so as to achieve a factor price ratio conducive to the use of less capital-intensive techniques of production. In the present section we approach the problem from the direction of the cost and convenience of employing labor. In the discussion which follows, we will consider three basic approaches:

a. reducing the costs of labor as employers perceive them,
b. providing labor legislation more compatible with an employment strategy, and
c. providing explicit subsidies for labor costs.

Although the present section may raise more issues than it resolves, by exposing new areas for consideration by development planners it may serve to motivate the specific policy most consistent with each country's employment strategy.

a. Reducing the Costs of Labor as Employers Perceive Them

Earlier we noted the tendency for labor costs as perceived by employers to diverge from what workers actually receive in wages, what

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[49] Ibid., p. 47. If the tax on value added is viewed as a surcharge on the rate of interest, and we assume the capital-output ratio for firm A to be 2, the surcharge is equivalent to 5.75% (11.5 per 100 of gross output with a capital-output ratio of 2 implies 5.75 per 100 of capital). For firm B, the surcharge will depend upon the capital-output ratio (which we know to exceed that of firm A) such that surcharge on $B=.205/K_TQ$. On an interest rate surcharge basis, the tax on both firms is equal when the K_TQ of firm B is 3.58.

we might call the wage bill. The wage bill then, is that part of labor costs corresponding to wages, and in Latin American industrial employment probably accounts for from 60 to 80 percent of the private costs of employing labor ...the balance being made up of a variety of social charges and taxes. The existence of a sizeable margin between labor costs and the wage bill provides latitude for reducing the costs of labor as perceived by employers while leaving what workers perceive as their wages essentially undisturbed.

Benefits legally provided to industrial workers in Latin America are among the most comprehensive in the world. Provision of many such benefits, however, was politically motivated and are neither justified by economic nor social conditions of the time. Robert Alexander notes that Argentina, Brazil and Chile all offer extensive social security protection for the ill, aged and disabled under legislation passed to gain political support of the worker classes but with little concern for the impact of such programs upon the economy, or the ability of industry to sustain them.[50]

The cost to employers of fringe benefits, as a percent of the wage bill, probably ranges up to 70 percent in some cases, although comparable figures are difficult to come by. In Brazil, for example, employers presumably spend "about two-thirds as much paying contributions to various social insurance and other funds as ...in actual wages."[51]

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[50] Labor Relations in Argentina, Brazil and Chile, p. 17. McGraw Hill, New York, 1962.

[51] Robert Alexander, Today's Latin America, 2'd revised edition, p. 89. Frederick A. Praeger, New York, 1968.

Contributions to the national social security system constitute the largest of the wage supplements. The costs of the various programs provided under social security are typically paid by both worker and employer, with about two-thirds of the total contribution corresponding to the latter.[52] "In some countries the government also makes, or is supposed to make, sizeable contributions as well."[53]

Social security contributions for covered occupations have been climbing in recent years. Marshall Wolfe developed the following estimates of the combined employer-employee contributions to social security as a percentage of the wage bill:[54]

42-49% in Chile
39-45% in Uruguay
12.5-33% in Argentina
22% in Brazil
35.5% in Bolivia, and
19% in Paraguay.

Costs of social security, like any wage supplement, inevitably become incorporated into production costs and passed on to the consumer in the price he pays for the output of industry. To take an extreme position, fringe benefits penalize the consuming public through higher prices in order to provide social benefits for an "elite" five or ten percent of the population which is employed in a covered occupation.[55] In addition to the redistribution of income from consumers who may be

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[52] Marshall Wolfe, "Social Security and Development: The Latin American Experience", ECLA, Social Affairs Division (mimeo, "draft for comment"), p. 8. Santiago, September, 1967.

[53] Alexander, Today's Latin America, op. cit., p. 88.

[54] Wolfe, op. cit., p. 8.

[55] According to data from Marshall Wolfe, op. cit., contributors to social security accounted for 5.0% of the Mexican population in 1963, 4.1% of Venezuela's population in 1961, 3.2% of Colombia's population in 1964, and 7.0% of Peru's population in 1961. (p. 8)

far needier than the workers benefitting, a bias toward capital intensity in production may be promoted if employers are unable to pass on the bulk of the cost of such benefits to consumers.

The list of potential fringe benefits enjoyed by Latin American industrial workers is a long one and tends to increase along with a firm's financial strength and the size of its labor force. A sampling of such benefits would include the following:[56]

compensation for industrial accidents and disease
compensation for disability due to non-occupational illness
medical and hospital care for above
maternity and nursing benefits
provision of a nursery on the premises
family allowances
group life insurance
bonus (often in the form of a "13-month year")
severance pay
vacation pay
pay for sundays and holidays
overtime pay
sick leave
pension programs
indemnity (and a pension for very senior workers) for dismissal without "just cause"
funeral expenses
legal and other consultations
loan programs
commissaries
training programs and literacy programs
travel (to work) expenses
work clothing allowance

Based upon the Colombian Ministry of Labor's Annual Report to

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[56] Alexander, Today's Latin America, op. cit., pp. 83-90; Centro para el Desarrollo Ecoromico y Social de America Latina (DESAL), America Latina y Desarrollo Social, tomo II, 2'd ed., DESAL, pp. 47-54. Santiago, 1966; Alexander T. Edelmann, Latin American Government and Politics, revised edition, pp. 291-315. The Dorsey Press, Homewood, Illinois, 1969; Towards Full Employment, op. cit., Appendix 8; Moises Poblete Troncoso and Ben G. Burnett, The Rise of the Latin American Labor Movement, pp. 23-5. College and University Press, New Haven, 1960.

Congress for 1968, the ILO prepared the following estimate of the average cost to large employers of the fringe benefits required by law.

item	percentage of basic wage
Contributions to National Apprenticeship Service	2.0
Family Allowances	4.0
Annual Vacation	4.2
Severance Pay	8.3
Annual Bonus	8.3
Pay for Sundays and Holidays	19.2
Transportation Subsidy	1.8
Social Security:	
non-occupational illness & maternity	4.0
work accidents & industrial disease	1.8
old age, invalidity and death	3.0
Pensions	8-15.0
	64. -72.

Source: ILO, Towards Full Employment, op. cit., p. 205.

The question we now have to consider is where labor costs can be cut. Although the answer, quite obviously, varies from country to country, one fruitful area for consideration is the administration of social programs. Ideally, ways can be found of maintaining certain of these benefits--perhaps even making the more important ones available to additional workers--while reducing their costs to employers.

It should be noted, however, that the administration of social programs in itself represents an important source of white collar employment which, by its nature, is highly labor intensive.[57] In Chile

[57] Administrative personnel could be reduced drastically if these programs were to become computerized, but this is precisely the type of capital-intensive innovation Latin America can easily do without.

Administrative costs might be reduced by a review of salary levels within the administering agency.

in 1959 it was discovered that "social security funds employed 38,700 persons, or 26 percent of the total number of public employees;" for most of Latin America's social security administrations, however, "ratios of one functionary to every 100 contributors seem to be common."[58]

A more appealing approach from the point of view of the private sector would be to have government take over the costs of many of the social benefits now provided by employers. Health, education, insurance, pensions, could all be incorporated into existing social security programs where this is not yet the case. Other benefits such as employee loans, commissaries, legal and other consultations, funerals, etc. might be eliminated, or alternatively taken over by the workers--with an initial financial boost from the employer--through local labor organizations or confederations.

Finally, we should look at the major component of the cost of labor ...wages, to see what bearing wage increases have upon job creation. As one would expect, the link is obvious and direct, in part perhaps because wages are also the most visible component of labor costs, the one which most readily signals an increase in costs to the employer.

It is always interesting to speculate on "what might have been," ...for example, if government had held the line on wage increases. In an attempt to do just that, Reynolds and Gregory used regression equations for the Puerto Rican manufacturing sector to "estimate the

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[58] Wolfe, op. cit., p. 10.

amount of employment foregone as a result of wage increases."[59] The procedure yielded "an estimated loss of about 9,000 jobs between 1949 and 1954, and of 29,000 jobs between 1954 and 1958, in the manufacturing sector only."[60] Presumably, employment was sacrificed in other sectors as well since the wage increase was quite general.[61]

In the surplus labor model of Lewis, wage increases in the industrial sector serve to signal additional waves of rural migrants into the urban work force. While we might not subscribe to Lewis' model, we do agree with Todaro's very sensible thesis that real income differentials, "adjusted for the probability of finding an urban job," do

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[59] Reynolds and Gregory, op. cit.

[60] Ibid., p. 101. Production worker employment in 1958 amounted to only about 60,000.

Biases operating in both directions are noted by the authors. "On the side of underestimation [no account was taken] of the fact that actual and anticipated wage increases may have deterred plants from locating in Puerto Rico." On the side of overestimation, the authors assumed a homogeneous production function which, in reality, may have yielded increasing returns to scale. Also, "by assuming a stable production function within each period we have excluded technical progress." (p. 102)

It should also be noted that a second path of adjustment--changes in product price--was not fully relevant in the Puerto Rican case due to the "openness" of the economy and the important influence upon local prices exerted by mainland levels. "If a price increase is in fact the only adjustment open to a producer, this is likely to be a guarantee of his extinction." (p. 83)

[61] Ibid., p. 101. In a 1965 article in the American Economic Review, "Wages and Employment in a Labor-Surplus Economy", Vol. LV, No. 1, March, 1965, Reynolds argues that the rapid rise in urban wages in Puerto Rico between 1950-65--which he attributes largely to minimum wage regulation--has operated to retard the expansion of factory employment. However, the productivity increases which resulted did not come from the introduction of labor-saving machinery but rather from improvements in organization and administration. (pp. 32-3) (In Puerto Rico, minimum wages are set separately for each industry and are geared to the estimated wage-paying ability of that industry. Most workers in an industry earn very close to the minimum rate so as the minimum is raised, which happens every year or two, the industry wage level is forced up by a proportionate amount. p. 28.)

account for much of the rural-urban migration occurring in Latin America today.[62]

A wages policy which would restrict unjustifiable wage increases thus appears as a practical adjunct to any strategy aimed at maximizing employment opportunities. While empirical data on "what might have been" is a predictably scarce commodity, it does seem to us eminently sensible that by restraining industrial wages--the major and most visible component of the cost of labor--more workers would find employment, and migration would to some extent be curtailed. Under the present circumstances of severe unemployment it would seem far more important to create additional jobs than seek to improve the conditions of work for those fortunate enough to have productive employment.

b. Providing Labor Legislation More Compatible with an Employment Strategy

One very important social benefit absent from the list of the preceding section is a program for unemployment insurance. The fact that "unemployment insurance plans are virtually non-existent in Latin America"[63] should not surprise anyone who has stopped to consider the implications of such a program for an economy characterized by chronic unemployment of ten to fifteen percent of the work force. In lieu of unemployment insurance, however, elaborate mechanisms have evolved to

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[62] Michael P. Todaro, "A Model of Labor Migration and Urban Unemployment in Less Developed Countries", American Economic Review, Vol. LIX, No. 1, pp. 138-48. March, 1969.

[63] Richard U. Miller, "The Relevance of Surplus Labor Theory to the Urban Labor Markets of Latin America", a paper prepared for the Second World Congress, International Industrial Relations Association, p. 17. Geneva, Switzerland, September 1-4, 1970.

protect job security, making it extremely difficult for employers to discharge workers once the latter have assumed a "tenured" status.

In most countries of Latin America this protection takes the form of severance indemnity for the discharge without "just cause" of tenured workers.[64] Unions and the labor courts have defended the security of workers in their jobs to such an extent that employers frequently feel obliged to move with extreme caution, if at all, in their recruitment of new workers. It was said, for example, of pre-Castro Cuba that "it was more difficult to fire a worker than to divorce a wife (although it was often easier to find a new wife than a new job)."[65]

Many authors agree that labor legislation in Latin America tends to be too protective of job security, serving often to injure the very classes it intends to benefit, increasing prices for goods and services,

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[64] "Just cause" is usually defined rather vaguely as including breach of trust (revelation of company secrets), fraud, immoral conduct, unjustified and continual absence from the job, etc. Incompetence would not be considered "just cause" in many labor courts, (Poblete Troncoso and Burnett, op. cit., p. 25) nor would lack of work, that is, a slump in production.

For a summary of labor legislation for 13 Latin American nations, see U.S. Department of Labor, Foreign Labor Information: Latin American Labor Legislation, U.S. Department of Labor, Washington, D. C., August, 1956.

[65] Wyatt MacGaffey and Clifford R. Barnett, Cuba, (Survey of World Cultures), p. 142. HRAF Press, New Haven, 1962; quoted in Edelmann, op. cit., p. 301.

The author can recall as a member of the board of directors of the "Club Andino Boliviano" discussion of a proposal to discharge the Club's elderly receptionist, who happened to be deaf. Bolivian labor law, however, requires severance pay for terminating an employee equal to one month's wages for each year of employment. Since it would have been prohibitively expensive to fire her, the board decided to keep her on, but hired a part-time receptionist in addition.

and forestalling economic growth.[66] This consideration, however, should be balanced against the fact that Latin America's "extensive social laws are helping to avoid some of the worst outrages which accompanied industrialization in a number of the older industrial countries, such as Great Britain and the Soviet Union."[67]

For purposes of the present discussion we propose to consider only one of the constraints upon job creation inherent in Latin America's progressive labor legislation--that stemming from the provisions for job security.

The labor movement in Latin America has a strength disproportionate to its size.[68] For many years it has championed improved working conditions and social benefits; the progressiveness of present labor legislation attests to its success. However, the philosophy of unionism in Latin America, as is true in most countries where a free labor movement has been allowed to develop, is essentially one of trade consciousness, as distinct from class consciousness. The union voices and defends the interest of the workers (meaning those working), often without regard for the interests of the working class, and usually without consideration of the broader social, economic and political interests of the nation. While it would be unreasonable to seek to deny to workers protection against arbitrary dismissal, such protection

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[66] See, for example, Harry Stark, Social and Economic Frontiers in Latin America, 2'd edition, p. 398. Wm. C. Brown Co., Dubuque, 1963; and Wilbert Moore, Industrialization and Labor: Social Aspects of Economic Development, Part II, p. 390. Institute of World Affairs, Cornell University Press, Ithaca, 1951.

[67] Alexander, Today's Latin America, op. cit., p. 90.

[68] For a discussion of the Latin American labor movement, see Poblete Troncoso and Burnett, op. cit.

might well be tempered by a consideration of how it affects the prospects of those seeking employment. While it is unlikely that unions will willingly relinquish the job security they have fought so hard for, a progressively broader interpretation of "just cause" by labor courts might achieve the same end.

In Colombia, the situation is as follows:[69]

> "Once a probationary period has elapsed, and unless a written contract expressly limits the employment relationship to a fixed period, an individual worker cannot be dismissed except for 'just cause', [the existence of which must often] be decided by a labour court, and if the latter does not find a just cause, the employer must pay a high, perhaps very high, indemnity, depending on the number of years of the worker's service."

The ILO team in Colombia was unable to get a "clear idea of what is generally regarded as 'just cause' for dismissal ...but it was our impression that a great deal of uncertainty prevailed among employers as to the meaning of 'just cause' and that, as a result, many felt that recruitment of a worker involved such considerable risks that it was to be avoided if possible."[70]

The Colombian labor code's treatment of individual employee dismissals[71] follows a pattern common to all nations of Latin America, deriving from the revolutionary Mexican Consitution of 1917.[72] Each differs in the length of the probationary period--from two months to

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[69] Towards Full Employment, op. cit., pp. 200-1.

[70] Ibid., p. 210.

[71] Decree No. 2351 of 1965 amended the Colombian Labor Code by making much more stringent the requirement for dismissal of employees. Ibid., p. 412.

[72] Article 123 "has served as a model for many countries." Poblete Troncoso and Burnett, op. cit., pp. 23-5.

one year--the interpretation of "just cause", and the height of the indemnity--typically a month's wages per year of employment,[73] but all have the same adverse impact upon the creation of new jobs.

As one would expect, employers have developed a number of techniques for legally circumventing those provisions of the labor code pertaining to employee dismissal. The most common of these is simply restricting the permanent work force to a minimum by frequently offering overtime work, which employees are usually very anxious to accept. The effective work force is thus expanded by the extent of the overtime, without the need to contract for additional workers.

Employers may also circumvent the dismissal provisions through short-term labor contracts, or simply by firing workers prior to the conclusion of their probationary period, both of which tend to foster an indifferent and arbitrary attitude on the part of management, and a feeling of insecurity on the part of labor. Surely the value of a mechanism which serves to provide extreme job security as the trade-off for reduced employment opportunities must be called into question in the design of any serious employment strategy.

A strategy for maximum employment should be so designed as to encourage management's recruitment of labor, not inhibit it. Employers should have at least as much freedom in their choice of a work force as they do in their choice of a capital component. If restrictions are to be imposed upon factor utilization, these should be explicit,... purposefully designed so as to afford maximum employment opportunity

[73]See U.S. Department of Labor, op. cit., pp. 25-34.

for the work force.

A review of national labor legislation in the light of a forceful employment strategy would be an appropriate first step for each of the nations of Latin America. All such legislation could then be subjected to the single, searching criterion of whether in fact the benefits afforded outweigh their cost to society in terms of job opportunities which never materialize.

c. Providing Explicit Subsidies for Labor Costs

As a final approach to reducing labor costs we should consider the possibility of subsidizing the costs of labor as perceived by employers. There are numerous variations on the basic theme, only a few of which we can touch upon here.

In an earlier section of the present chapter we raised the prospect of government assuming the costs of certain social benefits such as health and maternity plans, education programs, life insurance, family allowances, pensions, etc., under an expanded social security system. To the extent that employers could pass on a part of these costs to the government, private labor costs would decline, perhaps making employers more amenable to increased recruitment of (now lower priced) labor.

As a more explicit subsidy on labor costs, governments could "allow a premium to be added to the wage bill before it is deducted from sales proceeds to arrive at taxable income."[74] This approach might be varied so as to encourage low wages and employment of unskilled labor by allowing disproportionately larger deductions for lower paid workers.

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[74] Towards Full Employment, op. cit., p. 182.

Limitless variations are possible, but development planners should be forewarned that the ramifications of subsidies for labor costs may be quite complex and difficult to predict, and there is the possibility, for example, that the thrust of such programs may be lost upon job creation if they only serve to subsidize wage increases. If this occurs, such institutionalized wage supports would not only be counter-productive but quite difficult to reverse as well.

C. Alternative Techniques of Production

In the present chapter we considered several fiscal, monetary and wage policies which bear upon the factor price ratio with the intent of encouraging increased use of labor by making it relatively cheaper vis-a-vis capital. An implicit assumption has been that of the availability of efficient alternative techniques of production embodying progressively more labor and less capital, that is to say, we were making the classical assumption of a continuous production isoquant,... at least for the range to the labor side of present capital-labor ratios. However, as we noted elsewhere (and we will note again in the following chapter), in the real world, production isoquants for industry are highly discontinuous, particularly in the range of lower capital-labor ratios.

The entire employment creation argument then, seems to hinge upon the existence, or at the very least the development, of efficient labor-intensive alternative techniques of production. To simply force up capital costs cannot but lead to higher production costs, without

increasing employment opportunities, unless entrepreneurs have alternatives to which they can turn.[75]

In the present section we simply want to introduce the subject of alternative techniques of production, placing it in its crucial relationship to the programs for adjusting the factor price ratio which we have just considered. The next chapter deals in its entirety with the question of alternative techniques.

The argument for labor-intensity in production is a very appealing one, perhaps because it is harmonious--it seeks to resolve the employment problem by means of restoring equilibrijm to factor markets. Harmony in all things is highly appealing to our nature. The argument for labor-intensity is also very simple; it is an argument which anyone can understand: If unemployment is your problem, simply change your techniques of production so as to use more labor (and hopefully less capital) in satisfying the economy's needs for goods and services.

As it turns out, however, what appears promising at the macroeconomic level has proven disappointing at the level of the individual firm, particularly firms producing the more sophisticated industrial articles. For some production processes, perfectly acceptable labor-intensive alternative techniques of production may be available, requiring only some inducement for entrepreneurs to adopt them. But for the majority of industrial processes, new techniques will have to be developed--either through invention or as indigenous adaptations of standard processes--if labor is to increase its participation in the

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[75] "We cannot really blame entrepreneurs for making wrong choices when they have no opportunity for choice at all." Sachs, op. cit., p. 20.

production process.

In the following chapter we consider which industries within the industrial sector show promise for the development for such alternatives. Subsequently, we try to identify those sectors within the economy having the greatest potential for the productive absorption of labor. We also make an attempt to isolate the characteristics which provide scope for technique adaptation in certain areas yet restrain it in others. Finally, we consider the extent to which we may look to industry for solutions to the unemployment problem,...and what other sectors of the economy hold greater promise.

CHAPTER IV: ALTERNATIVE TECHNIQUES OF PRODUCTION

A. Introduction

Modern technology often reflects the efforts of the industrialized nations of the world to deal with the problem of how to expand production of goods and services within the constraints imposed by an increasingly less abundant supply of labor. In this respect, modern technology embodies productive techniques which serve to change the structure of employment by the substitution of machinery for manpower, thus increasing the productivity of labor.

The developing countries of today must also deal with the problem of how to expand production of goods and services, but the constraints upon them are quite different from those which confronted the nations which were developing 50 years ago. Today's developing countries must seek solutions to the development "riddle" within a framework characterized by an abundant and largely unskilled labor supply, severe unemployment, and a rapidly growing population. There is little reason to think that the solutions which so well served the requirements of the presently developed countries will serve equally well the needs of today's developing countries. Yet this is the implicit assumption underlying wholesale transfer and adoption of modern technology by developing nations.

1. The Development of Modern Technology

Barbara Ward has used the term "technological disproportion" in referring to the adoption of labor-saving techniques by nations in which such techniques constitute "the least suitable methods of production."[1] The resource proportions which characterize the economies of the developing world have never been known by the nations which develop and market the modern technology. "The whole weight of economic research and of investment in further research is virtually confined to the developed countries and has, for 50 years and more, taken the form of trying to find labor saving methods of production."[2]

According to Benjamin Higgins, an advanced technology has not yet "been discovered which is suited to the factor-proportions of underdeveloped countries."[3] Higgins continues: "Perhaps such a technology does not exist; but it is important to find out. Meanwhile, the lack of technological advance adapted to their factor-proportions is a serious obstacle to development of underdeveloped areas--an obstacle .. that scarcely existed in the Western world during its Industrial Revolution."[4]

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[1] Barbara Ward, "The Decade of Development--A Study in Frustration," in John A. Pincus (ed.) Reshaping the World Economy,, p. 27. Englewood Cliffs, N.J.: Prentice-Hall, 1968.

[2] Ibid., p. 27.

[3] Benjamin Higgins, Economic Development: Principles, Problems and Policies, (1st ed.), p. 258. W.W. Norton, N.Y., 1959.

[4] Ibid., p. 258.

The nature of the remedy, while obvious, is difficult to implement. The developing nations must seek to develop a technology of production which is far less capital-intensive than that of the "up-to-date machinery which persuasive gentlemen from the North Atlantic area come to sell them."[5] According to Hans Singer, the developing nations "cannot develop a technology harmoniously unless it is their own technology."[6]

In establishing an indigenous technology, the developing countries would appear to have an important potential advantage in that their research efforts can take the form of adapting the "accumulated knowledge of modern science and technology" to their own needs.[7] It is not entirely clear whether this is truly an advantage or, as Guy Hunter puts it, the late developing nations are "bedeviled by inheriting or adopting ideas and standards developed from the quite different experience, circumstances and needs of the world-dominating industrial civilization."[8]

From an historical perspective, Gerschenkron notes:[9]

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[5]Ward, op.cit., p. 28.

[6]Hans Singer, International Social Science Bulletin, "Problems of Industrialization of Underdeveloped Countries," Vol. VI, No. 1, p. 220-1. 1954.

[7]Bruce F. Johnston, The Journal of Economic Literature, "Agriculture and Structural Transformation in Developing Countries: A Survey of Research," Vol. VIII, No. 2, p. 396. June 1970.

[8]Guy Hunter, Modernizing Peasant Societies, pp. 19-20. Oxford University Press, 1969.

[9]Alexander Gerschenkron, Economic Backwardness in Historical Perspective, p.8. Belknap Press of Harvard University, Cambridge, Mass., 1962.

> "Industrialization always seemed the more promising the greater the backlog of technological innovations which the backward country could take over from the more advanced country. Borrowed technology, so much and so rightly stressed by Veblen, was one of the primary factors assuring a high speed of development in a backward country entering the stage of industrialization..."

For many developing economies, the "basic dilemna of neither being able to utilize foreign technology effectively nor having the resources and capabilities necessary for conversion"[10] create a feeling of frustration and inferiority which often results in irrational planning decisions being taken. It is precisely in those "human resources and levels of social organization" which are necessary for the successful adaptation of advanced technologies to local factor availabilities that the developing economies are deficient.[11] In fact, the capacity of an economy to adapt and transform technology to its needs may in itself be a fair measure of that economy's stage of development.[12]

Fully 95 percent of the world's scientific research is concentrated in about 30 developed countries, leaving the other 100 or so, "encompassing two-thirds of the world's population," to share the remaining 5 percent between them.[13] Salvador Allende has recently

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[10] Jack Baranson, Industrial Technologies for Developing Economies, p. 3. Frederick A. Praeger, New York, 1969.

[11] Ibid., pp. 3-4.

[12] Ibid., p. 4.

[13] Steven Dedijer, Minerva, "Underdeveloped Science in Underdeveloped Countries," Vol. II, No. 1, pp. 61-81, (Autumn, 1963), cited in Gerald M. Meier, Leading Issues in Economic Development, Studies in International Poverty, (2'd ed.) p. 322. Oxford University Press, New York, 1970.

referred to this "monopoly of science and technology" as "the important asset in the political, economic and cultural domination" of the developing nations by "neo-colonialism".[14]

International transfers of technology are quite common and take many forms--publications, foreign investment, import of machinery and equipment, movement of people, technical cooperation programs (official and private), and licensing, patent and know-how arrangements.[15] An international market in licensing and know-how arrangements--although in itself difficult to define and measure--has developed and a number of countries prepare statistics on their "technological balance of payments", the aggregate volume of which amounted to about one billion dollars in 1964.[16] (see Table IV-1).

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[14] Salvador Allende, Ceres, "Perspectives on Agrarian Reform," Vol. 4, No. 5, p. 16. Sept.-Oct. 1971.

[15] Meier, op. cit., p. 325. On international transfers of technology, see also Paul W. Strassmann, Technological Change and Economic Development, Chapter 2: "The Network for Diffusing Manufacturing Technology among Nations," Cornell University Press, Ithaca, 1968; and Baranson, op. cit., especially Chapter 4: "Advancing Technology Capabilities,". On transfer of technology in agriculture, see Lester R. Brown, Seeds of Change, p. 56. Praeger, New York, 1970.

[16] Meier, op. cit., pp. 325-6.

TABLE IV-1

Technological Balance of Payments, Estimates for 1964

(percentages of world total receipts or payments*)

	Receipts	Payments
United States	57%	12%
United Kingdom	12	11
Fed'l Rep. of Germany	6	14
France	5	11
Other Western Europe	18	25
Japan	1	13
Other Developed Countries	1	6
Developing Countries	**	8

Notes: * Excludes transactions among socialist countries, and between those countries and developing countries.

** Receipts of developing countries were negligible and in any case less than one percent.

Source: C.H.G. Oldham, The Transfer of Technology to Developing Countries, with Special Reference to Licensing and Know-How Agreements, Report of UNCTAD, TD/28, November 6, 1967. (from Meier, Op.Cit. p. 326).

It is often argued that the factor bias embodied in labor-saving techniques of production is "frozen" into the design of new equipment. Thus, a frequent problem with imported technology is the discrepancy between its efficient scale of operation and the size of the domestic market. 'The less developed countries face the alternative of either buying the standard equipment or paying higher prices for equipment especially designed for their own factor intensities. In either case, the input substitution which potentially exists in a technology does not become as fully available to the less developed countries as to

the advanced countries."[17]

Where adapting the scale of operations to the size of the local market leads to considerable dilution of the original advantage of the imported equipment, market size may be adapted to the equipment through the development of export markets. While this is by far the more progressive approach, the possibility of exporting is often not available to a developing nation, especially for new products of unproven quality.

It should be recalled that technological change is primarily a resource-saving, not a resource-using process,--the object of which is to economize on the use of scarce inputs. Given the international structure of scientific research, and the factor price ratios characterizing the "30 developed countries" in which the bulk of such research takes place, it is not surprising that technological change, as it occurs, results in production processes which correspond less and less to the needs of the "100 or so" developing economies.

From the point of view of any national economy, a technological change is beneficial if "it affords the satisfaction of demand at a lower cost in resources valued at social cost."[18] Just what the social

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[17] Richard S. Eckaus, American Economic Review, "Notes on Invention and Innovation in Less Developed Countries," Vol. LVI, No. 2, p. 106. May, 1966.

[18] Organization of American States, Inter-American Economic and Social Council, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies," VII Annual Meetings of the CIES, Sept. 10-20, 1971, Panama. Washington, D.C.: OAS, 19 August, 1971. p. 82. emphasis added.

cost of productive factors is will always elude economists. However, the existence of involuntarily unemployed and underemployed human resources implies that private manpower costs exceed their corresponding social costs. We argued above, in Chapter III, that just the reverse was true of capital. Consequently, if the factor price ratio, taken at social cost, were employed as a guide to selecting techniques of production, even more labor-intensity in the production process than that indicated by the private factor price ratio would be appropriate. That is to say, although the ratio of the price of capital to that of labor in developing countries indicates a need for increased labor-intensity in production, this ratio actually understates the socially desirable level of labor-intensity.

Although technological change is essentially a resource-saving process, such change may lead to increased labor-intensity in production if it results in a capital saving vis-a-vis currently employed techniques of production. However, as we noted earlier, the new technologies made available by the "30 developed countries" are designed to economize on labor through its substitution by capital, ---not the reverse.

Although technological change implies an economy in resource use, this should not be interpreted in the static sense of leading to unemployment of productive resources. The savings in production costs which this economy allows become translated into lower prices and/or increased payments to the factors of production, the effect of which is to expand aggregate demand within the economy. Thus, "the resources

released by technological change are used to increase the total output of the economy, which in turn is absorbed by the increase in demand that goes along with rising income and employment."[19]

2. Sectoral Differences in the Assimilation of New Technology

The differentail ability of different sectors of the economy to assimilate advanced technologies is frequently observed. This difference is especially dramatic as between agriculture and industry, particularly heavy industry. A.O. Hirschman, in making this observation in Development Projects Observed, found reason to distinguish on grounds of technological adaptation between those projects "closely enmeshed with the natural resources,"--typically agricultural projects--and other, "industrialized" projects. He observed that those projects "enmeshed with nature" tend to be characterized by "technological uncertainty and ignorance" making necessary the "adaptation of general scientific and engineering knowledge to them."[20] This need for "adaptation" is really the obverse side of the coin of employment absorption, and the fact that certain projects not only offer scope for adaptation, but actually require it, may provide the necessary opportunity for shaping the underlying productive technique along lines of factor availability.

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[19] Ibid., p. 82.

[20] Albert O. Hirschman, Development Projects Observed, p. 42. The Brookings Institution, Washington, D.C., 1967.

Of "industrialized" projects, Hirschman notes that because they are "copiable" or characterized by minimal "technological uncertainty", they may offer very little scope for adaptation to local factor proportions. Referring to those latter project types, he comments as follows:[21]

> "... projects that touch a country's terrain only lightly or whose processes require few local material inputs are particularly transferable and 'copiable' and therefore free from technological uncertainty: this appears in 'infrastructural' projects like telecommunications, electric power transmission, and airlines as well as in the typical 'last stage' industries with which the industrialization process based on import substitution has tended to get underway in newly developing countries. As long as standard imported inputs are merely being converted by imported machinery, uncertainty is at a minimum, but it increases as industrialization spreads through backward linkages and as more and more domestic inputs and raw materials are used."

Robert Solo sees the differential adaptability of agricultural versus industrial projects as explaining the "paradoxical emphasis" on industrialization on the part of otherwise low-productivity agricultural societies.[22] "The greater the differences in the context of technical operations, the more difficult it will be to adapt a technology that has evolved in a high-productivity society to the needs and circumstances of a low-productivity society." Thus, "the ineradicable differences in the natural parameters of agriculture," combined with deep differences in social circumstances, "probably makes it more difficult to adapt advanced agricultural

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[20] Albert O. Hirschman, Development Projects Observed, p. 42. The Brookings Institution, Washington, D.C., 1967.

[21] Ibid., p. 42.

[22] Robert Solo, "The Capacity to Assimilate an Advanced Technology," American Economic Review, Vol. LVI, No. 2, pp. 91-97. May 1966.

technologies than to adapt advanced industrial technologies for assimilation."[23]

This same point is made by Theodore Schultz in his remark that "it is much easier for a poor country to acquire a modern steel mill than a modern agriculture."[24]

Each of these authors has observed the same important qualitative difference between sectors in respect to their ability to "assimilate" advanced technology. The significance of this difference, so far as the development of alternative techniques of production is concerned, is that certain sectors,--notably agriculture, construction and many services--will offer the possibility for "improving efficiency and productivity while absorbing manpower", and without substantial capital investment, while for other sectors, especially heavy industry, it will prove quite difficult to provide techniques which will allow for productively absorbing an increased proportion of workers.[25]

As a first approximation at explaining the differential capacity of different sectors to absorb increased labor inputs we can say that by the nature of the productive process some activities, most notably

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[23] Ibid., p. 94.

[24] Theodore W. Schultz, "Economic Growth from Traditional Agriculture" in Albert H. Moseman (ed.), Agricultural Sciences for the Developing Nations, American Association for the Advancement of Science, p. 105. Washington, D.C., 1964.

[25] United Nations, Economic Commission for Latin America, Economic Survey of Latin America, 1969, Part three: Special Studies, ECLA Committee of the Whole, Fifth Extraordinary Session, p. 27. New York, 4-6 May, 1970. Emphasis added.

agricultural activities, can be performed with equal efficiency in a variety of ways, that is to say, a broad range of scales-of-operation are economically feasible. On the other hand, certain industrial activities are characterized by economies of scale and "most efficient processes" and efforts to vary from the optimum scale or process can be quite costly in terms of lost efficiency. We can "raise chickens in a tiny backyard" and hope to market the eggs at a profit, "but no hobbyist can build an automobile with only the tools of his workshop",[26] much less think of competing in price with the "big three".

Thus, the set of physically possible activities gives rise to a subset of activities which are economically feasible, and it is from among the latter that production processes must be chosen.

In the following sections we examine in turn the industrial, construction and services sectors in an effort to identify those areas of economic activity in which flexibility exists with respect to the choice among economically feasible production alternatives. In the case of industry, which is the subject of the next section, we will be particularly interested in defining those manufacturing activities which appear to offer greatest potential for the development of labor-intensive alternative techniques.

