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CAPACITY UTILIZATION: UNDERVALUED INSTRUMENT FOR A MORE PRODUCTIVE APPROACH TO DEVELOPMENT

by

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Abstract

Rates of use of industrial facilities are generally well below their capabilities in both advanced and developing countries, with lower intensity of capacity use recorded in less developed countries. While shortages and business cycles contribute to this result, acceptance of low utilization at the planning stage of investment, such as is implied by single-shift stardards for operation, is the more potent factor. Development strategies focused on inducing investment have relied heavily on capital cheapening devices which distort the underlying relationships of scarcity or abundance among the real resources and encourage planned underutilization. Too little attention has been paid to the impact of factor price and cost patterns on continuing production and rates of capacity utilization. Inducements should be set closer to the point of production and reflect real availabilities and continuing costs. Imposing a tie between allowable depreciation expenses for recovery of capital and rates of utilization of capacity is suggested as a moderate but consistent measure pointing in the right direction and reflecting real costs. It is also valuable to the entrepreneur for its impact on cash flows and internally generated financing of further investment.

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I. INTRODUCTION

It is admittedly difficult to define industrial capacity. Yet, economists and other observers have generally acknowledged that underutilization of industrial facilities compared with their technical capabilities of production is widely prevalent in both advanced industrial countries and in less developed countries. It is also evident that many enterprise investments do not operate up to the level of their expected or potential economic efficiencies. Furthermore, in contrast with a perhaps oversimplified assumption about the greater relative scarcity of resources for investment in less fully productive, less developed countries, the use of existing industrial facilities appears in general to be less intensive and the volume of their productive return to the national economy smaller in less developed countries than in more advanced and "richer" countries which might be better able to surmount the effect of such wastes. There are many factors contributing to "planned," socially determined or technically determined idleness of capital. For the economic and growth policy considerations of less developed countries as of the more advanced, the more

pressing questions about utilization rates for industrial facilities arise not from situations determined by natural rhythms, seasonal or climatic in origin, nor from planned "necessary" excess capacity, but from those many opportunities when intensive use of capital is both practicable and desirable, but is not occurring. This proven inability to secure gains which are possible is serious for all countries and most serious for the less developed.

In practice the overwhelming problem is to find appropriate doctrines for dealing with scarcity. Even in situations which are freely characterized by many observers as reflecting surpluses of resources, the persistent issue is likely to be scarcity-dominant even at a broad reach, once the central significance of time lapses and ecological transformation is taken into account. Enhanced productivity, particularly of capital, is therefore of central importance in cost and resource saving, as a means of producing more effective and more abundant satisfaction of the needs and wants of the general population.

Analysts examining this phenomenon are increasing in numbers and can cite among lists of potential causes a significant variety of contributory elements. To this observer, the predominant forces, apart from optimistic

misjudgments, are investment strategies and inducement systems to support them which make it appear economically justified to proceed in the face of existing and prospective use of capital well below its potential productivity. The systems encourage the phenomenon, and they encourage it more strongly in the smaller less competitive market atmosphere that marks industrial development in the less developed countries. While less developed countries usally act on the idea that capital scarcity is their overwhelming limitation, they, as well as developed countries, where policy makers assume the overriding problem is to put new capital in place, rely heavily on direct and indirect devices to avoid some of the implications of dealing with a scarce resource. The most common approach is to cheapen the financial cost of capital to the entrepreneur to induce more rapid investment. This effects an increase in the financial profitability of the activity and it may permanently reduce tax liability on the capital. This can perhaps most easily be seen where industrial investment is sought, but it affects other fields of endeavor as well. Where direct government investment in wholly or partly government financed facilities is involved, many of the same distortions obtain, despite the possibility in principle of applying more sophisticated techniques of analysis to project selection or investment choice.

Taken up as inducements, the patterns of distortion of market signals and the practices that exaggerated their effect on investment choices and on the low return of production and employment to the investment also serve to exaggerate continuing low

intensities of capital use; they are widely applied by developed and less developed countries alike. Their effect on the considerations of the entrepreneur is representative of the relative scarcity or abundance of the resources whose movement they affect. Their impact is essentially capital cheapening, taken as a whole. The prevalence of distorting devices, especially in the area of foreign exchange operations, but also in respect to interest rates, price management and price controls, has been subjected to much negative criticism in recent years. This focussed largely on the distortions introduced without significantly attacking the investment centered strategies they were meant to support.

There are some who have argued that the free competitive market rules nowhere, least of all among the rich and powerful advanced nations, and that therefore defensive interventions by the less sophisticated economies are not only justified but essential. Some also argue that the market does not give the right signals for their goals or does not relate to the goals they favor. When its characteristics have been sufficiently distorted it may give perverse signals about the underlying scarcities or abundance of resources. Above all, outside of agriculture, there has been too little consideration given to strategies and problems of production per se.

In practise these may well be questions of degree, affecting how sensitively and how quickly the system of signals brings home to economic and political decision makers and to the general public that the running stream of production and consumption, buying and selling, saving and investing, has departed from its desired or projected course. Even the most centrally managed system, with administrative principle vigorously applied to decisions about consumption, production to supply it, and the investment goals to make such supply possible, in substitution for the decisions of the market, will ultimately have some revealing feedbacks, such as unplanned increases in inventory, or balky consumer complaints, to suggest the need for changes in policy or practise. The more the market is cushioned or protected against reflecting the actual relationships in the economy, the slower and more wrenching the recognition and adjustment process is likely to be when it takes effect. We know by experience that output can grow faster than "capacity" is growing, even in the United States, which leaves a wide area for more effective applications of unutilized capacity. In short term adaptations, planners in less developed countries sometimes allowed a role for gains from more intensive use of existing capacity, but often without consistently reflecting what such changes might imply for long term

capital growth requirements.

In preparing for this paper I have not sought to find new data to define the volume and location of under-utilized industrial investment, nor new quantitative and qualitative descriptives of the development strategies, the control systems and the systems of inducement that have contributed to the distortion that makes profitable survival possible despite low utilization of created investment, or encourages introduction of capital intensive facilities with low use-intensity prospects. Others have already engaged in such activities and their work will be available in increasing volume in the not-too-distant future. Enough has already been published in the last five years to establish in the formal literature on economic development a perniciously persistent role for the phenomena of under-utilization that most practitioners had observed in the field in the course of their direct, if less systematic and less documented experience.

The problems of industrial growth are severe and reflect the complexities of the systems which help to exacerbate the effects of misjudgment, waste of resources and low productivity. This paper offers no panacea for the whole range of difficulties. However it does suggest that strategies and tactics which lodge inducements to the entrepreneur closer to the point of production could

be helpful. A form of variable depreciation tied to intensity of capital use is suggested as one corrective measure for which a reasonable economic justification can be made. It would, in principle, reduce the degree of distortion inherent in the accounting for costs and in certain fixed capital charges. On their face, the potential range of values within which such adjustments might fluctuate is small. However, considered in relation to the cash flows which remain available to the entrepreneur to deal with operating costs and to support continuing entreprise investment decisions, they may well be significant enough to matter. Furthermore, other benefits on an economy-wide scale may also be expected from a more intensive use of productive capital, among them a reduction in continuing capital requirements for chosen output or consumption targets, permanently lower capital costs per job created, lower relative international debt levels, a higher proportion of self-financing, lower costs, and consequently more effective competitive status for a country's industrial products. A variable cost relationship also would increase the pressure for better management, making even unintentional capital idleness more costly.

In a signal system which has all too often resembled

a multi-headed monster, some might be inclined to under-value the usefulness of one more-or-less correctly oriented signal. It would still be a consistent pointer for a more effective evaluation of resource use and could help generate and encourage other, better, more revealing signals than those which seem to be so popular in current use.

One further note to the reader relates to the style of this presentation. It rests on the plain use of English, unsupported by mathematical generalizations, or intramural formulations that might inhibit any ordinary reader interested in the subject from rapid absorption of the main points made.

II. What is Capacity?

The expansion of productive capacity is the heart of most development strategies, certainly of those most popular during the last two decades. The evaluation of the status of existing capacity, of its quality and degree of use is one key to national policy choices of planning targets for growth, and to the economic reactions of entrepreneurs and investors to the market and profit prospect they envisage.

Much of the debate in development planning over policies affecting production capacity in terms of capital investment, or subsequent utilization and productivity of capital goes on without any significant attempts to set out clearly the generalized or specific definitions at stake in discussion, it being broadly assumed that the debaters have some "feel" for what they are talking about.

Testifying before the SubCommittee on Economic Statistics [Cf. Economic Committee, 97th Congress, 2nd Session, 1962] which in 1962 was considering measures of productive capacity, John D. Norton of the National Planning Association, whose experience and major initial concern related to mobilization of defense production and who was rather more interested in engineering than in economic

considerations, said "...no single all-purpose definition of physical capacity seems possible..." [1]
p. 95]. This is still a reasonable conclusion.

Capacity concepts may be needed for a national economy, for an "industry" (a concept also subject to definitional variations), for a specific enterprise, or for a specific machine or specific single product.

A great deal of attention is paid by technicians to the physical nature of facilities, machines and production processes and to their maximum engineering potential. To consider enterprises as a whole, whenever it is possible and customary to produce a variety of usable/saleable products, some translation process is necessary to convert the baskets of products into some measure that will permit comparing or summing up the potential as well as the actual physical output of T joints with engine blocks, or china service plates with ceramic insulators and laboratory equipment. This usually involves conversion to some surrogate measure that does not accurately describe any one of the joint products.

Even the engineering definition of the product capability of a single machine is not often simple, especially if it is a multi-purpose machine, or performs a technical process which may be applied to the production

1. Hearings Economic Committee, 1962, op. cit.

of a variety of products, as is partiularly characteristic of many machine tools for example.

The American Iron and Steel Institute, for example, had maintained a statistical series beginning in 1900, reporting on operating rates as a percent of capcity in the industry, but it dropped the series in 1960/1961. The grounds given for discontinuing the series was the Institute's conclusion that the measure was no longer realistic, due to the increase in new types of product and the introduction of technology that changed the production potential of existing and older facilities.[1]

1. Hearings Economic Committee,1962, op. cit., Testimony of J. D. Norton.

Even more important, the engineering definitions, even if all the anomalies could be resolved, still leave the economic definitions to be dealt with. These, for which some element reflecting cost of output relationships must be essential, are of the greatest significance both to national policy makers and individual entrepreneurs and investors.

Both technical and economic considerations enter into play for policy purposes--at the broader levels of activity, such as movements of national economies considered as integrated wholes, the comparative pace of regional economies against each other, or international corporate entreprises, and at the smallest reach, as in the problems of single plant operations, the characteristic contributions of a single structure, or a single piece of machinery

Let me consider first the physical concept of productive capacity. Physical capacity can be described by what a facility is, by what it consumes, by the pace at which it operates, or by the scale of product it generates. Such a measure could in principle reflect the maximum physical pace or product output the unit is capable of reaching, all considerations of cost, supply, or market

notwithstanding, "Rated engineering capacity," is a design-engineering estimate which describes the capacity of a unit. For instance, a motor turns at 3600 revolutions per minute, a press delivers 30 impressions per minute, a conveyor moves at X feet per second, a furnace accepts X tons per standard 4 hour charge, etc. Thus, a piece of machinery, or a mill may have an installation of spindles and looms, of lathes and presses, of furnaces, cookers and rolling mills. A textile facility may have among its required supplies 2X tons of cotton per working shift, it may operate 1000 spindles, and yield 1.8X tons of cotton yarn. A structure may be characterized in terms of floor area, cubage, or numbers of determinate, separately identifiable units. To calculate the effective capacity of a production facility or of a machine, one has to know, at a minimum, not only how fast and how continuously it is theoretically capable of turning, but the practical inhibitions, other than those imposed by the flow of production supplies to be processed, against reaching the theoretical limit. Effective capacity therefore may be based on operating results recorded under "average" or "representative" working conditions. It goes without saying that even despite competitive pressures, such average conditions may vary

from enterprise to enterprise; they certainly vary among countries. Some potential producing time must be allocated to essential repair and maintenance operations. Units which must operate in combination may have to sacrifice some of their technical capability to accord with joint requirements. Machines have to be specifically set up to perform for a particular specification of product. The more elaborate and differentiated are the product components and the more variable the volume of each product required by the entreprise marketing program, the more time must be subtracted from potential production schedules to permit the successive changes of machine set-ups to be made. All this is consuming time while a facility is in place but product is not being yielded, even though the plant may be "operating"

Some machinery affords a choice of speed and may be operated faster or slower; some options like this are also open even for continuous process operations, which in principle work a 24 hour day or depend on work cycles of even longer duration.

Paper and pulpmill practises offer a convenient illustration of some of the problems and practises of continuous flow processes. Assuming the supply lines are secure and constant and offer no inhibition to manage-

ment's objective for use of the plant, paper mills and pulp mills, whether in advanced countries or in less developed countries, may use slightly different practices in response to the interaction of technical and economic features. Schultze, in 1962, related U.S. mill practice to the difficulty and cost of interruption and restart-up processes. paper mills, with low interruption costs, tended to operate their flow processes on a 24 hour day, 6-day week schedule, using Sunday, as the downtime day for maintenance and repairs. If weak market conditions did not support full capacity production, paper mills might well adjust by keeping the flow-process operation going for fewer days in the week. Pulp mills, on the other hand, found their start-up more difficult and expensive and therefore preferred to operate a 24 hour day, 7-day week schedule. Thus, as long as the market supported their product, pulp mills could not rely on their weekly rhythm to afford time for maintenance, but had to schedule it specifically. When both pulp and paper production were produced in a combined operation, the more rigorous characteristics of pulp schedule governed the schedule for the whole operation.

Even consideration of capital and capacity in physical terms raises questions about its vintage. Is the capacity of older capital units truly restored by maintenance operations, or are characteristics of older capital reduced - so that it must operate slower, less accurately, and with an increase in the incidence of spoilage, rejections and

1. Hearings Economic Committee, 1962, op. cit., p. 153.

breakdowns?

In looking at capacity from the product end of the production line one also has to consider whether the allowance for product units that fail to come up to specifications - i.e., rejects, wastage, errors,- should also be accounted as "production," or whether economic considerations should dictate its treatment among the non-values of product.

All of these practises are more or less technically defensible explanations of why a machine or an established facility must in actual practise be expected to run at something less than its maximum technical engineering capacity.

The economic definition of capacity may be more complex still and it gets no easier when the object of the exercise in definition is economic or policy analysis, which presumably permits some deliberately simplifying assumptions. At a minimum, it requires a descriptive statement in economic terms, which can be made distinct and separate from the actual products emanating from that capacity at work at any given time. For most thinking, capital goods might come closest to being element most "indicative" of production capacity in the structure of industrial investment. However, it is clear enough that

capital goods may not be operable without the shelter of structures and that a factory as an operable whole may require investment in more than walls, roof and machinery.

The value of capital goods and structures available to an enterprise can be determined and in principle a similar estimate for a whole economy can be determined. The cost of capital acquisitions is reflected in entreprise financial records. These records can provide either gross capital, the sum of acquisition costs, or, since conventional accounting reflects the vintage of capital by recording the provisions for gradual recovery of capital as an expense for depreciation and obsolescence, it can define net capital (acquisition minus depreciation). The net capital concept may bear little resemblance to the current engineering stock of capital available in the integrated enterprise, which, in engineering terms, is capable of being put to use.

The distinguishing characteristic of capital goods and the structures which house them is that they are capable of delivering a stream of services, which are applied together with other inputs, those that have to be reviewed and are consumed or are transformed by the production process. Capacity in economic terms implies some level of use of productive capacity which it is

feasible to reach and which in principle will yield the best cost pattern for the units of production, or more practically, for each production facility concerned. The assumption made for a competitive, industrial system (or society) is that the point in the production scale, where marginal costs and revenues balance, will yield minimum average costs. This, in real terms, is an important goal for economists and presumably its early attainment in terms of intensity of capital use should be of more concern to social or welfare planners and long term planners in general. Since the role and availability of the production factors contributing to the stream of production is not fixed and can be expected to change from time to time and in relation to each other, the capacity definition would also have to reflect such changes. This is true for utilization of facilities already in being even when substitution among factors is relatively circumscribed, and the representative or expected rate of utilization is responsive to market forces whether these reflect long term secular trends, short term random pressures, or repetitive rhythms of change that mark normal patterns of a particular industry.

Lawrence R. Klein summarized the point neatly in 1962, testifying at the Hearings on Measures of Productivity Capacity:

> "Capacity is an economic concept, and outputs that appear to be capacity levels at existing factor costs will cease to be economic capacity levels if costs rise as a result of competitive bidding for resources by other sectors of the economy."[op. cit., p. 56]

Since capacity did not appear to be readily observable directly, researchers and analysts turned to collateral evidence to work out sets of rules that would govern the observations. The Wharton group of econometricians, at the University of Pennsylvania, therefore turned to measures of utilization rates of capital for their definition of capacity, judging capacity in terms of observed peaks of output. The National Industrial Conference Board devised an economic measure in financial terms, reflecting the ratio of depreciated plant and equipment values to gross operating receipts corrected for inventory changes to show the value of product. They applied various refinements to overcome misleading effects of price changes. This permitted selection of a fixed capital output ratios for a bench-mark year chosen on the basis of other evidence as the measure of full utilization and then examining ratio changes.[1] Fortune Magazine also used a measure based on the ratio of total capital stock to total output. The Federal Reserve Board had a capacity index for significant basic commodities, based on a variety of source data, but closer

1. National Industrial Conference Board Publication, Studies in Economics, No. 72, Creamer, Daniel, Capital Expansion and Capacity in Postwar Manufacturing, 1961.

maintained an index of manufacturing capacity compared to a 1950 base period, developed from work begun in 1947 on company management responses to an annual survey, which reflects management judgment about the actual and preferred rates of capacity utilization and changes in capacity available.[1]

In effect both the Wharton and McGraw-Hill indexes were reflecting the economic impact of contributory factors, and the significant attitudes of entrepreneurs to the status and use of their capital facilities. They had rejected the usefulness of engineering capability as the measure of full-operation - technical - capacity for ordinary consideration on the presumption that problems of intolerable increases in costs would intervene long before the technical point could be reached. McGraw Hill's measure, the entrepreneur's preferred rate of capacity utilization, was believed likely to reflect a rate of capacity utilization that would give the best return for the business at whatever level of aggregation was applicable in any given circumstance . McGraw Hill also felt that management's opinion about the preferred

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[US 13 - Testimony by Alan Greenwald (McGraw Hill), Daniel Creaver (NICB), Lawrence R. Klein (Wharton School, University of Pennsylvania) and others.

1. Hearings, Economic Committee 1962, op. cit, Alan Greenwald, pp. 3-5.

rates of use of capacity could be respected as indicating levels of activity either already attained or clearly attainable within the acceptable economic context of costs and prices. Given reasonable consideration of leads and lags, order books, delivery backlogs, market prospects, it was probably a judgment stage significantly close to the investment trigger of major significance for economic forecasting.

The Econometric Research Unit at the Wharton School, University of Pennsylvania, turned to independently observable facts from which to derive their status descriptors for 30 components of the Federal reserve board index. From the series for each of the industries, they were able to select production peaks, each of which was then declared the practical equivalent to 100 percent capacity utilization for its industry. Successive series of peaks could then be plotted to establish trend lines, and intervening actual rates of production compared to the trend-line of peaks became the indicators of capacity utilization.

Obviously interpretation of such measures will go better if it is supported by a great deal of more specific knowledge of conditions current in the economy and affecting specific industries. However, it seems reasonably well demonstrated that useful guides to the pace of industrial use of capital

investment for evaluation, forecasting, projection and planning and policy could be had from these efforts to describe the waxing stream of capital in use, even though none might be able to produce any very precise delineation of capital volume or condition. The Wharton and NICB kind of approach also offers the possibility of practical extension at entreprise levels, when consideration is being given to policies to encourage more efficient timing of investment or more efficient and intensive use of capital facilities. They offer the possibility of reflecting enterprise responsiveness and changing rates of activity without the requirement to predetermine the characteristics and intensity of a multitude of specific capacities at plant levels.

I mean to avoid the many arguments which could be entered to expand requirements of definition or theoretical rectitude of some of the descriptors, how vintage considerations should be treated, and whether gross or net capacity is the more relevant all-round measure. Those concerned with productivity measurement per se can pursue such questions more effectively. ¶ Next I should like to look briefly at experienced rates of utilization of capacity.

III Observed Utilization of Capacity

Any program economist or technical advisor working with the economic development aid programs of the last two decades in India, Pakistan or Turkey, to name only three examples, was likely to be struck very sharply by the under-utilization of existing capital facilities which came regularly to his attention. While the mental standard against which his observations were being judged was not very precise, the broadly accepted conclusion rated the experienced use-rates in the less developed countries below those in the home country of the observer.

If there were technical assistance programs aimed at industrial productivity, as well as industrial investment, the technical observers and specialists concerned with such programs, especially, alongwith project officers often had exceptional insights into production and productivity problems at the plant level. Among the most obvious problems were those posed by bottlenecks in the supply lines. Observers were regularly reporting such problems to programmers. In the effort to make some of these observations more systematic so that they could contribute better to the judgment of requirements for foreign exchange and the justification of aid allocations to finance commodity imports for industrial production, the U.S.A.I.D. mission

in Pakistan made a record of staff observations, from 1963-1965, in 108 industrial plants in West Pakistan, regularly visited in pursuit of regular program of concerns and for which the technical staff had already some expert familiarity. Later on there were repeat visits to varying numbers of establishments. In effect, their questionnaire was a primitive sort of McGraw Hill approach, the staff expert both observing conditions in the plants, and discussing them with plant management and entrepreneurs. No conscious effort was made to draw comparisons with utilization rates of industrial capital in the U.S. or other countries, but an effort was made to reach at least qualitative conclusions over time. On the initial rounds, the observations suggested that the overriding constraint on production was the scarcity of production supplies, specifically imported materials. Management had expressed aims for more intensive use of facilities and displayed little fear of finding markets for such hihger levels of production. Rule of thumb conclusions derived use-rates in the range of 50 to 60 percent of capacity (a finding also circumstantially supported later on, by data within the allocations system and the Census of Manufactures (see later discussions).

Subsequent assesements made in connection with increased

availability of exchange for commodity financing and an import "liberalization" program (1964) reported enhanced rates of plant utilization, in the range of 80 per cent use of capacity. In fact some of these observations were apparently reflecting responses to the decisions fo_ changes in the control system and supply availabilities and before very much of the expected inflow of new supplies could have arrived. Entrepreneurs were apparently prepared to risk faster utilization of reserve stocks of supplies in anticipation of replenishment, to get closer to a preferred rate of plant use.

These exchanges with management did not give rise to any elaboration of criteria for capital use, or generalized definitions of capacity, and as the supply problems were only sporadically moderated, most of the attention continued to focus on dealing more effectively with them.[1]

Clearly however, an entrepreneur's judgment that his plant was operating at 50 per cent of capacity was related

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1. Foregoing from experience of author, who participated in the A.I.D. evaluation and discussed preparation of surveys and findings at length with staff of Mission's Industrial Division and other colleagues. Documentation of the survey existed as late as 1970/71, but author has lost track of it. These reviews also referred to in studies by Thomas, P.S., Exchange Rates and Liberalization, and by Winston, Gordon C., Williams Center for Development Economics RM2X, The Composition of Output and the Rate of Growth in Pakistan, Sept. 1968.

to some undescribed normal set of economic practices, which itself might be far from the most intensive use economically possible. It took a more intensive address to the question of capital utilization rates per se to put all this in more realistic perspective.

In 1952, the U.S. Bureau of Labor Statistics made a survey of maximum production potential for the National Production Authority, using man-hours worked as the measure of capacity. Taking labor as the dominant variable input, they assumed a rough proportionality to capacity of the facilities in the survey. Respondents to the survey indicated that they could project a possible gain in output of almost 1:1 in moving up to their maximum employment; doubling man-hours was expected to increase output by a ratio of 1:9. Surveyers also reported a reluctance among the respondents to take on the responsibilities and problems of a change to multishift operations.[1]

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1. Norton, John de Witt, "Capacity Statistics: Problems and Potential," pp. 90-120.

Hearings before the Subcommittee on Economic Statistics, Joint Economic Committee, 87th Cong. 2nd Session, 1962. (Statement prepared at request of Federal Statistics Users Conference)

Taking the maximum intensity of time in used as a starting point, the 365 days of the year afford a maximum of 8,760 production hours, on 1,095 shifts of 8 hours duration each. A plant running on a five day work week, of one shift per day, and allowing for 11 holidays closed to operations in the year, cannot be "working" more than 250 shifts, or under 23 percent of the possible 1,095 shifts. Furthermore, within the 250 working shifts, even if normal repair and mainteneance is done only on "closed time," some allowance must be made for down time for setting up,model and product order changes, and in some countries,like France,for legally required vacations, so that actual product yielding operation of the capital facility may be below 20 percent of its potential. This is indeed what observers found, when they tried to look more systematically at the phenomenon. Rates of use of capacity representing normal practises in the United States characterized at periods of peak business activity, showed use ranges from 67 to 100 percent on the basis of

peak output bench marks, declining capital output ratios from peak to peak being taken as an indication that, in general, excess capacity was not a serious phenomenon, though it might exist in some specific industries. Both the financial data analysis (NICB techniques) or McGraw-Hill surveys of business management evaluations and investment plans, revealed the existence of excess capacity (i.e., unutilized capacity) at peak periods of output, which NICB studies defined as operation at less than 95% of capacity under normal practises. However, it did not touch on the much greater idleness of capacity outside the normal represenative practises, which might be attracted into production if a different set of signals were operating. NICB tables 5, 6 and 7 below, presented in a study made by David Creamer for the National Industrial Conference Board in 1961 show the derivation and scale of these estimates of capacity use in the United States.[1]

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1. Incorporated as Tables III-1, III-2, and III-3.

