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INDUSTRIAL PERFORMANCE AND GOVERNMENT CONTROLS

by

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INDUSTRIAL PERFORMANCE AND GOVERNMENT CONTROLS

Samuel Paul*

India's industrial performance has attracted a great deal of attention in recent years largely because of the state of stagnation, both in terms of industrial output and investment. Government has come in for considerable criticism on account of its policies and procedures which are alleged to have contributed to the present state of affairs. Government spokesmen, on the other hand, seem to be of the view that industry is indifferent to growth and is not taking advantage of investment opportunities. It has also been argued that our industrial development has been lopsided, having contributed to greater concentration of economic power and monopoly, rather than to growth with social justice. This is one of those happy situations about which one could say that there is a lot of truth in both arguments. It is true that our industrial development or for that matter, whatever development has taken place in the country, has benefited the richer rather than the poorer sections of the population. It is equally true that government policies have wittingly and unwittingly contributed to this trend as has been shown by various committees and commissions. Further, some of these policies and unimaginative systems of controls have had the effect of slowing down growth,

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and this has been particularly true in the industrial sector. It is not necessary for us to take time to document and support these statements. Others have already done it.[1] I take this as part of the historical background from which we must look ahead.

At this stage, it is perhaps useful to state explicitly that I firmly believe that our future industrial growth must be informed by considerations of social justice. I think that it is appropriate for us to formulate national economic policies which not only provide guidelines for industrial growth, but also the constraints within which firms must operate. These constraints should reflect social and political concerns and be reasonable in that they do not make it impossible for firms to survive and earn reasonable profits. I would prefer this approach to loading industrial enterprises with multiple objectives which confuse them and make it difficult for them to operate. The reference here is to the idea some people have of asking firms to make profits and grow, and at the same time maximise employment, develop the community and pursue all other national goals which only the nation as a whole can do. The mix of multiple objectives that the Parliament must live with and pursue should not be entrusted to the enterprise. The firm's primary competence lies in efficient production and growth and let us utilise it for that purpose but within a framework of carefully thought out constraints which it must observe.

I. Measures and Analysis of Performance

Having stated my personal creed, let me now return to the subject of industrial performance. To begin with, I would like to examine the recent trends in industrial performance in the light of which we could consider issues of policy for the future.

Industrial performance may be evaluated in terms of a variety of criteria depending on the focus of one's analysis. In judging the efficiency of industrial growth, for instance, it is customary to make use of measures of performance such as profitability, and different measures of costs and productivity.[2] In certain environments, it may be meaningful to examine industrial performance in terms of criteria such as import substitution, employment creation and regional development. Industrial development is a multi-faceted phenomenon the analysis of which cannot be attempted in terms of any single criterion.

The criteria which are most popularly used for evaluating industrial performance are profitability and output growth. In our country, businessmen are particularly fond of using the profitability test, the argument being that low levels of profitability, especially in the more controlled industries, have contributed to their low rates of growth. This is a widely held view, although I must confess that I am yet to come across any definitive study that has probed this question in depth. In a private economy, the credibility of such a hypothesis will seldom

be questioned. In an economy teeming with controls, incentives and disincentives both hidden and explicit, and accounting systems and practices of a highly innovative and sometimes mysterious nature, I am not certain that the argument can be taken at face value. I have strong reservations about the adequacy of the profitability criterion in explaining the state of our industrial performance.

The output criterion of performance, on the other hand, is simpler and more straight forward. Though there are conceptual and measurement problems, we can rely upon the output measure to tell us something about what is happening to the industrial sector. The conclusion that industrial stagnation is a severe problem is based on this criterion. Industrial production, it is reported, has declined from 7.1% in 1969 to 4.8% in 1970 and 3.5% in 1971. A more recent report which says that in 1972 industrial output has picked up has been used to show that performance is improving.

A third criterion which is also in vogue, but perhaps less frequently invoked because of the lack of meaningful data is investment growth. That industrial investment is stagnant is often stated, but supported only by bits and pieces of data. Unlike the series on industrial production, we have none on industrial investment. The Reserve Bank of India used to have a series on private corporate investment which has been suspended since 1962-63. The Economic Times has developed its own series based on RBI data, but one does not know how much

reliability could be placed on it. In any case, the series would cover only the private corporate sector. With the growing role of the public sector, this partial picture cannot be of much use in judging the trends in overall industrial performance.

A major limitation of all the three criteria outlined above is that they cannot shed much light on the question of efficiency which is an important dimension of industrial performance. Profitability measures could have performed this role. But for the reasons explained above, I doubt that the profit criterion could be used to draw conclusions about industrial efficiency. Productivity measures would have been more appropriate. However, problems of data are severe and at least I have not come across comprehensive studies of this nature from which conclusions on performance could be drawn.

In several recent studies of industrialisation, the criterion of effective protection rate (EPR) has been employed by economists for evaluating the efficiency of industrial growth. Effective rate of protection of a product is the ratio of its per unit value added at domestic prices to the per unit value added at international prices. The OECD study on India which incorporates Panchamukhi's work on this subject shows that many Indian industries are inefficient when judged by the EPR criterion.[3] However, there are several conceptual and measurement problems associated with this criterion. Until these are satisfactorily

resolved, it is doubtful whether the results given by EPR will be fully acceptable to policy makers and the larger body of economists.

If we analyse India's industrial performance in recent years by reference to the criteria of output growth, investment growth and EPR using all available evidence from various sources, the picture that emerges is rather dismal. Let me now add to this battery of evidence the results of some work I have done recently on another dimension of industrial performance. The focus of my analysis will be on the growth of industrial capacity and its utilisation. These aspects of industrial performance are important for two reasons. Firstly, since our data on investment in industry are rather weak and patchy, it is useful to have a proxy that can serve the same purpose. Investment series are necessarily estimated in money terms and correcting them for price changes is by no means easy. Actually, in terms of investment, our interest is in the addition to capacity which reflects potential output. By aggregating the growth of industrial capacity, we can get a comprehensive measure of the productive capabilities of the system for which we are investing the capital. Secondly, having invested the scarce capital, we should be concerned about how well we are utilising it. Output growth reflects only one side of the coin. If capacity has grown even faster, it is obvious that the rate of utilisation has in fact fallen. Capacity utilisation rates can tell us what scope there is for stepping up output in the short run. Further, such evidence is important in taking decisions

on the long run expansions required in the industrial sector. Analysis of capacity utilisation can provide important insights into the efficiency of the country's industrialisation process. Continued existence of large excess capacity is a luxury which only the capital rich countries can afford.

Available evidence points to an extremely poor record of capacity utilisation in several developing countries. Thus, the rate of capacity utilisation in Pakistan was found to be approximately 31% in 1965-66.[4] Recent studies of Indian industries have similarly revealed the existence of considerable excess capacity in several sectors.[5] Obviously, there is tremendous scope for raising the growth rate of the economy by improving the level of capacity utilisation. In fact, an improvement in the rate of utilisation of capacity will result in more than a one shot increase in output.[6] It will cause the rate of growth of output to rise in subsequent periods because of the interdependence of current output, saving and investment with the capital stock and output of the future. In the process of growth, an increase in capacity utilisation might act as a substitute for permanent reductions in the rates of consumption. Alternatively, it could accelerate growth by increasing capital productivity or effectively reducing the capital output ratio. These are the two routes by which improved capacity utilisation quickens the pace of economic growth.