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[26] N. Georgescu-Roegen, Oxford Economic Papers, "Economic Theory and Agrarian Economics," Vol. 12, No. 1, p. 5. Feb. 1960. The major criticism which Georgescu-Roegen levels against applying the Marxian "law of concentration" to agriculture is that "no parallelism exists between the law of the scale of production in agriculture and in industry." Other distinctions which he makes between agriculture and industry, such as "the role of the time factor"--the ability to hasten mechanical but not biological processes,--and the "unflinching rhythm" of agriculture--the freedom to postpone industrial processes--are less relevant to the subject of labor absorption.

B. Industry

The level of capital intensity in industry and the rigidity in the proportions in which productive factors must be combined is frequently exaggerated, due in no small part to inappropriate generalizations from specific cases, usually in heavy industry. Because, "in general the techniques and equipment of a Brazilian or Indian steel mill are not markedly different from those of a German or American mill," David Felix concludes that industrial development in the developing countries "involves heavy fixed capital costs, the machinery and equipment component of which must be almost entirely imported."[27]

Leontief makes the point even more strongly. As a consequence of his belief in a single, most efficient productive process for all industries he defines the process of development as consisting "essentially in the installation and building of an approximation of the system...in the advanced economies of the U.S. and Western Europe and, more recently, of the USSR--with due allowance for limitations imposed by local mix of resources and the availability of technology

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[27] David Felix, International Development Review, "Agrarian Reform and Industrial Growth," Vol. II, No. 2, p. 18. Oct. 1960. The "steel mill case" has been strengthened by Mainland China's "expensive mistake" is trying to adapt the technology of steel making to her factor availabilities by producing steel in thousands of small "backyard" furnaces throughout the country. Although the effort has apparently been abandoned, the reason for its failure is not well understood, "but the problems seem to have been in the quality of the steel, which was uneven and typically poor." Charles P. Kindleberger, Economic Development, (2'd ed., international student edition), p. 264. McGraw-Hill, Tokyo, 1965.

to exploit them."[28] The optimism implied in the final part of this remark,--"with due allowance..."--is short-lived as one reads further; referring to recent (i.e., pre-1963) interest in "designing custom-made techniques to meet the special conditions prevailing in certain underdeveloped countries," Leontief insists that "...the choice of alternative technologies hardly exists."[29]

Thorbecke and Stoutjesdijk, in their recent study on employment creation in Peru and Guatemala, discount the ability of the "essentially urban, non-agricultural sectors to absorb labor productively" on the basis of "past evidence and future projections..(and) a judgment that the scope for improvement in the employment record of the modern sector in the next decade is quite limited."[30]

Others simply caution against policies of employment creation within the modern sector as misguided "urban solutions" to a "total

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[28] Wassily Leontief, Scientific American, "The Structure of Development," Vol. 209, No. 3, p. 116. (Sept. 1963). Reprinted in Scientific American, Technology and Economic Development, Alfred A. Knopf, New York, 1963.

[29] Ibid., p. 116

[30] Eric Thorbecke and E. Stoutjesdijk, Employment and Output: A Methodology Applied to Peru and Guatemala, Development Centre Studies, Employment Series: No. 2, pp. 10-11. OECD, Paris, 1971.

economy problem".[31] Such solutions, according to these critics, are destined to be self-defeating in the additional rural to urban migration they induce.[32]

Surely the question of employment creation and labor absorption in industry will not be answered in terms which are black and white. In fact, the intent of this section is precisely to explore behind the aggregate so as to gain insights into where there may be chinks in the industrial armor which, when penetrated, will pay off in terms of increased employment.

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[31] Carl K. Eicher, Ceres, "Danger: Underestimating the Population Explosion," Vol. 3, No. 6, pp. 35-9. Nov.-Dec. 1970. Eicher relates the case of Kenya which, in 1964 tried to deal with its unemployment problem through a tri-partite scheme involving government, private firms and trade unions. The scheme required all firms, including government, which employed more than ten workers to increase employment by ten percent. The program failed, due in part to inadequate government financing. When the scheme was reintroduced in 1970, unions were asked to cooperate by reducing their pressure for wage adjustments. The program would have to be counted as a failure, however, since it resulted in a flood of rural migrants to urban centers. (p. 37)

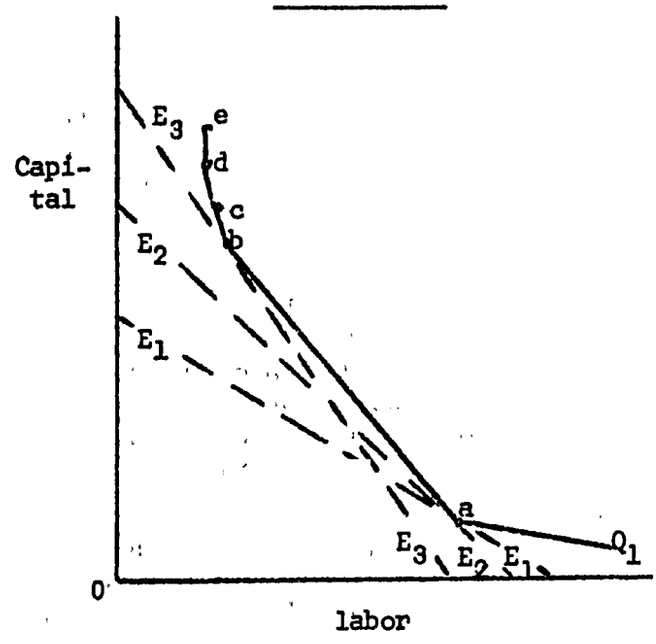
[32] Carl K. Eicher, et. al., "Employment Generation in African Agriculture," Institute of International Agriculture, College of Agriculture and Natural Resources, Research Report No. 9, Michigan State University, East Lansing, Michigan, pp. 10-11, July, 1970; John R. Harris and Michael P. Todaro, American Economic Review, "Migration, Unemployment and Development: A Two-Sector Analysis," Vol. LX, No. 1, pp. 126-142. March 1970. Both of these articles are in basic agreement that efforts to resolve the problem of urban unemployment cannot succeed unless accompanied by simultaneous efforts to make rural life more attractive, therby nullifying intersectoral real income differentials.

1. Factor Substitutability

a. Graphic Presentations

If real world production isoquants were continuous throughout the range of possible factor combinations, as the simple textbook models suggest, the unemployment problem would be quite manageable,--techniques of production could be readily adapted to the factor proportions as they exist in the developing world. Unfortunately, however, the isoquant for many production processes may be highly discontinuous, particularly in the region of low capital-labor ratios, as is suggested in a model by Harvey Leibenstein.[33] (See Figure IV-1).

FIGURE IV-1



Distinctly different productive techniques are represented by points a, b, c, d, and e in Figure IV-1. In this respect, the production surface can be thought of as the locus of all technological possibilities by which a given output can be produced. Technique "a" is the only available technique which is labor-intensive,

[33] Harvey Leibenstein, "Technical Progress, the Production Function, and Development," in W.W. Rostow (ed.) The Economics of Take-off into Sustained Growth, pp. 185-200. St. Martin's Press, New York, 1963.

corresponding perhaps to cottage industry.

The important assumption to note in drawing the production surface as we have is the absence of alternative techniques,--the large discontinuity--in the region of labor-intensity, where the amount of capital per worker is least. On the other hand, several alternative techniques of production are available when the capital-labor ratio is high.

At low wage rates, W_1, embodied in expenditure line E_1, technique "a" is most efficient. If the wage increases to W_2, technique "a" is still most efficient; however, since per capita output is unchanged, the higher wage is more difficult to sustain without product price increases. Only a very significant increase in the wage rate, to W_3, will lead to adoption of a new technique, the increased productivity of which is better able to sustain the higher wage level. On the other hand, once in the zone of high capital-labor ratios, small changes in wages will induce adoption of new techniques.[34]

Kindleberger's presentation[35] of the isoquants for industry seems to come closer to the problem. In Figure IV-2, the family of isoquants

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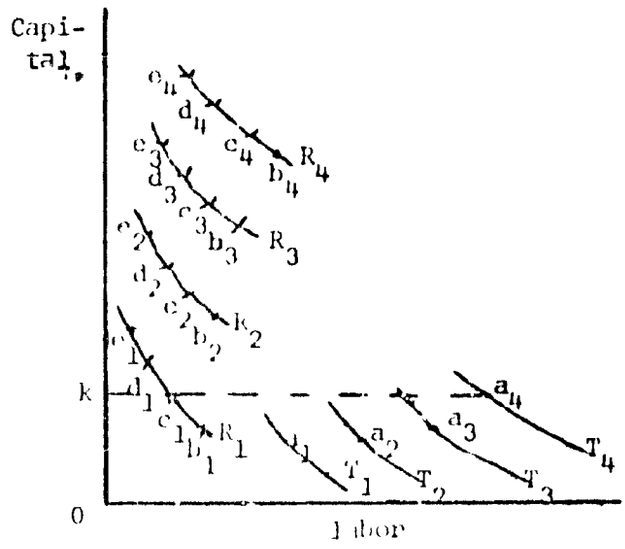
[34] Ibid., pp. 188-9

[35] Kindleberger, op. cit., pp. 250-1.

R_1, R_2, R_3 and R_4 correspond to capital intensive techniques of production; T_1, T_2, T_3 and T_4 correspond to labor-intensive techniques. a, b, c, d and e are distinctly different production processes.

FIGURE IV-2



Three cases can be considered:

Case 1. $R_1 = T_1$, $R_2 = T_2$, ...This case corresponds to the Liebenstein model of Figure IV-1 and nothing further need be said of it here.

Case 2. $R_1 = T_4$ (or $R_1 > T_4$).[36] This case characterizes many of the criticisms of labor-intensive production techniques in industry for it describes a situation in which a certain level of output, say Q_1, can be achieved by any of the techniques a_4, b_1, c_1, d_1 or e_1. Technique a_4 and c_1 have comparable output-capital ratios (in the case of $R_1 = T_4$), although labor productivity, that is the output-labor ratio, is lower for a_4. b_1 on the other hand uses less of both capital and labor in producing Q_1; thus, both the output-capital ratio and

[36] Case 2 could also be drawn on a single discontinuous isoquant by connecting b_1 on R_1 with a_4 on T_4 by means of a horizontal--but conceivably upward sloping--segment.

the output-labor ratio are higher for b_1 than for a_4.[37]

Case 2 forces us to consider the assumption of homogeneous capital and labor. Capital is a relatively homogeneous and liquid factor only until it is committed to a specific investment project. Once capital assumes a fixed form it becomes, "like families of indentured servants committed for several generations,"[38] neither homogeneous nor readily convertible into other forms. The physical capital embodied in process c_1 resembles that embodied in b_1 and d_1 far more closely than it does that in a_4. It resembles a_4, however, in respect to its purchase price, that is, K units of liquid capital could have been converted either into the capital component of c_1 or a_4. The fact of capital's durability, however, points up the importance of the investment decision in fixing factor proportions for many years into the future.

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[37] "...as techniques are made less capital-intensive, more labor can, of course, be employed with any given volume of investment, but it does not appear to be the case that techniques that employ more labor per unit of capital always yield a larger output per unit of capital. Indeed, in a number of cases it has been observed that some techniques that use much labor also use much capital per unit of output." ILO, Employment Objectives in Economic Development, Report of a Meeting of Experts (Geneva 1961), cited in Werner Baer and Michael E.A. Herve, Quarterly Journal of Economics, "Employment and Industrialization in Developing Countries," Vol. 80, No. 1, pp. 96-7. Feb. 1966.

[38] Strassmann, op. cit., p. 122. In commenting on the comparative flexibility of capital and labor, Strassmann notes: "like families of indentured servants committed for several generations, not just services but a part of the stock is committed to a firm...The free worker does not become as merged with the business as does capital because in-plant training, strange locations, and queerness of task seldom render him as unfit for employment elsewhere as are some specialized instruments and buildings."

Insofar as process a_4 requires a larger input in terms of labor than does c_1, the technology of a_4 can be viewed as "capital stretching" in the sense of requiring less capital per unit of labor in production than process c_1.

Unfortunately, however, the choice of a labor-intensive technique may conflict with other investment criteria; for example, maximum absorption of labor may yield low returns per unit of capital and fail to maximize future growth rates for output. Hla Myint poses the trade-off as follows:[39]

> "The advantage of the more labour intensive techniques is that for a given amount of capital investment they create a larger volume of employment. Since most of the wage income is spent on consumption, there is therefore a higher level of present consumption. Since a larger volume of employment means that the available income is spread over a larger number of people, there is also a higher degree of economic equality. On the other hand, the advantage of the more capital-intensive methods is, that for a given amount of capital investment, they yield a higher net output or surplus above the wage bill; this surplus can be made available for further investment. So although they yield a lower volume of present employment and consumption, they promise a higher potential level of employment and consumption in the future. There is, however, a greater degree of unequal distribution of income between the (state or private) 'capitalists' who obtain the surplus and the wage earners, and also between those workers who obtain immediate employment and those who for the present are left unabsorbed in the productive process."

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[39] Hla Myint, The Economics of the Developing Countries, p. 139. Praeger, New York, 1969.

Case 3. The final case assumes that R_1, R_2, R_3 and R_4 are the only possible ways of producing the good, say steel. This case characterizes the criticism that "...alternative technologies hardly exist." Such a conclusion, however, overlooks a wide range of possibilities wherein "substitution of variable costs which are typically more labor-intensive for fixed costs, which are capital-intensive," is a distinct possibility.[40] "It is possible to produce gasoline from a simple pipe still and not always necessary or economic to install catalytic crackers."[41] However, the same author concedes the point "that for some products it is necessary to use considerable amounts of capital to get any output at all."[42]

If the production process is viewed as a sequence of interrelated stages, rather than as a unified, unalterable process, interesting possibilities for employment creation can be discerned. Lewis has noted the possibility for employing more labor inside the factory "in moving things about, in the handling of materials,... in packaging."[43] That is to say, capital-intensive methods should be employed at those stages in the production process where their use is critical in capturing "the essential quality of the tool element in equipment"; however, there is far less justification for

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[40] Kindleberger, op. cit., p. 251.

[41] Ibid., p. 251

[42] Ibid., p. 251

[43] W. Arthur Lewis, Development Planning, p. 60. Harper & Row, New York, 1966. David Felix, on the other hand, refers to such efforts as "crude adaptations...in which the raw material inputs and final products are manhandled primitively." op. cit., p. 18.

accepting the "superfluous labor-saving appendages of the advanced technology of industrial countries."[44] "Machinery to cut metal makes more sense that machinery to move it,"[45] and methods which may pay off socially "when wages are $8. a day...may not be optimal when (wages) are $1. a day..."[46]

In purely economic terms, the explanation behind the "irrational" choice of capital-intensive techniques in circumstances where labor is obviously in abundance lies in the basic profit-maximizing rule of equating marginal cost with marginal value product. The paradox whereby labor is abundant yet not cheap, while capital, despite its scarcity is actually inexpensive, can occur if "the ratio between wages and the price of other factors is greater than the ratio between the corresponding marginal productivities."[47] That is to say, if an additional dollar spent on capital produces more in terms of output than an additional dollar spent on labor, regardless of how low the level of wages may be, the profit maximizing entrepreneur will opt for increasing capital.

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[44] Meier, op. cit., p. 438. Meier defines the problem of adaptation as one of devising new technologies which maintain "the essential quality of the tool element in equipment without the superfluous labor-saving appendages of the advanced technology of industrial countires." emphasis added.

[45] Kindleberger, op. cit., p. 265.

[46] Felix, op. cit., p. 18.

[47] Georgescu-Roegen, op. cit., pp. 39-40.

b. Elasticity of Substitution

The elasticity of substitution (σ) is a measure of the degree to which capital and labor tend to be substituted for one another in response to changes in their price ratio. Estimates of σ based upon industrial census data for 19 countries were developed by Arrow, Chenery, Minhas and Solow in their work on the Constant Elasticity of Substitution (CES) production function[48] (see Table IV-2).

TABLE IV-2

Cross-Country Estimates of the Elasticity of Substitution

ISIC No.	Industry	σ
202	Dairy products	.721
203	Fruit and vegetable canning	.855
205	Grain and mill products	.909
206	Bakery products	.900
207	Sugar	.781
220	Tobacco	.753
231	Textile - spinning and weaving	.809
232	Knitting mills	.785
250	Lumber and wood	.860
260	Furniture	.894
271	Pulp and paper	.965
280	Printing and publishing	.868
291	Leather finishing	.857
311	Basic chemcials	.831
312	Fats and oils	.839
319	Miscellaneous chemicals	.895
331	Clay products	.919
332	Glass	.999
333	Ceramics	.901
334	Cement	.920
341	Iron and steel	.811
342	Non-ferrous metals	1.011
350	Metal products	.902
370	Electric machinery	.870

[48] K.J. Arrow, H.B. Chenery, B.S. Minhas and R.M. Solow, The Review of Economics and Statistics, "Capital-Labor Substitution and Economic Efficiency," Vol. XLIII, No. 3, pp. 225-250. Aug. 1961.

TABLE IV-2, continued.

Notes: Countries included in the sample are: U.S., Canada, N. Zealand, Australia, Denmark, Norway, Puerto Rico, U.K., Colombia, Ireland, Mexico, Argentina, Japan, El Salvador, Brazil, S. Rhodesia, Ceylon, India, Iraq. Data pertain to different years between 1949 and 1955.

Source: K.J. Arrow, H.B. Chenery, B.S. Minhas and R.M. Solow, The Review of Economics and Statistics, "Capital-Labor Substitution and Economic Efficiency," Vol. XLIII, No. 3 p. 227. August 1961.

Indications of "varying degrees of substitutability in different types of production",--the fact that "technological alternatives are numberous and flexible in some sectors, limited in others"--led the authors to hypothesize a constant elasticity of substitution for each industry.[49] A single production function for all countries was assumed; thus, although the same industry in different countries may produce with different capital labor ratios, it nevertheless was assumed to operate on the same set of uniquely-shaped iso-product surves (of constant elasticity of substitution). A lower value for σ indicates a lesser degree of technical substitution between capital and labor in response to a change in their price ratio.

Thus, factor proportions in dairy products (σ= .721), sugar (σ= .781), tobacco (σ= .753), and knitting mills (σ= .785) are seemingly more rigid than in pulp and paper (σ= .965), clay products (σ= .919), glass (σ= .999), and non-ferrous metals (σ= 1.011). (see Table IV-2)

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[49] Ibid, p. 225.

e. A Third Factor of Production

As we noted earlier, technological change implies a more efficient use of an economy's scarce resources. Given capital as the scarce factor in the developing countries, the aim of technology should be to economize in its use, or maximize the output which can be gotten from it.

Many authors, however, have noted a third factor of production--skilled labor--which, in the developing countries, is more scarce and more crucial to the production process than capital. The scarcity of skilled labor, and the consequent necessity to maximize its productivity, can take precedence over efforts aimed at economies in the use of capital. Hla Myint notes:[50]

> "Many underdeveloped countries suffer from a greater shortage of skills than of material capital, so that they sometimes prefer more expensive machinery, which reduces repairs and maintenance, to cheaper or secondhand machinery which, although it might reduce the ratio of capital to unskilled labor, requires a larger amount of the scarcest factor, skilled labor."

Baer and Herve draw upon Hla Myint's theory of a third factor of production in developing their concept of "effective supply of labor".[51] "A skilled worker without either capital or unskilled labor is unproductive. However, capital and unskilled labor need to be combined with skilled labor to be productive. Thus, a minimum of skilled labor is needed per unit of unskilled labor and per unit of

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[50] op. cit., p. 137. Emphasis added.

[51] Baer and Herve, op. cit.

capital."[52] It follows then that the "effective supply of unskilled labor is determined by the amount which can be combined with the available supply of skilled labor,... and a similar reasoning can be applied to capital."[53] By this line of reasoning, the "effective supply of unskilled labor" will be smaller than the actual supply to the extent that skilled labor (and capital) constrains the utilization of the actual supply. Thus, with capital and skilled labor seen as competitive factors in production, the profit-maximizing allocation of resources may call for the substitution of capital for skilled labor, with unskilled labor being employed in proportion to the availability of skilled labor.[54]

That skilled labor, and not capital, is the constraint in industrialization was confirmed at the United Nations' Industrial Programming Seminar held in Sao Paulo in 1963. There, representatives of development banks and international lending agencies "agreed

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[52] Ibid., p. 100. In a "Comment" the authors clarify their use of the term "skilled labor" as "supervisory personnel limiting the effective supply of unskilled labor," and elsewhere, "complementary to unskilled workers. ...the noncommissioned officers of the labor infantry" with abilities for demonstration, teaching, discipline and close supervision. The authors distinguish this type of skilled labor from "skilled labor complementary to capital equipment. ...highly skilled technicians", the supply of which can be rapidly increased by imports and training. Quarterly Journal of Economics, "Employment and Industrialization: Reply," Vol. 81, No. 3, pp. 532-3. Aug. 1967.

[53] Baer and Herve, op. cit., p. 100.

[54] David F. Ross, Quarterly Journal of Economics, "Employment and Industrialization in Developing Countries: Comment," Vol. 81, No. 2, p. 338. May 1967.

almost unanimously that at least temporarily the supply of low-interest foreign capital exceeded the need for funds of acceptable investment projects. Skilled labor and reputable management were the shortage."[55]

The Baer-Herve thesis that the "effective supply of labor" is determined by the level of complementary capital and skilled labor available to the production process is borne out by Strassmann's description of the limits of labor absorptivity:[56]

> "Where labor is less trained and skilled, management may have to spend more on other factors of production to get an enterprise going. Relative factor prices, that is, lower wages, can hold up this shift in spending only as long as some elasticity of substitution remains. But workers of low skill have less ability to replace other factors: Where this ability becomes zero, no wage cut will bring an extra man into a plant. Instead, the services of more machines or more supervision will be bought. More supervision can make up for a worker's inexpertness in materials and processes, his nonchalance about coordinating one task with another, and his disdain for long hours of gray captivity.
>
> "Unfortunately, supervisors who can do their job well are usually scarcer and harder to train than anyone and constitute perhaps the greatest bottleneck for economic development."

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[55] Strassmann, op. cit., p. 123. Strassmann discusses "attempts to solve the supervisory shortage" as falling into six categories: "externalization, foreign hiring, use of graduate engineers, use of engineering dropouts, special training, and promotion from the ranks". pp. 96-102.

[56] Ibid., p. 93.

2. The U.S. Manufacturing Data.

In that the U.S. is the major supplier of capital equipment and technology for Latin America, perhaps we can learn something about labor-absorption in manufacturing industries by studying U.S. industrial data. Presumably, any technique which is used in the U.S. is also available for export.

Given a set of manufacturing data such as is available in the U.S. Census of Manufacturing, what measures or characteristics might we look for as a guide to labor absorptivity and economy of capital?

As an approximation, we can look for industries where small scale operations are able to hold their own with larger ones. Since small scale industry is typically less capital-intensive than is large scale industry,[57] the existence of successful small scale operations would identify an industry in which plant size can be matched to market size, without excessive capital expenditure.

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[57] This is an important assumption in Harry Oshima's analysis of the employment problem in Asia. Economic Development and Cultural Change, "Labor-Force 'Explosion' and the Labor-intensive Sector in Asian Growth", Vol. 19, No. 2 pp. 161-183. January 1971.

Bert Hoselitz comments that "small industry is usually much more labor-intensive than large industry." Journal of Economic History, "Small Industry in Underdeveloped Countries", Vol. 19, No. 4, p. 607. December 1959.

The assumption is generally confirmed by U.S. data from the Census of Manufactures. However, establishments of the smallest scale (1-4 employees) prove an exception. The extremely high levels of capital intensity of these plants may be due to indivisibilities of capital and other factors leading to over-capitalization.

Once such an industry is identified, its production process can be made more labor using by substituting labor for machinery in the handling, inspecting, packing, storing, etc., stages of the manufacturing process without significantly affecting the basic tool qualities of the actual production process. What is less certain, however, is the "cost-benefit" of such an adaptation to conditions of the developing nations, and the differential capacity for adaptation of different industrial processes.

Based upon data from the 1954 U.S. Census of Manufactures we developed indicators for each of the Standard Industrial Classification (SIC) 2-digit manufacturing industries. (See Figure IV-3). For each of these industries, three ratios--value added per employee; new capital expenditures per employee; and new capital expenditures to value added--are plotted as discrete functions of plant size measured by number of employees per establishment. Several interesting patterns are observed.

First, with respect to worker productivity (value added per employee), two basic patterns are discernible. The first of these productivity patterns--a continuous upward curve, or a "U"-shaped curve which bottoms-out early,[58] identifies industries characterized by economies of scale in production, ...the undustries in which increased size and increased worker productivity go hand in hand.

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[58] The high initial levels of productivity in the case of U-shaped curves is explained by high levels of capital intensity for plants with 1-4 employees (see preceding footnote).

FIGURE IV-3

Ratios of:

Value Added per Employee
New Capital Expenditures per Employee, and
New Capital Expenditures to Value Added

by Size of Establishment (number of employees),
for SIC 2-digit Manufacturing Industries.

(Ratios converted to index numbers:
ratios for plant size 10-19 employees = 100)

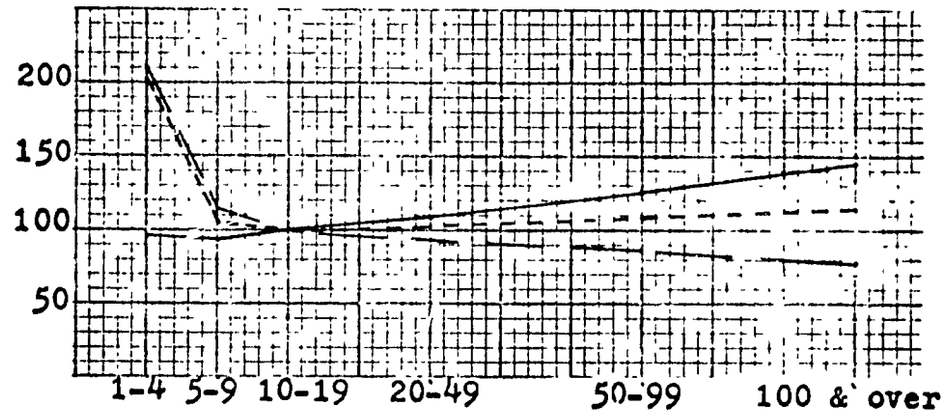
Key:

——— value added per employee (Q/L)

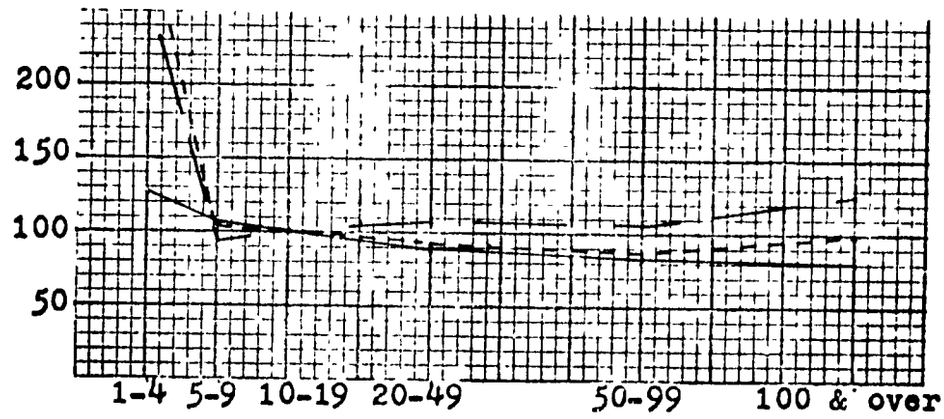
- - - - - new capital expenditures per employee (K/L)

—·—·— new capital expenditures to value added (K/Q)

