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MONEY AND PRICES — AN EMPIRICAL STUDY OF THE INDIAN EXPERIENCE — 1970-1982.†

J. C. Rao

Introduction

In this paper, an attempt has been made to study the inter-relationships between money supply and prices during 1970-1982, a period when money supply increased by 238 per cent, prices rose by 181 per cent and national income grew in real terms by 46 per cent.

In Section I we present a money stock measure M_{1R} , constructed by us, comparable to M_1 . The key sectoral prices influencing the general price level are identified in Section II. An estimate of the quantity of foodgrains retained by the farming population which is presented in Section III provides the basis for obtaining an estimate of the monetised sector by enabling an adjustment to be made to the Net National Product. Section IV contains our empirical results, followed by our broad conclusions presented in Section V.

I

Money Supply

Published data on M_1 for the period starting March 1978* incorporate the following amended procedure for classification of savings deposits into time deposits and demand deposits:

“The average of the monthly minimum balances in a savings account on which interest is being credited to the account shall be regarded as a time liability and the excess over the said amount, as a demand liability.”

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* The new definition and details relating to reconstruction of the published M_1 series for the period March 1978 — January 1981 have been presented in the Reserve Bank of India Bulletin, July 1981 in an article entitled “ M_1 data for the period March 1978 — January 1981.”

Prior to the above amended procedure for classification of savings deposits into time deposits and demand deposits, the maximum amount that could be withdrawn from the savings bank accounts without previous notice was being regarded as a demand liability, and the balance as a time liability.

The above amendment to the procedure of classifying savings deposits resulted in a shift of a portion of savings deposits from the category of demand deposits to that of time deposits. In March 1978 this shift was of the order of Rs. 3,996 crores for all banks or 52.3 per cent of demand deposits in March 1977. The published time series data on M_1 reflect this shift. Econometric studies involving the use of monthly time series of M_1 are not as much affected by this shift as when published annual data on M_1 for the past ten to fifteen years are subjected to econometric analysis. It would, therefore, be useful for researchers to have a monetary stock measure comparable to M_1 for a continuous period of ten to twelve years compiled on the basis of a common definition and capable of being extended year to year. In the following paragraphs an attempt is made to construct such an alternative series for the period 1969-1982.

The alternative series which we propose to construct will need to be updated over the next few years by researchers, if they find the series meaningful. The series being presented by us in later paragraphs, which we may refer to as M_{1R} , should, therefore, be simple to construct and update, and must also be flexible enough to incorporate specific adjustments which researchers may want to make from time to time according to their requirements and judgement. We have attempted to incorporate in our methodology this essential feature which a monetary aggregate should possess if it is to serve researchers well. The methodology suggested by us provides for updating of the alternative series based on norms as revealed in the latest available published data. If this methodology is followed, identical updating of the M_{1R} series by different researchers would become possible. Individual researchers, however, would be free to modify these norms as they may deem fit.

Savings Deposits: The Second Working Group on Money Supply (1977), after examining the basis for classification of savings deposits into time deposits and demand deposits, recommended that a sample survey of savings deposits should be conducted at an interval of every five years with a view to determining the demand and time deposit components of savings deposits. Their analysis of data on savings deposits with individual banks revealed consider-