Capacity utilisation has important implications also for employment generation. When a manufacturing unit moves from single shift to multiple shift operation, its requirement of direct workers tends to increase almost proportionately. Requirements of indirect workers and supervisory personnel will also rise, but much less than in proportion to the increase in the number of shifts. This generalisation would not, of course, apply to all industries across the board. Thus the impact on employment through multiple shifts may have little relevance in the case of continuous process industries such as chemicals and petroluem industries. Batch process industries such as engineering industries of various kinds, on the other hand, may offer considerable scope for increasing employment through fuller utilisation of capacity. The elasticity of employment with respect to utilisation may, therefore, vary from one industry to another. It would seem, on a priori grounds that the "utilisation elasticity of employment" cannot in any case exceed unity.[7] The range of the coefficient will tend to lie between zero and unity. The larger the value of the elasticity coefficient, the greater the chances of bringing down the capital labour ratio through fuller capacity utilisation. In this paper, however, we do not propose to pursue the investigation of the contribution of improved capacity utilisation to the rate of growth of output and employment. Suffice it to say that these are important areas for research in the Indian context in view of the tremendous importance being attached to employment creation.

The problems in the measurement of manufacturing capacity and its utilisation are well known. The basic problem is one of defining the concept of capacity itself. Even if an agreement is reached on the concept there still remains the problem of measurement. Modern industries with their complex technologies cannot easily be analysed in terms of the single product cost curves which seemed to fit the early industries of the nineteenth century. The relevant issues have been discussed at length in the literature though final answers have not been found to the satisfaction of all concerned.[8]

The Concept of Capacity

Economists define capacity as the output corresponding to the minimum point on the average cost curve of the manufacturing unit. Empirical determination of this version of capacity output is indeed difficult, especially in the context of multiproduct firms. However, if most cost curves are L-shaped as Johnston found in a number of his own studies and others that he surveyed, the economic concept may be approximated by the engineering concept of capacity.[9] The latter generally refers to rated capacity or assessed capacity considered feasible under "normal" conditions. Managers and technical experts operate with this definition of capacity which incidentally is the basis of the capacity definition of the CSO. The advantage of the engineering concept is that it is more operational than the economist's concept.[10]

A new and practical way of giving shape to the economic concept

of capacity has been developed by Klein.[11] This is the "peak output" approach to the measurement of capacity. Without going into a full scale discussion of the merits of this method, let me make two observations on its relevance under Indian conditions. 1) In an economy where supply constraints often keep peak outputs at low levels in spite of the availability of large capacities, a peak cannot be regarded as representing the "optimal" output. In other words, it might lead to a gross underestimation of excess capacity. 2) In industries whose production schedules exceed a month or a similar short period, a monthly peak may not truly reflect the real capacity at all. A boiler which is in process for a year may be reported as finished output in one month when the peak will suddenly shoot up. But in fact, it represents production which had gone on for months but was not reported until the finished product appeared. The proper way of measuring capacity under such conditions would be in terms of shifts or shift hours available. Many industries manufacturing custom made items may fall into this category.

For these reasons, we reject the peak output approach to capacity as inappropriate in the current Indian context. Instead, we have adopted a modified engineering approach in the present study as an approximation to the economic capacity of industry. The Monthly Statistics of Production (MSP) of the Central Statistical Organisation reports installed capacities of a variety of industries on an engineering basis. Except for a few continuous process industries, reporting is done on a

single shift basis. This source has several problems in terms of reporting, accuracy and coverage as well as the concepts used in measuring capacity. Even so, it is preferable to the alternative of approaching firms directly for the relevant data. Apart from being prohibitively costly, the latter approach would also have suffered from poor response which other investigators have experienced on other occasions. Since we have used MSP data, it is important to remember that the scope of our analysis is limited to the organised industrial sector only. Similarly, our treatment of the new products for which capacity has been created is admittedly unsatisfactory. This, however, is not a major handicap since in the index of industrial production, only 1.2% of output was contributed by new products since 1961.

In developing the time series on capacity and capacity utilisation, we have modified the definitions used by CSO. Only 18 product groups report installed capacity on a three shift basis in MSP. Seven others report capacity on a two shift basis. The remaining 275 industries or product groups report their installed capacity on a single shift basis. Actually, many manufacturing units in the third category operate on a two or three shift basis, showing thereby that their potential capacity is much in excess of the single shift equivalent. This is obvious since peak outputs in many industries are consistently higher than their reported single shift capacities which can only mean that many units are operating at least on two shifts. Having ascertained current industry practices,

we have recomputed the installed capacity of the industries in the second category assuming 2.5 shifts and for those in the third category assuming 2 shifts. This in fact is a conservative assumption. In a similar study of Pakistan, Winston has assumed 2.5 shifts for all industries.[12] Whether in fact these industries operate on two or three shifts is a different matter. Several factors including government policies or their own inefficiency may have prevented them from doing so. But the fact remains that they have the potential capacity to operate on more shifts than has been assumed in MBP.

Significant Questions

In the area of industrial capacity and its utilisation in India, there are a number of important questions which have not been adequately investigated or answered. What are the patterns of capacity growth in our industries? What is the pattern of capacity utilisation as between industries and over time? Why does a given structure of idle capacity prevail? Is there a set of key variables which can explain the inter-industrial variations in capacity utilisation underlying this structure? All these are questions the answers to which can give us important clues for evolving appropriate policies for improving capacity utilisation.

The purpose of this paper is to examine these questions with the aid of available data. As part of this investigation, we present below a historical analysis of India's industrial capacity as well as

capacity utilisation for the decade of the sixties. In regard to the last two questions, we shall limit the scope of our empirical analysis to a single year, viz., 1965, which was the latest year for which most of the required data were available. A more recent year could have been chosen except for the fact that data on some of the relevant variables were not available beyond 1965. Inspite of the limitations of data, the insights provided by our analysis may have important implications for policy making.

Capacity Growth and Utilisation

Let us now look at the coverage of the study. Of the industries covered by the index of industrial production, we have covered 62% by weight. Of the manufacturing segment, 73% by weight has been included in our study. What are left out are certain seasonal industries such as sugar and tea and some capital goods and other smaller industries for which capacity figures are not readily available. While the coverage is not hundred per cent, it is reasonably comprehensive so that the findings that emerge could be interpreted as fairly representative of the manufacturing sector as a whole.

Turning to the findings of the study, we find that during the period 1960-70, industrial capacity in the organised sector has grown at an annual rate of 5.7%. If we divide the industries into consumer goods, intermediate goods and capital goods, growth of capacity is seen

to have been quite uneven. Similarly, if the decade is divided into three periods, it is seen that the rate of growth has varied from one period to the other. (See Table I for a summary of results and Appendix A for rates of growth by industry).

The major findings of the analysis may be summarised as follows:

1) Growth of capacity during the period under study has been highest in the capital goods and intermediate goods sectors investment in which was deliberately stepped up through planning. These represent relatively new industries in India which started from a relatively small base. This result is therefore not surprising.

2) The rate of growth of industrial capacity has declined from 6.1% in 1960-64 to 4.6% in 1967-70. This confirms the suspicion of many observers that investment in industry has been on the wane. It is significant that the rate of growth of capacity since 1969 has been lower than that during the immediately preceding recession period. This is true also of the capital goods and intermediate goods groups the growth of which appears to have declined substantially since the recession.

3) A rather unusual finding is the steady growth in the consumer goods capacity over the decade of the sixties. The rate was very low at the beginning, possibly a reflection of the great emphasis on the non-consumer goods industries in the Second Plan period. From an average

of 2% growth in 1960-64, the growth rate has gone up to an average of over 4% from 1965. In fact in 1970, the growth of capacity was 12% over 1969, the major industries having expanded being food manufacturing, radio receivers, sewing machines and the like. The growth of consumer goods capacity has been larger than is realised by most people. This is an aspect of our industrial growth which needs to be investigated more carefully.

