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THE SHORT RUN POTENTIAL
FOR
EMPLOYMENT GENERATION ON INSTALLED CAPACITY
IN
LATIN AMERICA

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I

Introduction and Overview

The countries of Latin America have economies characterized by capital scarcity and widespread underemployment of their labor force. Hence, one would expect the capital stock that they do possess to be fully utilized. Yet the empirical data show extensive idleness of Latin America's capital stock! Such capital idleness in the midst of capital scarcity is contrary to the most elementary common sense. However, since production decisions in the Latin American economies are made by generally rational decision makers, the causality of underutilization must be found in factors causing divergence between the pursuit of private interests, be it profit maximization or some other, and the pursuit of maximum social welfare. Distortions in the price system such as minimum wages, maximum interest rates, overvalued exchange rates, import duties, etc., are obvious candidates for culprits, but non-price elements need to be borne in mind too.

The urgent need to create productive jobs in Latin America is undeniable. Some 20-50% of the Latin American labor force is estimated to be underemployed. Putting this excess labor to work on the currently underutilized capital stock is an obvious answer. However, implementing such a move is not easy. In addition to the micro-economic requirement for a change in entrepreneural behavior, a number of macro-economic considerations are central to a successful capacity utilization policy: markets must be found for the additional output, foreign exchange must be available to pay for the

additional required imported inputs, additional supply of non-traded inputs such as power, transportation, etc. must become available; additional credit for working capital must be available, etc. Thus, any attempt to move Latin American economies to a higher level of capital utilization and employment consists of a comprehensive policy package dealing with the various determinants of underutilization of capacity at the same time.

The following sections review the empirical situation and explore the employment potential of capacity utilization as well as its policy requirements. Section II presents data on the extent of underutilization of capacity as well as its nature. Section III calculates the employment potential of capacity utilization, both in the industrial sectors as well as in the economy as a whole. Sections IV and V deal with the micro and macroeconomic requirements to mobilize excess capacity. Finally, Section VI explores the extent to which the full utilization policy can lead to full employment in a decade and discusses some external limitations on the success of such a policy.

II

Capacity Utilization in Latin America

Detailed studies on the extent of the utilization of installed industrial capacity exist for Brazil (Kogut, 1975), Chile (Ramos, 1975), Colombia (Thoumi, 1975), Costa Rica (Schydlowsky, 1975), Peru (Abusada, 1976), and Venezuela (Abusada, 1977), and refer to the first half of the 1970's. In these analyses, capital idleness can be seen to take three different forms: a) days of the year when plants are shut down; i.e., holidays, Sundays, Saturdays, collective vacations; b) parts of the day when plants are shut down; i.e., less than three shifts work per day; and c) less than full output on the existing shifts worked or outright idleness of parts of a plant when it is normally open and working; e.g., heavy hydraulic presses used two hours per week. The first two types of underutilization are the most easy to document and appear to account for the bulk of the underutilization. However, output slack or partial idleness are also of importance.

It should be noted that the above measures assume that the socially optimal level of utilization is three shifts a day, 365 days a year with no slack or partial sections' shut down. Whether that assumption is an appropriate one is of course open to question. Unfortunately, it is not easy to calculate socially optimal utilization without having a full specification of each firm's production function. However, in Section IV a number of reasons are given for believing that private utilization falls well short of the socially desirable utilization, and thus it is quite plausible to take a three-shift, seven day a week measure as the benchmark. It is often also argued that such 'round the clock, 'round the year operation is not feasible because down time is needed for maintenance and repair. This is a false argument, for repair and maintenance time is properly part of the operating

time of a plant and should not be counted as idle time. Thus, when a firm works a single shift, maintenance occurs within the 8-hours worked, if it occurs in two additional hours of working time, that implies that the firm may be producing on one shift, but is in fact working ten hours, i.e., a shift and a quarter. Correspondingly, triple shifting would imply not working three times as much, but increasing work time by a factor of 2.4. The measures of utilization in this study are therefore always defined to include whatever maintenance and repair time may be required as a complement to the actual production time.

II.1 Underutilization of days in the year:

The distribution of plants according to days worked in the year is available for Peru and is shown in Table II.1.1. Note that a plant which works five and a half days, closing Saturday afternoons and Sundays works 287 days a year.

The Peruvian figures show that 47% of the firms work five and a half days or less, with another 38% working six days. That leaves only 15% of the firms working more than six days a week. The potential increase in work time is considerable for those firms working five and a half days, for another day and a half per week are available; i.e., production time could increase by 27%. For those firms working six days, the additional day amounts to an increase in production time of 17%. Over the whole distribution, production time could increase by 36%, thus if all firms went to seven days a week, production time for Peruvian industry would increase by more than a third!

It is also remarkable to note that there are as many single shift firms as three shift firms who work more than five and a half days a week.

TABLE II.I.I

PERU 1971: NUMBER OF DAYS WORKED PER YEAR IN MANUFACTURING PLANTS

Number of days	One Shift	Two Shifts	Three Shifts	TOTAL
Less than 100	8	-	-	8
100 to 150	18	5	1	24
151 to 200	31	7	6	44
201 to 250	104	15	16	135
251 to 270	95	15	17	127
271 to 290	113	50	55	218
291 to 310	317	71	62	450
311 to 330	48	9	22	79
331 to 360	13	2	28	43
361 to 365	22	18	24	64

Mean = 282
Median = 298
Mode = 302

Source: Ministry of Industry and Commerce, Industrial Statistics for 1971.

Moreover, the small number of round the year firms also indicates the relative unimportance of "continuous process" firms, for these could not afford to shut down for Saturdays, Sundays or holidays.

II.2 Underutilization of shifts in the day:

Table II.2.1shows that with the exception of Brazil, about 2/3 of the firms typically work one shift, another 15% work two shifts, and the remaining 20% work three shifts. The main variations around this average are Venezuela with more single shift and fewer three shift firms, and Brazil with the opposite.[1/]

The pattern of shift-work across industrial groups varies by country as can be seen from Table II.2.2. It is notable that there are some single shifters and some triple shifters in each industrial category, thus the product does not seem to be a determinant of the pattern of utilization. Whereas this might be a phenomenon of aggregation, it holds true at the more disaggregate level also. The implication is that the technological requirement of continuous processes is much less widespread and determining than is often believed. Instead, the shifting decision seems to depend on a deliberate choice of the entrepreneurs. Moreover, these findings also indicate that it is not impossible to work multiple shifts in any sector, as oft-times single shifting firms allege.

An interesting view of shift work is also offered by Table II.2.3, which shows for Peru and Venezuela the percentage of capital stock owned, labor employed, and value added generated, in plants working different number of shifts. It can be deduced from this table that the more capital intensive

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1/ In the Chile study, the breakdown of firms per shift has not been tabulated, while the greater incidence of shift work in Brazil may be due to the higher representation of large enterprises in the Brazilian sample.

TABLE II.2.1

PERCENTAGE OF FIRMS BY NUMBER OF SHIFTS WORKED

		1	2	3
BRAZIL	1974	35.60	25.00	39.40
COLOMBIA	1973	58.79	20.46	20.75
COSTA RICA	1974	66.56	11.00	22.44
PERU	1971	63.70	16.50	19.80
VENEZUELA	1974	73.80	12.70	13.50

Source: Country studies.

TABLE II-2.2

DISTRIBUTION OF PLANTS BY SECTOR AND SHIFTS WORKED

ISIC	COLOMBIA 1973			COSTA RICA 1974			PERU 1971			VENEZUELA 1974			BRASIL 1974		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
31 Food, Bev. & Tobacco Ind.	45	25	30	60	17	23	51	20	29	66	18	16	47	29	24
32 Clothing & Leather	65	19	16	59	12	29	55	22	23	74	13	13	36	19	45
33 Wood & Woodwork	100	-	-	92	-	8	92	4	4	89	8	3	37	16	47
34 Paper, Printing & Publish.	44	26	30	64	22	14	59	23	18	59	25	16	-	-	-
35 Chemicals & Coal	53	18	29	66	13	21	66	10	24	62	10	28	35	15	50
36 Non-Metalic Mineral	57	20	23	55	9	36	70	11	19	79	9	12	24	11	65
37 Basic Metals	43	14	43	50	-	50	42	29	29	71	10	19	28	27	45
38 Metal Working	66	24	10	28	4	18	83	15	2	83	11	6	36	42	22
39 Miscellaneous	72	14	14	86	-	14	54	15	31	85	12	3	28	36	36

firms work greater number of shifts. This conclusion can also be reached by cross clasifying firms by shifts worked and capital/labor ratios.[1/] Further confirmation is also obtained from multi-nomial logistic regression analysis.[2/] These results are encouraging since it indicates a lower degree of capital idleness than appears from looking at the number of firms working multiple shifts. On the other hand, it needs to be borne in mind that low capital intensive processes are by the same token intensive in the use of labor. Hence, the amount of employment and output that can be generated by greater capacity use is much higher than would occur if it were the capital intensive firms that were underutilizying the capital stock. Put another way, additional shiftwork in labor intensive firms generates more employment than similar increases in shiftwork in capital intensive firms.

Table II-2.3 also illustrates how crucial the aggregation scheme is to the average rate of utilization. Whereas 2/3 of the capital stock is in triple shift firms, these firms only produce something less than half of value added and employ only one third of the industrial labor force. A capital weighted index of utilization will therefore show high average utilization, an employment weighted or value added weighted index will show low utilization. Since what matters is the potential generation of employment and output, the latter weighting schemes are the appropriate ones to use. This runs counter to the first impression that a capital utilization index should be capital weighted.[3/]

1/ The capital/labor ratio must be defined as the ratio of capital services (not capital stock) to labor, or a distorted measure will result.

2/ See Abusada, (1975a) and (1977).

3/ Such capital weighting is used in a recent World Bank study on utilization, which therefore significantly understates the potential of a utilization policy for employment and output generation. See Hughes (1976).

