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

by

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INTRODUCTION

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. Transplanted to the developing economies, however, such techniques imply dependence upon foreign suppliers, excess capacity and consequent underutilization of plants and equipment, and too few new jobs in industry.

Recently, as massive outmigrations from rural areas have served to make unemployment and underemployment a far more visible social 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. Productive employment of these workers--both rural and urban--now represents the major developmental riddle for most of the developing nations of the world.

Economic development is not simply increasing per capita incomes; rather it is defined in terms of the degree to which poverty, unemployment and income inequality are being eliminated. 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.[1] Contemporary conditions characterizing Latin America, however, depart from 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 the growth in demand is slow, this condition translates directly into too few new jobs in industry.

The following chapters examine in detail these concepts. While several sectors of the economy are examined with respect to their capacity for absorbing labor, the main thesis of this study is that Latin America's employment problem--which is largely the result of 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 a reform should be complemented by government programs in support of the small farm sector and its share of the market. Agrarian reform as a solution to unemployment is unique in that it combines the several goals of increased output and employment, and more equitable income distribution in a single policy. By providing access to the income stream for an increased number of rural workers, agrarian reform serves to enlarge the markets for light manufactures, thus providing a sound foundation for cumulative expansion in the manufacturing sector as well as having an important impact upon levels of rural out-migration.

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1. W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor," The Manchester School 22 (May 1954): 139-91; Gustav Ranis and John C. H. Fei, "A Theory of Economic Development," American Economic Review 51 (September 1961): 533-65; and Fei and Ranis, Development of the Labor Surplus Economy: Theory and Policy (Homewood, Illinois: R. D. Irwin, 1964).

CHAPTER I

INCOME DISTRIBUTION AND EMPLOYMENT CREATION

In this chapter we will consider 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 the relationship of income distribution with patterns of savings and investment.

A. Income Distribution, Expenditure Patterns and Employment

It is generally agreed that consumption patterns of households are largely a function of income[2] in 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 have 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 than for other countries (see Table I-1).

The most distinctive feature of income distribution in Latin America, in contrast to the industrialized countries, is the much larger proportion of total income received by the 5 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. Although the proportion received by the lowest 20 percent in Latin America does not differ very significantly from that received by

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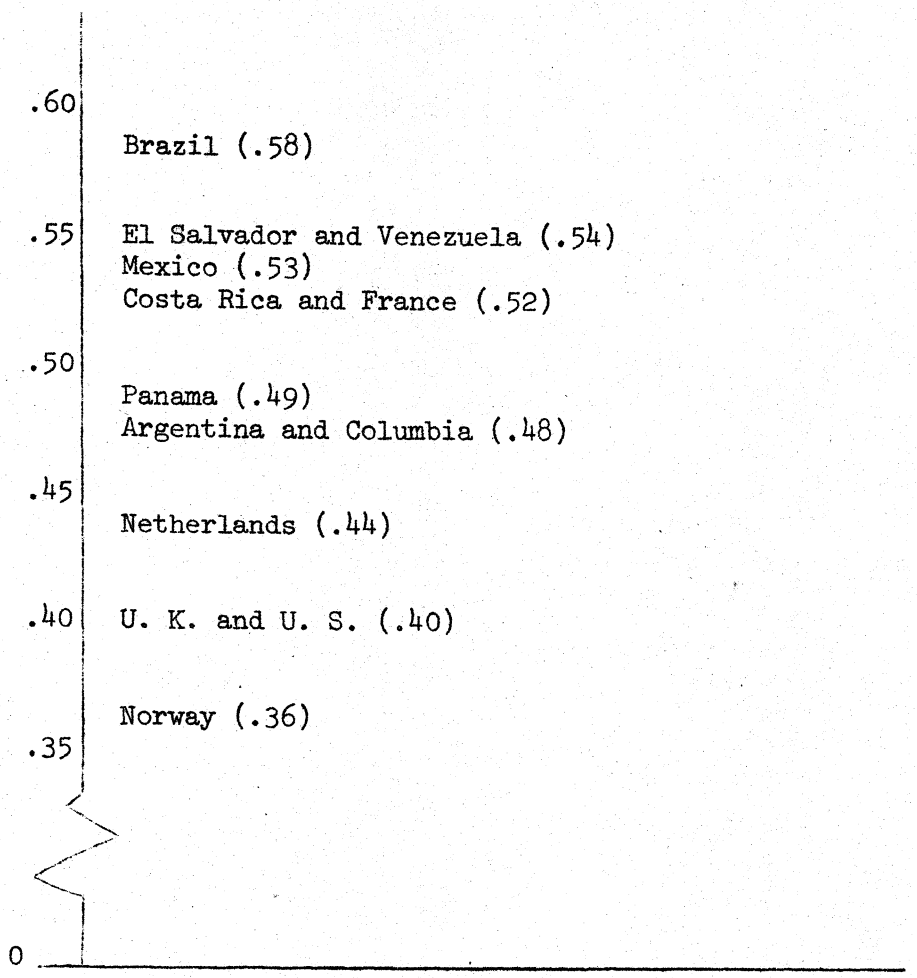
2. H. S. Houthakker found "similar" elasticities for all countries. "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law," Econometrica 25 (October 1957): 532-51.

TABLE I-1

Coefficients of Income Concentration,

Selected Latin American and Industrialized Countries



Source: ECLA, Economic Survey of Latin America, 1969 (New York: United Nations, 1970), p. 365. (It is not clear from the source whether or not the Gini ratios are computed from income data before direct taxes and excluding transfers.)

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

corresponding income groups in industrialized countries,[3] "differences in absolute income levels and in the composition of this lowest income group give it a different meaning in Latin America from what it has in the industrialized countries."[4]

TABLE I-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.

3. ECLA, Economic Survey, 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 (New Haven: Yale University Press, 1966), p. 423.

4. ECLA, Economic Survey, p. 365. Referring once again to Kuznets, "...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." Modern Economic Growth, p. 424.

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. 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 45 (March 1955): 21-22.

The fact that only 13.4 percent of total income accrues to the lower 50 percent of all families serves effectively to eliminate this half of the population from all but minimal participation in the market economy. Weak internal markets--the consequence of low levels of participation--impede industrial and agricultural expansion and the generation of new and remunerative employment opportunities.

For the rural sector, average family incomes lie well below the national average, a fact which is equally true for developed economies.[5] However, this disparity is far more pronounced in Latin America, 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)[6] 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."[7]

Clark has attempted to reconstruct the extent of market participation for a pre- and post-reform Bolivian peasant family of five. (See Table I-3.)[8] 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 participation on a cash basis. With agrarian reform, conditions of life for the highland peasant family in Bolivia improved markedly; Table I-3 shows the increase in post-reform market

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5. The differential between rural and urban incomes is discussed in Chapter IV.

6. 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.

7. Solon L. Barraclough and Arthur L. Domike, "Agrarian Structure in Seven Latin American Countries," Land Economics 42 (November 1966): 405. Reprinted as LTC Reprint No. 25 by the Land Tenure Center, University of Wisconsin-Madison.

8. Ronald J. Clark, "Land Reform and Peasant Market Participation on the Northern Highlands of Bolivia," Land Economics 44 (May 1968): 153-72. Reprinted as LTC Reprint No. 42 by the Land Tenure Center, University of Wisconsin-Madison.

TABLE I-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
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 and vegetables			various (in season)	2.50
noodles			15 lbs	1.50
bread	30 pieces	1.25	75 pieces	3.15
flour (wheat and 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	5.00

(TABLE I-3 continued on p. 8)

TABLE I-3, continued.

Purchased Articles	1952 quantity	1952 value*	1966 quantity	1966 value*
shirts			2	2.00
hats	2	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, "Land Reform and Peasant Market Participation on the Northern Highlands of Bolivia," Tables I and II.

participation and the decline of barter transactions. Nevertheless, nearly the entire family income continues to go 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."[9]

Table I-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 for lighting, cooking and, in some cases, heating. Consumption of Classes III and IV dominate throughout Table I-4, with the single exception of unprocessed foods. Between them, these 40 percent of all families account for 84 percent of furniture sales, 96 percent of metal products and machinery, 98 percent of transport equipment, and 83 percent of services.

It is essentially through three mechanisms that income distribution, through its influence upon consumption patterns, has an impact upon job creation:[10]

9. Barraclough and Domike, op. cit., p. 405.

10. ILO, Towards Full Employment (Geneva: 1970), pp. 145-8. A Programme for Colombia, prepared by an inter-agency team organized by the International Labour Office.

TABLE I-4

Latin America: Income Distribution and Aggregate Consumption Patterns by Income Class

	Income Class			
	I	II	III	IV
Income Distribution:				
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. 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 proportion of income spent on food.

1. Import Content of Goods

TABLE I-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	
electrical machinery and appliances	.53	.45
transport equipment	.59	

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

Peru: UN, ECLA, Analysis and Projections of Economic Development. VI. The Industrial Development of Peru (December 1959), Table 174.

Table I-5 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. In addition, to the extent that domestic inputs themselves have an import content, the figures of Table I-5 tend to understate actual import content of domestic output.[11] Many of the purchases of consumer durables,

11. Ibid., p. 147.

especially in smaller countries, represent imports in finished form,[12] thus denying to the domestic economy the income- and employment-generating benefits of these expenditures. To the extent that such imports compete for scarce foreign exchange resources, they tend to reduce 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 the degree of income inequality, the greater will be the loss in domestic employment generation.

2. Labor Content of Goods

Since the production of light manufactures tends to be labor-intensive and heavy manufactures capital-intensive, expenditures for wage goods in a developing economy will generate more employment opportunities than those spent for consumer durables. Put differently, the expenditures of the poor generate more employment than the expenditures of the rich.

In a recent paper,[13] OAS economists attempted to explore the impact upon employment and output of a 10 percent increase in the output of the labor-intensive sectors where the total value of output remains constant. The shift in the composition of output resulted in a 6.1 percent increase in employment.[14] It was calculated

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12. See Oscar Munoz G. for the Chilean case, "Crecimiento Industrial, Estructura del Consumo y Distribución del Ingreso," Estudios de Planificación, Documento No. 8, Universidad Católica de Chile, Centro de Estudios de Planificación Nacional (April 1971), p. 12.

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

14. 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 ($US000,000)	47,153	22,947	70,100
employment (000)	54,757	8,109	62,866
output: labor ratio	860/wkr	2,830/wkr	

The 10 percent increase in the output of the labor-intensive sectors will increase employment in those sectors by 10 percent 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 percent. Labor-intensive sectors included agriculture, artisan, construction, and non-basic services in the study; "less labor-intensive" included extractive and factory industries and basic services.

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. 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. 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.[15] Thus, the magnitude of the income redistribution necessary for a moderate gain in net employment calls for more far-reaching policies than most nations would be willing to consider. Of course light consumer goods could be manufactured by capital-intensive processes; however, they provide at least the opportunity to choose among alternative productive techniques, using varying amounts of labor inputs.

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 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 and provide many wage goods demanded by the

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15. Ibid., pp. 47-49. 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. It is assumed that the upper income group spends 50 percent of its income in each sector grouping, while the lower income group spends about 80 percent of its income on labor intensively produced goods.

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.

laboring classes. The FAO "Indicative World Plan" (IWP) for Latin America supports these conclusions.[16]

As lower incomes increase, a shift in food consumption habits takes place, with meat and dairy products replacing grains and starchy foods and consumption of processed foods increasing. (See Table I-6.) The significance upon agricultural employment of the changing consumption pattern for foodstuffs with changing income represents a key area for agricultural policy. In addition, if agricultural output is expanded so as to maximize rural income and employment, improvements in rural living levels 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. While it appears to be generally true, even for developed countries, that the upper income groups hold the potential for the substantial savings from which a nation's capital stock may be enlarged and its productive capacity expanded,[17] 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 imported luxury items, foreign travel, foreign savings accounts and other forms of foreign investment, and domestic real estate.