able inter-bank variations in regard to the portion of savings deposits included in demand deposits, the share varying from 90 per cent to 68 per cent. They concluded: "As it is, the time liability portion, attributable to withdrawal restrictions, forms only about 14 per cent of the total saving deposit balances of all scheduled commercial banks."* While broadly accepting this finding, we find it necessary to introduce a distinction between savings bank deposits in metropolitan and urban centres on the one hand and in rural and semi-urban centres on the other. In metropolitan and urban centres, savings bank accounts with liberal withdrawal facilities are likely to be used predominantly as transaction balances, and as such we have classified 85 per cent of these savings deposits as demand deposits and 15 per cent as time deposits. This proportion corresponds to the average for all savings deposits with commercial banks for the years 1970-1972. In the case of savings deposits with commercial banks in rural and semi-urban centres, we have classified them as time liabilities on the argument that transactions balances in these centres are by and large held in the form of currency. The savings deposits in rural and semi-urban branches are, accordingly, considered to reflect essentially the shift from savings in the form of currency to savings deposits with banks. With the location of more and more bank branches in rural and semi-urban centres and hitherto unbanked areas, the savings deposits with rural and semi-urban branches are more likely to represent savings and not take on the role of transactions balances to any significant extent as in the metropolitan and urban areas. This stability in the nature of savings deposits with branches of banks in rural and semi-urban centres might probably be more readily conceded if one takes into account the fact that the rural and semi-urban centres get reclassified after every census on the basis of their population. In this connection, we feel a quinquennial reclassification of bank branches might have considerable merit.

On the basis of reclassification of savings deposits described above, we find that the share of savings deposits in M_{IR} works out to 10.1 per cent in June 1969 and 20.6 per cent in June 1982. The share of the quantum of savings deposits included in M_{IR} in total savings deposits with commercial banks is 53 per cent for June 1973 and 45.5 per cent for June 1981, approximating a fall of nearly one percentage point per year. In the absence of data on savings deposits separately for metropolitan and urban branches prior to 1973, we have obtained the savings deposits in metropolitan and urban

* Money Supply : Concepts, Compilation and Analysis, Report of the Second Working Group, Reserve Bank of India Bulletin, January 1977.

branches for the years 1969-1972 by applying the ratio observed in 1973, i.e., 62.3 per cent, to total saving deposits. During these years the relative growth of savings deposits with branches of banks in rural and semi-urban areas was likely to be very low, if the proportion of rural branches in the total number of branches is any guide and as such our estimate may not be subject to any considerable error. Similarly, the savings deposit portion of M_{IR} in 1982 and 1983 has been estimated using the ratio obtained for June 1981, in regard to the share of savings deposits with metropolitan and urban branches in total savings deposits. The error in estimation here will be relatively higher than for 1969-72 if there has been a spurt in savings deposits in rural and semi-urban centres after 1981. The use of the latest available ratio is, however, recommended by us, as it provides an updating procedure. Generally, the relevant data are available in Banking Statistics: Basic Statistical Returns with a lag of about two years, and hence the assumption of the constancy of the ratio for two years should not introduce an unacceptable degree of error. Researchers would, however, be free to use their best judgement as regards the ratios likely to prevail over the period for which updating of the data is being undertaken.

Current Deposits: These are the traditional demand deposits. In India, these deposits are predominantly held by commercial organisations and other institutions and to a limited extent by individuals. They represent primarily transactions balances. We include these current deposits in M_{IR} . Data on current deposits for the period subsequent to June 1981, the latest period for which published data are available in Banking Statistics: Basic Statistical Returns, have been estimated on the basis of the proportion of current deposits for June 1981 in the total of currency, savings deposits portion in M_{IR} and current deposits, which works out to 24 per cent. Similarly, for the period prior to June 1973, we have applied the proportion (22.1 per cent) observed for June 1973, and obtained our estimate of current deposits, in the absence of published data.

Fixed Deposits with maturities of 6 months or less: In addition to current deposits, we propose to include in our M_{IR} series, fixed deposits with a maturity period of six months or less. These deposits are not normally treated as demand deposits, but we believe that they are held by business organisations and individuals to meet anticipated lump sum payments such as payment of dividends, interest on term loans and other borrowings on due dates, advance income tax and other taxes, custom duties, bonus payments etc., which arise in the course of their normal operations. They appear to be thus an outcome more of efforts directed towards