TABLE II-2.3

COMPARISON OF SHIFT-WORK MEASURES

PERU

	Single Shift Firms	Double Shift Firms	Triple Shift Firms
% of Firms	63.7	16.5	19.8
% of Employment	46.0	17.5	36.5
% of Capital Stock	21.9	13.9	64.2
% of Value Added	33.1	18.3	48.6

VENEZUELA

% of Firms	73.8	12.7	13.5
% of Employment	50.5	16.3	33.2
% of Capital Stock	24.8	10.0	65.1
% of Value Added	41.8	15.3	42.9

The size of the establishment also effects the level of shift work, as can be seen from Table II-2.4 The analysis of this variable must proceed with caution, since large firms which work more shifts will, as a result of that fact, be larger. Thus, output and employment must first be standardized at a single shift level before the impact of utilization can be derived. In the absence of this adjustment, one would pick up the impact of shifting on size rather than the impact of size on shifting. Table II-2.4 includes this correction and shows that on the whole, for larger firms, multiple shifting is more common. This result is also confirmed in Abusada's (1975a and 1977) multinominal logistic multiple regression framework.

The quality of organization is also an important element affecting shift work. The Chilean data show that family firms do not multiple shift nearly as much as do corporations. Indeed, when firms in Chile are classified by their form of legal organization (i.e., corporations and non-corporations) it is found that corporate firms work more shifts than non-corporate ones. A similar variable also helps explain utilization in Colombia. Finally, a related variable, that of foreign participation appears to have a positive correlation with utilization in both Peru and Costa Rica.

A further variable which affects utilization is the extent to which a firm's output is exported. In the presence of economies of scale, protected domestic markets tend to develop oligopolistic structures, which hamper expansion of sales and multiple shifting. Exporting provides a "vent for surplus" for the production of additional shifts without upsetting the domestic oligopolistic structure. Exports seem to be related to utilization

TABLE II-2.4

SHIFTWORK BY SIZE OF FIRM

NUMBER OF WORKERS PER SHIFT:	1 - 20			21 - 50			51 - 100			> 100		
SHIFTS WORKED	1	2	3	1	2	3	1	2	3	1	2	3
	PERCENT OF FIRMS											
COLOMBIA	73	18	9	71	21	8	47	29	24	36	16	48
COSTA RICA	73	9	18	73	6	20	50	15	35	67	20	14
PERU	n. a.			61	18	21	68	15	17	67	12	21
VENEZUELA	n. a.			75	13	12	77	11	12	67	15	18

in the Costa Rican and Peruvian data but less so in the Colombian data.

In sum, shift work is affected by a number of variables which are mutually related amongst themselves. Thus, a multi-variate analysis needs to be undertaken to isolate the individual impact of each of the exogenous variables. The corresponding statistical analysis is made somewhat more complex because the shift work decision is a discrete one; i.e., firms work one, two or three shifts. To the extent that actual hours worked deviate somewhat from the standard eight hour shifts, these deviations represent short term fluctuations around the norm, or alternatively, represent limited overtime arrangements. Since discrete dependent variables are not amenable to routine handling in ordinary least square regressions, researchers in this area have gone to choice models and logistic regression as the more appropriate technique. 1/

1/ See Betancourt & Clague (1978), Abusada (1975a). Note that in the IBRD study (Hughes, 1976), the statistical analysis was forced into a continuous specification by using the number of hours per year as the dependent variable rather than the number of shifts. However, such a specification lumps together the decision to work shifts, the decision to work days per year, and the decision to work overtime , each of which have different determinants and represent distinct and different decision processes within the firm. More recent analysis by Hasundunga Tampubolon discusses the use of discriminant analysis as an alternative and/or approximation to logistic regression. See "Capital Utilization in Manufacturing Industries in Indonesia", Ph.D. Thesis, B.U., Nov. '79. This approach is also used in Riedel (1975). Finally, the latest development in maximum likelihood estimation of multi-nominal probit systems with a concurrent development of computational techniques may make it possible to use such probit analysis on medium sized data sets of capacity utilization in the near future. The numerical results available so far indicate that while it is important to choose a specification consistent with a choice model, it is less important what actual estimation techniques are used, since linear probability, discriminant analysis and logistic regression all yield results that are fairly close together, with the last being only slightly superior to the former.

II.3 Underutilization within the shifts worked:

In the course of the Costa Rican study, entrepreneurs were asked to estimate the increase in output they could obtain (a) without varying capital stock, working hours or employment, (b) without varying capital stock nor working hours but hiring more workers. The first question asked essentially what pure productivity gains were available, the second attempted to capture output gains available through greater utilization of capacity within established working hours. The responses are shown by sector in Table II-3.1.

The magnitude of pure productivity gains possible is considerable: 17% for the industrial sector as a whole. Moreover, for many sectors gains from 15% to 30% are feasible. The utilization potential for many sectors is even higher, e.g., Footwear (100%), Furniture (48%), Machinery (45%). On the other hand for some it is quite low, e.g., Rubber Products (6.2%), Wood (2.9%). On average, however, the utilization potential, at 20% is slightly above the productivity gain potential.

When both sources of increased output are summed together, full utilization output within existing shift patterns appears to be from 0% (tobacco) to 110% (footwear) higher than current output with the average increase for all industry standing at 36.9%.[1/]

1/ Note that pure productivity gains do not directly generate employment for job creation, only the utilization potential of Table II-3.1 is relevant.

Table II.3.1

Underutilization Within Shifts: Costa Rica 1974

(1) Sector		(2) With No Add'l Workers	(3) With add'l Workers	(4) = (2)+(3) Cumulative Total
		% Increases in Output Achievable on Current Working Hours & Current Capital Snock		
3 1 1	Food Products	15.3	35.3	50.6
3 1 2	" "	10.7	14.1	24.8
3 1 3	Beverages	-	30.5	30.5
3 1 4	Tobacco	-	-	0
3 2 1	Textiles	16.9	21.1	38.0
3 2 2	Clothing	24.3	24.5	48.8
3 2 3	Leather & Leather Products	18.4	23.5	41.9
3 2 4	Footwear	10.0	100.0	110.0
3 3 1	Wood & Derivatives	2.4	2.9	5.3
3 3 2	Furniture	28.0	48.3	76.3
3 4 1	Paper	8.5	10.4	18.9
3 4 2	Printing & Editing	26.3	27.3	53.6
3 5 1	Industrial Chem'ls	24.3	19.8	44.1
3 5 2	Other Chemicals	10.4	22.7	33.1
3 5 4	Petrol & Coal Derivatives	2.5	-	2.5
3 5 5	Rubber Products	14.1	6.2	20.3
3 5 6	Plastics	10.8	14.6	25.4
3 6 1	Clay, Porcelain Objects	37.8	1.1	38.9
3 6 2	Glass	10.0	-	10.0
3 6 9	Non- Metallic Minerals	4.8	2.1	6.9
3 7 1	Basic Iron & Steel	-	-	-
3 7 2	Non-Ferrous Metals	-	-	-
3 8 1	Metal Products	16.9	20.1	37.0
3 8 2	Machinery	26.6	45.1	71.7
3 8 3	Electrical Goods	28.7	8.5	37.2
3 8 4	Transport Equip.	19.4	8.4	27.8
3 9 0	Miscellaneous Industries	58.4	20.2	78.6
Average 1/		17.1	19.8	36.9

1/ $\bar{Q} = \frac{\Sigma \Delta\%Q \times \# \text{ workers}}{\Sigma \# \text{ Workers}}$

Source: Refer to Schydlowsky 1975 worksheets.

III

The Employment Potential of Capacity Utilization

A higher level of capacity utilization can provide employment in two ways: (i) a once-and-for-all effect occurs when additional labor is hired to work with presently existing capital, and (ii) employment grows more rapidly if new capital stock is also used on a three shift basis. For the purpose of this essay, our principal concern is with the-once-and-for-all effect, however, at the end of this section we will pay some attention to the effect on employment of full capacity growth.

The employment effect of greater use of existing capacity can be decomposed into a direct and indirect effect. The direct effect takes place in the industrial sectors which increase their use of capacity, be it through greater shift work or increase in the number of days worked. The indirect effect occurs in the service sectors which respond to an increased demand resulting from the multiplier effect of higher incomes in the industrial sector.

III.1 Direct employment potential of industrial capacity utilization

That employment will increase when there is an increase in the number of shifts or days worked is obvious. However, whether this increase is proportionate to such an increase in working time is more questionable. It depends fundamentally on two variables: differential productivity of labor on higher shifts, and traditional staffing patterns. Both together will determine the size of the second and third shift crews, which in turn

determine the employment expansion resulting from additional capacity utilization. In turn, the relative size of the work crew on different shifts is subject to a number of influences: (i) economies of scale may exist with regard to labor, this is the case when economies in administration and supervision are possible; (ii) diseconomies of night time work may exist such as when the expansion of output requires greater complexity of tasks or when requirements of ancillary services such as security or transportation are greater in a higher shift hour.

Unfortunately, observed differences in crew size for firms that presently multiple shift are not altogether unambigous indicators of the crew sizes likely to emerge under a multiple shift policy: (i) under present conditions it often pays to have small higher shift work crews because labor is more expensive on the higher shifts. Thus as many ancillary processes as possible are done on the first shift even if they serve second and third shift output. For example, packing of all shifts' output may occur during the day. Thus, when the packers working for the second and third shift output are incorporated in the day crew count, obviously the differential in crew size is misstated. The case is even clearer for clerical functions such as invoicing. (ii) different capital intensities on separate processes make it more desirable under current institutional arrangements for entrepreneurs to operate only some sections of the plant for multiple shifts, and these are likely to be those which employ less labor. However, under a capital utilization policy, the decision would most likely be different.

These same elements affect the observations that exist on productivity differentials between shifts: not only do these vary extensively across

industries with some showing lower productivities on the higher shifts and others showing the reverse, but present practice is not a good guide to what would occur if multiple shifting were generalized.

In consequence, the crew size coefficient used for any projection of employment growth due to shifting is of necessity somewhat arbitrary and there is no overwhelming reason to deviate from the assumption of identical crew sizes across shifts.

The projection of the employment effects arising from the utilization of the existing capital is best done on a sector by sector basis. For each branch of industry, the following relation will hold:

$$E_2 = E_1(1 + \lambda) \qquad \text{(III.1.1)}$$

$$E_3 = E_1 (1 + 2\lambda) \qquad \text{(III.1.2)}$$

where E stands for employment, the subscripts refer to the number of shifts worked and λ is the coefficient of increased employment in an additional shift with regard to the first shift.