TABLE III - 1

NICB Table 5: Derivation of Percentage of Capacity Utilized in the U.S. at the 1957 Peak, by All Manufacturing and by Major Branches

	Fixed Capital 1957 in 1929 Prices ($ Millions)	Lowest Fixed Capital-Output Ratio in Bench mark or any Year	Estimated Capacity Output (1) ÷ (2) ($ Millions)	Actual Peak Output 1957 at Annual Rate ($ Millions)	Percentage of Capacity Utilized at the Peak (4) ÷ (3)
	(1)	(2)	(3)	(4)	(5)
ALL MANUFACTURING	51,061	.....	206,295	183,860	89
Motor vehicles.....	3,221	.187	17,225	11,552	67
Nonferrous products.....	2,200	.475[a]	4 632	3,715	80
Tobacco products.....	146	.038	3,842	2,815	73
Stone, clay, and glass products.	1,892	.337	5,614	4,303	77
Rubber products.....	558	.139	4,014	3,331	83
Electrical machinery	1,542	.135	11,422	9,688	85
Iron and steel products.....	4,976	.479	10,388	8,936	86
Paper and allied products....	2,610	.443	5,892	4,909	83
Scientific instruments.....	584	.198	2,949	2,616	89
Beverages.....	940	.123	7,642	6,803	89
Machinery, excluding electrical.....	3,279	.224	14,630	13,365	91
Lumber and wood products...	1,639	.582	2,816	2,297	82
Fabricated metal products....	1,969	.187	10,529	8,940	85
Petroleum and coal products..	10,074	.444	22,689	20,614	91
Transportation equipment, excluding motor vehicles...	1,610	239	6,736	6,622	98
Chemicals and allied products.	5,524	.364[b]	15,176	14,695	97
Furniture and fixtures.....	324	.111	2,919	2,768	95
Apparel.....	305	.037	8,243	8,151	99
Printing and publishing.....	1,279	.267	4,790	4,655	97
Food products.....	3,191	.114	27,991	26,976	96
Textile mill products.....	1,779	.199	8,940	8,944	100
Leather and leather products..	147	.062	2,371	2,360	100
Other manufactures, including ordnance.....	1,272	.263[b]	4,837	4,805	99

Note: Industries arrayed in order of the percentage increase in fixed capital-output ratio from 1953 to 1957 beginning with the largest

[a] This is based on 1957 fixed capital and 1956 output. For several years prior to 1957, the aluminum branch had been substituting the generation of its own power for purchased power. This change in capital structure is assumed to have been accomplished by 1957. Since 1956 output was higher than 1957 output, the former is used as basis, representing the relation of fixed capital to output at peak levels of output. For some evidence of the structural change in aluminum, see the "Annual Report of the Aluminum Company of America," 1957, pp. 14-15, and the "Annual Report of the Reynolds Metals Company," 1954, pp. 15-16

[b] In these industries, 1953 is taken as the bench mark year, since for the first time government owned, but privately operated facilities are included in the stock of fixed capital

Sources: Column 1 from table G-1, column 2 from table 3, column 4 from table G-3

SOURCE: Creamer, Daniel. Capital Expansion and Capacity in Postwar Manufacturing Studies in Business Economics, No. 72, National Industrial Conference Board, 1961, p. 75.

TABLE III-2

Table 6: Comparison of Industry Branches in the U.S. with and without Excess Capacity at the Peak Quarter in 1957, according to Survey Data and to Changes in Fixed Capital and Output

Based on McGraw-Hill Survey of Business Plans for New Plants & Equipment	No of Percentage Points between Actual and Preferred Rates of Operation	Based on Changes in Fixed Capital and Output	Percentage of Capacity Utilized
INDUSTRIES WITH EXCESS[1]			
Food and beverages	−9		
Chemicals	−9		
Stone, clay, and glass products	−7	Stone, clay, and glass products	77
Electrical machinery	−7	Electrical machinery	85
Paper and pulp	−6	Paper and allied products	83
Textiles	−6		
		Machinery excluding electrical	91
		Petroleum and coal products	91
		Iron and steel products	86
		Fabricated metal products	85
		Rubber and products	83
		Nonferrous metal products	80
		Motor vehicles	67
INDUSTRIES WITHOUT EXCESS			
Nonferrous	−3		
Iron and steel	−2		
Other metal working (fabricated metal products)	−2		
Machinery	−2		
Petroleum refining	−2		
Transportation equipment, excluding autos and trucks	−1	Transportation equipment, excluding motor vehicles	98
Automobiles, trucks and parts	−1		
Rubber	−1		
		Textile mill products	100
		Chemicals and allied products	97
		Food and beverages	95

[1] For the survey data, defined by us as industries with operating rates five or more percentage points below reported preferred operating rate. For determinations based on changes in fixed capital and output see table 5 and p. 24

Source: Based on "Business' Plans for New Plants and Equipment, 1959 1962," McGraw-Hill's Department of Economics, p. 6 and table 5 above

SOURCE: Daniel Creamer, Studies in Business Economics, No. 72, op. cit., p. 29.

Table NICB 6 is interesting also for the indication, offered in the McGraw Hill survey of Business plans, of management's tolerance threshold for excess capacity. The survey defined industries operating at least 5 points below management's preferred operating rates as having excess capacity, but even the "preferred" rates in these cases were not always in the 90 to 100 percent range; this was also the case for industries defined as not having excess capacity. In fact it is not readily determinable either in this opinion approach (or by Wharton's output peak to output peak definition) how much unutilized capacity remains at peak point or preferred rate of use. The McGraw Hill survey however gives a better indication of how closely peaks of output are pressing against management's concept of capacity under the economically effective operating conditions of the moment. On the other hand it is noteworthy that a few examples are also included where the preferred rate apparently exceeded 100 percent of defined capacity.

TABLE III - 3

NICB Table 7: Percentage of Capacity Utilized in the U.S. at Peak Operations in 1953, 1955, 1956, 1957, and 1959, by All Manufacturing and by Major Branches

	1953	1955	1956	1957	1959
ALL MANUFACTURING	100	97	92*	89*	93*
Beverages	100	87*	92*	89*	93
Food and kindred products	100	100	96	96	100
Tobacco products	100	79*	78*	73*	70*
Textile-mill products	97	100	93	100	100
Apparel	100	100	96	99	100
Lumber and wood products	100	100	76*	82*	85*
Furniture and fixtures	100	100	92*	95	100
Paper and allied products	92	100	90*	83*	89*
Printing and publishing	98	100	100	97	100
Chemicals and allied products	100	100	99	97	100
Petroleum and coal products	100	100	94*	91*	91*
Rubber and products	100	95	86*	83*	88*
Leather and products	100	100	100	100	100
Stone, clay, and glass	100	100	83*	77*	90*
Iron and steel products	100	98	99	86*	93*
Nonferrous metals and products	100	100	89*	80*	82*
Fabricated metal products	100	100	93*	85*	92*
Electrical machinery	100	87*	88*	83*	83*
Machinery, excluding electrical	100	94*	95	90*	95
Motor vehicles	100	94*	62*	66*	81*
Other transportation equipment	100	88*	93	96	96
Scientific instruments and apparatus	100	96	94*	89*	100
Miscellaneous, including ordnance	100	100	100	99	100

*Indicative of significant excess capacity

[a]Despite capacity utilization percentage below 95 not deemed to have excess capacity. For explanation see footnote 2, page 32 (i.e. 1955 record peak output).

Sources: "Statistics of Income," Part 2; Quarterly Financial Reports of FTC-SEC; See table 5 for derivations; The Conference Board.

Source: Creamer, Daniel. Studies in Business Economics No. 72, Capital Expansion and Capacity in Postwar Manufacturing, p. 34.

When the NICB survey results were again assessed in 1961,[1] they indicated that the intervening investment in extension of capacity has some relationship, though not close, to experienced use of capacity and felt excess of the preceding peak in 1959. However, the residue of excess capcity continued to exist ,in about the same measure; at the business peak in 1961, it was affecting almost 36 percent of the manufacturing stock of plant and equipment.

The persistence of such an excess, of usable capacity not yielding production,even as defined by management in terms of operational levels,again leads one to its effect on continuing investment in expansion. It does appear that when use rates are exceeding the low 90's of the percentile range, management's justification for investment is strengthening significantly, even though this may not be attaining boom proportions.

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1. Creamer, Daniel, with Smith, Delos, Recent Changes in Manufacturing Capacity, Studies in Business Economics, No. 79, National Industrial Conference Board, 1962, p. 53.

In July 1974 the U.S. Department of Commerce introduced its own statistical series tracing the intensity of capital use on the basis of quarterly surveys of fixed investment in use in manufacturing, which seek manufacturers' estimates and thus avoid the unresolvable conceptual problems.[1] The respondents account for approximately 75 percent of gross depreciable assets held by manufacturers in 1969. The major interest has been in the usefulness of such capacity studies as prospective indicators to investment intentions, productivity, production bottlenecks and costs and prices. The evaluation by manufacturers of the adequacy of their existing capital facilities for the level of business anticipated in annual forecasting periods had been followed since 1963. The new series follows capacity utilization and also reports manufacturers' preferences about utilization rates. As breakdowns are provided by industry as well as by size of capital aggregation, it is possible to see that operators of smaller manufacturing units apparently have lower aims for intensity of capital use and use their capital less intensively than do those using large aggregations of capital. Table III-4 below shows expressed preferences or expectations on intensity of use of capital in manufacturing from 1965 to 1974. The definitions of capacity for these purposes reflect common practice in the

1. Survey of Current Business.

Table III-4

United States: Capacity Utilization Objectives

Manufacturers Preferred Operating Rates, 1965-1974 (Percent)

Annual Averages	All Manufacturers			Manufacturers with Assets under $10 Million
	ALL	Durable Goods	Non-Durable Goods	
1974	94	96	93	92
1973	95	96	94	92
1972	95	95	94	92
1971	95	95	94	91
1970	95	96	94	92
1969	94	95	94	92
1968	94	95	94	92
1967	94	95	94	93
1966	94	95	94	92
1965	94	95	93	92
Average 1965-1973[1]	94	95	94	92

Source: U.S. Department of Commerce, Bureau of Economic Analysis. See Survey of Current Business, July 1974; March 1975.

[1]Derived.

industries and set no absolute or strictly comparable standards from one industry to another.

As can be seen from Table III-4 above, manufacturers' preferences about the intensity of capital use remain relatively stable, though actual use rates and their repercussions on the demand for investment may vary considerably. Table III-5 below traces actual use of capacity from 1965 to 1974, and summarizes the variation between the high and low points of capital use. This averaged 9 percent for all manufacturers, but almost 15 percent for durable goods manufacturers and 11 percent for manufacturers with assets valued at less than $10 million.

As Table III-5 indicates, few respondents appeared willing to evaluate their aggregate capacity as excessive for their near term prospects. On the other hand, when the intensity of capital use approached 90 percent of the preferred rates of use, there was a significant rise in respondents who thought their evaluation revealed a need for additions to plant and equipment. Thus, in December of 1973, non-durable goods manufacturers were operating at 91 percent of their preferred rate and respondents holding 62 percent of the producing assets felt a need for expansion.

The Federal Reserve Board Index, the McGraw Hill opinion survey based index, the Wharton School peak bench-mark index are still regularly available, and continue to be used as indicators of utilization of capacity, as is the McGraw Hill separate capacity index. They support

Table III-5

U.S. Utilization of Capacity in Manufacturing Enterprises

Operating Rates and Ratios of Operating to Manufacturers' Preferred Rates

	All Manufacturers			Manufacturers with Assets under $10 million
	ALL	Durable Goods	Non-Durable Goods	
Operating Rates (Percent)				
December 1974	78	76	80	72
December 1973	85	84	86	79
December 1972	85	85	85	78
Avg. Dec. 1965-Dec. 1973	83	82	85	77
Peak Date & Rate	6/66-87	12/65-88	6/66-87	6/66-81
Trough Date & Rate	9/70-79	9/70-75	12/70-82	12/70-72
Peak to Trough (Absolute)	(-8)	(-13)	(-5)	(-9)
Percent	-9.2	-14.8	-5.7	-11.1
Ratio of Operating Rates to Preferred Rates				
December 1974	.83	.79	.86	.78
December 1973	.89	.88	.91	.89
December 1972	.89	.89	.90	.84
Avg. Dec. 1965-Dec.1973[1]	.88	.86	.90	.84
Manufacturers' Evaluation of Capacity on Hand (Percent of Gross Capital Assets held by Respondents)[2]				
More Plant & Equipment Needed				
December 1974	41	37	44	
December 1973	54	46	62	
December 1972	40	35	43	
Facilities About Adequate				
December 1974	50	52	48	
December 1973	43	50	36	
December 1972	55	56	55	
Facilities Exceed Prospective Needs				
December 1974	9	11	8	
December 1973	3	4	2	
December 1972	5	9	2	

Table III-5 (Cont.)

Source of Data:

U.S. Department of Commerce, Bureau of Economic Analysis. New Series on Capacity utilization based on surveys, introduced Survey of Current Business, July 1974.

See: Hertzberg, Marie P., Jacobs, Alfred I., Trevathau, Jon E. "The Utilization of Manufacturing Capacity, 1965-73," Survey of Current Business, July 1974.

Also: Survey of Current Business, March 1975, pp. 17-18, Table 7.

[1]Derived.

[2]Respondents' characterizations for next 12 months.

Also:

Survey of Current Business
Annual Evaluation of Business
Prospects:
Woodward, John T. Investment Programs and Sales Expectations
for 1974 - March 1974; for 1975 - March 1975.

the notion that users find these measures helpful in demarking some important features of the stream in motion the definition of which remains inexact. Capacity affords much flexibility in application; it responds differently to different stimuli from the market or the administrative system. It is only reasonable that different users may need different definitions, and those they select may also have to vary from time to time.

Recently, the Brookings Papers on Economic Activity, (1973-3) interested in clues to inflation pressures, the possible role of capacity and supply limitations in dampening growth rates, and to business activity forecasting problems, featured a review of the popular capacity measures, prepared by Perry,[1] and an article by Klein,[2] which generated comments from a number of other workers in the field.

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1. Perry, George L. "Capacity in Manufacturing," Brookings Papers on Economic Activity 1973-3, p. 701-742.

2. Klein, Lawrence R., with Long, Virginia, "Capacity Utilization, Concept, Measurement and Recent Estimates," Brookings Papers on Economic Activities, 1973-3, pp. 743-756 , comments and discussion, pp. 757-763.

Perry found a wide range of difference in the mirroring of economic trends among the four most popular measures, so that as guides to the availability of excess capacity, the evaluation afforded would be ambiguous. Furthermore in measuring growth of capacity, they might, as they did for the period 1966-72, even show opposite trends. The measures come closest to consistency in depicting trends in utilization of capacity. While he found that both the Wharton and McGraw Hill indexes offered useful support from capacity utilization methods for predicting price changes, and made reasonably well fitted contributions to investment predictions, the Wharton peak to peak index showed negligible predictive usefulness in the effort to apply it to rates of growth in capacity. He concluded that the less breakdown to contributing components an index affords, the less useful it will be for understanding and anticipating specific changes in the needs and prospects of entreprises and business activity.

The Wharton method, as Perry points out can afford a great deal of industry detail, and is relatively simple to construct, and this has resulted in its adoption for observations outside the United States. Its drawback, as a descriptive measure and guide for less developed countries' policy formulation aimed at inducing more intensive use of

capital, is that it cannot define the degree of capacity remaining unused at observed "experienced"peak operation.

Klein, whose preferred definition of full capacity includes the concepts of minimum cost point, full input point on a production function and bottleneck point in a general equilibrium system, defines it as "an attainable level of output that can be reached under normal input conditions -- without lengthening accepted work weeks, and allowing for usual vacations and normal maintenance."[1] He notes the need to make revisions in trend lines due to problems in identifying the ends of cyclical phases, but changes in utilization rate index imposed by such revisions seem to have been small. He considers the indicator a reasonably good "early warning signal."[2]

Indexes derived by the Wharton peak-to-peak method applied to data on European countries are included here to indicate the running rates of manufacturing industry in those countries in a recent period. All included are members of consortia and groups engaged in organizing assistance on concessional terms for less developed countries and have participated directly and given support for industrial development investment.

1. Klein, Brookings Papers on Economic Activity, 1973-3, op.cit., p. 744.

2. Klein, Ibid., p. 752.

TABLE III-6 AGGREGATE CAPACITY UTILIZATION RATES

Six European Countries

Quarterly - 1970 - 1972

Output as Percent of Capacity

Year Quarter	Belgium	France	Germany	Italy	Netherlands	United Kingdom	Six Country Average
1970							
1	91.3	91.9	97.8	91.1	92.7	95.4	94.6
2	92.2	89.9	97.7	89.3	91.3	94.8	93.7
3	92.7	87.6	95.4	97.9	91.5	94.7	92.3
4	92.0	89.5	93.9	97.4	91.7	94.8	92.2
1971							
1	92.5	91.3	95.8	86.0	93.3	93.2	92.7
2	90.3	89.2	95.3	82.4	92.1	93.4	91.7
3	90.3	91.9	93.6	80.5	91.5	92.8	91.2
4	88.8	91.6	91.9	83.4	91.8	9019	90.4
1972							
1	92.4	93.0	92.9	82.8	92.3	85.7	89.8
2	92.0	93.5	93.4	80.7	92.4	82.1	91.5
3	91.6	96.0	92.0	78.5	91.3	92.9	91.5
4	93.4	94.0	94.7	82.8	93.6	94.8	93.0

Index from Wharton, EFA, Inc, University of Pennsylvania; Klein, Lawrence R. and Long, Virginia, "Capacity Utilization, Concept Management and Recent Estimates," Brookings Papers on Economic Activity, 3:1973, p. 751.

Winston reminded us in 1971[1] to put the image together as a whole, using time as a significant measure of idleness. Volume 3 of The Studies of Income and Wealth, The Theory and Empirical Analysis of Production[2], reporting on developments in the analysis of production and the attendant problems of accounting for growth, raised many definitional and technical questions, leaving also some fraction of recorded growth unattributable to the factors identified. In particular, the contribution to the volume by Eisner[3] recognizes the potential impact on capacity definitions and on changes in output of varying rates of utilization of capacity. Winston, in his 1971 paper just cited, refers to a finding by Foss,[4] built up on the basis of power consumption related to motor capacity and the incidence of single and multiple shift working, that the use of installed capacity in U.S. manufacturing had increased from 15.9 percent in

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1. Winston, Gordon C., The Reasons for Idle Capital, Research Memorandum No. 52, Center for Development Economics, Williams College, Williamstown, Massachusetts, May, 1971 (3).

2. Brown, Murray, ed., National Bureau of Economic Research, New York, 1967.

3. Eisner, Robert, Capital and Labor in Production: Some Direct Estimates, NBER, Studies in _____ and Growth, Vol. 31, The Theory and Empirical Analysis of Production, pp. 431-494.

4. Survey of Current Business, June, 1963.

1929 to 22.9 percent in 1955. Winston adds that concern seemed to arise nowhere over the implicit reverse statement of this fact, i.e., U.S. manufacturing capital even at its most intensive use, and after making reasonable allowance for required down-time, was still idle more than 75 percent of "the time."[1]

The overwhelming burden of idle capital is apparently that due to the relatively constant role of customary practise; it far outweighs the potential impact of cyclical fluctuations, which have their impact only on what constitutes normal working time, the 25 percent or less of the total potential.

Nor is the case in the United States unique. Similar observations, based on management assessments, have been made in France.[2] Saglio and Tabuteau, considering the short term response potential of existing capital stock from 1962-1970, undertook to report on the findings from monthly surveys of management's assessment of the use of production capacity. They were concerned with incremental output considered feasible with the existing establishment and practises and also on the assumption that additional labor might be hired. The 2600 entreprises in their sample could be classified among

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1. Winston, op. cit., page 6, p. 12-14.

2. Saglio, Alain, et Tabuteau, Bernard, Le degre d'utilization des capacites de production dans l'industrie; in Economique et Statistique, No. 21, March 1971.

some 17 sectors of production, including approximately 45 percent of the entreprises employing 500 or more workers. They concluded that, for all manufacturing covered, management believed an increase in production ranging between 7 and 11 percent could be obtained even without hiring additional labor, while granted the presumption of additional labor, they projected increases ranging between 16 and 22 percent. Over the long term, it appeared that the volume of unutilized capacity under customary practices averaged 15 percent for large scale entreprises (over 500 employees); 20-21 percent for medium sized entreprises (100 to 500 workers), and 25 to 26 percent for small scale entreprises. Having checked their findings further against actual production measures and indirect indicators of capacity, the authors concluded that, on the average, manufacturing industry operated at 19 percent below its installed machine capacity, with underutilization rising to about 25 percent in a depressed period (as at the beginning of 1965), but only falling to about 16 percent even at a lively period of economic expansion like 1969.

These observations too need conversion for comparison with total production potential used or unused; on the surface, utilization rates appear to lie below those experienced in U.S. manufacturing.

If French and United States experience represent reasonably well the orders of magnitude of capital use among developed countries, what can we say about less developed countries, where the use rates are reported to be notoriously less? These questions were being raised for over a decade in Pakistan, touched off initially by problems related to assuring import financing for industries dependent on imports for continuing operations, but also by concern over policy choices and the cost of growth, import substitution investment strategies. Data and definitional difficulties confronting such analysis are even greater than in the U.S. and no one should be prepared to take at face value small differences in figures as between one year and another, or for international comparison between one country and another.

In Pakistan estimates of intensity of capital utilization were sought in relation to industrial policy, long range planning considerations, and supply-requirements analysis. For the USAID program, the strongest immediate concern arose from supplying financing which provided a major share of essential support as commodity import financing for industries dependent on imports to sustain production. Beside the intuitive grasp provided by direct observation of staff members in discussion of supply problems in specific entreprises, the foreign exchange control and allocation system and the reporting it required yielded certain indicators.

Beyond that, a data base could be found in the Census of Manufactures and special surveys, even recognizing their limitations. A general census of manufacturing Industries (C.M.I.) was being made annually in West Pakistan by staff in the (then) Directorate of Industry and Commerce, with the data processing then taken on by the Bureau of Statistics. An evaluation of the returns indicated a relatively low proportion, 77.1% in 1962-63, falling to two thirds in 1965/66, of acceptable returns. The C.M.I. produced estimates of production, generally considered to yeild a gross underestimate of the cumulated total value of manufacturing production . For 1963/64 an underestimate of perhaps 20-25 percent was suggested by a survey of non-respondents.[1] A special survey to find a measure of capacity utilization was undertaken by the Central Statistical Offices, which collected data for Calendar year 1965, relating the reported value of production by large scale manufacturing to the estimated value of output, defined essentially in terms of the entrepreneurs' preferred normal operating practises. Significant gaps in the coverage occurred, including disappearance of some "industries" employing 20 or more, using power, reported by the C.M.I. in some earlier years. Calendar 1965 was an interesting touchpoint for policy reasons since the early months of the year were showing the impact of liberalized import policies introduced in 1964. The 1965 capacity survey for

a sample of 65 companies reported a rise in utilization from 62 percent of estimated capacity in the first half of 1964 to 82 percent in the first quarter of 1965 (March). The balance of 1965 as a whole shows the disruptive impact of policy and financial investment impelled by summer 1965 hostilities with India.

For what the figures are worth as indicators of an order of magnitude, the 1965 survey data gave 74 percent utilization of capacity for the year as a whole. The highest recorded rates of capacity use were in Printing and Publishing and Petroleum Products (full use or 100%), food industries and non metallic minerals (over 90 percent) and tobacco, textiles, rubber products which reported use rates between 80 and 90 percent of capacity. No strictly comparable measure could be put together from the C.M.I. for earlier years or even from an effort to backtrack the survey. However, data for 1960/61 suggest significantly lower rates of capacity use at that figure, even in cotton textiles, where the dominant large producers normally work over 900 manshifts per year.[1] The summary by major industry

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1. A useful account of the measures and reproduction of some of the survey and CMI data for 1960/61, 1963/64, and 1965 may be found in two papers by W. P. Hogan: (1) Industrialization Policies in Pakistan, with special reference to the rural sector in West Pakistan, February 1967, pp. 42 (Pakistan Advisory Group, Harvard University Development Advisory Service, for Planning Commission, Government of Pakistan, and Planning and Development Department, Government of West Pakistan; and (2) Capacity Creation and Utilization in Pakistan Manufacturing Industry, September 1967, p. 13, appendix 16.

group appears below in Table III-7.

A paper on Pakistan's industrial investment policy and targets prepared by Durrani[1] used 1968 data for 186 industries, available from Planning Commission work on the state of industry. The data resources included those already mentioned, the continuing Census of Manufacturing Industries, data from financial institutions and business and industrial organizations. No greater claims of reliability are made, but an indicative comparison of the 1965 results with those for 1968 can be made from Table III-7 below.

Following up Winston's reminders about total potential time in use, the reported utilization rates under "normal" industry practises imply that capacity is utilized some 15 to 20 percent of the potentially feasible working time.

It is interesting to compare this with European and U.S. experience. While the relative scale of differences remains large, such average differences show Pakistani entreprises by Winstons' accounting operating at 15-20 percent

1. Durrani, M. Tariq. Private Industrial Investment in Pakistan, Division of Economic Analysis, U.S.A.I.D. Mission in Pakistan, January 1972.

TABLE III-7

West Pakistan

Capacity Utilized in Manufacturing

Percent

Industry Group PSIC Code	Name	1965 Survey of Capacity	1968 Planning Commission
20	Food Industries	92.5	61.8
21	Beverage	57.7	29.0
22	Tobacco	83.9	87.5
23	Textiles	82.5	84.7
24	Wearing Apparel	74.8	59.3
25	Wood and Cork	67.2	57.3
26	Furniture	57.8	86.9
27	Paper and Board	18.7	73.6
28	Printing and Publishing	100.0	80.0
29	Leather and Leather Products	56.7	71.8
30	Rubber Products	88.0	64.5
31	Chemicals	37.5	61.3
32	Petroleum Products	100.0	71.2
33	NonMetallic Chemicals	92.6	62.9
34	Basic Metals	42.5	61.7
35	Metal Products	59.7	63.5
36	Machinery except electrical	56.1	51.2
37	Electrical Machinery	40.7	65.7
38	Transport Equipment	61.2	60.9
39	Miscellaneous	86.2	64.3
	All Industries	73.8	70.1

1965 Data from Government of Pakistan,/ Central Statistical Office, 1966 Survey of Capacity and Utilization in1965. See also discussion by W.P. Hogan, References above.