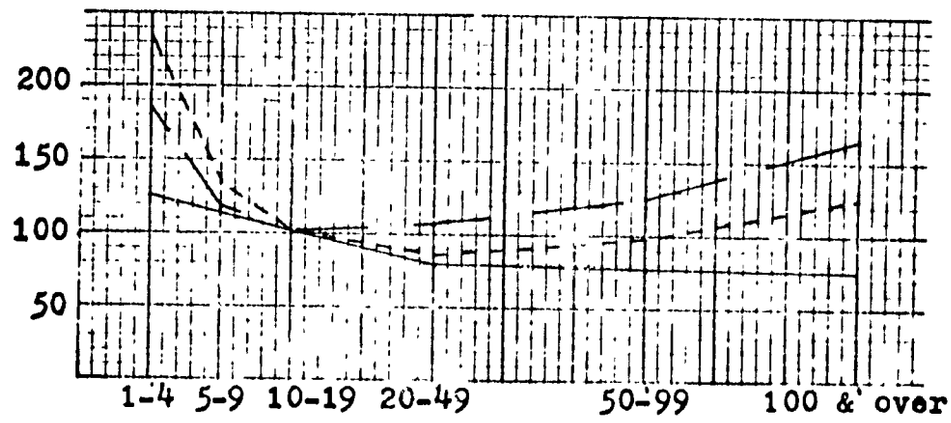
20. Food and Kindred Products



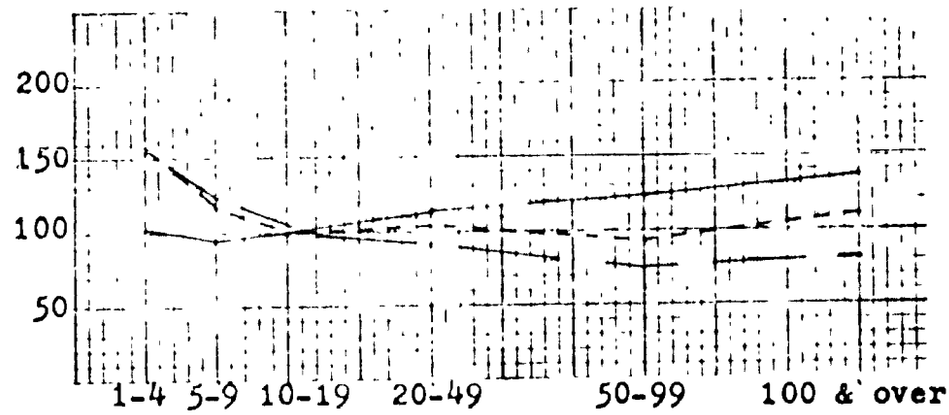
22. Textile Mill Products



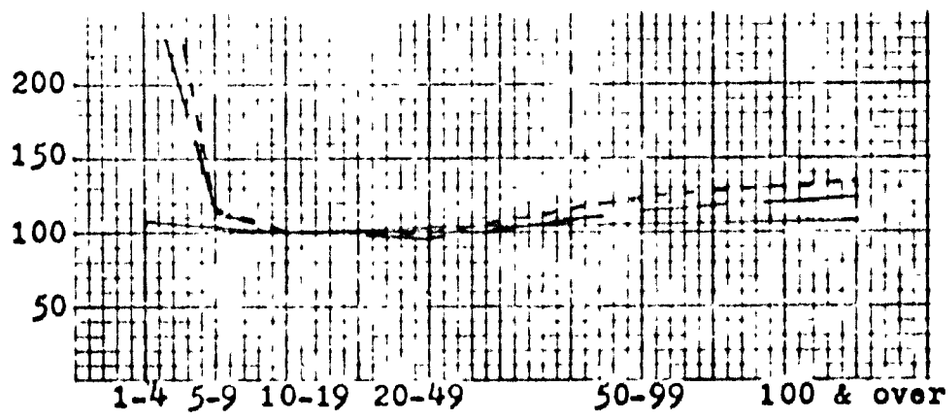
23. Apparal and Related Products



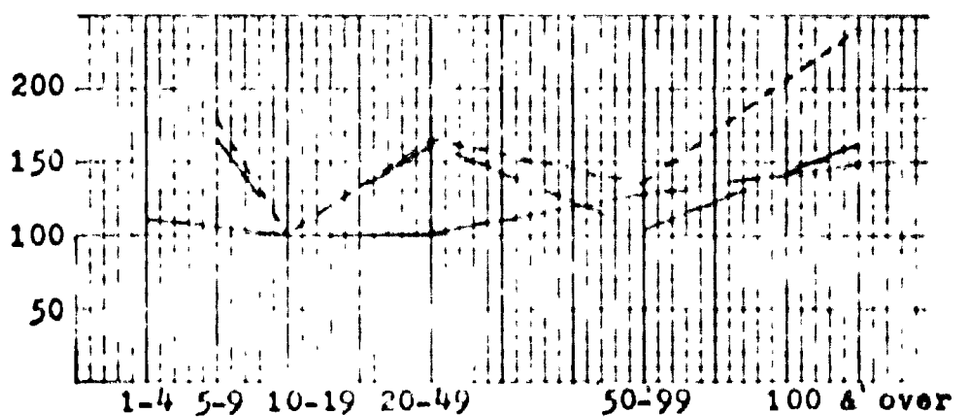
24. Lumber and Wood Products



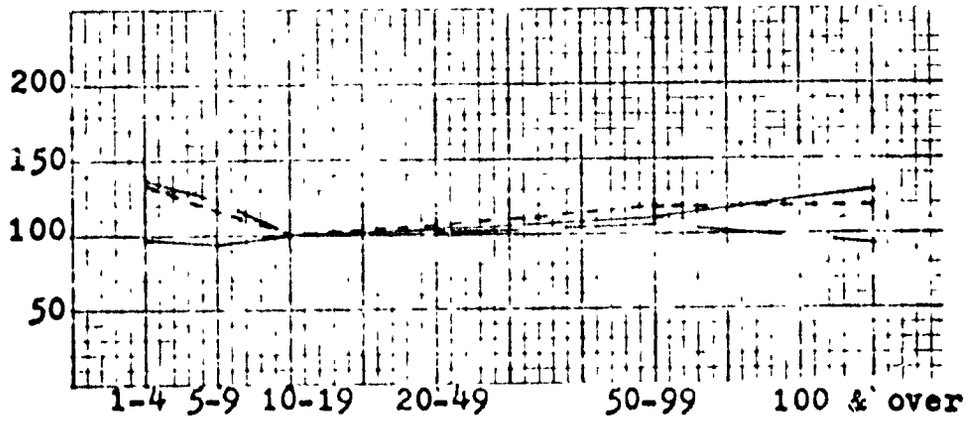
25. Furniture and Fixtures



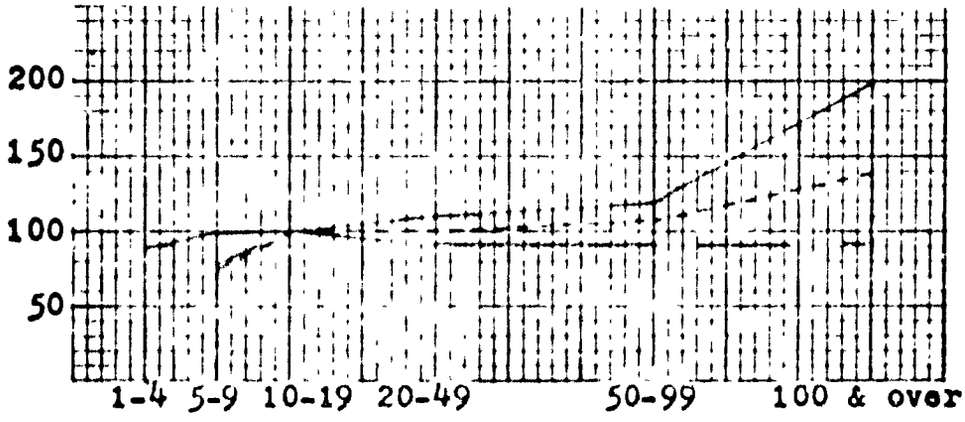
26. Pulp, Paper and Products



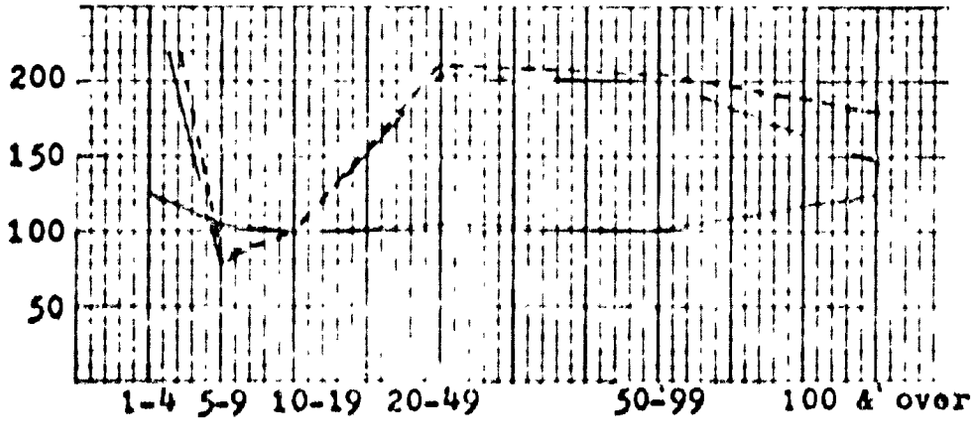
27. Printing and Publishing



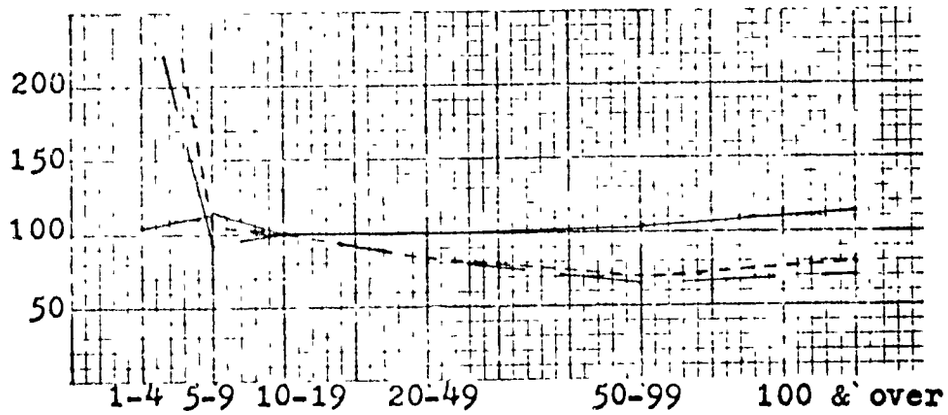
28. Chemicals and Products



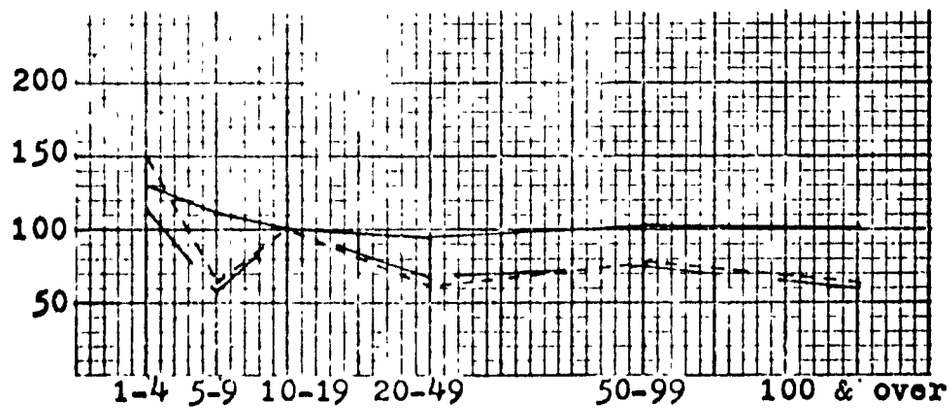
29. Petroleum and Coal Products



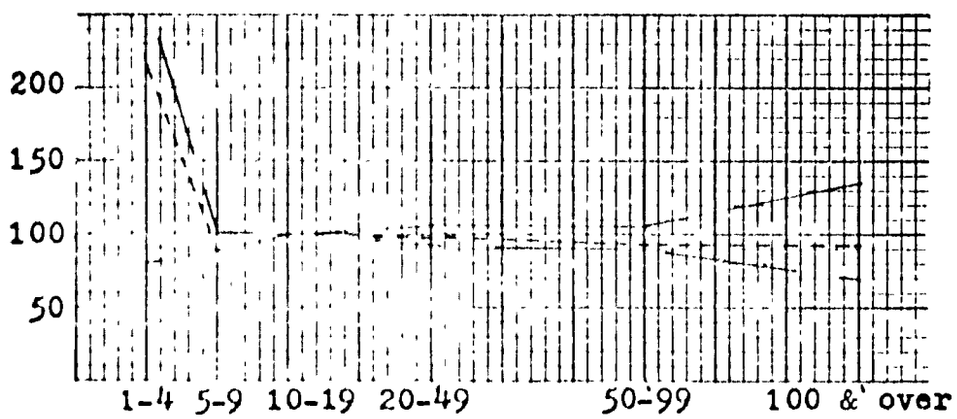
30. Rubber Products



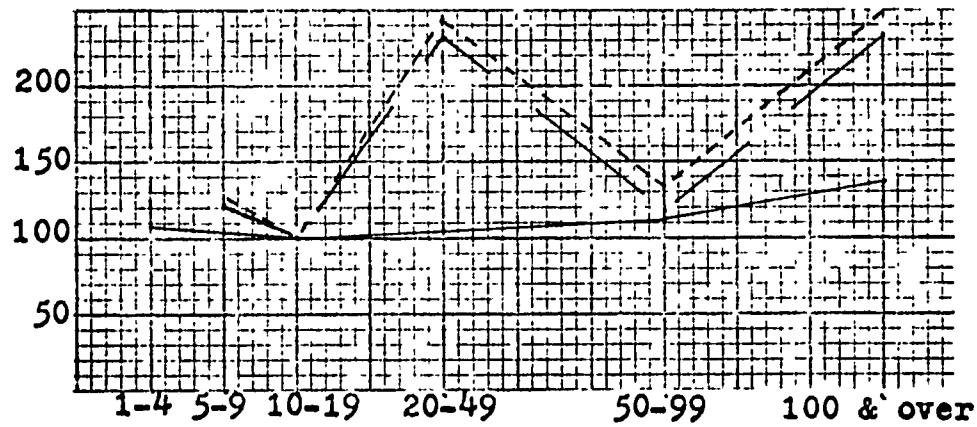
31. Leather and Leather Goods



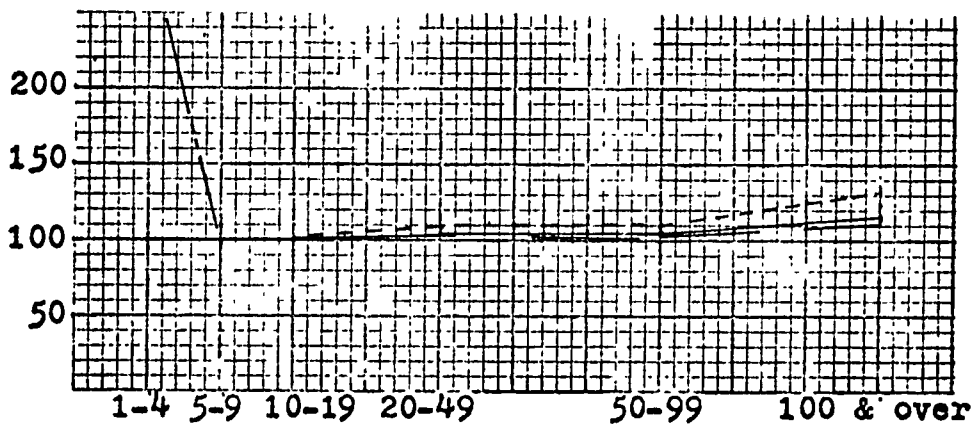
32. Stone, Clay and Glass Products



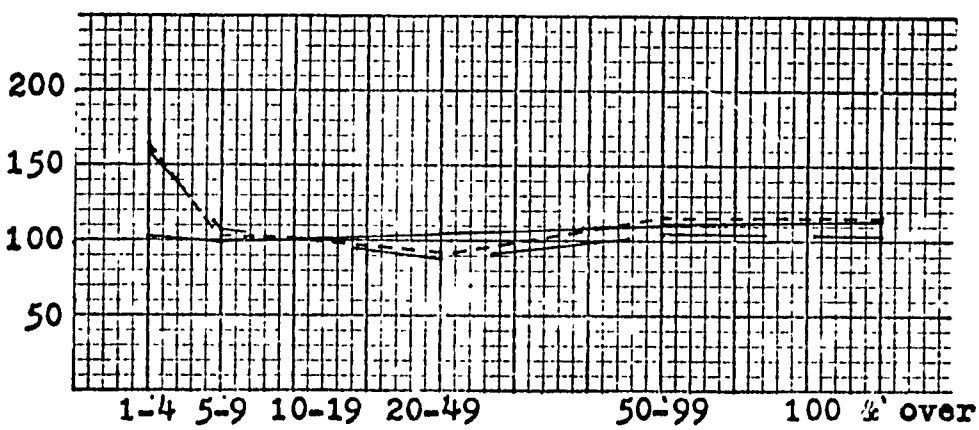
33. Primary Metal Industries



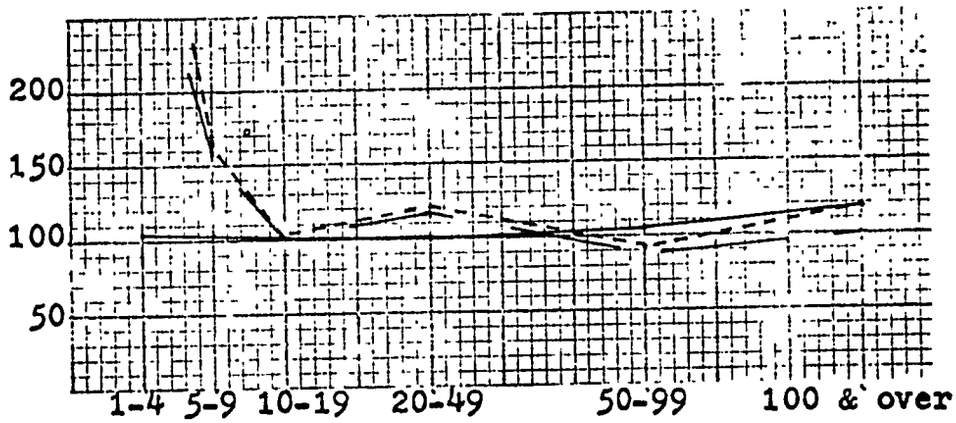
34. Fabricated Metal Products



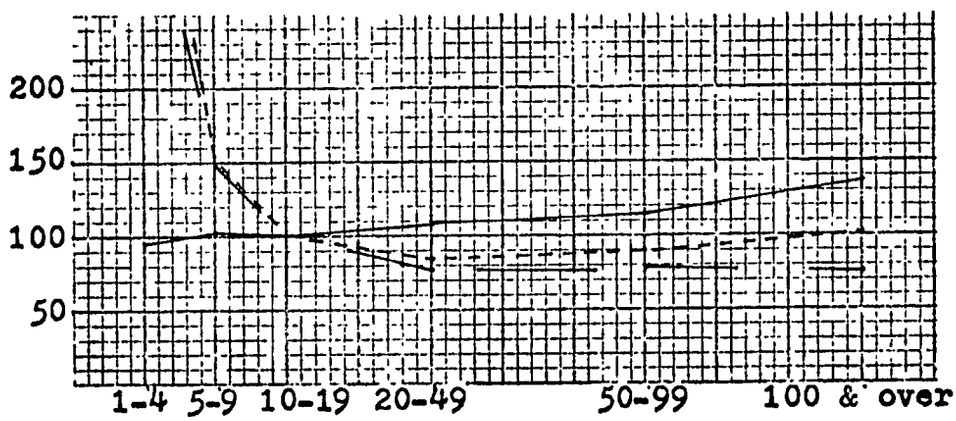
35. Machinery, except Electrical



36. Electrical Machinery



37. Transportation Equipment



Source: Based upon U.S. Census of Manufactures, 1954.

Industries which fall into this first broad productivity pattern, in which large scale seems to be a decided advantage, include--

20 food and kindred products
21 tobacco manufactures
24 lumber and wood products
26 pulp, paper and products
27 printing and publishing
28 chemicals and products
29 petroleum and coal products
32 stone, clay and glass products
33 primary metal industries
34 fabricated metal products
35 machinery, except electrical
37 transportation equipment

The second broad productivity pattern is characterized by productivity curves which are flat, continuous downward, or U-shaped but late to bottom-out. A superficial reading of these curves would suggest a group of industries which appear to allow for a constant level of productivity over a wide range of plant scales, that is, scale of operation can be matched to market size without having to accept a loss in worker productivity. Included within this productivity pattern are--

22 textile mill products
23 apparel and related products
25 furniture and fixtures
30 rubber products
31 leather and leather goods
36 electrical machinery

It is this latter group of industries which, tentatively, would appear to offer the developing nations greater prospect for employment expansion within the context of capital scarcity and a severely circumscribed local market.

New capital expenditures per employee is intended as a proxy for capital intensity.[59] When this measure is considered, additional light is shed on our productivity groupings. Of the six industries in group II, five show a tendency towards declining capital-labor ratios with scale of plant.[60] The sixth, electrical machinery, exhibits erratic swings in the capital-labor ratio, although capital intensity measured by horsepower per employee and electricity used per employee reveals a general capital deepening with increase in plant size.

The ratio of new capital expenditures to value added is our proxy for the capital-output ratio. This measure, particularly the incremental capital cost of new output, should be of primary concern to capital-scarce economies.[61] For the first five industries of group II capital costs of output appear to decline with plant size;[62] for electrical machinery the ratio is once again erratic. Thus, a tentative conclusion can be ventured that:

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[59] When this indicator gave ambiguous results it was supplemented by horsepower per employee and electricity used per employee.

[60] While this is not strictly true for "#23 apparel and related products", levels of capital per employee in this industry are extremely low throughout all plant sizes.

[61] According to David Granick, this is the measure which capital-economizing Soviet policy-makers strive to minimize. Quarterly Journal of Economics, "Economic Development and Productivity Analysis: The Case of Soviet Metalworking," Vol. LXXXI, No. 2, pp. 205-233, May 1967. There is little reason to think that this should be an important goal for U.S. entrepreneurs.

[62] Apparel is again an exception; however, capital costs of output for all plant sizes are extremely low.

textile mill products,
apparel and related products,
furniture and fixtures,
rubber products, and
leather and leather goods

display characteristics suggesting possibilities for a wider range of factor substitutability than the industries we have excluded.

We sought to test the hypothesis that in these five industries small establishments are able to hold their own against larger plants. Only a superficial test was possible, the results of which do not support the hypothesis. Despite an increase of almost 19,000 establishments between 1954 and 1967, seven industries--food, tobacco, textiles, apparel, lumber, furniture and leather--all producing traditional wage goods, registered declines in the total number of their establishments (see Table IV-3). These declines were largely concentrated in the small and medium sized plants; in the case of food, apparel and furniture, large scale plants (100 and more employees) actually increased their number. Thus, the very industries we identified as displaying characteristics suggesting their appropriateness to the economies of the developing nations are also precisely those which, in the U.S., are experiencing rapid increase in concentration.[63]

For the balance of the 2-digit industries, all of which showed an increase in the total number of their establishments between 1954 and 1967, evidence of growing concentration is also apparent.

[63] #30 rubber products appears to be the only one of the five industries of group II which did not experience a decline in the total number of its establishments. Actually, SIC #30 was redefined in 1957 to include the rapidly growing plastics industry.

TABLE IV-3

U.S. Manufacturing Sector: Net Change in Number of Establishments, 1954-1967,

by Size of Establishment, Selected SIC 2-digit Industries

SIC 2-digit Industry	All Establishments	Size of establishment (No. of Employees)			
		1 - 4	5 - 19	20 - 99	100 & over
20. food	-9856	-3565	-6136	- 758	+ 623
21. tobacco	- 298	- 153	- 49	- 35	- 61
22. textiles	- 990	- 70	- 511	- 275	- 134
23. apparel	-4979	-1308	-3096	-1334	+ 759
24. lumber	-4689	+ 115	-4220	- 544	- 40
25. furniture	- 265	- 288	- 414	+ 207	+ 230
31. leather	-1160	- 384	- 476	- 253	- 47
Total. All SIC 2-digit industries	+18,863	+10,554	-8357	+9976	+6690

Source: Based upon U.S. Census of Manufactures, 1954, 1967.

Table IV-4 presents aggregate data on the change in the size structure of the U.S. manufacturing sector between 1954 and 1967. Disproportionately large increases in number of establishments are accounted for by large scales, and when it is recalled that a large plant may be several hundred times larger than a small plant, the impression of growing concentration is reinforced. The significant increase in the number of very small scale plants (1-4 employees), however, should not go unnoticed.

To determine whether small scale plants were able to maintain their competitive position within their respective industry at the 4-digit level we looked at one example each from the two broad productivity patterns observed earlier. From the "economies of scale" pattern we selected SIC #20-food and kindred products, and from the constant productivity pattern we selected #25-furniture and fixtures. The same general trend towards increased concentration was observed, however, with no 4-digit industry revealing itself as uniquely adapted to small scale production.

As one would expect, small scale production is more characteristic of some industries than others. Table IV-5 indicates for the U.S. the proportions of total establishments for each 2-digit industry falling into small (1-49 employees), medium (50-99 employees) and large (100 and more employees) scale production.[64] The industries

[64] On the differential importance of small scale establishments in postwar Europe's manufacturing sector, Hoselitz has noted: "In general the proportion of the labor force in small industry [50 and fewer employees] is significantly higher than the national average in the food processing, leather, construction, metal fabrication, and machinery industries, and significantly lower in textiles, mining, basic metal production, paper and chemical industries. In other words, the 'heavy' industries have, on the whole, considerably larger establishments than the 'light' industries." op. cit., p. 603.

TABLE IV-4

U.S. Manufacturing Sector: Number of Establishments, by Size of Establishment, 1954 and 1967

	All Establishments	Size of Establishment (No. of employees)					
		1 - 4	5 - 9	10 - 19	20 - 49	50 - 99	100 & over
1954 total	286,814	106,960	47,402	41,982	42,798	21,091	26,571
% of total	100	37.3	16.5	14.6	14.9	7.4	9.3
1967 total	305,680	117,514	39,349	41,678	48,942	24,923	33,274
% of total	100	38.4	12.9	13.6	16.0	8.2	10.9
Net change: 1954-1967	+18,863	+10,554	-8,053	-304	+6,144	+3,832	+6,690
Net change over 1954, %	+6.9	+9.9	-17.0	-0.7	+14.4	+18.2	+25.2

Source: Based upon U.S. Census of Manufactures, 1954, 1967.

TABLE IV-5

U.S. Manufacturing Sector: Proportion of Establishments in Small, Medium and Large Size Classes, 1954

SIC#	Industry	Small (1-49 employees)	Medium (50-99 employees)	Large (100 & more employees
24	lumber & wood products	93.5%	3.8%	2.7%
27	printing & publishing	91.9	4.1	4.0
25	furniture & fixtures	85.6	7.3	7.1
35	machinery, ex. elec'l	84.8	6.2	9.0
32	stone, clay & glass prods.	84.0	6.9	9.1
20	food & kindred products	83.8	7.4	9.3
34	fabricated metal products	83.5	7.5	9.0
--	all industries	83.3	7.4	9.3
28	chemicals and products	81.0	8.7	10.3
23	apparel & related products	80.8	10.9	8.3
37	transportation equipment	71.3	8.0	20.7
31	leather & leather goods	69.3	10.5	20.2
30	rubber products	68.5	9.7	21.8
36	electrical machinery	66.3	10.3	23.4
29	petroleum & coal products	64.7	10.1	25.2
33	primary metal industries	63.9	11.5	24.6
21	tobacco manufactures	62.5	9.6	27.9
22	textile mill products	59.1	13.1	27.8
26	pulp, paper & products	57.4	14.3	28.3

Source: Based upon U.S. Census of Manufactures, 1954.

in Table IV-5 are ranked in descending order according to the proportion of their total establishments accounted for by small scale.

3. The Usefulness of the Data

The fact of growing concentration in the U.S. manufacturing sector suggests that more and more the orientation of the U.S. market for technology will be toward capital intensity and bigness. Under these circumstances, the design and production of capital equipment for small-scale industry assumes a reduced importance.

It should be recalled also that what is small-scale industry for the U.S. may imply a very large scale of operations, and a correspondingly high level of capital intensity, for small countries in the early stages of industrialization.

For Latin American factory industry, value added per employee is less than half the comparable figure for the U.S. manufacturing sector; for the less industrialized nations of Latin America the contrast is even more dramatic. (see Table IV-6).

Perhaps the major lesson to be learned from our examination of the U.S. manufacturing sector is to appreciate the difficulty that small developing nations must have in shopping for labor-intensive production techniques in the capital markets of the developed nations. The development of technology in the capital producing nations is proceeding along a path diametrically opposed to the needs and employment interests of the developing world. For these capital-poor nations to expect to find appropriate capital-saving techniques in such a setting seems extremely unlikely.

TABLE IV-6

Value Added per Employee in Factory Industry,

by Size of Establishment, U.S. (1954) and Latin America (1960)

	Size of Establishment (No. of Employees)		
	Small Scale (5-49)	Medium Scale (50-99)	Large Scale (100 & more)
United States	$6,064	$6,551	$7,890
Latin America	$2,170	$2,500	$3,940
Group I	2,580	2,630	4,200
Group II	1,460	2,130	3,070
Group III	1,150	2,030	2,350

Notes: Group I: Argentina, Brazil and Mexico, account for 80 percent of the total product of industry in Latin America;
Group II: Chile, Colombia, Peru, Uruguay and Venezuela, all having "reached a moderate degree of industrialization," together account for 16 percent of total industrial output;
Group III: Central America & Panama, Bolivia, Ecuador, Haiti and Paraguay together contribute less than 4 percent of total industrial output.

Source: Based upon U.S. Census of Manufactures, 1954 and U.N., ECLA, "Small-Scale Industry in the Development of Latin America", Economic Bulletin for Latin America, Vol. XII, No. 1, p. 69. May 1967.

The frequent assertion that the developing nations are heir to all technology developed to data is without practical relevance unless this technology is adapted to their factor availabilities, just as it has been adapted to those same availabilities in the developed countries. The belief that the developed nations provide a technological supermarket from which the developing nations need only choose "from the shelf", without adaptation to their specific needs, is seen as misguided cynicism within the context of a national employment strategy. It is not simply that the developing nations have gone to the wrong store to shop for their technology; there is no right store. What's more, the adaptations which have been successful for one society may prove too culture-bound to have application in another.

David Bell has noted that foreign aid is frequently described incorrectly as a process of transferring know-how; instead it is a process of developing know-how "...a process of finding out what will work in Nigeria not of transferring what has been found to work in Nebraska."[65] According to Bell, the process of foreign aid should properly be "thought of as a research process, aimed at learning how to move a particular society, with its special and unique characteristics of history and culture and physical geography, toward specified objectives."[66] Such a process of research, however, has been conspicuously absent both from international and national developmental efforts. Without strong

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[65] Address before the American Society for Public Administration, April 15, 1966, cited in Peter Dorner, "Interpretive Synthesis and Policy Implications of Land Tenure Center and Related Research", LTC No. 31 of The Land Tenure Center, p. 1. University of Wisconsin, Madison.

[66] Ibid., p. 1.

market incentives to create a demand for the research and development of technology for the developing nations, it is unlikely that major advances in this direction will take place.

A basic reorientation of the policies which guide the pattern of investment in the developing nations, as we discussed in the preceding chapter, is a necessary first step in shifting the direction of technological development more toward the needs of generating increased employment in the urban sector. However, as we will show below, the process of industrialization will need a major assist from the other sectors of the economy, particularly agriculture, if the employment problem in Latin America is to be brought within manageable bounds.

4. Adaptation of Advanced Technology: The Soviet Metalworking Case

David Granick provides an interesting illustration of the adaptation of advanced techniques to the needs of a capital-poor society in his analysis of the soviet metalworking industry.[67]

Granick divides soviet metalworking into "productive" and "auxiliary" processes. Auxiliary processes, which include materials handling, inspection, repair, bookkeeping, etc., "have been left largely unmechanized", there being no need to economize on unskilled labor. Consequently, possibilities in this area "for the substitution of capital for labor are quite easy to find." In productive processes,

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[67] op. cit.

on the other hand, Granick argues that "it is much more difficult to demonstrate investment potentialities" which would increase worker productivity.[68]

The overriding consideration in the Soviet metalworking industry, according to Granick, has been to procure as "close to the lowest possible ratio of capital investment to additional output, in so far as this can be achieved by the substitution of labor for capital." He notes that in this effort, Soviet policy-makers have "followed orthodox Western economic doctrine of substituting plentiful factors for scarce ones."[69]

The service and repair of equipment is the area in which "capital and labor can most readily be treated as substitute production factors."[70] Obsolescense, quite obviously, is a relative term. Thus, capital equipment is more likely to become obsolete earlier in a capital-rich, high-wage country than in one which is preoccupied with economizing capital. The decision to scrap equipment in the case of the former is countered in the latter by a preference for repair.[71] The use of second-hand equipment in developing countries is an area in which potential capital savings may be realized, but such economies are tempered by the availability of

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[68] Ibid., pp. 214-215. Contrasting U.S. and British techniques in manufacturing, Granick comments: "...strong impression drawn from the various reports of the Anglo-American Council on Productivity is that basic production equipment does not differ particularly between the two countries in most industries. There is no indication that lower British wages lead to the use of less modern production equipment." (p. 216) Note the restricted usage of "production", referring to the "productive processes" as distinct from the "auxiliary processes".

[69] Ibid., p. 232.

[70] Ibid., p. 220.

[71] Ibid., p. 223.

skilled mechanics to provide more frequent repair service.

Further illustrations of capital-saving in auxiliary processes include:

inspection--10 to 35 percent of total work time in metalworking is devoted to inspection;[72]

materials handling--extremely high potential use-levels of materials handling equipment must be shown in justification of its installation;[73]

clerical work and bookkeeping--these remain almost totally unmechanized in soviet industry.[74]

The Soviet metalworking case well illustrates an approach which many developing nations could profitably follow. By viewing the production process as a sequence of interrelated stages, rather than as a unified, unalterable process, interesting possibilities for employment creation may be discovered. Materials handling, inspection, packaging, etc., can all be performed labor-intensively without compromising the "essential quality of the tool element in equipment".[75] By thus selectively spreading scarce capital over the maximum number of workers, industrialization in the developing nations may be able to combine efficiency of operation with high levels of labor absorption.

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[72] Ibid., pp. 221-222. "As late as 1953, almost all inspection operations were still carried on by hand in the Cheliabinsk Tractor Plant--one of the major mass production plants of the Soviet Union."

[73] Ibid., p. 221. One expression of this policy is "the sheer failure to produce low-capacity electric hoists, trailer-trucks, overhead conveyors, etc."

[74] Ibid., p. 222.

[75] Meier, op. cit., p. 438.

C. Construction

Anyone who has traveled in the developing countries and seen buildings and public works under construction will recognize the vast potential for employment absorption in the construction industry. The ability of construction activities to allow great variation in labor intensity is due to the smooth and continuous isoquants which characterize much of this sector's activities. Unlike many industrial activities (where we found discontinuities in the production surface) the choice of a production technology in construction constitutes a loose, rather than rigid, relationship between productive factors, often capable of daily alteration, and, in any case, ending with the conclusion of the construction project. Thus, subsequent projects can be constructed with entirely different technologies from those of previous ones.[76] Whereas in industry the initial choice of technology has a lasting influence upon, and in fact reduces the scope for subsequent choices and the level of employment due to the durability of plant and capital equipment, this is far less true of construction activities.

It should be recalled, however, that capital-labor substitutions are reversible and variability in the production process cuts both ways. The flexibility which allows for considerable labor absorption

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[76] J. Gorinski, "Construction: Its Role in the Development of Backward Economies", in Essays on Planning and Economic Development, Vol. III. Warsaw, 1968, cited in Ignacy Sachs, "Selection of Techniques: Problems and Policies for Latin America", Economic Bulletin for Latin America, Vol. XV, No. 1, p. 33. 1970.

can also be a source of labor displacement, for the introduction of the simplest lifting, mixing or conveying equipment can spell unemployment and consequent economic hardship for vast numbers of construction workers.

Table IV-7 presents data for Latin America for the 1950-65 period on the growth of output and employment in construction, as well as the percent share of the net increase in the active population absorbed by construction activities.

The slow growth in the productivity of labor suggests that factor proportions in construction have remained rather constant over the period, without significant capital deepening. Although the contributions of construction to GDP and to employment has kept pace with the growth of the economy over the 15-year period as measured by the long-term growth rates in column 6 of Table IV-7, the growth rate of output in construction between 1960-65 was only half as rapid as for the 1950-60 period; over the same two periods employment growth declined by one-third. The slackening in construction growth resulted in a substantial decline in the numbers being absorbed into employment in construction activities, from an average yearly rate of nearly 70,000 during the 1950-60 period to about 57,000 per year during the 1960-65 period.[77]

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[77] Esteban Lederman, Los Recursos Humanos en el Desarrollo de America Latina, No. 9 in Series II: Anticipos de Investigacion, Cuadernos del Instituto Latinoamericano de Planificacion Economica y Social (ILPES), Cuadro 9. Santiago, 1969.

TABLE IV-7

Latin America: Output and Employment in Construction, 1950-65

	1950	1960	1965	1950-60	1960-65	1950-65
Construction output						
Percent of GDP	3.4	3.4	3.0			
Growth rate, %				4.5	2.2	3.8
Construction employment						
Percent of active population	3.6	3.7	3.6			
Growth rate, %				3.1	2.1	2.8
Growth rate of productivity in construction				1.4	0.1	0.9
Labor absorption by construction: percent of net increase in active population				4.8	3.3	4.0

Source: Based upon Esteban Lederman, Los Recursos Humanos en el Desarrollo de America Latina, No. 9 in Series II: Anticipos de Investigacion, Cuadernos del Instituto Latinoamericano de Planificacion Economica y Social, (ILPES), Cuadro 9, Santiago, 1969, and UN, ECLA, Economic Survey of Latin America, 1966, Table 14.

1. Building Construction

Colin Clark identified building as a "genuine 'Diminishing Returns' industry" due to the inelastic supply of skills and management and the absence of "appreciable economies of large-scale organization to off-set this."[78] As a consequence, Clark generalized that efficiency of labor in building increases "more slowly than in production as a whole."[79] While this conclusion is supported by the data in Table IV-7, the hypothesis does not seem to be a fair reflection of reality. Productivity-increasing innovations in materials and organization in the building trades, as well as increased mechanization, could be adopted by building contractors as readily as by any other entrepreneurs if marginal returns to labor were to show a tendency to decline more rapidly than returns to other inputs.

The fact that productivity in the building trades does tend to grow slowly, as Clark noted, may, to a greater extent, be the consequence of this industry's smooth isoquants than to a genuine situation of diminishing returns. Unlike manufacturing industry, in which products and processes are frequently introduced simultaneously, the construction of buildings and public works (much like agricultural production) has developed more or less independently in all countries on the basis of indigenous technologies and raw materials. This factor,

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[78] Colin Clark, The Conditions of Economic Progress, 3d ed., pp. 381-2. MacMillan & Co. Ltd., London, 1957. "This is seen from the figures of cost when housing contracts are let in larger blocks." On the other hand, Clark sees a possibility for increasing returns in civil engineering due to the potential for mechanization. (p. 383)

[79] Ibid., pp. 383-4.

more than any other, explains the existence of broad variations in building techniques and materials, the economic and social implications of which are smooth isoquants and a gradual process of capital-deepening. According to Paul Strassmann, "compared with manufacturing wages, building wages have been more closely attuned to factor abundance in most countries in past decades. Union organization and labor legislation has usually been late in coming to this sector."[80]

Strassmann studied the response of building contractors to eleven potential innovations in the Peruvian construction industry where, contrary to the general pattern, construction wages had risen to the level of manufacturing plant wages, "thus providing the conditions for an early arrival of prefabrication and mechanization in the construction industry there."[81] Of the eleven innovations studied, all of which were labor saving to some extent,[82] ten were adopted by at least some of the 15 firms in the sample. Vinyl floor tiles, as a substitute for parquet floors, was adopted by all the companies in the sample. This particular innovation allowed for savings in materials costs (over parquet floors) of one-third, and of 50 minutes of labor time per square meter in installation.[83] Metal ceiling forms, as a substitute for wood, and eliminating many supporting posts, was adopted

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[80] "Innovation and Employment in Building: The Experience of Peru", Oxford Economic Papers, Vol. 22, No. 2, p. 258. July, 1970.

[81] Ibid., p. 258.

[82] Savings on labor ranged between 20-90 percent per unit of output; additionally, three of the innovations lowered materials costs while seven raised them. Ibid., p. 247.

[83] Ibid., p. 246.

by 98 percent of the sample; labor savings were 35 percent.[84]

Factor substitution was revealed in other ways as well. The rapid increase in construction wages in Peru[85] closely parallels, and might explain, at least in part, the increasing substitution of reinforced concrete walls for the more labor intensive alternative, brick walls.[86]

In "Patterns of Industrial Growth",[87] Chenery regressed construction's share in GDP on income and size for a sample of 34 countries. His regression equation is of the form--

$$\text{Construction} = B_0 + B_1 \cdot Y + B_2 \cdot N$$

where Y is per capita national income in 1952-54 in hundreds of U.S. dollars and N is population in millions. The coefficients were computed as $B_0=4.06$, $B_1=1.152$ and $B_2=-.055$; however, B_2, the size coefficient, was found not significantly different from zero at the 95 percent confidence level.[88] The partial derivative of construction activity with respect to income, that is, the income elasticity of construction, is thus 1.152.

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[84] Ibid., p. 247. In Mexico, where wages in construction were relatively lower than in Peru, building contractors adopted only seven of the ten innovations which Peruvian contractors adopted.

[85] Between 1955-67, daily earnings in construction rose by 14.6%. "By 1960, average wages and benefits matched those of manufacturing even though construction employed a much larger fraction of unskilled workers." By 1968, unskilled construction workers in Lima-Callao were receiving 48% more than unskilled manufacturing workers. W. Paul Strassmann, "Construction Productivity and Employment in Developing Countries", International Labour Review, Vol. 101, No. 5, p. 512. May, 1970.