In turn, actual employment, E_A, can be defined as follows:

$$E_A = E_1 \{ 1 + \lambda(n - 1)\} \qquad \text{(III.1.3)}$$

where n is the number of shifts actually worked.

Increases in employment can now be defined by combining the previous formulae as follows:

$$E_i = \frac{1 + \lambda(i - 1)}{1 + \lambda(n - 1)} E_A \qquad \begin{matrix} i = 2, 3 \\ i \geq n \end{matrix} \qquad \text{(III.1.4)}$$

Table III.1.1 shows a projection of increases in industrial employment for six Latin American countries built up from sectoral data on the assumption that blue collar labor has an expansion coefficient of 1. Furthermore, it is assumed that additional capacity utilization occurs only with regard to the use of more shifts, while the number of days worked and the utilization within shifts is kept constant. These figures are, therefore, underestimates of the full employment potential of utilization.

For the medium sized countries, bringing everybody to a full second shift in worth around 100,000 new industrial jobs. Moreover, as a percentage of existing employment, the new industrial jobs created amount to increases going from 1.4% in Brazil through 4.7% in Peru, with a median figure of 2.6%. That is equivalent to only slightly less than one full year's increase in the labor force. For a three shift operation, the total volume of employment created is significantly larger. Now we are talking of volumes running from 4.5% of the labor force for Colombia to 14.3% for Peru, with a median of 7.4% or about two years worth of labor force growth. Notice, furthermore, that for the high impact countries, Chile and Peru, the job creation is equivalent to the increase in labor force of between 3 and 4 years.

It is also worth nothing that the employment creation is spread throughout the industrial sector, in accordance with the finding that the pattern of utilization is quite mixed across sectors.

III.2 Indirect employment potential of greater capacity utilization

Additional employment possibilities outside the industrial sector occur as a result of the multiplier effect which industrial activation has on the rest

TABLE III.1.1

ESTIMATED INCREASES IN INDUSTRIAL EMPLOYMENT DUE TO MULTIPLE SHIFTING

	TWO SHIFTS		THREE SHIFTS	
	N° of jobs	% of present employment	N° of jobs	% of present employment
Brazil	592,000	1.4	2751,500	7.2
Chile	111,400	3.7	343,400	11.5
Costa Rica	18,400	2.6	45,900	6.4
Colombia	103,700	2.1	225,100	4.5
Peru	151,500	4.7	463,300	14.3
Venezuela	79,000	2.6	228,000	7.6

Industrial employment: Country study estimates adjusted to standard size shifts and National Accounts level of industrial output.

of the economy. Since agriculture usually has a very inelastic supply curve, it is the service sector which will provide a major part of the response and where the additional indirect employment will take place. To estimate the indirect potential, therefore, it is necessary to develop a small macroeconomic model suitable for capturing the effect on the economy as a whole of increased capacity utilization in industry, and then to derive the employment implications of the additional output occuring in the service sector.

Consider the economy divided into three sectors, agriculture, industry and services. Any increase in income will then by definition be the sum of the increases in income in each one of the sectors.:[1/]

$$Y = Y_a + Y_i + Y_s \qquad \text{(III.2.1)}$$

where the suscripts a, i, s stand for agriculture, industry and services, respectively.

The short run response of agriculture to an increase in demand is usually quite low. For modeling purposes we can assume that it is zero:[2/]

$$Y_a = 0 \qquad \text{(III.2.2)}$$

In turn, the increase in income in industry is derectly proportional to the additional multiple shifting which occurs:

$$Y_i = \bar{Y}_i \cdot S \qquad \text{(III.2.3)}$$

where $\bar{Y}_i$ is the initial level of industrial income at the observed intensity of shift work, and S is the proportionate increase in shift work.

1/ Note that all symbols refer to absolute increases (Δ's).

2/ The result of this "extreme" assumption is to understate the indirect effects of capacity utilization.

The increase in value added in services (Y_s) will be equal to increase and demand for services (E_s) since with the large scale underemployment in Latin American economies, the supply response of the service sectors is highly elastic. Even where some investment is required, it can usually be put in place very quickly; such is the case when the trucking fleet is fully utilized. However, in other cases such as in the electricity generation sector, the supply elasticity in the short run may be quite low. For these sub-sectors, our model's assumption is that new investment is aggressivaly put in place in the respective sub-sector in order to keep it from becoming a bottleneck and strangling the output of the rest of the economy. Expenditure on services, in turn, is related to the income level by a marginal propensity to spend on services (e_s) which is a function of private disposable income:

$$Y_s = E_s = e_s\ (1 - t)Y \qquad \text{(III.2.4)}$$

We can now perform the requisite substitution into Eq. III.2.1 and then collect terms to derive a reduced form showing the equilibrium level for the increase in income as a function of multiple shifting:

$$Y = \bar{Y}_i S + e_s(1 - t)Y \qquad \text{(III.2.5)}$$

$$Y = \frac{1}{1 - e_s(1 - t)}\ \bar{Y}_i S \qquad \text{(III.2.6)}$$

Note that the multiplier is very similar to the Keynesian multiplier. In lieu of marginal propensity to consume, in this model the multiplier contains the marginal propensity to spend on services (i.e., domestic goods) out of

disposable income. In either case, however, the multiplier contains the endogenous, responding, elements in the economy: all consumption and expenditure on services, respectively.[1/] In turn, where in Keynesian models the exogenous expenditures are investment, government, or exports, in this case the exogenous element comes from the new multiple shifting which sets the whole process of income creation in motion.

Since income in the service sector is related directly to aggregate income, it is possible to calculate directly the increased income which will arise in the service sector alone:

$$Y_s = \frac{e_s (1 - t)}{1 - e_s (1 - t)} \bar{Y}_i S \qquad \text{(III.2.7)}$$

Further, if an employment coefficient (n_s) is defined for the service sector, we can write an equation for the number of new jobs created in the service sector (N_s):

$$N_s = n_s Y_s = \frac{n_s e (1 - t)}{1 - e_s (1 - t)} \bar{Y}_i S \qquad \text{(III.2.8)}$$

Estimates for the employment generated in our sample countries in the service sector are given in Table III.2.1. The parameters underlying this calculation are given in the Appendix. Again, across the board second shifting in industry will cause service employment to pick up, in most cases, more than a year's worth of labor force growth, while triple shifting picks from two to four years worth of labor force growth.

1/ Remember that in our model agricultural and industrial output levels are not demand responsive, hence only the service sector gives rise to a multiplier.

TABLE III.2.1

ESTIMATED INCREASES IN SERVICE EMPLOYMENT

DUE TO MULTIPLE SHIFTING

	TWO SHIFTS		THREE SHIFTS	
	N° of Jobs	% of Present Employment	N° of Jobs	% of Present Employment
Brazil	423,100	1.1	2529,400	6.6
Chile	94,400	3.2	327,900	11.0
Costa Rica	30,600	4.3	77,100	10.9
Colombia	278,000	5.5	603,400	11.9
Peru	114,100	3.5	397,400	12.3
Venezuela	100,700	3.3	319,300	10.6

Service Employment: Based on following employment/value added coefficients
Brazil 104.31 per million Cr. in 1969 prices; Chile 23.17 per million Esc. in 1970 prices; Costa Rica 58.5 per million Col. in 1972 prices; Colombia 76.3 per million Pesos at 1958 prices; Peru 13.97 per million Soles at 1971 prices; Venezuela 46.13 per million Bolivares at 1971 prices.

III.3 Total potential of employment generation by using installed capacity:

Table III 3.1 shows the total employment which can be generated by going to increased shift work as well as the proportion these new jobs represent in comparison to the existing level of employment. It is quite remarkable that with the exception of Brazil which shows the much lower figure of 2.5%,[1/] going to two shifts increases employment levels from 6-8% in our countries, an increase in employments equivalent to 3-4 years of growth with minimal new capital invested.

On a three shift basis the corresponding figures run from 14-27%. These volumes are absolutely massive. Not only can multiple shifting pick up all of the registered unemployment, it can make a very significant dent in the estimated underemployment in the economies of Latin America.

Equally important as the total volume of employment is the type of job which is created by capacity utilization. Since the new jobs are in the "modern" sectors of the economy, the quality of the jobs created lies above the average of the economy. To detail what occupational categories they correspond to requires disaggregated information on the occupational structure of the sectors increasing their output due to capacity utilization. Such information has been assembled for Peru using nine skill categories (Valdivieso, 1978). These results are reproduced in Table III.3.2. It will be noticed that blue collar occupation expand more than white collar ones with supervisors and foremen having the highest rates of growth. Directors' and managers' jobs expand barely more than unskilled ones and distinctly less than semi-skilled ones.

1/ As mentioned before, this may well be due to the greater representation of larger enterprises in the corresponding sample.

TABLE III.3.1

TOTAL ESTIMATED INCREASES IN EMPLOYMENT

DUE TO MULTIPLE SHIFTING

	TWO SHIFTS		THREE SHIFTS	
	N° of Jobs	% of Present Employment	N° of Jobs	% of Present Employment
Brazil	965,000	2.5	5280,900	13.8
Chile	205,800	6.9	671,300	22.5
Costa Rica	49,000	6.9	123,000	17.3
Colombia	381,700	7.6	828,500	16.4
Peru	265,600	8.2	860.700	26.6
Venezuela	180,000	5.9	547.300	18.2

TABLE III-3.2

OCCUPATIONAL COMPOSITION OF INCREASE IN EMPLOYMENT

IN PERU

DUE TO MULTIPLE SHIFTING

	1969 Employment Total	Generalized 2 Shifts total	% Increase	Generalized 3 Shifts total	% Increase
Directors & Managers	37843	49947	32.0	63642	68.2
Profesionals	13197	17086	39.5	21650	64.1
Technicians	27188	35116	29.2	44669	64.3
Office Workers	133371	173611	30.2	218969	64.2
Sales People	46749	59901	28.1	73686	57.6
Supervisors & Foremen	4907	7360	50.0	9958	102.9
Skilled	18029	130451	48.2	175232	99.1
Semiskilled	240492	325023	35.1	414639	72.4
Unskilled	286445	375569	31.1	478376	67.0
Total	878221	1174064		1500821	
Increase		295843	33.7	622600	70.1

Source: Valdivieso, 1978

III.4 Employment implications of full utilization growth.