Let us now turn to the utilisation of industrial capacity. The period under study is 1961-71. Here again, industries have been grouped under consumer goods, intermediate goods and capital goods. (See Table II for a summary of results and Appendix B for rates of utilisation by industry).

The findings of the analysis are summarised below:

1) While the rate of capacity utilisation estimated on the basis of the MSP definition of capacity seems impressively high around 80%, when adjusted for multiple shifts as explained earlier, the average utilisation rate is no more than 53% for the entire period. This indeed is low and shows the tremendous potential for stepping up output simply through a fuller utilisation of existing capacity. It would seem that nearly half the industrial capacity in the country has remained unutilised. It is even more disturbing that the level of utilisation has remained more or less stagnant throughout the period under review.

2) In the period 1961-65, the utilisation rate was 54% which declined to 52% during the recession period 1966-68 and improved to 54% again during 1969-71. It would seem that the difference in performance between the recession and non-recession periods has not been all that significant. The Reserve Bank series on capacity utilisation also would lead to the same conclusion although the rate is reported as much higher, viz., about 80%.[13] This has to do with the method adopted by RBI which in my view suffers from the limitations of the peak output method referred to earlier.

3) In the consumer goods group, utilisation has been steadily improving from 46% in the first period to 49% in the second and 53% in the third. Capital goods did about 58% in the first period and has been stagnating at 42-43% since then. It is in intermediate goods that the level of utilisation has been the highest, 64, 61 and 61% respectively in the three periods. However, it is to be noted that this group has not been able to do better since the recession.

4) The intermediate goods group consists primarily of continuous process industries. Given the nature of the process and the high cost of interruptions, businessmen will be more careful about planning and utilising capacities in these industries. This may explain the higher levels of utilisation found in the intermediate goods group.

5) A major factor responsible for the state of low utilisation

in the engineering industries is the performance of the steel industry. From a utilisation rate of 86% in 1966, this industry has steadily declined to 65% in 1971. The entire range of steel processing industries has been affected as a result, although imports have bridged the gap to some extent. Steel industry is a good example where by fuller utilisation of capacity alone a substantial increase in output could have been achieved.

6) Though the general level of utilisation is extremely low and there is no evidence of even a gradual rise in this level, there are several industries which have been operating at or close to full capacity in the past one or two years. The most important among these are caustic soda, soda ash, aluminium, commercial vehicles and tyres and tubes. It is these industries which have capacity bottlenecks and where output cannot be increased without an expansion of capacity.

II. Inter-Industry Variation in Capacity Utilisation: A Cross-Section Analysis

In theoretical discussions on this subject, a most persuasive view that has been put across is that of Robin Marris whose hypothesis is that the normal preferences of people in favour of day time work would tend to create underutilisation of capacity.[14] The theory is that these preferences cause the shift differential in wages to rise substantially so that firms find it more profitable to reduce utilisation and

increase labour productivity by providing labour more capital to work with. While this may be a useful explanation of the phenomenon of chronic idle capacity which is characteristic of industries in some countries, it does not adequately explain why inter-industrial variations in capacity utilisation are as wide as have been observed, for instance, in the Indian case.

Other observers who have studied the problem of underutilisation have attributed it to supply and demand constraints which in turn may have been caused by government policies and rigidities in the system.[15] Faulty demand projections, raw material shortages, foreign exchange bottlenecks and labour unrest are among the factors highlighted by the proponents of this view. There must be considerable merit in this argument because surveys of firms seem to have reinforced the diagnosis of these observers.

The survey approach may be a useful way of identifying the major causes underlying idle capacity as perceived by the responding firms. However, there is the possibility that the respondents will tend to highlight the more obvious and direct factors which need not be the only variables influencing capacity utilisation. For instance, a part of the inter-industry variations in utilisation may well be due to differences in certain basic industry characteristics. Firms may not have related these differences to their experiences in terms of utilisation. Again, certain policy instruments may have influenced the structure

of utilisation though firms may be unable to specify the relationship between the two.

An Econometric Investigation

If we are to improve our understanding of the structure of capacity utilisation and of how it is being influenced by important causal factors, it seems that a more comprehensive and theoretically defensible model of the problem must be formulated. The model's usefulness in explaining the phenomenon could then be tested with the aid of econometric tools.

In my view, there are two sets of variables which together determine the pattern of capacity utilisation of any industry. These are 1) critical industry characteristics, and 2) governmental policy. A third, namely, "outliers" to reflect arbitrary factors may also be added though they are not causal variables in the sense in which the first two are.

(a) Industry Characteristics

Inter-industry variations in capacity utilisation may well be due to the differences between industries in terms of certain basic characteristics. A well known characteristic which has been studied carefully by many economists is market structure. Theory asserts that a monopolistic market structure will tend to restrict output and hence reduce capacity

utilisation. We give below a list of selected industry characteristics which might have significant influences on capacity utilisation.

1) Market Structure: We would expect capacity utilisation to be inversely related to the degree of monopoly or market control characterising the industry. The low volume-high margin syndrome associated with Indian business may well be a manifestation of this tendency. In other words, the greater the degree of monopoly, the lower the rate of capacity utilisation.

2) Pressure of Demand: Demand conditions facing industries vary. We would expect those industries which experience growing demand for their products to show a higher rate of utilisation. Other things remaining the same, growth of market demand should be an incentive for increased supply resulting in better utilisation of capacity.

3) Size of Firm: Technological as well as managerial scale economies are supposed to be a function of size. If so, we would expect industries with larger sized firms to operate at higher levels of utilisation. Size may also bestow other advantages such as influence over decision making in government which in the Indian context might enable the larger firms to procure a larger proportion of scarce inputs and operate at higher levels of capacity utilisation. This, of course, is a different dimension of the influence of size.

(b) Policy Influences

Unlike industry characteristics, it is more difficult to identify specific, measurable governmental policy variables, though no one would deny their impact on the performance of an enterprise. We know that through the maze of controls, incentives, penalties, and administrative practices, government policies do influence the structure of capacity utilisation. But how this complex set of policies and procedures differentiate between industries, and the actual operation of this process are difficult to comprehend and define. In terms of variables which might lend themselves to quantification, we list below three policy variables:

1) Import Substitution: The government's policy on the extent of competing imports permitted in any product group may have a significant bearing on that industry's ability to utilise its capacity. To the extent that imports compete with indigenous production, capacity utilisation will tend to be adversely affected. Industries differ in the degree of import substitution facing them. One would expect this to be an important variable because of the deliberate strategy of import substitution being followed by the government.

2) Effective Rate of Protection (ERP): Restrictions on internal licensing, quotas, tariffs, indirect taxes, and fiscal incentives are factors which have provided high levels of effective protection to many industries. A consequence of these policies has been the development of "inefficient"

industries in the country. Sometimes industries may be efficient, but earning excess profits as a result of high effective protection. If a high ERP is an index of inefficiency or excess profits due to shortages, we would expect it to be inversely correlated with capacity utilisation. The hypothesis would be that government policies which induce inefficient industries to develop through protective measures will work against efficient capacity utilisation.

a) Raw Material Allocation: Though ERP will no doubt reflect raw material problems too, there is a case for separately listing this variable in view of the government's direct role in raw material allocations. Ideally, we would have liked to quantify the manner in which the government discriminated between industries on this count. Thus, if the government gives a larger quota (in relation to requirements) of raw materials, imported or indigenous, to one industry than another, we would expect the former to more fully utilise its capacity than the latter. There is no market demand problem for these industries since the constraint is on the supply side. This constraint is reflected in the shortage of both raw materials and finished goods.