[86] Ibid., p. 512.

[87] Hollis B. Chenery, "Patterns of Industrial Growth", American Economic Review, Vol. L, No. 4, pp. 624-54. September, 1960.

[88] Ibid., p. 634.

Hypothesizing a proportional expansion of construction with income, as Chenery's linear model necessarily implies, tends to conceal important structural changes within the $100 to $1000 per capita income groups we are concerned with. Evidence from other sources seems to suggest that the rate of growth of construction activity rises abruptly with increasing urbanization and entry into the monetized economy, but declines in later stages of the "take-off" as population growth rates decline, and as a result of differences between plant and equipment with respect to durability and innovation.

The ILO found that for "poorer" developing countries, those with per capita incomes below $350, housing accounted for 2.5 percent of GDP whereas for middle-income countries, with incomes between $350 and $900, housing expenditures rose to 4.6 percent of GDP.[89] For the latter income class the annual growth rate of housing construction during the 1955-64 period averaged 10 percent[90] or about twice the growth rate of income, implying an income elasticity of demand for housing of about 2.0. ILO's preliminary estimates for Colombia, or for Cali and Bogota, suggest income elasticities for housing in this same general range.[91]

A case for accelerated growth in construction activities as countries pass through a somewhat earlier "transitional" phase in their development is made by Paul Strassmann.[92] On the strength of regression analysis for 27 countries at various states of development

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[89] ILO, Towards Full Employment, op. cit., p. 128.

[90] Ibid., p. 129.

[91] Ibid., p. 130.

[92] "Construction Productivity and Employment...", op. cit.

Strassmann hypothesizes that as "product per head rises from under $200 per year to over $400, the construction sector will usually grow 50 percent faster than the rest of the economy,"[93] implying a housing elasticity of 1.5.[94]

In order to examine the relationship between construction and income for the nations of Latin America we prepared a scatter diagram plotting construction's share of GDP as a function of per capita income (see Figure IV-4). While the array generally reveals a positive relationship, the correlation becomes very questionable when the countries are grouped into subsets of low- and middle-income countries (see Figure IV-4).[95] We can observe, however, that the middle-income group has a more consistently higher share of construction in GDP than does the low-income group.

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[93] Ibid., p. 515.

[94] According to estimates for the income elasticity of construction computed by S.K. Singh of the World Bank, the abrupt increase in construction activities "with increasing urbanization and entry into the monetized economy" is by no means apparent, especially if we consider only the $100-$1000 range of per capita incomes.

"Aggregate Employment Function: Evaluation of Employment Prospects in LDCs", (mimeo, undated, c. 1970-71). Singh's estimates are as follows:

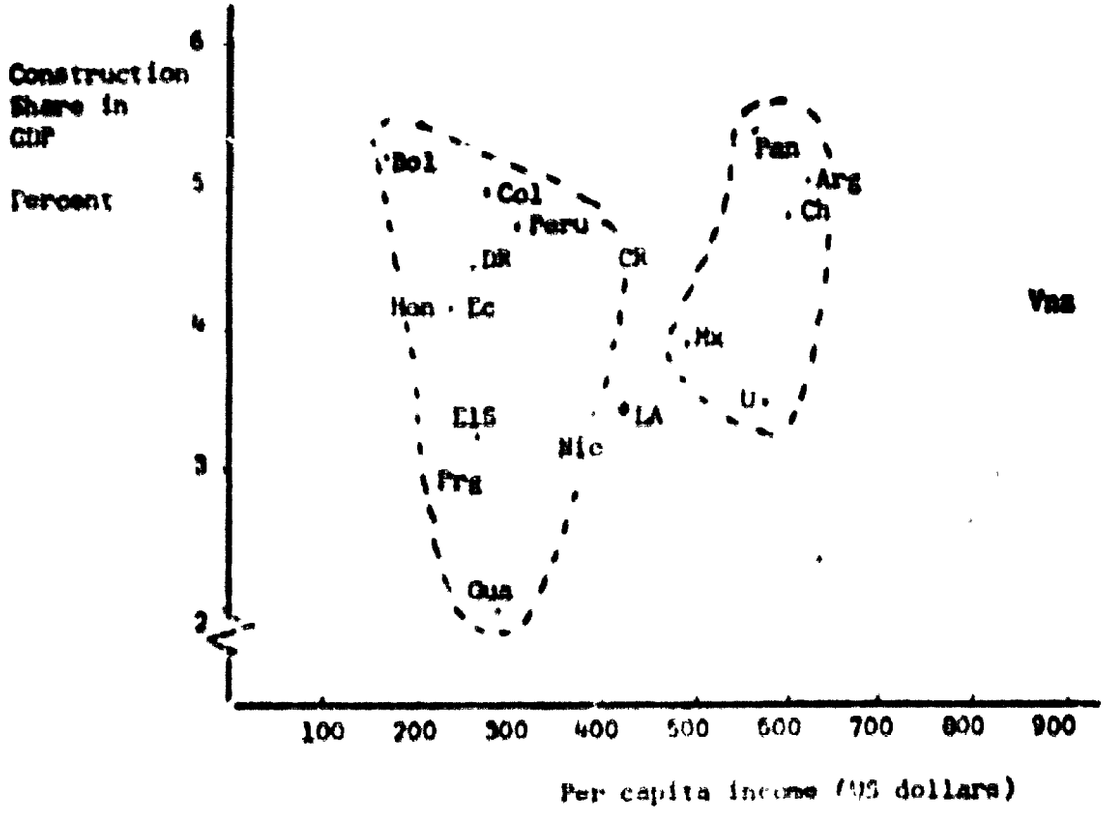
(Table 5, Ibid.)

Per capita income	Income elasticity of construction
$US 50	.86
100	1.37
150	1.41
200	1.40
300	1.36
400	1.33
500	1.31
700	1.27
1000	1.24
2000	1.18

[95] The fact that the data does not distinguish housing activity from all of construction is one important source of confusion.

FIGURE IV-4

Latin America: Share of Construction in GDP as a Function of Per Capita Income, 1967



Source: Based upon AID, Latin America, Economic Growth Trends, Statistics and Reports Division, Tables 4 & 6, December 1968.

As economies enter the "modern" stages of economic growth, the share of construction in output--and to a lesser extent in employment--"will decline as the rate of population growth and the demand for new residential construction slackens, as more construction is done not within the contract construction industry but by enterprises primarily engaged in other activities, and as capital investment shifts away from construction of plants, offices, etc. toward equipment."[96] Among "modern" countries, construction activities account for 6.2 percent of total GDP and occupy 6.6 percent of the labor force.[97]

Thus, it would appear that the potential for labor absorption in building construction in developing countries has two foundations,--the rapid growth of construction activities in the "transitional" stages of development, and slow growth of labor productivity. Rapid growth in the "transitional" stages results from urbanization--as housing becomes increasingly more monetized--and the investment-in-plant needs of industrialization. This component of the labor demand function in construction is largely an historic datum. The second component, however, slow growth in labor's productivity, is highly susceptible to variations in the capital - labor ratio in construction. In the study of construction innovations among Peruvian building contractors, Strassmann concluded that "highly labor-saving innovations are proving viable under Latin American conditions [and] present trends do not warrant employment optimism.[98] Nevertheless,

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[96] Simon Kuznets, Modern Economic Growth, p. 133. Yale University Press, New Haven, 1966.

[97] Ibid., p. 128. The figures correspond to the unweighted arithmetic means of the shares for the following countries: U.K., France, Belgium, W. Germany, the Netherlands, Norway, U.S., Canada and Japan.

[98] "Innovation and Employment...", op. cit., p. 243.

an effective employment strategy should seek to maximize both components of the labor demand function.

The slow growth of labor productivity in construction, vis-a-vis manufacturing, implies that direct employment benefits per unit of expenditure--an employment multiplier concept--will be greater for construction activities than for manufacturing. The high labor input into construction, however, is dependent upon the peculiar characteristics of this sector's activities, which we discussed above, ...the most notable of which is the smooth production isoquant. The importance of wage constraints upon continued high levels of labor absorption into construction is made clear by the Peruvian case and should be made a priority consideration in the employment strategy of Latin American economies. The high degree of susceptibility to substitution of capital for labor makes it particularly important that wage increases in construction not exceed productivity gains.

The importance of holding down wages in construction can be simply illustrated. If 30 percent of the cost of housing is attributable to labor, and if wages were to rise by 50 percent, then, assuming a price elasticity of demand for housing of 1.5-2.0,[99] the wage increase would lead to a reduction in the demand for housing of between 22 and 30 percent, with corresponding implications for the level of employment in housing.

We have already noted the tendency for the construction sector in "transitional" countries to grow more rapidly than the overall economy. This tendency, which we earlier called an historical datum, can be profitably

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[99] To the extent that the price elasticity of demand for all goods with respect to the price of housing is zero, we can assume that the price elasticity of demand for housing and the income elasticity of demand for housing are equal magnitudes but of opposite signs.

encouraged through expanding the availabilities of housing finance and facilitating the conditions of housing purchase.

The growth of Savings and Loan Associations throughout Latin America is helping to finance an increasing number of homes for lower- and middle-class families and this movement deserves encouragement. Mutual aid housing programs, under which the homeowner himself provides much of the unskilled and semiskilled labor, is another important area to consider. Perhaps the most impressive example of a mutual aid housing program in Latin America is that of the Instituto de Credito Territorial in Colombia which has helped people build for themselves over a half-million houses.[100] Although purchased labor inputs are considerably reduced under this program, the impact on employment creation is nevertheless quite significant since most construction materials are locally produced.

Lower down-payments and/or increased maturities may also serve to expand the demand for housing, although higher interest rates may have to be charged to offset the increased risk.[101]

Finally, a redirection of housing funds into rural areas could serve to dampen somewhat the outmigration from these areas. While it is unlikely that potential migrants are the same individuals as potential homeowners, the demand of the latter could provide employment for the former in construction, building materials and other allied industries.

In 1914 Henry Ford instituted a wage scale of $5 for an eight-hour day at a time when millions of workers were willing to labor nine hours for $2 a day. Ford combined high wages with the availability of automobile

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[100] ILO, Toward Full Employment, op. cit., p. 133.
[101] Ibid., p. 130-1.

credit because he believed that "one's own employees should be one's own best customers."[102] This unique application of Say's Law provided much of the impetus for the subsequent automobile-oriented economic growth which characterized 20th century development in the U.S. Could not a similar pattern of growth be built around construction activities?[103]

Throughout Latin America there exists a strong demand for housing which, if satisfied, would bring forth savings that would probably not otherwise be forthcoming. Nevertheless, there is reason to doubt that housing construction could provide the growth stimulus which the automobile industry provided in the U.S.

To understand the reason for our pessimism is to understand the controversy between growth and employment, for the nature of the trade-off between the two is well illustrated by this question.

The high direct employment multiplier which we earlier attributed to construction activities means that of every dollar of final demand for housing a significant proportion goes directly into wage payments. The fact of low productivity and low wages in construction guarantees that these wage payments will be widely dispersed among workers whose propensity to consume wage goods is quite high.

Subsequent rounds of income and employment generation, and economic growth generally, depend upon the time pattern of all economic repercussions within the domestic economy resulting from the initial expenditures

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[102] Stuart H. Holbrook, The Age of the Moguls, pp. 205-6. Doubleday & Co. Inc., Garden City, N.Y., 1953.

[103] This is a major theme in Lauchlin Currie's Accelerating Development, McGraw Hill, N.Y., 1966.

on housing. This is the subject of input-output or interindustry analysis. For the present we should note that it may happen that, although a labor-intensive industry produces a more substantial direct impact upon income and employment than does one which is capital-intensive, by the time these direct effects have operated through the economy by means of subsequent rounds of spending, the original differences may well be reversed. "The reasons for this are fairly clear. An industry which uses a great deal of labor but not many inputs will probably have fewer interactions with other industries than one which utilizes a considerable amount of capital equipment." On the other hand, "when an industry which uses a great deal of capital expands its output the 'chain reaction' this sets off will spread throughout many sectors of the economy."[104]

In reality, the labor-intensive road to economic development is essentially untraveled as yet so that our pessimism with respect to the growth stimulus which could be provided by housing construction is founded only upon conventional economic analysis and the experience of the now-developed countries. What is true of one economy, however, need not be true of another, particularly if capital needs are satisfied by imports in the case of one but met from domestic sources in the case of the other.

The main considerations surrounding the income and employment generating implications of different expenditure and investment patterns can be summarized as:

a) the extent to which a given industry is integrated into the domestic economy, and the extent to which it is dependent upon imports;

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[104] William H. Miernyk, The Elements of Input-Output Analysis, p. 49. Random House, N.Y., 1965.

b) the share of wages and salaries in gross value, not only in the producing industry but in its domestic suppliers as well; and

c) the pattern of consumption expenditures (as well as savings and investment habits) of wage and salary earners, and of capitalists.

The sequence and extent of the linkages which would be forged by housing construction in Latin America are nowhere near as rich as was the case for the U.S. auto industry. Automobiles reached forward and backward within the U.S. economy and had a significant influence upon nearly all sectors of economic activity. On the demand side the automotive industry stimulated road construction, repair and parts shops, glass, rubber, steel, textiles, chemicals and petroleum products; on the side of supply it provided a major consumer durable, an input into the motor transport industry, and an important source of foreign exchange earnings.

Housing construction, on the other hand, forges far more modest linkages. Being essentially a consumer durable and requiring very little maintenance, houses, once constructed, provide far less opportunity for additional employment than other forms of accumulated capital, such as the construction of an irrigation dam, a factory or a road.[105]

The fact that the important parameters of development are different today, parameters such as population growth rates, levels of unemployment, export prospects, also makes it unlikely that increased expenditure on housing construction could set off a chain of growth-stimulating reactions. Nevertheless, such an approach might not be entirely ill-advised, especially if there exists a critical need for immediate employment generation. The

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[105] ILO, Employment Objectives in Economic Development, op. cit., pp. 65-6.

newness of such an approach, however, contrasted with our traditional concepts from neo-classical and keynesian analysis, makes it exceedingly difficult to commit an economy, with any degree of confidence, to such a radical pattern of development.

A far more modest goal for employment creation in construction, but one within reach, is set by Strassmann:[106]

> "If pressed for a rough order of magnitude, I would guess that in most countries on the verge of industrialization, a judicious expansion of construction finance and moderate restraint on the growth of labor earnings could raise employment by 3 percent."

Emphasis on construction as an employment strategy is fully consistent with what would occur naturally, although "it could trigger off [this] inevitable shift somewhat earlier and then strengthen what is viable."[107]

2. Public Works

Ragnar Nurkse is usually credited with popularizing the idea of employing surplus workers in the construction of capital projects.[108] Nurske's orientation, however, was towards capital formation and increasing the national product. For him, the question was not so much one of resolving problems of unemployment as it was of utilizing a free resource--disguised rural unemployment--in producing real capital.[109]

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[106] "Construction Productivity...", op. cit., p. 516.

[107] Ibid., p. 509.

[108] "This possible source of capital formation in underdeveloped areas has hitherto been neglected in economic literature." Problems of Capital Formation in Underdeveloped Countries, p. 37. Basil Blackwell, Oxford, 1953.

[109] Ibid., p. 36.

W. Arthur Lewis in his classic article "Economic Development with Unlimited Supplies of Labour", published shortly after Nurkse's Problems of Capital Formation, also suggested that surplus labor could be "used to make capital goods without using any scarce factors."[110]

While the theoretical merits of the argument for forced savings from productively employing formerly surplus labor were readily acknowledged, the practical limitations of this proposal provided reason for concern.[111] In his original presentation Nurkse had acknowledged the gap between theory and practice in converting surplus labor into infrastructure: "the mere possession of a surplus labor force in the overpopulated countries is no guarantee of progress. It is an advantage only if, and in so far as, the surplus labor force can be effectively used for real capital accumulation. I have confined myself to a theoretical outline of the problem; I have no

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[110] The Manchester School, XXII, May 1954, reprinted in A.N. Agarwala and S.P. Singh, The Economics of Underdevelopment, p. 421. Oxford University Press, N.Y., 1963. This possibility rests on two very dubious assumptions: that the marginal productivity of surplus labor is zero (Nurske also makes this assumption, in op. cit., p. 36), and that "capital can be created by labour without withdrawing scarce land and capital from other uses." The latter assumption is modified several sentences later: "Food cannot be grown without land, but roads, viaducts, irrigation channels and buildings can be created by human labour with hardly any capital to speak of--witness the Pyramids, or the marvelous railway tunnels built in the mid-nineteenth century almost with bare hands...so it is not difficult to think of labour creating capital without using any but the simplest tools." p. 421. Emphasis added.

[111] See Harvey Leibenstein, Economic Backwardness and Economic Growth, p. 261. John Wiley & Sons, Inc., N.Y., 1957.

illusions about its practical difficulty."[112]

By 1958 Nurkse's "early optimism for releasing surplus labor through changes in agricultural organization was qualified somewhat...when he wrote that such changes... 'are a major undertaking and cannot be lightly taken for granted,'"[113] and elsewhere,[114] commenting on India's development plan, he noted: without agricultural "reorganization the labor surplus in agriculture remains largely potential. On the other hand, reorganization may well prove impracticable without an active policy of absorbing the surplus manpower."[115]

Although the experience of the 20 years that have elapsed since it was first presented have served to point up the practical limitations of labor intensive infrastructural development, the concept is so appealing

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[112] Op. cit., p. 56. Emphasis added. The Malthusian in Nurkse surfaces when he argues that labor intensive capital formation solves two problems simultaneously: it holds down population growth, and results in capital formation. He asks rhetorically: "What about the danger of population explosion which might result from any increase in real income and which might soon nullify any improvement in the level of material welfare?" In the model which he develops, increases in real income are directed into capital formation, thus preventing consumption from increasing and, to the extent that population growth depends upon consumption levels, "there is no reason to expect any growth in population." (p. 47)

[113] Charles H.C. Kao, Kurt R. Anschel and Carl K. Eicher, "Disguised Unemployment in Agriculture: A Survey", in Carl Eicher and Lawrence Witt (eds.) Agriculture in Economic Development, p. 135. McGraw-Hill, N.Y., 1964. The reference is to "Epilogue: The Quest for a Stabilization Policy in Primary Producing Countries", KYKLOS, Vol. 11, Fasc. 2, p. 262. 1958.

[114] "Reflections on India's Development Plan", Quarterly Journal of Economics, Vol. 71, No. 2, May 1957.

[115] Ibid., p. 192.

it is difficult to reject entirely.[116] However, the fact that labor is nowhere a costless input, nor is it productive without capital and supervision, has served to relegate labor intensive public works projects to the status of but one technique among many.

Studies conducted in the field by the UN and the ILO seem to indicate that labor intensive techniques of construction can compete quite successfully with projects organized around heavy equipment, even on strict criteria of economic efficiency. In looking at comparative costs of earthmoving in the Sharavathi Valley Project in Mysore State, India, ILO investigators found that:[117]

"(a) the cost per cubic meter dug with a mechanical shovel was nearly four times as much as with traditional methods by the best workers;
(b) the cost of stone-crushing by manual labor with hammers was cheaper than by machine;
(c) the cost per kilogram of masonry lifted was the same for both cranes and manual labor carrying granite by bamboo ramps."

In another study of earthmoving operations, the UN's Bureau of Economic Affairs[118] found that mechanized excavation activities in the

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[116] This is not to say that the concept has no merit in practice, see the discussion, below, on community development projects. The appeal of labor intensive infrastructural development is pointed up, as an example, by an ILO study which refers to the advantage of employing much labor and little capital because of the large number of un- and under-employed workers whose manpower is going to waste, and because capital is scarce and should be conserved for projects of high priority where it is indispensible. ILO, "Economic Development, Employment and Public Works in African Countries", International Labour Review, Vol.91, No. 1, p. 14, January 1965.

[117] ILO, Men Who Move Mountains, Geneva 1963 (mimeo), cited in ILO, "Economic Development...", op. cit., p. 21.

[118] United Nations, Bureau of Economic Affairs, "Capital Intensity in Heavy Engineering Construction", Industrialization and Productivity, Bulletin 1, pp. 34-48. UN, Department of Economic and Social Affairs, N.Y., April 1958. Earthwork is defined as "an operation involving the removal of material from exposed surfaces and depositing it elsewhere;" earthmoving operations include excavation, hauling, filling and compacting.

developing countries are more costly than similar activities in the developed countries due to factors such as low rate of equipment utilization, inadequate maintenance and repair of equipment, scarcity of skilled labor, and inadequate supporting facilities such as supply of spare parts.[119] The cost disadvantage reflects most importantly differences in the productivity of factors employed, which in turn are determined by the entire "climate" in which industrial operations in the developing countries take place.[120]

The major cost elements relating to earthmoving equipment are depreciation and repair and maintenance. In the developing countries, low utilization of equipment--due to lack of alternative employment, or physical difficulties in transporting it elsewhere--may necessitate depreciating its full cost against a single project, well before its actual physical depletion. Such "excessive depreciation charges are only an accounting reflection of poor utilization of equipment."[121]

The "recent industrial background" of the developing countries frequently implies a high incidence of equipment breakdown due to low levels of maintenance and repair, poor organization of work, and a scarcity of skilled labor. Furthermore, maintaining spare parts may be very costly if equipment is limited and parts stocks must be charged 100 percent against the project.[122] Thus, in the developing countries it is the absence of external economies which serves to constrain the economic use of earthmoving machinery.

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[119] Ibid., p. 48.
[120] Ibid., p. 48.
[121] Ibid., p. 45.
[122] Ibid., p. 45.

In summary, the UN Report found that the lower labor costs of the developing countries "arising from the generally low wage rates provide only a partial offset to the higher costs on equipment account," adding that the factors responsible for these "higher costs are related to a large extent to the more general problem of external economies in underdeveloped countries."[123]

Despite the proven ability of labor intensive techniques to compete on economic efficiency criteria with more mechanized techniques of construction, the ILO found that in Africa private contractors tended towards far more capital intensity in project design than did national public works agencies.[124] The tendency for contractors, when given the choice of project design, to elect one which seemingly entails an excessive degree of mechanization may be due to an effort to avoid what Tinbergen has called "the trouble of dealing with people."[125] Thus, contractors can minimize labor difficulties and seasonal worker shortages, while economizing on supervisory personnel, by substituting machinery for both unskilled workers and supervisory personnel.

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[123] Ibid., p. 48.

[124] ILO, "Economic Development...", op. cit., p. 22. Among contract projects, "those under foreign contracts are perhaps again more capital intensive than those under local contracts. The difference in types of work undertaken explains in part the difference in labor intensity. Direct labor projects are usually on a smaller scale and of simpler nature (minor road works, building construction, maintenance) while contract projects are large scale development works (national highway construction, major dam and irrigation projects...)."

[125] Jan Tinbergen, "Choice of Technology in Industrial Planning", Industrialization and Productivity, Bulletin 1, p. 24. UN, Department of Economic and Social Affairs, N.Y., April 1958.

If, as the ILO suggests is true for African countries, public works projects have the dual purpose of contributing to economic development and providing employment and income, then project design should be expected to score high on both objectives. Unfortunately, however, a highly labor intensive technique is frequently not the same technique as that which minimizes a project's money costs (or maximizes contractor's profitability). Although the social opportunity cost of labor may be very low, the contractor must pay the going wage; and although the social costs of unemployment are high, unemployment is not the contractor's concern. Despite the scarcity of capital as reflected in its opportunity cost in manufacturing activities, maximizing private profitability may nevertheless be consistent with capital intensity in project design.

On the other hand, for projects undertaken by the government there is little excuse for neglecting the social costs of unemployment. Since all costs and benefits, both social and private, ultimately redound to the society as a whole, whose political agent is the government, it would be expected, at least in theory, for government to "internalize" all the accounts of society. While the private sector, and even local governments, are free to pass social costs onto other sectors of society, the national government, because it is answerable to all sectors of society, is obliged to apply a more global cost-benefit calculus to its decisions. This is not to deny that such costs and benefits do, in fact, affect different members of the society differently; however, there are dangers in ignoring certain social costs, perhaps the most extreme of which is revolution.

One way of guaranteeing that the dual objectives of public works projects are satisfied is by requiring all contractors bidding on a project

to submit alternative labor- and capital-intensive project designs. In the case of larger projects, in which the design is established by consulting or government engineers in advance of bidding, both a labor-intensive and a capital-intensive design should be required. The accompanying economic analysis should detail the respective benefits of each alternative with respect to employment, income distribution, balance of payments and economic growth.

There are, of course, many circumstances under which a capital intensive organization of construction projects is called for. The physical requirements of the project, for example, may make heavy equipment necessary, as in some forms of earthmoving--large rocks, long distances or high lifts--where working space is restricted, such as the top of dams, or where substantial compacting is necessary, as in dams, high dykes and roads subject to heavy use.[126] In other cases the time factor may be decisive: it may be necessary to complete an irrigation project before the start of the agricultural year, or a road before the onset of the rains. The need to meet heavy interest and amortization charges on machinery may also serve as an incentive to rush a project into operation.[127] Projects in remote areas, where transportation, housing and other amenities would have to be provided for workers constitutes a further instance where mechanization may be preferable to labor intensity.[128]

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[126] ILO, "Economic Development...", op. cit., pp. 19-20.

[127] Ibid., p. 19.

[128] In a capital-intensive project in Finland, temporary housing represented 7% of project costs; in Ghana, cost of the temporary village for a capital-intensive alternative amounted to 12% of total project costs. UN, "Capital Intensity...", op. cit., p. 38.

It is frequently asserted that very large projects should be conducted on a capital intensive basis because of the obvious difficulties of organizing and supervising the vast labor force which would otherwise be required.[129] Sheer size does present many organizational problems which most nations, developed or developing, could not cope with effectively. It is interesting, therefore, to read of the success of a gigantic earthmoving project in Mainland China, cited in the UN Report:[130]

> "Extensive use was made of seasonally unemployed farm labour; many millions of farmers released from agricultural operations during the winter and spring months of the year were mobilized by the Government. ...2.5 billion cubic feet of earth was moved by 1.3 million workers, without the use of any machinery, in the construction of the main irrigation canal in North Kiangsu, which was finished in eighty days."[131]

Despite the Chinese case, about which very little is known, but which indicates the unique ability of a highly regimented society to carry out such a vast project, the generalization made earlier, that large projects are difficult to organize, still holds true. To the extent that large projects can be divided into independently managed sub-projects, or into stages allowing varying degrees of capital intensity, this difficulty

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[129] In the UN study on earthmoving operations (see footnote 118) "a tendency for unit costs to decline with increasing size of projects" was noted. This tendency, which was attributed to the ability to use larger equipment, and to distribute ancillary works and overhead facilities over a larger construction base, was observed for data from developed countries, especially the US, and appears to have greater application to these countries. (p. 43)

[130] Ibid., p. 37.

[131] The "success" of the project: 2.5 billion cubic feet of earth moved by 1.3 million workers in 80 days, when reduced to more comprehensible units, is less impressive. Average output per worker per day comes to .89 cubic yards of earth moved. By far the more impressive achievement is the organization of such a vast work force.

can be overcome in part.

Voluntary, community level projects have a vast potential for absorbing rural underemployed workers in small public work projects of direct and obvious benefit to the participants. Such community development projects often include:

irrigation works--canals, dams, ditches, leveling
drainage and flood control
farm-to-market roads
land clearing
reafforestation
soil and water conservation

and community works, such as:

vocational training centers
potable water systems
schools
markets
health centers.

The philosophy underlying community development has become an integral part of the development literature. Essentially it seeks to apply the community's underemployed labor resources to small capital formation projects which are of direct and obvious benefit to the workers.

To a large extent, community development, as a source of employment, is a rejection of Keynesian economics as applied to the developing countries. It is a recognition of the fact that unemployment in the developing countries is qualitatively different from its counterpart in the developed world. "People are out of work not because the factory is closed but because there is no factory; not because there is no sale for the products of their land but because they have no cultivible land."[132] The problem

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[132] Gabriel Ardant, "A Plan for Full Employment in the Developing Countries", International Labour Review, Vol. 88, No. 1, p. 17. July, 1963.

of unemployment in the developing countries is not so much one of secular demand deficiencies and underutilized capacity as it is in the developed countries; rather it is a problem of insufficient investment and a consequent chronic low level of economic activity and productive employment.

Community development, while acknowledging the role of capital formation in employment creation, also recognizes the difficulty of achieving the necessary levels of investment through conventional processes. Instead, it reverses the traditional link between capital formation and employment creation: although investment creates employment, "it is no less true that employment creates investment",[133] albeit of a somewhat simple form. Thus, the voluntary labor effort of a community can lead to an increase in the community's stock of capital--land improvements, schools, roads, etc.--which may allow for increased output and employment.

Community development projects often do not provide remunerative employment for the unemployed, at least not directly; nor are their impact upon urban unemployment very clear cut. However, to the extent that community development can improve the levels of rural living standards it can dampen the tendency for rural workers to migrate to urban areas; such a result would not be inconsequential.

Despite the voluntary nature of the work obligation, community development projects are not costless. Some form of worker remuneration is often required, even if only in the form of surplus food commodities, as made available under Title II of Public Law 480 and the World Food Programme

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[133] Ibid., p. 18.

of the UN and FAO.[134] The costs of cash wages, materials, tools and technical advice must be borne by the community and the national community development agency; supervision of the project is frequently delegated to a community leader.

Due to many factors, productivity of labor on public works projects--both funded and voluntary--is usually extremely low. If worker efficiency could be increased, thus reducing both labor and capital costs per unit of output, the effective level of real investment could be raised allowing additional workers to be employed. In recognizing this prospect, the ILO study recommends the following improvements in working conditions, so as to make labor intensive organization of public works competitive with capital intensive techniques, and to prevent work projects from degenerating into "unemployment relief with little or no beneficial effects on the development of the economy."[135]

Improvements in: "a) organization of the work unit
b) tools
c) methods of using tools
d) ratio of productive work to ancillary work
e) incentives
f) food
g) supporting services, e.g., temporary housing, medical facilities, amenities, arrangements for essential provisions and for tool and appliance maintenance."

3. An Illustration of Substitutability

To illustrate the potential for labor substitution in road construction,

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[134] See the Annual Report on Public Law 480 for 1969: Food for Peace, 91st Congress, 2nd Session, House Document No. 91-352; and the 1970 Annual Report on Public Law 480, 92nd Congress, 1st Session, House Document No. 92-135.

[135] ILO, "Economic Development...", op. cit., pp. 23-25.

we can cite an ILO report filed by the resident engineer for a road surfacing project in sub-tropical Africa.[136] The project was planned by the public works department and designed for a foreign contractor using highly mechanized techniques. However, for "political and financial reasons" the public works department was instructed to serve as its own contractor, i.e., carry out the project itself. The design of the project, however, was not altered.[137]

As equipment breakdowns and organizational failures occurred, onlookers who were refused work on the basis of the capital intensive design were now recruited into the work force. The results were encouraging and additional substitutions were made. It was "found that all the operations, except hauling (with trucks) and watering (with waterbowsers) could be accomplished entirely by labour-intensive methods."[138]

Table IV-8 contrasts per kilometer costs for performing the various surfacing operations under capital- and labor-intensive alternatives. Total man-days of unskilled labor, per kilometer of road, amounts to 34

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[136] J. Muller, "Labour-Intensive Methods in Low-Cost Road Construction: A Case Study", International Labour Review, Vol. 101, No. 4, pp. 359-375. April 1970. The project called for all-weather gravel surfacing of a 480 kilometer dirt road. The author examines only "the main objective of the project--to provide the road with a compact gravel surface-- ...to the exclusion of the other three objectives (drainage, bridges and realignment)." Studies of these other objectives, however, "would result in considerations and recommendations very similar to those put forward here." (p. 362)

[137] Ibid., p. 360. It is fairly clear that the public works department is going to run into difficulty. Sophisticated and costly machinery is due to be imported but the necessary complement of technical and skilled personnel is not, nor is it available locally.

[138] Ibid., p. 365. The availability of truck hauling capacity then became the limiting factor "since there was no way of using labor-intensive methods to haul gravel over a distance of several kilometers." (p. 365)

TABLE IV-8

Direct Operational Costs of 1 Kilometer of Road (US dollars)

Operation	Capital-Intensive Method		Labor-Intensive Method	
	Input	Cost/km	Input	Cost/km
a) opening a quarry	1 bulldozer 1.4 hrs. 6 workers 0.2 dys.	12.60	1 tractor 0.2 days 12 workers 1.2 days	11.50
b) clearing the road	1 motorgrader 0.7 hrs. 12 workers 0.2 days	6.40	12 workers 0.7 days	5.30
c) excavating and loading	1 excavator 16.0 hrs. 1 bulldozer 8.0 hrs. 6 workers 2.3 days	210.00	150 workers 2.3 days	223.00
d) hauling and dumping	6-10 trucks 1200 kms. 6 workers 2.3 days	249.00	6-10 trucks 1200 kms.	240.00
e) spreading and shaping	1 motorgrader 1.4 hrs.	9.60	18 workers 2.3 days	27.00
f) watering	2 waterbowsers 40 kms.	8.00	2 waterbowsers 90 kms.	18.00
g) compacting	2 tractors with rollers 20 kms. 12 workers 0.2 days	4.60	6 workers 4.5 days	18.00
h) finishing	(Not necessary under capital-intensive method)		1 motorgrader 4.7 hrs. 3 waterbowsers 10 kms. 2 tractors with rollers 8 kms.	6.40
Total Cost per kilometer:		$500.20		$549.20
Total man-days of work created per km (unskilled)	34		428	

Source: Based upon J. Muller, op. cit., Tables I & II, pp. 364 & 367.

for the capital intensive method and 428 for the labor intensive method. The capital intensive method, however, requires, in addition, more skilled and semi-skilled workers because of the additional activities involved in operating and servicing the equipment.

A blending of the two alternatives, both of which are actually extreme designs, seems to be indicated by a careful reading of Table IV-8. The cost of the last operations--spreading and shaping, watering, and compacting--are far higher for the labor intensive method than for the capital intensive method ($69.40 per kilometer vs. $22.20); what's more, the grader, waterbowsers and rollers are needed in both cases. Thus, if operations (a) to (c) are performed labor-intensively, and (d) to (g) capital-intensively, a third method--what the ILO expert refers to as the "optimum balance" method--could be introduced incorporating the best of both approaches. Per kilometer costs under this method amount to $511, intermediate between the two extreme alternatives;[139] requirements of unskilled labor would be 380 man-days per kilometer.

An interesting problem illustrating the indivisibility of capital arises with respect to the "optimum balance" method. Unless the motor-grader was employed elsewhere, it would be idle 90 percent of the time.[140] Rather than allow the problem to be resolved by increased use of the motor-grader for other operations, at the cost of fewer jobs, an "intermediate technique" is sought, and discovered, "in the form of a very simple mechanical grader, towed behind an agricultural-type tractor" (which is

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[139] Ibid., p. 369. Machine compacting eliminates the need for step (h), finishing.