While the once and for all impact of capacity utilization on employment is massive, the cumulative effect of full capacity utilization growth is even greater. When both elements are combined, the effect of a higher base and a higher rate of compounding is downright spectacular.

Growth accelerates under multiple shifting because the marginal capital output ratio falls, however the precise impact of such a change depends on the extent of the availability of cooperating factors, mainly labor, on the elasticity of substitution between capital and such factors, and on the relative price changes which might accompany the process. An upper bound estimate of all these effects can be obtained by applying strict Harrod-Domar assumptions, which imply no substitution between capital and other factors, and plentiful existence of surplus labor throughout. On this basis, it has been shown in Schydlowsky (1979) that full double shifting will raise the growth rates of the countries in our group by between 16% and 61% whereas triple shifting raises the growth rate 40% - 78%. If we assume an employment elasticity with regard to income growth of .6, this implies quite significant additional rates of growth of employment. Table III.4.1 tabulates the resulting numbers. It should be noted that on a three shift basis, the additional rate of growth of employment in a number of the countries is close to a single year's rate of growth of the labor force. This means that each year of multiple shifting allows the employment of one years backlog of unemployed labor force.

Table III.4.1

Full Utilization Growth and Employment

Employment Index Year 2000

1976 = 100

	One Shift	Two Shifts	Three Shifts
Brazil	385	1096	2678
Chile	178	200	262
Colombia	296	425	641
Costa Rica	260	335	565
Peru	246	303	538
Venezuela	219	261	349

Employment Growth Rate 1/

	One Shift	Two Shifts	Three Shifts
Brazil	5.54	5.96	8.08
Chile	2.33	2.54	3.09
Colombia	4.44	5.65	7.06
Costa Rica	3.90	4.68	6.49
Peru	3.66	4.20	5.96
Venezuela	3.18	3.67	4.43

1/ Excludes once-and-for all effect of raising shiftwork

IV

Mobililizing Excess Capacity: The Micro Requirement

Economic policy to motivate enterprises to use their existing installed capacity more fully as well as to design their expansions with higher utilization in mind requires understanding the causality of underutilization at the microeconomic level. This section first sets out the basics of the utilization decision as we now understand it, then presents a simple formal model of shift choice under profit maximization, and finally outlines policies designed to lead entrepreneurs to choose higher levels of utilization.

IV.1 The causality of excess capacity:

The utilization decision is fundamentally one in which work at less desirable hours is traded off against a larger stock of capital. Thus, it is essentially a question of choice of the capital stock to labor ratio. Moreover, this choice exists even when the ratio of capital services to labor is fixed by a production function which does not allow for factor substitution. For the ratio of capital stock to capital services is variable through the number of shifts per day and days per week that the capital stock is utilized.

As might be expected, the utilization choice is dependent on the relative prices facing the entrepreneur which determine the profitability of the alternative utilization regimes. In addition, however, non-price elements also play an important role.

Entrepreneurs would only choose to multiple shift if it pays them to do so, according to the criterion by which they evaluate such decisions, be it profitability, utility, or some other. However, there is no reason to expect the entrepreneurially optimal decision to be also socially optimal unless entrepreneurs are maximizing profits and the price system works precisely in accordance with the assumptions of the competitive model. Empirical reality in Latin America includes extensive deviations from the prices which would rule in competitive economies, and these produce systematic pressures towards low shift decisions.

Wages in the industrial sectors of Latin America are typically determined by a combination of labor legislation and union bargaining. Given the extensive underemployment in these economies, the resultant market wage rates are significantly above the marginal social cost of labor for the economy. Moreover, labor legislation, particularly as it relates to fringe benefits, and the social security legislation, as it relates to taxes on the wage bills, raise the cost of labor to the entrepreneur significantly above the rate of take home pay of the workers. Thus, the cost of labor is twice removed from the social opportunity cost. Finally, Latin American labor legislations also often include statutory provisions on the additional cost of night and holiday work. Thus, higher shift labor, Sunday labor, and holiday labor is thrice removed from its social opportunity cost. Insofar as the cost of labor affects entrepreneurial decisions at all, in Latin America government policy has led the entrepreneur to use multiple shifts less than he otherwise would or than is optimal for the economy.

The price of capital goods, on the other hand, is subject to quite the opposite set of influences. Credit is available usually at subsidized interest rates for the purchase of fixed assets, ostensibly to provide an incentive to investment. Moreover, tax codes provide tax free reinvestment of part of earnings, provided this reinvestment takes the form of purchase of fixed assets. Import duties do their part by being well below the average for the import of capital goods, which when combined with overvalued exchange rates, presents a double subsidy to the purchase of such goods. Finally, many legislations specify depreciation of equipment in relation to a fixed lifetime, rather than proportional to use. This implies that profits deriving from second and third shift output pay a higher effective tax rate than is paid by profits from first shift operations. The combined cheapening of capital goods provided by the accumulation of this incentive structure is quite significant and if it has any effect on entrepreneural decision making, it certainly distorts the decision towards a lower level of capacity utilization than would be socially optimal.

An expansion of working capital is an essential requirement for additional utilization on existing plant. Similarly, a higher ratio of working to fixed capital is essential for any new plants that are to have higher utilization rates than heretofore. However, credit for working capital is hard to come by and available only at high rates, since the credit rationing systems of most Latin American economies discriminate against loans for working capital. Moreover, in many instances, working capital loans are tied to the pledging of real assets. However, if available assets have been pledged for working capital needed to work a single shift, they are

not available again to be pledged for working capital to finance second shift or third shift operations. Thus, the structure of the credit markets biases the private decision towards lesser utilization of the capital stock even further.

Finally, international economic policy of most Latin American countries with their well known import substitution and anti export biases, has led to relatively small domestic markets, often served by fairly tight oligopolies, in which economies of scale could not be exploited. In this situation, the marginal social utility of export sales is well above the marginal private revenue. However, export sales that would be socially optimal do not take place and the rate of utilization resulting from private optimization therefore falls well short of the social desideratum.

In summary, there are abundant reasons in Latin America for the privately chosen level of capacity utilization to fall well short of the social optimum even on strict profit maximization assumptions of entrepreneural behavior.

Non-price elements, however, also play an important role. One important element is the risk of innovation that entrepreneurs see in varying their utilization pattern from the one obtaining in more developed economies from which they procure their capital equipment. Thus it is quite common for entrepreneurs to explain their shifting practices by stating that "I have traveled to Germany, Sweden, Holland and the United States before I installed my factory. In none of these countries do establishments like mine work

more than a single shift." Evidently the factor proportions of these countries differ significantly from those of Latin America, and labor-manning practices should not be indiscriminately imported. However, the new industralist perceives a significant risk in modifying tried and true practices. Hence, low utilization standards are in part the result of risk avoidance by imitation.

A second important element relates to labor relations. In environments where unions are specific to individual establishments rather than industry-wide, there is a gain from "divide and rule" by having several plants each with its own union, working a single shift each, instead o having a single plant working three shifts with its consequently larger and more powerful union. In the transition of single shift to multiple shift regimes, labor relations and labor legislation may play an even more important role. For here, often a discrete increase in employment is involved for the entrepreneur and unless the newly hired workers can also be fired in short order, the risks of going to greater utilization may be quite considerable. However, it is quite common in Latin America for firing to be allowed only during a probationary period which may last up to 90 days, and thereafter for dismissals only to be acceptable for specific cause, to be approved by the Ministry of Labor.

Finally, individual entrepreneurs see numerous external impediments to multiple shifting, such as lack of transportation and other social amenities for higher shift work crews. These are cases of classical pecuniary external economies, for if a large part of economic activity went to multiple shifting, the ancillary services would certainly appear.

In sum, it appears that there are a number of non-price factors which move entrepreneurs to adopt a single shift mode instead of a double or triple shift mode.

Price and non-price elements interact in the shifting decision. It is important to note, however, that the decision to adopt shift work or to work on Sundays and holidays is a discrete one. In consequence, excess causation is the rule rather than the exception. For it is sufficient that single shifting be more profitable than multiple shifting, it does not need to be so by a factor of two or four or ten; likewise, it is sufficient that multiple shifting appear a risky innovation to the entrepreneur, it is not necessary that in addition it be unprofitable, etc., etc. Once the scales are tipped against intensive utilization of capital, additional causes do not change the decision, they simply generate over-causation.

The existence of such over-causation creates difficulties in identifying the causal structure of underutilization of capital and presents challenges for designing a policy to cope with it. When more than enough causes are present, no single cause or cluster can be identified as "the" cause or causes; we simply know that they are a set of alternatively necessary and collectively over sufficient causes, many of which are present simultaneously. For the design of policy, the implication is that as many as possible of the alternative causes should be neutralized by policy, since we do not know which one would be the residually operative and sufficient one to cause underutilization to persist. Such a situation certainly makes policy design more difficult.

IV.2 A simple optimization model for shift choice:[1/]

Consider an entrepreneur contemplating an expansion of production to satisfy a perceived growth in his market. He has an alternative of doing so by going to two shifts of work on his existing plant, or by expanding the size of his fixed assets and continuing to work on one shift. Which alternative he prefers depends on which one yields the higher present value of cash flow.

Define

B = net benefits

S = sales

L = wage bill

M = raw material bill

i = interest rate paid

WK = stock of working capital

FK = stock of fixed capital

tx = corporate income tax rate

d = period of depreciation of fixed capital

a = period of amortization of debt contracted to finance fixed capital

subscripts refer to first shift on new plant and second shift on existing plant. Absence of subscript signifies first shift on existing plant.

1/ For more sophisticated models incorporating substitution between inputs, see Baily 1974, Betancourt & Clague 1975a, Millán 1975 , Tampubolon 1979, Winston 1972. For alternative objective functions see Abusada & Millán 1973, Betancourt & Clague 1975b, Tampubolon 1979. For imperfect capital markets, see Betancourt & Clague 1975(c), Schydlowsky 1974.