According to Hla Myint:

> 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

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16. In Shlomo Reutlinger, et al., "Agricultural Development in Relation to the Employment Problem," Economic Staff Working Paper No. 112 (IBRD: Washington, D.C., May 25, 1971), p. B-4.

17. 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," p. 7.

TABLE I-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.	1,064.
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	

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

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

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 cabbage

(TABLE I-6, continued)

between families in the second the 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 range from 0.3 percent for the lowest group to about 3 percent 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).

> 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.[18]

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;[19] for example, expanded consumer credit is required to move higher priced consumer durables whose market would otherwise be severely circumscribed by generally low levels of income. Thus, to the extent that savings and other financial resources become absorbed by these types of expenditures they are

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18. The Economics of the Developing Countries (New York: Praeger, 1969), p. 99.

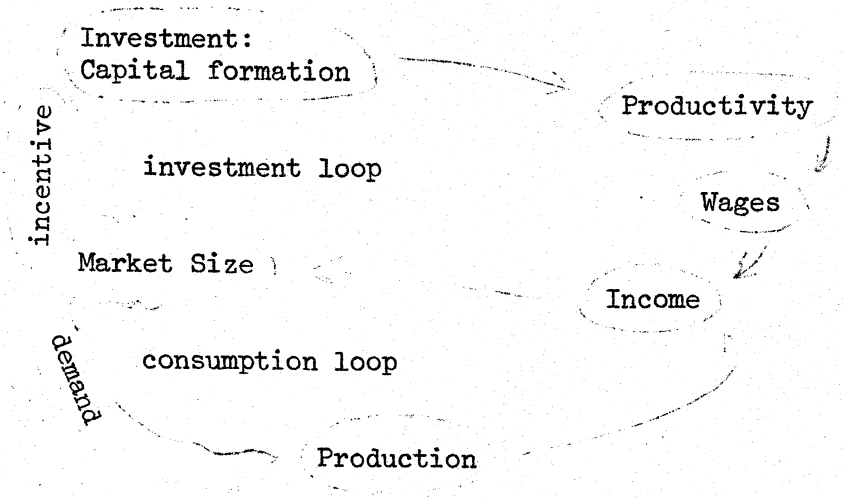
19. ECLA, "Mobilization of Domestic Resources," Economic Bulletin for Latin America 15 (1970): 119-20. Accessibility to financial institutions has been a limiting factor in reducing the level of personal savings of the non-metropolitan population. In Peru, for example, between 1955 and 1965 the number 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.

not available for more productive, job-creating forms of capital formation.

Despite the seeming inconsistencies between growth rates and the level of capital formation in Latin America (See Table I-7), 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.[20]

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."[21] In Nurkse's scheme of things, market size--measuring in terms of effective consumer demand--occupies center stage, determining not only capital intensity and hence labor's productivity, but the total volume of production as well.

Nurkse's Vicious Circle of Poverty



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

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20. 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.

21. Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries (New York: Oxford University Press, 1967), p. 6.

TABLE I-7

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	14.3	4.3	16.4
Colombia	4.1	20.3	3.9	16.9
Peru	3.9	20.8	5.1	22.5
Group III				
Costa 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.

Nurkse recognized a "constellation of circumstances tending to preserve any backward economy in a stationary state."[22] For him, the solution lay in "balanced growth"; implicit in this concept 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.[23] 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."[24] Thus, highly skewed patterns of income distribution, such as characterize the economies of Latin America, seldom provide the conditions necessary for a cumulative (or simultaneous) investment boom.

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.[25]

C. Conclusion

We have attempted to identify several of the links between inequality in income distribution and low levels of employment.

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22. Ibid., p. 10.

23. W. Paul Strassmann, "Economic Growth and Income Distribution," Quarterly Journal of Economics 70 (August 1956): 426.

24. ECLA, Economic Survey of Latin America, 1969, Special Studies, ECLA Committee of the Whole, Fifth Extraordinary Session (New York: 4-6 May 1970), Part III, p. III-17.

25. 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 (Oxford: Basil Blackwell, 1962). 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 (New York: Harper and Row, 1965), pp. 8-11.

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 policies which can resolve the unemployment problem 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. For the developing countries, however, unemployment is chronic, and their economies cannot marshal the resources necessary to stimulate the cumulative demand expansion which results in full employment.

Within the context of economic development, income redistribution 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.[26] 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.

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26. William C. Thiesenhusen, "A Suggested Policy for Industrial Reinvigoration in Latin America," LTC No. 72, Land Tenure Center, University of Wisconsin-Madison (September 1970).

CHAPTER II

FACTOR PRICE DISTORTIONS AND UNEMPLOYMENT

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. 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. However, in Latin American economies, despite the relative abundance of labor and scarcity of capital, production techniques have tended to converge 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,[1] 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. 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.

A. Factors Contributing to the Capital-Intensive Bias

During the late 1940s and into the 1950s the fashionable diagnosis of economic backwardness was a lack of capital.[2] 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

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1. As representative of this literature, see Ignacy Sachs, "Selection of Techniques: Problems and Policies for Latin America," Economic Bulletin for Latin America, 25, no. 1, pp. 1-34, and Amartya Kumar Sen, Choice of Techniques (Oxford: Basil Blackwell, 1962).

2. See, for example, Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries (New York: Oxford University Press, 1967); Simon Kuznets in United Nations, Processes and Problems of Industrialization in Underdeveloped Countries (New York: 1953), p. 3; and the readings included in Section III.1 of Gerald M. Meier, Leading Issues in Development Economics (New York: Oxford University Press, 1964).

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 promoted the present capital-intensity bias in Latin American have been subsidies for capital equipment, external influences 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 "have created conditions artificially favorable to automation and over-investment in fixed capital."[3] Capital subsidy mechanisms common to Latin America include:

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, counted as "better risks," typically benefit from this process, and these are often precisely the firms which already are highly mechanized and likely to continue using capital-intensive techniques.[4]

b. Inflation, which may lower the real rate of interest below the nominal rate, thus serving to subsidize capital costs. 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."[5] 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.[6]

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3. Um Projeto para o Brasil, 3d ed. (Rio de Janeiro, S.A.: Editora Saga, 1968). Translated by the author.

4. ILO, Towards Full Employment, A Programme for Colombia, prepared by an inter-agency team organised by the International Labour Office (Geneva: 1970), pp. 178-79.

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

6. Werner Baer, Industrialization and Economic Development in Brazil (Homewood, Illinois: Richard D. Irwin, 1965), pp. 128-30.

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.

Inflation may also influence the capital-labor ratio by the differential impact it has on various production factors. If, for 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 inflation; (b) workers' ability to defend their level of living against 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. Sometimes foreign exchange is made readily available at fair or favored rates for the servicing of loans from overseas equipment suppliers.[7] Nations may also overvalue their currency with respect to foreign currencies, thereby reducing the domestic price for all imports. 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, ending the period about two-thirds higher.[8] The effect of such controls was to discourage exports and encourage imports, favoring essential goods, capital equipment, and intermediate inputs. A static policy of import licensing based on the prior volume of transaction discounted the "needs of new industries, which depended very much on supplies from abroad in their initial state of operation."[9]

d. Duty-free or otherwise preferential tariff treatment on imports of capital equipment. Central American nations have for years competed for foreign investment capital, causing unjustifiable losses in central government revenue. The five members of the Central American Common Market adopted the Central American

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7. Gerald M. Meier, Leading Issues in Economic Development, Studies in International Poverty, 2d ed. (New York: Oxford University Press, 1970), p. 436.

8. Baer, Industrialization and Economic Development in Brazil, p. 49.

9. Ibid., p. 50.

Agreement of Fiscal Incentives for Industrial Development[10] in an attempt to control this; incentives, however, continue to be very generous.[11]

e. Tax laws allowing accelerated depreciation and investment allowances, the most notable of which is probably SUDENE's article 34/18 of 1961. (SUDENE is the government development agency for Northeast Brazil.) Under this law, Brazilian corporations can reduce their tax liability by 50 percent, provided that 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 (compared with commercial bank rates of 30-40 percent).[12]

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 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.[13]

Hirschman defends a subsidy devoted wholly to capital as a more efficient stimulus in attracting new investment since "outlays for capital precede expenditures for labor."[14] However, many types of capital purchases determine labor needs. SUDENE could have insisted upon a minimal level of employment creation, perhaps in the

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10. Clark Joel, "Tax Incentives in Central American Development," Economic Development and Cultural Change 19 (January 1971): 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.

11. Ibid.

12. A. O. Hirschman, "Desenvolvimento Industrial no Nordeste Brasileira e o Mecanismo de Crédito Fiscal do Artigo 34/18," Revista Brasileira de Economia 21 (December 1967): 5-8; 34/18 funds are also available to SUDAM, the development agency for the Amazon.

13. See ibid., Table 8.

14. Ibid., p. 29.

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 (NCr $20,580).[15]

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.

2. External Influence upon Capital-Intensity in Production

Trade and aid relations with developed countries have also contributed to the present high levels of capital intensity in Latin American economies. These factors include:

a. Supplier Credits. Such credits and other supplier inducements 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. The sellers' market is dominated by dealers representing foreign equipment manufacturers who enjoy a monopoly-by-default due to the absence of a local engineering, design, and equipment producing capability.[16] A "false concept of modernity" is promoted through advertising and other propaganda which stress a need for catching up with the newest technology and becoming competitive in international markets.

b. Direct Private Foreign Investment. Private foreign investors tend to think in terms of the capital-labor proportions to which they are accustomed, and may be quite insensitive to problems of the local economy, particularly the need to create additional employment opportunities.[17]

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15. In the article referred to 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, 21 April 1972, p. 25.

16. Sachs, "Selection of Techniques," pp. 7, 20.

17. See, for example, Commission of International Development, Partners in Development (New York: Praeger, 1965), p. 111; and Lloyd G. Reynolds and Peter Gregory, Wages, Productivity and Industrialization in Puerto Rico (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 92.

The bias toward high capital-labor ratios 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 equity participation in the firm making the capital import.[18]

c. Foreign Aid. The "concessionary" terms at which foreign aid is made available encourages a wasteful overuse of capital, frequently accompanied by an offsetting decline in domestic savings.[19] In addition, 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.[20] Also the institution of "tied loans," common in bilateral aid agreements, tends to increase the cost, or

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18. Baer, Industrialization and Economic Development in Brazil, p. 56.

19. "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, 1966), p. 187, cited in Keith Griffin, Underdevelopment in Spanish America (London: George Allen and Unwin, Ltd., 1969), pp. 122-23.

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).

20. Organization of American States, Inter-American Economic and Social Council, "Employment and Growth in the Strategy of Latin American Development: Implications for the Seventies" (Washington, D.C.: August 19, 1971), pp. 112-13.

alternatively, to "reduce the worth of foreign aid to recipient countries by something between 10 and 20 percent."[21] Under "tied aid," 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 eliminate the benefits of competitive bidding. 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 be the best way of adapting production techniques to the low labor and high capital costs of developing countries."[22]

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. Relatively uncritical acceptance of such recommendations reinforces the labor-saving bias, thus aggravating the problem of unemployment.[23]

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21. Ian Little, Tibor Scitovsky, and Maurice Scott, Industry and Trade in Some Developing Countries (London: Oxford University for the Development Centre of OECD, 1970), p. 56.

"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 percent in the case of tied USAID loans, and 24 percent in the case of Rupee Payments Area loans from the Socialist countries. Without the freedom to "match," the excess cost would have been 29 percent from the U.S. and 26 from Socialist countries (pp. 56-57).

22. 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 values (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 n., p. 57).