The third category of variables, "outliers" has been mentioned only to highlight the fact that there might exist certain special or accidental factors, unrelated to the above two, which may also cause inter-industrial variations in utilisation. For instance, low utilisation

in an industry in one year may have been due to a major addition to capacity in the immediately preceding year. It may take a while for the industry to gear up to achieve full utilisation of the new capacity. Similarly, there might occur strikes, power failures, etc., which are disturbances of a regional nature causing the rate of utilisation to fall. In the specification of a comprehensive model, these outliers should also be taken into account in an appropriate fashion.

We report below the results of a preliminary attempt to explain the inter-industry variations in capacity utilisation in India in terms of the different variables discussed above. The rate of capacity utilisation has varied considerably from one industry to another in 1965, the year we selected for a cross section analysis. The question to be answered is whether the Indian experience in 1965 was in line with the theoretical expectations provided by the model outlined above.

Detailed capacity and output data were gathered for 185 product groups based on MSP. These were then aggregated into 39 industry groups. Weighted rates of capacity utilisation (CU) were computed for these industries for 1965 (See Appendix C). Similarly, data on a wide range of independent variables corresponding to each industry were also estimated from a variety of sources. The independent variables considered were:

1. Market structure (MS), represented by the number of units in the industry.[16] This measure was used in the absence of a more direct measure of market control such as concentration ratio.

2. Pressure of demand (ΔPO), represented by change in the peak output of the industry over 1960-64.[17] This entails the assumption that growth of output in the recent past is a good proxy for future demand.

3. Size of firm (K) represented by the ratio of Fixed Capital to total manhours worked (capital intensity).[18] Fixed capital per reporting unit was also used.

4. Import Substitution (IS), represented by imports as a per cent of total supply.[19]

5. Effective Rate of Protection (ERP), as estimated by V R Panchamukhi.

6. Import content of production (IC), as a proxy for the raw material allocation variable.[20] This admittedly was not a satisfactory measure since allocations may not have been made on the basis of import content in all cases.

Our data have some important limitations. First of all, the 39 industries account for only 61% of the total index of industrial production. Some industries had to be left out because capacity data were not readily available. Others had to be left out because of the seasonal nature of production or because they were mainly export oriente Secondly, several approximations had to be made in the measurement of independent variables. Reference has been made to this problem while defining the variables. Data were not often available at the required levels of aggregation. Thirdly, in some cases, data on independent variables were not available for 1965. The extreme case is that of the import content data which pertains to the year 1960-61. On the other hand, import content may not have changed very much from year to year. These are some of the limitations of the data which should be kept in

mind while evaluating our results.

Results

In the first stage, we attempted a cross section analysis of the 39 industries to test the hypothesis that utilisation rates are a function of the six variables listed above. The fit of the estimated equation was extremely poor. We then proceeded to disaggregate the set of industries in the belief that there might be major structural differences between different groups. For instance, patterns of utilisation might differ depending on the nature of the end products of industries. Since the number of observations was limited, we divided the entire group into two categories: 1) capital and intermediate goods, and 2) consumer goods, and proceeded to estimate equations separately for each one. This distinction seemed reasonable also on the basis of the variations in the utilisation rates. In 1965, the capital and the intermediate goods group had an average utilisation rate of 68% whereas the consumer goods group had a rate of 51% only. The average for both together was 59%.

For the capital and intermediate goods group, we found that industry characteristics alone explained 40% of the inter-industry variations in utilisation rates. When the policy variables were added, nearly 72% of the variance was explained. The estimated equation is given below:

$$CU = \underset{(6.76)*}{46.920} - \underset{(2.22)**}{0.046\ MS} + \underset{(4.66)}{0.190\ \triangle PO} + \underset{(5.21)}{2.949\ K}$$

$$- \underset{(5.89)}{1.224\ IS} - \underset{(4.50)}{0.025\ ERP} - \underset{(2.50)**}{0.430\ IC}$$

$\bar{R}^2 = 0.722 \qquad F = 6.00 \qquad D.F. = 16$

* t-ratios are given in paranthesis
** significant at 5% level

Our model has explained a substantial part of the inter-industry variations in the utilisation rates of the capital and intermediate goods sector. A major variable not adequately reflected in the model pertains to raw material allocation which may be represented only imperfectly by the import content variable. Results could perhaps be improved if this deficiency is removed.

Let us now turn to an interpretation of the results. The major points which deserve to be noted are the following:

1) All the net regression coefficients are significant. So is the F ratio. The explanatory variables in the model, therefore, seem to be important factors influencing the pattern of capacity utilisation.

2) The sign of the market structure variable is not in line with our expectation. The finding is that monopoly or oligopoly does not lead to a lower utilisation of capacity. We need to experiment with better measures of MS before drawing a firm conclusion on the role of this variable. On the other hand, it could be argued that market control

does not produce the expected effect since in a regime of shortages most firms face relatively inelastic demands and could increase profits by expanding output within a given range. The effective constraint is on the supply side and those firms with greater market control may be more successful in getting more raw materials and thus releasing the supply constraint.

3) Demand as reflected by the growth rate of output contributes to fuller utilisation.

4) Industries characterised by larger sized firms or more capital intensive units tend to have higher rates of utilisation. This may reflect both economies of scale as well as efficiency in management and socio-political power in terms of getting things done.

5) The sign of the import substitution coefficient is consistent with our theoretical expectation. Imports compete with indigenous production and hence tend to reduce utilisation.

6) The ERP coefficient needs to be interpreted carefully. High ERP's are associated with lower utilisation rates. Our interpretation is that high effective protection tends to keep alive inefficient industries incapable of utilising their capacity effectively. They survive only because of the protection, not through the efficient operation of their capacity.

7) The interpretation of the import content coefficient is also a bit tricky. Why would CU go down as IC goes up? A plausible answer is that given the governmental criteria and procedures for import, industries with higher import content may have faced relatively greater difficulties in meeting their requirements than others. If a pro-rata allocation policy which is quite common in government is followed, units with relatively higher import content will get more hurt because their additional requirements could not perhaps be met from the open market.

The results we obtained for the consumer goods industries with the same independent variables yielded discouraging results. We introduced other variables such as labour unrest also, but this did not improve the results. We suspect that some of the major consumer industries are dependent on agricultural inputs which is a factor our model does not take into account. Incidentally, the three policy variables (IS, ERP, and IC) are marginally significant in the consumer industries analysis also.

Our analysis of the inter-industry variations in capacity utilisation has highlighted the importance of certain industry characteristics and governmental policy variables as explanatory factors of the phenomenon. The findings on the role of market structure and size deserve to be explored further because of their obvious public policy implications. The relation between ERP and CU raises certain important questions about the impact of

the protective policies of the government on the efficient operation of industry. Our finding on this subject is that high levels of effective protection have adversely affected the rate of capacity utilisation.

III. Implications for Policy

Let us now turn to the policy implications of the foregoing analysis of the growth and utilisation of capacity. First of all, in a capital poor country, it is unpardonable that we have built up a vast and diversified industrial base, which has been exploited only to the extent of half its potential capacity. The reasons for this phenomenon have been widely discussed by many observers. In many cases, raw material shortages and other supply constraints are the prime culprit. Lack of demand, labour troubles, power shortage or cuts and administrative delays have also been reported as important causal factors. However, we have seen that both government policy variables as well as industry characteristics play a significant role in causing differences in the utilisation of capacity. I propose to classify these factors under three heads.