[140] Ibid., p. 369.

already included in the "optimum balance" design). "Moreover, such a 'tow-grader' can quite easily be produced locally."[141]

It is easy to make designs for projects which will never materialize, or to correct actual design defects only in retrospect, after the "heat is off". In the foregoing illustration, the actual execution of the project met with every conceivable kind of problem; substitutions of labor for disabled capital provided a very obvious ad hoc solution to equipment breakdowns as they occurred. However, when it was clear that the work could not possibly be completed within the allotted time, a foreign contractor was brought in to bring a rapid but costly conclusion to the project.[142]

The development of alternative techniques requires more than an ability to learn from past mistakes; it calls for formulating creative and harmonious solutions to problems as they occur, and the incorporation and continual adaptation of those solutions as they bear upon subsequent problems.

In the developed countries, innovation has resulted from the pressures of need, as specific solutions to specific bottlenecks. The result has been the evolution of a technology more and more attuned to the needs of the innovating country, and within it, the innovating industry.

How a nation deals with its technical problems in industrialization will have an important bearing upon the pattern of its development. The choice between "trait-taking" and "trait-making", as Hirschman puts it, that is, between which traits to accept, because they are unchangeable, and which to make over according to the country's needs and capabilities,

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[141] Ibid., p. 369.
[142] Ibid., p. 371.

plays a crucial role in the subsequent process of economic and social development.[143] What a country is or becomes, economically and socially, is, in an important way, a function of how it deals with those problems which have "a special vocation for inducing certain types of learning, attitude change, and institutional reform."[144]

In the developed countries, innovation often resulted from the problem-solving process in areas where no solution yet existed; the rewards for innovation were tangible and quite sizeable at times. For the developing countries the problem is not to find techniques where none exist, but rather to develop alternative techniques which allow for increased use of labor without compromising its productivity. The fact that labor-saving techniques already exist is often an unfortunate distraction offering an easy way out of the problem. After all, project managers are scored on their output, not their inputs, and rewards go for building good roads, not labor intensive roads.

4. Digression on the Use of Opportunity Costs in Road Construction.

With the data already at hand we can extend our analysis somewhat by applying arbitrarily chosen opportunity costs to each of the three alternatives, as might be the case if the project was undertaken by a public agency. Table IV-9 presents our results.

In order to construct Table IV-9 we have made the following assumptions:

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[143] A. O. Hirschman, Development Projects Observed, op. cit., pp. 131-139.
[144] Ibid., p. 5.

TABLE IV-9

Cost Comparisons for 1 Kilometer of Road:

Opportunity Costs* and Market Prices for 3 Alternative Methods of Road Construction (US dollars)

Operation	Capital-intensive		Labor-intensive		"Optimum Balance"	
	Market Price	Opportunity Cost	Market Price	Opportunity Cost	Market Price	Opportunity Cost
a) opening a quarry	12.60	17.10	11.50	7.59	11.50	7.59
b) clearing the road	6.40	7.56	5.30	2.65	5.30	2.65
c) excavating & loading	210.00	291.00	223.00	111.50	223.00	111.50
d) hauling and dumping	249.00	345.00	240.00	341.00	249.00	345.00
e) spreading & shaping	9.60	13.60	27.00	13.50	9.50	13.60
f) watering	8.00	11.36	18.00	25.56	8.00	11.36
g) compacting	4.60	5.06	18.00	9.00	4.60	5.06
h) finishing	--	--	6.40	9.08	--	--
Total Cost:	$500.20	$690.68	$549.20	$519.88	$511.00	$496.76

* See text for assumptions with respect to opportunity cost calculations.

Source: Based upon Muller, op. cit., Tables I & II, pp. 364 & 367.

1. the opportunity cost of unskilled labor is half the wage rate;

2. the opportunity cost of machine time is one-and-one-half times the market price, i.e., the opportunity cost of capital is one-and-one-half times the interest rate;

3. 8% of machine costs go for semi-skilled labor for operation, repair and maintenance; the opportunity cost of this labor is one-and-one-quarter times its wage; and

4. 12% of machine costs go for fuel, lubricants and repair parts; the opportunity cost of which is equal to the market price.[145]

As expected, by assigning an opportunity cost for capital and semi-skilled labor in excess of their market price, the capital intensive method becomes the most costly alternative, increasing by 38 percent over the cost figured at market prices. On the other hand, the implicit subsidy of 50 percent for wages of unskilled labor has caused the labor intensive method to decline in cost by about 5 percent. The "optimum balance" method, appraised at opportunity costs, now becomes optimum in terms of economic efficiency as well, with per kilometer costs lower than any other alternative.

The object of this brief exercise is simply to show that where there is reason to suspect that factor price ratios valued at the market differ from their ratios valued at true social opportunity costs, use of the latter will tend to redress the bias, provided alternative techniques of operation are available.[146]

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[145] Muller, in op. cit., makes a similar assignment of machinery costs: "it is presumed that 8 percent of the hire charges on the machines goes to operators, and 12 percent to fuel and lubricants." (p. 368)

[146] Ozay Mehmet applies benefit-cost analysis to the problem of employment creation in an article in the International Labour Review entitled "Benefit-Cost Analysis of Alternative Techniques of Production for Employment Creation", Vol. 104, Nos. 1-2, pp. 37-50. July-August 1971. He contrasts two techniques of public highway construction, one labor-intensive, the other capital-intensive, by applying market prices and "shadow prices" to each. He assumes an income multiplier of 5 for wages due to the high propensity of workers to consume domestic wage goods. This, combined with assumptions for social opportunity costs of imported capital and three classes of labor leads to a reversal of the decision based upon accounting benefit-cost analysis favoring capital-intensity.

Services

In the course of the structural transformation of employment which accompanies the economic growth of nations, the services or tertiary sector takes on an increasing importance.[147] That a similar process occurs for construction activities has already been noted. In both cases the basic causes are very similar--an increasingly monetized economy, income-induced shifts in the pattern of demand, and most importantly, differential growth rates for productivity.

Today's developing countries are likewise characterized by rapid growth in services employment; however, the sequence of structural transformation is radically different. In the developed countries, agriculture gave up workers to industry, which in turn induced the development of services. Thus, the growth of employment in industry predated[148]--and technically speaking, induced--employment growth in services (see Table IV-10 and Figure IV-5).

In the developing countries, both manufacturing and services are simultaneously increasing their representation in the labor force, ...at the expense of the agricultural sector. By far, however, employment growth in services exceeds that from manufacturing, ...and from industry generally. While the increase in manufacturing activities reflects increased investment and implies economic growth, the same cannot be said for growth in services.

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[147] Simon Kuznets, Modern Economic Growth, op. cit., p.111. The share of services in the labor force was constant or changed little in the U.K., Belgium, the Netherlands, Sweden and Australia. In other countries, such as Switzerland, Denmark, Norway, Italy, the U.S., Canada, Japan and the USSR, a large absolute and relative increase occurred.

[148] Ibid., Table 3.2.

TABLE IV-10

Distribution of the Labor Force by Major Sectors,

Latin America and Selected Developed Countries

	Percent share in total labor force		
	Agriculture	Industry	Services
Latin America			
1925	61.3	19.5	19.2
1950	54.1	23.1	22.8
1960	48.6	24.2	27.3
1965	46.1	23.9	30.0
France			
1911	30	43	27
1951	20	47	33
Sweden			
1910	41	36	23
1950	19	50	31
Italy			
1871	51	35	14
1911	45	36	19
1951	35	40	25
U.S.A.			
1870	51	30	19
1910	32	41	27
1950	12	45	43

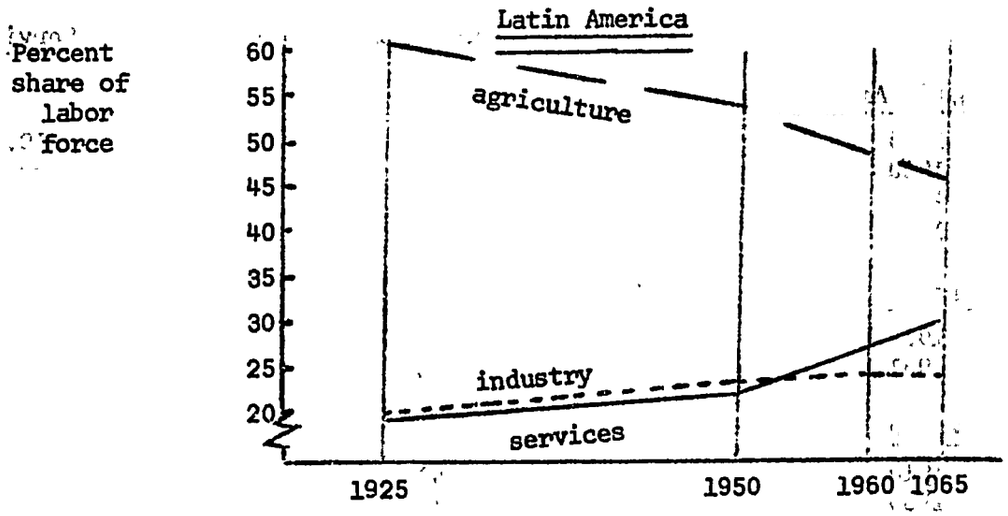
Note: Agriculture includes fishing, forestry and hunting.
Industry includes mining, manufacturing, construction, light and power, gas and water, transportation and communications.
Services include trade and finance, personal, domestic business, professional and government services, and, in the case of Latin America, a progressively larger proportion of overt and disguised unemployment in the form of marginal services.

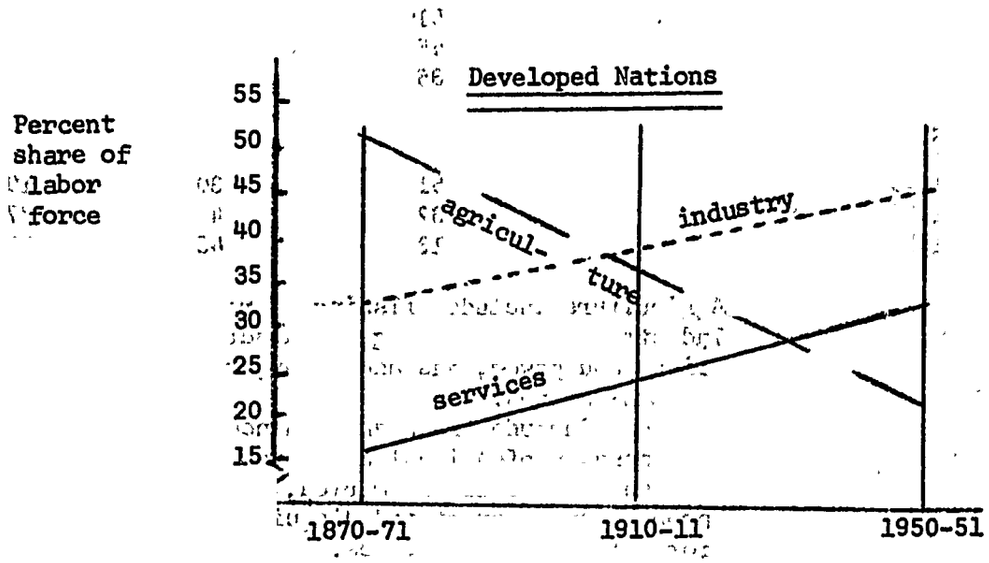
Source: Latin America
1925: Slawinski, op. cit., Table 3.
Other years: ECLA, Economic Survey of Latin America, 1966, Table 13.
All other countries
Kuznets, Modern Economic Growth, op. cit., Table 3.2.

FIGURE IV-5

Sectoral Distribution of Employment

Latin America and Selected Developed Countries





Based upon Table IV-10

Chenery's studies of the patterns of industrial growth yield a "growth elasticity" for "other services" of 1.066.[149] The fact that this coefficient is not significantly different from 1 at the 95 percent confidence level confirms "Kuznets' conclusion that the share of services (other than transport) in national product does not vary significantly with the level of per capita income."[150]

Figure IV-6 is based on cross-sectional data for 1950-65 for about 100 countries. The graph reveals that as nations attain a per capita income level of about $300, the services share of GDP stabilizes at 39-40 percent. Employment in services, however, increases continually over the entire range of income levels, ...from 18-22 percent of the labor force at per capita incomes below $300., reaching 32 percent for the $1000 income level, and finally intersecting the curve (slope = 0) for services' share in GDP at 39 percent, just before reaching the $2000 income level. Thus, the cross-sectional pattern is highly consistent with the long-term trends of Table IV-10 and Figure IV-5.

The significance of this pattern upon employment creation in the developed countries is fairly clear--employment absorption in services

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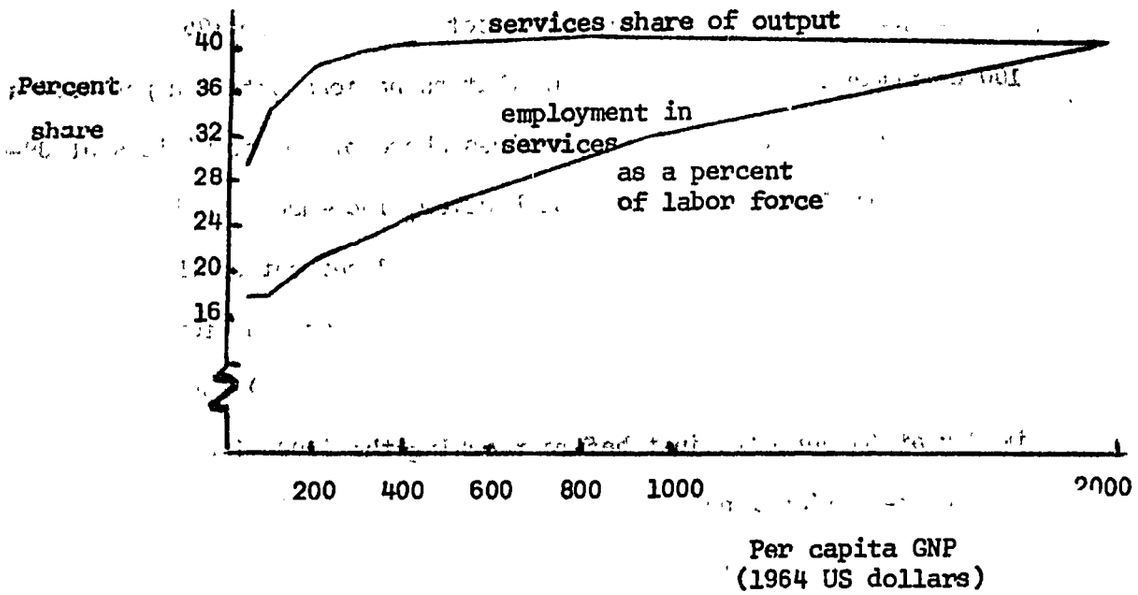
[149] "Patterns of Industrial Growth", op. cit., "Other services" excludes transportation and communications. The "growth elasticity" for transportation and communications was 1.288. The regression equation is the same as that described above for construction activities.

[150] Ibid., p. 635. We should recall that Kuznets studied long-term trends for largely developed countries while Chenery worked with cross-sectional data for countries at various stages of development. Nevertheless, both authors are in agreement that the patterns derived for cross-section analysis coincide closely with those for time-series analysis. (p. 633 and footnote 9).

FIGURE IV-6

Variations in Services Output and Employment

with Level of Development



Note: Services excludes "utilities". Employment in services was adjusted by the author in order to make the concept comparable with output.

Source: Based upon Chenery, "Growth and Structural Change", Finance and Development, Vol. 18, No. 3, p. 19. September 1971.

continues at a rapid rate throughout the "modern" stages.[151] For the developing countries, however, where a radically different structural transformation of employment has occurred, the usefulness of these results, so far as the study of employment creation is concerned, is questionable.

The fact that considerable services "employment" is neither industry-induced nor industry-related reveals a weakness in this pattern of development, and probably explains the general low level of productivity in services. To the extent that industrialization, and productive activities in general, must ultimately support the economic burden of underemployment in services, the latter tends to serve more as a drag upon further industrialization than does industrial activity serve as an inducement of services employment.

Walter Galenson sees manufacturing as the key sector for economic growth; however, "under conditions of modern technology ...its role is not likely to be that of a major source of new employment."[152] Instead, manufacturing growth, through a multiplier mechanism, generates "effective demand leading to employment expansion in other sectors" with tertiary activities the major employment beneficiary. Such multiplier effects are "apt to be much more significant than any direct contributions that the

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[151] Since the share of services in GDP was rather constant, "we may conclude that in many countries the absolute and relative rise in the share of the services sector in total labor force was significantly greater than the increase in its share of total product." Kuznets, op. cit., p. 111.

The slow growth of productivity in services is confirmed by the fact that, for a number of countries services' share in resources rises more rapidly than its share in total product. Ibid., p. 113.

[152] "Economic Development and the Sectoral Expansion of Employment", International Labour Review, Vol. 87, No. 6, pp. 506-7. June 1963.

manufacturing sector can make to the alleviation of mass unemployment."[153] Thus, Galenson advises that we "add another dimension" to our analysis of employment creation through a selection-of-techniques approach, "... the impact on tertiary employment."[154]

What this approach implies for employment policy is that industrialization proceed along modern lines. While sounding more like an interpretation of the economic history of the presently-developed nations than a prescription for employment creation in the developing nations, there nevertheless appears to be some evidence in support of such an approach. The economic advisor to the President of the World Bank, for example, is impressed by the fact that the countries in which the lowest income groups have benefitted most from development over the past 20 years have been precisely those experiencing the highest growth rates.[155] Thus, he observes:[156]

> "Given the policy instruments and administration capacity of the less developed countries, I would judge that the employment increases generated by high growth are the most reliable means for maximizing the welfare of the lower income groups."

We should note in passing that while "high growth" has been shown to lead to employment generation, this is not the only route, and the challenge of development today is precisely to find an alternate route to

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[153] Ibid., p. 507.

[154] Ibid., pp. 516-18.

[155] Hollis B. Chenery, "Growth and Structural Change", Finance and Develment, Vol. 18, No. 3, p. 27. September 1971.

[156] Ibid., p. 27. Chenery continues: "Even the most optimistic 6-7 percent growth targets of the Committee for Development Planning, however, will hardly prevent the unemployment from growing in many countries; greater attention is also needed to the possibilities of substituting labor for capital."

"high growth" which will provide for employment generation,--not only at the end of the road, but along the way as well.

Most of the developing countries have pursued policies of "high growth" through modern industrialization, ...with consequent employment growth in their services sector. But is this truly employment, or simply a reflection of urbanization?, or, do services tend to be a "residual outlet", as Thorbecke has suggested, absorbing "many individuals who would otherwise be unemployed [and in this respect] fulfilling the same function in an urban context as the traditional agricultural subsector performs in rural areas?"[157]

Galenson anticipates this question, but answers it evasively, ignoring underemployment:[158]

> "If people are engaged in activities which enable them to support themselves, it seems difficult to argue that they are not gainfully employed, no matter what one may think of the nature and intensity of their tasks, ... comparative productivity does not provide a criterion for degree of employment."

That a growing percentage of the work force in developing countries is engaged in tertiary activities would appear to correlate even more closely with urbanization and high levels of urban unemployment than it does with manufacturing growth. Clearly, however, all are interrelated.

ECLA's studies of structural changes in employment in Latin America reveal such a correlation between urbanization and the growth of employment in services. In the 50's, 71 percent of the net increase in the labor force was absorbed by services in Argentina, Chile and Uruguay, the most

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[157] Eric Thorbecke and E. Stoutjesdijk, Employment and Output: A Methodology Applied to Peru and Guatemala, op. cit., p. 42.

[158] Galenson, op. cit., p. 516.

urbanized countries of the region. In Venezuela and Colombia, where urban growth was quite rapid, respectively 57 and 49 percent of the net increase was absorbed by services. On the other hand, in countries such as Brazil, Peru, Mexico and the Central American Republics, larger proportions were absorbed by the agricultural sector than by services.[159]

Analysis of the employment absorption capabilities of the services sector is complicated by the heterogeneous nature of service activities and the difficulty in measuring the value of their output. The services sector is an aggregation of all economic activities which are neither primary nor manufacturing.[160] According to Kuznets, all services "have one basic feature in common: none of the activities represents in any significant way the production of commodities; each renders a product that is intangible and not easily embodied in a lasting and measurable form."[161]

Lack of an independent measure of production in services often requires that output be estimated by valuing inputs.[162] Thus, an increase in the

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[159] "Structural Changes in Employment within the Context of Latin America's Economic Development", Economic Bulletin for Latin America, Vol. X, No. 2, p. 173. October 1965.

[160] The term "tertiary industries" reflects more clearly the catch-all nature of services. According to Colin Clark, the phrase "tertiary industries" was "originated by Professor A.G.B. Fisher in New Zealand, and became widely known through the publication of his book, The Clash of Progress and Security, in 1935. It took its origin from the titles current in Australia and New Zealand of 'primary industry' for agriculture, grazing, trapping, forestry, fishing and mining, and 'secondary industry' for manufacture." The Conditions of Economic Progress, op. cit., p. 491.

[161] Kuznets, op. cit., p. 143. Kuznets excludes transportation and communications, and electric power, gas and water from his services sector; these are included in industry.

[162] Keith B. Griffin, "Latin American Development: Further Thoughts", Oxford Economic Papers, Vol. 20, No. 1, p. 126. March 1968.

output of government services--education, health facilities, etc.--may simply reflect increased salary levels for public employees with no corresponding gain in productivity. The same is true for many monetized services--telephone and postal services, for example--where increased user rates may reflect an inability to increase worker productivity. Whereas in agriculture if a task formerly done by three workers can now be done by two, statisticians would claim that productivity had increased; for many service activities, however, if a task formerly done by three workers is now done by four, statisticians will conclude that output has increased. What may in fact have occurred is that total output has remained unchanged but an underemployed rural worker has shifted from agriculture into services.[163]

In order to explore the employment absorption capabilities of service activities it seems convenient to disaggregate the sector into the following three sub-sectors:

1. industry- and urbanization-induced service activities,
2. public sector services, and
3. other services.

1. Industry- and Urbanization-Induced Service Activities

The most important service activities, so far as their contribution to GDP and their role in development are concerned are those which are economically and technically linked to the process of industrial growth and urbanization. Most notable among these activities are (a) the basic services--transportation, communications and storage; (b) utilities--light and power, gas and water; and (c) trade and financial services.

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[163] Ibid., p. 126.

Capital intensity in basic services and utilities tends to be quite high, often as high as most manufacturing activities, thus allowing for high levels of labor productivity.

S. K. Singh has estimated productivity in the service sub-sectors as a proportion of output per worker in the economy as a whole for different levels of per capita income.[164] The results are presented as Table IV-11. It is seen that relative productivities decline in all three sub-sectors as their share in the labor force increases, and as per capita income rises. This is simply a reflection of the fact that as development progresses and the share of output and employment contributed by the agricultural sector declines, relative productivities in all areas of economic activity tend to converge asymptotically upon the economy-wide average.

As the high levels of productivity for utilities and basic services imply, underemployment in these sub-sectors is quite low (see Table IV-14, below).

Chenery's results from regressing transportation and communications on income yield a coefficient of 1.288,[165] indicating a high degree of responsiveness on the part of these basic services to increases in the level of per capita income. However, high levels of productivity in transportation and communications, as in manufacturing, act as a constraint

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[164] "Aggregate Employment Function...", op. cit. Using recent cross-section data for 78 countries--47 developed and 31 underdeveloped--Singh estimated parameters for sectoral growth rates of employment. His 3-sector and 7-sector models can be characterized as polynominals in the log of per capita income and the growth rate of output.

[165] "Patterns of Industrial Growth", op. cit., p. 634.

TABLE IV-11

Latin America: Industry- and Urbanization-Induced Service Activities, Employment and Productivity* at Different Income Levels

Per capita income	Commerce		Utilities**		Transportation & Communications	
	Percent of active population	Relative productivity	Percent of active population	Relative productivity	Percent of active population	Relative productivity
$US 50	4.17	2.47	0.10	13.2	0.68	5.31
100	5.43	2.74	0.17	6.37	1.63	2.87
150	6.35	2.59	0.28	4.87	2.31	2.27
200	7.08	2.41	0.38	4.22	2.83	1.99
300	8.27	2.11	0.52	3.60	3.57	1.72
400	9.23	1.89	0.63	3.30	4.10	1.59
500	10.05	1.72	0.72	3.12	4.50	1.50
700	11.43	1.49	0.85	2.91	5.10	1.40
1000	13.10	1.27	1.00	2.75	5.70	1.32

Notes: * output per worker in the service sub-sector as a proportion of average worker productivity in the economy as a whole. Thus, 2.47 implies a level of worker productivity 2.47 times the national average.

** electricity, water and gas.

Source: S. K. Singh, op. cit., Table 4.

upon employment absorption. Thus, although output in transportation and communications increases 28.8 percent faster than GDP, employment growth in transportation and communications would approximately parallel the growth in GDP.[166]

ECLA data for Latin America indicate that output in basic services (including water, gas and electricity) has increased faster than GDP, as predicted (5.6 percent per year vs. 4.6 percent over the 1950-65 period).[167] Employment growth in basic services, however, has outrun the growth rate of GDP in recent years (4.1 percent vs. 2.2 percent) due to a slowing in the growth rate for productivity in basic services.[168] As a consequence, the contribution of basic services to employment has risen from 4.1 percent of the economically active population in 1950 to 5.2 percent in 1965 (see Table IV-12).

As indicated in Table IV-11, the contribution of utilities to total employment is at no time in excess of one percent for the range of incomes characterizing the developing countries. This fact, combined with the high level of technical training required of many workers in this subsector, identify it as one providing little prospect for significant labor absorption.

On the other hand, basic services employment has shown impressive growth in Latin America, outrunning the predictions of Table IV-11. The key role played by transportation in particular as an input into almost

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[166] This assumes an annual growth rate for productivity in basic services of 1.4%. Lederman, op. cit., Cuadro 9.

[167] Ibid., Cuadro 9.

[168] Ibid., Cuadro 9.

TABLE IV-12

Latin America: Distribution of the Active Population

by Economic Sectors, 1950-1965

	Distribution of the active population		
	1950	1960	1965
Agricultural sector	54.1	48.6	46.1
Mining	1.0	1.0	1.0
Manufacturing	14.2	14.1	13.8
Factory	6.8	7.5	7.5
Artisan	7.4	6.6	6.3
Construction	3.7	4.0	3.9
Services	26.9	32.3	35.2
Basic Services and Utilities	4.1	5.0	5.2
Trade and Finance	7.7	9.0	9.5
Government	3.2	3.6	3.8
Miscellaneous services	9.6	11.7	12.6
Unspecified activities*	2.3	3.0	4.1

Notes: * Mainly overt and disguised unemployment in the form of marginal services.

Source: UN, ECLA, Economic Survey of Latin America, 1966. Table 13.

all economic activities, and as a major determinant of the price of food and other wage goods, makes it especially important that the cost of transportation services be maintained at minimal levels. While feasible transportation alternatives are few,[169] policies directed at the labor-intensive expansion of this group of activities should be closely scrutinized on efficiency grounds. Transportation activities in Latin America are already heavily staffed, and, if one were to judge by the heavy pressure placed upon transport facilities, output-capital ratios are quite high. Even so, low rates for transportation services, whether due to government regulation, competition, or the high volume-density of traffic, may tend to understate the value of output in transportation activities.

Trade and financial activities in Latin America have proven quite capable of rapid and continual absorption of labor, ...no doubt in excess of actual needs. Singh's regression results indicate that commerce employment increases its share of the active population by about one percent for each $100 increase in per capita income (see Table IV-11). Actual figures for employment in trade and finance in Latin America are generally in agreement with these estimates. In 1950, this sub-sector provided employment for 7.7 percent of the active population; by 1960 the proportion had grown to 9.0 percent, and by 1965 to 9.5 percent (see Table IV-12).

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[169] The author can recall, while living in a remote Guatemalan village, an incident which reveals that what is "feasible" is largely determined by one's experience. A shipment of several hundred 4-inch steel pipes were delivered to a road-head 4-hours walk from the village. Each pipe measured about 18 feet in length and weighed close to 500 pounds. Transporting the pipes into the village presented an impossible task from this observer's point of view who naturally thought in terms of roads and helicopters. The villagers on the other hand, with a totally different perception of the world, saw only one feasible way of moving the pipes, ...and within three weeks had carried them all into the village.

Underemployment in commerce, particularly in trade, is quite high in Latin America, estimated by ECLA at 19 percent in terms of unemployment equivalents (see Table IV-14). Such underemployment often takes the form of "over-staffing", as evidenced by the abundance of messengers, clerks, salespeople, janitors, etc., which one encounters in many offices and shops in Latin America.

So long as wages in these marginally productive activities in trade and finance remain low, possibilities for continued absorption of labor are probably bright. It is not clear, however, if further absorption is desirable from the point of view of economic development. To the extent that the costs of such employment are passed on to middle and upper class consumers, and other businesses, "over-staffing", if it can be called that, represents an efficient system of privately-funded welfare.

2. Public Sector Services

The existence of "featherbedding" in public sector activities is a well-established means of maintaining people in jobs. When public sector expenditures represent a fifth to a third of GDP, as is true in Latin America (see Table IV-13), the possibilities for such employment can be quite considerable.

TABLE IV-13

Latin America: Percentage Share of Public Sector*

in GDP, Selected Countries

	1955	1966
Argentina	27	28
Brazil	24	33
Central American Republics	14	17
Chile	23	35
Colombia	20	21
Ecuador	21	23
Mexico	15	22
Peru	19	21
Uruguay	26	30
Venezuela	28	36

* Total government expenditures (including autonomous agencies) and capital outlays of public enterprises.

Source: UN, ECLA, Economic Survey of Latin America, 1968. Table 56.

The expansion between 1955 and 1966 in governments' share of GDP has in part been the response to heavy and increasing pressures for programs of development aimed particularly at income redistribution. However, inelasticity of public revenues have forced governments to make increasing use of internal and external credit, especially in financing the 30-40 percent of public expenditures accounted for by capital outlays.[170]

[170] UN, ECLA, Economic Survey of Latin America, 1968, Chapter IV, "Public Sector", pp. 102-3. Slow growth of government revenues has been due to the fact that "tax machinery is not equal to the task of keeping tax yield abreast of the increases in the total product," and the steady decline for some countries in the relative importance of the external sector and imports as a source of taxation. (p. 102)

Services employment in the public sector is, to a large extent, a function of economic growth and the process of urbanization. The growing complexity of economic activity places a heavy burden on the central government to provide supporting, regulatory and supervisory services, while urbanization implies a greater need for such labor-consuming services of local governments as police, sanitation, public health, education, etc.[171]

Institutional and political factors, however, often difficult to anticipate, also play an important role in determining the level of government employment so that, in the final analysis, the growth of public employment may, as one observer put it, be dependent upon the "possibilities afforded by the public sector budget".[172]

Between 1950 and 1965, services employment within the public sector in Latin America absorbed about five percent of the net increase in the labor force,[173] raising its share of the economically active population from 3.2 percent to 3.8 percent over the period (see Table IV-12).

3. Other Services

Just as the service sector is a residual after the removal of agricultural and manufacturing activities, so is "other services" a residual after the removal of public services and what we have referred to as industry- and urbanization-induced services--utilities,

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[171] Kuznets, Modern Economic Growth, op. cit., p. 150.

[172] Zygmundt Slawinski, "Structural Changes in Employment within the Context of Latin America's Economic Development", op. cit., p. 166.

[173] Ibid., p. 166.

transportation and communications, and trade and finance. Consequently, "other services", as we are using it here, encompasses the personal and professional services--tailors, beauticians, doctors, lawyers; non-financial business services such as consultants and accountants; housing; domestic services; street services--bootblacks, venders, beggars; and "unspecified activities", as they are referred to at times--essentially overt and disguised unemployment in the form of marginal services.

To attempt to analyze the employment absorption capabilities of such a diverse group of activities and "non-occupations" would be ill-advised. However, a few comments on unemployment and underemployment might be in order.

ECLA has attempted to estimate the extent of underemployment in the Latin American economy by means of unemployment equivalents. Table IV-14 shows the results. The key to this Table is column 2 which presents the sectoral estimates of underemployment. For service activities, but with the exception of basic services and utilities, underemployment is extremely common, accounting for 45 percent of total unemployment computed in this fashion (the sum of the last three entries in column 4). Underemployment in agriculture accounts for an equal share of total unemployment, although it occupies a third more workers than do the low productivity service activities (see Table IV-14).

W. Arthur Lewis characterizes high levels of underemployment as a sort of feudal carryover, as the more advantaged sectors of society feel themselves obligated to provide subsistence employment for the agricultural surplus driven out of rural areas:[174]

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[174] Development Planning, op. cit., p. 76. Lewis continues: "Unemployment is due to the breakdown of this social system before it is fully replaced by another." (76-77).

TABLE IV-14

Latin America: Rough Estimates of Equivalent Unemployment in the Labor Force around 1969

Sector	(1) Economically active population (000)	(2) Percentage of equivalent unemployment in the sector	(3) Unemployment equivalent (1) x (2)	(4) Percent of total unemployment (3) ÷ sum of (3)
Agriculture	35,320	32.6	11,514	45.4
Mining	822	19.0	156	0.6
Manufacturing	11,546	16.7	1,928	7.6
Construction	3,768	6.4	241	0.9
Basic Services and Utilities	4,566	2.0	91	0.4
Trade & Finance	8,451	19.0	1,606	6.3
Government & Other Services	14,475	35.7	5,167	20.3
Unspecified activities	4,699	100.0	4,699	18.5
Total:	83,647	30.4	25,402	100.0

Source: UN, ECLA, Economic Survey of Latin America, 1968. Table 24.

> "Social custom imposes on the middle and upper classes the obligation to burden themselves with hordes of useless servants; having many servants becomes a status symbol which extends even deep down into the lower middle and upper working classes. If population pressure is severe, it becomes almost immoral for any man of status to do for himself what a servant could do for him, or to soil his hands with manual operations. Even entrepreneurs get caught up in this spirit, if they accept the social mores, and burden their businesses with large numbers of useless clerks, messengers and other hangers-on. Wages are low, barely adequate to keep body and soul together; not adequate for serious hard manual work; and more in the nature of charity than of payment for hard serious labour, which is neither given nor expected. The rest of the surplus swarms into casual trades; markets are crowded with pedlers and stallholders, making occasional sales; and there is a vast reservoir of casual labourers, gardeners, dock workers, construction workers, and porters. Thus everybody has some sort of job, however great the pressure of population."

In summary, the situation with respect to increased employment opportunities in service activities is mixed, although prospects for continued growth would appear promising so long as wages remain at extremely low levels.

E. Digression on the Origins of the Employment Problem

In the present, brief section, we shall attempt to place in proper perspective the origins of Latin America's unemployment crisis, so as to reduce the temptation to look for solutions to the problem in areas where we have no right to expect them.

The post-war industrialization process in Latin America represents, among other things, an attempt to provide for economic growth and an accelerated rate of job creation within the context of a rapidly increasing labor force and a quickening in the process of off-farm migration. In

effect, Latin American governments, wittingly or not, committed their limited capital resources to the gamble that their economic salvation lay in rapid industrialization. In retrospect, of course, it is quite easy to see the folly of hitching the prospects of a nation's economy to a single, small sector and expecting that sector, like the proverbial tail of the dog, to wag the rest of the economy into a dynamic takeoff process with full employment. The choice of industrialization is not simply a matter of betting on the wrong horse, but of riding it badly and, more importantly, of a failure to hedge that bet from the start, and to expect too great a payout in terms of employment creation.