23. John R. Eriksson, "Employment and Development: The Problem and Some Policy Alternatives," Mimeo (Washington, D.C.: AID, October 12, 1971), pp. 13-14; and K. B. Griffin, "Investment Allocation and Development in Turkey," Mimeo (Washington, D.C.: AID, September 1966).

3. Wage Policies

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, leaving both groups dissatisfied.[24] There is evidence from Chile, Brazil, and Colombia, among other countries, that union pressure and minimum wage legislation have forced costs of labor beyond its opportunity cost, inducing investors to turn to more highly mechanized modes of production.[25]

In addition, foreign employers, by providing social benefits to their workers, 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. Suggested Policies to Reverse the Capital-Intensive Bias

1. Institutionalizing the Employment Problem

This paper recommends the establishment of an Office for Employment Creation to be charged with specific responsibility for reviewing all economic policies and decisions with respect to their impact upon employment creation and income distribution. The Office for Employment Creation should enjoy complete autonomy, with a staff free of conflicts of interest and a political strength comparable to that of the strongest ministries--typically Finance, Economy, and Defense.

2. Policy Measures Operating upon the Cost of Capital

For the centrally planned economy, or the public sector of a mixed economy, it is theoretically possible to choose an appropriate interest rate for each investment project so as to optimize the utilization of the available factors of production. 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. 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 favor more labor-intensive techniques.

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24. Sachs, "Selection of Techniques," p. 24.

25. K. B. Griffin, "Latin American Development: Further Thoughts," Oxford Economic Papers 20, (March 1968): 129.

In this section I shall try to deal in a general way with the major fiscal and monetary tools available to government to implement such a policy.

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."[26] The resultant 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. Those consumer, capital, and intermediate goods with a high import content are made more costly, encouraging a reduction in demand for them, 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."[27]

b. Interest Rates. I have suggested 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. As a countermeasure, two basic policy alternatives are available: a free market, and selective lending policies oriented towards employment generation.

The classical model suggests that the first approach, resulting in higher interest rates, would increase credit costs and thus lead to the substitution of labor for capital. It is not at all clear, however, that such a sequence would actually occur. If interest rates do rise, firms may simply treat this as an increase in the cost of production, reflected in reduced profits and/or increased prices for its output, making no labor-intensive adjustments.

The second approach, which is suggested by the ILO Study Team for Colombia, 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. Thus credit would be made available to those firms most likely to use it for the creation of new employment opportunities.

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

27. Ibid., p. 177.

c. Other Mechanisms Operating upon the Cost of Capital. Like the interest rate policy just discussed, most of these mechanisms must be administered selectively so as to induce employment-creating investment.

Tariff policies, for example, could be reformulated by eliminating completely all preferential tariff treatment, but reserving to the proposed Office for Employment Creation authority selectively to permit exceptions where these are considered necessary to further the employment objective. Such policies, however, with their problems of favoritism and requirements for data collection and analysis, should be held to a minimum.

The treatment of depreciation and other deductions against taxable income offer a further opportunity for development planners to restrain capital-intensive projects. 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.[28] 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 taxed according to its origin, say 5 percent for labor and 50 percent for capital, Firm A would be taxed at 11.5 percent of gross output (1.5 percent on value added by labor and 10 percent on value added by capital) and Firm B would pay a 20.5 percent levy (0.5 percent on labor and 20 percent on capital). The reduction in its profits after taxes might thus be sufficient to dissuade Firm B from electing the more capital-intensive technology.[29]

This approach would also require selective application since it tends to discriminate blindly against the use of capital,

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28. Um Projeto para o Brasil, pp. 46-48.

29. Ibid., p. 47. If the tax of 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 percent (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-Q. On an interest rate surcharge basis, the tax on both firms is equal when the K-Q of Firm B is 3.58.

penalizing its use in employment creation equally with uses which are labor-saving.

3. Policies Operating upon the Cost of Labor

a. Reducing the Costs of Labor as Employers Perceive Them. Benefits legally provided to industrial workers in Latin America are among the most comprehensive in the world. 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 secure. Contributions to the national social security system constitute the largest wage supplement. 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 redounding to the latter.[30]

Based upon the Colombian Ministry of Labor's Annual Report to Congress for 1968, the ILO prepared the following estimate of the average cost to large employers of the fringe benefits required by law.

TABLE II-1

Item	Percentage of basic wage
Contributions of 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 and maternity	4.0
work accidents and industrial disease	1.8
old age, invalidity and death	3.0
Pensions	8-15.0
	64. -72.

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

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

Costs of social security, like any wage supplement, inevitably become incorporated into production costs and passed on to the consumer. 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.

An 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, and 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.

In addition, a wage policy which would restrict unjustifiable wage increases appears as a practical adjunct to any strategy aimed at maximizing employment opportunities.[31] 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. In lieu of unemployment insurance elaborate mechanisms have evolved in most Latin American countries to protect job security, making it extremely difficult for employers to discharge workers. Often this protection takes the form of severance indemnity for

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31. Lloyd G. Reynolds, "Wages and Employment in a Labor-Surplus Economy," American Economic Review 55 (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. 32-33). 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).

the discharge without "just cause" of tenured workers.[32] 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. 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, and forestalling economic growth.[33]

The philosophy of unionism in Latin America is essentially one of trade consciousness, as distinct from class consciousness. The union voices and defends the interest of the workers (meaning those actually 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.

The Colombian labor code's treatment of individual employee dismissals[34] follows a pattern common to all nations of Latin America, deriving from Article 23 of the revolutionary Mexican Constitution of 1917.[35] Each differs in the length of the probationary period (from 2 months to a year), the interpretation of "just cause," and the amount of indemnity (typically a month's wages per year of employment),[36] but all have the same adverse impact upon the creation of new jobs.

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32. "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, nor would lack of work, that is, a slump in production. Moises Poblete Troncoso and Ben G. Burnett, The Rise of the Latin American Labor Movement (New Haven: College and University Press, 1960), p. 25.

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

33. See, for example, Harry Stark, Social and Economic Frontiers in Latin America, 2d ed. (Dubuque: Wm. C. Brown Co., 1963), p. 398; and Wilbert Moore, Industrialization and Labor: Social Aspects of Economic Development (Ithaca: Cornell University Press, 1951), part II, p. 390.

34. Decree No. 2351 of 1965 amended the Colombian Labor Code by making much more stringent the requirement for dismissal of employees. In Towards Full Employment, p. 412.

35. Poblete Troncoso and Burnett, The Rise of the Latin American Labor Movement, pp. 23-25.

36. See U.S. Department of Labor, Foreign Labor Information, pp. 25-34.

Employers have developed a number of techniques for legally circumventing these provisions of the labor code. The most common is to restrict the work force to a minimum by frequently offering overtime work, which employees are usually very anxious to accept. The need to contract for additional workers is thus diminished. 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.

A strategy for maximum employment should be so designed as to encourage management's recruitment of labor, not inhibit it. If restrictions are to be imposed upon factor utilization, these should be explicit, and purposefully designed so as to afford maximum employment opportunity 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. Governments could "allow a premium to be added to the wage bill before it is deducted from sales proceeds to arrive at taxable income."[37] However, 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

An implicit assumption of this chapter 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. However, in the real world, production isoquants for industry are highly discontinuous, particularly in the range of lower capital-labor ratios. 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 production process. The following chapter will explore this issue more fully.

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37. Towards Full Employment, p. 182.

CHAPTER III

ALTERNATIVE TECHNIQUES OF PRODUCTION

A. Introduction

Modern production technology 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. Thus it aims for the substitution of machinery for manpower. Developing countries must deal with the problem of how to expand production of goods and services, but 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. Thus, the implicit assumption underlying wholesale transfer and adoption of modern technology by developing nations must be questioned.

1. The Development of Modern Technology

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."[1] According to Benjamin Higgins, an advanced technology has not yet "been discovered which is suited to the factor-proportions of underdeveloped countries."[2] In principle, research efforts in developing nations can take the form of adapting the "accumulated knowledge of modern science and technology" to indigenous needs,[3] however, the possibility of doing so remains ambiguous

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

2. Benjamin Higgins, Economic Development: Principles, Problems and Policies, 1st ed. (New York: W. W. Norton, 1959), p. 258.

3. Bruce F. Johnston, "Agriculture and Structural Transformation in Developing Countries: A Survey of Research," The Journal of Economic Literature 8 (June 1970): 396.

given "the quite different experience, circumstances and needs of the world-dominating industrial civilization."[4]

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.[5] It is often argued that the factor bias embodied in labor-saving techniques of production is "frozen" into the design of new equipment.[6] Thus, a frequent problem with imported technology is the discrepancy between its efficient scale of operation and the size of the domestic market.

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. However, 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 about 95 percent of such research takes place, it is not surprising that technological change results in production processes inappropriate to developing economies.

Just what the social cost of productive factors is will always elude economists. However, the existence of involuntarily unemployed and underemployed human resources implies that private manpower costs

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4. Guy Hunter, Modernizing Peasant Societies (Oxford University Press, 1969), pp. 19-20.

5. Gerald M. Meier, Leading Issues in Economic Development, Studies in International Poverty, 2d ed. (New York: Oxford University Press, 1970), 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" (Ithaca: Cornell University Press, 1968); and Jack Baranson, Industrial Technologies for Developing Economies, especially Chapter 4: "Advancing Technology Capabilities" (New York: Praeger, 1969). On transfer of technology in agriculture, see Lester R. Brown, Seeds of Change (New York: Praeger, 1970), p. 56.

6. Richard S. Eckaus, "Notes on Invention and Innovation in Less Developed Countries," American Economic Review 55 (May 1966): 106.

exceed their corresponding social costs. I argued above 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.

2. Sectoral Differences in the Assimilation of New Technology

The differential 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.[7] The fact that certain projects, typically agricultural ones, not only offer scope for adaptation to local factor resources but actually require it, may provide the necessary opportunity for shaping the underlying productive technique along lines of factor availability.

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.[8] 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.[9]

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, notably agricultural activities, can be performed with equal

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7. Albert O. Hirschman, Development Projects Observed (Washington, D.C.: The Brookings Institution, 1967), p. 42.

8. Robert Solo, "The Capacity to Assimilate an Advanced Technology," American Economic Review 56 (May 1966): 91-97. The same point is made by Theodore Schultz in "Economic Growth from Traditional Agriculture" in Albert H. Moseman, ed., Agricultural Sciences for the Developing Nations (Washington, D.C.: American Association for the Advancement of Science, 1964), p. 185.

9. United Nations, Economic Commission for Latin America, Economic Survey of Latin America, 1969, Part 3: Special Studies (New York: ECLA Committee of the Whole, Fifth Extraordinary Session, 4-6 May 1970), p. 27. Emphasis added.

efficiency in a variety of ways, in contrast to certain industrial activities characterized by economies of scale where efforts to vary from the optimum scale or process can be quite costly.[10]

In the following sections I 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, I will be particularly interested in defining those manufacturing activities which appear to offer greatest potential for the development of labor-intensive alternative techniques.

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.[11] Others simply caution against policies of employment creation within the modern sector as misguided and self-defeating in the additional rural to urban migration they induce.[12]

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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10. N. Georgescu-Roegen, "Economic Theory and Agrarian Economics," Oxford Economic Papers 12 (February 1960): 5.

11. The rigidity of production techniques in industry is discussed in: David Felix, "Agrarian Reform and Industrial Growth," International Development Review 11 (October 1960); Charles P. Kindleberger, Economic Development, 2d ed. (Tokyo: McGraw-Hill, 1965), p. 264; Wassily Leontief, "The Structure of Development," Scientific American 209 (September 1963); Eric Thorbecke and E. Stoutjesdijk, Employment and Output: A Methodology Applied to Peru and Guatemala, Development Centre Studies, Employment Series no. 2 (Paris: OECD, 1971).