1968 Data- As summarized by Durrani, from Planning Commission Resources, Reference above (D8).

East Pakistan: The parallel 1968 series for East Pakistan gives an "All Industries" use of 65.1 percent of Capacity.

Cotton Textiles: Durrani, for USAID analytical purposes relating to foreign exchange prospects made an analysis in 1970/71 of the cotton textiles industry which is consistent with the results of the 1965 and 1968 data summarized in the Table above: 1965 - 90.1% 1968 - 91%. At that time, it also appeared East Pakistan cotton textile entreprises had heavier capital commitments and lower utilization rates than mills in West Pakistan.

of potential time compared with U.S. plants at 23-25 percent, or rates lower by one-fourth to one-third than those in U.S. experience. In absolute terms, however, the realized differences are obviously much less, and possibly therefore more readily amenable to changes in signals received by the entrepreneurs. The differences also seem to be less for continuous process industries, or possibly the method favors the reporting by industries operating three manshifts per working day.

Against the observations in Pakistan, can be set those of higher utilization rates made by Lim for West Malaysia,[1] which also attempt to distinguish utilisation performance among different ownership groups. He also argues that the capital use measures employed, especially if the measures were tied to rates of electricity consumption, tend to underestimate actual rates of use. Certainly, in countries where foreign exchange financing for imported supplies is controlled and allocated, and raw materials and maintenance supplies are subject to regulation, an entitlement process, or differential regulated pricing to different classes of users, entrepreneurs are under considerable

1. Lim, David, "Capital Utilisation in West Malaysian Manufacturing: A Comparison of Malaysian and foreign Establishments," June 1974. (Paper is part of author's contribtuion to World Bank four country project on Capital Utilization and industrial development.

pressure to show that they do have unutilized or under-utilized capacity.

In any case, Lim's analysis of 350 establishments, representing about 10 percent of the manufacturing establishments in West Malaysia in 1972, suggested that, as against the standard of a day of 24 hours and a year of 8,760 hours, capital plant was used 74.9 percent of the time, including lay-offs due to maintenance and repairs with idle time. By a measure which attempts to modify the simple time in use observation by a measure of intensity (to reflect, for example, slowing down speeds of prime movers etc.) he arrives at an average utilization rate of 70.7 percent. By McGraw Hill type of entrepreneur's rating of capital use, the measure of capacity use derived was 88 percent. As one could readily see also in Pakistan, the range among industries was very wide.

Of interest, in terms of managerial standards and the responsiveness to various elements of local and long range signals affecting the decisions of manufacturing managements, is Lim's observation that foreign-managed plants used their capital 78.4 percent of the total time compared with 65.1 percent use experienced by Malayan-managed plants.

Differences in individual cases could be quite extreme. Foreign managements also tended to be less satisfied with

the rates of use experienced. Thus, in many of the categories where comparison was possible, foreign owned plants reported themselves as having attained lower levels of use of capacity, compared to their own standard of accepted practise, than did Malaysian owned plant. even though, by the time-measure standard, the foreign owned plants showed higher rates of capacity use than Malaysian plants.

The significant point about these comparisons, however, is not how well some less developed countries are doing relative to others, but more the general acceptance of wide-spread idlesness of usable capital under normal operating conditions.

It is interesting to consider whether U.S. entrepreneurs have a different experience in use of capacity, in foreign countr. with its consequent repercussion on costs, when they are operating investments which are comparable to those they have in the United States. Gates and Linden made a study of American experience abroad which explored this and other characteristics of operating patterns.[1] Companies reported lower rates of factory output-per-man-hour in their foreign installations, some of which could have represented the "shakedown cruise" of such operations. Solicited

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1. (GIC) Gates, Theodore R. and Linden, Fabian. Costs and Competitions: American Experience Abroad, Studies in Business Economics Number 73, National Industrial Conference Board, New York, 1961.

management evaluations (i.e. qualitative opinion) and the estimates of comparative performance show geographic differences. It has to be recognized that cycles of economic expansion are not uniform from one region or one country to another, or even from one company to another in the United States The longer a company had pursued its operations abroad, the greater was the chance that it had achieved lower costs than at home--after 15 years operating experience, an even chance. Plant operations in the U.S. in the 1960 sample (a period of milder retardation in the U.S. and continued industrial growth among EEC countries) were shown to be at 74 percent of capacity, as the entrepreneurs defined it, compared to their operations at 72 percent in Latin America; but 71 percent for their U.S. operations compared to 82 percent abroad for those with operations outside of Canada, the United Kingdom, the Common Market or Latin America (i.e. "all other"). Latin American and "all other" operations were reported at significantly higher unit costs (33 percent in Latin America, 24 percent for "all other") than the company experienced in its domestic operations.[11] Asked to comment on possible changes in cost status if their plants in the United States and abroad were all to operate at "full capacity" as they normally defined it, managements estimated significant cost improvements would be possible in plants abroad, not only for those which had

experienced 44 percent higher foreign unit costs, with average operations at 69 percent of capacity, but also for those with similar U.S. and foreign cost experience and with 1960 foreign operating experience of 81 percent of capacity, compared with 84 percent in the U.S. Operating at full capacity, managers thought, would put unit costs at these latter plants below full capacity U.S. costs. While the Latin American and "All Other" categories include less developed countries, these cannot be separately identified among the totals.

There are obviously a variety of causes for variations in productivity. The Gates and Linden survey [1] soliciting management opinions, found that respondents gave the first two places to foreign disadvantages in mechanization and technology, and to characteristics of the work force and employment practises They generally cited as third category of importance characteristically lower volume and shorter production runs and associated underutilization of capacity as they defined it. It seems reasonably clear that entrepreneurial management at the home base was explicitly aware of the handicaps their foreign operations would face in driving for higher productivity One is struck by the absence of any volunteered references to investment inducement policies that might have contributed to the existing pattern and/encouraged investment in underutilized capital.

[ ] Gates and Linden, op. cit.

Although the study did not attempt to break new ground on causes, it did afford some useful insight into the breakdown of the major components of unit cost. Plant overheads tended to range at about one-fifth of unit costs (excluding general and administrative costs). The average across-the-board for all respondents was 20 percent for their operations in the United States and 18 percent for foreign operations; the average included such variations as:

Table III-8
Plant Overhead as Proportion of Company's Unit Cost:

Location of Foreign Operations:	U.S. operation	Foreign operation
Canada	19	17
United Kingdom	20	19
Common Market	24	21
Latin America	19	17
Australia	15	11
All Other	17	18
Total	20	18

Respondents pointed out that use of similar methods to expense depreciation might give them more generous write-offs abroad, where faster depreciation patterns were often accepted, and the definition of an eligible depreciable item might also be more generous. Foreign tax laws also might be more liberal (part of the inducement for investment.) However, respondents thought that at the level of cost per unit of product, total costs were "not appreciably influenced". What was gained on the swings (predominantly lower wage rates per hour), was lost on the roundabouts, and this with some prospective costs for

the future of the enterprise abroad, (such as new development costs), initially met at home and not currently charged to foreign operations.

IV. Why is Capital Idle?

There are two major forms of capital idlensss: planned or intentional idleness, and accidental, unfortunate, undesired or unintentional idleness. Unfortunately more professional attention has been devoted in this century to the causes and cure of the second type of underutilization of capital, which represents the tip of the iceberg, marked by considerable short term variability of quite limited range compared to total potential, than to the first. Planned nonuse is endemic, represents idleness of two thirds to three quarters of potential capital use time, and afflicts the capital requirements, the call on resources and the cost patterns of rich and poor countries alike.

The simplest strategies of economic development or sustained growth are built on the assumption that an expansion of productive capacity is the root of growth and that the way to get this capacity is by investment to secure a continuing expansion of the volume of capital in place. The attack is concentrated on establishing new facilities or adding more units to old ones. In this analysis production and productivity problems, which are central to the successful operation of industrial

entreprises, i.e., questions of assuring flows of production, maintaining market-effective competitive costs, and satisfaction of consumer wants at lowest average cost, got little direct planning recognition. The major exceptions tended to arise in relation to foreign exchange shortages for financing imported production supplies, or problems of financing working capital or exports. There was also some attention paid to technical management practises that were directly related to productivity.

¶ Development tactics have focussed on means of getting support, first for the planned global levels of investment, and thereafter, for a specific series of identifiable projects. MOst of the discussion of strategy focussed on the appropriate level of gross investment to aim for, on the kind or sequence of increasing sophistication of investment to favor, and on the means to secure the investment. By a kind of natural (if undesirable) association, the investment strategy was excessively oriented toward import substitution, perhaps in the belief that it was a simplifying, self-justifying, market-demonstrated solution. Significantly it was broadly assumed that, once in place, the investments would be used productively and make the maximum contribution of which they were technically capable. Evidence of the pervasiveness of underutilization of

installed capacity was not overlooked, but the capacity utilization levels were not explicitly defined in terms of standard accepted practises. In retrospect such address to the subject as did occur can be seen as really aimed at what was described above as the "tip of the iceberg," the capital idleness of misfortune, or unintentional idleness. Indeed, many planning documents proposed a higher initial target rate of growth in GNP than consistent with the previous record of investment realization and return, or capital-output ratio experience. Such optimism was often appraised with considerable skepticism by outside observers.[11] The complex control systems which mushroomed out in pursuit of the many goals sought, especially those intended to support the investment goals, were generally recognized to be a distorting factor, but were rarely if ever openly accorded the credit for the central distorting role in the pursuit of the production process which they merited. Material shortages were the first point of complaint, and at times when supply was easier, managerial and financial problems were attributed stronger roles in forestalling more intensive use of capacity. Skeptics could be distinguished from believers, in that skeptics gave little support to efforts by an LDC to attract or generate more foreign exchange financing to enlarge the

flow of production supplies for manufacturing industry, arguing that higher production levels would not find either domestic or foreign markets.

Winston's calculations[1] suggested that, in the absence of dependence on imports, manufacturing capacity in West Pakistan might have been able to reach utilization levels 11 percent higher than he observed. This would have meant very substantial gains, increases on the order of one-third above realized levels for manufacturing industry as a whole, and not to be denigrated. The feasible impact of this particular element of bottleneck solving could not have done enough by itself to put utilization rates anywhere near their potential maxima.

Some of the phenomena of investment focussed strategies are readily understandable as seen from the public planning side -- the absorption of technically able administrators and advisers in the mechanics of long range planning, the simplification of growth principles for exposition, and the attractiveness of an approach easy to understand, or to pursue with concrete examples of actions suitable for external financing. Administrators, managers of public policy, faced situations marked by a

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1. Winston, W.B., "Capital Utilization in Economic Development," The Economic Journal, March 1971, pp. 36-60.

multiplicity of mutually inconsistent goals and multiples of variable elements, most beyond the span of administrative control likely to be available. They tended to focus on areas which look more amenable to their intervention and the policy supports they might be able to apply. New investment in capital facilities is such an area.

Observers of the production process have argued that investors, making choices of scale and timing of investment in new capital facilities must weigh and balance two sets of costs: These are the disadvantages of interludes of underutilization and excess capacity, when a new capital facility is first put into operation, against the disadvantages of interludes when an entreprise, operating at its practical peak, finds its market participation endangered, while it waits for completion of new capacity to expand production and sales. Manne has argued, in effect, that errors in demand estimates (i.e., prediction of the "regeneration point," when demand equals capacity), were likely to be more drastic than those affecting cost estimates. He studied size and timing choices of investments in India, where underutilization of capacity is a byword. India has a public sector interest in massive scale basic industry manufacturing, along with policy supported social doctrine favoring industrial democratization in the shape of small

scale industrial operations widely spread about the country. Manne concluded there was "a tehdency for India to construct plants of less than optimal size."[1] As the forecast "points of regeneration" might not be realized very exactly, this particular set of planning-practise generated excess capacity partook of both planned and unplanned elements.

Deliberate building of industrial facilities without too much regard for the circumstantial interdependence of the projections of plant utilization is not rare. For instance, pursuit of investment in additional production capacity while existing facilities of the same kind are known to be grossly underutilized, even according to the "norms" of accepted local practice, is a common example. It could be found in countries as diverse on the scale and sophistication of development as India and Afghanistan. In a "blame it on the donor syndrome", excess underutilized capacity has been defended in some quarters as prudent provision against future demand for industrial products, that would be validated later. The catch, as it were, might otherwise come at a time when concessional aid would afford less support to the less developed country. It seems

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1. Manne, (M)Manne, Alan S, editor, Investments for Capacity Expansions: Size, Location and Time Phasing, M.I.T. Press, 1967 (George Allen and Unwin Ltd., London), p. 25

hardly a very "development"oriented defense.

India and Pakistan both had administered an elaborate system of "sanctioning" investment under the development plans. There was little follow-up on subsequent private sector development of granted sanctions, allocations or even of licenses under the systems. Two sorts of unplanned capital idleness could be generated in the interstices of the system: unrecognized capacity and unsupported dependent capacity.

It was generally conceded in India that sanctioned investment might in practice result in higher levels of capacity (utilization rates undefined) than intended by the sanctions and ensuing licenses; it might also, under joint conditions of production, give rise to product capacity in areas not directly intended by the sanction. Under the Indian control systems for allocation of foreign exchange and raw materials, often at less than their scarcity values, these capacities could be considered non-existent. Their specific recognition under the allocations system could in effect have been regarded as validating the previous transgression of a private entrepreneur. For the entrepreneur, pressures existed in both directions: Foreign exchange and material allocations tied to a historical base defined in terms of installed capacity encouraged expansion and overstatement. More intensive use of capacity above its "installed rating," as for example a second shift

which might occur without reflection in the reporting system, could also be a device for tax evasion, as was the formation of small shops outside the system. Small scale industry in Pakistan, if the experience in the diesel engine shops of Daska can be taken for any guide, included many shops which got their start entirely outside the system -- without licenses, foreign exchange allotments, or institutional credit.[1] (It should also be noted that after 1960 not all industrial investment in "factories" required licensing, with the liberalization changing from time to time, but registration requirements persisted.

During the early sixties, the government of India also made an effort to change the definition of rated capacity, despite the technical problems this entailed, opting in 1961 for a two-shift basis to be applied, in principle, for its targetting. In 1962 the licensing Committee reexamined the subject and decided in favor of future use of a measure based on "the maximum practicable utilisation of plant and machinery on an annual basis." In 1965 the Committee looked for a means of assessing, for planning purposes, the total installed capacity in an industry, that would avoid

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1. S22 Smith, Edward Hamilton, The Diesel Engine Industry of Pakistan's Punjab: Implications for Development (w. assistance of M. Tariq Durrani), U.S.A.I.D. Mission to Pakistan, October 1970, unpublished.

reassessment of the previously installed capacity. All sorts of possibilities of "stretching" existing capital might suggest themselves, while the definition of actual capacity, or the rate of its use, remained moot.[1] **

The draft version of India's delayed Fourth Five Year Plan (1969-1974) summarized for the general public a hope for more intensive use of existing capacity as the source of near term growth: "Substantial capacity has been created in many new lines and a fairly sound base for the future has been laid. In a wide range of industries, therefore it will be possible merely by the fuller use of existing capacity -- as distinguished from new investment -- to achieve substantially higher levels of production in the near future."[2] The text presumes some liberalisation but persistence of licensing systems and import controls. There is no clear explanation of what pressures in the system were presumed on to effect the desired intensification of use.

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1. Report of the Industrial Licensing Policy Inquiry Committee, (Team Report), Government of India, Department of Industrial Development, Ministry of Industrial Development Internal Trade and Company Affairs, July 1969 (with Appendic

**. Hazari, R.K., Industrial Planning and Licensing Policy: Final Report of Consultant to the Planning Commission, Government of India, 1967.

2. Government of India, Fourth Five Year Plann, 1969-74, Summary of Draft, July 1969.

In the approach to the fifth Plan 1974-79[1] there is more focus on social aims, greater elaboration of the model structure under the target exercise, and a call for "substantial expansion of engineering industries." In this early approach, at least, capacity utilization issues get no significant attention. In fact the reverse is true because the possiblity of adopting higher targets on some sectors is hinged on the availability of additional financing and suitable additional projects.

In January 1972 the Government of India, aiming at more intensive utilization of industrial capacity, introduced a liberalization of industrial licensing policy to allow existing license holders in 54 industries, whose capacity status had originally been defined in terms of one or two shifts, to increase their ratings, no questions asked, to the equivalent of three full shifts, or maximum utilization; for others licensed capacity, previously enlarged to 125 percent of the original limit, could now rise to 200 percent. These privileges were not automatically available to the larger industrial houses, nor to establishments subject to majority foreign interest in the ownership; goods reserved for small sector operations were excluded altogether.

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1. Government of India, Planning Commission, January, 1973,

Some import liberalizations were the intended accompaniment, along with other policy reviews aimed at easing some of the other problems facing management.

A look at the estimates of capacity utilization for the three preceeding years (1969-1971) reveals widespread underutilization of capacity under the existing "norms." The big five steel producers were at 65 percent of input capacity and 60 percent of finished steel capacity in 1971; the three-shift cottontextile industry was running averages of 68 percent of spindles installed and only 59 percent of looms; many categories of industrial machinery and tool production, chemical industry production etc., running at distressingly low rates. There were few instances where production was pushing against the ceiling.

The evidence did not suggest that the licensed rate of installed capacity was the significant constraint on more intensive use of installed capacity.[1]

Both Hazari and the Industrial Licensing Policy Inquiry Commitee noted a lack of follow-up in the Indian system, which made it a singularly ineffective feeder of the needed information flow on stage of accomplishment, foreign exchange status, or flexibility where interdependent development

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1. (S35) Satyanarayana, Y. Impact of GOI's Liberalised Licencing Policy on Industrial Output; U.S. A.I.D., New Delhi, India, July 1972.

sectors were involved. This is a general planning fault however and not one that inheres solely in the licensing system.

Planners set targets to support the aims of public policy, which, at their least, are meant to indicate to private entrepreneurs the scale of investment effort and subsequent production and markets. It is often clear, all too soon, that these targets should be discounted.

Some observers would be prone to write such targets down from the beginning, and indeed there are many that deserve no more respectful treatment. Such discounting choices might be anyone's realm at the start of a plan. However, by the mid-year of a five-year plan there is sufficient evidence to support serious official amendment. Public recognition or not, certainly, planners, who by then are organizing for the next plan to come, should be striving for the utmost realism in their evaluations of the projected actual end-terms of their present plan, since these will establish quantitative base points for the next. Unfortunately, first approximations for plans in sequence, even prepared when significant discounting of targets is already required by evaluation of current ongoing plans, may find planners still reluctant to surrender the untenable assumptions implicit in current targets. Even the technical planners are not themselves misled about near-term prospects, disadvantages, repercussions in relations with the investing community and the disenchantment of the general public at a time when their support is most needed may ensue.

Even where official discounting of targets takes place, there are variables among sectors and the opinions of entrepreneurs are rarely uniform. Targets may be reduced by cutting the installed capacity of a project, or by delaying its construction. In addition, in the investment process and in the construction of capital facilities, many difficulties remain to be resolved even where there is initial agreement about objectives and an appropriate license has been issued to an entrepreneur who acutally means to use it. Fianlly, some investment is completed according to projected timetables, only to find that failures to fulfill plan targets in other areas, not necessarily under industrialization targets, has left them without the parallel development of the markets they expected to have. These unsatisfactory states can be further exacerbated if unsuitable price policies also prevail, for they may increase the lag between completion of an investment and the catch-up to that point of its production curve that was foreseen under "accepted" practice.

However costly these sorts of losses of potential production are, they are at least occurring under a set of values that presume use, once over the initial obstacles that impede realization of the "planned" use of capacity.

Far more troublesome is the much greater absorption of resources in non-production entailed by the intentional

underutilization of capacity, a planned and rational response to sets of economic signals that suggest this as the best economically defensible course of investment.

Literature is supposed to abstract from life, but sometimes the literary representation abstracts and simplifies so much that the life it limns may be missing some of the principal features of its workaday character. Thus, it is not surprising that the calculations of businessmen and working business accountants may reflect direct knowledge of operational conditions and an intuitive grasp of practical relationships in which they are so deeply and so intricately involved that decision-making may bring them to the surface only occasionally. They do not have to be reconsidered, let alone discussed frequently.

That kind of underlying consideration might have difficulties in finding its way into the literature of economic theory under the best conditions. Theoretical formulations that gave the problem only glancing notice, or that left no room for it, were very popular in development planning and development strategy. Certainly, fixed capital output ratios, or those that were projected to vary to correspond with planned time periods, as for successive 5 year plans, glided over the utilization problem. Economists looking for explanations of productivity growth were more likely to take utilization issues into account. Contributors

to production analysis, particularly Eisner, identified difficulties in accounting for less-than-capacity used capital in developing production functions of the Cobb-Douglas (increases in production/output matching equal increases in labor and capital input) and CES (constant-elasticity-of-substitution) type. Differences between firms and gross fixed assets and employment seemed the most significant, but a role was left for varying use of capital stock. However, the utilization rates used were from McGraw Hill survey data, and therefore already incorporated in the measure and disregarded the accepted and acceptable levels of disuse of capital.[1]

The popular Studies in Development Planning[2] is devoted to illustrating a variety of methods suggested for use by development planners. Though in principle

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1. (N1) Brown, Murray, editor, The Theory and Empirical Analysis of Production, National Bureau of Economic Research. Studies in Income and Wealth, Volume 31, 1967. See especially Eisner, Robert, "Capital and Labor in Production: Some Direct Estimates," and comments evoked; and Griliches, Zvi, "Production Functions in Manufacturing: Some Preliminary Results," and comments evoked, which identifies some of the problems of defining the capital stock, its annual flow of services, and life span.

2. (C12) Chenery, Hollis B., editor, Studies in Development Planning, Harvard University Press.

there must be interest in capital saving, rates of capital use get no significant attention.

To summarize briefly, many analyses of production assumed constant rates of capital use (tied to competitive equilibrium models), or focused on the cost to own capital for a fixed term, rather than on the variable flow of services per unit of product that capital might deliver.

It is no surprise, then, that even with the growing attention drawn to utilization of capacity problems by experience in less developed countries receiving concessional aid, the issue should not have created more stir. Foss in 1963,[1] drew attention to the prevalence and persistence of unutilized capacity in the United States, even reflecting a trend of intensified use, and even at peak periods of economic activity. Foss did not think he could demonstrate the causes of the long-term trend for intensification, but among those he suggested were: postwar demand pressure to supply an immediately enlarged market, coming after wartime experience with multiple shift work; change in relative labor costs from establishment of wage premia for overtime worked beyond a normal shift; effort to smooth seasonal production peaks; better handling techniques and management of equipment; changes in product-mix and use of producing techniques favoring automation.

Under a project sponsored in 1954 by the United

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1. (F18) Foss, Murray F., "The Utilization of Capital Equipment: Postwar Compared with Prewar," Survey of Current Business, June 1963.

Kingdom Ministry of Labour, with financing accorded from sources derived from the Counterpart funds from United States Economic Aid under the European Recovery Program, Robin Marris, for the Cambridge University Research Group, undertook to study the economics of multiple shift working in British industry. The study appeared in book form in 1964;[1] its major contribution to the growing theoretical structure was the observation that the normal annual rate of use of machinery and equipment was a planning decision made about the design of the plant, a choice made in response to prospective cost and profit patterns.[2] An understanding of the factors which determined that choice would therefore be more important to understanding the characteristic utilization patterns in industry and to selecting means to influence them, than any actual operating rates subsequently experienced. Experienced rates of use would be short-term market responses. The study group assumed the usual business object would be to design a plant that would earn the maximum rate of profit on its fixed capital. They considered the position of the firm in the industry, the nature of labor costs and the incrustations of law and custom that affect them, and the state of technology in the industry. The study

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1. (M33) Marris, Robin, The Economics of Capital Utilization: A Report on Multiple Shift Work, Cambridge University Press, Cambridge, England, 1964.

2. (M33) Ibid., p. 117.

concluded that investment decisions favoring high utilization rates were more likely "if any or all of the following conditions were present, provided they did not offset one another:"

1. Large elasticity of utilization;
2. Low ratio of basic daily wage rate to expected product price;
3. Large market;
4. High labor productivity (which is contagious to encouragement of high utilization even for portions of the plant that do not achieve it); and high value of fixed capital per man, at least for the specific activity involved;
5. Relatively smooth annual production curve;
6. Significant economies in prime costs from multishift operation (example continuous process industries).

The Marris study puts perhaps the greatest reliance on the variable impact on incentives to utilize planned capital of wage rates and labor cost and their effect on the margin of profit per unit of output. Marris does note, however, a portion of depreciation costs other than allowances for obsolescence, which may well, in real terms, be a variable factor in machine costs, if in fact a unit it wears out faster when more intensively utilized, thus offsetting to some degree the lower cost of capital per unit of product.

I should add that practical accounting methods hedged in by legal restrictions of tax authorities and regulatory

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1. (M33) Marris, op. cit., pp. 118-119.

bodies do not directly reflect these conceptual refinements in accounting for the flow of business costs. Indirectly, effects of more intensive use might show themselves in the life history of equipment as varying requirements for repair, maintenance and replacements.