First of all, there are factors beyond the control of the firm and the government which contributes to idle capacity. These include raw material shortages caused by unexpected foreign exchange difficulties, technological changes, labour problems and power cuts in some cases. There is a second category of factors attributable to faulty national

planning. Lack of foreign exchange planning, unrealistic demand projections, and failures of detailed planning as for example in the case of power where the integration of generation and transmission is poorly done. The third concerns industrial and licensing policy where policies are framed which work against the fuller utilisation of capacity.

As regards the uncontrollable factors, there is little that a government or industry can do. If unexpected national calamities such as droughts or international disasters like wars occur, everyone will agree that their impact on industrial performance could not have been foreseen or avoided. However, certain other factors like labour unrest do not readily fall into the same category although they may also be unpredictable Labour trouble may develop because of the failure of industry in adopting reasonable industrial relations policies or the failure of government in evolving and enforcing appropriate labour policies at the national level. In the Indian context, it is clear that political factors are playing a major role in the disturbances faced by industry on the labour front. The problem, therefore, is one not only of evolving appropriate labour policies at the micro and macro levels, but also of creating a political will to ensure that labour plays its legitimate role in improving industrial performance.

The second set of factors is certainly more controllable although the country's performance in this area leaves much to be desired. We are yet to evolve a system which ensures that the national goals which are

declared and accepted are translated into action and results by the operating agencies and enterprises. The interface and links between the two are weak and poorly structured. As a result, we have consistent input-output models on paper, but their counterpart in the real world fails to emerge, thereby causing major shortages and constraints in the process of development. The existing system seems largely incapable of coping with this complex task. It is not that expertise is lacking in individuals. Many competent men exist but their talents and motivation are not exploited to achieve the national tasks. We need to take a close look at the total system, its structure, practices and men to determine the nature and scope of reforms needed to bring them in line with the requirements of task performance.

Realignment of Policies

Turning to the third set of factors, it is interesting to note that although in every plan we have emphasised the importance of the fuller utilisation of industrial capacity, we have not fully succeeded in evolving policies and controls which facilitate the achievement of this objective. Until very recently, where licensed capacity was given in terms of a single shift, the government did not permit the output of industry to exceed the one shift production limit. It is a sad reflection on our techno-economic planners that they did not realise early in the game the contradiction between this restriction and the goal of full

utilisation of capacity. In fact, this policy itself must have resulted in the creation of costly and unwanted industrial capacity in the country. This has been at least partially corrected in the recent shift in policy which first permitted 54 and subsequently 12 additional industries to increase output up to the limit of three shifts with certain restrictions on the larger houses and foreign majority companies. If a case could be made, it is said that other industries may also be added to this list. If so, we may soon find that the list grows so large that it covers a very wide spectrum, much like our priority industries list which often makes a mockery of the concept itself.

Why do we follow this approach where everyone has to make applications and go through a lot of administrative red tape? The main argument, it would seem, is that we do not wish to increase the output of certain industries which are not socially desirable. A list is therefore prepared of all those industries the outputs of which are deemed desirable. Another reason is that the government does not wish large scale units to compete in certain products with the small scale sector for which reservations have been made. The list of 64 industries therefore excludes such products.

Actually, one wonders whether there is not a simpler way to achieve these objectives. First of all, would it not be easier for the government to prepare a list of socially undesirable products rather

than a list of all industries the capacities of which are worth utilising more fully? The undesirable products must naturally be end products and not intermediate goods which may go for diverse uses. Thus, the status symbols of luxury such as cars, domestic airconditioners, refrigerators, etc., may be included in the list. It would be a more manageable list than that of the desirable products. Barring the products on the undesirable list, why should we not permit increase in output for all others, if it does not cost us any more scarce foreign exchange or domestic inputs? Let manufacturers fend for themselves and find their raw materials if they can produce and sell their wares. Why should the government worry about them and protect them from competition?

Secondly, a banned list of end products will not cause the problems due to inter-industrial dependence which is inherent in a list of permitted products. In the list of 64, if textiles are included but not dyes, fuller utilisation of textile capacity may not in fact take place as desired if the utilisation of dyes capacity is restricted. It is difficult to perceive in advance all the detailed inter-industry relations, and if we did, we would have to have a pretty long list. Under the present policy, there is provision for petitioning the government to include additional industries to the list on this basis. But one can imagine the additional procedures and processes through which one would have to go if new industries are to be added to the list.

Thirdly, a banned list will force the government to be more

specific about the products and industries which are regarded as socially undesirable. There is a lot of loose talk about the kinds of industries which do not deserve to be encouraged in the country. It is very difficult to pinpoint what exactly we don't want and the reasons thereof. This is clear from the list of 64 which includes manmade fibres and cotton textiles which cover many luxury products also. The rationale of the choice of the 64 industries is not self evident. Passenger cars are often referred to as a luxury and yet we merrily plan for erecting additional capacity for augmenting its output. When a banned list of end products is evolved, it will not be so easy to be vague and fuzzy. When something specific is being denied to the public, there will be greater pressure to explain why it is being denied, and to be more careful in preparing the list.

A banned list of end products the production of which will have to be limited to the specified licensed capacity will thus achieve the government's objective of restricting the output of undesirable products and at the same time facilitate fuller utilisation of all other industrial capacities with the least administrative delays to the extent that licensing restrictions are the primary bottleneck to fuller utilisation. If we are concerned about monopoly and concentration, we should enforce controls at the investment stage to restrict expansion by certain firms or business groups. Once the capacity has been created with government approval, we must treat it as a resource available for the country

and utilise it to increase production unless the products involved themselves are socially desirable. In an economy of shortages, increased output can only relieve the situation and contribute to overall growth.

Protection and Utilisation of Capacity

An important finding of the cross section analysis of the capacity utilisation of selected industries is the inverse relation between utilisation and effective protection rates. The factors which lead to high rates of protection need to be investigated more thoroughly to determine the aspects of policy which need realignment. Obviously direct controls such as raw material allocation, tariffs, and import restrictions can cause serious distortions in the efficiency of enterprise operations. While some of these controls are justified, we need to examine these areas carefully to see where restructuring could improve efficiency. One area which deserves immediate attention is the system of raw material allocation which favours the status quo and makes little use of the price mechanism to ration off excess demand. The prevailing administrative system for raw material allocations is cumbersome, breeds corruption and delays, favours the established users and blunts the raw material producers' motivation to increase supplies. Most of these items are controlled on the assumption that as a result the end product prices will remain reasonable and that the common man will benefit. Actually items like steel and cement are not of great direct concern to the

common man. These are products for which their users should be made to pay economic prices so that the producers have an incentive to augment their output. At best, there is a case for reserving a part of the output for strategic users such as defence and railways and perhaps the small scale users. The balance should be distributed to the remainin users through the market. A dual price policy will eliminate a large part of the frictions prevalent in the system, lead to a more efficient allocation of the scarce materials and contribute to improved capacity utilisation in the process.

In the proposed system, greater attention should be given to the identification of constraints and critical areas of shortage. If improve utilisation is being held back by lack of spares and other items not indigenously available, provision should be made for the import of those items without the parties having to go through elaborate procedures. Import licences of small value thus given to eliminate critical constrain will not only improve capacity utilisation but also create increased demand for indigenous machinery. A careful survey of the factors which inhibit fuller utilisation of capacity assumes considerable significance in this context.

There will no doubt be interests which will get hurt by this change. The established firms may have to face increased competition. The middlemen will lose their cut and the beaurocrats will no longer command the patronage and fringe benefits bestowed on them by the old system.