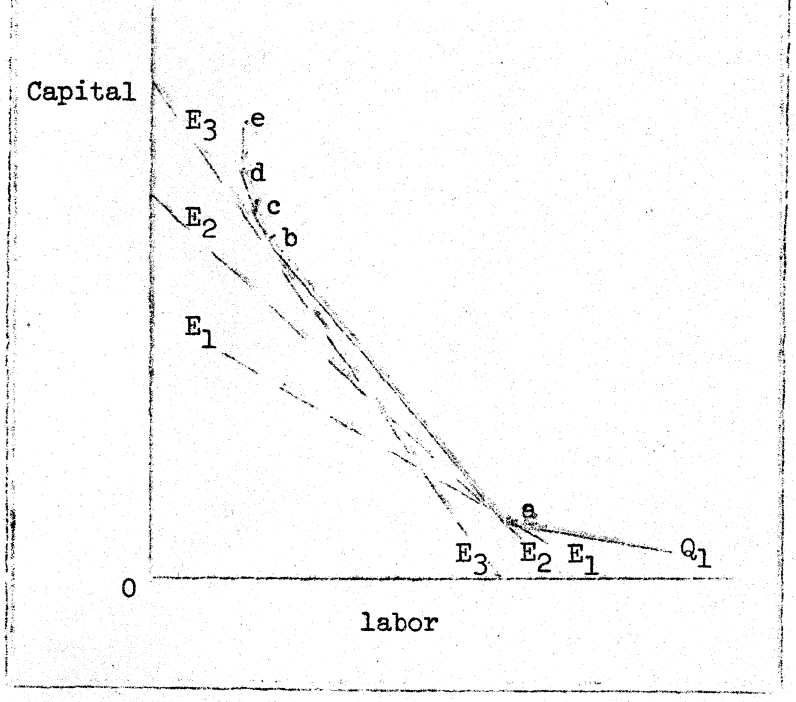
12. Carl K. Eicher, "Danger: Underestimating the Population Explosion," Ceres 3 (November-December 1970): 35-39; Carl K. Eicher, et al., "Employment Generation in African Agriculture," Institute of International Agriculture Research Report no. 9 (East Lansing: Michigan State University, July 1970), pp. 10-11; John R. Harris and Michael P. Todano, "Migration, Unemployment and Development: A Two-Sector Analysis," American Economic Review 60 (March 1970): 126-142.

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.[13] (See Figure III-1.)

FIGURE III-1



Distinctly different productive techniques are represented by points a, b, c, d, and e in this figure. Technique "a" is the only available technique which is labor-intensive.

The important assumption to note is the absence of alternative techniques--the large discontinuity--in the region of labor-intensity, where the amount of capital per worker is least, whereas several alternative techniques of production are available with a high capital-labor ratio.

Kindleberger's presentation[14] of the isoquants for industry seems to come closer to the problem. In Figure III-2, the family

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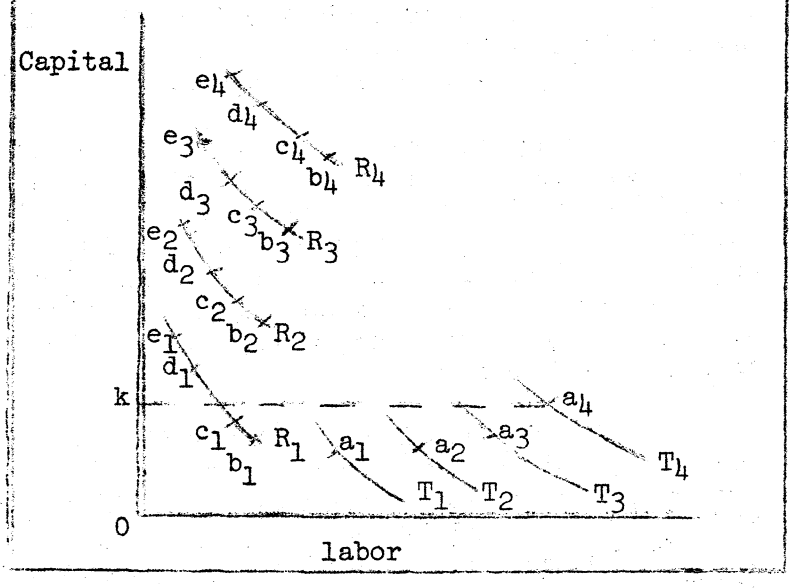
13. Harvey Leibenstein, "Technical Progress, the Production Function, and Development," in W. W. Rostow, ed., The Economics of Take-off into Sustained Growth (New York: St. Martin's Press, 1963), pp. 185-200.

14. Kindleberger, Economic Development, pp. 250-1.

of isoquants. 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 III-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 III-1 and nothing further need be said of it here.

Case 2. $R_1 = T_4$ (or $R_1 > T_4$).[15] 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 the output-labor ratio are higher for b_1 than for a_4.[16]

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 neither homogeneous nor readily convertible into other forms. The physical capital

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15. 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.

16. ILO, Employment Objectives in Economic Development (Geneva: 1961), cited in Werner Baer and Michael E. A. Herve, "Employment and Industrialization in Developing Countries," Quarterly Journal of Economics 80 (February 1966): 96-7.

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 into the capital component of either 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.

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.

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. However, within this case a wide range of possibilities exist for substitution of variable labor-intensive costs for fixed capital-intensive costs.[17] Of course "for some products it is necessary to use considerable amounts of capital to get any output at all."[18]

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. That is to say, capital-intensive methods should be employed at those stages in the production process where their use is critical in effectively utilizing machinery to say cut metal; however, there is far less justification for using them in jobs which can be accomplished by labor, such as transporting equipment, supplies, and products.

In purely economic terms, the explanation behind the "irrational" choice of capital-intensive techniques in circumstances where labor is obviously in abundance lies in equating marginal cost with marginal value product. The paradox whereby labor is abundant yet not cheap, while capital, despite its scarcity is actually inexpensive means that 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.[19]

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17. Kindleberger, Economic Development, p. 251.

18. Ibid.

19. Georgescu-Roegen, "Economic Theory and Agrarian Economics," pp. 39-40.

b. Elasticity of Substitution

The elasticity of substitution (s) 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.

TABLE III-1

Cross-Country Estimates of the Elasticity of Substitution

ISIC No.	Industry	s
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 chemicals	.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

Notes: Countries included in the sample are: U.S., Canada, New 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, "Capital-Labor Substitution and Economic Efficiency," The Review of Economics and Statistics 43 (August 1961): 227.

The authors of Table III-1 hypothesized a constant elasticity of substitution for each industry. 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 curves (of constant elasticity of substitution). A lower value for s 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 (s = .721), sugar (s = .781), tobacco (s = .753), and knitting mills (s = .785) are more rigid and would consequently allow for less substitutability of factors than industries such as pulp and paper (s = .965), clay products (s = .919), glass (s = .999), and non-ferrous metals (s = 1.011).

c. 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. As Hla Myint notes:

> 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.[20]

Baer and Herve draw upon Hla Myint's theory of a third factor of production in developing their concept of "effective supply of labor" whereby "capital and unskilled labor need to be combined with skilled labor to be productive.... [Hence, the] effective supply of unskilled labor is determined by the amount which can

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20. Hla Myint, The Economics of Developing Countries (New York: Praeger, 1969), p. 137. Emphasis added.

be combined with the available supply of skilled labor."[21] 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.[22] That skilled labor, and not capital, is the constraint in industrialization was also confirmed at the United Nations' Industrial Programming Seminar held in São Paulo in 1963. The Baer-Herve thesis is also borne out by Strassmann's description of the limits of labor absorptivity as dependent upon elasticity of substitution. "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."[23]

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?

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21. Baer and Herve, "Employment and Industrialization in Developing Countries," 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. "Employment and Industrialization: Reply," Quarterly Journal of Economics 81 (August 1967): 532-3.

22. David F. Ross, "Employment and Industrialization in Developing Countries: Comment," ibid. (May 1967): 338.

23. As discussed in Strassmann, Technological Change and Economic Development, p. 123.

Since small-scale industry is typically less capital-intensive than large-scale industry,[24] 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. However, the "cost-benefit" of adaptation to conditions in developing nations, and the differential capacity for adaptation of different industrial processes remains uncertain.

Based upon data from the 1954 U.S. Census of Manufactures I developed indicators for each of the Standard Industrial Classification (SIC) two-digit manufacturing industries. For each of these industries, three ratios--value added per employee, new capital expenditures per employee, and new capital expenditures to value added--were plotted as discrete functions of plant size measured by number of employees per establishment.[25] 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[26]--identifies industries characterized by economies of scale in production. Industries which fall into this pattern include:

20 food and kindred products
21 tobacco manufactures

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24. This is an important assumption in Harry Oshima's analysis of the employment problem in Asia. "Labor-Force 'Explosion' and the Labor-Intensive Sector in Asian Growth," Economic Development and Cultural Change 19 (January 1971): 161-183.

Bert Hoselitz comments that "small industry is usually much more labor-intensive than large industry." "Small Industry in Underdeveloped Countries," Journal of Economic History 19 (December 1959): 607.

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.

25. For the original charts, see Figure IV-3 in the author's Ph.D. thesis, "The Problem of Employment Creation and the Role of the Agricultural Sector in Latin America" (University of Wisconsin-Madison: Agricultural Economics, 1972), pp. IV-30 - IV-36.

26. The high initial level of productivity in the case of U-shaped curves is explained by high levels of capital intensity for plants with 1-4 employees (see n. 24 infra.).

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, suggesting a constant level of productivity over a wide range of plant scales; that is, scale of operation can be matched to market size. 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

This latter group of industries could, tentatively, offer developing nations greater prospect for employment expansion within the context of capital scarcity and a severely circumscribed local market.

When new capital expenditures per employee (a proxy for capital intensity) are considered, five of the six industries cited above show a tendency towards declining capital-labor ratios with scale of plant. (The sixth, electrical machinery, exhibits erratic swings in the capital-labor ratio.) For these same first five industries capital costs of output appear to decline with plant size. Thus, tentatively 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. However, these very industries are also precisely those which, in the U.S., are experiencing rapid increases in concentration.[27] For the balance of the two-digit industries, evidence of growing concentration is also apparent.[28]

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27. See Table IV-3 in the author's Ph.D. dissertation, p. IV-40.

28. Ibid., Table IV-4, p. IV-42.

3. The Usefulness of the Data

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. In addition, for Latin American factory industry, value added per employee is less than half the comparable figure for the U.S. manufacturing sector (see Table III-2). But

TABLE III-2

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 and 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	1,160	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 and 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 12 (May 1967): 69.

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.

The frequent assertion that developing nations are heir to all technology developed to date is without practical relevance unless this technology is adapted to their factor availabilities. 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.[29] Without strong market incentives to create a demand for technological research for developing nations, however, it is unlikely that major advances in this direction will take place.

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.[30] 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."[31]

The service and repair of equipment is the area in which "capital and labor can most readily be treated as substitute production factors."[32] In a capital rich, high wage country, capital equipment is likely to become obsolete earlier than in a country preoccupied with economizing capital. 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 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;

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29. As cited in Peter Dorner, "Interpretive Synthesis and Policy Implications of Land Tenure Center and Related Research," LTC Paper no. 31 (University of Wisconsin-Madison: Land Tenure Center, December 1966), p. 1.

30. David Granick, "Economic Development and Productivity Analysis: The Case of Soviet Metalworking," Quarterly Journal of Economics 81 (May 1957): 205-233.

31. Ibid., p. 232.

32. Ibid., p. 220.

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

clerical work and bookkeeping--these remain almost totally unmechanized in Soviet industry.[33]

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. By thus selectively spreading scarce capital over the maximum number of workers, industrialization in developing nations may be able to combine efficiency of operation with high levels of labor absorption.