Winston, in a recent paper, has summarized very concisely and conveniently the development of capital use theory over the last decade[1] and there is no need to repeat it here. His own work has focused on the characteristics of shift working and in a series of papers since 1971 on the effect of rhythmic changes in prices of inputs, such as day/night rhythms for labor, or electric power; seasonal peaks of supply reflecting natural rhythms, such as agricultural crop sequences, length of days, range in temperature or precipitation. "Given technology, optimal utilization--hence the relationship between capital stock and output or employment--is then determined by relative factor prices, the amplitude of the input price rhythm and the elasticity of substitution."[2]

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1. (1/ (W20) Winston, Gordon C., "The Theory of Capital Utilization and Idleness," Williams College, Williamstown, Mass March 1974 (to appear in Journal of Economic Literature).
(2/ (W16) Winston, Gordon C., "The Reasons for Idle Capital," Research Memorandum No. 52, Center for Development Economics, Williams College, Williamstown, Mass.; May 1971 (b.

2. (W15) Winston, Gordon C. and McCoy, Thomas O., "Investment and the Optimal Idleness of Capital," Research Memorandum No. 53, Center for Development Economics, Williams College, Williamstown, Mass.; June 1972.

One more point relative to the elasticity of substitution in production needs to be made before resting on the conclusion that fixed coefficients, defined on capital stocks, really that is on investment levels, do not afford a reliable guide to prospective costs of growth or potential for production. Winston,[1] summarising observations on choice of techniques and alternatives of factor use in production, reminds us that capital and labor uses do respond to relative factor prices and that substitutions may be effected both before investment (choice of products[2] and choice of plant structure, refinement of process and organization), and after investment (manning tables, operating time schedules--which may differ from the pre-investment planned optimum or "normal"). For factor prices to be a matter of indifference to factor substitutions affecting capital use in the price-indicated directions, a number of rigidities would have to be rendering factor use unresponsive to changes in product mix, choice of technique, operating standards, and capital utilization, including a presumption that engineering capability was an effective operational constraint on capital use. Observation of manufacturing operations suggests the

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1. (W6) Winston, Gordon C., "On the Inevitability of Factor Substitution," Research Memorandum No. 46, Center for Development Economics, Williams College, Williamstown, Mass.; April 1972.

2. Some observers consider choice among designs of product factor substitution; others regard it as technical change. It seems likely to reflect some of each set of considerations.

opposite, however; we know plants are rarely, if ever, operating at maximum engineering-set potential, and much variation in respect to the other relationships may be seen among different installations and in the same installation at different times.

If measures can be devised that will be effective in encouraging a more intensive use of capital, they are of interest not merely in relation to new investment choices, or the marginal increment to the capital stock during the target period of some critical program, but also in respect to the rate of use of all existing installations. I conclude more strongly than did Winston that "fixed production coefficients defined on capital stocks (or investment) that permeate the growth and development literature may be misleading."[1] Likewise, therefore, the elaboration of "requirements" for capital investment, not only for industrial targets, but for aggregate development targets and for concessional flows of assistance, cannot be regarded as reliable indicators, once policy issues are taken into account.

It was noted earlier that observed rates of capital use are generally lower in less developed countries than in the United States and other developed capitalist countries, Winston and Kim[2] endeavored to put this

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1. (W15) Winston and McCoy, op. cit.

2. (K21) Kim, Young Chin and Winston, Gordon C., "The Optimal Utilization of Capital Stock and the Level of Economic Development," Research Memorandum No. 58, Center for Development Economics, Williams College, Williamstown, Mass.; December 1972.

in a model analytical framework and concluded that theoretical analysis ended in the same court: "the misuse of capital resources is greater in capital-poor underdeveloped economies than in advanced economies both in terms of output capital stock ratios and the time schedules for use of capital in the working day and the working year." As they had earlier noted in respect to determinants of multishift working: the greater the relative share of capital in costs, compared to the share of labor (at increased rates for second and third shift premia), the more profitable it would be for an entrepreneur to choose to operate more than one shift. Both developed and less developed countries show planned non-use of installed capital at very high levels, suggesting that factor prices may not adequately reflect real long term scarcities, or may be misassigning both economic and social priorities. For less developed countries, which have fewer resources, are receiving concessional assistance, and are under severe time pressure to demonstrate progressive growth in real capacity to satisfy domestic wants, to be recording regularly greater wastage of existing capital facilities than more advanced countries do, suggests either the existence of factor prices less in tune with the real scarcities in their economic structure, or failure of management to respond in production to the operating price signals.

We can concentrate on the first suggested explanation,

for entrepreneurs in less developed countries have shown themselves quick to identify and respond to profitability signals given by the prevailing control and subsidy systems.

A look at development and growth policy issues that economically developed and less industrially advanced countries have in common has identified two persistent questions: First, why is capital utilized at levels far below its maximum potential, or, put another way, why are entrepreneurs willing to continue to invest in expansion of facilities when facilities remain underutilized? Second, why are existing capital facilities used even less intensively in less developed countries than among more advanced industrial countries?

The first question has been answered in essence; the price signal system reinforces custom and preference and makes it profitable to plan at the time of investment and to build into the structure and production lay-out of the facility a pattern of use that accepts as normal a large element of non-use. These normal practises lead entrepreneurs to make additional investments, when the market demand/production schedule in operation presses against capacity to deliver products without changes in normal practise. The edges of decision need not be sharp and neat. Many entrepreneurs will breach practise at the margin--operate

their equipment faster and more continuously, work some extra hours, despite overtime penalty wage rates and possibly higher costs, only partly compensated by the greater productivity of installed capital. At some point in the range of their accepted normal intensity, decisions to expand will be triggered off.

As we have seen, respondents participating in the McGraw-Hill surveys of capacity utilization, reported, over rather longish periods of time, a preference for operation at 90 percent of their potential capacity as defined by their own customary usage. Presumably they respond to significant indications that operations will be exceeding the preferred rate of use, and prospects indicate such higher rates of use will be maintained, by triggering consideration of the specific timing of new investments, some of which may have been foreshadowed in long range plans of the enterprise.

The inducements to invest are many, the devices being mainly capital cheapening. The main focus of public growth policy has been aimed at inducing the entrepreneur to commit himself to the investment. Operating under a control system that regulates access to foreign exchange, and access to rights to establish new industrial enterprises, that moderates the market price of scarce foreign exchange and scarce credit, entrepreneurial

groups engaged in multiple trading and manufacturing ventures can often protect their own equity risks through related profit-making, realized during the course of completing the investment and installing the new facilities. Even without those sources of profitability, however, their evaluation of the long-range profitability of proposed investment, contemplating initial or permanent one-shift, low-intensity operation, reflects the cheapening of the initial cost of capital, and subsequent reliefs to operating costs, or freedom from taxation on income, each of which improves the net profit left available to the enterprise. It can be argued that subsidies or cost reducing devices that operate at the point of investment may well be more perniciously distorting, because the enterprise receives them no matter what subsequent operating record the entrepreneur makes. Preferential access to scarce foreign exchange usually meant the opportunity to obtain it at the official exchange rate, or in any case at some rate substantially below the free market rate. In Indian and Pakistani foreign exchange markets of the 60's, this privilege alone might understate the scarcity value of the imported equipment by the difference between official rates of 4.8 and market determined rates of 9 or better. Machinery imports were also frequently free of import tariff, or allowed substantial reductions of duty. As

India was approaching the devaluation of 1966, for example, tariff adjustments raising the cost of imports were in effect heralding the change of direction. Though it would not be easy to separate from among the objects, the desire to afford greater protection in the domestic market for the growing Indian production of machinery was present. In Pakistan substantial amounts of machinery were brought in under the premium system, at effective exchange rates up to double and triple the official rate, in order to secure earlier access to markets or to assure continuity of production. Nevertheless, substantial subsidies were realized by entrepreneurs via the exchange control system for their most important planned capital purchases.

My object is not to reexamine the control systems or the foreign exchange regimes, which have been elaborately examined by others; I do not think I can add significantly at this date to the insights already drawn.[1]

It is sufficient to conclude that capital thus entered the accounts of the enterprise at lower total cost than its scarcity value would have dictated. This was a permanent contribution to the financial structure of

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1. see Reference Listings for Bhagwati and Desai-India; Lewis-Pakistan; P.S. Thomas-Pakistan; W. Hecox-Pakistan; Bergsman-Brazil; King-Mexico; Little, Scitovsky and Scott-comparative review of industrialization; Krueger, A.O. Krueger-Turkey (K24, K25, oral presentation, Toronto, AEA meeting, December 1972).

the enterprise.

Other benefits were aimed at the annual operating profits of the enterprise and they could be a mixed lot. Grants of freedom from various kinds of taxes, predominantly income taxes, for a term of years, was a very popular device, the relief being measured as a portion of the initial capital cost. This might take the form of allowing accelerated depreciation,i.e. increasing allowable production expenses and thus reducing potential profits subject to taxation. The larger depreciation charge also reduces the pressures that might otherwise operate on management to force larger distributions of earnings to shareholders. Here at least it was necessary for the enterprise to operate efficiently enough and to use its facilities (even at their understated cost) intensively enough, to make profits to get the benefit offered. Of course these limits could be modified by carrying forward privileges for losses.

Local grants of facilities likewise encourage capital waste. On the other hand preferential rates to industrial users of electric power, or water, whatever other reasons there might be for objecting to them, in principle encourage more intensive use of capital.

Preferential interest rates, commonly highly regarded as a device to encourage investment, are a reduced charge on profits(made after depreciation has been expensed to

reflect the consumption of capital). They afford financing at lower cost than local scarcity values would dictate (and frequently below world scarcity levels). They permit an enterprise to carry out of profits a higher volume and value of capital equipment and installed facilities than it otherwise could, without losing investors to more competitively profitable activity. Added to the understatement of the original value of the capital by exchange and tax reliefs, the total easement may be exactly the level of signal the entrepreneur needed, even though in response more capital facility is developed than production plans would seem to warrant by some more objective standards.

Illustrations of the prevalence of these kinds of distorting measures are legion. For example, in the United States, the State of Massachusetts, to select only one among many, hoping to attract more investment and win more jobs for the State, reduced the excise on corporate property by 27 percent in 1973; it offers a 3 percent investment tax credit on tangible property, effective through November 1978, for manufacturing or research enterprises; purchases of machinery, replacement parts, tools and fuel are free of sales taxes; local tax exemptions are granted on manufacturing machinery, equipment and inventory; location in an eligible coummunity (poverty group) may win up to 52 percent exemption from local

property taxes; financing for Industrial Development up to $5 million is tax exempt; etc.[1]

The Government of the United States, aiming to encourage investment mainly as an anti-recession measure, granted accelerated depreciation privileges for new investment, to ease the impact of federal income taxes during an initial operating period. The prospect of expensing capital over 7 years, instead of over 12, is clearly more attractive to the entrepreneur in terms of prospective tax burden and cash flow available to the enterprise.

For examples of inducement practises from less developed countries I shall limit myself to selections from India and Pakistan. Governments in less developed countries confronted with a multiplicity of objectives, and the need to generate more activity in areas of the country, or of economic activity where the economic pace was deemed to be lagging, or the catch-up problem was considered severe, often applied the same kinds of measures differentially. Thus, the Government of India, wanting to favor small scale industry, allowed such enterpises a deduction from taxable income equivalent to 5 percent of profits, the total amount eligible measured against the capital investment, until the capital base was exhausted. At 5 percent per year for 5 years, this benefit

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1. Source: Advertising campaign of the Massachusetts Department of Commerce and Development, Wall Street Journal, October 17, 1974.

could be equivalent in value to 25 percent of the capital base.

The Government of Pakistan granted income tax holidays for the early working years of new industrial investments, which reflected a number of objectives. In its 1970 and 1971 listings, meant to apply to the next 5 years,[1] the exemptions, initially for periods of 2, 4 and 6 years, varying with degree of area "backwardness," lag to be overcome, or economic disadvantage, were reduced. The periods of relief for West Pakistan from July 1970 were reduced to zero, 3 and 6 years. Producers' goods industries of "national importance" were eligible for 6 year relief wherever located. In addition to benefits granted industries based on production with indigenous raw materials, there were 29 listed industries to be favored, including a catch-all group covering producing units which meant to export at least 30 percent of their output. The benefits were not limited to new undertakings; establishments initiated between 1965-1970 were eligible, but expansions of existing units were also eligible. The benefits required a 60 percent payout of profits, with dividend tax benefits also passed through to the shareholders. Differential import duties on capital goods were

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1. provided by the Department of Investment Promotion and Supplies, Ministry of Industries and Natural Resources, Government of Pakistan, September 1971. Also--"Guide to Investment in Pakistan," 2nd Edition, same source; 1970.

also contemplated (50 percent tariff in West Pakistan generally, but 30 percent in East Pakistan and under-developed areas in West Pakistan).

In addition to basic exemption from income tax, a special depreciation to follow it was allowed for new enterprises, for which capital costs were clearly going to reflect higher prices than those enjoyed by their predecessors in industry. More important than this special allowance, were initial depreciation allowances that could be charged on top of normal depreciation practise; these amounted to 25 percent of the value of plant and installed machinery (with some variations). This could be of substantial continuing benefit for the cost patterns of enterprises that elected the declining balance depreciation method. The regulations also allowed for the carry-forward of losses incurred against profits of subsequent years for up to 6 years. Depreciation was to be properly included in expenses before the profit/loss balance was struck, so the depreciation privilege seemed to be reasonably well protected in terms of cash flow availability in any case and in terms of net benefit for retained profits provided the enterprise made some profits.

This same set of inducements also permitted differential depreciation charges relating to shift work. Thus enterprises were permitted to expense charges

50 percent above the normal depreciation schedule for working two shifts and to double depreciation for three shifts, the standard one-shift measure being 300 shifts. This approach, meant to stimulate capital use by relieving income of tax, will be dealt with later in this paper.

If developed and less developed countries were equally engaged in the drive to generate industrial investment, the impact of the favored devices and the degree of their employment could clearly have been more generous to the enterprise in a less developed country. In some degree, the disadvantages of carrying out the investment at a long remove from the capital suppliers, of having often to add infrastructure or local development costs that would not fall directly on an individual enterprise in an advanced industrial country, of expecting operating difficulties to arise due to less experienced management and work force, of facing supply line difficulties and problems of performance standards, might justify measures meant to "even up" differences and keep these new industrial installations competitive while they negotiated a way through the obstacle course of beginning operations. It can be seen from the abbreviated list of inducements, however, that not all of them were self-limiting. Those that affected the initial write-up of capital values on the books of

the enterprise as the exchange rates and practises (such as tariffs and interest rates) reflecting on delivered cost of capital do, have a permanent effect on the understated capital and cost structure of the enterprise. The infant industry, or at least the specific establishment, gets a permanent advantage of a partial gift of capital. Likewise, subsidized interest rates on the original capital financing affect the cash availabilities of the enterprise for as long as the term of the debt--which could be 10 to 20 years.

The exchange rate/control system-generated distortions and the benefits they created are an edge which LDC enterprises were more likely to have enjoyed over rather long periods, and which were not available to entrepreneurs in the United States, at least. The tax exemptions and tax reducing devices, using Pakistan as an example because it is not atypical, were likely to have been applied at higher levels among LDCs than in the United States, and with broader effect than among developed countries generally, even compared with countries concentrating on regional differences and "depressed area" problems. Actual systems tend to become very complex, as exceptions and special cases are dealt with, but an effort to define empirically the gains and losses of investment inducement systems among a number of countries--in the specific sense of trying to determine

whether they did attract investment that would not have occurred at all (and there are many skeptics) might be well worthwhile. It is beyond the scope of this paper.

In the case of Pakistan, the political and economic disruption which attended division of the country and the foundation of Bangladesh as a separate political entity, also affected the elaboration of special policies. Furthermore as the government in the West was heading down the road toward the very major devaluation (from official rate of Rs 4.76 to the dollar to Rs 11),which actually took place in May 1972, much of the practical structure elaborated to reduce the distortion imposed by the official exchange rate could also be dropped.

A brief look at the experience of American companies operating both at home and in foreign countries, to see what their cost patterns suggest, may be worthwhile. Utilisation rates and the possibility of significant cost modification under full capacity operation were mentioned in Part III above. According to the Gates and Linden survey[1] the typical product costs about 10 percent more to produce abroad than in the U.S., although the midpoint of the foreign range of unit costs is only about 2 percent higher than that experienced in the domestic plants of the same companies:

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1. (G13) Gates and Linden, op. cit., pp. 18-22 and Part 3 above.

Table IV-1

Average Total Unit Cost by Area

Compared with U.S. Operation

U.S. = 100 Percent

	Mean Average	Median
Canada	110	106
United Kingdom	85	82
Common Market	96	85
Latin America	128	120
Australia	126	125
All Other	109	105
Total	110	102

Source: G13 - National Industrial Conference Board-Gates, Theodore and Linden, Fabian, op. cit., p. 19. The approximately 800 respondent producers in the sample manufactured some 200 lines of products.

Cost of material is evidently the predominant single influence on cost per unit of output either at home or abroad, accounting for an average of 46 percent of unit costs in foreign operations, compared with 37 percent in domestic production by the same companies. Plant overheads, a category which mingles depreciation with production supervisory costs, maintenance and repairs, etc., cluster about 20 percent of total unit cost, averaging lower outside the United States. Production labor shows considerable diversity, with U.S. plants averaging 17 percent of cost per unit compared with 13 percent experienced in their foreign operations. The table below shows these comparisons in somewhat greater detail.

Breakdown of Average Total Unit Cost into Major Components
by Area for Companies Operating in the U.S. and Abroad
(Mean Averages)

Area of Operation	No. of Products	Proportion of Total Unit Cost (Percent) Plant Costs: Material	Labor	Overhead	Subtotal	Sales	Other	Total Unit Cost
Canada	48	42	16	17	75	18	7	100
United States		35	20	19	74	19	7	100
United Kingdom	29	47	13	18	79	14	6	100
United States		38	16	20	74	18	8	100
Common Market	40	46	12	21	78	14	8	100
United States		32	18	24	74	17	9	100
Latin America	55	49	10	17	76	15	10	100
United States		39	14	18	71	21	8	100
Australia	17	48	15	11	75	16	10	100
United States		42	15	15	71	19	9	100
All Other	12	51	7	19	77	12	11	100
United States		43	14	17	74	18	9	100
Total All Products								
Foreign	201	46	13	17	77	15	8	100
United States		37	17	19	73	19	8	100

Source: National Industrial Conference Board, (G13) Gates and Linden, op. cit., p.213.

By the measure of the value of investment in capital per production worker employed in the United States, the array of product groups indicates that the most marked cost differences abroad affect labor. Foreign costs of labor exceed those in the United States 23 percent of the time on the all respondent average, but 32 percent of the time when capital invested was over $20,000 per production worker employed. The comparison of foreign and domestic plant overheads, which include depreciation, showed up roughly even balance for 50 products in U.S. operations using $20,000 or more in capital investment per U.S. employed production worker; 48 percent of the foreign respondents had higher overheads than the U.S. operations and 46 percent had lower costs. When capital investment per U.S. worker was under $15,000, the case for some 92 products, 64 percent of the foreign operations had overhead costs lower than in the U.S. and only 30 percent experienced higher foreign overhead costs.[1]

Given the uncertainties of the data, the variations in cost accounting methods, rational differences in operating techniques, and the impossibility of assuring rigorous comparability such comparisons cannot be pressed too hard--they are nevertheless useful as clues and give some notion of the orders of magnitude of the differences in cost

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1. (G13) Gates and Linden, op. cit., Table 8c.

complexion among producers located in certain industrially advanced and in less developed countries.

V. DEVELOPMENT DISENCHANTMENT: THE NEED FOR A CHANGE

After nearly two decades of concentration on plans and programs in economic transformation of less developed countries via strategies heavily dependent on accelerating investment in manufacturing, supported by strong elements of infrastructure stimulation, development practitioners and economic observers alike found themselves unsatisfied with the result. This dissatisfaction was much and particularly reflected in the literature of the trade, buttressed with political and social interpretations. The dissatisfaction and disillusionment were perhaps the most strongly expressed when the results could justifiably be deemed remarkable in terms of changes in average growth rates, introduction and expansion of a new industrial base, modernization of practises in expanding areas of commercial, industrial and agricultural activity. Much of the writing on the economics and politics of development accepted, as reasonably respectable economic performance among LDCs, the achievement of general rates of growth of GNP in the 5 percent range, recognizing the much higher rates of change in industrial output which such rates encompassed.

Dissatisfaction was most often strongly directed against the convenient surrogate measure of the whole complex process of change and growth: i.e. measurement of achievement by the convenient shorthand of accounting for total growth of GNP. The surge of growth and change had not proven a panacea for the host of social and political

problems which, it had been tacitly or overtly assumed, would, as an adjunct to these economic processes be moderated in ways favorable to wider participation of the population in the benefits of economic improvement and the accelerated absorption of growing labor forces in more productive activity. Often these aims were identified only in the most general terms. They involved very long range prospects and neither efficiency nor equity afforded any easily definable or applicable criteria. Poverty continued persistent and widespread, the financial and resource costs of growth were high and prospective demands semmed likely to be higher and possibly increasingly difficult to command. The disenchantment was real and it engendered a considerable amount of intellectual veering away from the earlier simplicities of maximizing growth and accelerating investment, seeking easier ways to reach for the socio-economic ends of development favored, not all of them conducive to dealing more effectively with the underlying long term issues of scarcity that persist even when there are apparent surpluses to contend with.

Some, rationalizing their position, have argued that "improving" the content of growth is more important than maximizing the rate of growth. Some think increasing employment should take precedence over other goals, that a more labor intensive production structure could be attained by product selection concentrated on simple consumer wants, and that inducements beyond the scarcity-abundance relationships, the efficiencies they suggest, should be offered to entrepreneurs or otherwise imposed on the system to achieve the

employment goals. Not all observers equate employment goals with income distribution objectives but they are certainly related.

Rather than argue against growth, which is the quintessential easement for economic transformation and the generation of more resources in the form and at the times and places best suited to the satisfaction of public and private wants, it might be more useful to look more closely at the actual growth achieved. This ought to generate a much stronger dissatisfaction with the summary growth rates achieved, i.e. with the real returns in increased production and productivity of labor and capital relative to costs incurred. This dissatisfaction should turn not only to the areas and patterns of investment chosen for industrial change and elsewhere in the economy, but also to the patterns of acceptable operation of facilities and standards of investment.

Investment policies for some areas in early stages of industrial change were capable of generating from their low bases and maintaining for significant periods annual rates of increase of 15 to 25 percent in manufacturing production (viz. Bangladesh formerly East Pakistan). This is a rate of annual increase in output which is significant for total growth even when manufacturing industry is contibuting a share of not more than 10 percent of the annual gross national product. It is especially worth noting that some countries and regions realised rates of industrial change of this order with their manufacturing plants, old and new, operating on the average at less than half to two-thirds of technical single-shift capacity. Even when loose employment practises put more labor in such a factory

than a similar technology or plant organization would call for as organized in a more developed country, the operation as a whole was not pulling the weight that its capital endowment suggested it should be capable of, or that, in principle, had been expected of it. In this sense, the growth rate, both in the manufacturing sector and for the economy as a whole, was grossly unsatisfactory, no matter how high the ratio appears in terms of absolute values running from 0 to 100. This level of inadequacy had its reflections in the relatively slow growth of employment in industrial production, in its high cost per man year of employment, in the difficulties affronting broader distribution of gains, and in the poor competitive strength of much of the realized product.

The observed capital-output ratios of this experience also generate quite unrealizable estimates of required investment for capital development in the near term to continue growth at a pace which might afford some reasonable prospects of affecting significantly radical changes in the structure and modernity of the economy in the moderately foreseeable future, perhaps the next decade or decade and a half. The implications for concessional aid requirements derived from these indicators of capital required for creation of the desired increases in employment and realization of targets for production and consumption are likewise very large. They come up repeatedly for consideration in an atmosphere justifiably skeptical that the sole or even the major effective answer is likely or even ought to be unrestricted access to subsidized resources.

Disappointments over the returns from industrial investment, in terms of employment and output, were a prime and justified complaint. Insofar as these complaints reflected large elements of under-utilization of the newly achieved industrial capital there was ample justification for seeking more effective policies and for seeking them as a first remedy to improve an approach to development with which there is already significant experience and spreading levels of competence to sharpen and extend the effort under the appropriate umbrella of policy.

It was not that a more intensive utilization of capital as a development and growth tactic went unrecognized as an industrial strategy. At least, references to the desirability and ostensible adoption of this tactic occur frequently in Indian and Pakistani planning documents, for example.

The very first Indian Five Year Plan (1951-56) gave a selective acknowledgment to capacity utilization by including among its priorities for industrial development "(a) Fuller utilization of existing capacity in producer goods industries like jute and plywood and consumer goods industries like cotton textiles, sugar, soap and vanaspati, . . ." (pp. 88-89)[1] The texts also refer to a significant fall in industrial productivity in India "since 1939, citing various contributory factors of management, work-force, quality, and irregularity of supply, concluding that "Improvement of productivity must, in the years to come be a major objective." (p. 92)

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1. Government of India Planning Commission, The First Five Year Plan: A Summary, December 1952.

The summary statement of priorities was quoted directly from the industry chapter of the detailed Plan[1] which added a broad-brush reference to the potential cost implications of more intensive use of capacity:

> "The emphasis on fuller utilisation of existing capacity must necessarily be a prime consideration in policy, for where such capacity exists increased production can usually be secured at diminishing cost per unit. The increase in productivity per unit of resources already employed in such industries can make a vital contribution to the increase in total production so urgently needed at the present time. It is a matter of satisfaction from this point of view that considerable progress has been made in recent months in the direction of increasing the supply of raw materials for major industries with the result that significant improvement has been recorded in the index of industrial production in the country. In so far as failure to utilise existing capacity is due to factors other than the availability of raw materials a careful analysis will have to be made of the difficulties pertaining to each industry and the necessary steps to obviate them will have to be taken expeditiously. . ."

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1. Government of India Planning Commission, The First Five Year Plan, December 1952, Chapter XXIX, p. 426, para. 13.