better cash management rather than investment of funds to draw regular interest income. Just as individuals use both currency and a part of savings deposits as their transactions balances, commercial organisations, we postulate, use current deposits and short-term fixed deposits of maturity not exceeding six months as their transactions balances. Unfortunately, data on fixed deposits of maturity not exceeding 6 months are not available for the period after March 1978. We have, therefore, estimated these deposits assuming constancy of their proportion in aggregate deposits which stood at 3.2 per cent in March 1978. Similarly, for June 1973 and June 1974 we have applied a constant proportion of 6.4 per cent observed in June 1972. This does introduce an element of arbitrariness, but we hope not too much of error, as in quantitative terms the total of fixed deposits with maturities of 6 months or less constituted only 5.6 per cent of M_{1R} in June 1972.

Some further clarification is probably called for. It may be noted that for estimating the quantum of fixed deposits with maturities of 6 months or less, we have used their share in aggregate deposits as the basis of estimation. According to the hypothesis presented in this section, we should really have used the ratio of these deposits to current deposits as the basis for estimation. We have deliberately not done so, as we first wish to test our hypothesis using an estimate of such fixed deposits derived in a manner unrelated to current deposits. Once it is established that they truly belong to M_{1R} , the alternative estimation procedure could be followed.

Currency : We treat all of the currency with the public as highly liquid balances and include it in M_{1R} . It is generally recognised that a part of the currency with the public represents savings of the household sector, though probably a diminishing part, but we have no means of estimating the amount of currency forming part of currency hoards.

M_{1R} : The M_{1R} series constructed as above, is presented in Annexure 1 for the period 1969-1982 for the last Friday of June each year. The available published data permits construction of a similar half-yearly series for the same period for the last Friday of June and December.

We shall be testing the suitability of M_{1R} as a measure of transactions balances in Section IV. It might be noted that the M_{1R} series takes into account demand deposits only with scheduled commercial banks. These banks are estimated to account for more than

90 per cent of aggregate deposits of all banking institutions including co-operative banks. As disaggregated data for banking institutions other than scheduled commercial banks are available with a longer time lag than for scheduled commercial banks, we have constructed our M_{1R} series using data relating only to scheduled commercial banks (Refer Annexure IX).

II

Prices

The most noticeable feature of the price level during the past decade or so is probably, its very steep rise. The Wholesale Price Index (All Commodities) with base 1970-71 = 100, rose in 12 years to 280 points. The annual rate of increase in this price index exceeded 20 per cent in two successive years, 1973-74 and 1974-75, a rate of increase not observed in any previous year since 1948-49. Again during the two successive years 1979-80 and 1980-81, the Wholesale Price Index rose by 17.1 per cent and 18.2 per cent respectively, following a four year period of relative price stability. These steep and sudden increases in the rate of inflation have contributed to the present high price level, as there have been no downward adjustments in the price level during the seventies, barring a marginal fall in prices in 1975-76. The level of prices connoting price stability has thus been at higher and higher levels since 1970. A 9.1 per cent rise in the Wholesale Price Index in 1981-82 meant a rise from 257.3 points to 280.6 points, the base year price index being 100 points in 1970-71. Maintenance of price stability, which is one of the important goals of monetary policy, becomes an extremely difficult task when faced with the kind of price behaviour witnessed during the seventies. A better understanding of price behaviour would be helpful in anticipating inflationary tendencies and for taking remedial monetary policy measures well in time and in a planned manner.

An examination of the trend in the Wholesale Price Index over the last three decades, (prior year price indices converted to a common base 1970-71 = 100) reveals that the Wholesale Price Index was at the level of 50.4 points in 1951-52, and ten years later at 55.2 points. A near doubling of the index took place over the next ten years when the index reached 105.6 points in 1971-72. A further doubling of the price index took place in the succeeding eight years with the index standing at 217.6 in 1979-80. An acceleration of the annual rate of price increase is clearly discernible in the trend in the Wholesale Price Index presented here.