The present value of the cash flow of a second shift and a new plant can then be written as:

$$PV(B_2) = PV(S_2 - L_2 - M_2 - i_2 WK_2)(1 - tx) \qquad \text{(IV.2.1)}$$

$$PV(B_1) = PV\{[S_1 - L_1 - M_1 - i_1 (WK_1 + FK_t) - \frac{1}{d} FK_1] (1 - tx) + (\frac{1}{d} - \frac{1}{a}) FK_1 \} \qquad \text{(IV.2.2)}$$

Which alternative is chosen depends on which present value is larger:

$$PV(B_2) \gtrless PV(B_1)$$

$$PV(S_2 - L_2 - M_2 - i_2 WK_2)(1-tx) \gtrless PV\{[S_1 - L_1 - M_1 - i(WK_1 + FK_t) - \frac{1}{d} FK_1](1-tx) + (\frac{1}{d} - \frac{1}{a}) FK_1 \} \qquad \text{(IV.2.3)}$$

Using an approximation for the interest payment on the amortization of debt, and assuming that the depreciation and amortization periods are equal allows considerable simplification of the above expression. Therefore, assume:

$$PV(iFK_t) \sim PV(i \frac{FK_1}{2}) \qquad \text{(IV.2.4)}$$

$$d = a \qquad \text{(IV.2.5)}$$

Now our inequality becomes:

(IV.2.6)

$$S_2 - L_2 - M_2 - i_2 WK_2 \gtrless S_1 - L_1 - M_1 - i_1 (WK_1 + {}^1/_2 FK_1) - \frac{1}{d} FK_1$$

Since the new shift and the new plant are alternatives, they must have the same sales level. Hence:

$$S_2 = S_1 \qquad \text{(IV.2.7)}$$

If the second shift requires paying a shift premium, say of α, and if more laborers need to be hired because they have lower productivity of, say, ρ, then:

$$L_2 = L(1 + \alpha + \rho) \qquad \text{(IV.2.8)}$$

On the other hand, material inputs on the second shift can plausibly be assumed to be the same as on the existing first shift. Thus:

$$M_2 = M \qquad \text{(IV.2.9)}$$

In the new plant, more advanced technology can be expected. Therefore, there will be some savings of labor, say, equal to β, and some savings of material, say, equal to β_1. Therefore:

$$L_1 = L(1 - \beta) \qquad \text{(IV.2.10)}$$

$$M_1 = M(1 - \beta_1) \qquad \text{(IV.2.11)}$$

Assuming working capital to be the same in either alternative,[1/] and assuming that there is a single interest rate, we can make the requisite substitutions in IV.2.6 to obtain:

$$- L(1 + \alpha + \rho) - M \gtrless -L(1 - \beta) - M(1 - \beta_1) - (\frac{i}{2} + \frac{1}{d}) FK_1 . \qquad \text{(IV.2.12)}$$

Futher simplification leads to:

$$L(\alpha + \rho + \beta) + M\beta_1 \lessgtr (\frac{i}{2} + \frac{1}{d}) FK_1 \qquad \text{(IV.2.13)}$$

1/ Note that goods in process on the second shift are more expensive than in the new plant due to the wage premium, lower labor productivity, and technological change. Offsets to this may be economies of scale in inventories not available with the new plant due to the heterogeneity of inputs resulting from the technical change.

This expression can be interpreted as follows: Multiple shifting will be more profitable than expansion whenever the sum of the increase in labor cost due to shift premium (α), lower productivity (ρ) and technological change (β) plus the savings of materials available due to technological change (β_1) is smaller than the cost of interest and depreciation incurred on the fixed capital of the new plant.

By the same token, the factors leading to full utilization of capital are: a high ratio of capital stock to labor, a high interest rate, and quick depreciation. On the other hand, the elements leading to low shift work are labor intensity, high shift premium, high negative productivity differentials, and rapid technological change.

If the market works well, and capital is scarce compared to labor, capital will be dear and labor will be cheap. As a result, the right hand side of IV.2.13 will tend to be greater than the left hand side. Then entrepreneurs will tend to prefer multiple shifting to plant expansion. However, if prices are artificially distorted, for example, the market price for capital is held low while the market wage and shift premium are held high, the private decision will be to choose plant expansion even though the social calculus would still require utilization. Thus it is possible to see how the divergence between market and shadow prices causes the private shift choice decision to differ from the socially optimal one.

IV.3 Microeconomic policies for capacity utilization:

The purpose of microeconomic policy is to change the structure of incentives facing the entrepreneur so that his choice on utilization coincides more fully with the socially optimal one. It is useful to group the microeconomic policies into four kinds:

a. Tax Policy: The goal is to make the relative cost of capital and labor to the entrepreneur equal to the shadow cost to society.

Several tools are available to affect the cost of capital for this purpose: (i) depreciation rates which accelerate with the rate of utilization. Such a policy would stand in stark contrast to the current practice which sets fixed rates of depreciation for equipment independent of the rate of use. It should be noted, however, that a number of tax regimes include provision for exceptional acceleration of depreciation when justified. Multiple shifting should be an exception given statutory recognition. (ii) extension of the reinvestment privileges now available for acquisition of new fixed assets to those who "invest in the utilization of capital". The addition of a shift, even if it is only on part of the plant is not really more difficult to document than the purchase and installation of new capital equipment. (iii) removal of import duty exemptions on capital goods and possibly a rise in the statutory import duties on such goods if they are abnormally low. This measure would simultaneously rationalize the use of foreign exchange and remove a major bias subsidizing the acquisition of fixed capital.

Tax policy can also be used to affect also the cost of hiring labor; (iv) the excess of the market wage over its shadow cost can be offset by special deductions from taxable profits corresponding to some fraction

of the wage bill. (iv) a tax credit for multiple shifting can be introduced. (v) a tax credit can be given for existing social security and other taxes which raise the cost of labor on additional shifts above the take-home pay to the workers.

b. Wage Policy: The goal here is to lower the cost of labor to entrepreneurs and bring it as close as possible to the opportunity cost of labor for the economy. Four different kinds of policies are involved:

(i) removal of explicit taxes on wages. At issue are social security contributions and other taxes on labor income which drive a wedge between the cost of labor to the employer and the take-home pay of the employee. A simple way of dealing with this wedge is to transfer the cost of social security benefits to general revenues of the treasury and to abolish direct taxation of wages. Should this not be possible for all of existing employment, then it can be implemented on a marginal basis either to all shift working employees or to all new shift workers added to the employed labor force.

(ii) modification of tenure rules: at issue here is generation of more flexibility to the employer in hiring and firing on the higher shifts in multiple shift operations. This is particularly important since the riskiness of adding a shift may be seen as being quite large. Several practical alternatives present themselves: one possibility is to simply extend the probationary period from the customary 90 days to a period of 12 or 24 months. Another alternative is to tie the job tenure to the execution of particular sales contracts, in analogy to the construction industry where workers are hired for a particular job and are automatically fired when that construction job is completed. A third possibility is to set upper bounds on the speed

with which a multiple shift labor force can be contracted to say 20% or 25% per year.

(iii) shift premium regulations: These premia have their origin and justification in worker preference to work during the daytime. When combined with a basic wage which is above the social opportunity cost of labor, however, shift premia tend to distort the labor market even further and reduce the employment possibilities of workers. Moreover, existing legislation of shift premia tend more often to incorporate the standards of developed countries than to reflect the preferences of the workers themselves. Thus, wage premia should in principle be set in such a way as to make the wage obtained on an afternoon or night shift equal to the price for which labor would freely wish to contract for that work schedule. The most practical proposal is to delete wage premia from labor legislation. Collectively bargained wage premia should also be discouraged, but are more likely to reflect worker preference, and in any case should be seen in conjunction with the basic wage negotiated since issues of horizontal equity between workers rotating through different shifts may well be involved.

(iv) minimum wages: In pursuit of the goal of bringing market wages for multiple shifting into accord with the opportunity cost of labor, minimum wage legislation should not apply to multiple shifts. Since such an approach is likely to be infeasible politically, a more reasonable alternative would be to exempt multiple shifting from the minimum wage legislation for the first year or eighteen months of operation.

c. Credit Policy: The goal is to correct the current bias in the credit system against working capital and in favor of purchase of fixed investment. In the short run, a useful approach is to extend the same kind of preferential credit to those who "invest in the utilization of capital" as those who "invest in the acquisition of capital goods". Over the longer run, encouraging the financial system to lend on a discounted cash flow basis rather than against the equity of the chattel mortage will remove the pre-existing distortion.

d. Non-Monetary Incentives: The general atmosphere prevailing towards multiple shifting will significantly affect the response elasticity of entrepreneurs to the various policies discussed above. It is in the creation of a positive atmosphere towards multiple shifting than non-monetary incentives have a major role to play. These incentives may range from preferential access to government services and processing for multiple shifters, through award of decorations for full use of capacity, to lower preference rating on government contracts for single shifters. Where tax exemptions, preferential credit, etc. are allocated on a discretionary basis by the government, the extent of multiple shifting could also be taken into account. As a transitory measure, compulsory double shifting could also be considered, certainly on all new investments but very possibly on existing investment as well. Whereas such a requirement would violate entrepreneural freedom of choice, a welfare cost would be incurred by the economy only in those cases where single shifting is optimal, which are assuredly quite few. If compulsory double shifting were adopted in conjunction with measures promoting multiple shifting from a profitability

point of view, it would essentially consist of hastening the move towards convergence between private choice and social optimality.

V

Mobilizing Excess Capacity: The Macroeconomic Requirements

When the focus shifts from changing the utilization pattern of a single firm to that of modifying the utilization level of all of industry, a number of new issues arise that need to be confronted. For instance, at the firm level, one can assume that a market for multiple shift output is available, particularly if the firm is a pure competitor. At the macro level, a comparable assumption would not be appropriate. Similarly, at a micro level, if more inputs are needed as output expands, it is plausible to assume that the firm can buy them on competitive markets. At the macro level, the availability of additional inputs required to raise the level of output is a more questionable matter.

This section first reviews the major macro requirements for higher utilization. It then completes the macro model begun in Section III in order to estimate the overall balance attendant to an increase in utilization, particularly as regards the balance of payments and fiscal situations. The corresponding estimates are then discussed and finally the major macro policies appropriate for increasing utilization are presented.