Whatever the first plan experience with intensification of capital use might have been, the main policy interest was concentrated on achieving investment. The Review of the First Five Year Plan[1] was focused on investment achieved and changes in output compared to projected category targets. While the injunction about seeking greater productivity was repeated with the restatement of priorities, the report did not deal with utilisation of capacity as a problem in and of itself.

The preparations for the Second Plan gave the matter somewhat more attention. The collected Papers Relating to the Formulation of the Second Five Year Plan[2] included an article by Professor C. N. Vakil[3] which indicate that in Indian industry from 1946-1953 about 57 percent of the 78 industries identified in the study were left working at less than 60 percent of their reported capacity for periods of three years or more. Professor Vakil's article was supplemented by a paper supplied by the Economic Division of the Planning Commission entitled "Installed Capacity and its Utilisation in Indian Industry"[4] which reviewed the status of targets and production, industry-by-industry, touched lightly on contributory or justified causes, mainly physical or technical, including the factors relating to industry interaction, standby needs, reserves and nominal capacity. The article concluded that

1. Government of India, Planning Commission, May 1957, Chapter IX, Industry and Minerals.

2. Government of India, Planning Commission, Panel of Economists' Meeting, January 1955.

3. Ibid., pp. 169-173 "Indian Industry's Installed Capacity and Present Production Levels."

4. Papers Relative to formulation of Second Five Year Plan, op. cit., pp. 174-197.

the low level of utilisation was persistent: In the face of increasing capacity the growth of production has, generally speaking, lagged behind that of capacity in a large number of industries. . ." and also that "It is therefore necessary to plan for a balanced utilisation of idle capacity so as to maximise total production."

In subsequent planning years, references to capacity utilization are repeated, but there is no basic confrontation with the issues posed by the cost distortion effects which contribute to it, or to the long term implications it might have for planning.

The Second Five Year Plan[1] again called for conservation of resources by achieving additional production "to the maximum extent possible through the greater use of idle capacity." The expressed reservation modifying the priority of this objective was the need for careful examination of the technical and economic issues in the individual industries (p. 395, para. 20). The draft of the Fourth Five Year Plan,[2] mainly devoted to targets, links fuller utilization of existing capacity with "appropriate balancing investment." The Plan itself was postponed while three annual plans were undertaken to permit adaptation to the disruption following the 1965 hostilities with Pakistan and the adjustments to the 30 percent devaluation of the official exchange rate of the Indian rupee in June 1966. Over the Third Plan as a whole, industrial production had grown 7.9 percent, compared with a proposed target

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1. Government of India Planning Commission, 1956, Chapter XIX, Programme of Industrial Development, pp. 387-428.

2. Government of India Planning Commission, A Draft Outline, July 1967.

of 11 percent. The July 1969 Summary of the Draft of the Fourth Five Year Plan noted a further decline in the rate of growth of industrial production from 1966-1968, less than 1 percent in 1966-67 and 1967-68 combined, attributing the resultant unutilized capacity mainly to the decline in purchasing power, with industrial recovery commencing about January 1968.

So far at least nothing fundamental to changes in the non-use system appeared to be heralded.

By the 1974 Draft of the Fifth Five Year Plan the 1972 decision to allow fuller utilization of installed capacity "by permitting production in excess of licensed capacity subject to certain conditions, in 54 selected industries, which list was further expanded to cover 11 more industries" (Chapter 5, Para. 514) was being cited as a significant corrective of deficiencies in private sector implementation and investment.[1] The industrial growth objectives were to be achieved by means mainly of new investment, but included among the means was "maximisation of output from existing capacity. . ."

The unsatisfying growth of industrial employment during the past two decades, though recognized was not deemed to be very amenable to resolution by "changing the product pattern of manufactured goods in a labour-intensive direction in the organised sector of the economy." These prospects got short shrift in the Approach to the Fifth Plan (January 1973). They were deemed to be

1. See also Part IV above.

"rather limited." (Page 4, Para. 4) and even the idea of multiple shifts was passed over lightly. It seemed that a more fundamental reconsideration of the capital cost issues and the long term growth and capital requirements issues did not go far into problems of non-use of capital and planned acceptable levels of use taken into account by public and private investors.

Pakistani planning documents, from the first plan for 1955-1960 on, show more specific references to utilization of capacity, including even in the First Plan, specific significance attached to the possibility of inducing entrepreneurs to engage in double or triple shift operations in industries where this had not been the characteristic mode of operation.[1]

In the Second Five Year Plan (June 1960) and Revised Estimates of November 1961[2] first priority was given to better utilization through improved managerial and technical skills and manpower, supply of balancing equipment and selective modernization where warranted.

The Third Five Year Plan 1965-70, as it appeared in May 1965[3] noted that much of industry was less productive than the same industry with the same machinery in many of the developed countries." It cited among a multiplicity of physical and economic causes the failure to work multiple shifts, concentration of ownership across the industrial board resulting in inadequate management

1. Government of Pakistan, National Planning Board, The First Five Year Plan, 1955-60, December 1957 (as approved by the National Economic Council in April 1957), p. 411, paras. 42-46.

2. Government of Pakistan, Planning Commission, p. 223, paras. 14-16.

3. Government of Pakistan, Planning Commission, pp. 462-3; p. 469.

attention to a wide variety of complex and specific problems at plant and organization level. Still, technical improvement was the most favorably anticipated remedy in planning terms and the investment inducement issues were left for consideration in other contexts.

A Report of the Advisory Panel on Industrial Strategy and Policies[1] referred to the high incidence of underutilization of capacity, the existence of capacity in excess of effective demand, long-lead time industries, materials flow problems, especially dependence on imports. It suggested support to tide-over what might be deemed a "running-in" hump problem via market subsidies to industry during break in periods, protection if necessary, access to raw material imports at official (i.e. below the market) rates of exchange, especially for capital goods industries. The Panel "also felt that judicious use of capacity taxation in case of industries that do not suffer from constraint of raw materials or limited effective demand would be conducive to better utilization of capacity. Care should be taken to ensure that capacity tax is fairly assessed on a long-term basis while taking into account productivity of labour and other relevant factors." (para. 8)

Now in the presence of the customary variety of capital-cheapening inducements to increase investment in capital without compelling high intensity of use--tax exemptions, preferential exchange rates, preferential access to financing, etc.--the Government of Pakistan had first considered capacity taxation in

1. Government of Pakistan, Planning Commission, Reports of the Advisory Panels for the Fourth Five Year Plan 1970-75, Vol. I, July 1970, pp. 172-201.

1961/62, the first application being to smaller textile plants, then extended in that industry, applying flat rates to units of equipment. Capacity taxation was extended in 1966, on a broader reach as a significant change from certain excise taxes, hoping both to simplify administration of multiple taxes (the predecessor excises having required checking production in the factory) and to stimulate more intensive use of capital.

First candidates for this tax extension were cement, soda ash, and sugar, relatively simple product lines, dependent essentially on domestic supplies of materials. In 1968 capacity taxation was also applied to the vegetable oil processors and cotton textile producers. (The larger textile producers were among the most intensive capital users in the country, 900 shifts or better being the common practise. Obviously the determination of taxable capacities would require consultation, not only in the first instance, but periodically thereafter to keep up with capital changes. Cnossen[1] has described the early vicissitudes experienced under these new tax forms, resulting in some dropouts.

As of the fall of 1972 manufacturers of sugar, cement, soda ash and cotton textiles remained subject to capacity tax. In addition capacity taxes were also levied on hotels and cinemas with the budget of 1968/69. For the manufacturers, annual capacity was derived from a combination of producers' estimates, engineering ratings of machinery and equipment, and records of past production.

1. Cnossen, Sijbren, "Capacity Taxation: The Pakistan Experiment," Staff Papers, International Monetary Fund, March 1974, pp. 127-169.

Obviously production yields might not be identical even on equivalent 24 hour operating cycles. Furthermore the effort to do exact justice by granting adjustments and reliefs meant modification of the incentive impacts of the tax and surrender of some of the objective simplicity originally sought.

In the case of the hotel tax, as rationalized in the 1968-69 budget, the levy applied at varying rates to the scheduled daily room rental; thus it was applied on the basis of existing capacity rather than actual occupancy or sales.[1]

Winston, writing in 1967, only about 15 months after the July 1966 shift from excise to capacity taxes for some industries in Pakistan, noted the approach had a number of advantages in steepening the cost curve for idleness in the short run. At the rates in force and with the intensity of capital use in Pakistan they exerted pressure in the right direction and the effective increases could be significant related to the current cost of using, or rather of not using capital. However, he pointed out, that, as applied up to then, capacity tax was too little value-related and would not serve the purposes of a capital tax for long-run choice of capital saving investment structures.[2]

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1. Government of Pakistan, Ministry of Finance, Budget 1968/69 Changes in Taxation.

2. Winston, Gordon C. Capacity Taxation, unpublished draft, Karachi, November 16, 1967.

Cnossen sets a high value on a climate of certainty and perceived equity for business management and therefore considers that the ambiguities and administrative complexities encountered were detrimental to cooperation and efficiency. Of course the capacity tax would also be less flexible than income or excise. However the capacity tax can be regarded as essentially a more complex form of property tax. With a longer period of operation, during which the adjustment problems of any new approach could be overcome and the operational system become sufficiently familiar to the taxpaying and investing public to permit entrepreneurs to take even its possible uncertainties for granted, it might be a useful incentive. It points in a direction consistent with the aims of public policy. It does make it more expensive not to use available capital. How much impact the tax might have in isolation from other

consistent and inconsistent factors is hard to say. The probable scale of the tax seems unlikely to offer a sufficient offset for other abuses against true scarcity relationships and the scale on which those might be prevalent elsewhere in the adapted system of price and market signals. In Pakistan a number of fundamental adjustments were imposed after the separation of East and West, including a major devaluation of the Pakistan rupee from PRs 4.8 to the U.S. dollar to a new official rate of 11. as well as the elimination and reduction of some tax holidays. Capacity tax being a repetitive feature of continuing operating costs might make for greater pressure for efficiency than its quantitative impact simply because it represents an outlay that must be met from current cash flows rather than a saving contributing to initial excesses of judgment and absorbed into the capital base.

To sum up: the references to utilization as they appeared in successive Pakistan development plans clearly recognize the prevalence of underutilization, see intensification of use as a significant contribution to increasing productivty and growth of production, lend encouragement to expansion by multiple-shift working. However, in the final analysis, with the exception of recognition for special cost problems that might arise in introducing multi-shift operations, the planners seem to be focussing on the normal view of capacity operation as customarily accepted in the industry; this meant single-shift operation by plan, where that was the usual practise. There is considerable reference to improvement

of management practises, operating techniques, and greater efficiency of operation, all of which would certainly have benefited industrial productivity and presumably long-range profitability as well. The five-year plans cited materials shortages, deriving mainly from limitations of foreign exchange resources, as a major impedance to fuller use of capacity. Since the effect of these actual exchange constraints was felt even at one-shift levels, or at less than one-shift capacity operation, it might be thought idle wishing to look for measures of encouragement for a still more intensive use of capacity, for which they did not see a reliable prospect of imported raw materials and supplies. References to the economic climate of the problems were more likely to relate to errors of anticipation of markets, misguided choices of investment, inadequacies in control of quality, failure to pursue exports. Little or no light is directed at the underlying system of signals that led entrepreneurs to plan investments where the profitability base rested on one-shift operation, or who then found support in the system for breakeven and profit prospects at less than half to two-thirds of even one-shift operation.

As noted in Part III above, better utilization of industrial capacity was a continuing theme in discussions between U.S. A.I.D. officials and Pakistani officials and entrepreneurs. Assistance to finance flows of commodities for current operations in industry and agriculture was a major component in the IBRD consortium guided consideration of aid to Pakistan and of major importance in the flow of aid from the United States. While the broader price and market

distorting policy issues were not neglected, the short term aspects of commodity flow financing, anticipation of requirements, adequate lead time, avoidance of either bottlenecks or waste, tended to dominate the day-to-day discussion. Winston suggests that the impact of supply shortages and cyclical variations on the intensity of capital use is in the range of 10 percent of "normal" practise.[1] Even this moderate prospective improvement was deemed well worth striving for.

The concentration on reaching at least "normal" operating conditions undercut the debate over the significance of utilization rates as the means of accelerating production and long term growth in an important respect. No one would argue that better use of existing capacity would not be advantageous. The availability of additional production would certainly have elevated market exploration, means of improving competitive status and the role of exports to even more prominence than they already enjoyed in Pakistan in a practical way. The discussion was usually imbedded in aid planning considerations, and aid level commitment issues. In this context, arguing for more commodity assistance meant either arguing for a larger share of total aid to be devoted to commodities for production, or, with dubious prospects of success, for radically larger total aid commitments. Both arguments were advanced on more than one occasion. Total aid levels discussed for commitment enjoyed a symbolic value in the intent they represented, even though project elements of prospective aid would move when specific projects were ready and only commodity aid flows could be counted on to move

1. See Part III.

to a relatively regular time table.

As long as the angle of view was focused on near term issues, aid recipients could continue to argue that growth gains derivable from more intensive use of capital could only be a one-shot affair and not repeatable. Thus any decision to postpone some of the drive for new projects in favor of more financing for current production could give no more than a short easement in production and cash flows. Overwhelmed in the pressure of immediate experience, and with no particularly appropriate or favorable examples to cite from elsewhere, wartime experiences being deemed too circumscribed and protected from normal considerations to be acceptable, the potential change in the whole capital structure of requirements for industrial production, the possible permanent change in the capital cost per job created in industry, the permanent increase in production was discounted into insignificance. Mention of the possible changes in industrial profit structure or competitive status was not followed up in any practical way to an examination of the levels of planned non-use. The estimating processes that were the daily fare of planners and aid donors did not go far enough in experimenting with variations to have any practical effect on either the policy debate or continuing operations. More intensive use of existing capacity remained in the index of good and desirable aims without much prospect of significant achievement.

With so much of the focus of planning centered on the problems of investment per se it is not extraordinary that the main concentration of inducement pressures should also have been aimed at that point in the economic process. Even when the inducements employed

operated at post investment stages of the economic process, as tax holidays and various exemptions measured by the cost of capital did, their form related back to the original cost of capital and reflected only indirectly the immediate operational problems of the going enterprise.

Nothing will take the place of better policy, realistically attuned to the underlying scarcities that must be accommodated. However, there are some tools that have not been given as much use as they appear to merit.

In what follows an effort is made to suggest through changes in handling of depreciation a way of stimulating more intensive use of capital from the point of including more intensive use in the primary investment considerations, reducing the acceptable levels of planned non use, and of moving the specific forms of stimulation and recompense away from their excessive potential for influencing the level of investment and closer to the operational points of continuing production.

VI. Intensifying Capital Use: Adapting Methods and Measures

It is relatively easy to point out that price system distortions that make capital cheaper or dearer than its real scarcity or abundance to the economy will lead to the misuse of capital and the abuse of the role and productivity potential of labor as well. System distortions are present everywhere, introduced as a matter of public policy in developed and less developed countries alike, or reflecting the exercise of economic dominance in matters of market regulation. It is not much easier to argue for greater flexibility and closer reflection of underlying relationships, such as flexible exchange rates, market rates of interest, or floating rate contracts in one place than another, since real conflicts of interest are immediately at stake. Nevertheless, the rigidities are matters of degree and the last period of major world-wide monetary and trade adjustments have certainly proved that the systems are not impervious to pressures for change and greater flexibility.

In some sense the introduction of inducements to invest, when investment is regarded as the cardinal catalytic point in the system of stimuli for growth, is a competitive process. If the developed countries have used capital cheapening devices, as they have, the less developed have been impelled to do likewise, on an assumption about attracting and retaining both their own and outside capital. They also had to take into account assumptions about the potential competitiveness of the ensuing production in the domestic market (even

when it was to be protected) and in exports.

Inducement practises are aimed directly or indirectly at the immediate and long term profitability of the investment, and, at least as important to the entrepreneur, at the cash flows of the enterprise. Since the cash flow questions may be of greatest importance to the entrepreneur for the ease or constraint they may reflect in his current operations and continuing command over further maintenance of his capital position or expansion of investment, some apparent inconsistencies among the inducements may appear in the system. The inducements in one form or another give services, facilities, and access to resources to industry without exacting a commensurate recompense from industry, or they relieve industry of financial responsibility for making supporting contributions to the state. To the extent that inducements to invest encourage overcapitalization and planned utilization of capital below its maximum technical potential, the costs of which are masked, they grant industry reliefs which are not adequately assessed, or which given their long term impact, may not be calculable in any conveniently practicable way. They do this at the very time when the demand for state functions is growing and the needs generated directly and indirectly by the industrial expansion are contributing significantly to these demands.

Notable in the revenue patterns of the LDCs is the reliance on taxes that derive from the fastest growing sectors of the economy: namely, excises on manufactured goods. Usually these more than keep up

with GNP growth and even exceed it. However, the taxes directly collectible from these fast growing sectors do not contribute in proportion to what the sectors are really doing, or do so only after rather long delays, because of the tax reliefs from accelerated depreciation, tax holiday, and tax exemptions which are granted as inducements to invest. So again, excises continue to be more important in the revenue structure than they would need to be if income taxes (corporate direct taxes) were playing the role the growth of these sectors would support even at their unsatisfactory utilization rates.

Two main kinds of impact are possible: Practises can affect the cost of capital and the fixed costs of the enterprise, or they can affect the cost of operations and variable costs . Often they do both.

First, inducement can ease the burden on the entrepreneur of assembling enough capital on his own part to initiate the investment. An overvalued exchange rate gives the entrepreneur access to the foreign components needed at lower domestic cost than reality justifies. The capital structure of the enterprise will have lower cost of machinery for as long as the original input can be made to serve. Cheapening the financial cost of the capital and its reflected value in the enterprise permits minimum average cost to occur at a lower range of production and lower intensity of capital use. The returns of the enterprise will look better than the real cost of its capital to the economy would imply and will continue to do so for as

long as the original conditions can be made to serve and replacements and maintenance can be covered under the same regime. Exemptions of capital equipment and machinery imports from import or other taxes have a similar effect. Some countries do not require entry taxes or installation costs to be incorporated in the initial year capital base, which preserves current income from tax. Interest rate subsidies on borrowed capital reduce its continuing cost and the operational cash flow requirements for capital service of the enterprise. Tacked on to an original understatement of the value of the capital base this can be very significant. Altogether, devices of this kind yield an understatement of the capital base on which profits and returns to the investment are calculated and evaluated.

Second, the reliefs affect operating patterns and operating costs. Thus customs and tax reliefs on imported raw materials and components would contribute directly to reducing the variable costs of production and improve profit prospects, as do other subsidies, such as preferential utility rates.

Third the reliefs preserve cash flows in the command of the entrepreneur. Charging each unit of production with an appropriate share for the use of capital is a production expense (over and above maintenance costs) which also provides for the recovery and replacement of capital. Here the results of inducements may be inconsistent with profit maximization objectives. Thus accelerating depreciation rates beyond those justified by the anticipated physical

or economic life of the capital will increase the annual expense charged to cost of current production. It will reduce the bookkeeping rate of profit shown by the enterprise, but it will permit the entrepreneur to retain command over a larger portion of the cash flow generated by the enterprise. Reducing the bookkeeping profit will make it harder to attract external capital for expansion, but improving the cash retention will give the entrepreneur better command over future self-financing of expansion. Initial depreciation allowances and tax holidays and exemptions, like accelerated depreciation rates, preserve earnings from tax liability but, because they are usually of exceptional dimensions and limited duration, they may distort the evaluation process less than blanket acceleration rates given to induce the original investment and unrelated to subsequent efficiency in use of the capital. Some investors have complained that depreciation allowances and income tax holidays only help when there is income generated to preserve and initially they might have only losses. Carry-forward provisions have answered this complaint, although most economists would consider the pressure for generation of profits an advantage and an encouragement for early attainment of operational efficiency.

The accounting for capital available to and used in an enterprise has to meet a variety of considerations, and it seems unlikely that any one approach could meet them all. The bookkeeping conventions of simplified rules of thumb or accounting conventions which respond to tax policy may not really tell the entrepreneur what he ought to take account of to figure his survival capability in a

market situation or one determined by the physical endurance of capital alone.

One might determine the physical cost of capital for units of product from total potential lifetime capacity. A unit of capital is after all the potential for delivering a stream of repetitive services which can be reflected in an appropriately determined rent. Arguing that a machine life, fully utilized, allowing for necessary stoppage for maintenance, repair, and operational servicing, might be capable of producing one million units of product, the minimum cost that any unit might be asked to bear could be one-millionth part of the original cost to put the unit in place. (Let us omit for convenience the problem of foregone alternatives for the capital value committed at the outset.) The bookkeeping systems short-cut this approach by converting it to a time function, with a portion of the recovery required to be made in each year of capital life. When productivity of capital in use is less than its capacity the smaller volume of production may have to bear the cost over approximately the same life span, so the accounting moves away from the minimum indispensable cost of capital per unit of production which might constitute an ultimate standard. A modification of this ultimate level of output might well reflect the entrepreneur's "normal" expectation of output from the capital. It ought to have the most significant impact on price policy decisions to reflect the long term capital burden which the enterprise must meet.

The significance of the depreciation expenses may be better assessed when their role in costs and savings is examined. As noted

in Part IV, companies operating both in the U.S. and abroad found plant overheads in the U.S. contibuting an average of 20 percent of total unit costs, while in their foreign operations plant overheads accounted for 18 percent of unit costs. The allowances for capital consumption or depreciation included in this measure as revealed by the Conference Board survey accounted for 15 percent of unit overhead costs in the United States, but for 20 percent of the plant overheads in foreign operatons, the depreciation allowances being on the whole more generous abroad at that time.[1] Converted to a share of total unit costs, the pattern would appear as in Table VI-1 Below.

Table VI-1

Depreciation as Percent of Total Average Unit Costs for Manufacturers Operating Plants in the United States and Foreign Countries[2]

(Total Average Unit Cost = 100)

ocation of Foreign Operation	U.S. Plant Operation	Foreign Plant Operation
nada	3.2	3.6
ited Kingdom	2.6	2.7
mmon Market	3.1	4.2
tin America	3.2	3.6
stralia	2.0	2.9
ll Other	2.2	3.8
tal	3.0	3.6

1. Gates and Linden, NICB Number 73, 1961, op. cit., p. 70.

2. Derived on basis of survey data presented by Gates and Linden, op. cit.

Considering the size of this cost component and the relative lack of precision in the evaluations of the effectiveness of inducements to investment offered via this means there might be some reason for surprise at how widely spread the resort to such measures is. An attempt to develop a standardized quantitative measure facilitating comparison of tax depreciation practices and their impact on the cost of capital in different countries was made by George Kopits, under the sponsorship of a Working Group of the Committee on Fiscal Affairs of the Organization for Economic Cooperation and Development relying for data primarily on responses made by tax authorities of 22 associated countries to a special questionnaire.[1]

In general, the surveys showed that taxing authorities permitted differentiation between buildings and equipment, equipment being generally allowed a shorter period for the recovery of capital value. Straight volume depreciation appeared to be the most used method of capital recovery, but significant use was made of alternative methods, especially declining balance, or even special designs to fit the circumstances of a particular enterprise. In addition to normal procedures most of the respondent countries permit special allowances and accelerated depreciation, some even to the point of permitting total recovery to exceed the original cost.[2] Such special

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1. Kopits, George, International Comparison of Tax Depreciation Practices. Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practices, August 1973. The 22 respondents: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

2. Summary Tables identifying the tax depreciation practices reported appear as Appendix VI-A at the end of this section.

treatments are accorded to encourage a particular form of activity on purpose (examples: research, manufacturing, location in a backward region, etc.). Correctives are allowed in most countries if the asset proves to have a longer or shorter economic life than the tax life on which depreciation was charged.

In any case the differences between what is permissible for tax purposes and the underlying economic reality may demand different sets of accounts and Australia, Canada, Denmark, Ireland, and the United States permit such distinctions between corporate books of account and enterprise tax returns. Apparently the actual resort to this practice is only acknowledged to be extensive in Canada and the United Kingdom. U.S. professional accounting and auditing standards require rationality but do not prescribe technique.[1] The U.S. Internal Revenue Code suggests the taxpaper apply his normal income accounting methods to compute taxable income as well.

While one might often be told that a country had variable depreciation, as I was told by economic officials in France, for example, it developed on closer inspection that the reference was to depreciation practices like "declining balance" which resulted in a depreciation charge that did not remain the same from year to year. The annual variations experienced, however, were predetermined by a systematic scheme or formula chosen at the beginning of the recording of asset life True production-related variation of capital recovery allowances is rare. Kopits noted that 18 of

1. Cashin, James A., Editor in Chief, Handbook for Auditors, McGraw Hill, New York, 1971. Chapter 24-"Property, Plant and Equipment," by Daniel A. Schaeffer; Chapter 25-"Depreciation, Depletion and Amortization,"by E. J. de Maris and Frederick K. Neumann.

the 22 respondents to the OECD Survey of Tax Depreciation Practices reported that they would permit faster capital recovery for equipment subjected to multiple-shift operations, yet only Portugal, considered one of the less developed among OECD members, reported any extensive use of this device. Across the board there were so many other justifications permitted for accelerating depreciation charges that a tie to actual variations in productivity and productive use of capital may have been overwhelmed.

The effect of the principal approaches can be illustrated by very simple examples of the impact of straight-line depreciation, declining balance depreciation, and the addition of special initial allowances. These will identify the basic factor of each method; other accretions in terms of allowances may elaborate or modify, but in general the main direction is established by the principle.

Using the straight line method, which calls for equal amounts to be charged each year as the standard of measurement, departures may call for higher or lower charges in the early life of the asset, i.e. they are more or less rationalized on a time base, or they may call for continuing variations rationalized in relation to use of the asset. Smaller expenses will be charged in the early years of asset life under a present worth concept, with sinking funds, and with measures based on retirement and replacement patterns for parts or all of an asset, which affects its useful life. A larger expense for depreciation early in asset life is yielded

by the declining-balance method, a fixed rate applied to a declining asset value, by a method of deriving the annual rate of charge on the basis of the remaining life span of the asset (i.e. the rate becoming a declining fraction), or by internal period formulas for a preset sequence of straight-line depreciation variations within the total life period.