At the start of the import substitution industrialization process in Latin America, which we can date roughly at 1950, modern manufacturing provided employment for less than seven percent of the labor force and contributed 16 percent of GDP[175] (see Table IV-15). Considering its small employment base in 1950, it seems extremely unrealistic to have expected this sector to provide jobs for the rapidly growing mass of surplus workers in Latin America during the decades of the 50's and 60's.

Even in 1950 the dimensions of the employment crisis of the 60's could readily be determined: most of the labor force was already born, and the process of urbanization was well underway. Job creation, in fact, was one of the major rationalizations of the industrialization process. Thus, to blame the present employment crisis on the failure of industry to follow a more labor-absorbing pattern of development seems to overlook the original magnitude of the task the manufacturing sector was expected

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[175] These figures do not take account of the contribution of artisan industries which, in 1950, provided employment for 7.6% of the labor force and contributed 2.3% to GDP, see Table IV-15.

TABLE IV-15

Latin America: Sectoral Distribution of Work Force and Growth Rate of Employment, 1950-65

	Agriculture*	Extractive Industries	Manufacturing			Construction	Basic** Services	Other*** Services	Total Employment	Total Work force	Unemployment
			Artisan	Factory	Total						
Employment (000)											
1950 employment	27,506	547	3,432	3,780	7,212	1,890	2,089	10,495	49,739	52,664	2,925
Percent	55.3	1.1	6.9	7.6	14.5	3.8	4.2	21.1	100.		5.6
1955 employment	29,608	617	3,981	4,094	8,075	2,299	2,636	12,842	56,077	60,240	4,163
Percent	52.8	1.1	7.1	7.3	14.4	4.1	4.7	22.9	100.		6.9
1960 employment	31,496	692	4,841	4,275	9,116	2,578	3,268	15,716	62,866	69,160	6,294
Percent	50.1	1.1	7.7	6.8	14.5	4.1	5.2	25.0	100.		9.1
1965 employment	33,591	768	5,447	4,609	10,056	2,863	3,842	19,531	70,651	79,473	8,822
Percent	47.5	1.1	7.7	6.5	14.2	4.1	5.4	27.7	100.		11.1
Growth Rate of Employment (% per yr.)											
1950-55	1.5	2.4	3.0	1.6	2.3	4.0	4.7	4.1	2.4	2.7	7.3
1955-60	1.3	2.3	4.0	0.9	2.5	2.3	4.4	4.1	2.3	2.8	8.2
1960-65	1.3	2.1	2.4	1.5	2.0	2.1	3.3	4.4	2.4	2.8	7.0
1950-65	1.3	2.3	3.1	1.3	2.2	2.8	4.1	4.2	2.4	2.7	7.6

Notes: *includes agriculture, forestry, fishing and hunting
**includes water, gas, electricity, transportation and communications.
***includes commerce, public administration, health and other services

The percentage distribution of the active population as presented in this Table differs slightly from the same concept as presented in Table IV-12. Both Tables are based upon ECLA data. Both are included in the present chapter since each presents detail not available from the other.

Source: Lederman, op. cit., Cuadro 9.

to perform.

To emphasize this point, let's consider for a moment the nature of the labor flows bearing upon the employment problem. In 1950 the agricultural sector[176] in Latin America provided employment for 52.2 percent of the labor force.[177] By 1965, the agricultural sector employed only 42.3 percent of the labor force, and the latter had grown at an annual rate of 2.7 percent over the period. That is to say, agricultural employment had grown by only 1.3 percent per year, thereby releasing a steady stream of migrants which, over the 1950-65 period totaled about eight million.[178] Put another way, of the increase in the Latin American labor force between 1950 and 1965 of approximately 26.8 million, agriculture absorbed only 22.7 percent. Thus, what we might refer to as Exhibit A, is an outward migration from the agricultural sector of eight million workers.

Exhibit B is the increase over the same period in the 1950 non-agricultural labor force[179] amounting to 12.7 million workers (see Table IV-16) all of whom, we may assume, will also seek non-agricultural employment.

Thus, the increase in Latin America's labor force between 1950 and 1965 of 26.8 million workers can be roughly divided as follows:

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[176] Including agriculture, forestry, fishing and hunting.

[177] This assumes that 5.6% of the labor force was "visibly" unemployed; if we consider only the employed labor force, agriculture provided 55.3% of the jobs, see Table IV-15.

[178] The difference between 52.2% of the 1965 labor force--corresponding to agriculture's proportion in 1950--and actual agricultural employment in 1965.

[179] We have avoided double-counting the eight million migrants.

Increase in 1950 agricultural labor force		14.1 million
Those who stayed in agriculture	6.1	
Those who abandoned agriculture	8.0 (Exhibit A)	
Increase in 1950 non-agric'l labor force		12.7 (Exhibit B)

"Visible" unemployment was already nearly six percent in 1950; the large figure for "other services" (see Table IV-15) undoubtedly conceals a good deal of additional underemployment. Ignoring for the time being the underemployment, let us designate as Exhibit C the nearly three million "visibly" unemployed workers in 1950.

The sum of Exhibits A, B and C--23.7 million additional workers seeking to enter the non-agricultural work force between 1950 and 1965, a number greater than total non-agricultural employment for 1950--sets the stage for the employment problem which was to materialize and assume crisis proportions in the 1960's.

Table IV-16 presents the structure of non-agricultural employment in 1950 and 1965, together with projections for non-agricultural employment in 1965 on the assumption that employment in each sector increased over the 15-year period in direct proportion to increases in that sector's output.[180] This assumption of a constant labor-output ratio is intended as a proxy for a constant level of capital intensity in production, ... an attempt to abstract from the influence of capital deepening upon levels of employment in industry.

We indicated above the dimensions of the employment problem between

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[180] The implications of this assumption include--
a) industrial production is not characterized by increasing returns to labor;
b) no technical adjustments to factor price changes are made;
c) growth in output is distributed over the entire sector in proportion to 1950 shares;
d) no normal learning curve for labor;
e) generally, technological progress does not occur.

TABLE IV-16

Latin America: Non-Agricultural Employment, Actual and Hypothesized, 1950 and 1965

	Extractive Industries	Manufacturing Industry		Construction	Basic Services	Other Services	Non-Agricultural Labor-Force		
		Factory	Artisan				Employed	Unemployed	Total
(1) 1950 Non-Agricultural Employment (000)	547	3,432	3,780	1,890	2,089	10,495	22,233	2,925*	25,158
(2) 1950 Sectoral Distribution of Non-Agricultural Labor Force (%)	2.2	13.6	15.0	7.5	8.3	41.7	88.4	11.6	100.
(3) Growth Rate in Output, 1950-65 (% per year)	6.0	6.5	2.8	3.8	5.6	4.1	--	--	--
(4) Compounding Factor**	2.397	2.572	1.513	1.750	2.264	1.827	--	--	--
(5) 1965 Hypothesized Non-Agricultural Employment [(1) x (4)] (000)	1,311	8,827	5,719	3,307	4,729	19,174	43,065	2,817	45,882
(6) 1965 Actual Non-Agricultural Employment (000)	768	5,447	4,609	2,863	3,842	19,531	37,060	8,822*	45,882
(7) 1965 Sectoral Distribution of Non-Agricultural Labor Force (%)	1.7	11.9	10.0	6.2	8.4	42.6	80.8	19.2	100.
(8) Actual Growth Rate in Employment, 1950-65 (% per year)	2.3	3.1	1.3	2.8	4.1	4.2	3.5	7.6	4.1
(9) Difference between Hypothesized and Actual Growth Rates for Employment [(5) - (6)] (000)	543	3,380	1,110	444	887	-357	.....Σ = 6,007.....		
(10) Ratio of Actual Employment to Hypothesized Employment for 1965 [(6) ÷ (5)]	0.586	0.617	0.806	0.866	0.812	1.019	0.861	3.132	1.000

Notes: * Assumes that all "visible" unemployment occurs in non-agricultural sectors
** Compound interest multiplicative factor for growth rate in output, line (3), and 15 years

Source: Based upon Table IV-15.

1950 and 1965--23.7 million new jobs outside of agriculture during that period. Interestingly, had employment in the non-agricultural sectors developed along the lines of our assumption, 20.8 million new jobs would have resulted by 1965 and unemployment, while finishing the period at the same absolute level as it began, would have declined in relative terms from 5.6 percent to 3.7 percent of the total labor force.

Line (10) of Table IV-16 reveals the extent to which growth in employment fell short of growth in output or, alternatively, actual growth in employment fell short of hypothesized growth.

The ratios in artisan industry, construction and basic services are all very much alike, indicating modest gains in worker productivity of respectively 1.5%, 0.9% and 1.4% per annum and suggesting, at least in the aggregate, that for those sectors capital deepening did not occur to any great extent. In the case of "other services", realized growth in employment actually exceeded hypothesized growth, implying a decline in worker productivity. This result, however, should not surprise us if we recall that this sector accounts for trade, public administration, education, health, as well as the legions of underemployed in such common shelters as domestic employees, street vendors, car washers and watchers, bootblacks, etc.

The results for "extractive industries" suggest that capital deepening has been greatest in this sector. The difference between hypothesized and actual employment levels in 1965, while significant in relative terms, amounts to only a half-million jobs, equivalent to one-sixteenth of "visible" unemployment in that year.

The remaining sector to be considered, "factory industry", presents, as would be expected, the most disappointing showing of all. Had growth in output been accompanied by an equally rapid growth in employment, that is, had the hypothesized level of employment for 1965 been realized, 3.4 million new jobs in manufacturing would have been created[181] reducing "visible" unemployment in 1965 from 8.8 million workers to 5.4 million, that is, from 11.1 percent of the 1965 work force to 6.8 percent, about one-fifth higher than the comparable figure for 1950.

Yet the implications of such a rapid growth in manufacturing employment raise some important questions. What, for instance, does a constancy in worker productivity imply for the level of wages and profits in manufacturing? And could we expect such growth to occur in the absence of any gains in the efficiency of labor? What would be the impact of this rapid rate of job creation upon rural-urban migration? and upon workers in "other services"? Would these two vast reservoirs of underemployed labor not allow surplus workers to spill over into manufacturing, diluting the apparent benefits of job creation?

The point we want to make here is a simple one, and it is essentially this: the case whereby capital-intensive industrialization has been made the scapegoat for Latin America's unemployment crisis has been overstated! How much growth in employment might conceivably be expected from a sector

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[181] It is, of course, naive to think that industrialization would have proceeded as rapidly as it did had the benefits of technological progress been denied to the industry, that is to say, if capital deepening was somehow prohibited.

which provided jobs for less than seven percent of the total labor force in 1950?[182] In reality, capital-intensive industrialization is far less a cause of unemployment[183] as it is a savior which proved to be something less than that.

The solution to the unemployment crisis in Latin America, at least in the foreseeable future, lies not primarily in industry but in agriculture. This would seem to follow if we are correct in our reading of the origins of the problem--rural outmigration and rapid population growth. Had the rural outmigration of eight million workers over the 1950-65 period (our Exhibit A, above) been contained, "visible" unemployment at least--which in 1965 totaled 8.8 million--might today be of manageable proportions.

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[182] The rate at which factory employment would have had to grow over the 1950-65 period in order to keep the number of "visibly" unemployed workers from increasing can be estimated as a residual from:

79,473	1965 total work force
- 2,925	1950 "visible" unemployment
-65,204	1965 non-factory employment, actual
11,344	1965 jobs needed in factory employment
3,432	1950 factory employment, actual

Thus, $11{,}344 = 3{,}432\ (1+r)^n$ for $n = 15$ yields a growth rate for factory employment of $r = 8.3\%$ (see Table IV-15).

[183] We should not lose sight of the fact that in some industries factory manufacturing leads to the displacement of artisan workers producing competitive products. The constancy of total manufacturing employment (factory plus artisan) over the 1950-65 period would seem to bear out this thesis (see Table IV-15).

CHAPTER V: A RURAL SOLUTION

A. The Problem Restated

1. Growth Rates and Labor Absorption

Many estimates have been made of the level of sustained growth in GDP required to absorb the increment to the labor force into non-agricultural employment. Few of these estimates are in agreement, but all are extremely high,...perhaps unattainably high.

In a Report[1] prepared for the IDB, Raul Prebisch portrays the employment problem as a consequence of slow growth "due to the fact that Latin America's rate of economic development has not been high enough to allow the outflow of redundant manpower from agriculture to be absorbed at a satisfactory level of productivity, and at the same time to ensure a rapid rise in average per capita income throughout the economy."[2] To Prebisch, the solution requires a decade devoted to "getting rid of the distortion in the structure of employment," at the end of which time a sustained 8 percent growth rate would allow for adequate labor force absorption with increased worker productivity.[3]

Of the effort necessary to achieve and sustain a growth rate of 8 percent, Prebisch notes that it "will have to be really exceptional.

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[1] Raul Prebisch, Change and Development, Latin America's Great Task, Report submitted to the Inter-American Development Bank, Washington, D.C., July 1970.

[2] Ibid., p. 67.

[3] Ibid., p. 67. The structural adjustment in employment implies a certain amount of the labor force in industrial employment, in this case 35 percent of the non-agricultural labor force in industry by 1980.

Exceptional in its nature, and on an exceptional scale. It will call for an expenditure of energy that will seriously test the Latin American countries' ability to shoulder their heavy development responsibilities."[4]

Sensitivity analysis of the rate of growth of GDP required to absorb the net increase in the total labor force into non-agricultural employment reveals quite vividly the crushing burden which high population growth rates place upon labor force absorption. On the basis of the estimates of Table V-1, and assuming a per capita income of $300, the growth rate of GDP required to absorb the net increment of the total labor force into non-agricultural employment would be 3.0 percent if the population growth rate was only 1.0 percent; 4.6 percent if population grows at 1.5 percent; and 9.3 percent for a population growth rate of 3.0 percent. (See Table V-1). In contrast to the nine-plus percent growth rates for GDP necessary for labor absorption by the nations of Latin America, 19th century Japan was able to achieve full absorption of her incremental labor force with a growth rate of GDP of only 4 percent, thanks to a population growth rate of only about 1 percent. Thus, the crucial difference between the situation in Latin America today and 19th century Japan is not so much one of technological bias in favor of capital intensity as it is the dramatic change in the growth rate of population.[5]

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[4] Ibid., p. 83.

[5] S. K. Singh, "Aggregate Employment Function: Evaluation of Employment Prospects in LDC's", pp. 64-65. Washington, D.C. World Bank (mimeo, undated, c. 1970-71).

TABLE V-1

Required Rate of Growth of GDP to Absorb Increment of Total Labor Force into Non-Agricultural Occupations at Different Levels of Development

Per Capita Income		Assumed Population Growth Rates (percent)				
		1.0	1.5	2.0	2.5	3.0
$U.S.	100	3.72	6.11	8.30	10.40	12.66
	150	2.97	4.64	6.70	8.57	10.44
	200	2.87	4.54	6.28	8.62	9.76
	250	2.66	4.52	6.18	7.87	7.50
	300	3.01	4.60	6.20	7.79	9.33
	400	3.34	4.33	6.31	7.80	9.29
	500	3.60	5.01	6.42	7.82	9.23
	600	3.78	5.13	6.48	7.82	9.16
	800	3.95	5.21	6.47	7.73	8.98
	1000	3.95	5.15	6.35	7.55	8.75

Source: Singh, op. cit., Table 1, p. 61.

Dudley Seers, in his pathbreaking study[6] on the employment problem in Colombia, estimated that five million new jobs would be needed by 1985. He tested a "fast growth" strategy for expansion of the modern sector but found that it would necessitate a sustained growth rate for the urban economy of 14 percent over the entire 15-year period, ..."creating

[6] ILO, Towards Full Employment, A Programme for Colombia, prepared by an inter-agency team organized by the ILO, Geneva, 1970.

unmanageable needs for capital and skills, not to speak of problems of urban planning, food supplies and wages policy."[7] The strategy he ultimately recommended was one for more balanced growth, allowing slow migration and increased employment in agriculture. This strategy "implied the need for a fast pace of land redistribution and settlement and for improving employment prospects, education and health services and housing in the small towns and the countryside."[8]

Not only for Latin America, but for the Asian and African continents as well, economists and development planners alike are becoming more convinced that the solution to the employment problems of a large number of developing countries "will have to be sought largely in expansion of rural employment."[9] "The impossibility of absorbing large additions to the labor force into the non-agricultural sectors and the alarming drift of rural labor into overcrowded towns" provide vivid testimony to this conclusion.[10]

While the demand side of the employment equation should not be overlooked for a moment, it is nevertheless clear that at no feasible growth rate can industry alone provide the employment generation necessary to stem the increase in the pool of unemployed. More and more, the problem

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[7] Dudley Seers, "New Approaches Suggested by the Colombia Employment Programme", Internation Labour Review, Vol. 102, No. 4, p. 381. October, 1970.

[8] Ibid., p. 381.

[9] ILO, Employment and Economic Growth, Geneva, p. 132. 1964. See also, Eicher, et. al., "Employment Generation in African Agriculture", Institute of International Agriculture, College of Agriculture and Natural Resources, Research Report No. 9. Michigan State University, East Lansing, Michigan. July, 1970; and Harry Oshima, "A Strategy for Asian Development", Economic Development and Cultural Change, April, 1962.

[10] ILO, Employment and Economic Growth, op. cit., p. 132.

appears to be one of "too many peasants" growing and migrating out of agriculture at too fast a rate.

2. Rural Out-Migration

The more pressing dimensions of the employment problem lie clearly on the side of supply, ...and while there is little that can be done to alter the size of the labor force for at least 15 years, ...and probably for 30,[11] the functional distribution of the work force is, to some extent, subject to the influence of government policy. Thus, most recommendations to deal with the employment problem, and quite sensibly we believe, have been aimed at retarding the flow of potential migrants out of the rural areas and holding them instead in the countryside.

The institution of the extended family has long served to disguise rural underemployment within minifundia, as it still does today; in fact, ECLA has estimated the unemployment equivalent in Latin American agriculture at 33 percent for 1969 (see Table IV-14). However, through the twin processes of migration and urbanization, the locus of surplus workers is shifting, and becoming painfully visible. Prebisch speaks of the migrants who "ceaselessly pour into the bigger towns", thus merely shifting "the scene of their redundancy",[12] and Eric Thorbecke has noted that the decline of 11 percentage points in agriculture's share of total employment over

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[11] Gunnar Myrdal sees the labor force in Latin America increasing by 3 percent until the end of the century. "The United Nations, Agriculture and the World Economic Revolution", Journal of Farm Economics, Vol. 47, No. 4, pp. 894-895. November, 1965.

[12] Prebisch, op. cit., p. 1.

the 1950-69 period was exactly offset by a similar increase in services employment.[13] Nevertheless, by exposing the employment problem in this way, and effectively politicizing it, urbanization may force nations to finally face up to it as well.

a. A Theory of Migration

Who are the migrants out of agriculture and why do they leave? Armed with the answers to these questions we might be better prepared to identify the potential migrant, and design policies which could make him sufficiently content with his rural status so as to preclude the necessity of his migrating out of agriculture.

Studies of outmigration from agriculture in the U.S. reveal that the process of migration is quite selective, especially as regards age and education of migrants. Young adults, and the better educated elements of the rural work force (often the same individuals) prove to be more highly mobile than older and more poorly educated farmers.[14] For the developing countries these same basic traits characterize migrants. However, while age and education may serve to identify potential migrants they are in no way a cause of migration. Rural workers migrate out of agriculture because, on balance, life seems more promising elsewhere in the economy. Thus, if we were to develop a theory of migration, the perceived net advantages of non-agricultural employment vis-à-vis agricultural

[13] "Unemployment and Underemployment in Latin America", document prepared by the Inter-American Development Bank, 1971, cited in OAS, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies", Washington, D.C., August 19, 1971. pp. 45-46.

[14] ILO, Why Labour Leaves the Land, p. 22. Geneva, 1960. Non-whites, particularly the young, have higher migration rates than do whites.

employment would have to occupy center stage.

According to the 5th UN Report on Progress in Land Reform, rural-urban migration "is largely a manifestation of two different but parallel phenomena:[15]

> "...the result of the wide differences in levels of income and living, which encourages migration of skilled labour from rural areas with depressed living standards to urban areas that provide wider employment opportunities, ...[and]
>
> "...the consequence of declining income levels in rural areas resulting from increase in rural underemployment because of increasing population pressure, from loss of land by the poor peasants in favor of the richer classes, from technological unemployment or increase in living costs."

Migration is essentially a reaction to the insecurity of agricultural employment, and a response to non-agricultural opportunities for employment at a considerable income differential. In consequence, it is the unemployed, the hired worker, the tenant, and the sharecropper who migrate; "farm owners and occupiers with secure tenure are less mobile than the insecure and landless."[16] Members of minifundia farm families may also be predisposed to leave the farm if it proves too small or unproductive to adequately support the extended family. Farm owners, however, are the last to leave since their incomes comprise not only the returns to the family's labor, but those to capital and management as well, ...resources which are not readily transferred "jointly into industrial and commercial enterprises."[17]

Variations in relative living levels between agricultural and non-agricultural pursuits appears to be a less important determinant of rural-

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[15] U.N., Progress in Land Reform, Fifth Report, p. 262. N.Y., 1970

[16] ILO, Why Labour Leaves the Land, op. cit., p. 15.

[17] Ibid., p. 15.

urban migration than is the opportunity for stable and remunerative employment in the non-farm sector. In studying U.S. agricultural trends prior to 1945, T. W. Schultz has observed that rural outmigration was not related to relative income levels. He notes that the movement of over 8 million people out of agriculture during the war years occurred as farm incomes increased as a proportion of industrial wages from 42 percent in 1940 to 62 percent in 1944.[18]

Doreen Warriner's observations for the developing countries, particularly the Middle-East, confirms the finding that disparity in income earnings is of secondary importance in explaining migration processes: "gradual long-term falls in the level of farm incomes per head, resulting from falling labour productivity or falling prices, do not appear to result

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[18] Agriculture in an Unstable Economy, p. 97. Committee for Economic Development, Research Study, McGraw-Hill, N.Y., 1945.

	average net income per worker engaged in agriculture	wage income per employed industrial worker	percent agricultural income is of industrial
1940	$ 531	$1273	42%
1941	733	1495	49
1942	1041	1847	56
1943	1362	2156	63
1944	1456	2360	62

The movement of people to farms in 1932, when farm prices were the lowest in 30 years (index of 61; average in 1925-29=139), and off farms in 1940-44 when farm prices doubled and incomes trebled is to Schultz "paradoxical behavior" revealing that farmers do not appear to respond to price signals, and pointing up the difficulty of moving labor out of agriculture (90-91).

Net withdrawals from farming amounted to 8.31 million between Jan. 1940 and Jan. 1944; however, despite these withdrawals, total agricultural production increased over the same period from an index of 110 to 129 (94-95). "It has taken the mobilization for war to show us how great an excess of manpower was attempting to derive a living from farming." (91)

in increased movement in the absence of increased urban employment opportunities."[19]

An ILO study[20] on rural migration processes brings these several elements together into a generalized theory of migration in which the relative disparity in levels of living, especially wage levels, between farm and non-farm sectors is the major long-term factor predisposing farm workers to migrate out of agriculture, while the rate of migration at any point in time is determined by the volume of employment opportunities in the non-farm sectors, as perceived by the potential migrants.

The dominance of employment opportunities in this theory is made clear from the following quotation from the ILO Study:[21]

> "While a low relative income level in agriculture, and particularly the low relative level of wages, is the main permanent long-term factor causing a shift into other occupations, the rate of the movement at any given time is also determined by the increase or decrease in the volume of employment. If relative incomes become more unfavorable to agriculture in a period of industrial unemployment, the rate of movement will not increase because migrants cannot find work. In a period of full employment, on the other hand, the rate of movement out of agriculture will rise, even if the relative economic position of agriculture improves."

From his experiences in Africa, Todaro develops a similar argument, although in mathematical form and minus the explicit emphasis on urban employment opportunities as the dynamic factor in the migration process.[22]

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[19] "Problems of Rural-Urban Migration: Some Suggestions for Investigation", International Labour Review, Vol. 101, No. 5, p. 442. May, 1970.

[20] Why Labour Leaves the Land, op. cit.

[21] Ibid., p. 17.

[22] "A Model of Labor Migration and Urban Unemployment in Less Developed Countries", American Economic Review, Vol. LIX, No. 1, pp. 138-148. March, 1969.

In attempting to expand upon the simple Lewis and Ranis-Fei wage differential models, Todaro notes that the "existence of a large pool of unemployed and underemployed urban workers must certainly affect a prospective migrant's 'probability' of finding a job in the modern sector."[23] Thus, in "analyzing the determinants of urban labor supplies," one must look at prevailing income differentials "adjusted for the probability of finding an urban job."[24]

For most of Latin America the "push" factors of "agricultural distress" resulting from neglect of the agricultural sector are constantly operating, so that migration operates essentially in response to the "pull" of expanding non-agricultural employment opportunities. Thus, in countries such as Brazil and Venezuela, where investment booms concentrated in urban industrial areas have stimulated considerable economic growth, generating--although to a far lesser extent--new employment opportunities, the "pull" and "push" have combined for rapid migration. However, in other countries where the "push" of "agricultural distress" has been equally strong, but where it has not been combined with the "pull" of rapidly increasing urban employment opportunities, migration has been slower.[25]

If the rural-urban migration is to be contained, these "push" and "pull" factors, the combined influence of which has served to transfer the focus of the employment problem from the countryside to the city, will have to be weakened.

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[23] Ibid., p. 138.
[24] Ibid., p. 138.
[25] ILO, Why Labour Leaves the Land, op. cit., pp. 17-18.

b. The Natural Process of Wage Equalization

In the course of economic development with free mobility of labor and capital, productivity and wages in all economic activities tend to equalize. Rural out-migration is simply one of the mechanisms by which this process unfolds, as low productivity agricultural workers strive for what they perceive as a better way of life elsewhere in the economy. To the extent that labor leaves the land for more productive employment in the non-farm sector, utilization of human resources is increased.

Thus, during the decade of the 50's, although per capita rural incomes in Latin America increased by $25, incomes in urban areas rose by $50, and about 15 million migrants entered the cities.[26] At the beginning of the decade, wages of industrial workers averaged about three times the level paid in agriculture.[27]

For the developed countries, worker migrations out of agriculture have served both as a cause and as an effect of increased agricultural productivity. The reduction in the farm work force, coupled with increased needs for food and fiber by the growing urban centers, placed heavier demands upon those remaining in agriculture,--demands which were continuously met, ...and exceeded, allowing for further labor transfers out of agriculture and a continuous improvement in levels of living throughout the economy.

The outward movement of labor from agriculture tends to drive rural wages upwards towards the level of urban wages when it occurs gradually

[26] David F. Ladin, "Urban Growth and Economic Strategy in Latin America", Development Digest, Vol. IV, No. 4, pp. 9-10. January, 1967.

[27] Anatole A. Solow, "Urbanization in Latin America", Development Digest, Vol. IV, No. 4, p. 1. January 1967.

and under conditions of full employment, as has characterized the process of structural change in the developed countries.[28] However, when the outward movement from agriculture is excessive in relation to urban employment opportunities, yet not sufficient to cause a shortage of labor on the land, this process of "urban drift" has the effect of driving down average urban earnings towards the level of rural earnings.[29] It is this latter form which migration takes in the developing countries.

Prebisch notes:[30]

> "the exodus of agricultural workers is inevitable if the level of living of the rural masses is to be raised. What is not inevitable is the appalling congestion in the big towns due mainly to this population shift. In this as in other respects, the Latin American countries are suffering some of the drawbacks of the development process before they have reaped its benefits."

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[28] Rural wages never reach the level of industrial wages, even in developed countries. The differential which is maintained is due to several circumstances. Lewis notes: "part of the difference is illusory, because of the higher cost of living in the capitalist sector; ...there is also usually a substantial difference in real wages. This may be required because of the psychological cost of transferring from the easy going way of life of the subsistence sector to the more regimented and urbanized environment of the capitalist sector. Or it may be a recognition of the fact that even the unskilled worker is of more use to the capitalist sector after he has been there for some time than is the raw recruit from the country." In his model of "Economic Development with Unlimited Supplies of Labour", Lewis argues that subsistence income sets a floor for wages paid in the capitalist sector, "but in practice wages have to be higher than this, and there is usually a gap of 30 percent or more between capitalist wages and subsistence earnings." The Manchester School, May 1954, reprinted in A. N. Agarwala and S. P. Singh, The Economics of Underdevelopment, pp. 410-411. Oxford University Press, New York, 1963.

The ratio of farm wages to manufacturing wages in the U.S. during the 1950-1968 period ranged between .44 and .50.

[29] Warriner, op. cit., p. 442.

[30] Prebisch, op. cit., p. 34.

B. The Need for Structural Reform

In a free and open society there is no effective means to prevent individuals from pursuing what they perceive to be their own best interest, ...nor should there be. How then can a significant proportion of the approximately 25 million new entrants into Latin America's agricultural work force over the decade of the 70's be contained in agricultural, or at least rural, occupations? One thing seems obvious, if migration is to be constrained, significant structural change will have to sweep the countryside. Yet what type of changes could induce a reversal in the trend towards abandoning agriculture? What would have to occur so as to cause agricultural workers to voluntarily remain in the rural sector? It seems fairly clear that nothing short of "massive, rapid and drastic" agrarian reform[31] will suffice to induce workers not to abandon agriculture, ... and this should be but the first step.

1. Land Tenure Institutions

As Dorner and Kanel point out, land tenure institutions cannot be judged in the abstract; forms of agricultural organization differ according to the circumstances of the society which they serve, and only with respect to the needs of that society can judgments be passed as to the adequacy of the tenure institutions.[32] In the developed countries, agricultural

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[31] The term is Jacques Chonchol's, cited in William Thiesenhusen, "Technological Change and Income Distribution in Latin American Agriculture," p. 20. Land Tenure Center Papers, LTC No. 78, Madison, Wisconsin, August, 1971.

[32] Peter Dorner and Don Kanel, "The Economic Case for Land Reform: Employment, Income Distribution and Productivity," Land Reform, Land Settlement and Cooperatives, No. 1, 1971, reprinted as LTC Reprint No.74. Land Tenure Center, Madison, Wisconsin.

organization has evolved in step with the economic, social, political and even military needs of society. Thus, the political urgency of occupying the western states dictated early forms of land settlement in this country, but the pressing labor needs of industrialization and the attractions of urban life drew workers off the farm, where they were replaced by machinery, further strengthening the industrialization process.

In Latin America, no such evolution has occurred. Despite radically different demands being placed upon the agricultural sector today, it has hardly yielded. "Except for the revolutionary reforms of Mexico, Bolivia, and Cuba, the substantial though less massive reforms of Venezuela and Chile, and the recent efforts by Peru, very little expropriation and reorganization of the large farm sector has occurred."[33]

The primary need of Latin American society today is for jobs, and, more by default than any other reason, those jobs are going to be sought in agriculture. Consequently, if Latin America's agriculture is to make its maximum contribution to society, it must be responsive, first and foremost, to the need for generating employment in a fashion which will guarantee a more equal distribution of income and increased productivity of farm workers.[34]

a. The Case for a Smallholding Agriculture

The classical model of a continuous production function comes closest to reality in the case of agriculture. The great diversity in physical

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[33] Peter Dorner (editor), Land Reform in Latin America, Issues and Cases, Land Economics Monographs Number 3, p. xviii. Published by Land Economics for the Land Tenure Center at the University of Wisconsin-Madison, 1971.

[34] Dorner and Kanel, op. cit., p. 5.

conditions and resource availabilities which exists throughout the world has forced each society to develop its own indigenous solutions to the problem of food production. The result has been an infinite diversity of factor combinations and productive techniques representing the unique adaptation of each society to this common problem. With industry we found that invention and innovation occurred in the high capital-labor range of the production surface because this was the range corresponding to factor proportions in the nations doing the research. With agriculture, for the same reason, we should expect to find invention and innovation occurring throughout the entire range of the production surface. In practice, however, slow diffusion and transfer of agricultural practices among countries has restricted the choice of agricultural techniques available to any given country.

Existing factor proportions in most Latin American economies indicate the necessity for agricultural organization along lines of a high man-land ratio, thus maximizing the returns to land. Organizational forms, copied from abroad, which serve to economize on labor by maximizing worker productivity are totally inappropriate to the needs of Latin American economies. As in many other respects, the developing countries can often acquire more appropriate solutions to the problem of diversifying agricultural techniques from interaction as equals with other developing countries than from their subordinate relationships with the aid-giving and capital-exporting nations of the developed world.

As has been shown repeatedly,[35] in cases where contrasting minifundia and latifundia characterize the agricultural landscape, the smallest farms

[35] This relationship has been well documented in the publications of the Land Tenure Center of the University of Wisconsin-Madison.

achieve the highest outputs per unit of land. The inverse relationship which exists between farm size and the output of land makes it quite clear that an agriculture organized along lines of small family farms promises to be far more absorptive of labor than a large farm agriculture.[36] Evidence from some of the agrarian reform projects in Chile, for example, "indicate an increase of over 20 percent in the number of families productively employed on reformed haciendas."[37]

As a form of agricultural organization, the family farm is unique in that it recognizes employment generation per se as an explicit objective of "management." Dovring notes that the size of the agricultural labor force in developing countries is determined far more by demographic pressures than by economic facts. "How many people there are on farms in an underdeveloped country bears no particular relation to the demand for labor, either in the traditional or economic sense. In many cases, the size of the agricultural population is ...determined by the number of people who could find physical sustenance from farming."[38]

By not tieing its operation to strict criteria of economic efficiency,

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[36] Dorner and Kanel, op. cit., p. 11.

[37] Peter Dorner and Herman Felstehausen, "Agrarian Reform and Employment: The Colombian Case", International Labour Review, Vol. 102, No. 3, p. 231. September, 1970. Reprinted as LTC Reprint No. 66, Land Tenure Center, Madison, Wisconsin. A comparative study of Peruvian haciendas and Bolivian ex-haciendas on the altiplano near Lake Titicaca revealed a decline in employment on the Peruvian haciendas but an increase on the reformed Bolivian ex-haciendas. Ibid., p. 231. The study referred to is Melvin Burke, An Analysis of the Bolivian Land Reform by Means of a Comparison between Peruvian Haciendas and Bolivian Ex-Haciendas, a Ph.D. dissertation, University of Pittsburgh.