Underutilisation and Investment

The analysis presented above has important implications for our policies on investment also. As has been pointed out, the overall decline in the growth of installed capacity in the industry sector confirms what many observers have been saying for sometime and underscores the need for taking a close look at the happenings on the investment front. Clearly, the investment problem has a bearing on both public and private sectors and is linked to the overall shortage of savings due to the slow growth of the economy. The public sector's deceleration in investment has to do with the government's inability to raise resources and channel them into investment projects. The private sector's performance can be traced to a number of factors. Firstly, extreme underutilisation of capacity is an inhibiting factor in taking investment decisions. To put it in positive terms, effective utilisation of existing capacity itself would have given an impetus to fresh investment. Especially after the recession, many businessmen have learnt the hard way that it is unwise to rush into new projects simply because the Planning Commission has made optimistic projections for certain industries. On the other hand, when existing capacities are being fully utilised and unfilled demand persists continually, it is a signal to industry that expansion should be taken on without delay.

Secondly, private investors have been held back because of

indecisions and lack of clarity in policy at the highest levels in government. Policies may be categorised in two ways. Given our national goals, there can be optimal and sub-optimal policies. Given our concern for growth with justice, we should ideally evolve policies that are optimal from the standpoint of achieving these goals. But in fact we may end up with policies which are somewhat inappropriate or sub-optimal from the point of view of meeting these goals. We are all familiar with governmental policies, licensing and control procedures which may not necessarily be optimal. But if they are in force and are certain to continue, industry would take them as given and proceed to take decisions and get results within that framework. This may not be optimal, but still, action will be taken and waiting will be minimised with all its implications for growth.

The other categorisation is of policies which are firm and predictable and policies which are indecisive and uncertain. When policies are firm and investors feel that they can go ahead on their basis, positive results will follow. But if there is a lot of dilly dallying and people sense uncertainty in policies, the tendency will be to postpone action and the worst hit will be long-term decisions pertaining to investment. Investment decisions are extremely important in the context of fuller capacity utilisation since lack of capacity in one industry may well be the cause of underutilisation in another. In my judgement, it is not so much the sub-optimality of our policies as the uncertainty

and indecisiveness attaching to them which has hurt investment. The latter inhibits not only the private investors, but also the government officials who would hesitate to act when policies are uncertain and likely to change at short notice. All of us could live with a certain amount of sub-optimality in policies, but would find it far more difficult to cope with uncertainty, lack of clarity, and vascillation in policies.

The latest in this phenomenon which is characteristic of our industrial policy is the current state of debate on the joint sector. At one time, it was thought that the concept was accepted and that action was being taken on specific projects. Then came the big debate at the AICC Session in Gandhinagar when it looked as if joint sector was dead. More recently, we again see some signs of life in the concept, although it is too early to say what the shape of things will be. This is an example of the kind of continued uncertainty caused by vascillation which can lead to a forced investment holiday.

There is no doubt that a decision on joint sector requires the exercise of political judgement at the highest level. If for idealogical reasons, we were to throw out this concept, and go ahead with public sector expansion and a limited role for the private sector, that would be better than being indecisive on joint sector indefinitely and losing valuable time in the process. Time is an important dimension of growth

and the talk of telescoping growth and achieving distributional goals has no meaning if we have no concept of time in our policy planning and implementation. Personally, I think that joint sector is the best answer we have in addition to public sector expansion for stepping up investment in the priority industries and thus releasing the supply constraints which are causing underutilisation elsewhere in the system. The idealogical stance that public sector alone should expand will not take us very far in the present stage of our economy where a great deal of financial and techno-managerial resources exist outside the public sector. Again, if we are not concerned about time and its impact on growth, we could ignore the potential contribution that increased investment might offer. But then, we will be serving neither growth nor distributional objectives by adopting such a posture.

Table I

Annual Rates of Growth of Installed Capacity

Period	Consumer goods	Intermediate goods	Capital goods	All Industries
1960 to 1970	3.6	8.3	6.7	5.7
1960 to 1964	1.9	11.2	9.1	6.1
1964 to 1967	4.2	8.7	6.6	6.4
1967 to 1970	5.3	4.0	3.7	4.5

Appendix A

Rates of Growth of Installed Capacity in Indian Manufacturing Industries

Sl. No.	Industry	Weight	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
I	Consumer Goods Industries.											
1.	Food Manufacturing Industries	1.772	100.0	104.6	120.7	128.5	130.5	143.5	192.2	186.2	188.1	237.2
2.	Vanaspathi	1.090	107.6	107.8	107.6	111.3	110.3	112.2	113.5	113.5	123.0	155.5
3.	Cigarettes	2.150	100.0	97.0	97.8	102.2	107.0	126.6	126.0	127.4	127.4	127.4
4.	Cotton Textiles	21.180	100.1	100.9	102.2	105.1	109.1	112.3	114.2	117.4	117.6	118.1
5.	Woolen & Other Textiles	1.510	105.4	110.0	111.2	111.7	141.9	147.9	148.9	151.7	151.6	150.3
6.	Plywood & Cork	0.409	69.9	69.9	69.9	69.9	69.9	69.9	69.9	139.1	99.3	99.3
7.	Leather & Leather Products	0.467	100.7	101.6	107.0	108.7	110.3	111.9	112.1	112.2	111.9	110.2
8.	Drugs & Pharmaceuticals	2.141	101.7	102.5	98.7	109.5	111.4	115.8	126.2	126.2	140.6	140.1
9.	Washing & Cleaning Compounds	0.920	100.0	96.7	98.7	98.7	98.7	98.7	98.7	93.1	93.1	93.1
10.	Matches	0.500	101.2	101.2	101.2	98.6	98.5	98.5	98.5	98.5	98.5	98.5
11.	Office & Household Machines	0.478	100.0	100.0	104.6	118.7	118.8	122.4	123.0	116.0	133.6	149.4
12.	Radio Receivers	0.610	100.0	118.8	139.4	139.4	139.9	175.9	196.9	285.8	419.7	825.3
13.	Electrical Fans	0.411	102.2	158.6	156.6	170.7	175.4	175.4	182.4	171.8	209.5	209.5
14.	Miscellaneous Products	0.353	100.0	99.7	99.8	98.6	98.7	121.8	121.8	99.0	52.6	52.6
	Total Index	33.991	100.3	102.0	104.0	107.8	112.3	117.7	122.1	126.1	130.8	142.8
II.	Intermediate Goods Industries.											
1.	Paper & Paper Products	1.630	102.5	108.1	123.7	136.1	157.4	159.3	172.3	179.4	182.7	190.6
2.	Tyres & Tubes	1.460	113.9	129.7	156.1	178.1	176.5	190.8	201.5	201.5	244.6	244.6
3.	Rubber Products	0.757	92.4	141.8	142.8	143.4	146.2	160.2	172.2	172.0	185.2	185.2
4.	Heavy Organic Chemicals	0.079	118.5	138.8	147.8	189.6	226.3	212.4	219.7	220.5	242.6	252.5
5.	Heavy Inorganic Chemicals	0.524	103.9	102.8	136.2	158.5	183.9	202.3	231.2	239.8	246.1	257.8
6.	Synthetic Fibres	0.642	117.0	136.2	140.3	140.3	140.7	140.8	143.9	143.8	221.5	223.0
7.	Dyes & Dye Stuffs	0.519	100.0	100.0	100.0	100.0	101.2	101.2	174.8	169.5	169.5	169.5
8.	Fertilisers	0.456	105.1	103.4	134.2	151.5	154.8	266.6	432.6	555.3	754.1	754.1
9.	Paints & Varnishes	0.290	119.5	119.3	119.4	119.4	140.4	139.2	139.4	107.9	106.5	106.5
10.	Petroleum Refinery Products	1.340	–	100.0	104.1	114.9	123.6	171.4	185.7	204.1	204.4	233.9
11.	Cement	1.170	109.1	111.9	118.4	123.9	134.7	144.8	147.1	170.0	179.1	195.2
12.	Asbestos Cement Products	0.890	113.3	113.3	128.2	175.1	191.7	191.7	207.7	207.7	247.5	258.5