In straight-line depreciation, recovery of capital is evenly spread over the projected life of the asset. Thus an asset with a projected economic life of 10 years, capable during its life of producing 1.0 million units, demands that 10 percent of the cost to be recovered must be charged up to expense each year. This results, for a recoverable investment of $100,000, in the following recovery pattern.

Table VI-2
Straight Line Depreciation
Dollars 000

Year	Annual Depreciation Charge	Cumulative Recovery Amount	Cumulative Recovery Percent of Total
1	10	10	10
2	10	20	20
3	10	30	30
4	10	40	40
5	10	50	50
6	10	60	60
7	10	70	70
8	10	80	80
9	10	90	90
10	10	100	100
Total 10 years	100	100	100

In real life even this simplest of models would be adapted to a partial starting date, to reflect salvage value of the discarded asset, to the offsetting impact of sinking fund procedures which allow accumulation of the desired total recovery value for a smaller depreciation expense set aside each year because they incorporate accrued interest earnings on the annual amounts set aside.[1] In real life it is also unlikely that the real deterioration of the asset, either physical or economic, would occur at an even rate. The adjustments mentioned deal with financial considerations as a whole, but not with such specifics.

The cost per unit of production under straight line depreciation will vary with output by significant amounts.

Table VI-3
Straight Line Depreciation
Cost per Unit of Output

Year	Depreciation Expense (Dollars)	Units Produced	Equipment Cost per Unit of Output (Dollar
1	10,000	10,000	1.000
2	10,000	50,000	0.200
3	10,000	100,000	0.100
4	10,000	150,000	0.066
5	10,000	200,000	0.050
6	10,000	160,000	0.063
7	10,000	130,000	0.077
8	10,000	100,000	0.100
9	10,000	80,000	0.125
10	10,000	20,000	0.500

1. Tables elaborating such detailes can be found in: Cost Behavior and Price Policy, a study prepared by the Committee on Price Determination for the Conference on Price Research, of which Edward S. Mason was chairman. Published by the National Bureau of Economic Research, New York 1941. Chapter IV: "Costs and Rate of Output: The Allocation of Fixed Costs Over Time," pp. 51-79.

Straight line depreciation must, therefore, somewhat resemble capacity taxation when that tax is handled as a constant. The rewards of higher production will be lower unit costs and better competitive standing, the incidental rate of difference perhaps not enough to reflect real differences underneath.

Assuming that the real contribution to capital ought to be valued as a "normal" measure against lifetime capability then the "normal burden" of capital to be born by each unit of output in the example above would be an even $0.10, without regard to the level of total output achieved in any given year.

Using the declining balance method of expensing depreciation gives a different charge to be expensed each year, but on a pattern which is predetermined. The rate is based on life expenctancy, for 10 years, recovery in 10 periods, and therefore requires that an asset will lose each year the same proportion of its remaining value. Compared with straight-line depreciation for an equal life and asset value, it requires very much higher nominal rates of depreciation to be applied, and very high rates indeed (on the order of 60 percent per year) to approach elimination of the tail still left at the end of the tenth year because of the mathematical nature of the declining function. In fact, there is usually a salvage value to be allowed for and the rate determined by this technique is very sensititve to changes in the estimated salvage value allowed. Switches in technique are applied for the latter years of the asset life to permit the total recovery desired to take place. The table which follows shows the pattern of depreciation that would

occur at three different rates under the simple declining balance method. Technical changes have been deliberately omitted.

Table VI-4

Comparison of Depreciation Charges under Different Methods

Asset Value of $100,000 - 10 Year Life

Year	Straight-Line Rates 10%	Annual Charges in Dollars Declining Balance Rates 25%	35%	60%
1	10,000	25,000	35,000	60,000
2	10,000	18,750	22,750	24,000
3	10,000	14,065	14,790	9,600
4	10,000	10,545	9,610	3,840
5	10,000	7,910	6,250	1,535
Cumulative Depreciation Expensed at Half-Life	50,000	76,270	88,400	98,975
6	10,000	5,935	4,060	615
7	10,000	4,450	2,640	246
8	10,000	3,335	1,715	98
9	10,000	2,500	1,115	40
10	10,000	1,880	725	16
Total	100,000	94,370	98,655	99,990
Balance	Nil	5,630	1,345	10

Two features of the declining balance method illustrated in the simple comparison above seem particularly relevant to issues of capital saving in resource choices and intensity of capital use. Asset recovery charges are very heavily concentrated in the initial

years, more than half the capitalized asset value being recovered and expensed before the end of the third year. In every case more than three-quarters of the asset value has been charged to expense by the midpoint of its anticipated life. When the impact of special inducements to undertake investment now rather than later is added to the depreciation rate structure which already exists, there is little to affect operational considerations later in investment life. For instance in the United Kingdom, initial capital writeoffs up to 80 percent of value have been allowed. In France after 1951 double straight line depreciation could be charged in the first year of a capital life in excess of 5 years and the final years dropped to compensate.[1]

The comparative evaluation of capital costs for enterprises reflects the impact of tax structures on depreciation practices and there are compensating effects. A country with high income tax rates is quite likely to allow a high initial depreciation allowance and encourage accelerated depreciation when it wants to influence the course of investment. Kopits summarized these practices among the 22 respondents to the OECD survey in the form of a capital-cost index, which compares the actual direct tax impact at the central government level in each country with the implicit cost in the absence of such taxes. The average for all respondents indicates a tax cost of approximately 15 percent for equipment in manufacturing[2] and 35 percent on buildings.[3] with mean average resting at 20

1. Malinvaud, Edmond, "Peut-on mesurer l'evolution du coût d'usage du capital productif?" Economique Statistique, revue mensuelle, No. 22, Avril 1971; Republique Française, Ministre de l'Economie et des Finance, Institut National de la Statistique et des Etudes Economiques.

2. Mean average of median index for each compnent industry.

3. Median.

percent for all assets combined.[1] This, though far from depicting the relative cost of capital, at least gives some notion of the tax intentions that confront investors and that planners and investors in less developed countries consider they will have to compete with. The loading of expensed recovery of capital by acceleration techniques aggravates the poor income experience of the earliest years of activity. Even more, the demands on operating income for capital recovery in the later years are so low that they depart further and further from the real operating posture within the enterprise. They offer no significant encouragement for intensification of capital use. The reverse is true; the situation encourages premature retirement and replacement of assets, or premature expansion in order to reintroduce a measure of depreciation expense more reasonably related to the operating characteristics of the enterprise.

Depreciation practices in and of themselves do not, of course, generate any income for the enterprise or for the economy; only production and sales to users of the product does that, ultimately. The way depreciation is treated for taxes changes the current relations between the enterprise and the state, and the way it is treated for enterprise policy analysis may affect internal relationships between management and stockholders and among management factions. In an unregulated industry the market sets the ultimate terms of price, competitive profit rates, and the ability to manipulate the division of earnings between those which can be ratained in the business and those which must be distributed to shareholders in the enterprise.

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1. Applicable Tax Rates shown in Appendix VI-B and Summary indexes in Appendix VI-C.

When an enterprise is regulated by state determination of permissible "fair return" on invested capital, and by regulation of actual rates that may be charged consumers, i.e. by a sort of "double-tying," one feasible means of increasing the absolute volume of profits may be to increase the total capital investment. Electric power production facilities, for example, require especially long lead times to be set in place, and require emergency stand-by capacity as well as coverage for both cyclical peaks and rising requirements over the life of the facility. Cash flows over the life of the facility are of major importance to management. The concentration of depreciation allowances for tax purposes early in the life span of facility investment would seem to have implications for price policy, for determination of investment requirements and for financing investments which are less than socially desirable either for the enterprise or ultimately for the consumer. This may involve both considerations of timing and operational efficiency. Recent articles in the utility field have been exploring the indications of over-provision of capital and inability to deliver service at minimum cost, assuming that profit maximizing remains the objective of a regulated firm. Thus Courville finds that his examination of electric power generation experience confirms the theoretical proposition (the "Averch-Johnson effect").[1] A similar conclusion was reached by Spann, who examined the first

1. Courville, Leon, "Regulation and Efficiency in the electric utility industry," The Bell Journal of Economics and Management Science, Spring 1974, pp. 53-74.

year of operation for a sample of 35 electric power plants built between 1959 and 1963 and a second sample of 24 companies using fossil fuels for generation in 1963. He assumed a constant cost of capital to all electric utilities based on an industry wide average and estimated 25 year life depreciation on the basis of industry advice.[1] Bailey and White suggest that under regulation it may be rational to reverse standard price practices and set higher prices for off-peak operation than for peak operation and that this too may contribute to overcapitalization.[2]

Jaffe explicitly assumes that maximization of discounted cash flow is the appropriate goal of the firm. Most theoretical models do not deal effectively with depreciation for the regulated industry and some exclude it from consideration altogether.[3] While concentrating on the depreciation question, Jaffe simplified only by assuming tax depreciation and book depreciation would be identical and deliberately ignoring problems of actual replacement rates. In contrast with some thinkers, who argue the public good might be best served by accelerated depreciation (lower tax liabilities and lower cost base for rate setting, encouragement to anticipation of requirements), Jaffe concluded that slower depreciation, with larger amounts taken in the later stages of plant

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1. Spann, Robert M. "Rate of return regulation and efficiency in production: an empirical test of the Averch-Johnson thesis." The Bell Journal, op cit., Spring 1974, pp. 38-51.

2. Bailey, Elizabeth E. and White, Lawrence J., "Reversals in peak and offpeak prices," The Bell Journal, op. cit., Spring 1974, pp. 75-92.

3. Because it is not a cash expenditure.

life, would be more advantageous.[1] Linhart criticized Jaffe for not having taken sufficient account of the earnings requirments, including continuing debt service, during each period of the life span, which he concluded gave rise to the need for an accelerated depreciation curve.[2] However Jaffe disagreed and responded with the reminder that the life path of the capital investment might require even greater postponement of depreciation and more than one treatment.[3] Linhart's comment concludes wryly, "Of course, in reality depreciation is supposed to follow the diminution of economic value of the asset." I will return to this point.

It is worth returning to the significance of cash flows and the retention of earnings in the enterprise to its future prospects and to the role which depreciation has played in this pattern. For this purpose U.S. data from the Gross National Product Accounts is conveniently available and may be deemed indicative even if not an exact guide to behavior of entrepreneuers, domestic or foreign, in other countries. The table which follows shows the derivation of cash flows for non-financial corporations in the United States from 1970 to 1974.

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1. Jaffe, Bruce L., "Depreciation in a simple regulatory model," The Bell Journal, op. cit., Spring 1973, pp. 338-342.

2. Linhart, Peter B.,"Depreciation in a simple regulatory model: Comment," The Bell Journal, op. cit., Spring 1974.
Also: In "Some Analytical Results of Tax Depreciation," The Bell Journal - Yearbook, 1970, pp. 82-112, Praeger Publishers, New York. He argues that a switch from straightline to accelerated tax depreciations would result in requirement for substantial rates increases.

3. Jaffe, Bruce L., "Depreciation in a simple regulatory model: Reply," The Bell Journal.

(Billions of Dollars)

	1970	1971	1972	1973	1974 (Prelim.)
1. Gross Product Originating in Nonfinancial Corporations[1]	519	555	614	684	732
2. Capital Consumption Allowances	54	58	64	68	73
3. Indirect Business Taxes plus Transfer Taxes less Subsidies	51	56	59	63	67
4. Income Originating in Nonfinancial Corporations	414	441	492	553	591
5. Compensation of Employees	347	366	405	454	492
6. Net Interest	16	17	18	21	23
7. Profits Before Tax	56	63	76	96	111
8. Profits After Tax	28	33	43	55	65
a) Dividends	20	20	22	24	31
b) Undistributed Profits	8	13	21	31	34
9. Inventory Valuation Adjustment	-5	-5	-7	-18	-35
10. Cash Flow, Gross of Dividends (2 + 8)	82	92	107	123	138
11 Cash Flow, Net of Dividends (2 + 86)	62	71	84	99	107
a) Undistributed Profits as Percent of Line 11	13%	18%	25%	31%	32%
b) Capital Consumption Allowance as Percent of Line 7	87%	82%	75%	69%	68%

Gross National Product and Income Accounts, Old Table 1.14, March 1975, Table 10, Survey of Current Business, U.S. Department of Commerce.

Totals may not [illegible] due to rounding of entries.

[illegible] exclude [illegible] originating in the rest of the world.

Data for the last 5 years (1970-1974) shows U.S. capital consumption allowances approximating 10 percent or better in relation to gross national product and far outweighing retained profits after taxes and dividends in enterprise cash flows. In every one of those five years capital consumption allowances accounted for more than two-thirds of cash flow, net of dividends.

As might be expected from this pattern, the financing of expansion by non-financial corporations in the U.S. was overwhelmingly dependent on internally generated funds. The table which follows (Table VI-6) shows the financing pattern for three major periods of U.S. capital expansion in the last two decades.

As can be seen in the table, market sources of funding only came even close to providing half the required expansion financing in the last period described. At that point retained earnings, i.e. undistributed nominal profits, accounted for less than 10 percent of the total expansion financing.

One other relationship is also relevant, capital consumption compared with total investment outlays and presumed net investment. This is shown for the decade 1965-1974 in Table VI-7 below. Only once, in 1966, was derived net physical investment equivalent to half the value of total capital outlays.

The importance of depreciation to investment financing is not just a U.S. phenomenon. Shah, for example, analyzing Indian private corporate financing, noted that between 1938 to 1955, rising depreciation allowances accounted for two-thirds

of gross retentions and undistributed profits, roughly equivalent to about half the size of dividends paid out, accounted for only one-third of retained cash flows.[1]

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1. Shah, Kishori C. Pattern of Corporate Savings and Investments, Bombay University Press, Popular Book Depot, 1960, pp. 178; 210, chapter VII.

Table VI-6

United States

Financing Expansion of Facilities by Nonfinancial Corporations

Sources of Funds

(Percent)

	4th Q 1954- 3rd Q 1957	2nd Q 1961- 1st Q 1964	1st Q 1971 4th Q 1971
:al Financing	100.0	100.0	100.0
:ernal Sources			
Total	62.7	68.6	51.7
Capital Consumption Allowances	38.8	47.7	42.2
Retained Earnings	23.9	20.9	9.4
ernal Sources			
Total	37.3	31.4	48.3
Stocks, Bonds and Mortgages	16.3	15.6	25.8
Loans	8.3	4.6	12.3
Other	12.7	11.2	10.2

urces and Uses of Funds: Nonfinancial Corporations," Survey of Current Business, April 1974, U.S. Department of Commerce, Bureau of Economic Analysis.

Table VI-7

United States

Business Investment and Financing

(Billion dollars)

	Total Capital Outlays	Capital Consumption	Net Physical Investment
rporate Business			
1974 (p.)	126	73	53
1973	122	68	54
1972	103	63	39
1971	87	58	29
1970	84	54	30
1969	84	50	34
1968	75	45	30
1967	71	42	30
1966	77	38	38
1965	62	35	27

deral Reserve Bulletin, February 1975, Series on Flow of Funds Analysis, Tables A58, A5

otals my not add due to rounding.)

The rates of depreciation considered acceptable for tax purposes, remarkable though they are, still appear to reflect an underestimate of the real pressure of economic capital recovery requirements. The U.S. Department of Commerce notes this in its current capital recovery series by allowing for an adjustment for earlier actual capital retirements than the adjusted 1962 guideline life suggested, evaluating reported data at 85 percent of a more closely estimated depreciation requirement. In a study of capital consumption treatment and the share of profits of nonfinancial corporations in the gross national product from 1948 to 1973, Nordhaus[1] noted the need to adjust reported capital consumption allowances for both changes in tax laws and changes in price levels to arrive at something closer to economic depreciation. Over this period the statistics reflect an apparent fall in the share of profits (which was not restricted to the United States alone). Both nominal and "genuine" rates of return on capital, after adjustments for depreciation, declined after taxes in similar fashion. Capital consumption allowances as reported rose from $6.9 billion in 1948, when adjusted economic depreciation would have called for $10.3 billion, to $68.3 billion in 1973, compared with adjusted economic depreciation of $70.6 billion.

During most of the period analyzed by Nordhaus economic depreciation would have required higher allowances than were commonly taken or permitted for tax purposes; in significant instances estimates did not exceed 60 percent of requirements. Following the changes introduced

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1. Nordhaus, William D., "The Falling Share of Profits," Brookings Papers in Economic Activity, 1974-1, pp. 169-208; comments and discussion, pp. 209-217.

in 1961, there was a period ending in 1968 when the economic depreciation could have been covered by less than liberalized practice permitted, but these differences did not exceed 10 percent of the allowances reported.

Nordhaus noted further that, over the 25 year period 1948-1973, corporate capital earned an average of 7.1 percent after taxes, while the average cost of capital was 6.5 percent. There was a considerable decline in the cost of capital from 1948-50 to the late 60's.

Coen, reviewing tax adjustments presumably aimed at permitting tax depreciation to approach more closely to economic depreciation as a feature of tax equity and neutrality, looked for the real impact of capacity depreciation under the new U.S. Treasury guideline, the Asset Depreciation Range System (ADR) of service lives for equipment.[1] Coen concludes that in general revealed service lives and replacement patterns are actually longer than the ADR system guidelines, so in principle the new guideline would allow excessively rapid depreciation.

One should note, however, that significant inadequacies in present value of the stream of depreciation may still remain. Furthermore, the problem of adequately providing for replacement under inflationary conditions may not be resolved by a more nearly correct reflection of service life.

Bearing in mind that investment objectives were the paramount interest in income tax reductions, tax credits for equipment, shortened

1. Coen, Robert M., "Investment Behavior, The Measurement of Depreciation, and Tax Policy," The American Economic Review, March 1975, pp. 59-74.

depreciation guidelines accelerated depreciation and their reversals, it is perhaps unfair to criticize these inducements because they were not closely enough tied to production considerations and because they not only did little to induce more intensive use of existing capital, but were counterproductive, encouraged capital excess, underutilization, and premature retirement. There is also, however, considerable reason to question their effectiveness as inducements to invest. Eisner and Lawler, after attempts by Eisner and others to estimate the rental cost of capital as a measure of the effects of investment tax incentives, turned to look at what business investors said about their own reactions to these incentives in responses to McGraw Hill surveys made in 1963-1966 and in 1968.[1] Over 3600 observations were available but the authors could accord little reliability to the statistical inferences. However, they concluded that the respondents to the survey revealed only minor compensating reflections in capital expenditure as a result of increases or decreases in tax inducements. They did not think the responsiveness of investment to such pro or anti-investment inducements was underestimated in these rather negative conclusions. Perhaps, therefore, to suggest dropping the untimely incentive and altering its structure may be open to less objection than if the devices had been spectacularly effective against their first objective.

1. Eisner, Robert and Lawler, Patrick J., "Tax Policy and Investment: An Analysis of Survey Responses," American Economic Review, March 1975, pp. 206-212.

If we are to reject the characteristic inducement patterns of the past two decades, what can we set in their place? The best inducement to make an investment, a long-term capital commitment, is the promise of profitability based on a promising assessment of market prospects. That alone does not obviate errors in capital concentration or failure to plan and reach a maximum intensity of capital use. The planning questions can be better resolved if true scarcity relationships are reflected in price patterns, the physical and financial price of capital, the price of foreign exchange, and the market prices of supplies for production and products. It is easy to conceive, however, that planners and politically responsible agencies may want to see the events of economic development move more trenchantly than they have in the past and may want for accepted political and social aims to help them to do so.

Earlier in this paper a point was made of the systematic remoteness of the inducement pressure points in the popular planning strategies and incentive systems from the point of production. How can some of these interventions be brought closer to that point in a way that would encourage more intensive use of capital at planning point, at point of investment choice and at the point when the problems of continuing operation have to be met?

If one looks at agricultural policy, one finds wide acceptance of guaranteeing the market for agricultural products as a major production point inducement for intensified production from a given agricultural holding and not merely for the expansion of land

under cultivation. Agricultural economists are not all very sure what a guaranteed price and market support may actually contribute under deficit conditions but such incentives are generally thought to be worth including in a program battery. The nature of the products, such as wheat, cotton, etc.,facilitates such action. They are staples; they can be stored; often the government sets the criteria for market grading; their seasonal production patterns are determinate even if the yields to the effort and inputs remain variables contingent in important measure on natural factors out of man's control.

Industrial production, ecompassing an infinite number of privately controlled variables and an enormous number of differentiated products, is far less favorably structured for such kinds of intervention. The most common assurance widely found is the government consumption requirement for defense or other public purposes, which is satisfied by production contracts or predictable levels of market purchases. For the generality of industrial activity predetermined product support levels would appear to be a highly undesirable pandora's box of detailed intervention and overwhelming management problems. The United States is so large and so diverse that one can probably find at least one example of almost anything and there are many state determined regulatory actions.

In the aftermath of the Second World War premium payments were made to selected industrial producers to get more production out of existing or shut-in facilities. In 1946 shortages of construction materials were a serious bottleneck and a major hindrance in the

effort to attain a rapid acceleration of production of dwellings to cope with the accumulated pressures on the existing supply of housing. It was known that wartime diversions had directed plants and products to other uses; lines of production had been converted, or were shut in; operations were proceeding with less acceleration than required to meet the demand for housing at price ranges including those in reach of returning Veterans. Housing suffered in the competitive market race for materials, even under the allocations systems that had been imposed and it was thought that a special thrust in production to drive levels over the short term obstacles might be efficacious.

Significantly for those looking for a convertible experience, the problem was viewed as short range, one to encourage actions to occur a little earlier than under normal procedures and pressures, which would bring increased supply to market faster and preserve price patterns against a more extreme inflation, especially deterimental to immediate goals for housing. The problem was seen as one of overcoming the inhibiting effect of extra costs of conversion, extra costs of labor for multiple shifts, extra difficulties of producing larger amounts of specific types and sizes of product after long disuse, or out of line with ordinary market practice. It was assumed that the market would set itself right in due course if transitional problems could be overcome without incurring excessive disruption in price patterns.

The actions to grant guarantees and premia to private industrial producers for production above certain agreed base levels

were taken under the aegis of the Veterans Emergency Housing Program, originally seen as a two year effort, outlined in the Veterans Emergency Housing Act, passed in May 1946, which included an appropriation of $400 million. General Price controls were still in effect at that time and lasted until November 1946.

The first of the premium payment regulations was issued in June 1946, EPRI, for structural clay products, and others added, to a total of 11 plans,[1] of which 9 were in effect by September 1, 1946. The plans were developed in cooperation with representatives of each industry and resulted in government payments to individual producers for production in excess of agreed bases. This might take the form of paying for production of specified types and sizes of product (e.g. 5" and 7" cast iron soil pipe) above the amounts poured in a base period; or of production generated by working extra shifts or by diverting multiple use facilities to preferred products. None of the original regulations projected a life beyond one year and several were shorter. Participation in the schemes was not compulsory, but it seems clear that significant participation by producers was secured. It was estimated that the cost of the original 11 schemes, if production lived up to the projected course, would reach some $49 million. Current assessments of the program in operation, as well as those undertaken at its conclusion, credit it with an effective impetus to acceleration of production, which broke new records

1. Including (1) Structural Clay Products, (2) Softwood Plywood, (3) Merchant Gypsum liver, (4) Standing Timber in State Owned Lands, (5) Convectors, , (6) and (7) Hardwood Flooring, (8) Cast-Iron Soil Pipe, (9) Merchant pig iron, (10) Sand-Lime Brick, (11) Housing nails.

and contributed to a rapid easing in the difficulties of the housing industry with the general surge in the economy. Details by industry are presented in the official VEHP history (referenced below) and may also be seen in detailed production statistics of the building materials industry for that period.

This is not to say that the national economy realized the 2.7 million dwelling unit starts, with the cost distribution of the product that had been set as the goal for the end of 1947. Starts of new permanent dwelling units tripled in 1946, assisted by the whole range of priority programs, including the impact of the introduction of premium schemes on materials supply for housing. By mid-1947 housing starts were running at annual rate of approximately 800,000.[1]

Altogether, the complexity of this approach, of attempting to circumvent a major bulk-line price push in the industry through paying short-term transition premia for more intensive immediate production, largely from existing facilities, argues against its feasiblity on a broad scale in purely mechanical terms. The administrative and policy burden of such detailed intervention also seems likely to inhibit its effectiveness for anything beyond short range, narrowly defined problems. There is always the danger that profitability will be sought from pressing the state into granting more generous adjustments rather than from efficiency in meeting the market. The difficulties

1. a) An official report of the program was made from inception through 1947: Rogg, Nat, A History of the Veterans Emergency Housing Program, 188 pp., Office of the Housing Expediter, Washington, D.C., 1948.
b) I also had access to U.S. Archives collection of papers, reports, directives on development and operation of the program.
c) I participated as observer or staff member in meetings dealing with development and operation of VEHP programs, including the premium plans.

of stockpile management, where support price schemes run into accumulation of unsold stocks, has been well illustrated both in the operation of agricultural support policies and government-run stockpiles of "strategic" materials. Even if it had direct advantages which it seems to lack, it seems to be an approach likely to strain the already overtaxed administrative capabilities in a less developed country.

Capacity taxation, as noted earlier, is a device which nudges the entrepreneur in the right direction and might be a useful adjunct, but it is not a sufficiently powerful device, at least as practiced. Introduced as an alternative to an earlier agglomeration of detailed excises, with many modifications and adjustments that can be introduced in the search for a more exact equity, its "punitive" character stems from the association with capacity as the basis for the imposition. Superficially one might argue that there is little to choose between it, when the definition of capacity is related also to output and an "inducement" approach which tied a variable measure to production as the starting point. In practice there may be a difference worth having, especially if the inducement can be devised to operate with less detailed intervention by the state as tax collector or para-managerial second supervisor over production.