C. Construction

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, the choice of a production technology in construction constitutes a loose, rather than rigid, relationship between productive factors. Subsequent projects can be constructed with entirely different technologies from those of previous ones.[34] It should be recalled, however, that capital-labor substitutions are reversible; the flexibility which allows for considerable labor absorption can also be a source of labor displacement.

Table III-3 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 labor productivity suggests that factor proportions in construction have remained rather constant without significant capital deepening. Although the contribution of construction to GDP and to employment has kept pace with the growth of the economy over the 15-year period (measured by the long-term growth rates in column 6 of Table III-3), the growth rate of output in construction between 1960 and 1965 was only half as rapid as for the 1950-60 period; over the same two periods employment

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33. Ibid., pp. 221-22.

34. J. Gorinski, "Construction: Its Role in the Development of Backward Economies," in Essays on Planning and Economic Development, vol. 3 (Warsaw: 1968), cited in Ignacy Sachs, "Selection of Techniques: Problems and Policies for Latin America," Economic Bulletin for Latin America 15 (1970): 33.

TABLE III-3

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

	1950	1960	1965	1950-60	1960-65	1950-65
Construction output						
Percent of GDP						
Growth rate, percent	3.4	3.4	3.0	4.5	2.2	3.8
Construction employment						
Percent of active population						
Growth rate, percent	3.6	3.7	3.6	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 América Latina, no. 9 in series II: Anticipos de Investigación, Cuadernos del Instituto Latinoamericano de Planificación Económica y Social (ILPES), Cuadro 9 (Santiago: 1969), and UN, ECLA, Economic Survey of Latin America, 1966, Table 14.

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.[35]

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 economies of scale.[36] While this conclusion

35. Esteban Lederman, Los Recursos Humanos en el Desarrollo de América Latina, no. 9 in series II: Anticipos de Investigación, Cuadernos del Instituto Latinoamericano de Planificación Económica y Social (ILPES), Cuadro 9 (Santiago: 1969).

36. Colin Clark, The Conditions of Economic Progress, 3d ed. (London: Macmillan and Co., Ltd., 1957), pp. 381-84.

is supported by the data in Table III-3, the hypothesis does not seem to be a fair reflection of reality. Productivity-increasing innovations, as well as increased mechanization, could be adopted by building contractors 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. Unlike manufacturing, but (much like agricultural production) construction has developed more or less independently in all countries on the basis of indigenous technologies and raw materials. This factor 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.

Strassmann studied the response of building contractors to 11 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."[37] Of the 11 innovations studied, all of which were labor saving to some extent, 10 were adopted by at least some of the 15 firms in the sample.

In "Patterns of Industrial Growth,"[38] Chenery regressed construction's share in GDP on income and size for a sample of 34 countries. He found that the partial derivative of construction activity with respect to income, that is, the income elasticity of construction, is 1.152.

However, 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

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37. For details on the Peruvian case, see Paul Strassmann, "Innovation and Employment in Building: The Experience of Peru," Oxford Economic Papers 22 (July 1970); and Strassmann, "Construction Productivity and Employment in Developing Countries," International Labour Review 101 (May 1970).

38. Hollis B. Chenery, "Patterns of Industrial Growth," American Economic Review 50 (September 1960): 624-54. Chenery's 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 15 percent confidence level.

$1,000 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 differences between plant and equipment with respect to durability and innovation become significant.

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 (those with incomes between $350 and $900), housing expenditures rose to 4.6 percent of GDP. For the latter income class the annual growth rate of housing construction during the 1955-64 period averaged 10 percent, 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 Bogotá, suggest income elasticities for housing in this same general range.[39]

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. On the strength of regression analysis for 27 countries at various states of development, Strassmann hypothesizes a housing elasticity of 1.5 as per capita output rises from $200 to 400.[40]

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39. ILO, Towards Full Employment (Geneva: International Labour Office, 1970), pp. 128-130.

40. Strassmann, "Construction Productivity and Employment." However, 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-$1,000 range of per capita incomes.

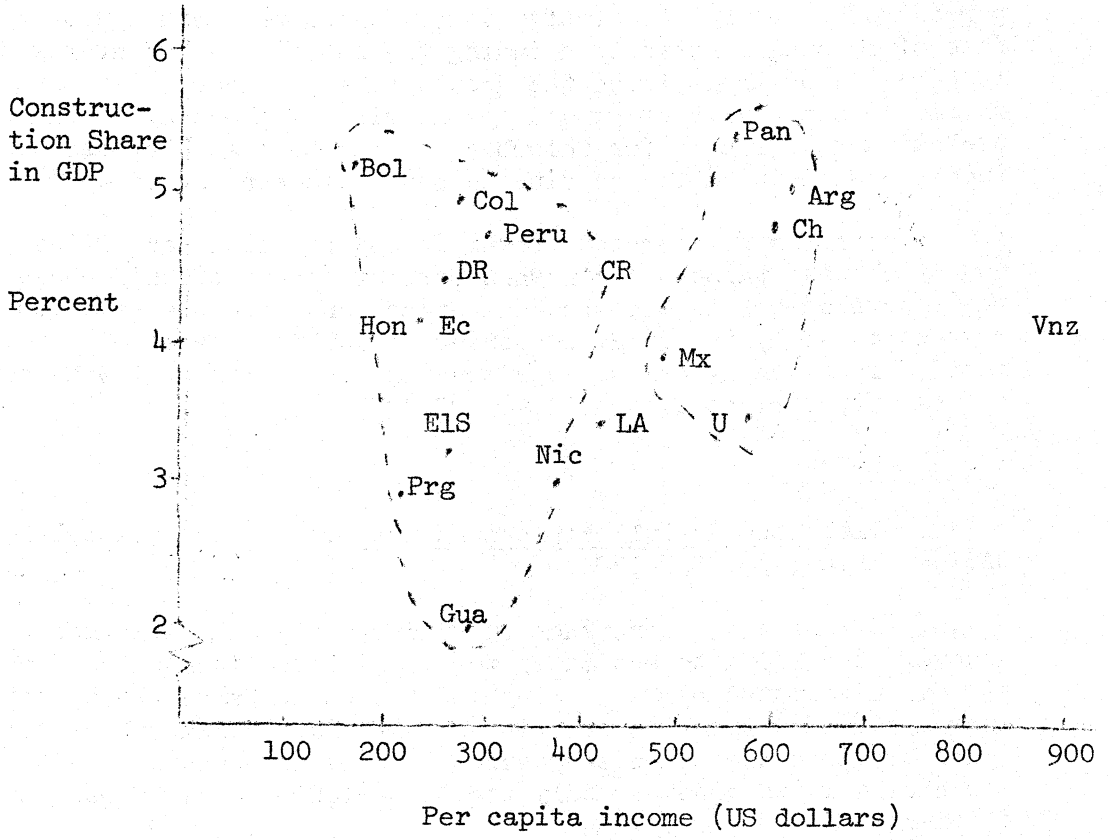
"Aggregate Employment Function: Evaluation of Employment Prospects in LDCs," Mimeo (undated, ca. 1970-71). Singh's estimates are as follows:
(Table 5, ibid.)

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
1,000	1.24
2,000	1.18

In order to examine the relationship between construction and income in Latin America we prepared a scatter diagram plotting construction's share of GDP as a function of per capita income (see Figure III-3). While the array generally reveals a positive

FIGURE III-3

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 and 6. December 1968.

relationship, the correlation becomes very questionable when the countries are grouped into subsets of low- and middle-income countries. The fact that the data do not distinguish housing activity from all of construction is one important source of confusion. 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.

As economies enter the "modern" stages of economic growth, the share of construction in output--and to a lesser extent in

employment--tends to decline. Among "modern" countries, construction accounts for 6.2 percent of total GDP and occupies 6.6 percent of the labor force.[41]

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 (due to urbanization and industrialization), and slow growth of labor productivity. 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."[42] Nevertheless, an effective employment strategy should seek to maximize both components of the labor demand function.

The slow growth of labor productivity in construction, vis-à-vis manufacturing, implies that direct employment benefits per unit of expenditure 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 discussed above, the most notable of which is the smooth production isoquant. However, 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 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, with the homeowner himself providing much of the unskilled and semiskilled labor, have had a significant impact on employment creation in Colombia,[43] even though purchased labor inputs are considerably reduced. 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. Finally, a redirection of housing funds into rural areas could stimulate demand of potential homeowners which could provide employment in construction, building materials, and allied industries for potential out-migrants.

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41. Simon Kuznets, Modern Economic Growth (New Haven: Yale University Press, 1966), p. 128.

42. Strassmann, "Innovation and Employment," p. 243.

43. ILO, Towards Full Employment, p. 133.

Nevertheless, there is reason to doubt that housing construction could provide the same growth stimulus as, say, the automobile industry provided in the U.S. Although a labor-intensive industry produces a more substantial direct impact upon income and employment than does a capital-intensive one, 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.[44] Housing construction forges only modest linkages. Being essentially a consumer durable requiring very little maintenance, houses, once constructed, provide far less opportunity for additional employment than other forms of accumulated capital, such as irrigation dams, factories, or roads.[45] In addition, today's parameters of development, such as population growth rates, levels of unemployment, and export prospects, also make it unlikely that increased expenditure on housing construction could set off a chain of growth-stimulating reactions. Thus, this study must remain committed to a far more modest goal for employment creation in construction as set by Strassmann at 3 percent.[46]

2. Public Works

Ragnar Nurkse[47] is usually credited with popularizing the idea of employing surplus workers in the construction of capital projects. 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. W. Arthur Lewis in his classic article, "Economic Development with Unlimited Supplies of Labour," suggested much the same.[48]

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

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44. William H. Miernyk, The Elements of Input-Output Analysis (New York: Random House, 1965), p. 49.

45. ILO, Employment Objectives in Economic Development, pp. 65-66;

46. "Construction Productivity," p. 516.

47. In Problems of Capital Formation in Underdeveloped Countries (Oxford: Basil Blackwell, 1953), p. 37.

48. The Manchester School 22 (May 1964), reprinted in A. N. Agarwala and S. K. Singh, eds., The Economics of Underdevelopment (New York: Oxford University Press, 1963).

reason for concern even for Nurkse.[49] Yet the concept remains so appealing that it is difficult to reject entirely.[50] 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,[51] with factors such as low rate of equipment utilization, inadequate maintenance and repair of equipment, scarcity of skilled labor, and inadequate supporting facilities (e.g., supply of spare parts) playing an important role. 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. Thus, in developing countries it is the absence of external economies which serves to constrain the economic use of earthmoving machinery and to promote labor-intensive construction techniques.

However, the ILO found that in Africa private contractors tended towards far more capital intensity in project design than

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49. See Harvey Leibenstein, Economic Backwardness and Economic Growth (New York: John Wiley and Sons, Inc., 1957), p. 261; 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 (New York: McGraw-Hill, 1964), p. 135; and Ragnar Nurkse, "Reflections on India's Development Plan," Quarterly Journal of Economics 71 (May 1957).

50. See, for example, 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 91 (January 1965): 14.

51. ILO, Men Who Move Mountains, Mimeo, (Geneva, 1963), cited in ILO, "Economic Development, Employment and Public Works in African Countries," p. 21; and United Nations, Bureau of Economic Affairs, "Capital Intensity in Heavy Engineering Construction," Industrialization and Productivity, Bulletin 1 (New York: UN, Department of Economic and Social Affairs, April 1958).

did national public works agencies.[52] Unfortunately, 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. On the other hand, for projects undertaken by the government there is little excuse for neglecting the social costs of unemployment. Furthermore, there are dangers for governments 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, detailing the benefits of each alternative with respect to employment, income distribution, balance of payments, and economic growth.

Many circumstances may require a capital-intensive organization of construction projects such as the physical requirements of the project, the time factor, and the location of the project where transportation, housing, and other amenities would have to be provided for workers.[53] It is frequently asserted that very large projects should be conducted on a capital-intensive basis because of organizational difficulties in supervising a vast labor force.