No.	Industry	Weight	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
13.	Non-Metallic Mineral Products	1.785	100.1	116.9	120.2	126.9	137.6	146.9	160.1	136.4	138.4	138.9
14.	Aluminium	0.485	119.8	172.1	172.1	172.1	311.4	344.6	344.6	402.0	402.0	450.9
15.	Steel Pipes & Tubes	0.600	100.0	100.9	128.2	150.6	145.8	168.6	218.6	232.7	251.9	259.6
16.	Steel Castings & Forgings	0.480	100.0	116.2	146.6	146.6	212.9	306.5	324.5	320.9	321.5	312.5
17.	Basic Metals (ferrous)	4.980	192.2	192.2	192.2	192.2	192.2	192.2	192.2	192.2	192.2	192.2
18.	Basic Metals (non-ferrous)	0.741	89.2	76.7	75.9	70.6	63.6	50.2	53.3	57.3	60.2	61.7
19.	Metal Products	0.855	105.8	146.1	153.5	165.5	174.7	188.5	203.5	183.6	167.1	167.1
20.	Other Electrical Goods	1.358	102.5	122.5	154.4	156.5	207.6	228.4	263.6	261.1	283.1	294.8
	Total Index	21.051	127.0	134.9	145.0	153.1	166.9	180.5	196.7	200.8	215.2	221.4
III.	Capital Goods Industries											
1.	Non-electrical Machinery	0.491	103.8	115.6	120.7	130.6	172.1	170.5	167.1	147.2	158.2	164.1
2.	Machinery Components & Accessories	0.155	100.1	141.5	203.3	251.2	350.5	412.1	420.8	426.4	431.4	514.3
3.	Electrical Machinery	0.666	100.0	143.2	171.2	171.2	192.5	195.8	332.2	379.9	453.7	465.1
4.	Railway Wagons	2.370	100.0	100.0	110.9	118.9	132.1	134.5	134.5	134.5	134.5	134.5
5.	Motor Vehicles	2.110	100.0	100.0	100.0	135.8	135.8	135.8	135.8	135.8	135.8	135.8
6.	Other Transport Equipment	0.730	111.6	134.5	142.4	190.5	181.4	202.7	198.3	233.3	233.3	233.3
	Total Index	6.532	101.6	119.5	123.0	141.9	153.5	158.5	171.9	179.3	187.8	191.6
	All-industry Index	61.574	109.6	114.1	120.2	126.9	135.3	143.5	152.9	157.3	165.7	174.8

Note: The rate of growth of installed capacity of each manufacturing industry has been computed as the weighted average of the rates of the different product groups of that industry. The rate of growth of installed capacity of an industry-group (or sector) is computed as the weighted average of the rate of the individual industries that constitute an industry-group. The weights are based on the value-added figures as supplied by the MSP. The value-added weights are also used in the official series of Index Numbers of Industrial Production.

Table II

Average Rates (Per cent) of Utilisation of Installed Capacity

Sl. No.	Industry	Periods		
		1961-1965	1966-1968	1969-1971
1.	Consumer goods	46.3	40.6	53.0
2.	Intermediate goods	64.3	60.9	61.2
3.	Capital goods	57.6	42.3	42.8
4.	All Industries	53.6	52.1	54.5

Appendix B

Rates of Utilisation of Installed Capacity in Indian Industries

Sl. No.	Industry	Weight	1961	1963	1965	1966	1967	1968	1969	1970	**
	I. Consumer Goods Industries										
1.	Food Manufacturing Industries	1.772	0.207	0.337	0.316	0.389	0.226	0.216	0.229	0.293	0.271
2.	Vanaspathi	1.090	0.606	0.685	0.744	0.612	0.663	0.801	0.738	0.614	-
3.	Cigarettes	2.150	0.713	0.746	0.911	0.839	0.781	0.855	0.846	0.891	0.912
4.	Cotton Textiles	21.180	0.413	0.458	0.501	0.468	0.501	0.502	0.525	0.556	0.536
5.	Woolen & Other Textiles	1.510	0.422	0.350	0.412	0.372	0.376	0.448	0.374	0.319	-
6.	Plywood & Cork	0.409	0.484	0.702	0.769	0.749	0.772	0.437	0.583	0.417	0.530
7.	Leather & Leather Products	0.467	0.309	0.363	0.356	0.351	0.345	0.305	0.240	0.204	0.245
8.	Drugs & Pharmaceuticals	2.141	0.245	0.313	0.306	0.340	0.275	0.272	0.366	0.397	-
9.	Washing & Cleaning Compounds	0.920	0.301	0.348	0.361	0.383	0.376	0.436	0.543	0.565	0.593
10.	Matches	0.500	0.352	0.311	0.344	0.353	0.332	0.364	0.395	0.327	0.535
11.	Office & Household Machines	0.473	0.723	0.389	0.398	0.440	0.423	0.447	0.329	0.339	0.329
12.	Radio Receivers	0.610	0.504	0.535	0.745	0.572	0.775	0.957	0.743	0.754	0.430
13.	Electrical Fans	0.411	0.606	0.414	0.476	0.424	0.437	0.492	0.428	0.418	0.525
14.	Miscellaneous Products	0.353	0.335	0.289	0.345	0.290	0.299	0.396	0.324	0.344	0.480
	Total Index	33.991	0.426	0.458	0.504	0.475	0.485	0.499	0.513	0.537	0.540
	II. Intermediate Goods Industries										
1.	Paper & Paper Products	1.630	0.848	0.895	0.803	0.866	0.833	0.842	0.926	0.775	0.849
2.	Tyres & Tubes	1.460	0.997	0.900	0.969	0.907	0.916	1.123	1.102	1.047	0.911
3.	Rubber Products	0.757	0.682	0.473	0.489	0.453	0.471	0.495	0.431	0.407	0.404
4.	Heavy Organic Chemicals	0.079	0.342	0.406	0.364	0.391	0.300	0.354	0.399	0.315	0.265
5.	Heavy Inorganic Chemicals	0.524	0.809	0.759	0.749	0.746	0.697	0.771	0.832	0.855	0.950
6.	Synthetic Fibres	0.642	0.466	0.521	0.590	0.623	0.713	0.803	0.494	0.492	0.457
7.	Dyes & Dye Stuffs	0.519	0.474	0.420	0.651	0.472	0.451	0.505	0.498	0.509	0.420
8.	Fertilisers	0.456	0.469	0.484	0.457	0.437	0.433	0.419	0.328	0.529	0.481
9.	Paints & Varnishes	0.290	0.462	0.583	0.455	0.424	0.502	0.561	0.558	0.563	0.473
10.	Petroleum Refinery Products	1.340	0.416	0.473	0.921	0.410	0.459	0.464	0.378	0.462	-
11.	Cement	1.170	0.870	0.909	0.905	0.879	0.885	0.809	0.872	0.895	0.770
12.	Asbestos Cement Products	0.890	0.434	0.554	0.506	0.353	0.276	0.284	0.275	0.339	0.345
13.	Non-metallic Mineral Products	1.785	0.383	0.372	0.330	0.365	0.372	0.457	0.455	0.342	0.446
14.	Aluminium	0.485	0.862	0.971	0.617	0.664	0.813	0.725	0.781	0.937	1.060
15.	Steel Pipes & Tubes	0.600	0.594	0.718	0.691	0.753	0.429	0.488	0.506	0.338	0.288