V.1 The macro-economic requirements:

A first major requirement at the macro level to raise utilization is the availability of markets for the output. At an aggregate level, there is no obvious problem, for the increased supply generated from utilization is balanced on the demand side by the increased incomes generated from that

self-same utilization. Hence, unless some hoarding, private or public, goes on, the additional supply should create its own demand. This Nurksian view of the situation does not hold at a sectoral level, however. The additional output resulting from multiple shifting occurs in the industrial and service sectors. Demand, on the other hand, is for agricultural goods as well. Thus, while the level of output of services will be exactly equal to the demand for those services, there will be excess supply of industrial goods and excess demand for agricultural goods. Hence, either very major change in relative prices must occur, or the excess supply of industrial goods needs to be exported. The latter alternative is obviously much less disruptive for the domestic economy and for small countries much more feasible. Moreover, it has the advantage of allowing full exploitation of whatever economies of scale are available, and takes part of industrial sales out of the oligopolistic framework within which industry operates on the domestic market and which tends to make prices very sticky indeed.

Exporting requires price and quality competitiveness, no mean conditions for industries which have grown up substantially in an import substitution environment. Thus, in order to make exports feasible, government supports in the form of tax exemptions or bounties will no doubt be necessary. Fortunately, however, not all multiple shifters need to export nor does all additional output of industry need to find outlet in the export market, since, as noted before, the expansion of domestic incomes attendant to the higher utilization levels will create a larger domestic market for industrial goods

in which the less quality or price competitive enterprises can sell.

A second major concern is the availability of material inputs. Raising industrial output will require intermediate inputs produced by domestic industry as well as intermediate inputs normally imported from abroad. The increased demand for the first of these can to some extent be satisfied by the higher level of shifting of supplier industries; imported inputs however will have to grow as well, and foreign exchange is required to pay for them. A first element of macroeconomic congruence occurs here, for the requirement to export part of the new industrial output fits in neatly with the requirement of foreign exchange to pay for new imported inputs to manufacture those outputs! Given positive value added at world prices in the industrial processing, revenue from new exports should be adequate to cover the foreign exchange requirements of production.

The third macro requirement is the availability of increased credit to finance the new working capital requirement of the higher level of activity. Over time, the higher level of retained earnings of the multiple shifting enterprises will make it possible for them to finance themselves internally, and the initial extention of credit for working capital can be repaid. Without the initial pump priming, however, it is hard to get the process started. Fortunately, the higher level of activity will generate an increased demand for transaction balances which makes room for credit creation in a non-inflationary manner. Increased demand for savings account balances consequent to the higher income levels reinforces this effect.

The fourth major macroeconomic requirement is the availability of labor to work additional shifts. Given the large scale underemployment in Latin American economies, the availability of unskilled labor is no problem. However, the mix of jobs available to be filled includes a substantial fraction of semi-skilled occupations. Hence, a very considerable training effort must accompany the move to full utilization. It is to be expected that the overwhelming proportion of this training will occur on the job as individuals are promoted up the job ladder, first assistants become masters, second assistants become first assistants, etc. Past experience with rapid industrial growth indicates that rapid training on the job is indeed possible; for full utilization of capacity it is essential.

The fifth major macro requirement is the availability of energy inputs and other non-traded goods. While services as a whole are in very elastic supply due to the widespread underemployment of labor, the same is not true of some types of inputs such as electricity and other specific types of infra-structure. Here the utilization of installed capacity would have a capital investment requirement. Moreover, the infra-structure involved typically has a long gestation period and thus may impose a constraint on the speed with which it is possible to reach full utilization. It should be noted, however, that even for electricity generation the indivisibilities and gestation periods of large hydro or thermal projects are essentially a matter of costs: it is always possible to set up quickly a number of diesel generating systems which are perfect substitutes for the large projects in all but cost.

Finally, an important macro requirement is fiscal balance. The required export supports will have an important financial cost for the treasury. This cost must be financed. The same is true for various of the components of a microeconomic policy of utilization. Cases in point are tax credits for employment growth or transfer to the government of social security and fringe benefit costs.

The most obvious source is taxation on new incomes generated in the utilization process itself. Should those not be sufficient, it may be necessary to have recourse to higher rates on pre-existing incomes. The extent to which the fiscal expenditure necessary for high utilization is self-financing is an important element determining the feasibility of the full utilization policy.

V.2 Completing the macro model:

In Section III we developed a small macro model in order to explore the aggregate income effect of utilization. Here we will extend the model to enable us to explore whether there will be balance between the new export revenue and the foreign exchange needed to pay for the input, whether there will be balance between fiscal expenditure and new revenue, and whether there is adequate margin to expand credit on the basis of the new demand for liquid balances.

We will start with the balance of payments equations on the model.

We assume that imports are of two kinds, intermediate goods imports (M_1) and final good imports (M_2). The former are used as inputs to the industrial sector, and the latter as supplements to the availability of agricultural and industrial goods in the economy.

$$M = M_1 + M_2 \qquad (V.2.1)$$

$$M_1 = m_i Y_i \qquad (V.2.2)$$

$$M_2 = M_a + M_i \qquad (V.2.3)$$

Since we have assumed earlier that there is no increase in agricultural output persuant to capacity utilization, any growth in the demand for agricultural goods (E_a) must be satisfied by imports (M_a). Moreover, expenditure depends on disposible income. Thus:

$$M_a = E_a = e_a(1+t)\ Y \qquad (V.2.4)$$

In the industrial sector, we will have an excess supply of goods, since not all of the production of industrial goods persuant to multiple shifting can be placed in the domestic market. Moreover, since we are operating with only single industrial sector, it is not feasible to distinguish between those sub-sectors which export and those sub-sectors which import. Finally, it should be noted that the only new exports in the system are the new exports of industrial goods. Thus we can directly write the balance of trade of the industrial sector as follows:

$$X - M_i = Y_i\ (1+m_i) - E_i = Y_i\ (1 + m_i) - e_i\ (1 - t)\ Y \qquad (V.2.5)$$

Collecting all the elements in the balance of trade, substituting and simplifying leads us to the following equations:

$$X - M = X - M_i - M_a - M_1$$

$$= Y_i(1 + m_i) - e_i(1 - t)\ Y - e_a(1 - t)\ Y - m_iY_i \qquad (V.2.6)$$

$$X - M = Y_i - (e_a + e_i)(1 - t)\ Y = Y_i - E_a - E_i$$

$$= Y_i + (Y_s - E_s) - E_a + E_i = Y - E = tY \qquad (V.2.7)$$

The last equation above shows us that the balance of trade, which in this model is also equal to the balance of payments, follows the traditional

absorption expression: a surplus is equal to the excess of income over expenditure, a deficit will imply in excess of expenditure over income. Since in this model it is assumed that there is equality between ex-ante private savings and ex-ante private investment (i.e., as much credit is extended to the private sector as it has savings), the only source for a short fall of expenditure from income is government taxation. Thus the balance of payments is equal to government revenue from internal taxation. Note that this implies that the system will always be in surplus. However, all values are expressed in domestic prices and since these differ from the world prices, it is not at all obvious that the surplus in domestic prices will also imply a surplus in world prices. We must therefore deflate the balance of payments from domestic to world prices to derive appropriate expression for foreign exchange. This can be done by dividing the appropriate terms by the export subsidy (d), average import duties (tm), import duties on finished industrial goods (t_i) and finished agriculture goods (t_a) as well as intermediate goods for industry (tm_i):

$$(X - M)_{INTL} = \frac{X}{1+d} - \frac{M}{1+tm} = \frac{X}{1+d} - \frac{M_i}{1+t_i} - \frac{M_a}{1+t_a} - \frac{m_i Y_i}{1+tm_i} \qquad (V.2.8)$$

Since the model does not separately generate exports and industrial imports, empirical estimation of this equation necessitates deflating directly the balance of payments of domestic prices to international prices on the assumption that the subsidy or new exports will on the average be equal to the import duty on the new imports. The appropriateness of

this assumption depends on the particular mix of exports and imports which will in fact occur and the tariffs and subsidies attached thereto. For example, if relatively more competitive products are exported and the less competitive ones are imported, export subsidies will be lower on average than import duties; on the other hand, if f.o.b. values are much below c.i.f. values, the opposite will occur. The following equations make use of the assumption of equality in the average of export subsidies and import duties on industrial goods:

$$(X - M)_{INTL} \sim \frac{X-M_i}{1+t_i} - \frac{M_a}{1+t_a} - \frac{m_i Y_i}{1+tm_i} = \qquad \text{(V.2.9)}$$

$$= \frac{Y_i(1+m_i) - E_i}{1+t_i} - \frac{E_a}{1+t_a} - \frac{m_i Y_i}{1+tm_i}$$

A further difficulty in empirical application arises from the need to distinguish imports of goods that are produced domestically from those that are not. Unfortunately, the usual classification of imports into finished, intermediate and capital goods is not adequate for our purposes whenever the country produces intermediate goods domestically, since in this case it is necessary to be able to distinguish between those imported inputs which compete with domestic production and those which do not. If we are willing to assume that the average tariff on imported intermediates is equal to the average tariff of all industrial goods imported, then no sub-classification is necessary and we can simplify our balance of payments equation further:

$$(X - M)_{INTL} \sim \frac{Y_i}{1+t_i} - \frac{E_i}{1+t_i} - \frac{E_a}{1+t_a} \qquad (V.2.10)$$

making use now of the relevant equations from the income generating model we obtain an expression for the balance of payments effect in terms of the initial level of industrial income as well as the increase in shift work:

$$(X - M)_{INTL} \sim \left[\frac{1}{1+t_i} - \frac{1 - t}{1-e_s\ (1-t)} \left(\frac{e_i}{1+t_i} + \frac{e_a}{1+t_a}\right) \bar{Y}_i\right] S \qquad (V.2.11)$$

We turn now to the fiscal relations and define the fiscal surplus (T - G) as equivalent to the sum of domestic taxation (T_d) and taxes on imports (T_t) less export bounties (B). Moreover, domestic taxation is specified as a function of income while import duties and export bounties are defined to be equal to the difference between domestic and world price value of the respective flows:

$$T - G = T_d + T_t - B \qquad (V.2.12)$$

$$T_d = tY \qquad (V.2.13)$$

$$T_t = M - M_{INTL} \qquad (V.2.14)$$

$$B = X - X_{INTL} \qquad (V.2.15)$$

Making the requisite substitutions into V.2.12 and using the expression for the balance of payments and domestic prices developed as V.2.7, we obtain the following final results:

$$T - G = tY + M - M_{INTL} - (X - X_{INTL}) =$$

$$T - G = (X - M) - (X - M) + (X - M)_{INTL} \qquad \text{(V.2.16)}$$

$$T - G = (X - M)_{INTL} \qquad \text{(V.2.17)}$$

The last equation states that fiscal surplus or deficit will be exactly equal to the balance of payments surplus or deficit. This result is fully consistent with the basic assumptions of the model in which there is only one domestic leakage (taxes) and one foreign one (imports) while on the other hand there are also only one domestic and one foreign exogenous input. The domestic balance under such circumstances necessarily implies foreign balance and vice versa. By extension, domestic deflation implies balance of payments surplus and domestic deficit spending implies a balance of payments deficit. Were one to introduce financial accumulation on the part of the private sector, be it in the form of money or quasi money, the tendency of the model to be domestically deflationary and internationally in surplus would increase, except insofar as domestic credit would be systematically expanded in offsetting fashion.