The Chinese case, of course, indicates the unique ability of a highly regimented society to carry out vast projects,[54] but the generalization made earlier, that large projects are difficult to organize, still holds true. However, to the extent that large projects can be divided into independently managed sub-projects, or into stages allowing varying degrees of capital intensity, organizational difficulties can be overcome in part.

Voluntary, community level projects have a vast potential for absorbing rural underemployed workers in small public work projects. The philosophy underlying community development has become an integral part of the development literature. Essentially

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52. ILO, "Economic Development, Employment and Public Works in African Countries," p. 22.

53. For specific case studies, see ibid., pp. 19-20; and UN, "Capital Intensity in Heavy Engineering Construction," p. 38.

54. Ibid., p. 37.

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, deriving not so much from secular demand deficiencies and underutilized capacity as from insufficient investment and consequent chronic low levels of economic activity and productive employment.

Community development recognizes the difficulty of achieving the necessary levels of investment leading to employment creation through conventional processes. It reverses the traditional link between capital formation and employment creation, insisting instead that surplus workers can increase the community's stock of capital--land improvements, schools, roads, etc.--thus allowing for increased output and employment. Nevertheless, community development projects often do not provide remunerative employment, at least not directly, nor is their impact upon urban unemployment very clear. 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.

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 of the UN and FAO.[55] 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. 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: 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,

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55. 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.

amenities, arrangements for essential provisions and for tool and appliance maintenance.[56]

3. An Illustration of Substitutability

To illustrate the potential for labor substitution in road construction, we can cite an ILO report filed by the resident engineer for a road surfacing project in sub-tropical Africa.[57] Table III-4 contrasts per kilometer costs for performing the various surfacing operations in this project under capital- and labor-intensive alternatives. Total man-days of unskilled labor per kilometer of road amounts to 34 for the capital-intensive method and 428 for the labor-intensive method. The capital-intensive method, in addition, requires more skilled and semi-skilled workers for operating and servicing equipment.

A blending of the two alternatives, both of which are actually extreme designs, seems to be indicated by a careful reading of Table III-4. 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; requirements of unskilled labor would be 380 man-days per kilometer.

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 which traits to accept, because they are unchangeable, and which to make over according to the country's needs and capabilities, plays a crucial role in the subsequent process of economic and social development. In general,

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56. ILO, "Economic Development, Employment and Public Works in African Countries," pp. 23-25.

57. J. Muller, "Labour-Intensive Methods in Low-Cost Road Construction: A Case Study," International Labour Review 101 (April 1970): 359-75.

TABLE III-4

Direct Operational Costs of 1 Kilometer of Road (US dollars)

Operation	Capital-Intensive Method Input	Cost/km.	Labor-Intensive Method Input	Cost/km.
a) opening a quarry	1 bulldozer 1.4 hrs. 6 workers 0.2 days	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 1,200 kms. 6 workers 2.3 days	249.00	6-10 trucks 1,200 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, "Labour-Intensive Methods in Low-Cost Road Construction," Tables I and II, pp. 364,367.

then, 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 seemingly offering an easy way out of the problem.

D. Services

In the course of the structural transformation of employment which accompanies economic growth, the service or tertiary sector takes on an increasing importance.[58] 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.

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--and technically speaking, induced--employment growth in services (see Table III-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. Employment growth in services exceeds that in manufacturing (and in industry generally) by far. However, while the increase in manufacturing activities reflects increased investment and implies economic growth, the same cannot be said for growth in services. The fact that considerable services "employment" is neither industry-induced nor industry-related reveals a weakness in a pattern of development based on the developed countries' model, 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."[59] Instead, manufacturing growth, through a multiplier mechanism, generates "effective demand leading to employment

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58. Kuznets, Modern Economic Growth, p. 111.

59. "Economic Development and the Sectoral Expansion of Employment," International Labour Review 87 (June 1963): 506-7.

TABLE III-5

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, personnel, 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: Zymundt Slawinski, "Structural Changes in Employment within the Context of Latin America's Economic Development," Economic Bulletin for Latin America 10 (1965), Table 3.
Other years: ECLA, Economic Survey of Latin America, 1966, Table 13.
All other countries
Kuznets, Modern Economic Growth, Table 3.2.

expansion in other sectors" with tertiary activities the major employment beneficiary. 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 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?"[60]

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 1950s, 71 percent of the net increase in the labor force was absorbed by services in Argentina, Chile, and Uruguay, the most 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.[61]

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. Kuznets defines service activities as those which do not involve the production of commodities.[62] Lack of an independent measure of production in services often requires that output be estimated by valuing inputs. Thus, an increase in the 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

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60. Eric Thorbecke and E. Stoutjesdijk, Employment and Output, p. 42.

61. "Structural Changes in Employment within the Context of Latin America's Economic Development," Economic Bulletin for Latin America 10 (October 1965): 173.

62. Kuznets, Modern Economic Growth, p. 143.

have occurred is that total output has remained unchanged but an underemployed rural worker has shifted from agriculture into services.[63]

1. Industry- and Urbanization-Induced Service Activities

The most important service activities in terms of their contribution to GDP and their role in development are those which are economically and technically linked to the process of industrial growth and urbanization. These include: (a) basic services--transportation, communications, and storage; (b) utilities--light and power, gas and water; and (c) trade and financial services.

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 subsectors as a proportion of output per worker in the economy as a whole for different levels of per capita income.[64] Thus, 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.

Chenery's results from regressing transportation and communications on income yield a coefficient of 1.288,[65] 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 upon employment absorption. Thus, although output in transportation and communications increases 28.8 percent faster than GDP, employment growth in transportation

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63. Keith B. Griffin, "Latin American Development: Further Thoughts," Oxford Economic Papers 20 (March 1968): 126.

64. "Aggregate Employment Function." Using recent cross-section data for 78 countries--47 developed and 31 underdeveloped--Singh estimated parameters for sectoral growth rates of employment. His three-sector and seven-sector models can be characterized as polynominals in the log of per capita income and the growth rate of output.

65. "Patterns of Industrial Growth," p. 634.

and communications would approximately parallel the growth in GDP.[66]

ECLA data for Latin America indicate that output in basic services (including water, gas, and electricity) has increased faster than GDP. Employment growth in basic services, however, has outrun the growth rate of GDP in recent years due to a slowing in the growth rate for productivity in basic services.[67] 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 III-6).

TABLE III-6

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.

66. This assumes an annual growth rate for productivity in basic services of 1.4 percent. Lederman, Los Recursos Humanos, Cuadro 9.

67. Ibid.

According to Singh's calculations,[68] the contribution of utilities to total employment is at no time in excess of 1 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 sub-sector, 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. The key role played by transportation in particular as an input into almost 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, 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. 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 III-6).

Underemployment in commerce, particularly in trade, is quite high in Latin America, estimated by ECLA at 19 percent in terms of unemployment equivalents.[69] 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" represents a system of privately funded welfare.

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68. S. K. Singh, The Economics of Underdevelopment, Table 4.

69. UN, ECLA, Economic Survey of Latin America, 1968, Table 24.

2. Public Sector Services

When public sector expenditures represent one-fifth to one-third of GDP, as in Latin America (see Table III-7), the likelihood of feather-bedding is considerable.

TABLE III-7

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 income redistribution programs and in part a function of processes resulting from economic growth and urbanization. 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.[70]

Between 1950 and 1965, services employment within the public sector in Latin America absorbed about 5 percent of the net increase

70. Ibid., Chapter IV, "Public Sector," pp. 102-3.

in the labor force,[71] raising its share of the economically active population from 3.2 percent to 3.8 percent over the period (see Table III-6).

3. Other Services

"Other services" 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. According to their estimates for service activities, but with the exception of basic services and utilities, underemployment is extremely common, accounting for about 45 percent of total unemployment computed in this fashion. 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.[72]

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. The Origins of the Employment Problem

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 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 to

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71. Zymundt Slawinski, "Structural Changes in Employment within the Context of Latin America's Economic Development," p. 166.

72. UN, ECLA, Economic Survey of Latin America, 1968, Table 24.

stimulate the rest of the economy into a dynamic takeoff process with full employment.

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 7 percent of the labor force and contributed 16 percent of GDP[73] (see Table III-8).

TABLE III-8

Latin America: Sectoral Distribution of Work

	Agriculture[a]	Extractive Industries	Manufacturing		
			Artisan	Factory	Total
Employment (000)					
1950 employment	27,506	547	3,432	3,780	7,212
Percent	55.3	1.1	6.9	7.6	14.5
1955 employment	29,608	617	3,981	4,094	8,075
Percent	52.8	1.1	7.1	7.3	14.4
1960 employment	31,496	692	4,841	4,275	9,116
Percent	50.1	1.1	7.7	6.8	14.5
1965 employment	33,591	768	5,447	4,609	10,056
Percent	47.5	1.1	7.7	6.5	14.2
Growth Rate of Employment (% per year)					
1950-55	1.5	2.4	3.0	1.6	2.3
1955-60	1.3	2.3	4.0	0.9	2.5
1960-65	1.3	2.1	2.4	1.5	2.0
1950-65	1.3	2.3	3.1	1.3	2.2

[a]includes agriculture, forestry, fishing, and hunting

Even in 1950 the dimensions of the employment crisis of the 1960s could readily be determined: most of the labor force was already born, and the process of urbanization was well underway. Thus, to blame the present employment crisis on the failure of industry

73. These figures do not take account of the contribution of artisan industries which, in 1950, provided employment for 7.6 percent of the labor force and contributed 2.3 percent to GDP, see Table III-8.

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.

In 1950 the agricultural sector in Latin America (including agriculture, forestry, fishing, and hunting) provided employment

TABLE III-8

Force and Growth Rate of Employment, 1950-65[a]

Construction	Basic[b] Services	Other[c] Services	Total Employment	Total Work force	Unemployment
1,890	2,089	10,495	49,739	52,664	2,925
3.8	4.2	21.1	100.		5.6
2,299	2,636	12,842	56,077	60,240	4,163
4.1	4.7	22.9	100.		6.9
2,578	3,268	15,716	62,866	69,160	6,294
4.1	5.2	25.0	100.		9.1
2,863	3,842	19,531	70,651	79,473	8,822
4.1	5.4	27.7	100.		11.1
4.0	4.7	4.1	2.4	2.7	7.3
2.3	4.4	4.1	2.3	2.8	8.2
2.1	3.3	4.4	2.4	2.8	7.0
2.8	4.1	4.2	2.4	2.7	7.6

[a]The percentage distribution of the active population as presented in this Table differs slightly from the same concept as presented in Table III-6. Both Tables are based upon ECLA data. Both are included in the present chapter since each presents detail not available from the other.

[b]includes water, gas, electricity, transportation, and communications.

[c]includes commerce, public administration, health, and other services.

Source: Lederman, Los Recursos Humanos, Cuadro 9.