As long as it is assumed for an economy that its members will have continuing wants to be satisfied, no matter what political or social theories are adopted, the capital invested in production ought to be recovered. This does not determine in advance whether its continuing productivity is to be preserved in place or the recovered values ultimately moved to other forms of production. Provision therefore has to be made for the preservation and recovery of productive capital and financial measures to reflect these requirements are accepted everywhere. The accounting methods, which record contractual and imposed relationships in terms of money, however,may succeed only imperfectly in reflecting either real costs for factors made available for production or factors both available and actually used productively.

Inducements to accelerate investment through depreciation adjustments have notoriously moved the money/cost image away from the underlying reality. An effort to move the financial image closer to the underlying reality would seem at this point to hold more long term promise for continuing to attract investment with the prospect of more efficient and intensive use of capital and lower long term costs of product and per man employed. The aim ought to be to encourage production without introducing distortion, or at least, by offering less encouragement to distortion.

To this end I suggest that the expensing of depreciation take on more of the character of a variable cost than is now commonly the case. Its measure should be determined much more by

current managerial decisions about operating levels than by a long-term predetermined choice of rate based on average service life experience, an economic phenomenon that is also already affected by distortions in the system that contribute to capital waste. The entrepreneur and the enterprise would benefit if the compensation for real needs generated by intensive utilization of facilities were built-in.

The entrepreneur defines as high utilization, or "capacity" under his normal operating practices, a point which seems to touch significant changes in cost patterns. The cost of additional units of output at this margin is presumed to be high compared to the average cost at the most efficient operating rate under a given price and market structure. To work a second shift may mean higher costs for light, heating or cooling, storage, disproportionate maintenance and repair costs, more breakdown time, premium wage rates, larger supervisory and administrative costs and other cost increasing differences under the existing price relationships.

It would not be enough merely to encourage intensification of utilization. Improved provision for maintenance and repair is also necessary to lengthen the effective life of machinery. Translated, this means not necessarily to lengthen its chronological life--obsolescence is more likely to overtake a piece of equipment than its ultimate deterioration and total breakdown due to old age. The operational object is to intensify its efficient working capacity while it is working, to reduce its liability to breakdowns during working time.

Most of the likely cost changes confronting an enterprise which is pressing for a more intensive use of its facilities are not difficult to identify. There are regular and known changes involved. Workers get special rates of pay for working a night shift or weekends, the premia are determined by rules of law, or negotiated under contract relationships. Electric power requirements will be higher for more hours, under a rate structure for peak and off-peak periods that may be different, but is known. Supervisory and management needs are harder to measure and the cost of spreading these skills too thin more difficult to identify and compensate. The change in machine-life productivity under conditions of continuous maximum-intensity use are much more difficult to judge, if known at all outside of continuous process operations, and even continuous processes do not assure maximum intensity of use. Some enterprises already operate on multiple shifts for part of their operations but not for others, especially where continuous processing covers only part of their product mix.

The details of any system have to be designed to fit the specific industrial circumstances where it is to be applied. What is suggested here therefore is an outline of operational principles, which can be adapted. They can be usefully applied in developed and less developed countries alike. However, the less developed countries have greater financial and resource scarcities. A relatively slow growth of employment and high cost per new industrial job has been experienced by them and is in prospect in the modern sector, if the same conditions continue. Considering their prospective needs for

employment and improved competitive efficiency, the less developed countries may well have to be the leaders in seeking a greater efficiency that is needed in either group.

The basic suggestion made here is to substitute for existing depreciation incentives and standard procedure, a method of tying the expensing of depreciation/capital recovery to the rate of use of the facilities in question. There are simple and complex ways of doing so. The major issue is equipment. The simplest method is an adaptation from straightline depreciation based on total potential duration of expected life. Conceived in terms of life-time, the estimation of prospective total potential shifts in use over the projected life of the facility would permit derivation of an expense factor for shifts in use that can be applied to a single piece of equipment, or across the board against a capital facility. Records of capital in place have to be kept up to date in any case. Expensing depreciation could be simplified, recognizing the expected increases in output and productivity, which as noted earlier are likely to be slightly less than 1:1, by allowing a rate of depreciation equal to double the standard single-shift expense allowance whenever two shifts are worked. A stronger compensation has to be offered for a third shift for which, even for mechanical reasons, the increase in output and productivity is bound to be lower, allowing for servicing time for maintenance and repairs and down-time for setting up to specifications to meet the characteristics and volume of product items called for by the orders received by the enterprise or by its market progress during the operational year. This might

justify 2.5 times the standard depreciation rate, or because the third shift is harder to evoke and continuous operation may have more than time-commensurate cost and replacement implications, the intensification goals may warrant allowing depreciation expense to be charged at triple the single-shift standard rate.

A different way of getting at the same objective would be to estimate life-time productivity of a unit of capital, thus determining a normal charge for capital per unit of product. Annual depreciation expensed would then be determined by annual rates of production. The total would plainly be higher under three-shift than under one-shift operations.

All this could seem very simple, with simple one-line production, or using a nominal unit value per product model. It would obviously require correction from time to time, or require an annual translation of the implications of the life-time standard in terms of the production mix and values of a current year. One might also conceive of adding a labor-use weight to the criterion, reflecting man-hours worked, while letting the machine-use criteria trigger off the application of multiple rate expensing of depreciation. It is possible to conceive of substituting a man-hour measure for a machine use measure where the relative relationships are simple and unavoidable--a second shift cannot be worked without complimentary production supporting-staff. However, acceptability of a method ought to give full consideration to simplicity of administration, ability to ride on data collection and record-keeping also needed for improved

normal financial supervision of the enterprise and for normal tax purposes and national economic analysis. Experiences in underdeveloped countries suggest that both officials and private entrepreneurs could be better equipped to deal objectively with policy issues if more of the administrative resources available could be put to securing a better--more timely, more sensitive, more comprehensive--series of economic and social data for current analysis, practical policy adjustment and forward planning.

Experience would be required to determine how well or accurately the initial choices had been made and to what degree and under what terms of reference they ought to be modified. Either of these methods make the duration of the capital recovery indeterminate unless a standard of multi-shift operations is chosen for the enterprise from the beginning. There is nothing to prevent such a standard choice from being made at the planning stage, if the relative costs of factors of production are permitted to emerge freely. Its implications for capital saving and for cost competitive status of product could then be more realistically taken into account.

Similarly, the extra costs of multiple-shift operations, which represent premiums paid for labor, some of which are regulated by law, may be more than the market would yield. Taking an example from the United States, (but premia for the nontraditional standard daylight shift are also paid elsewhere, including less developed countries) workers whose functions have to be performed on weekends and holidays may command double pay for these invasions of normally

accepted periods of leisure, even though those hours may occur in a week when the total hours worked does not exceed the normal standard. It would therefore be possible for a worker to earn more in premium pay annually than he would out of his regular time worked, a penalty on the enterprise for so organizaing its operations as to require this sacrifice of normal lesiure time of its working staff. Working every Saturday and Sunday plus eleven holidays, or 115 days at premium rates, could earn the equivalent of 241 days of normal pay under such a regime. For two additional "normal" days per week the worker could receive 104 days of normal pay, making his total equivalent to 345 days pay for 219 days worked, an increase of 57.5 percent in the cost of labor input per unit hour/day which would have to be met by the product. If triple shifts were to be more commonly used, the differentials to induce labor to accept the nontraditional non-daylight shift work might not need to be as high, determined by the market, as they may be now, determined by regulation which seeks to discourage their use. At the same time that labor costs were rising, economic depreciation might also be rising, although it is possible to envisage situations resembling the labor premia, where allowable depreciation under tax law could be rising without a commensurate increase in equipment contributions to production.

The simplest approach to determining what an enterprise ought to be allowed to recover through expensing depreciation is the original cost of the capital (with or without installation costs). It has the advantage, usually, of being a known amount. However, for a going economy confronted by the real conditions of the last decade, it seems clear that original cost may not reflect adequately

the capital replacement problems of the enterprise, operating against the thrusts of price and cost inflation in the domestic economy and among its capital suppliers. Experience has also shown that there is a creep-up in machine capabilities and sophistication over time that an enterprise has to absorb and cope with if it is to stay competitive. Depreciation systems based on original cost do not deal with this in principle, and evade it altogether when exaggerated acceleration of depreciation is granted as part of the inducement to invest. One way of attempting to deal with it more directly is to accept replacement cost as a base for capital recovery. This would not be an easy substitution and existing indexes of prices hardly seem adequate to be more than general signposts to the underlying gap. Apart from a statistical effort to design and maintain better standard price series for use in a more sensitive depreciation system, it might be advantageous to encourage enterprises to evaluate the capital base on which they are operating by periodic valuation surveys, followed by regular adjustments in their allowable depreciation base, and acceptance of the ensuing changes in tax liability.[1]

A very simple illustration will allow the impact of variable volume-keyed depreciation to be compared with the most common standard depreciation and some of the other elements in the system.

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1. On the operations side, such a need is accepted. Last-in-first out accounting for inventories is common practice to moderate the impact of inflation on profits and give a better indication of continuing costs.

Capital Value:

Assume imported machine capital with a depreciable value, imported at official exchange rates of	100

Capital Recovery:

Over 10 years requires annual expensing of 10%	
Annual Depreciation charge	10
For double shifts at double charge	20
For triple shifts at triple charge	30

The significance of depreciation shifts to management problems is its impact on cash flows or retained funds. Depreciation, as pointed out above, has over long periods accounted for two-thirds or better of retentions realized and permitted. The doubling of an annual depreciation allowance to reflect intensity of capital use implies an increase in cash flow under management's command equivalent to two-thirds or more of the old availability. Presumably there are other benefits in after-tax profits realizable on the larger volume of sales.

Expensing depreciation reserves it from gross receipts before determination of taxable income. Profits after tax, available for distribution to shareholders and retention in the enterprise will suffer to a degree determined by the impact of the corporate income tax, but appreciably less than the change in depreciation.

When tied to more intensive use, the variable depreciation charge makes a reasonable response to the problems of long term impact of more intensive use on life-time costs. Under predetermined depreciation processes unrelated to use rates, taxable profits may include an/economic element of capital recovery that will be indifferently subject to tax, even though this might not have been the real intent of public policy. The lack may also exacerbate the internal pressures on management against distribution of profit to shareholders, also a matter of public policy interest, which has been subject to tax inducements favoring distribution of profits in many countries.

The incentive generated by undervaluation of foreign exchange gives a permanently lower capital base against which to measure apparent profitability. However the recovery of capital permitted under any regime, no matter how accelerated, is unlikely to match up with actual financial costs of replacement unless some additional special arrangement is made for it.

The impact of possible depreciation changes should also be compared with that of other subsidized benefits or special privileges the enterprise may be enjoying from investment incentives. For example:

<u>Interest Rate Subsidy</u>

Capital Investment Debt		100
Service incurred at subsidized		
Rate of Interest	6%	6
Market Rate of Interest	9%	9
Annual Saving or Gain	3%	3

<u>Foreign Exchange Rate</u>

Official Rate	4.8x = $1	
Market Rate	9.6x = $1	
Annual Saving by Under-valuation of Capital		10

The heavy reliance of enterprises on internally generated funds for expansion and new investment is a fact of investment life in developed and less developed countries alike. One might argue on philosophical or policy grounds that investment decisions ought to be more dependent on the repeated decisions of the market than they are. Either way, some dependence on the market for additional capital is bound to remain. Financial and investment records also make clear that management does not merely plough back funds into its existing line of product. The quality of management reinvestment decisions, how good and how competitive they prove to be, can only be read when the experience of diversifying and seeking new lines of product is all available. Clearly varying degrees of success are reflected in the returns. Under the pressure of inducements to intensify the use of capital, the efficiency of many investment choices should also improve. While higher expensing of depreciation is tax saving, it also puts more pressure on management to do a better day-to-day job of husbanding resources and generating saleable production.

Depreciation rates keyed to intensity of capital use obviously cannot be powerful enough to override many other distorting elements. However, as a modest pointer in the desired direction they would represent an element of consistency, encouraging a more intensive planned use of capital, and assisting more intensive use of existing facilities, whatever the inducement regime under which the investments were undertaken. They would not represent an intention to encourage

an entreprenuer to take the plunge over his misgivings, but imply a real continuity of effort to get a better reflection of the underlying reality of costs for which a continuing case could be made.

Appendix VI-A

Table I

SUMMARY OF TAX DEPRECIATION PRACTICES: BUILDINGS 1/

Country	Normal Allowance							Special Allowances				Valuation of Building												Special Provisions				Rep. of Used Bldg.	Tax on Gain on Sale	
												Dep. Base			Critical Event				First Year Calculation											
	Straight Line	Declining Balance	Facts & Circumstances	Other (e.g. SYD)	Useful Life	Switchover	Accelerated Dep.	Additional Deduction	Tax Credit	Cash Grant	Tax-Free Reserve	Composite	Includes Taxes	Includes Interest	Contract	Completion 3/	Acquisition	Payment	Use	One-Half Year	Three-Fourths Year	Full Year	Following Year	Salvage	Longer Life	Same as New	Other	As Ordinary Income	Preferred Rate
Australia	■	X			X		X												X			X				X		X	4/
Austria	■				X	NA	■				X	X	X	X					X	X				X		30/		X	
Belgium	■		X			NA	X					X	31/	31/	X							X			34/	30/		X	5/
Canada		■				NA	X	X				X	31/	31/			X					X				X		X	6/
Denmark	■					NA	7/			X	X					X						X				X		X	8/
Finland		■				NA	X	X			X			31/					X			X				X		X	9/
France	■				X	NA	X			X		X	X	X					X	X						X		X	11/
Germany	■				X	NA	X	X		X		X				X				X						X		X	
Greece	■					NA	X					X	X	X					X	X				X		X			13/
Ireland	■	X				NA	16/	17/		X			X					X				X				X		X	15/
Italy	■					NA	■			X			X	X					X	X				NR	NR	X		X	
Japan	X	■	2/	2/	X	2/	X												X	X				X		X		X	
Luxembourg	■				X	NA	X		X							X					X			X	X	30/		X	19/
Netherlands	■	X			X	NA	■			X		X	X	X					X	X				X	X	30/		X	20/
Norway	■					NA	X	X			X		NR	X					X	X					X	30/		X	
Portugal	■				X	NA	X				X	X	NR	X					X			X		X		X			8/
Spain	■				X		X		22/		X		X	X		X				X					X		X	X	21/
Sweden	■				X	NA	■				X		35/	35/					X	X					X	X		X	23/
Switzerland	X	■			X		X				X	X	31/	31/					X	X				32/	NR	X		X	
Turkey	X	X			X	NR		■					X	X			X					X				X		X	
United Kingdom	■				X	NA	■			25/			31/	31/				X				X				X		X	26/
United States	X	■	X		X	X						X							X	X				X	X		X	X	27/

X = Applicable

■ = Frequent practice, applies in at least 40 percent of all cases

NA = Not applicable

NR = Not reported

(See footnotes at the end of Table 3)

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

Table 2

SUMMARY OF TAX DEPRECIATION PRACTICES: EQUIPMENT 1/

Country	Normal Allowance						Special Allowances					Valuation of Equipment: Dep. Base		Valuation of Equipment: Critical Event				Valuation of Equipment: First Year Convention				Special Provisions				Tax on Gain on Sale	
	Straight Line	Declining Balance	Facts & Circumstances	Other (e.g. SYD)	Useful Life	Whichever	Accelerated Dep.	Additional Deduction	Tax Credit	Cash Grant	Tax-Free Reserve	Includes Taxes	Includes Installation	Installation	Acquisition	Payment	Use	One-Half Year	Three-Fourths Year	Full Year	Following Year	Salvage	Longer Life	Obsolescence	Multiple Shifts	As Ordinary Income	Reduced Rate
Australia	X	G	X		X		X	G				X	X				X	X					X	X	X	X	3/
Austria	G				X	NA	G				X	X	X				X	X				X	X	X	X	X	
Belgium	G	X	X			X	X					31/	31/		X					X			X	X	X	X	5/
Canada	X	G				NA	X	X				X	X		X					X						X	6/
Denmark		G				NA	X			X	X	X	X		X				X							X	
Finland		G				NA	X	X			X	X	X				X			X						X	10/
France	X	X			X	X	X		12/			X	18/				X	X						X	X	X	11/
Germany	X	X			X	X	X	X		X		X	X	X					X						X	X	
Greece	G					NA	G					X	X				X	X				X		X	X	X	14/
Ireland	X	G	X		X	NA	16/	17/		X		X	X				X				X				X	X	19/
Italy	G					NA	G			X		X	X				X	X				NR	NR	NR	NR	X	
Japan	X	G			X	2/	G					X	X				X	X				X		X	X	X	
Luxembourg	X	X			X	X	X	X	G			X	X		X				X			X		X	X	X	
Netherlands	G	X			X	NA		X		X		X	X				X	X				X	X	X	X	X	20/
Norway	G					NA	X	X			X	X	X				X	X					X	X	X	X	
Portugal	G					NA	X				X	X	X				X			X		X		X	G		8/
Spain	G	X			X	NA	X		22/	22/	X	X	NR				X	X					X	X	X	X	21/
Sweden	X	X	X			X	X	24/			X	X	X	X						X				X	X	X	
Switzerland	X	G					X				X	X	31/				X	X						X	X	X	23
Turkey	X	G			X	NR		G				X	X			X				X				X	X	X	
United Kingdom	27/	G				NA	G			25/		X	X			X				X						X	26/
United States	X	G	X		X	X	X	G			X	X	X				X	X				X	X	X	X	X	29/

X = Applicable

G = Frequent practice; applies in at least 40 percent of all cases

NA = Not applicable

NR = Not reported

(See footnotes at the end of Table 3)

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

Table 3

SUMMARY OF TAX DEPRECIATION PRACTICES: INTANGIBLES AND MISCELLANEOUS 1/

	Intangibles						Miscellaneous		
	Normal Allowance			Special Provisions			General Provisions		
Country	Straight Line	Declining Balance	Facts & Circumstances	Deduction 29/	Useful Life	Shorter Life	Inflation Adjustment	Lower Book Depreciation	Depreciation in Deficit Year
ustralia				33/				X	X
ustria	X				X	X			X
elgium	X		X			X			
anada	X	X						■	
enmark	X							X	
inland	X				X	X			
rance	X			X		X			
ermany	X			X		X			X
reece				28/			X		X
reland	X				X			X	
taly	X		X		X	NR			NR
apan	X			X	X	X			X
uxerbourg	X			X		X			
etherlands	X			X	X				X
orway	X			X					
ortugal	X			X	X				X
pain	X			X					X
weden	X	X		28/		X			
witzerland	X	X				X			
rkey	X	X			X				X
ited Kingdom	X			X	X		■		
ited States	X			X		X	X		X

Applicable

Frequent practices, applies in at least 40 percent of all cases

Not reported

(See footnotes after table)

Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

Footnotes to Table 1, 2 and 3

1/ All provisions are effective as of January 1972, unless otherwise specified.

2/ Practice allowed with approval of tax authorities.

3/ In the case of used asset, acquisition.

4/ Taxable gain may be written off against the value of a new asset.

5/ Gain exceeding cost, less accumulated depreciation, is taxed at preferred rate if asset has been held for over 5 years.

6/ Excess of gain over original cost was tax-exempt on sales before January 1, 1972. Since then, one-half of excess is included in taxable ordinary income as capital gain.

7/ Certain forms of accelerated depreciation are available for assets first used between 1968 and 1970, to be claimed for taxable years 1970 through 1973.

8/ Taxed as capital gain.

9/ Gain is tax-free if taxpayer owns the land where building is situated for more than 10 years.

10/ Gain is deducted from book value of the taxpayer's remaining equipment, reducing their depreciation base.

11/ Gain on sale of an asset held for over 2 years, in excess of accumulated depreciation, is taxed at a preferred rate.

12/ Tax credit for assets delivered between 1966 and 1970.

13/ Gain is not taxed.

14/ Gain may be used to reduce depreciation base of new or existing equipment.

15/ Gain is not taxed when it exceeds accumulated depreciation.

16/ Accelerated depreciation for certain assets is available only between April 1971 and March 1973.

17/ Additional deductions for certain assets are available only between April 1971 and March 1973.

18/ Allowed as current deduction if installation costs do not produce a rise in the value of the asset.

19/ Gain from building held over 5 years which is reinvested within 2 years is not taxed.

20/ If asset is replaced within 4 years, gain may reduce the book value of the replacing asset.

21/ Gain from sale of an asset by an individual is not taxed if it was held for over 3 years.

22/ Tax credit and cash grant effective for assets ordered between December 1971 and June 1972.

23/ Gain from asset held over 2 years is taxed at a preferred rate.

24/ Additional deduction effective for equipment acquired during 1971 or 1972.

25/ Cash grant available for asset purchased before March 1972.

26/ Gain in excess of original cost is taxed as capital gain.

27/ Since March 1972, asset cost is currently deductible.

28/ Current deduction allowed for certain intangible assets.

29/ Deduction allowed when asset is sold, worthless, or has declined significantly in value, unless otherwise specified.

30/ Useful life determined on a case-by-case basis.

31/ May be treated as part of depreciation base or as current deduction.

32/ Salvage deducted from depreciation base, if value of the land is high compared to the value of the building.

33/ Annual deduction over legal life.

34/ Longer life available for improved assets only.

35/ A builder who owns the building under construction may claim interest and taxes as current deductions.

Appendix VI-A

Table 4

ELIGIBILITY CRITERIA FOR SPECIAL ALLOWANCES: BUILDINGS

Country	Accelerated Depreciation 4/					Additional Deduction 2/ 6/			Tax Credit 6/		Cash Grant 6/		Tax-Free Reserve 4/
	All Building	Type of Building	Region of Use	Activity	Other	Type of Building	Region of Use	Activity	Activity	Other	Region of Use	Activity	Activity
Australia			5/	5/									
Austria				X									X
Belgium			X										
Canada		X						X					
Denmark		X	X		5/						3/		X
[illegible]land			X	X			X						X
France				X								5/	
Germany		X		X	X		X				1/	1/	
Greece		5/	5/	5/									
Ireland		1/				X		5/			3/		
Italy	X												
Japan			X	X	X						3/		
Luxembourg		X							1/				
Netherlands			X										
Norway		X					X				2/		
Portugal					5/								X
Spain			5/						5/	5/			5/
[illegible]den	X				X								5/
Switzerland					5/								X
Turkey							X	X					5/
United Kingdom		X	X								1/		
United States													

X = Applicable

1/ Does not reduce depreciation base

2/ Does not reduce depreciation base unless otherwise specified

3/ Reduces depreciation base

4/ Reduces depreciation base unless otherwise specified

5/ Effect on depreciation base not reported

6/ Eligibility restricted to indicated criteria

Source: Kopits, George, International Comparison of Tax Depreciation Practises. Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

Table 5

ELIGIBILITY CRITERIA FOR SPECIAL ALLOWANCES: EQUIPMENT

Country	Accelerated Depreciation 4/					Additional Deduction 2/ 6/				Tax Credit					Cash Grant 6/		Tax-Free Reserve	
	All Equipment	Type of Equipment	Region of Use	Activity	Other	Type of Equipment	Region of Use	Activity	Other	All Equipment	Type of Equipment	Region of Use	Activity	Other	Region of Use	Activity	Type of Equipment	Activity
Australia			5/	5/		5/		X										
Austria	X																	X
Belgium		X		5/														
Canada		X	1/	1/				X										
Denmark		X			5/										3/			X
Finland		X	X				X											X
France				5/							3/							
Germany			X	X	X	X									1/			
Greece		5/	5/	5/														
Ireland	X	X					X								3/			
Italy	X														3/			
Japan			X	X	X													
Luxembourg				X				X		1/			1/					
Netherlands									1/						5/			
Norway		X					X											X
Portugal		5/																5/
Spain			5/									5/	5/		5/	5/		5/
Sweden					X				X									X
Switzerland					5/													5/
Turkey							X	X										
United Kingdom	X														1/			
United States	X			X						1/							5/	

X = Applicable

1/ Does not reduce depreciation base

2/ Does not reduce depreciation base unless otherwise specified

3/ Reduces depreciation base

4/ Reduces depreciation base unless otherwise specified

5/ Effect on depreciation base not reported

6/ Eligibility restricted to indicated criteria

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 5 on Depreciation Practises, August 1973.

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Table VI-

CORPORATE INCOME TAX RATE, BY COUNTRY

Country	Statutory Tax Rate 1/ (Percent of Taxable Income)
Australia	47.5
Austria	44.0
Belgium	33.0
Canada	50.0
Denmark	36.0
Finland	43.0
France	50.0
Germany	33.0 2/
Greece	38.2
Ireland	50.0
Italy	43.8
Japan	31.4 2/
Luxembourg	40.0
Netherlands	47.8
Norway	26.5
Portugal	21.8
Spain	32.8
Sweden	40.0
Switzerland	7.6
Turkey	25.0
United Kingdom	40.0
United States	48.0

1/ Basic national tax rate effective January 1972. For further explanations, see Appendix B, item IV, E.

2/ Average of tax rates on retained and distributed income.

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

Table VI-C-1

CAPITAL COST INDEX FOR MANUFACTURING, 1/

BY COUNTRY

Country	Buildings	Equipment	All Assets 2/
All Countries, Mean	135.1	115.3	120.0
Australia	190.5	123.8	139.8
Austria	138.4	113.4	119.4
Belgium	124.2	111.8	114.8
Canada	160.0	134.3	140.5
Denmark	127.5	114.2	117.4
Finland	134.3	115.1	119.7
France	150.8	120.8	128.0
Germany	136.5	113.7	119.2
Greece	118.7	111.2	113.0
Ireland	158.6	123.3	131.8
Italy	125.6	113.8	116.6
Japan	128.4	110.6	114.9
Luxembourg	146.7	112.3	120.6
Netherlands	141.3	133.1	135.1
Norway	125.1	114.1	116.7
Portugal	115.4	108.1	109.9
Spain	134.0	117.3	121.4
Sweden	135.8	111.0	117.0
Switzerland	105.0	102.2	102.9
Turkey	112.7	106.8	108.2
United Kingdom	122.5	107.5	111.1
United States	149.8	116.5	124.5

1/ Based on the capital cost index for selected asset types listed in the Tax D[illegible] ciet[illegible] Survey (Appendix B), Buildings: median index for factories and machine shops, [illegible] mean of the median index for equipment types under each manufacturing industry ([illegible] related, chemicals, petroleum refining, iron and steel, metal working, textiles, and [illegible] and paper). The base (100) stands for absence of taxation.