Finally, we include a demand for money function of the simplest form, with velocity the assumed constant:

$$MO = kY = \frac{k}{1 - e_s(1-E)} \bar{Y}_i S \qquad \text{(V.2.18)}$$

Notice that this equation implies that when income increases to a new stable level due to multiple shifting, the stock of money will rise to a new stable level as well.

V.3 Macro Balance of Capacity Utilization

A glance at Table V.3.1 shows that full utilization is perfectly feasible in terms of macroeconomic consistency. The balance of payments of all our sample countries are in healthy surplus for two shifts and very significant surplus for three shifts. Indeed the additions to reserves under these regimes range from 3% to 51% for two shifts and from 8% to 126% for three shifts.

From a fiscal point of view these surpluses look equally healthy. On a two-shift basis, recurrent annual surpluses run from .3% of GNP through 2.2%. In terms of government revenue, the surpluses run from 1.5% to 16%. For three shifts, the surpluses are more sizable ranging from 1% of GNP to 5.6%, while as a percentage of government revenue they run from 5% to 41%.

Two important elements are left out in the foregoing calculations. The first of these relates to the changes in domestic tax regimes necessary to finance the microeconomic incentives to utilization. It is not possible to derive magnitudes for these without having fairly detailed information of the cost structure of firms. However, the current surpluses generated by taking into account only the impact of the trade policy modifications are such as to lend credence to the belief that any domestic fiscal effects are fully financeable.

The second effect left out is the transitory deflationary effect consequent to the increased demand for money arising from a higher level of income. These monetary effects are shown in Table V.3.2. As can be seen, on the two-shift basis, the additions to the monetary stock demanded run from .8 to 3.1% of GNP.

Table V.3.1

BOP and Fiscal Consequences of Multiple Shifting

		TWO SHIFTS				THREE SHIFTS			
		BOP and Gov't Surplus US$	% of Int'l Reserves 12/31	% of GNP	% of G'vt Revenue	BOP & Gov't Surplus US$	% of Int'l Reserves 12/31	% of GNP	% of G'vt Revenue
Brazil	(1974)	525	10.0	.5	4.6	3140	59.6	3.04	27.8
Chile	(1970)	128	33.0	1.6	9.2	444	114.3	5.5	32.1
Colombia	(1972)	105	32.3	1.1	11.7	227	69.9	2.2	25.3
Costa Rica	(1972)	22	51.3	2.2	16.1	54	125.9	5.6	40.6
Peru	(1971)	29	6.8	.4	2.7	101	23.8	1.5	9.5
Venezuela	(1971)	39	2.6	.3	1.5	123	8.1	1.0	4.7

Table V.3.2

Monetary Effects of Multiple Shifting

		ADDITIONAL DEMAND FOR MONEY						ALLOWABLE EXPANSION OF CREDIT			
		Absolute(millions)		% of Monet. Stock		% of GNP		Absolute(millions)		% of Credit to Private Sector	
		2 Shifts	3 Shifts	2 Shifts	3 Shifts	2 Shifts	3 Shifts	2 Shifts	3 Shifts	2 Shifts	3 Shifts
Brazil	(1974)	5301	31696	4.19	25.07	.8	4.5	5301	31696	2.78	16.63
Chile	(1970)	1495	5193	14.95	51.93	1.6	5.6	1495	5193	18.46	64.11
Colombia	(1972)	5255	11404	16.50	35.80	2.8	6.2	5255	11404	14.01	30.40
Costa Rica	(1972)	259	651	15.95	40.09	3.1	7.9	259	651	14.51	36.47
Peru	(1971)	3578	12456	8.09	28.16	1.4	4.7	3578	12456	11.98	41.71
Venezuela	(1971)	686	2174	8.45	26.79	1.2	3.9	686	2174	7.01	22.22

While on three-shift basis they run from 3.9 to almost 8% of GNP. Such increases in the demand for money are very strong deflationary pressures and even if they occur on a once-and-for-all basis they give considerable margin for transitory imbalance of the government finances during the period of transition to the multiple shift regime. Correspondingly, such additions to the demand for money give room for considerable credit expansion to the private sector, thus assuring the provision of the working capital credit necessary to set the mechanism in motion. 1/

V.4 Macroeconomic policies for capacity utilization:

The key macroeconomic policy for utilization is international trade policy. Supporting policies are in the areas of monetary policy, labor policy, and energy infrastructure.

1. Trade Policy:

Two goals need to be pursued vigorously for capital utilization to be feasible: Surplus industrial production must be competitive on the export market, and, intermediate goods needed for the process of production must be readily importable without undue delays or red tape. Implications for concrete policy design are the following:

1/ Note also that while the model is built on the assumption that private sector does not accumulate financial assets on a net basis, this does not preclude members of the private sector from accumulating savings deposits while other members receive new credit of an equal magnitude. Thus gross credit expansion is prefectly consistant with the zero net accumulation of financial assets on the part of the private sector. However, such increase in the gross level of credit outstanding can finance the working capital needs equally as well as new net credit, hence the provision of credit need not be constrained to a magnitude only equal to increase in the demand for money.

a) Export competitiveness: firms must be provided with a bounty sufficient to cover the difference between the world price at which they sell and their marginal cost plus the return on their efforts. This bounty can take the form either of an across-the-board export subsidy, a drawback scheme refunding taxes on inputs or subsidized credit providing equivalent support. Alternatively, this competitiveness can be achieved through a preferential exchange rate or through a compensated devaluation which reorders all the components of the exchange rate system simultaneously (Schydlowsky 1967). The crucial point is that the accumulation of measures taken brings the domestic supply price down to where the producer can compete in the world market. Note in this connection that the preceding subsection showed that the fiscal budget will still be in considerable surplus after paying for an export bounty equivalent to the average of import tariffs.

b) Availability of imported inputs: full utilization of capacity and aggressive export marketing is by and large not compatible with an import licensing system. Producers must be able to buy whatever they want, at what ever time they want, with regard to no more than the out of pocket cost. Thus, to the extent that licensing systems exist in countries wishing the multiple shift, these must be either modified sufficiently to accomodate the need to expand imports in response to capacity utilization or alternatively they need to be abolished altogether. Should it be indispensible to maintain an import licensing system for whatever reason, a transferable import license given to exporters as an export bonus may serve very well and has been used successfully by a number of countries.[1/]

1/ See for instance a description of the Pakistan export bonus scheme in Bruton and Bose, 1963. Presently Bangladesh has a similar system called the "Export Performance Licensing Scheme".

2. Monetary Policy:

The purpose here is to provide adequate finance for working capital to all the new multiple shifters. A very simple mechanism is for the Central Bank to initiate the rediscounting of drafts backed by "multiple shifting certificates" provided by the enterprises who wish to borrow against their shift work plans. In turn, these certificates could be issued by the Ministry of Labor after an inspection to determine that multiple shifting in fact has been or is being instituted.

3. Labor Policy:

The crucial issue here is mobility of skilled labor and rapid training of such labor. To ensure mobility, it is desirable to modify the labor legislation in order to convert fringe benefits that are lost when a worker changes jobs into equivalent funded benefits that can be taken along from job to job. These measures will significantly reduce the segmentation of the labor market and hence would increase mobility and improve the allocation of skilled labor.

4. Energy Infrastructure:

The goal here is to prevent the lack of availability of crucial energy inputs and/or other infrastructure to strangle the growth in output. The electricity generating and port facilities are the most likely candidates for becoming significant obstacles. Thus planning for the expansion of capacity in these areas needs to be closely integrated with multiple shifting policy.

VI

Full Employment in a Decade: The Possible Goal?

VI.1. Employment need and employment potential:

The urgent need to create jobs in Latin America is obvious and widely accepted, even if a precise numerical quantification of the number of jobs needed is not available. If the gross estimates of underemployment are to be believed, perhaps as much as half of the labor force of the major Latin American countries do not have adequate employment. If once again one is willing to assume that this segment of the population is on the average employed fully only half of the time, the open unemployment equivalent will come to 25% of the labor force, a very sizeable figure indeed. Moreover, the labor forces of Latin America are growing quite rapidly. In ten years, the labor forces of the area grow by between 30 and 40%, in 20 years they almost double . If the job opportunities grow only at the same rate as the labor force the absolute number of unemployed will grow dramatically.

Capacity utilization can make a major dent in the situation, as has been argued before. Employment can be significantly stepped up on the existing installed capacity and it can also be stepped up very significantly on new investment by fully using the new capacity on round-the-clock, round-the-year basis. Table VI.1.1 shows the potential. It is structured on the assumption that the employment elasticity of growth is a very modest .6; i.e., that for every 1% of growth in output employment goes up only 6/10 of a percent. Even so, it is remarkable how quickly employment catches up with the labor force. After ten years on a two-shift basis (1975-85), there is almost no unemployment left in Colombia and Brazil; on a three-shift basis,

Table VI.1.1

The 25-Year Employment Horizon as seen from 1975

Labor Force Index

	1975	1985	1990	1995	2000
Brasil	100	132.7	153.2	177.9	205.8
Chile	100	128.8	143.1	157.5	172.8
Colombia	100	138.7	163.0	192.0	224.4
Costa Rica	100	140.2	161.4	185.2	211.4
Peru	100	137.0	161.2	190.1	223.2
Venezuela	100	143.3	110.9	195.6	227.0

Source: I.L.O. "Estimaciones y Proyecciones de la Fuerza de Trabajo 1950-2000", Vol III, Latin America, Geneva 1977, 2nd Edition.