TABLE III-9

Latin America: Non-Agricultural Employment,

	Extractive Industries	Manufacturing Industry	
		Factory	Artisan
(1) 1950 Non-Agricultural Employment (000)	547	3,432	3,780
(2) 1950 Sectoral Distribution of Non-Agricultural Labor Force (%)	2.2	13.6	15.0
(3) Growth Rate in Output, 1950-65 (% per year)	6.0	6.5	2.8
(4) Compounding Factor[b]	2.397	2.572	1.513
(5) 1965 Hypothesized Non-Agricultural Employment [(1) x (4)] (000)	1,311	8,827	5,719
(6) 1965 Actual Non-Agricultural Employment (000)	768	5,447	4,609
(7) 1965 Sectoral Distribution of Non-Agricultural Labor Force (%)	1.7	11.9	10.0
(8) Actual Growth Rate in Employment, 1950-65 (% per year)	2.3	3.1	1.3
(9) Difference between Hypothesized and Actual Growth Rates for Employment [(5) - (6)] (000)	543	3,380	1,110
(10) Ratio of Actual Employment to Hypothesized Employment for 1965 [(6) ÷ (5)]	0.586	0.617	0.806

[b]Compound interest multiplicative factor for growth rate in output, line (3), and 15 years

TABLE III-9

Actual and Hypothesized, 1950 and 1965

Construction	Basic Services	Other Services	Non-Agricultural Labor-Force Employed	Unemployed	Total
1,890	2,089	10,495	22,233	2,925[a]	25,158
7.5	8.3	41.7	88.4	11.6	100.
3.8	5.6	4.1	--	--	--
1.750	2.264	1.827	--	--	--
3,307	4,729	19,174	43,065	2,817	45,882
2,863	3,842	19,531	37,060	8,822[b]	45,882
6.2	8.4	42.6	80.8	19.2	100.
2.8	4.1	4.2	3.5	7.6	4.1
444	887	-357	..... s = 6,007		
0.866	0.812	1.019	0.861	3.132	1.000

[a]Assumes that all "visible" unemployment occurs in non-agricultural sectors

Source: Based upon Table III-8.

for 52.2 percent of the labor force.[74] 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.[75] 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, eight million workers migrated from the agricultural sector. Over the same period the non-agricultural labor force increased by 12.7 million workers[76] (see Table III-9). In addition, "visible" unemployment was already nearly 6 percent (roughly 3 million) in 1950.

The sum of the above--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 1960s.

Table III-9 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.[77] 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. Lines (9) and (10) of the Table reveal the extent to which growth in employment fell short of growth in output, or, alternatively, the extent to which actual growth in employment fell short of hypothesized growth.

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74. This assumes that 5.6 percent of the labor force was "visibly" unemployed; if we consider only the employed labor force, agriculture provided 55.3 percent of the jobs, see Table III-8.

75. The difference between 52.2 percent of the 1965 labor force--corresponding to agriculture's proportion in 1950--and actual agricultural employment in 1965.

76. We have avoided double-counting the eight million migrants.

77. 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.

As expected, the most disappointing sector is "factory industry." Had employment in this sector grown as rapidly as output, 3.4 million additional jobs would have been created, still leaving 5.4 million "visibly" unemployed outside of agriculture. Industrialization would not, of course, 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.

The point to make here is this: the solution to the unemployment crisis in Latin America, at least in the foreseeable future, lies not primarily in industry but in agriculture. Had the rural outmigration of eight million workers over the 1950-65 period been contained, "visible" unemployment at least--which in 1965 totaled 8.8 million--might today be of manageable proportions.

CHAPTER IV

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 so.[1] On the basis of the estimates of Table IV-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 were 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.

Dudley Seers,[2] in his study on the employment problem in Colombia, estimated that 5 million new jobs would be needed by 1985. He found that expansion in the modern sector alone would necessitate a sustained growth rate for the urban economy of 14 percent over the entire 15-year period from 1970 to 1985--obviously an unfeasible goal. Seers recommended instead a strategy of balanced growth, allowing slow migration and increased employment in agriculture. Such a strategy implies the need for rapid land redistribution and settlement, and improved prospects for employment, education, health services, and housing in rural areas.[3]

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 lies in the

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1. See, for example, Raul Prebisch, Change and Development, Latin America's Great Task, Report submitted to the Inter-American Development Bank (Washington, D.C., July 1970).

2. ILO, Towards Full Employment, A Programme for Colombia, prepared by an inter-agency team organized by the ILO (Geneva, 1970).

3. Dudley Seers, "New Approaches Suggested by the Colombia Employment Programme," International Labour Review 102 (October 1970).

TABLE IV-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
$US 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
1,000	3.95	5.15	6.35	7.55	8.75

Source: S. K. Singh, "Aggregate Employment Function: Evaluation of Employment Prospects in LDC's," Table 1 (Washington, D.C.: World Bank, n.d.), p. 61.

agricultural sector.[4] 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 increased unemployment.

4. See ILO, Employment and Economic Growth (Geneva: 1964); Eicher, et al., "Employment Generation in African Agriculture," Research Report no. 9 (East Lansing: Michigan State University Institute of International Agriculture, July 1970); and Harry Oshima, "A Strategy for Asian Development," Economic Development and Cultural Change (April 1962).

2. Rural Out-Migration

The more pressing dimensions of the employment problem lie clearly on the side of supply. 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,[5] 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 have been aimed at retarding the flow of potential migrants out of rural areas.

The institution of the extended family has long served to disguise rural underemployment within minifundia; in fact, ECLA has estimated the unemployment equivalent in Latin American agriculture at 33 percent for 1969.[6] However, through the twin processes of migration and urbanization, the locus of surplus workers is shifting, and becoming painfully visible as well as politically potent.

a. A Theory of Migration

The aim of this section is 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.

While age and education may serve to identify potential migrants (in general the younger and more educated rural elements migrate), 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.[7] In consequence, it is the unemployed, the hired worker, the tenant, and the sharecropper who migrate.[8] Members of minifundia farm families may also be predisposed to leave the farm if it proves too small or unproductive adequately to 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.

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5. 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 47 (November 1965).

6. UN, ECLA, Economic Survey of Latin America, 1968. Table 24.

7. U.N., Progress in Land Reform, Fifth Report (New York: 1970), p. 262.

8. ILO, Why Labour Leaves the Land (Geneva: 1960), p. 15.

Variations in relative living levels between agricultural and non-agricultural pursuits appear to be a less important determinant of rural-urban migration than is the opportunity for stable and remunerative employment in the non-farm sector. Doreen Warriner's observations for the developing countries, particularly those in the Middle East, confirm the finding that disparity in income earnings is of secondary importance in explaining migration processes.[9]

An ILO study[10] 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. From his experiences in Africa, Todaro develops a similar argument, although minus the explicit emphasis on urban employment opportunities.[11]

For most of Latin America the "push" factors of "agricultural distress" resulting from neglect of the agricultural sector are constant, 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.[12]

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.

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

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9. Doreen Warriner, "Problems of Rural-Urban Migration: Some Suggestions for Investigation," International Labour Review 101 (May 1970).

10. Why Labour Leaves the Land.

11. "A Model of Labor Migration and Urban Unemployment in Less Developed Countries," American Economic Review 59 (March 1969).

12. ILO, Why Labour Leaves the Land, pp. 17-18.

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 1950s, 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.[13] At the beginning of the decade, wages of industrial workers averaged about three times the level paid in agriculture.[14]

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 and under conditions of full employment, as has characterized the process of structural change in the developed countries. 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.[15] It is this latter form which migration takes in the developing countries.

B. The Need for Structural Reform

What type of changes could induce a reversal in the trend towards abandoning agriculture? It seems fairly clear that nothing short of "massive, rapid and drastic" agrarian reform[16] will suffice

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13. David F. Ladin, "Urban Growth and Economic Strategy in Latin America," Development Digest 4 (January 1967): 9-10.

14. Anatole A. Solow, "Urbanization in Latin America," ibid., p. 1.

15. Warriner, "Problems of Rural-Urban Migration," p. 442.

16. The term is Jacques Chonchol's, cited in William C. Thiesenhusen, "Technological Change and Income Distribution in Latin American Agriculture," LTC Paper no. 78 (Madison, Wisconsin: Land Tenure Center, August 1971), p. 20.

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,[17] land tenure institutions cannot be judged in the abstract; forms of agricultural organization differ according to the society they serve, and only with respect to the needs of that society can judgments be passed as to the adequacy of the tenure institutions.

In Latin America, despite radically different demands being placed upon the agricultural sector than when it was originally organized in the colonial period, structural forms remain basically unchanged. "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."[18] 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.

a. The Case for a Smallholding Agriculture

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 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, in cases where contrasting minifundia and latifundia characterize the agricultural landscape, the

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17. 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 (Madison, Wisconsin: Land Tenure Center).

18. Peter Dorner, ed., Land Reform in Latin America, Issues and Cases, Land Economics Monographs no. 3 (Published by Land Economics for the Land Tenure Center at the University of Wisconsin-Madison, 1971), p. xviii.

smallest farms 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.[19] Evidence from some agrarian reform projects in Chile, for example, "indicate an increase of over 20 percent in the number of families productively employed on reformed haciendas."[20]

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.[21] By not tieing its operation to strict criteria of economic efficiency, 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.

Investment in family farm agriculture differs from investment in other economic activities in its predominance of labor intensity. 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 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. 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

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19. Dorner and Kanel, "The Economic Case for Land Reform," p. 11.

20. Peter Dorner and Herman Felstehausen, "Agrarian Reform and Employment: The Colombian Case," International Labour Review 102 (September 1970): 231, reprinted as LTC Reprint no. 66, Land Tenure Center, Madison, Wisconsin. For Bolivia and Peru, see Melvin Burke, "An Analysis of the Bolivian Land Reform by Means of a Comparison between Peruvian Haciendas and Bolivian Ex-Haciendas" (Ph.D. diss., University of Pittsburgh).

21. Folke Dovring, "Unemployment in Traditional Agriculture," Economic Development and Cultural Change 15 (January 1967): 163.

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.

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.

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 3 hectares of arable land (plus 15 has. of agricultural land) per agricultural worker in Latin America, an amount adequate for the maintenance of a farm family.[22] 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, where one-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 IV-2 which presents data for 6 of the CIDA study countries. These data reveal the wastefulness implied by the latifundia-minifundia situation; i.e., the tendency of smallholdings to overuse labor resources and the failure of the large estates productively to utilize land resources. "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."[23]

Sweeping redistribution of the land resource is a necessary first condition for generating needed employment opportunities.

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22. See M. J. Sternberg, "Agrarian Reform and Employment, with Special Reference to Latin America," International Labour Review 95 (January-February 1967); and Dorner and Felstehausen, "Agrarian Reform and Employment," p. 227.

23. Solon Barraclough and Arthur Domike, "Agrarian Structure in Seven Latin American Countries," Land Economics 62 (November 1966): 401. Reprinted as LTC Reprint no. 25, Land Tenure Center, Madison, Wisconsin.

TABLE IV-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

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, "Agrarian Structure in Seven Latin American Countries," Table III, p. 402.

However, agrarian reform, if restricted only to land distribution is not in itself a sufficient condition for such employment generation; appropriate governmental policies are also necessary.

According to Doreen Warriner, "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."[24] These obstacles include shortages of land and water, climatic risks, soil erosion, effects of salinization, regional maldistribution of farm population, distance from markets, etc. These very obstacles can, however, be turned to advantages by translating their removal into productive employment opportunities. The infrastructural works for the control of water resources--drainage, irrigation, and storage--the reclamation and colonization of land, construction of roads, all can spell new jobs.[25] Of course, incomplete or poorly conceived reforms may lead to a further waste of resources (the Mexican case is a good example).[26] 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; however, it is not the intent of the present study to consider this issue, nor that of minimum per worker holdings.[27]

I have frequently made reference to the family farm as the organizational form best able to absorb surplus manpower. This is clearly one of the lessons of the CIDA studies (see Table IV-2). While I would admit to a predisposition towards family farm agriculture, 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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24. Warriner, "Problems of Rural-Urban Migration," p. 449.

25. Ibid., p. 451.

26. ILO, Why Labour Leaves the Land, pp. 226-27.

27. For a discussion of this issue, see Solon Barraclough, "Alternative Land Tenure Systems Resulting from Agrarian Reform in Latin America," Background Paper (Rome: FAO, May 26-30, 1968) RU: LT/69/May 10, 1969, p. 4.

C. A Rural Strategy

Existing tenurial conditions are a "major factor limiting employment in agriculture"[28] and thus limiting access to agricultural income. 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."[29] 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:

> '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.'[30]

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, 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.