[38] Folke Dovring, "Unemployment in Traditional Agriculture", Economic Development and Cultural Change, Vol. 15, No. 2, part 1, p. 163. Jan. 1967.

the family farm is free to absorb any or all members of the extended family, and to the extent that it does so, it relieves society both of the welfare and employment burden of otherwise unemployed individuals. Wyn Owen has called this type of rural-urban income transfer "farm financed social welfare".[39]

Investment in family farm agriculture differs from investment in other economic activities in its predominance of labor-intensity. Raup has described the process of capital formation in agriculture as "accretionary", "rarely concentrated either in space or in time",[40] and as such, vastly different from the dramatic forms of capital formation in industry or infrastructure. While capital-intensive forms of investment such as occur in industry have an obvious counterpart in agriculture--tractors, threshers, barns--the converse is not true; labor-intensive investment in modern industry is extremely rare. Capital forming activities such as land clearing, digging irrigation and drainage ditches, fencing, etc., have few counterparts in industry; even fewer have the biological forms of capital--livestock, perennial crops--in which the process of growth and maturation represents capital formation.

The farmer, the rancher, the fisherman, can all convert their labor time into the creation of capital; cottage industry can often do likewise. The modern industrialist, however, has no such option. The use of labor in industry is severely constrained by complementary inputs of capital

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[39] "The Double Developmental Squeeze on Agriculture", American Economic Review, Vol. LVI, No. 1, pp. 43-70. March, 1966.

[40] Philip M. Raup, "Land Reform and Agricultural Development", in Herman M. Southworth and Bruce F. Johnston, Agricultural Development and Economic Growth, p. 273. Cornell University Press, Ithaca, N.Y. 1967.

and materials, and is constantly subjected to the test of minimum productivity,--whether at the margin the extra product covers the added cost. For the family farm maximum productivity is not the relevant criterion; so long as additional output can be wrested from the land, and "free" labor is available, any undertaking may be feasible. The crucial point of departure between family farming and modern industry is the extent to which the former not only absorbs labor, but does so productively. So long as there exists the institutional framework assuring tenure security, "making the use of a productive asset the preclusive right of an individual or a group,"[41] surplus or underemployed labor in agriculture can be put to the task of building farm infrastructure.

In the industrial sector, capital formation is constrained by profitability; costs and returns are monetized and as such, simple to compare. Not so with family agriculture. Since labor effort entails no explicit costs, any positive marginal product, be it tangible or intangible, represents a net advantage for the family farmer.

The long periods of seasonal unemployment which large scale agriculture implies, particularly the more commercially-oriented forms, are eliminated when the land is in the hands of small farmers since the latter are motivated by the need to provide more regular employment for themselves and their family.[42] This need takes the form of more diversified cropping, livestock, the planting of tree crops, and general capital improvements such as fences, outbuildings, pens, etc., projects which, under large-farm agriculture--where labor is looked upon as a market-priced input--may be

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[41] Ibid., p. 273.

[42] ILO, Why Labour Leaves the Land, Op. cit., p. 226.

uneconomic or not even considered.

Other forms of agricultural organization allow for the conversion of surplus labor effort into capital formation, or directly into increased output; however, only under a family farm organization will this effort be freely forthcoming, and its product maximized. Hence, the institution of land tenure plays a key role in the creation of employment opportunities. As Raup has said: "wherever there is surplus agricultural labor and shortage of working capital, the task of the tenure system is to put people to work."[43]

b. The CIDA Data

Studies based upon the CIDA data for Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala and Peru indicate that Latin America's agricultural sector is capable of providing an adequate level of living for the entire rural population, as well as the increments to the agricultural labor force; whether in fact it does so will depend upon how agricultural activity is organized, and government policy towards the farm sector.

On the average there are three hectares of arable land (plus 15 has. of agricultural land) per agricultural worker in Latin America,[44] an amount adequate for the maintenance of a farm family.[45] However, unequal distribution of land ownership and access to and control over complementary resources has prevented the productive employment of the agricultural work force and instead has forced millions of rural workers to abandon agriculture,

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[43] Raup, op. cit., p. 274.

[44] M. J. Sternberg, "Agrarian Reform and Employment, with Special Reference to Latin America", International Labour Review, Vol. 95, Nos. 1 and 2, p. 7. January-February 1967.

[45] Dorner and Felstehausen, op. cit., p. 227.

where a third of the remaining labor resources are still underemployed.

The tenure pattern and the attendant distortions in the productivity of agricultural resources is made clear from Table V-2 which presents data for six of the CIDA study countries. These data reveal clearly the wastefulness implied by the latifundia-minifundia situation which characterizes Latin American agriculture,--the tendency of smallholdings to overuse labor resources in an effort to coax maximum output from "sub-family" holdings, and the failure of the large estates to productively utilize the land resources at their disposal. Despite "ready access to credit and technical assistance, ...only one-sixth of the lands in estates in the seven [CIDA study] countries is or has been in cultivation; the rest are left in native vegetation."[46] The extensive underutilization of large estates precludes the employment on these lands of millions of agricultural workers, ...each of them a potential migrant.

Sweeping redistribution of the land resource is a necessary first condition in most countries of Latin America for generating the needed employment opportunities; the CIDA studies have revealed the potential:[47]

> "The data indicate that in Latin American countries the quantity and quality of the land available is sufficient, in comparison with other regions, to provide remunerative employment for the existing agricultural labor force, and that a margin for additional employment is also available."

However, agrarian reform, if restricted only to land distribution is not, in itself, a sufficient condition for such employment generation; the sufficient condition is provided by appropriate governmental policies

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[46] Solon Barraclough and Arthur Domike, "Agrarian Structure in Seven Latin American Countries", Land Economics, Vol. XLII, No. 4, p. 401. November 1966. Reprinted as LTC Reprint No. 25, Land Tenure Center, Madison, Wisconsin.

[47] Sternberg, op. cit., p. 3.

TABLE V-2

Relationships Between the Value of Agricultural Production, Agricultural Land, Cultivated Land and the Agricultural Work-Force by Farm Size-Class in Selected CIDA Study Countries

Country and Size Groups	Percent of Total in Each Country			Relative Value of Production as Percent of that of Sub-Family Farms		
	Agricultural Land	Agricultural Work Force	Value of Production	Per Ha. of Agricultural Land	Per Ha. of Cultivated Land	Per Agricultural Worker
ARGENTINA (1960)						
Sub-Family	3	30	12	100	100	100
Family	46	49	47	30	51	251
Multi-Family Medium	15	15	26	51	62	471
Multi-Family Large	36	6	15	12	49	622
Total	100	100	100	30	57	261
BRAZIL (1950)						
Sub-Family	xx	11	3	100	100	100
Family	6	26	18	59	80	291
Multi-Family Medium	34	42	43	24	53	422
Multi-Family Large	60	21	36	11	42	688
Total	100	100	100	19	52	408
COLOMBIA (1960)						
Sub-Family	5	58	21	100	100	100
Family	25	31	45	47	90	418
Multi-Family Medium	25	7	19	19	84	753
Multi-Family Large	45	4	15	7	80	995
Total	100	100	100	23	90	281
CHILE (1955)						
Sub-Family	xx	13	4	100	100	100
Family	8	28	16	14	47	165
Multi-Family Medium	13	21	23	12	39	309
Multi-Family Large	79	38	57	5	30	437
Total	100	100	100	7	35	292

TABLE V-2, continued.

Country and Size Groups	Percent of Total in Each Country			Relative Value of Production as Percent of that of Sub-Family Farms		
	Agricultural Land	Agricultural Work Force	Value of Production	Per Ha. of Agricultural Land	Per Ha. of Cultivated Land	Per agricultural Worker
ECUADOR (1954)						
Sub-Family	20	x	26	100	100	x
Family	19	x	33	130	179	x
Multi-Family Medium	19	x	22	87	153	x
Multi-Family Large	42	x	19	35	126	x
Total	100	x	100	77	135	x
GUATEMALA (1950)						
Sub-Family	15	68	30	100	100	100
Family	13	13	13	56	80	220
Multi-Family Medium	32	12	36	54	122	670
Multi-Family Large	40	7	21	25	83	706
Total	100	100	100	48	99	224

Notes: Gross value of agricultural production in all countries except Argentina where the estimates are of added value. Comparable data are not available for Peru.

x/ No information available.

xx/ Less than one percent.

Source: Barraclough and Domike, op. cit., Table III, p. 402.

complementary to land distribution and geared specifically to employment generation.

Of the need for such complementary policies, Doreen Warriner comments as follows:[48]

> "Judging by what I have seen in recent years in developing countries, whether structural change can lead to any significant degree of fuller employment depends on whether or not redistribution of land can be accompanied or followed by greatly increased inputs of land, i.e. an extension of the area in cultivation and an increase in farm sizes, or of capital, i.e. an intensification of land use amounting to a change in the type of farming. Increase in these inputs depends on governmental agricultural policy rather than on the structural change itself. The real value of land reform, its true significance, is that by revealing the limits of structural change it throws into high relief the environmental obstacles to agricultural development; it leads into, and not out of, the problems of improving land use."

The obstacles which land reform "throws into high relief" include shortages of land and water, climatic risks, soil erosion, effects of salinization, regional maldistribution of farm population, distance from markets, etc., many of which call for explicit governmental policy in support of the program of land distribution.[49] These very obstacles can be turned to advantages by translating their removal into productive employment opportunities. The infrastructure works for the control of water resources--drainage, irrigation, and storage--the reclamation and colonization of

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[48] Warriner, Op. cit., p. 449. "It is of course true that land reform, by setting up a structure in which land ownership is more equally distributed, can provide a substitute for unemployment relief and old-age pensions, and will result in fuller employment, in favorable soil, climate and market conditions, which allow production to be intensified. In less favorable conditions, it will simply convert open unemployment into disguised unemployment." (pp. 448-9)

[49] Doreen Warriner, "Employment and Income Aspects of Recent Agrarian Reforms in the Middle East", International Labour Review, Vol. 101, No. 6, June 1970. In her remarks, Warriner is thinking largely of the situation prevailing in Egypt, Iraq and Iran.

land, construction of roads, all can spell new jobs if coordinated into sound policies for employment creation on the land. "Unemployed peasants could be mobilized to reclaim land, dig canals and drains, terrace land, undertake afforestation, at low cost, provided that they could eventually benefit by a grant of land."[50]

The dangers of incomplete or poorly conceived reforms may be a further waste of resources, which is precisely what the reform was intended to correct. In extreme cases, "programs of agrarian reform...may actually reduce employment opportunities unless they are geared specifically to employment goals."[51] Many of the early Mexican ejidos were either so small or the land so poor or eroded that the ejiditarios still found it necessary to work outside their holdings.[52] Warriner warns that the employment benefits of structural change often tend to be exaggerated: "Unfortunately, the whole subject of land reform has now been inflated by propaganda to an extent that precludes analysis of results and comparison of experience."[53] She adds, cynically, "demolishing the myths may mean undermining the faith, and that I should not wish to do."[54]

Various forms of agricultural organization have been put forward as best suited to the post-reform needs for security of employment and income, and increased productivity. It is not the intent of the present study to consider this issue, nor that of minimum per worker holdings. These

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[50] Warriner, "Problems of Rural-Urban Migration...", op. cit., p. 451.
[51] Sternberg, op. cit., p. 1.
[52] ILO, Why Labour Leaves the Land, op. cit., pp. 226-7.
[53] "Problems of Rural-Urban Migration...", op. cit., p. 448.
[54] Ibid., p. 448.

subjects, which are of primary practical relevance, must be studied and resolved by each individual country on the basis of its own economic and political realities, and in the light of the physical and cultural restraints imposed by geography and society.[55]

We have frequently made reference to the family farm as the organisational form best able to absorb surplus manpower. This is clearly one of the lessons of the CIDA studies (see Table V-2). While we would admit to a predisposition towards family farm agriculture,[56] this form of organization is not intended as a recommendation for policy. It is rather intended as a generalization, to characterize smallholdings on which the management decisions in farming the land, as well as the product thereof, redound to those who work the land, in decided contrast to the several forms of large-scale agriculture.

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[55] Solon Barraclough discusses the question of land tenure systems alternative to latifundia-minifundia under three general headings: individual private holdings, communal and cooperative units, and state farms. In making his observations, Barraclough assumes the principal goals of agrarian reform to be "increased agricultural production and investment, more equitable distribution of income and opportunities and the fuller participation of the campesinos in local and national political decision making." "Alternative Land Tenure Systems Resulting from Agrarian Reform in Latin America", Background Paper, Second Meeting, Panel of Experts on Land Tenure and Settlement, p. 4. FAO, Rome, May 26-30, 1968, RU:LT/69/ May 10, 1969.

[56] There seems to be a bias among north americans in favor of family farms. Even those quite removed from the rural setting feel strongly about the institution of the family farm and would defend it against the incursions of corporate farming simply on the basis of some inner-felt affection for smallholding agriculture and the bucolic image it brings to mind.

John Powelson attempts to explain the high productivity of U.S. agriculture in terms of some factor "x", "too big to be described as incentive, but decidedly there [and which] no system other than family farming can induce." Pride of individual achievement and ownership might be a conventional explanation. Latin America, Today's Economic and Social Revolution, pp. 53-54. McGraw Hill, N.Y., 1964.

C. A Rural Strategy

A better life for more people on the land requires a strengthened and increased access to the agricultural stream of income for the rural population. However, existing tenurial conditions is a "major factor limiting employment in agriculture"[57] and thus preventing improved access. Nearly 30 years ago, at the Hot Springs Conference of 1943 at which the FAO was founded, it was "perceived that effective agrarian structure was one of the main obstacles to rural development."[58] Since that time, the only significant agrarian reforms which have occurred have either resulted from revolutionary governments, or been imposed by occupying powers.

Ernest Feder sees the employment impact of recent reform efforts in Latin America as all but negligible:[59]

> "'During the 1960's, Latin America's so-called land reform has been an unqualified failure. ...Actually families receiving land from the governments' land reform institutes are outnumbered by new families joining the poor rural proletariat by a ratio of 20 to 1.'"

In agrarian societies, land is the basis of wealth and the main source of income. Control over the land, therefore, determines the distribution of income, and along with it, the source of power. The traditional basis for the control and ownership of land in Latin America has been to gain control over those people who occupied the land, through a repressive-benevolent system of interpersonal relationships. "In brief, landownership is closely associated with the power to make others do one's will."[60]

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[57] Dorner and Felstehausen, op. cit., p. 228.

[58] Solon Barraclough, "Why Land Reform?", CERES, Vol. 2, No. 6, p. 24. November-December 1969.

[59] Cited in William C. Thiesenhusen, "Employment and Latin American Development", Chapter 4 of Dorner (ed.), op. cit., p. 72.

[60] Barraclough, "Why Land Reform?", op. cit., p. 22.

1. Agrarian Reform: The Necessary Condition

Agrarian reform is the necessary condition for breaking that stranglehold of power which landlords have traditionally enjoyed. In many cases, security of tenure is sufficient in itself to provide for the strengthened and increased access to rural income streams which, as we noted earlier, is required to create more remunerative employment on the land. According to the ILO Report on Colombia:[61]

> "To have peasants enjoy low income with at least subsistence is probably better than their joining the swelling ranks of the unemployed in the towns. Even from the viewpoint of the resettled, such a situation may well be preferable in view of the independence they would enjoy and the future prospects, especially if this is in the context of a rural development strategy."

Kanel sees the minimal advantages of land distribution as providing the peasantry a waiting station at which they can consider their option of migration from a more secure vantage point within the rural economy:[62]

> "Despite all its imperfections, peasant proprietorship provides considerably more security to the agricultural population than ownership vested in large landowners. An agriculture of landowning peasants provides a shelter for the masses of people for whom outside employment is not available. It absorbs population increases up to the limits of capacity to support life. On the other hand, it does not necessarily act as a barrier to outmigration when employment opportunities appear elsewhere. It permits the use of new technological opportunities in farming, but those who have no alternatives or who cannot or are not

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[61] ILO, Towards Full Employment, op. cit., pp. 76-77.

[62] Don Kanel, "Land Tenure Reform as a Policy Issue in Modernization of Traditional Societies", Chapter 2 of Dorner (ed.), op. cit., p. 31. Thiesenhusen in "Employment and Latin American Development", op. cit., notes that "even if (for the time being) reform does no more than provide sustenance for large numbers of rural people, it will contribute to economic development by retarding migration until industrial development can catch up with population growth." (p. 71)

ready to utilize new technology have access to subsistence. By contrast, in an agriculture dominated by large landowners, continued peasant employment depends on employer decisions, and for a variety of reasons, more active management by these landowners often leads to a relatively labor-saving path of modernization."

2. Government Support Programs: The Sufficient Condition

In other cases, structural reform may simply serve to highlight the need for infrastructural improvements,--technical and financial assistance, and improved agricultural inputs--in the absence of which the benefits of land distribution would be of little importance. In such cases, productivity gains of the magnitude which will have an impact upon rural-urban income differentials will require that major government action programs be directed at the rural sector. Yet during the past decade, expenditures by the Latin American governments on agriculture are estimated at less than 6 percent of total central government expenditures, less than 1 percent of GNP. No country has averaged 10 percent and very few have even touched that level in 10 years.[63] Clearly, the rural employment problem and the attendant problem of rural outmigration will not be solved by ignoring the rural sector.

If our objectives of more remunerative employment on the land and a reversal to the tendency towards outmigration are to be satisfied, programs for productivity increase must be coupled with, and in fact integrated into, policies for agrarian reform. The design and pursuit of such integrated policies and programs must be made a cornerstone of any effective rural strategy which seriously attempts to stem the forces of migration, for excessive attention either to agrarian reform or productivity increase,

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[63] Charles Montrie, "Employment and Development Planning in Latin America", p. 12. Office of Development Programs, Bureau for Latin America, Agency for International Development, (mimeo) October 15, 1971.

without a corresponding emphasis upon the other, can jeopardize the success of the entire rural effort.

3. Security of Markets

The size of the market for agricultural output, and its growth rate, can act as constraints upon the expansion of agricultural production and thus upon agricultural incomes from a re-organized smallholding agriculture. This possibility is of particular concern in those countries or regions where (a) labor-saving forms of agricultural organization have the capacity to capture increasing shares of the nation's market, and/or (b) the scope for market expansion is limited.

The possibility of such a post-reform demand deficiency is indicated by Clark's studies of the Bolivian agrarian reform.[64]

> "By far the largest share of agricultural produce now comes from small peasant holdings, and there is no shortage of staples and other food commodities, signifying that peasants have taken advantage of the new income earning opportunities which the land reform presented. The real barrier [to increasing agricultural output and incomes] is no longer on the supply side, but is more likely a function of the limited demand for agricultural produce in Bolivia."

a. The Demand Side: Market Size and Growth

The scope for expansion of agricultural markets is defined essentially by three parameters: the rate of growth of domestic demand for agricultural production, possibilities for import substitution of agricultural imports, and prospects for increasing agricultural exports.

1. Growth of Domestic Demand. Growth rates for population and per capita income set a floor for the growth in domestic demand of about 4 -

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[64] Ronald J. Clark, "Agrarian Reform: Bolivia", Chapter 7 of Dorner (ed.) op. cit., p. 150. Emphasis added.

5 percent, on top of which a component corresponding to increased market participation, or more generally, income redistribution, must be added. ECLA has estimated that "Latin American agricultural production will have to grow by about 4.3 percent annually in order to keep pace with population growth, increase per capita incomes and meet minimum nutritional standards."[65]

Over the 1950-65 period, per capita consumption of foodstuffs rose at only 1.1 percent,[66] a reflection of the unequal distribution of the benefits of a 2.5 percent growth rate in per capita income over the same period. Had this growth been distributed more equally, the higher Engel coefficients of the lower classes[67] would have guaranteed a far more rapid increase in per capita food consumption. Even in the absence of income growth, improvements in the distribution of income, through these different propensities on the part of the poor and rich to consume food, would result

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[65] Solon Barraclough, "Employment Problems Affecting Latin American Agricultural Development", Monthly Bulletin of Agricultural Economics and Statistics, Vol. 18, Nos. 7/8, p. 2. July/August 1969.

The FAO "Provisional Indicative World Plan for Agricultural Development" (IWP) estimates the annual growth rate in the demand for food in Latin America between 1962-1985 at 3.5%, fully 88% of which is attributed to the "population effect" and only 12% to the "income effect". The IWP observes that "the impact of increased spending power on personal demand for food is surprisingly modest." The "income effect" estimated for Latin America (Zone C in UN terminology) is the lowest for all of the developing regions and is due to a low income elasticity of demand for food. Vol. III, pp. 5-8. August 21, 1969.

[66] Prebisch, op. cit., p. 37.

[67] The Michigan State study of food marketing for the city of Cali, Colombia, cited in Chapter II shows that average food expenditures decline as a proportion of income from 82 to 28% as families pass from the first to the fourth income quartile (see Table II-6).

with an increased demand for the products of agriculture.[68]

Clark has demonstrated quite vividly in the case of Bolivia how market participation, especially for foodstuffs, increased significantly as a consequence of the land reform (see Table II-3). It is probably here, in the increase in market participation, especially by those with the highest marginal propensity to consume food, that the most significant gains in domestic demand expansion will be realized.

With increased per capita income, consumption patterns shift towards items higher up on the food chain,--poultry and dairy products, beef and pork--as well as processed foods.[69] Research carried out jointly by ECLA/FAO on the income elasticity of demand for food, assuming a modest redistribution of income, bears out the movement in the direction of livestock products.[70]

The shift towards a livestock economy has important implications for the agricultural sector. As an example, it can mean increased output and employment if the price ratio between feed and finished livestock products is sufficiently favorable to make feeding economically feasible. On the other hand, the grazing of livestock, even poultry, implies foregoing the backward linkage with feed producers. The contrasting possibilities simply point up once again the important role which governmental policy, especially price policy, can play in the generation of employment opportunities.

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[68] This point was made in Chapter II (see section II.A.1.c. Expenditures for Food).

[69] The Getulio Vargas Foundation, Center for Agricultural Studies, Projections of Supply and Demand for Agricultural Products of Brazil, published for the U.S. Department of Agriculture, Economic Research Service, by the Israel Program for Scientific Translations, Jerusalem, Tables 31, 32,33. July 1968.

[70] ILO, Towards Full Employment, op. cit., p. 81, footnote 3. A decline from 66% to 61% in the share of income received by the top 30% is assumed.

2. Import Substitution. A second measure of the scope for growth of agricultural output is shown in Table V-3 which indicates the ratio of agricultural imports to total agricultural supply for 18 countries of Latin America. A low ratio, as is the case for Argentina, Brazil, Colombia, Ecuador, Mexico and Paraguay (all under 5 percent) implies limited scope for agricultural expansion through import substitution. On the other hand, a high ratio does not necessarily imply the reverse, and in at least one case, that of Peru, the scope for expansion is probably understated due to the importance of fisheries in the denominator.

Peru and Chile, with respective ratios of .150 and .253, and to a lesser extent Venezuela, with a ratio of .222, appear to have greatest prospect for substituting domestic for imported output in that their agricultural imports are quite diversified and include many commodities whose domestic production could be increased. On the other hand, about 60 percent of Bolivia's agricultural imports are accounted for by cereals,--essentially imports of wheat flour under PL 480. The very favorable terms[71] under which these imports move, and the opportunities this trade affords for illicit profits will make it very difficult for Bolivia to give it up,

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[71] All sales programs under PL 480 are carried out under Title I of the Act. Long-term credit sales agreements under Title I allow for repayment periods of up to 40 years, with grace periods of up to 10 years. Interest is charged at 2% during the grace period and 3% thereafter. 1970 Annual Report on Public Law 480, 92nd Congress, 1st Session, House Document No. 92-135. p. 15.

TABLE-V-3

Latin America: Agricultural Output, Imports, and Ratio of Imports to Total Agricultural Supply

	Agricultural Output* ($000,000)	Agricultural Imports ($000,000)	Ratio: Imports to Total Agricultural Supply
Argentina	2,302	97	.040
Bolivia	141	29	.171
Brazil	8,417	318	.036
Chile	445	151	.253
Colombia	1,688	48	.028
Ecuador	451	21	.044
Mexico	3,834	124	.031
Paraguay	157	7	.043
Peru	791	140	.150
Uruguay	231	22	.087
Venezuela	630	180	.222
Costa Rica	154	23	.130
Dominican Republic	245	30	.109
El Salvador	233	33	.124
Guatemala	387	31	.074
Honduras	222	19	.079
Nicaragua	184	19	.094
Panama	168	20	.106

Note: *Agricultural output includes forestry and fishing.

Source: Col. 1: Agency for International Development, Latin America, Economic Growth Trends, Washington, D.C., Tables 3 & 6. December 1969.
Col. 2: U.S. Department of Agriculture, Economic Research Service, Agricultural Trade of the Western Hemisphere, Washington, D.C., February, 1972.
Col. 3: Col. (2) divided by sum of cols. (1) & (2).

even if domestic flours or flour extenders could be substituted for the imports.[72]

Agricultural imports under PL 480 are important for most of the nations of Latin America[73] and in many cases fulfill a genuine developmental need. However, in many other cases, where the U.S. government is simply encouraging Latin governments to assume a short planning horizon and thus take the easy way out, such trade would seem to confirm Joan Robinson's criticism that "'the aim of aid is to perpetuate the system that makes aid necessary.'"[74]

For the countries of Central America, Panama and the Dominican Republic, import ratios are about .10 (see Table V-3); cereals, fruits and vegetables, oils and fats, and dried milk appear as recurring items.[75] Cereals, oils and fats, and dried milk dominate the agricultural imports of many of the larger nations of Latin America as well.[76]

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[72] Unfortunately, Bolivians have become "hooked" on bread and rolls made from the flour of hard wheats from the U.S. For a government to deprive the urban population of this high quality flour, or even allow its price to rise would result in "bread strikes" which, if not resolved quickly and favorably could cause a government to topple. Domestic wheat flours, including the Mexican and Colombian Green Revolution varieties, may be combined with imported flours up to a maximum level of about 50 percent. Climate, however, prevents the production of a truly hard sub-tropical wheat. To some small extent, flour "extenders"--the flours of potatoes, manioc or green bananas--could be combined with wheat flour, although this is not a common practice. The point is that Bolivians will insist upon the white breads to which the U.S. has accustomed them, and in all likelihood will have to continue importing at least 50% of their expanding needs of white flour.

[73] 1970 Annual Report on Public Law 480, op. cit., Table 2.

[74] Cited in Keith B. Griffin, "Latin American Development: Further Thoughts", Oxford Economic Papers, Vol. 20, No. 1, p. 132. March 1968.

[75] U.S. Department of Agriculture, Economic Research Service, Agricultural Trade of the Western Hemisphere, Washington, D.C., February 1972.

[76] Ibid.

The price system is a powerful mechanism. Many nations have found it a relatively simple matter to turn a deficit in a certain agricultural commodity into a surplus through an import substitution program founded upon high producer prices. Unfortunately, however, such programs are difficult to turn off, and the line between self-sufficiency and over-production is often very narrow. Exporting the surplus, which is the obvious solution, is difficult due to the high price structure existing within the domestic economy. Disposal of the surplus, or restoring a domestic market equilibrium, may thus become a serious economic problem.

The possibilities of increased bilateral trade among the nations of Latin America may provide a temporary solution. Most of these nations have surplus industrial capacity or surplus agricultural output; high production costs, however, preclude conventional export sales. Bilateral trade agreements between two such nations,--either in agricultural for industrial output, say fertilizer for refined sugar, or agricultural commodities for agricultural commodities--could be considered. Although quite inconsistent with long-run international trade theory, such an exchange might have interesting short-run benefits.

3. Export Growth. The importance of agricultural exports varies considerably among the nations of Latin America, as do their prospects for export growth, making aggregate analysis difficult and of limited value.

The Economic Research Service of the U.S. Department of Agriculture estimated the annual growth rate for agricultural exports of the LDC's at 2 percent over the 1965-80 period, ...1 percent less than the growth rate estimated for their agricultural imports.[77] Prospects for export growth

[77] U.S. Department of Agriculture, Economic Research Service, "World Demand Prospects for Agricultural Exports of Less Developed Countries in 1980", p. vi. Washington

in cotton textiles, bananas, cocoa and coarse grains are rated as "good", those for coffee "fair", and for rice "poor".[78]

The international market for meat, particularly beef and veal, is quite promising, according to the FAO,[79] a situation which many of the countries of South America, with their vast expanses of natural grasslands, are in an excellent position to take advantage of. The "Provisional Indicative World Plan for Agricultural Development" estimates that meat exports from South America could increase from a 1961-63 average of about 0.8 million tons to as much as 4 million tons by 1985, a considerable upward revision over FAO's estimate of a few years earlier of 2.6 million tons.[80] However, the presence of hoof and mouth disease in South America, unless it was effectively controlled, could serve to restrict this otherwise highly promising trade largely to processed meats.

To a considerable degree, the agricultural export prospects of the developing countries will depend on the economic policies of the developed countries, particularly where the latter countries are exporting competitive products.[81] With the exception of a few exclusively tropical products, --mainly beverages and fruits--the developed countries are capable, collectively, of meeting all their agricultural needs either from natural or synthetic products, ...a fact which is illustrated by their increasing degree of self-sufficiency.[82]

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[78] Ibid., p. v.

[79] FAO, "Provisional Indicative World Plan...", Vol. III, op. cit., pp. 47-8.

[80] Ibid., pp. 47-8.

[81] USDA, "World Demand Prospects...", op. cit., p. vi.

[82] FAO, "Provisional Indicative World Plan...", Vol. III, op. cit., p. 44.

The removal of trade restrictions are not expected to benefit LDC exporters unless explicit trade arrangements are made in their favor.[83] Thus, the potential for expansion of agricultural markets varies considerably among the nations of Latin America. For some, slow growth in market size may become an important policy constraint; for otners, however, the more relevant question may be not the prospect of demand insufficiency but rather of the ability of an agriculture in process of re-organization along lines of small family farms to keep pace with the growing demands for its output resulting from a progressive expansion in market participation on the part of the rural sector.

b. The Supply Side: The Potential Level of Output

If present trends continue, non-agricultural activities can be expected to absorb about two-thirds of the increment to the labor force, the total of which over the decade of the 70's will amount to approximately 3 million workers annually. Thus, fully a million new entrants must be absorbed into agriculture each year,[84] implying about a 3 percent growth rate for the agricultural work force. The data of Table V-2, especially columns 4 and 5, give an outside and admittedly exaggerated measure of the (once-for-all) yield increases which might be forthcoming in the wake of major structural reform of landownership patterns. Add to these the continuous benefits of yield increasing inputs and improvements in marketing and one can readily see that the potential for increasing agricultural output and worker productivity from a restructured agriculture is quite impressive. The extent

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[83] USDA, "World Demand Prospects...", op. cit., p. vi.

[84] Barraclough, "Employment Problems...", op. cit., p. 1.

to which this potential increase is actually realized will depend upon several factors,--among them the pace of land redistribution, complementary policies towards the agricultural sector, and the market for agricultural output.

The temporary decline in food production--or at least in food deliveries--which accompanies land reform represents an offset to the potential increases we have just considered. Especially in the case of sweeping agrarian reforms, such transitional shortages may lead to serious inflation and the need for increased imports.[85] Where reform is staggered, however, production declines may not materialize.

The sweeping Bolivian reform of 1952-3 led to reductions in the quantity of agricultural produce reaching urban markets which persisted for several years. Through an "unfortunate misconception, yet rather widely held," production is believed to have declined;--"actually, such a decrease is not shown by Bolivian production indices."[86] Clark attributes the "apparent" association between land reform and production declines to three factors: "marketing adjustments, transportation bottlenecks, and weather phenomena.[87] The former two, by far the more important factors, were

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[85] A FAO study on international strategies to utilize surplus food production suggests that surplus food might be used to advantage by developing countries during the transitional phase of agrarian reform in order to offset food shortages and avoid serious inflation and increased food imports, the prospect of which might otherwise deter a country from instituting agrarian reform. The Report urges that surplus food "be set aside to help in the launching of justified land reforms." Development Through Food: A Study for Surplus Utilization, Basic Studies Series, No. 2, p. 97. Rome, 1962. Presumably, such surpluses, as well as those available under PL 480, Title II, could also be utilized as worker compensation in the infrastructure projects complementary to agrarian reform.

[86] Clark, "Agrarian Reform: Bolivia", op. cit., p. 146.

[87] Ibid., p. 146.

overcome within 3 - 4 years by means of newly evolved institutional arrangements in which the peasantry received the cash incomes previously accruing to the landlords.[88]

c. The Policy Implications: Protection of Market Shares

The possibility of demand insufficiency,--resulting from the intrusion of labor-saving and highly productive forms of agricultural organization upon markets formerly satisfied from smallholding agriculture, and/or agricultural supply running up against the limits of market size--calls for a policy which reserves to the smallholding subsector a progressively larger minimum share of the market by restraining the ability of labor-saving agriculture to capture larger market shares.

The growth of highly mechanized commercial agriculture, by which food and fiber needs can be met with only a small fraction of the agricultural labor force, circumscribes the extent of the market which can be supplied by smallholding agriculture. Further encroachment by large, mechanized producers upon the markets being served by labor-intensive small scale agriculture is quite likely considering the availability of surplus land resources, capital and technology by which large producers can move swiftly in order to seize new market opportunities. We have read enough

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[88] Ibid., pp. 146-7.

accounts[89] of the devastating impact which mechanization has had upon agricultural employment throughout Latin America to recognize the need for constraint upon arbitrary decisions to mechanize.

On the Colombian coast, dominated by large commercial farming operations, total crop land increased by 282 percent between 1960 and 1965, compared with an increase of only 31 percent for the nation as a whole.[90] Tractor use on the coast,--which over an earlier period (1953-1960) had more than doubled--continued to increase at a disproportionately faster rate after 1960 with the expansion of cotton production there. By 1965 about 25 percent of the nation's total tractors, and a considerably higher proportion of effective horsepower, were operating in the coastal departments, up from 17 percent in 1953.[91] Thus, large farm agriculture is providing a progressively larger proportion of Colombia's total agricultural supplies,...and doing so with relatively fewer workers.

It is not inconceivable to think that the nations of Latin America could meet their needs for food and fiber with only 10 percent of their labor force in agriculture, as occurs in the developed nations. The

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[89] Barraclough and Domike, in op. cit., p. 394, for example, note that "on a 15,000-hectare hacienda in Ecuador, owned by Swedish interests, half of the resident population was sent away when the farm was transformed into one of the most 'efficient' in the country." Barraclough in "Employment Problems...", op. cit., p. 2, notes that in Calabozo, Venezuela, where he had visited, an irrigation project was established on which "119 rice and livestock farms of about 200 hectares each...with practically unlimited access to modern capital, technology, management and organization", and with an average investment per farm of over $750,000, were able to produce one-third of the nation's entire rice needs. For some Central American examples, see Rodolfo Quiros, "Agricultural Development and Economic Integration in Central America", (Ph.D. dissertation, University of Wisconsin, Madison, 1970), especially Chapter IV.

[90] Roger Soles, unpublished data.

[91] Ibid.

fact that the technology to do so exists and is available to them represents a major threat to the success of a program for remunerative employment creation on the land. To deal with this danger, national agricultural policy may have to define explicitly the markets which are to be served by smallholding agriculture, or alternatively, restrict the production of mechanized agriculture to certain specific commodities.