2/ Obtained from applying weights .24 and .76 to the index shown for buildings and equipment, respectively. These weights are derived from the 1968 percentage distribution [illegible] gross investment between structures and equipment in U.S. manufacturing (most recent data as reported by Musgrave et al. (1971, p. 451).

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

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Table VI-C-2

MEDIAN CAPITAL COST INDEX,[1] BY COUNTRY AND BY ASSET GROUP

Country	Buildings	Equipment Groups 3/											
	All	Agriculture	Building & Office	Construction	Food & Related	Chemicals	Petroleum Refining	Iron & Steel	Metal Working	Textiles	Pulp & Paper	Transportation	Utilities
All Countries, Mean 2/	138.0	111.8	115.7	111.9	114.0	114.4	116.3	117.2	115.0	114.1	116.0	114.5	120.2
Australia	190.5	103.0	142.6	123.7	117.4	127.7	121.8	113.0	138.6	127.7	120.4	124.3	144.5
Austria	141.4	110.7	113.7	110.0	114.0	114.4	112.5	114.9	113.1	111.2	113.9	109.9	117.2
Belgium	131.3	109.4	110.7	109.4	111.8	110.7	110.7	115.4	111.8	110.7	111.8	111.7	110.7
Canada	160.0	123.7	127.3	123.7	127.3	127.3	127.3	160.0	127.3	127.3	143.6	127.3	155.6
Denmark	127.5	112.0	112.0	112.0	112.0	112.0	127.5	112.0	112.0	112.0	112.0	112.0	112.0
Finland	134.3	115.1	115.1	115.1	115.1	115.1	115.1	115.1	115.1	115.1	115.1	115.1	115.1
France	150.8	117.0	123.7	117.0	118.9	122.0	118.9	123.7	123.7	118.9	119.6	118.7	122.0
Germany	136.5	112.5	112.2	109.9	112.5	112.5	116.1	117.5	112.2	111.6	4/	112.9	118.3
Greece	129.8	114.4	116.9	111.0	111.0	111.0	112.2	111.0	111.0	111.0	111.0	118.6	118.6
Ireland	158.6	116.5	122.4	119.4	122.4	122.4	122.4	124.9	122.4	124.9	123.7	128.5	123.7
Italy	125.4	111.5	114.8	112.2	113.2	113.9	112.1	115.4	112.9	113.9	115.3	113.1	117.1
Japan	129.3	107.0	112.8	107.8	110.2	110.0	109.0	112.8	111.3	108.5	112.3	110.5	112.8
Luxembourg	153.7	111.9	111.9	109.8	111.4	113.0	4/	114.7	111.1	111.1	4/	110.2	4/
Netherlands	148.0	126.2	130.9	118.7	130.9	130.9	146.5	130.9	130.9	130.9	130.9	130.9	146.5
Norway	125.1	111.5	116.1	111.5	111.6	115.2	115.8	115.8	114.5	110.6	114.9	110.6	115.8
Portugal	120.5	106.8	108.7	106.4	108.7	107.1	106.8	107.5	107.5	108.7	110.5	107.6	108.7
Spain	131.5	115.6	117.7	112.8	116.5	115.6	116.5	122.0	115.6	116.5	117.7	117.4	118.9
Sweden	142.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Switzerland	105.7	103.3	102.7	101.9	102.1	101.9	102.9	102.1	102.1	102.1	102.5	101.9	102.9
Turkey	118.6	103.3	105.8	104.0	108.6	105.8	110.8	107.1	104.7	104.7	105.6	103.9	110.8
United Kingdom	122.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5	107.5
United States	153.4	108.9	108.9	106.8	114.3	109.6	119.9	123.5	114.3	114.3	119.9	116.0	133.8

1/ Median of the capital cost index for asset types, listed in the Tax Depreciation Survey (Appendix B). The base of the ind (100) stands for absence of taxation.

2/ Arithmetic mean of the median capital cost index of each country, for each asset group.

3/ Defined in terms of the activity for which equipment is used.

4/ Not reported.

Source: Kopits, George, International Comparison of Tax Depreciation Practises, Report prepared for the OECD Committee on Fiscal Affairs, Working Group No. 32 on Depreciation Practises, August 1973.

A Summation and Selected Views on the Search for Paths to More Effective Development

Underutilization of industrial capacity is widespread and it would seem to be a problem on which economic analysts and advisors for both developed and less developed countries can share a common interest. Perhaps the best lead could be given by a reform of the general inducement practices that operate against more intensive use of capital and greater efficiency in the developed countries, but the impact of underutilization is significantly more severe in the less developed countries, which can afford it less, so the lead may devolve on them. The questions which bear on these efficiency issues are likely to grow more pressing when the pace of growth in developed countries slows, as has been happening recently due to economic recession, or in longer-terms if they were to choose policies which give stronger force to ecological and social objectives, or because their population curves show signs of abating. In any case, the length of cyclical turns within a secular trend may offer significant obstacles for the timing of changes and plans for accelerating growth, production and social advancement in the less developed countries.

Even if the international sources of concessional aid show changes in the balance among contributors, it would be less than advantageous for all concerned to be indifferent to the effectiveness with which such funds are used. The enlarging direct role

which oil-producing donors might play is not likely to change that. At least so far, large donors whose investment funds derive primarily from earnings on petroleum operations have proven they intend to exercise a strong concern for the security of their capital in selecting the channels through which they would be willing to see it employed in less developed countries beyond their own borders. Such a concern compels an interest in more effective investment.

Social and economic analysts have a mutual interest in what becomes of the fruits of productivity and production.

Do employment, labor welfare, social objectives, or foreign contribution of capital permit indifference to the effectiveness of investment in yielding maximum returns from its most intensive use? Does it obviate the need for efficiency?

It appears Currie[1] may have been one of the first of the present wave of distributionists. He argued on efficiency and impact grounds; i.e., modern investment programs cannot affect the productivity of all workers at once, directly, where they are. He therefore proposed to increase the productivity of the least productive (the virtually unemployed) through setting non-agricultural employment targets, to be reached through heavy focus on investment in housing, increase in government services, and increased production of wage goods. Currie was far from expecting this approach to counter increasing urbanization. He assumed that the practical employment-creative processes would continue to siphon people out of farm employment (or stagnating nominal employment), but that state-generated and assisted programs would be directed to employing them, either by adding to the number of employed, or by lengthening the number of days of effective employment they were able to find during the work year. He also assumed some focus on activity that would (ultimately at least) generate the products for the satisfaction for such

1. Currie, Lauchlin, Accelerating Development: The Necessity and the Means, McGraw Hill Book Company, New York, 1966.

workers of their already pressing needs and on meeting an enlarging effective demand. It is clear that his approach depended heavily on intensified use of facilities already in existence. Since he deemed the improvement of the institutional factor in systems of adjustment and allocation to be a long term contribution to resolving problems of financing and easing frictions, his logic led him to propose programs of direct public management intervention, such as price control and rationing. He specifically argued, then, that "more important than achieving a certain rate of per capita growth in income is achieving a much greater equality."

The notion that a definition of profit sharing can be applied, which includes a public interest share, was raised quite early. Currie attributed its expression to Lyndon B. Johnson.

Some have suggested a development focus on strategic industries, proposing that in the presence of imperfect competition, the strategic industries should limit their wage advances to the average national gain in productivity. If their productivity were to increase faster than the average, their adjustment should take the form of lower prices, rather than higher wages.

Currie argued that this policy would be inconsistent with the profit-sharing which Latin American social and political theorists have favored, because profit sharing would absorb all the gains from growing productivity. If the pattern in an industry led profits to fall below the general return on capital, forces would be set in motion to redress these relative falls, i.e. it would push prices up.

A government which is going to accept large amounts

of external local-cost financing, because it believes itself unable to exact the resources from its own citizenry, has even greater problems to face in opting for equalization by growth, let alone with growth reduced to a lesser priority. However, with a low priority on growth, it may be losing both growth and opportunities to increase the degree of equality reachable with upward mobility. Advance and overt evidence of advance may be more important than equality when short and long term considerations are taken into account.

A substantial increase in voluntary saving is possible, to increase domestic initiative for investment, when growth advances are continuing, though not if moralistic or theological views about interest rates discriminate against savers who might be attracted into formal money channels, while the uses of such savings are allocated officially at rates of financial and productive return well below their scarcity value. At least this seems to have been the experience in Korea and Taiwan. What the more doctrinaire planners in less developed countries imply when they say it is a matter of political choices, not of economic ones, and then argue that a socialist, communist, or at least a centrally-administered solution is required in their situation, is that public compulsory action will produce the higher saving that the signal system has not evoked from private sources. In viewing problems of lagging regions, like East Pakistan (now independent Bangladesh), for example, one economic observer and participant argued for public investment on the ground that even radical capital cheapening inducements had not proved enought to bring the rate of private investment to the level the case appeared to need. External obeservers have to assume that the prospective rentability of the proposed industrial enterprises, sought to generate the diversified industrial advance desired for the

lagging area, was not sufficiently attractive to draw private entrepreneurs.

The Indian experience probably affords more documentation of application of the "gap-filling" principle of the role of the state than do many others. It is a less developed country which has adopted the principle of mixed structure of private and public production roles in its strategy for economic and industrial development. It was already even at the start of the first five year plan, one of the world's larger industrial producers and both the styles of production and the forms of organization show elements of considerable sophistication.

In principle, in such a case, the government, in addition to any role reserved for its own investment ab initio, intervenes by itself taking over directly the investment-development action desired, or called for by a plan mode, when the private sector has demonstrably failed to fulfill the investment role set out for it. However, if the market and price guidance are contradictory, and the administrative controls applied by the government yield distortions of the cost, production and market prospects of the investment, one might well question, where in the dogma the higher priority lay? . . . the maintenance of controls, the interventionist investment role, or the final product for which the investment was presumably desired in the first place? . . .

If an investment cannot be made to yield reasonably competitive returns under "normal" conditions and for practical non-policy reasons, the government will face the same poor prospects for the productivity of the investment and the marketing of the output for which the state will be responsible, as the private investor might have. Deficits borne by the public fisc are paid by the taxpapers

and the distribution of the tax burden is not in general more progressive in effect among the LDCs than under the more sophisticated "progressive" administrations in the more advanced countries.

If in fact distortions introduced by the control system itself have helped to make the investment unattractive, the Government when it takes on the investment for itself, must be quite clear on the effect of these distortions, whether they run to the project, as an entity, or only to the private entrepreneur (that must be a rarity). The government must also be quite clear on what it might have to do to free the project, as a government entity, from the distorting effects already created by some of its other actions. If the reliefs from the control system are recognized to be needed, there would seem to be adequate grounds for reconsidering the whole sequence of decisions. Or in the reverse and more common case, where the impact of the inducement system and control priorities have been applied to offset basic economic factors that make the project unattractive to private entrepreneurs, the same factors must be addressed by the government, unmasked by the distortions introduced by the inducement and control system.

Some planners have argued that private entrepreneurs are too greedy to be allowed their way, whereas the government would exercise a higher morality for the higher social good in administering and managing operations in the facilities resulting from its investment intervention. However, if the real problem is that the projects have long gestation periods, little responsive to whether the projects are generated by private initiative or effected by the government, that, once in place, they are operated at less than capacity, that they have

managerial problems, which affect the efficiency of their production and the quality of their product, then the ultimate payer on whom the burden of these inefficiencies rests, whether in his role as consumer of the product or taxpayer covering deficits, might be forgiven for doubting that a higher social morality had in fact operated to improve his lot.

This observation, however, raises questions about the whole process of public saving methods and uses. The public fisc, substituting itself for the private entrepreneur, succeeds, at a minimum, to his share of the produce. Conceivably, it could squeeze its workers or the general consumers more trenchantly than private entrepreneurs might do. The public enterprise may prove incapable, under the circumstances governing the original choice and timing of the investment and its operating conditions, of generating enough return for its maintenance, or it may reach such a stage only after inordinate delay, time counted in decades rather than months or years. The prevalence of operating deficits and underutilized capital offer prima facie cases of such failures. How, then, can such a project generate savings for further investment in its own or other fields of activity? By squeezing the maintenance of the capital? These methods are destructive of the prospects and possibilities of further rapid achievement of industrialization or indeed of the linkages to general sustained growth.

If the profitability in a prospective project is not deemed adequate by the private entrepreneur to induce him to make the investment, what is it that leads the state to consider it an efficient allocation of scarce resources? Some participants in such efforts answer that the low-or-no-return investment is forced on them to make up for past lack of investment, or that its low return will be overcome in time, or that social necessity for action is

overriding. Anyone is likely to make some mistakes, but, if we are 20 years older in experience, ought we not to benefit by twenty years of broader observation, not to say wisdom? The donors might be well within their prerogative to define as anti-development a haunting answer repeatedly offered by observers otherwise more sophisticated. These argued that the donors were fickle and their financial support is not reliable. Therefore, investment in facilities can--nay, should--be acquired while concessional financing is available. If the facilities in place proved untimely (i.e. significantly underutilized) time would catch up with them and their existence would be justified by more intensive use later on, when perhaps the flow of concessional aid would be less favorable, less flexible, or, at least in terms of net flows, non-existent. In its most respectable short term form, this is the hump argument.

The rationalization for what may be an Alpine range instead of a small irregularity, overlooks the impact of the unutilized capacity, which has capital service costs diverting resources from potentially more productive current uses, which depreciates and grows obsolete, and which raises replacement demands, all possibly before it can come into full or optimum (recognizing true full cost) productive use. The cost of production in such underutilized plants may be noncompetitively excessive, even when the financial cost of the capital to the enterprise and to the entrepreneurs for their initial share of the investment has been understated. The project plans and evolution of project feasibility prepared for analysis of such plants may not have projected (even in a second and more private set of books, assuming these might be a necessary defensive gesture

for some more reluctant entrepreneurs) so serious a degree of under-utilization as actually occurs. If this is so, some potential market prospects are excluded by inability of the enterprises to reduce costs and lower selling prices.

Furthermore, the cash flow problems of the enterprise may generate demands and requirements for current operating subsidies over and above the initial capital-cheapening subsidies, or profit-raising subsidies applied to induce the investment in the first place. How the resources for such additional subsidies are generated determines who actually bears the burden of providing this sustaining support for misguided scale, location, or timing of investment, or for its subsequent resource-wasteful management. The form which this burden takes and where it ultimately rests depends on the general distribution of fiscal burdens in the state and country. It is reasonably clear that the balance of the burden of taxation, even moderated for the delivery of services by the state, must in significant measure be met by drawing from those areas where most of the income is generated, or from those activities for which most of the income is used.

In an economy in which the whole industrial sector is producing between 10 and 20 percent of the gross national product at factor cost, the central control of that sector can hardly resolve the problem of saving for the economy as a whole, and often not even for the accelerated growth of this part of the economy alone. If allowances have to be made, in addition, for failure to put the existing capital fully to work--i.e. to extract from it the maximum (or the optimum) product which it is technically capable of producing, bringing its technical and economic capability closer together, and for which at least in the case of any finite project, it was presumably

selected--the inadequacy is compounded, and centralized control of the unit will not compensate for the missing production.

The trouble with supporting, or even merely tolerating systematic inefficiency (let alone encouraging it by creating fertile ground for the kind of decisions that lead to it) is that it leads to more of the same. There is no automatic way out--the lame, the halt, and the blind do not wake, on one morning of miracle, capable of running and seeing with, or better than the rest.

To elide again from the profitability arguments, for a "hump" or "transition stage" question: if one argues that society pays as a whole, and will make up, for the general social good, for the inefficiency and inadequacy generated in some parts, then there has to be some area of production capable of yielding a sufficient surplus to permit siphoning off resources for this purpose. The additional capital investment, or even premature capacity, generated by capital encouraging distortions (or required to meet social objectives, like pollution control) if not paid for by product proceeds, results, one way or another, in reduced return to capital. The productivity of the capital is reduced in the absolute quantitative sense and profits are reduced in value (which also has a qualitative sense).

If profits are allowed to deteriorate to non-competitive levels how is capital to be maintained? Attraction/incentives can be provided via the public fisc, but that reflects whatever degree of impact or incidence of burden bearing the general tax system allows. As already remarked by competent observers, the share of total income generated by the top 1 percent, 5 percent, or 10 percent of the income recipients is not sufficient, even if it were all to be allocated to the State, to meet the purposes of the modern state, including its

support of general investment.

Thus whatever the political starting point, economic onsiderations for sustaining the system fall on the bulk of the income producers, and as is clear, one way or another, on the consumers whose demands for the products are satisfied in the process. Is not more choice left to the individual, more degrees of freedom, more flexibility, if the product price reflects all the real costs and the consumer can then choose among the real costs for the satisfaction of his own and the national priorities?

Where does or should one stop? As a matter of public policy certain services are chosen and their price is included in the total public fisc, but not as a clarification of the individual burden of these choices. These are defined matters of political import or welfare import considered too important to the measure of a citizen to be overlooked and which the polity has agreed should not be left to the full determination of the market.

All the discussion of productivity and factor product/return underscores the very real need to look at questions of resource flows and growth in detail and on a gross basis--not merely as net differences. This is a point the significance of which extends all the way down the line to the review of financial flows of aid, those guides to the flow of real resources supplementing those already domestically available to a developing country.

A similar set of arguments applies in balance of payments analysis. GNP use for analytical purposes can be managed by dealing with nets changes, but analysts cannot predict the directions of gross change, identify bottlenecks, or deal with equity problems except

on a gross basis. The long range and repetitive nature of the development problems also speak for stating explicity the whole range of considerations through which selected goals are chosen.

We have had no shortage of doctrine for development since 1946, and are obviously in the throes of a new round of zealous prescription. Doctrine has come up against chains of experience suggesting that, in significant measure, the proposed solutions foundered, not because they overlooked labor or employment, but on the gross economic inefficiency of:

a) initial choices of investment;

b) means used to put investment in place;

c) ineffective policies for management of created facilities, ineffective, non-maximizing and non-optimizing production, productivity and returns.

Such ineffective investments cannot effectively play the other social roles which doctrine predicated, because the investment does not generate the necessary resources to do so. Thus, if a country chooses to go by the route of forced investment, valuing the creation of facilities beyond their product, either the social role failures are concealed by sleight of hand, or, the squeeze on consumption may be openly moralized (early Russia, modern China), or the squeeze on general consumption may be concealed by using the general tax system and other factors in the control systems (as is possible where private operations remain the predominant fact) to generate the necessary subsidies to keep the industry sector working even as ineffectively as it does.

A review of the experience of the last several decades brings one back to the fundamental importance of reducing the initial distortions in decision making and of devising maintenance systems which

minimize distortion. These two aspects of a prime policy need present a major difficulty, even when one knows with some precision what the distortion minimizing course is. This is not always the case, with the approximations available to observers and policy makers for analysis. A big share of political life relates to putting an acceptable surface on a sequence of compromises that were worked out to permit either stability or progress in any direction. Politics in the democracies is in principle the art of carrying on the necessary courtesies to permit the polity to get on with the accepted official operations and to let the rest of the socio-economic action fill the place in the arena designated for it.

Thus it may be more convenient politically for a government to let the transport system serve the Defense Services, without direct budget transfers between the two systems (letting the railroad show a deficit or a smaller return over costs) than it would be to enlarge the defense budget. It is well for the economist to focus on the economic fundamentals affecting the choices, thus deepening the understanding of the factions that must be placated to reach and execute one form or another of necessary compromise

This would leave for the politicians the adjustment of the political compromises needed to reflect the fundamental revelations of the technicians.

Given the tax and allocation systems characteristically patched together by the less developed countries, it is their poor who pay for the mistakes. However, looking at taxation in the strong-holds of progressive taxation, i.e. the countries of the democratic west, with their much heavier social programs, it is still true that the major

share of tax-contributed resources which are generated directly for use at home, or are contributed as foreign aid, represent a burden on the relatively poor. Thus the argument that rich countries surrender little by contributing to poorer countries has poor standing when resources are proven to have been applied under policies and to activities with low yields.

There is no dearth of economic advice that offers the general prescription for less developed countries to find less distorted means of generating the investment they desire for growth and improvement...Avoid overvalued exchange rates (undervaluation has been much rarer). Let the relative scarcity of financing be reflected in effective interest rates. Allow realistic and flexible prices and commercial markets to do more of the job of allocation of resources for productive investment and distribution.--I share the predilections already expressed by others.

It may be difficult for socially dedicated officials to accept that chance working out of market relations may come closer to their chosen objectives than the elaboration of administrative controls, a fiscal and financial policies that in operation hardly approximate the elaborate structure sketched when they were launched. The more administrative measures are taken to tilt the flow of resources in defiance of the real scarcity relationships, the more the users in their market relations contend to tilt it back to their advantage. For instance the diversion or allocation to certain borrowers of financing at subsidized low interest rates for investment and working capital tends to raise the rates asked to meet the requirements of

others. Sometimes these market adjustments reflect the greater risks entailed in serving these other categories of borrowers, but in any case the shifts and real effective rate patterns are a response to the artificially increased scarcity of resources for their use. Participants in the exchanges have no difficulty in devising measures that will circumvent such constraints as official limits on interest rates for certain loans, such as commitment fees, commissions, securities, guarantees, service payment regulations, and other ties and requirements. The financial allocations "available" are universally short of ostensible "requirements," because subsidized interest rates attract borrowers to the source, which cannot meet all the demands on it. It is only natural for the lender to seek the best borrowers for distribution of his subsidized resources, even though these are among those most likely to have been able, or close to able to manage their business in the context of market-determined rates.

The manager responsible for distribution of the subsidized credit is looking for the best record he can make; in terms of the search for greater productivity it is even desirable. The end result, however, may be a not-so-obviously-different distribution of credit resources than was designated by the officially prescribed set of targets.

The focus of narrow development strategies at the point of investment, over the last two decades, encouraged the use of capital cheapening inducements to investment, which in their turn did little or nothing to counter traditonal levels of planned idleness of capital, or to stimulate intensification of capital use. The losses of

production and productivity elevate apparent continuing new capital requirements for increasing employment and undermine the potential competitiveness of the realized production.

If, as we think, businessmen seek profitability within the system of price signals under which they operate, it is worth exploring whether elements in the structure cannot be refocused to give more encouragement for increasingly intensive use of capital, whether in existing facilities, or those yet to be planned.

The specific devices considered, as partial or complete alternates for, or as additions to the existing arsenal of widely accepted capital cheapening and other invesment inducements, included applying premia for desired industrial production and capacity taxation.

Premium schemes were deemed in essence only suitable as short term tools, tiding over a brief transitional problem, by meeting extra costs, forestalling their short term impact on the market, and assuring the producer against the risks of incidental short term misjudgments of the market stemming from the unusual conditions of the transition.

Capacity taxation, viewed as a means of making up for misrepresentation of values elsewhere in the system, seems unlikely to be a sufficiently powerful tool. It is certainly not as flexible and evocative of response as the price system itself can be. Intentionally or not, the effort to provide exact equity by detailed administrative intervention will be discriminating against one industry or plant and another. It is uncertain that, as a fixed

tax, the capacity concept of the base for taxation adds or changes much that could/be derived by straightforward property taxes on appraised value (original value, amended at intervals).

Tax preferences, holidays, and outright exemptions are only incidentally related to intensity of capital use. Most of them were originally intended as transitional instruments, tiding the enterprise over its initial "start-up" difficulties, usually expected to be unsatisfactory compared to long term expectations of operating income. The specific rate of capital use plays no role in determining the life or size of the concession. It is hard for the taxing authority to determine exactly what the public fisc will be surrendering when partial tax holidays, or exemptions from income tax are granted, even when the exemption is limited to a specific term of years. If the firm were to make no profits and there were no adequately compensating carry-forward provisions for losses, the state and the enterprise might be quite without gain or loss to either. There are many hazards in predicting future enterprise profits; successful intensive operations, good management, market boldness may accrue for the enterprise far more in tax free benefit during the tax holiday period than the government might have assumed it would be relinquishing from the public fisc when the principles of the relief or inducement were set out.

Compared with tax holidays, tax preferences, and tax exemptions, there is one advantage to depreciation-based concessions, as seen by an economist or a Secretary of Finance. A depreciation-based

concession has a definite and known limit, and the allowable accounts are regularly recorded in books of account, financial statements and tax records. If the depreciation is limited to recovery of original cost the definitions remain rather simple; if, recognizing the replacement problems of enterprises under rapidly changing prices, revaluations are made to allow recovery through depreciation sufficient to meet actual replacement costs, the depreciation method will be more complex, but still manageable.

Accelerated depreciation practices based on initial allowances or shortened life offer no help in stimulating more intense use of capital, either at the planning stage or later.

Instead it has been suggested here that capital recovery rates be more closely tied to actual rates of capital use. This can be done by using time measures, or combined time and labor force measures, which are easier than unit production measures, or level of production measures. Double standard depreciation might be allowed for double shift working and so on. Provision should also be made to include adjustments for replacement cost requirements. While capital recovery costs may not be high in themselves, they are important to the entrepreneur, representing over two thirds of funds retained in the enterprise for operations, capital replacement, and expansion. The justified increase of these allowances, when output is increased by more intense use of capital, may be very significant for the entrepreneur. No panacea can be seen in this measure, but it would be a step in the right direction, consistent with objectives to increase the efficiency of capital, increase production and increase employment at lower capital cost.

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