Industry	Weight	1961	1963	1965	1966	1967	1968	1969	1970	1971
16. Steel Castings & Forgings	0.480	0.469	0.421	0.337	0.218	0.202	0.186	0.217	0.176	0.200
17. Basic Metals (Ferrous)	4.980	0.667	0.916	0.860	0.790	0.738	0.718	0.792	0.670	0.662
18. Basic Metals (non-ferrous)	0.741	0.351	0.357	0.297	0.226	0.262	0.317	0.232	0.325	-
19. Metal Products	0.865	0.469	0.399	0.426	0.385	0.395	0.516	0.549	0.556	0.573
20. Other Electrical Goods	1.358	0.512	0.479	0.425	0.416	0.374	0.394	0.418	0.407	0.389
Total Index	21.051	0.618	0.678	0.632	0.612	0.694	0.623	0.633	0.593	0.609
III. Capital Goods Industries										
1. Industrial Machinery	0.375	0.258	0.249	0.363	0.346	0.245	0.241	0.282	0.287	0.350
2. Machine Tools	0.386	0.522	0.592	0.508	0.333	0.266	0.177	0.266	0.316	0.265
3. Motor Vehicles	2.110	0.507	0.511	0.397	0.315	0.244	0.339	0.347	0.810	0.570
4. Other Transport Equipment	0.620	0.425	0.398	0.443	0.433	0.473	0.410	0.421	0.466	0.297
5. Non-electrical Machinery	0.491	0.586	0.588	0.578	0.680	0.681	0.774	0.864	0.372	0.625
6. Machinery Components & Accessories	0.165	0.633	0.447	0.438	0.385	0.388	0.433	0.498	0.379	0.505
7. Electrical Machinery	0.666	0.701	0.598	0.847	0.939	0.611	0.459	0.418	0.575	0.471
8. Railway Wagons	2.370	0.594	0.907	0.672	0.446	0.490	0.423	0.329	0.336	0.192
Total Index	7.185	0.543	0.634	0.550	0.455	0.413	0.402	0.386	0.510	0.386
All-industry Index	62.225	0.504	0.552	0.553	0.519	0.513	0.530	0.539	0.553	0.543

Note: The capacity utilisation rate for each manufacturing industry has been computed as the weighted average of the rates of the different product groups of that industry. The capacity utilisation rate of an industry-group (or sector) is computed as the weighted average of the rates of the individual industries that constitute an industry-group (or sector). The weights are based on the value-added figures supplied by the MSP. These value-added weights are also used in the official series of Index Numbers of Industrial Production.

APPENDIX C

RATES OF CAPACITY UTILISATION IN INDIAN INDUSTRIES (1965)

Sr No.	Industry	Capacity utilisation Rate (%)	
		Unadjusted[a]	Adjusted[b]
1	2	3	4
1	Food Manufacturing Industries	63.3	31.6
2	Vanaspathi	74.4	74.4
3	Cigarettes	113.9	91.1
4	Cotton Textiles	87.5	50.1
5	Woolen and Other Textiles	82.4	41.2
6	Wood & Cork	153.8	76.9
7	Leather and Leather Products	71.3	35.6
8	Drugs and Pharmaceuticals	53.9	26.9
9	Soaps and Glycerine	72.3	36.1
10	Matches	68.8	34.4
11	Office and Household Machines	79.6	39.8
12	Radio Receivers	149.0	74.5
13	Electrical Fans	95.2	47.6
14	Paper and Paper Products	83.6	80.3
15	Synthetic Fibres	118.0	59.0
16	Other Transport Equipment	87.6	43.8
17	Tyres and Tubes	96.9	96.9
18	Rubber Products	97.8	48.9
19	Heavy Organic Chemicals	55.7	36.4
20	Heavy Inorganic Chemicals	76.5	74.9

1	2	3	4
21	Dyes and Dyestuffs	130.3	65.1
22	Fertilizers	64.9	45.7
23	Paints and Varnishes	61.5	45.5
24	Petroleum Refinery Products	92.1	92.1
25	Cement	90.5	90.5
26	Asbestos Cement Products	101.2	50.6
27	Non-Metallic Mineral Products	66.0	33.0
28	Aluminium	61.7	61.7
29	Steel Pipes and Tubes	86.4	69.1
30	Steel Castings and Forgings	67.5	33.7
31	Basic Metals (Ferrous)	115.3	95.0
32	Basic Metals (Non-ferrous)	51.2	29.7
33	Metal Products	82.8	42.6
34	Non-Electrical Machinery	115.0	57.8
35	Machinery Components & Accessories	87.6	43.8
36	Electrical Machinery	169.5	84.7
37	Other Electrical Goods	83.1	42.5
38	Railway Wagons	84.0	84.0
39	Motor Vehicles	97.7	48.8

a. The rates of capacity utilisation were worked out assuming the number of shifts reported in MSP.

b. The rates in (a) above have been reestimated on the basis of two shifts whereever the reporting was on a single shift basis in MSP.

Source: MSP.

NOTES

[1]See, for example, Dutt Committee Report; Hazari Report on Industrial Licensing; Bhagwati and Desai, India Industrialisation & Trade Policies (OECD, 1970).

[2]See G. Stigler, Capital and Rates of Return in Manufacturing Industries, (Princeton, 1963); J. Kendrik, Productivity Trends in the United States, (NBER, 1961); Collins and Preston, Concentration and Price-Cost Margins in Manufacturing Industries, Berkeley, 1968).

[3]Bhagawati and Desai, op. cit.

[4]G.C. Winston, "Capital Utilisation in Economic Development," Economic Journal, March 1971, pp.36-60.

[5]See, for instance, M. Budin and S. Paul, "Utilisation of Indian Industrial Capacity, 1949-59," Indian Economic Journal, July 1961; R.K. Koti, Utilisation Industrial Capacity in India, 1967-68, Gokhale Institute Series No.9, 1968; Ramaswamy and Pfouts, Utilisation of Industrial Capacity, Government of India and USAID, 1965; National Council of Applied Economic Research, Underutilisation of Industrial Capacity, (New Delhi, 1966).

[6]Winston, op. cit.

[7]Utilisation elasticity of employment $= \dfrac{\%\text{ change in employment}}{\%\text{ change in capacity utilisation}}$

[8]For a competent review, see A. Phillips, "An Appraisal of Measures of Capacity," American Economic Review, May 1963; L.R. Klein, "Some Theoretical Issues in the Measurement of Capacity," Econometrica, April 1960.

[9]J. Johnston, Statistical Cost Functions, (McGraw-Hill, 1960).

[10]Budin and Paul, op. cit.

[11]Klein, op. cit. Also see Klein and Preston, "Some new results in the Measurement of Capacity Utilisation," American Economic Review, March 1967.

[12]G.C. Winston, "Capital Utilisation in Economic Development," Economic Journal, March 1971 pp.36-60.

[13]Reserve Bank of India Bulletin, April 1970 and February 1973.

[14]R. Marris, The Economics of Capital Utilisation, (Cambridge, 1964).

[15]E.S. Mason, Economic Development in India and Pakistan, (Harvard, 1966); Koti, op. cit.

[16]As reported in the Annual Survey of Industries.

[17]Data obtained from the Monthly Statistics of Production.

[18]Based on ASI data.

[19]As estimated by Padma Desai, Import Substitution in the Indian Econ (New Delhi, 1972).

[20]Based on estimates given in Manne and Rudra, "A Consistency Model o India's Fourth Plan," Sankhya, Series B, Vol.27, September 1965.