In that the capacity of land to absorb labor is a function both of what is produced and how it is produced, the use to which a parcel of land is put can be as important in determining labor needs as the techniques of farming it. Vegetable crops, for example, are characteristically labor-intensive; cotton, corn, potatoes, and sugar cane can be produced by either a mechanized or a labor-intensive scheme of agriculture. Livestock production tends to be land intensive,... but poultry, hogs and dairying require more labor per unit of land than do beef cattle. Thus, land use has an important bearing upon employment creation and can, to some extent, be treated as a policy variable just as we are suggesting that agricultural

techniques be treated.[92]

Clark claims that the shift from "traditional staples" into vegetables, fruits and flowers--all highly labor-intensive crops--was an important factor in increasing employment on the land in post-reform Bolivia.[93]

Quiros provides us a counter-example.[94] The expansion of large-scale, mechanized cotton production on Nicaragua's pacific coast led to a massive displacement of tenants and sharecroppers from traditional "granary areas". As a result, basic grains--cash crops for the small producers--moved from

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[92] In connection with an agricultural sector loan for Colombia, a group from the Sector Analysis and Strategy Staff of the Bureau for Latin America, AID, has been analyzing the impact upon agricultural employment of different patterns of agricultural output. The following table, excerpted from a working document for the Colombian Agriculture Sector Analysis, reveals the nature of the differences between commodity groups.

Commodity Group	Labor Coefficient Labor % of Total Costs	Dollar costs of generating one direct man year of employment.
1. Peanuts, beans, raspberries ñame, lettuce, yuca, cucumbers	.50 to .68	300 to 665
2. Mango, tobacco, cauliflower strawberries, beet, sugar cane	.40 to .48	475 to 710
3. Arracacha, onions, plantains, cacao, lentils, habas, spinach tomatoes, peas, cabbage, orange, lemons, irrigated rice lulo, grapes.	.30 to .39	615 to 950
4. Small farm corn, sesame, jute, soybeans, potatoes	.20 to .26	950 to 1,420
5. Millet, cotton, barley, sorghum, wheat, milk	.10 to .19	1,420 to 3,270
6. Wool, eggs, poultry, pork, beef	.01 to .043	6,300 to 26,255

[93] "Agrarian Reform: Bolivia", op. cit., pp. 147-8.

[94] Quiros, op. cit.

the export to the import side of the trade balance.[95]

The net gains from the cotton boom are difficult to evaluate, but if the social costs of labor displacements, the reversal of grain exports, the cost of imported machinery and other inputs, and the loss in income through repatriation of profits abroad are taken into account, the benefits to the nation are far less than they might have appeared at first blush.[96] Thus, the shift in land use and techniques of farming--while of questionable value for the economy as a whole--had very serious and cumulative effects upon the employment situation in agriculture.[97]

Quiros argues that once in the hands of large-scale agriculture, and despite setbacks in export markets forcing contraction of output, land does not revert to campesinos "under any given tenure arrangement". In the case of El Salvador, over 30 percent of the land removed from cotton production was allowed to return to natural pastures; 55 percent was planted to rice and corn under mechanized conditions.[98]

4. Supplementary Rural Employment

The need for creating opportunities for rural employment to supplement those generated directly by agrarian reform arises not only from

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[95] Ibid., pp. 183-9.

[96] Ibid., p. 191.

[97] It is interesting how the fact of labor displacement resulted in the circumstances making labor-saving machinery necessary. By 1964, labor outmigration from the cotton zone was of such a magnitude that five percent of the cotton crop was left in the field due to the shortage of pickers. As a consequence, the first 13 mechanical pickers were imported in 1964; by 1967 there were 200 in the country. Ibid., p. 183. The case points up vividly the cumulative dangers of unrestrained mechanization.

[98] Ibid., pp. 193-7.

the possibility of a demand insufficiency--which as we noted above is not a real problem in many countries--but from the necessity to hasten job creation in the countryside, develop certain activities which are complementary to the reform effort, and because in practice, sufficient land resources may not be available where and when they are needed to accommodate the entire agricultural work force on the land.

Recent CIDA studies have proposed "'as a "reasonable objective" for agrarian reform--programs benefitting half the families of landless workers now in agriculture, minifundio holders and cultivators with insecure tenure within the next decade, or 5 percent of such families annually plus an allowance for increase in their numbers.'"[99]

We can think of several broad areas of supplementary employment which both depend upon and support agricultural production,--rural industry, infrastructure and marketing, and colonization.

a. Rural Industry

Traditional minifundia agriculture in Latin America is characterized by exceedingly low ratios of purchased inputs--and consequently high ratios of labor--to total value of output. Whether due to the risk-averting nature of the small-holder, or his inability to secure credit, the impact of his productive activity upon the economy is minimal. He purchases essentially no inputs, employs no paid labor, and produces only a very modest surplus for market. Only in his role as a merchant of his own surplus, and subsequently as a small consumer, does he interact at all with other units of the economy.

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[99] Thiesenhusen, "Employment and Latin American Development", op. cit., p. 72. Emphasis added.

On the other hand, if he was able to avail himself of yield-increasing inputs such as improved seed, pesticide, fertilizer and implements he could increase his output (and presumably his income as well) while at the same time forging backward links with the rural support industries in which new employment opportunities can be developed.

The manufacture of sophisticated chemical preparations such as pesticides and fertilizers obviously does not lend itself to small-scale rural industry. However, modest employment generation in the rural sector, and lower product price, is possible if these products are moved in bulk to the countryside where they could be broken into smaller units, packed and labeled with the aid of rural labor, or by producer co-ops.

Certified seed production, or at least high quality seed, could be a further means of diversifying the agricultural base.

The production of draft animals, and of the feed to maintain them, could become an important rural specialization, especially if tractorization is to be successfully avoided. Many draft animals, however, will continue to be produced as a part of the farm enterprise on mixed small-holding operations. In contrast with the tractor and its inputs of fuel, lubricants and spare parts, animal traction is strictly a local industry.[100]

Perhaps the most meaningful rural industry, however, would be the manufacture of mechanical "intermediate" inputs. Devices such as hand seeders,

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[100] Robert D'A Shaw, in discussing the employment implications of the Green Revolution notes that "the number of jobs created by plants in Asia with the capacity to produce 12,000 tractors per year would be a mere 11,200." "The Employment Implications of the Green Revolution", Development Digest, Vol. IX, no. 1, p. 96. January 1971. This estimate fails to take account of the employment that would be generated as a result of the linkages formed with other domestic industries.

hand pumps, and a host of animal drawn implements--tool bars, plows, harrows, seed drills, fertilizer spreaders, etc., all qualify as "intermediate" inputs in the sense that they embody techniques which are transitional between traditional and modern agriculture.

Beyond the obvious reduction in drudgery and increased efficiency which such inputs allow the farmer, their manufacture also provides very important benefits to the economy, immediate employment opportunities being only one. The manufacture of intermediate inputs requires a certain amount of raw materials--lumber, high quality steel for cutting and digging edges, sheet and extruded metal products, tires, etc.--as well as metal and woodworking tools. The need for these materials and tools forge linkages between agriculture and urban industry via the rural intermediate workshops. Such symbiotic relationships are the foundation of a healthy economy, for where the scope for specialization is retarded by restraining the size of markets, development staggers and economies stagnate.

The skills which are developed in rural workshops, be they "intermediate" or otherwise, prepare rural workers to assume the responsibilities of semi-skilled and even skilled workers in the urban labor force,...an "external economy" which reinforces considerably the case for rural workshops.

Rural industry can extend forward from agriculture as well as backward. Food transforming is the most obvious example of a rural industry which lends itself quite well to the constraints of the rural sector. Scale is highly variable, capital needs are not very great, and with certain obvious exceptions, such as containers, it is not reliant upon other manufacturing activities. Furthermore, food transforming can offer an

excellent source of seasonal employment since peak labor needs often occur immediately after the harvest.[101] By reducing spoilage and waste, especially for perishable produce, farmers are enabled to market an increased proportion of their output.

Agricultural import statistics, of course, represent a good starting point for determining the scope for agricultural import substitution. Sacks made of jute and other fibers frequently appear, for example, but many nations of Latin America have been quite slow to replace these imports with domestic production.

The frustrated attempts to decentralize industry in Latin America should serve as a warning that, with the few exceptions which we have been discussing, the attractions of the large metropolitan centers are difficult to counteract in practice. The dilution of public infrastructure which would be required would be costly and the results unpredictable, and in any case long-run.[102] Studying the question of industrial parks for Central America, the Stanford Research Institute, "while admitting that decentralization was desirable...concluded that only the capital cities could economically provide the infrastructure needed to attract industries. Overhead public investment to make secondary cities attractive would be out of proportion with present resources."[103]

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[101] Griffin, op. cit., p. 130.

[102] Solow, op. cit., p. 6.

[103] Stanford Research Institute, "An Industrial Park Development Program for Central America", Menlo Park, Calif., 1964, cited in Solow, op. cit. p. 6.

b. Infrastructure and Marketing

The employment generating role of rural infrastructure projects, designed along labor-intensive lines, has been discussed in the preceding chapter. We need only reiterate here some of the more salient points with respect to the potential of rural construction activities for absorbing workers.

There are two broad areas in which new employment opportunities can be developed--voluntary labor projects which open new lands to cultivation, and paid labor on rural infrastructure projects.

We noted earlier that community development projects do not typically offer new and remunerative employment opportunities. Since the major and often sole compensation is the benefits derived from the finished project, it is unlikely that labor will be forthcoming except from those who view themselves as potential beneficiaries.

This same concept, however, can be incorporated into a scheme for developing new lands for settlement which provides employment and the promise of land for the participants. According to such a scheme, the necessary infrastructure to open new agricultural lands would be provided voluntarily by the future settlers, thus becoming the beneficiaries of their own labor efforts. Construction of infrastructure would, of necessity, be organized along labor-intensive lines; a food allowance would be provided. In the case of remote virgin lands, minimal infrastructure would consist of roads and bridges. Land clearing and construction of storage facilities could be done cooperatively or individually. Settlements formed from reclaimed land would require a different type of infrastructure,--draining or irrigation, for example.

A very similar idea was presented earlier when we suggested that the very obstacles which land reform "throws into high relief" could be turned to advantage by translating their removal into productive employment opportunities. We noted at that time the remark by Doreen Warriner that "unemployed peasants could be mobilized to reclaim land, dig canals and drains, terrace land, undertake afforestation, at low cost, provided that they could eventually benefit by a grant of land.[104]

The second broad area of employment creation through rural infrastructure is that of paid labor working full time on construction projects. We feel convinced that considerably more workers could be utilized productively in place of many mechanized operations, particularly in road construction projects.

In the previous chapter we cited an example from Africa of how 12 times as many workers could have been employed on a road-surfacing project without compromising the quality of the work. While labor-intensive projects are admittedly more difficult to administer, the employment gains can be of such a magnitude that few responsible governments can afford to ignore them.

Labor-intensive designs should be more than an afterthought; they should become a major weapon in the battle for employment creation in the rural areas. It will probably require a strong national directive, however, elevating employment creation to priority status, before public works projects are no longer designed in such a way as to avoid what Tinbergen has called "the trouble of dealing with people."[105]

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[104] "Problems of Rural-Urban Migration...", op. cit., p. 451.

[105] Jan Tinbergen, "Choice of Technology in Industrial Planning", Industrialization and Productivity, Bulletin 1, p. 24. U.N. Department of Economic and Social Affairs, N.Y., April 1958.

c. Colonization

Colonization projects in Latin America have often proved a very costly and not always efficient means of generating agricultural income and employment. Frequently such projects are politically motivated, aimed at reducing pressures for reform of lands owned by people of substantial wealth and power.

Powelson remarks of colonization that "its strongest asset--that it is politically easy--is also a liability" since it would leave unresolved "the primary objective of agrarian reform [which is breaking] the political stranglehold of parasitic landowners."[106]

Of the reasons for favoring tropical frontier settlement, Domike notes, they are not "to create economically and socially viable communities [but rather]...to achieve a national integration, to secure borders,... to satisfy regional economic interests,...[or] to divert political pressures away from the land reform problems in the already settled areas."[107]

The many obstacles to successful colonization schemes are well known--infrastructure development, quality of the land, access to markets, malaria--and the track record is generally poor. "Albert Hirschman calls colonization projects 'failure prone'" and another writer "notes that 'on a worldwide basis, it must be admitted that few spheres of economic development have a history of failure to match that of tropical land settlement.'"[108]

Areas on the fringe of existing agriculture and suitable for settlement

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[106] Powelson, Latin America..., op. cit., p. 57.

[107] Arthur L. Domike, "Colonization as an Alternative to Land Reform", p. 3. Washington, D.C., June 2-4, 1970. A paper presented at the Spring Review on Land Reform, Agency for International Development.

[108] Ibid., p. 18.

have long ago been taken up, leaving only the large tracts, located somewhere "over the mountains", quite removed from centers of economic activity. "To bring such unutilized areas within the effective economy is generally a matter beyond the power of individual effort;"[109] thus, in the absence of co-ordinated governmental action such areas are destined to remain beyond the limits of the effective economy,...as are their unfortunate colonists.

In Colombia, as in many of the nations of Latin America with large unsettled tropical zones, colonization has been attempted by means of both directed, state-sponsored programs and "spontaneous" settlement. In the former, "all facilities were provided, including transport for prospective settlers. This system was found to be a costly failure, many of the settlers not being farmers."[110] "Spontaneous" settlement schemes, on the other hand, have suffered because of the remoteness of the regions settled and the lack of supporting infrastructure. A hybrid, "directed spontaneous" settlement scheme is being attempted by the Colombian government to encourage genuine farmers to migrate into the eastern llanos by providing minimal infrastructure --especially access roads--and supportive services of credit and technical assistance. Simply the publicity of the project--most notably of the impending road construction--has been sufficient to cause large numbers of peasants to move into the new areas.[111]

The lesson from the Colombian case,--and it has been learned from other countries as well, most notably Brazil--that settlement follows new roads,

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[109] FAO, Prospects for Agricultural Development in Latin America, p. 81. Rome, 1953.

[110] ILO, Towards Full Employment, op. cit., p. 73.

[111] Ibid., p. 73.

indicates the minimal input necessary for colonization to occur. However, every economic resource has an alternative use, and those resources devoted to colonization might be more productively utilized in generating employment and income on already existing agricultural properties. Thus, colonization, where such schemes are feasible, can be viewed as a partial alternative to agrarian reform[112] which may be indicated by a comparison of the economic and social benefits of each approach.[113]

If colonization comes as a "free good" so to speak, that is, the resources devoted to opening new areas for colonization have little or no opportunity cost to society, such schemes can represent an important complement to the strategy for employment generation on the land. Resources which are "free" to society include the civil activities of the military, the "venceremos" style of project-oriented voluntary labor effort, and perhaps most importantly, voluntary labor efforts of the potential beneficiaries themselves, supported by donations of tools and surplus food from international agencies.

Colonization projects thus formulated can overcome many of the traditional causes for failure,--high cost, lack of infrastructure, lack of

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[112] Domike begins his paper: "To the unqualified question, 'Can new land settlement programmes do away with the need for agrarian reform?,' the only possible answer is negative." Instead he views colonization as a supplement to land reform efforts. op. cit., p. 1.

[113] INCORA, the agrarian reform agency of Colombia, has made rough comparisons reflecting the relative orders of magnitude of the costs for settling a farm family under three basic settlement schemes: irrigation, colonization and agrarian reform. The results: 90,000 pesos per family for irrigation, 40,000 for colonization, and 20,000 for redistribution. ILO, Towards Full Employment, op. cit., p. 75. In actuality, irrigation and colonization tend to compete for similar resources to a far greater extent than does agrarian reform. For the latter, settlement costs are usually limited to the costs of securing the land.

genuine interest in farming--while creating employment opportunities right from the start.[114] Other problems, however, such as the quality of the land and the availability of credit and technical assistance--especially as applies to tropical agriculture--will remain, pending governmental programs of support. Addressing himself to the question: Is Land Enough?, Thiesenhusen notes:[115]

> "If separate plots of land are distributed, the incomes of recipients will rise, but only a small group of the most innovative usually continue to make steady progress. The remainder often seem to plateau at an income level that is usually higher than formerly, being unable to advance further for lack of decent prices for output, technical knowledge, infrastructure, reasonably priced inputs, credit--sometimes even ambition. Income distribution may well become more skewed than before as some seize quickly upon new opportunities while others lag behind."

The settlement of new lands through colonization can provide an outlet for agricultural workers, such as itinerants, who do not have a firm connection, and therefore a claim, to lands which are made available through agrarian reform. As the reform proceeds, however, certain of them could be enabled to trade their holdings for parcels of redistributed agricultural land, as the latter becomes available, thus allowing for

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[114] On methods of reducing the costs of colonization, Thiesenhusen notes: "(2) The colonists' own labor can be used to clear land, dig irrigation ditches, build houses and storage facilities, and lay roads. This method lowers original costs to the parcel holders, means less expense for the government agency, and gives colonists some sense of participation in their own future. If subcontracts for certain skilled labor are to be given, they should be let by the community of colonists and not by the government agency." William C. Thiesenhusen, "Colonization: Alternative or Supplement to Agrarian Reform", Chapter 7 of Dorner (ed) op. cit., p. 214.

[115] Ibid., pp. 220-221. This remark would apply equally to land distributed through agrarian reform. Thiesenhusen notes that technical assistance is a major concern for farmers settling new lands, but unfortunately the lack of knowledge about tropical agriculture is a constraint upon success.

consolidation of those newly settled lands which, after a few years of crop-dipping, lend themselves best to livestock production.

Colonization complements agrarian reform in that it allows for the unburdening upon existing agricultural lands of the pressures of the rural population. However, as we noted above, colonization is by no means an alternative to agrarian reform although admittedly, all too often it has taken this form.[116] Thus, to the extent that colonization permits of a more rapid and orderly absorption on the land of farmers with secure tenure, it can serve to strengthen and reinforce efforts to generate rural employment, while allowing for increased productivity of the reform beneficiary as well as the colonist.

d. A Rural Solution: In Summary

The need for a rural solution was made apparent by the analysis of the previous chapter, and by our consideration in the present chapter of the extremely (and perhaps unattainably) high growth rates necessary for labor force absorption into non-agricultural activities.

Rural outmigration, we found, was largely a response to insecure tenure, predisposing agricultural workers to the temptations of urban employment. The probability of finding urban employment we identified as the dynamic factor in explaining migration.

In our suggested approach to dealing with the twin problems of migration and urbanization, we are attempting to weaken the "push" factors of agricultural distress rather than operate on the "pull" factors of

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[116] "In fact, colonization rather than land reform more nearly describes the activity undertaken as a result of most (though not all) agrarian reform laws passed in Central and South America in the last decade or so, with the obvious exception of Cuba." Ibid., p. 210.

urban employment opportunities. To attempt to stem migration by reducing opportunities for urban employment would appear counter-productive if we recall that our efforts at rural job creation are intended to complement, not compete with urban job creation.

The major element in the strategy we are recommending for rural employment creation is massive agrarian reform--so that the land becomes the basis for increased employment and income for the man who works it.

We argued for a restructuring of agriculture along the lines of small family farms as the organizational form which could best absorb labor and maximize agricultural output.

Such a minimal reform would serve to reduce the power which the traditional landowning class has long exercised in rural areas, thereby providing the workers strengthened and increased access to the rural income stream. For many cases, security of title would be sufficient in itself to retain agricultural workers on the land; for others, governmental assistance in increasing productivity would be the sufficient condition.

For several reasons, however--and despite the fact that, on the average there is enough agricultural land in Latin America to allow for an adequate level of living for the entire agricultural population, plus natural additions to it--even a successful and massive agrarian reform would fail to benefit perhaps half of all farm families. In addition, the size and growth rate of the market for agricultural output may constrain output and incomes of smallholding agriculture.

Thus, we recognized the need for protecting the market share of smallholding agriculture on the one hand, and for identifying additional employment opportunities in the rural areas on the other.

Protecting the market share of smallholding agriculture is best achieved by means of governmental policies which serve to restrain the growth and degree of mechanization of commercial agriculture. Such policies would include an upward adjustment in the cost of labor-saving capital--and in some cases an outright prohibition on its use--so as to bring home to the private sector the social costs of its efforts to reduce labor requirements.

In seeking employment opportunities to supplement those created by the agrarian reform we considered rural industry, infrastructure and marketing (or more generally, construction activities), and colonization. The prospects for employment creation in rural industry were essentially linked to the success which agrarian reform and complementary policies have in the direction of integrating the smallholding subsector into the national economy, and particularly into a rural industrial economy.

On the other hand, increased employment of labor on rural construction projects could provide for a sizeable number of jobs. Furthermore, such projects could be programmed selectively so as to direct the benefits of employment to those areas which most need them.

A second form of infrastructure construction, modeled along community development lines, utilizes the voluntary labor of the projects' potential beneficiaries. A similar scheme was proposed for colonization projects whereby the future colonists themselves would be employed in opening new areas for settlement.

In brief, then, if the agricultural sector is to make its greatest contribution to the employment needs of society, it must be reorganized in such a way as to generate maximum employment while guaranteeing to farm workers a more equal distribution of income and increased productivity.

The necessary restructuring, we have argued, calls for a massive agrarian reform and reorganization along lines of a smallholding agriculture, with supplementary employment opportunities provided in rural industry, infrastructure works, and colonization.

CHAPTER VI: SUMMARY AND CONCLUSIONS

During the past two decades spent in pursuit of industrialization and economic growth, population and urbanization have increased at accelerated rates. Urban employment opportunities, however, have fallen far short of the demand for jobs, resulting in a highly volatile employment problem. The economic policies pursued by Latin American governments have worked to the benefit of an elite few, serving to increase the income spread between the advantaged members of society and the mass of the low-income families. Governments seem to have lost sight of the fact that it is the individual and not the quest for an ever-expanding national product which must be the central concern of development.

Motivated by the belief that a lack of capital was the limiting factor in their economic development, the nations of Latin America formulated elaborate policies granting fiscal, credit and foreign exchange advantages to entrepreneurs, thereby biasing the factor price ratio in favor of increased capital intensity in production. Additional inducement was provided by the increased costs of employing labor--the consequence of progressive social legislation granting generous fringe benefits and guaranteeing job security.

While the changes in the factor price ratio were signalling entrepreneurs to shift to more capital-intensive production techniques, no parallel development occurred in the technological field. The development of production techniques attuned to the particular factor availabilities and employment needs of the developing economies was neglected in

favor of wholesale adoption of the highly labor-saving methods of the advanced western nations. Latin American entrepreneurs were thus free to fall into step to "distant drummers" in the capital-exporting developed nations.

As a consequence, many techniques of production in Latin America obey far more the parameters of the developed countries than they do those of the country of adoption. The goal of technological change in the developed market economies is ever-increasing output and worker productivity. Transplanted to the developing economies, however, such techniques imply dependence upon foreign suppliers, excess capacity and consequent underutilization of plant and equipment, and too few new jobs in industry.

To economists who identified the employment problem as the consequence of factor price distortion the solution was obvious: simply reorient investment incentives so as to favor labor-intensity in production. Such an approach, however, hinges upon the existence, or at the very least the development of efficient alternative labor-intensive techniques of production. This is the assumption we examined in Chapter IV.

Analyzing data for the U.S. manufacturing sector we observed that the general tendency towards increased concentration was particularly evident in precisely those industries we had tentatively identified as displaying characteristics suggesting their appropriateness to the economies of the developing nations. This is not to imply that these industries are therefore not appropriate; rather it points up the difficulty in shopping for labor-intensive production techniques in technology markets oriented towards increasing bigness and capital intensity.

Although alternative techniques may be difficult or costly to develop for many manufacturing processes, the stages approach to employment creation in industry may hold considerable promise. As illustrated by the Soviet metalworking case, this approach consists in treating the production process as a sequence of interrelated stages, many of which allow for a considerable level of labor abosoption without compromising the essential nature of the tool element in production.

In construction activities we found far more flexibility in the manner in which productive factors could be combined. However, the very fact that technical coefficients of production are nicely variable (i.e., isoquants are smooth and continuous) points up the importance of constraint on construction wages, for the exercise of the freedom enjoyed by building contractors to constantly alter production techniques is highly sensitive to the relation between the marginal value product of factors.

Public work projects offer several interesting possibilities for productive employment of surplus workers in the very process of increasing the economy's capital stock. While this approach sounds extremely attractive, there are very few examples of its successful application. The practical limitation is organizational, particularly the high level of managerial skill (or alternatively worker discipline) necessary to effectively organize massive groups of unskilled workers. When given the choice, private contractors and government public works agencies will seek to economize on supervisory personnel and avoid "the trouble of dealing with people" by opting for high levels of mechanization.

To guarantee that employment generation is recognized as one of

the explicit goals of public works projects we indicated the desirability of insisting upon submission of a labor-intensive project design alternative to the more mechanized design which contractors prefer. On the basis of how each alternative satisfies the priority development needs of the nation, a choice could be made between them.

Community development offers a similar prospect of capital formation by the labor-intensive application of surplus workers. However, low levels of funding and the highly local nature of these projects requires that labor effort be voluntary. Remuneration usually consists of sharing in the benefits of the finished project.

Analysis of the employment generating potential of the services sector is complicated by the heterogenous nature of service activities. In Latin America, service activities have become a residual outlet for many individuals who would otherwise be unemployed, thus performing the same function in urban areas as traditional agriculture performs in rural areas.

In the developed countries, growth in services employment was induced by prior growth in industry; in these countries services has gradually been increasing its share of the labor force to about 40 percent at per capita income levels of $2000. Nominal employment in services in Latin America is already approaching 40 percent of the work force, far outrunning employment in industry. Thus, while services may continue to absorb large numbers of individuals in highly marginal and extremely low-paid activities, such "employment" is in large measure a form of privately funded welfare, the costs of which must ultimately bear largely upon the small manufacturing sector.

Paul Strassmann has attempted to categorize those activities in which men can hold their own against the intrusion of labor-saving machinery. Moving from the simple to more complex activities, he compares people with machines in transport, fabrication, control, transfer of information, analysis, and various other services.[1]

> "People can move light objects a short distance--a hundred pounds a few hundred yards. People cannot move indivisible tons at high speeds for continental lengths.
>
> "With simple hand tools, people can shape and combine materials by striking, cutting, rubbing, squeezing, twisting, and stirring. People cannot attain high precision or uniformity, nor great speed or pressure. They cannot attain anything at all in the presence of boiling temperatures, radiation, or poisonous fumes.
>
> "Men can look, feel, listen, smell, and taste in order to inspect, accept, reject, measure, and record. Their speed and accuracy is once more limited. Direct response to changes in voltage, humidity, chemical states, and the like is impossible.
>
> "To transfer information, people can file, remember, retrieve, and report. Where simple classification is possible, machines excel in speed and accuracy.
>
> "Men still surpass machines in breaking information into components for selective recombination with other data. But machines can assist. If items of data are very numerous yet involve a limited number of clearly defined factors, then programming on a computer may reveal patterns beyond the reach of searchers with desk calculators.
>
> "Jumping over a large number of activities where comparisons of man and machine are possible, one comes to the area in which people are hardest to replace, that is, where the impact of one human being on another is the very service wanted. Psychoanalysts, conjurers, athletes, dancers,

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[1] Technological Change and Economic Development, pp. 151-2, Cornell University Press, Ithaca, New York, 1968.

> "Geisha girls, masseurs, priests, and legal guardians all play such roles. At this most human level it is doubtful that there have been gains in speed or subtlety since Pericles' Athens, perhaps precisely because improvable machines are least involved."

Precisely because so many areas of economic activity offer limited scope for the substitution of men for machines, such choices, where they do exist, must be recognized and taken advantage of.

In retrospect it seems quite unrealistic to have expected the Latin American manufacturing sector, providing employment for less than seven percent of the labor force in 1950, to have grown so rapidly as to absorb the labor surpluses of the 50's and 60's. Yet this was the gamble Latin American governments were drawn into in committing their limited capital resources to industrialization. To blame the present employment crisis on the failure of industry to follow a more labor-absorbing pattern of development seems to overlook the original magnitude of the task the manufacturing sector was expected to perform.

We showed that by making the most extreme assumption about labor-intensity--that of a parallel growth of output and employment in manufacturing, implying constancy in the level of capital intensity and in the output-labor ratio--about 3.4 million more jobs in manufacturing could have been created over the 1950-65 period. The point of this exercise was not to suggest a policy approach but to indicate the limits of employment generation in manufacturing even under highly unrealistic assumptions. Those who believe that the employment problem can be solved simply by a reorientation of factor prices should take especial note of these results.

We showed in Chapter II how the unequal distribution of income in Latin America, by constraining market size, defines the pattern of industrialization. Yet very little has been done to correct this inequality which, in consequence, has become more pronounced in many countries.

Productive employment for the entire work force is the surest way of reducing income inequality. In the present paper we have argued that the major approach to such employment creation should be agrarian reform.

Agrarian reform as a solution to unemployment is unique in that it combines the several goals of increased output, employment and income distribution in a single policy. Agrarian reform, by providing access to the rural income stream for an increased number of workers serves to enlarge the markets for light manufactures, thus providing a sound foundation for a cumulative expansion in the growth of the manufacturing sector.

Agrarian reform would also have an important impact upon levels of rural out-migration, which over the 1950-65 period accounted for the transfer of 8 million workers out of the agricultural sector.

It is important that Latin American nations, in the formulation of an employment strategy, recognize what the employment generating potential of each sector of economic activity is, what the costs of realizing that potential are, and not least important, what the social and political consequences would be of failing to develop that potential. It is in the light of this very logical calculation that the crucial importance of the agricultural sector within the context of a national

employment strategy is recognized.

If Latin America's agricultural sector is to make its maximum contribution to society, it must be responsive, first and foremost, to the need for generating maximum employment in a fashion which will guarantee a more equal distribution of income and increased productivity of farm workers. The low levels of income and market participation characterizing rural workers and their high propensity towards out-migration are a measure of the extent to which the present organization of agriculture fails to meet this need.

The adequacy of land tenure institutions must be judged in the light of the demands which society places upon the agricultural sector; as those demands evolve, tenure institutions should evolve accordingly. In Latin America, land tenure institutions have yielded very little to pressures of growing income inequality and unemployment, forcing surplus rural workers off the land into urban areas, thus shifting "the scene of their redundancy". In consequence, the employment problem has become far more visible,...and far more politically explosive.

The main thesis of the present study is that Latin America's employment problem--which is largely the result of an institutionalized neglect of the rural sector--cannot be resolved without giving major attention to the organization of agricultural activity, the focus of which must be massive agrarian reform. Such reform, we argued, should be complemented by government programs in support of the small farm sector, and in defense of its share of the market.

Agrarian reform, by slowing off-farm migration and replacing it instead by increased access to larger rural income streams for more

people, can lead to an effective enlargement of the size of the national market and a more balanced pattern of economic development and growth with progressively diminished unemployment.

CHAPTER VII: RECOMMENDATIONS

1. It is the major recommendation of the present study that Latin American governments commit themselves by their actions more than by their words to a basic reorientation in development planning, explicitly subscribing in the broadest sense to a set of aggressive, well-conceived policies designed to achieve maximum employment generation. The major agency of such an employment strategy should be an Office for Employment Creation (described in Chapter III, Section B.1). By virtue of its political strength, this Office could effectively intervene on behalf of the unemployed and underemployed in all important matters bearing upon employment generation.

Commitment, however, requires the confidence that the outcome of a set of actions will be favorable. Knowledge of the outcome of such actions depends on experience and research which frequently are not available for any given country. This should not be taken to mean that an employment strategy cannot be developed and implemented without such data. In fact, studies of behavior changes consequent upon institutional changes can only be conducted in the laboratory of the real world.

The experience of other countries in their attempts to deal with their own employment problems provide many guides which can serve usefully as first approximations for formulating policy. The agrarian reform experiences of developing countries, for example, provide a body of data which could be profitably studied by other nations considering similar reforms. However, the ultimate design of an

employment strategy and the nature of the complementary programs will have to be indigenous, devised through a process of constant evaluation and review of the policy components of such a strategy and a reformulation in the light of the results which they produce.

The fact that pre-tested recipes either for economic development or employment generation are not available should surprise no-one. If it were otherwise, we would need give far less attention to this problem.

The role of research in the social sciences is precisely the study of human behavior, and the fact that such behavior cannot be studied outside of the daily conduct of life itself necessarily implies that research must develop simultaneous with the implementation of policy. Thus, through a feedback mechanism dependent upon evaluation and research the results of policy choices condition future policy directions.

The general policy set from which the Latin American economies could selectively choose in formulating indigenous employment strategies is listed below. As we noted above, close and careful study of the results of each, as well as the effects of their interactions, should be studied simultaneous with their implementation.

2. Massive agrarian reform is seen as the crucial policy measure in resolving the employment problem in Latin America. Agrarian reform is a policy which would provide immediate employment opportunities for vast numbers of rural workers in the rural areas, thus dampening the tendency towards rural out-migration and the severe social and political problems associated with urbanization and urban unemployment.

3. Complementary to the agrarian reform there must be a rural employment strategy built around the following set of policies and programs:

a. technical and financial assistance for the small-holding agricultural sub-sector;

b. general improvements in the quality of rural life;

c. a policy reserving to the small-holding sub-sector a progressively larger minimum share of the market for agricultural production by restraining the ability of labor-saving agriculture to capture larger market shares;

d. full development of the export potential for agricultural production, particularly for the products of small-farm agriculture;

e. where feasible, agricultural policy should take account of the importance upon rural employment generation of what is produced and how it is produced;

f. the development of rural industry, including such things as seed production, production of draft animals, and distribution of chemical inputs into agriculture.

From the point of view of the long-run benefits to economic society, the most meaningful rural industry is the workshop manufacture of "intermediate" inputs--hand seeders, hand pumps, and animal-drawn implements such as tool bars, plows, harrows, seed drills, etc. Development of the rural workshop sector is particularly important in the process of economic growth because of the skills it develops among the rural work force and the linkages it forges with other sectors of economic activity.

Food processing and fiber processing may be particularly well-

suited to establishment in rural areas.

g. Well-conceived, economic colonization schemes also provide an important complement to agrarian reform.

4. The approach to increased industrial employment recommended here is two-fold:

a. Reversing the capital-intensive bias in production by a re-orientation of the policy mechanisms which have caused that bias, viz.,

mechanisms operating upon the cost of capital
- exchange rates,
- interest rates,
- inflation,
- treatment of depreciation and other deductions against taxable income,
- exemptions from taxes, duties, etc.,
- tariff treatment.

mechanisms operating upon the cost of labor
- wages should be held to (or below) the level of productivity gains,
- the various social benefits should be rationalized with an eye to reducing labor costs to the employer,
- economies should be sought in the administration of social programs,
- national labor legislation should be restructured in the light of the national employment strategy.

b. Encouraging the development of efficient, labor-intensive alternative techniques of production, in part by the re-orientation of investment incentives just discussed. The resultant factor price ratio, by encouraging the use of more labor in production, should provide an incentive for technological development in the direction of increased urban employment opportunities.

Of greater importance in this connection, however, will be the efforts of the Office for Employment Creation in guiding and directing the research and development process for alternative techniques.

The stages approach to employment creation has wide application in industry and should be promoted by the Office for Employment Creation (see Chapter IV, Section B.4).

5. The international exchange among developing countries of information concerning national approaches to employment creation should be encouraged.

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