Employment Index (employment elasticity of growth = .6)

	1975	1985			1990			1995			2000		
		1 Sh	2Sh	3 Sh	1 Sh	2 Sh	3 Sh	1 Sh	2 Sh	3 Sh	1 Sh	2 Sh	3 Sh
Brazil	75	128.6	137.2	185.4	168.4	183.2	273.5	220.5	244.7	403.4	288.7	326.8	594.9
Chile	75	94.5	103.0	124.6	105.9	116.8	145.0	118.9	132.4	168.9	133.4	150.1	196.6
Colombia	75	115.8	139.8	172.8	143.9	184.0	243.1	178.8	242.2	341.9	222.2	318.9	480.9
Costa Rica	75	110.0	126.7	165.0	133.1	183.6	225.9	223.3	200.1	309.4	270.4	251.6	423.7
Peru	75	107.4	122.5	169.4	128.6	150.4	226.2	153.9	184.8	302.2	184.2	227.0	403.7
Venezuela	75	102.6	113.9	136.5	119.9	136.4	169.6	140.3	163.3	210.6	164.0	195.7	261.5

Note: See Table III.3.1 for rates of growth used.

Unemployment Level (% of total labour force)

	1975	1985			1990			1995			2000		
		1 Sh	2 Sh	3 Sh	1 Sh	2 Sh	3 Sh	1 Sh	2 Sh	3 Sh	1 Sh	2 Sh	3 Sh
Brazil	25	3.0	0	0	0	0	0	0	0	0	0	0	0
Chile	25	26.6	20.0	3.3	26.0	18.4	0	24.5	15.9	0	22.8	13.1	0
Colombia	25	16.5	0	0	13.8	0	0	6.9	0	0	1.0	0	0
Costa Rica	25	21.5	9.6	0	17.5	0	0	0	0	0	0	0	0
Peru	25	21.6	10.6	0	20.2	6.7	0	19.0	2.8	0	17.5	0	0
Venezuela	25	28.4	20.5	4.7	29.8	20.2	0.8	28.3	16.5	0	27.8	13.8	0

in all but Venezuela, the stock of employment inherited in 1975 has been absorbed and all the growth of the labor force has been employed to boot. After fifteen years, all countries have full employment and at three shifts some have excess demand in the labor market.

If somewhat lower aggregate rates of growth are used the process takes a bit longer and multiple shifts are more essential to it. On the other hand, if a more optimistic employment elasticity were adopted, say .8, these results would be even stronger.

The implications from these calculations are staggering: contrary to what is being generally believed, persistent unemployment in Latin America is not due to the shortage of capital and savings! Full employment is completely achievable on the existing stock plus the normal accumulation at savings rates recorded in the past. The limiting factor is the lack of full utilization of the existing and potential capital stock, and this lack is due not to technological characteristics but to behavioral ones subject to government policy action.

VI.2. Policy needs and policy constraints:

Full employment requires as its principal instrument full utilization of installed and to be installed capital for the next 10 or 15 years. This, in turn, requires considerable policy action along a broad front. The particulars of the economic policy involved have been reviewed in the preceding sections and they are by no means forbidding: On the macro side, trade policy needs to be reordered to make industrial exports a routine reality and to make imports available on a current basis; moreover, credit for working capital needs to be forthcoming and labor mobility needs to be made easier. Finally, infrastructure

investment (particularly power) needs to be related to utilization policy. On the micro side, factor prices need to be reoriented to make utilization more profitable and the tax and credit systems need to be used in a reinforcing fashion. Elements of all these measures can be found in place in one or another country of the Continent although the full panoply exists nowhere at this time.

The most important element in utilization policy is conviction: conviction on the part of the government that full employment can be achieved if full utilization is vigorously pursued, for without this conviction red tape will ensnarl the utilization policy; and full conviction on the part of entrepreneurs that industrial exporting is possible and full utilization of plant and equipment is feasible, for without this conviction entrepreneurial response to the incentives will not be forthcoming.

The creation of such conviction is a slow and gradual process. But it is not impossible. For the conviction also used to exist in Latin America that the countries of the continent were unable to export anything other than traditional goods. Yet after 10 years of export promotion in some of the countries of the hemisphere the results are clear for all to see: Latin America is as able to sell industrial goods as any other part of the world, yet quite firm convictions to the contrary were held before the policies were adopted. Thus the main obstacle to full employment lies in the belief that it is not achievable.

VI.3. World markets requirements and limitations:

The full utilization strategy requires agressive export promotion of industrial goods. Individual countries, particularly if they are small, will have little problem penetrating markets, for they will be only the proverbial drop in the bucket and therefore can view the world as pure competitors. However, when a whole continent undertakes the full utilization policy, a fallacy of aggregation results: Latin America as a whole, or the LDC world as a whole is by no means small on world markets. Should all LDCs agressively pursue full utilization and export promotion, problems will arise to find markets for the output which need to be resolved. Indeed, in selected products where export promotion from LDCs has been particularly vigorous , import restrictions have begun to appear in the major industrialized markets. Such restrictions in good part reflect the real adjustment problems occuring in these economies pursuant to the increase in supply from LDCs. Since in the aggregate, LDC production and exports also generate LDC demand for imports, we have here not an aggregate problem, but a sectoral problem. Hence international adjustment assistance as well as negotiations to agree on appropriate procedures for such assistance would seem to be in order.

A much more fundamental problem results from the implications for energy demand resulting from full utilization policy. Unquestionably, such a move on the part of the LDC's will increase their energy needs and their oil imports. Thereby they will cause a deterioration in the collective balance of payments of the non-oil countries. In turn, this is likely to lead to deflation in the industrialized countries as well as very possibly an increase in the cartel's asking price for oil with the consequent inflation. Deflation in

the industrialized countries will make marketing of the LDC output more difficult; the rise in the price of oil will make selling such output more important, for foreign exchange will be more badly needed. However, the industrialized countries will also be attempting to improve their balances of payments, thus increased protectionism against LDC industrial exports can be expected. It would appear, then, that the energy demand created by a full utilization policy may well be a factor creating an inherent limitation for the policy. Such would not be the case if the LDC's adopted an energy import substitution policy (or indeed an energy export promotion policy) along with their full utilization policy. For then the net increase in their demand for energy would be zero or negative and the endogenous energy constraint would cease to be operative.[1/]

1/ Any exogenous tightening of energy supplies would naturally still affect LDC prospects.

VI.4 Conclusions

Full employment in Latin America is achievable in a decade and a half or so. The constraint for getting there is not capital nor probably the willingness to implement the required policy for full utilization. The constraint is fundamentally an energy one. As long as non-oil countries are unable to pay for their oil imports with the export of goods to the oil producing countries, a high level of output and employment is not sustainable. For the oil surplus countries cannot be expected to accumulate increasing amounts of financial paper in exchange for their oil, particularly not from LDC's. Nor can the oil users be expected to increasingly transfer title to their assets to the oil surplus countries for this risks ultimate denationalization of their economies. Deflation and unemployment on the one hand and substitution against oil in consumption and production on the other are the two options. Given the low elasticities and lags involved in the second, deflation in the world economies, both industrialized and less developed is the most likely prospect. Full employment in Latin America will therefore continue to be possible but continue to be unachieved.

APPENDIX

PARAMETERS ENTERING ESTIMATION OF GNP INCREASES FROM MULTIPLE SHIFTING

1. Marginal Propensities to Spend:

	e_A	e_I	e_S
Brazil	.17	.32	.51
Chile	.128	.4059	.4658
Colombia	.16	.28	.55
Costa Rica	.15	.36	.48
Peru	.14	.40	.46
Venezuela	.18	.32	.50

2. Domestic Taxation, Share of Industry, Average Shift Work.

	t_a 1/	t_i	t_1	$\bar{V}_I/\bar{V}$	$\bar{S}$
Brazil	.02	.115	.1707	.24	2.01
Chile	.02	.22	.181	.28	1.69
Colombia	.02	.176	.0848	.225	1.67
Costa Rica	.02	.09	.156	.19	1.55*
Peru	.02	.291	.1063	.239	1.69
Venezuela	.02	.0525	.045	.171	1.84

(*) Production increases possible without additional shifting imply an equivalence of 1.33 shifts worked on average.

1/ Assumed values

Potential Aggregate Output Rate of Growth

	Curr. Shift	Two Shifts	Three Shifts
Brazil	9.24	9.94	13.47
Chile	3.89	4.24	5.15
Colombia	7.4	9.41	11.77
Costa Rica	6.5	7.80	10.82
Peru	6.1	7.00	9.94
Venezuela	5.3	6.12	7.38

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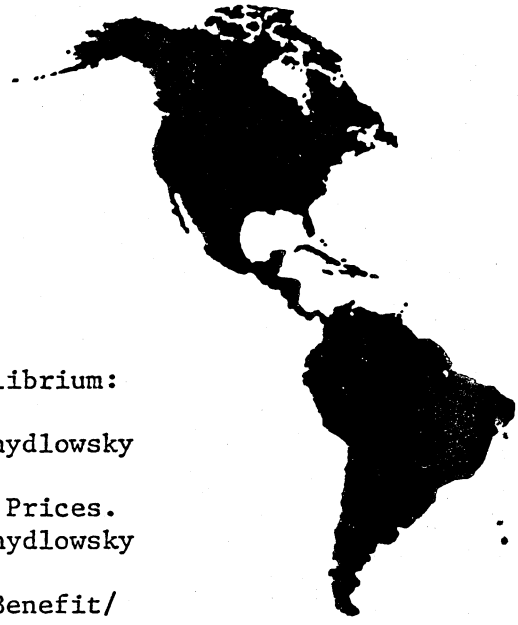

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