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. According to the ILO Report on Colombia: "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."[31]

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28. Dorner and Felstehausen, "Agrarian Reform and Employment," p. 228.

29. Solon Barraclough, "Why Land Reform?," CERES 2 (November-December 1969): 24.

30. Cited in William C. Thiesenhusen, "Employment and Latin American Development," Chapter 4 of Dorner, ed., Land Reform in Latin America, p. 72.

31. ILO, Towards Full Employment, pp. 76-77.

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.[32]

2. Government Support Programs: The Sufficient Condition

Often, however, 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.[33]

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. Excessive attention to either agrarian reform or productivity increase, 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. 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.

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32. Don Kanel, "Land Tenure Reform as a Policy Issue in Modernization of Traditional Societies," Chapter 2 of Dorner, ed., Land Reform in Latin America, p. 31. Thiesenhusen in "Employment and Latin American Development" 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).

33. Charles Montrie, "Employment and Development Planning in Latin America," Mimeo (Office of Development Programs, Bureau for Latin America, Agency for International Development, October 15, 1971), p. 12.

The possibility of such a post-reform demand deficiency is indicated by Clark's studies of the Bolivian agrarian reform:

> 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.[34]

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 - 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."[35]

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34. Ronald J. Clark, "Agrarian Reform: Bolivia," Chapter 7 of Dorner, ed., Land Reform in Latin America, p. 150. Emphasis added.

35. Solon Barraclough, "Employment Problems Affecting Latin American Agricultural Development," Monthly Bulletin of Agricultural Economics and Statistics 18 (July/August 1969): 2.

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 and 1985 at 3.5 percent, fully 88 percent of which is attributed to the "population effect" and only 12 percent 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. 3 (August 21, 1969): 5-8.

Over the 1950-65 period, per capita consumption of foodstuffs rose at only 1.1 percent,[36] a reflection of the unequal distribution of the benefits of a 2.5 percent growth rate in per capita income over the same period. Even in the absence of income growth, improvements in the distribution of income would result in an increased demand for the products of agriculture.[37]

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 I-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.[38] 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.[39]

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.

2. Import Substitution. A second measure of the scope for growth of agricultural output is shown in Table IV-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

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36. Prebisch, Change and Development, p. 37.

37. This point was made in Chapter I-A.

38. 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: July 1968), Tables 31, 32, 33.

39. ILO, Towards Full Employment, p. 81, footnote 3.

TABLE IV-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., December 1969), Tables 3 and 6.

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) and (2).

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 import substitution since 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 wheat flour imports. The very favorable terms[40] 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.

Agricultural imports to Latin America under PL 480 in many cases fulfill a genuine developmental need. However, in many other cases such trade would seem to confirm Joan Robinson's criticism that "'the aim of aid is to perpetuate the system that makes aid necessary.'"[41]

For the countries of Central America, Panama, and the Dominican Republic (with import ratios of about .10), cereals, fruits and vegetables, oils and fats, and dried milk appear as recurring import items. Cereals, oils and fats, and dried milk dominate the agricultural imports of many of the larger nations of Latin America as well.[42]

The price system is a powerful mechanism. Many nations have found it a relatively simple matter to turn a specific agricultural deficit 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 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 commodities for industrial output or in agricultural commodities for agricultural commodities--could be

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40. All sales programs under PL 480 are carried out under Title I of the Act. Long-term credit sales aggreements 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 percent during the grace period and 3 percent thereafter. 1970 Annual Report on Public Law 480, 92nd Congress, 1st Session, House Document no. 92-135, p. 15.

41. Cited in Keith B. Griffin, "Latin American Development: Further Thoughts," Oxford Economic Papers 20 (March 1968): 132.

42. U.S. Department of Agriculture, Economic Research Service, Agricultural Trade of the Western Hemisphere (Washington, D.C.: February 1972).

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 LDCs at 2 percent over the 1965-1980 period, 1 percent less than the growth rate estimated for their agricultural imports.[43] Prospects for export growth in cotton textiles, bananas, cocoa, and coarse grains are rated as "good," those for coffee "fair," and for rice "poor."

The international market for meat, particularly beef and veal, is quite promising, according to the FAO, a situation of which many of the countries of South America, with their vast expanses of natural grasslands, are in an excellent position to take advantage. 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.[44]

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. The removal of trade restrictions are not expected to benefit LDC exporters unless explicit trade arrangements are made in their favor.[45]

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 others, 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 growing demands.

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43. U.S. Department of Agriculture, Economic Research Service, "World Demand Prospects for Agricultural Exports of Less Developed Countries in 1980," p. vi.

44. FAO, "Provisional Indicative World Plan," vol. 3, pp. 47-8.

45. USDA, "World Demand Prospects," p. vi.

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 1970s will amount to approximately 3 million workers annually. Thus, fully 1 million new entrants must be absorbed into agriculture each year, implying about a 3 percent growth rate for the agricultural work force. The data of Table IV-2, especially Columns 4 and 5, give an outside and admittedly exaggerated measure of the 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 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 I 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.[46] Where reform is staggered, however, production declines may not materialize.

The sweeping Bolivian reform of 1952-53 led to reductions in the quantity of agricultural produce reaching urban markets which persisted for several years. "Actually, such a decrease is not shown by Bolivian production indices."[47] Clark attributes the "apparent" association between land reform and production declines to three factors: marketing adjustments, transportation bottlenecks, and weather phenomena. The former two, by far the more important factors, were overcome within 3 to 4 years by means of newly evolved institutional arrangements in which the peasantry received the cash incomes previously accruing to the landlords.[48]

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46. 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. Development Through Food: A Study for Surplus Utilization, Basic Studies Series, no. 2 (Rome, 1962).

47. Clark, "Agrarian Reform: Bolivia," p. 146.

48. Ibid., p. 146-47.

c. Policy Implications: Protection of Market Shares

Demand insufficiency, resulting from the intrusion of large-scale commercial agriculture into domestic markets formerly supplied through smallholding agriculture, calls for a policy which reserves to the smallholding subsector a progressively larger market share. Further encroachment by large, mechanized producers upon the markets being served by labor-intensive small-scale agriculture is quite likely, given the availability of surplus land resources, capital, and technology which enable large producers to seize new market opportunities, and, incidentally, displace agricultural workers.[49]

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. 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.[50] 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 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 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. National agricultural policy may have to restrict certain markets to smallholding agriculture, or, alternatively, restrict the production of mechanized agriculture to certain specific commodities.

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

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49. For examples, see Barraclough and Domike, "Agrarian Structure in Seven Latin American Countries," p. 394; Barraclough, "Employment Problems," p. 2; for some Central American examples, see Rodolfo Quiros, "Agricultural Development and Economic Integration in Central America" (Ph.D. diss., University of Wisconsin-Madison, 1970), especially Chapter IV.

50. Roger Soles, unpublished data.

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.[51]

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.[52] Quiros provides us a counter-example. The expansion of large-scale, mechanized cotton production on Nicaragua's Pacific coast led to a massive displacement of tenants and share-croppers from traditional granary areas. As a result, basic grains--cash crops for the small producers--moved from the export to the import side of the trade balance.[53] If the social costs of labor

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51. 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, beets, sugar cane	.40 to .48	475 to 710
3. Arracacha, onions, plantains, cacao, lentils, habas, spinach, tomatoes, peas, cabbage, oranges, 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

52. "Agrarian Reform: Bolivia," pp. 147-48.

53. Quiros, "Agricultural Development and Economic Integration," pp. 183-89.

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 may be questioned. 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. 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.[54]

4. Supplementary Rural Employment

The need for creating opportunities for rural employment to supplement those generated directly by agrarian reform arises not only from the possibility of a demand insufficiency--which as I noted above is not a real problem in many countries--but from the necessity to hasten job creation, develop activities complementary to land reform, and because in practice, sufficient land resources may not be available to accommodate the entire agricultural work force. Several broad areas of supplementary employment might include 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 smallholder, 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.

On the other hand, if he were 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

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54. Ibid., pp. 193-97.

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. Perhaps the most meaningful rural industry, however, would be the manufacture of mechanical "intermediate" inputs such as hand seeders, hand pumps, and a host of animal-drawn implements--tool bars, plows, harrows, seed drills, fertilizer spreaders, etc. 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.

The skills which are developed in rural workshops prepare rural workers to assume semi-skilled and even skilled positions in the urban labor force. Food transforming is a rural industry with forward linkages 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.[55] By reducing spoilage and waste, especially for perishable produce, farmers are enabled to market an increased proportion of their output.

The frustrated attempts to decentralize industry in Latin America should serve as a warning that, with the few exceptions which I 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.[56]

b. Infrastructure and Marketing

There are two broad areas in rural construction in which new employment opportunities can be developed--voluntary labor projects which open new lands to cultivation, and paid labor on rural infrastructure projects.

Since the major and often sole compensation in community development projects is the benefits derived from the finished project, it is unlikely that labor will be forthcoming except from

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55. Griffin, "Latin American Development," p. 130.

56. Solow, "Urbanization in Latin America," p. 6.

those who view themselves as potential beneficiaries. This same concept, however, can be incorporated into a scheme for developing new lands for settlement where the necessary infrastructure would be provided voluntarily by 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.

The second broad area of employment creation through rural infrastructure is that of paid labor working full time on construction projects. Considerably more workers could be utilized productively in place of many mechanized operations, particularly in road construction projects. Labor-intensive designs could and should become a major weapon in the battle for employment creation in rural areas. It will probably require a strong national directive, however, elevating employment creation to priority status, before public works projects are designed in this way.

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.[57] 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.[58]

Areas on the fringe of existing agriculture and suitable for settlement have long ago been taken up, leaving only the large tracts. In the absence of co-ordinated govermental 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"

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57. John Powelson, Latin America, Today's Economic and Social Revolution (New York: McGraw Hill, 1964), p. 57.

58. See Arthur L. Domike, "Colonization as an Alternative to Land Reform" (Washington, D.C.: June 2-4, 1970), p. 3. A paper presented at the Spring Review on Land Reform, Agency for International Development.

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."[59] "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.[60]

The lesson from the Colombian case--and it has been learned from other countries as well, most notably Brazil--that settlement follows new roads, indicates the minimal input necessary for colonization to occur. 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 which may by indicated by a comparison of the economic and social benefits of each approach.[61]

If resources devoted to opening new areas for colonization have little or no opportunity cost to society, such schemes can represent an important complement to employment generation strategy. 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,

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59. ILO, Towards Full Employment, p. 73.

60. Ibid.

61. 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, 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.

lack of genuine interest in farming--while creating employment opportunities right from the start. 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.[62]

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, thus allowing for consolidation of those newly settled lands which, after a few years of cropping, lend themselves best to livestock production.

Colonization complements agrarian reform, however, colonization is by no means an alternative to agrarian reform although admittedly it all too often has taken this form. To the extent that colonization permits 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. Conclusion

The need for a rural solution was made apparent by the analysis of the previous chapter, and by my 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, I found, was largely a response to insecure tenure, predisposing agricultural workers to the temptations of urban employment. The probability of finding urban employment was identified as the dynamic factor in explaining migration.

In the suggested approach to dealing with the twin problems of migration and urbanization, I am attempting to weaken the "push" factors of agricultural distress rather than operate on the "pull" factors of urban employment opportunities. To attempt to stem migration by reducing opportunities for urban employment would appear counter-productive if I recall that efforts at rural job creation are intended to complement, not compete with urban job creation.

The major element in the strategy I am recommending for rural employment creation is massive agrarian reform--so that the land

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62. See William C. Thiesenhusen, "Colonization: Alternative or Supplement to Agrarian Reform," Chapter 7 of Dorner, ed., Land Reform in Latin America.

becomes the basis for increased employment and income for the man who works it.

I 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, I recognize 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 I 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 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.