We have tried to identify the more important components of the Wholesale Price Index which have contributed to the observed fluctuations in the Wholesale Price Index. It is generally recognised that prices of agricultural commodities have a considerable influence on the general price index. We start with this postulate and have attempted in this section to empirically assess the extent to which this postulate provides a means of forecasting the general price level as measured by the Wholesale Price Index.

In order to derive a meaningful relationship of operational significance for policies aimed at price stability, a close statistical relationship has got to be established first between the prices of agricultural commodities and the general price index, and needs to be followed up with a forecast of the prices of agricultural commodities with an acceptable degree of accuracy. Some estimate of the impact of other sectoral prices on the general price level would also have to be attempted before a satisfactory explanation of price behaviour is arrived at. The problem of devising policy measures to ensure relative price stability must then be examined. In this section, we present the statistical relationship observed by us between the Wholesale Price Index (All Commodities) and some of its important components. The other aspects of the analysis of price behaviour mentioned here are discussed in a later section.

In our attempt to identify the key sectors contributing to fluctuations in the general price level, we hypothesised that the prices of foodgrains have an impact on the general level far in excess of its designated weight of 12.922 per cent in the construction of the Wholesale Price Index. The wage component in the cost of manufactured goods and in the cost of services was likely to be influenced by the prices of a basic necessity like foodgrains. As such a considerable induced effect on the general price level originating in the prices of foodgrains might well be expected. Similarly, the prices of agricultural raw materials for industry would exercise considerable influence on the prices of finished products of the industries based on these raw materials and in turn also of the finished products of those industries and services using the products of the former group of industries. Here again, the weight of 10.621 per cent in the Wholesale Price Index attributed to Non-Food Articles (excluding Minerals) in the Primary Sector, we believe, is associated with a much stronger influence on the prices of manufactured products and hence on the general price level, than is indicated by its direct contribution to changes in the Wholesale Price Index. Together, Foodgrains, and Non-Food Articles (excluding Minerals) in the Primary Sector, have a weight of 23.543 per

cent in the Wholesale Price Index, and if our hypothesis regarding their strong induced effects were, in fact, valid we should expect to find a close correlation between fluctuations in the Wholesale Price Index and the prices of the components mentioned above. We, therefore, constructed a composite index of prices of Food-grains, and Non-Food Articles (excluding Minerals) in the Primary Sector. The annual series of this composite index and the Wholesale Price Index were found to move very closely over the past three decades (Please see Chart I).

It can be seen from Chart I, that the divergence between the movements of the Wholesale Price Index and the composite index constructed by us corresponding to a weight of 23.543 per cent increased after 1974-1975, as compared to the period 1964-65 — 1974-75. Throughout the period 1975-76 — 1981-82, the composite index remained below the Wholesale Price Index, while the trend in the two series remained the same. This probably indicates that some other systematic factor or factors were operating to push the general price level slightly higher than the level of the composite index WPA. This development which came in the wake of the oil price increase in the early seventies, pointed to the importance of induced effects on the general price level of increasing oil prices. Here again, we opted to test the induced effect of prices of Petroleum Crude and Natural Gas in the Primary Sector, with a weight of 0.602 per cent in the Wholesale Price Index, on the general price level before venturing into investigation of the impact of prices of Mineral Oils which has a much higher weight of 4.912 per cent. We constructed a revised composite index for the period 1970-71 to 1981-82 by adding Petroleum Crude and Natural Gas to the composite index constructed earlier. The movements in the revised composite index and in the Wholesale Price Index were found to be extremely close (Please see Chart I). This close association over an extended period may be taken as substantiation of our hypothesis of strong induced effects on the general price level of the items included in the composite index and the revised composite index.

The above analysis indicates that the various factors affecting prices of foodgrains which have a weight of 12.922 in the Wholesale Price Index, and the prices of non-food agricultural commodities covered by our composite index (mainly, fibres, oil seeds and sugarcane with a total weight of 9.016) need to be studied in depth in order to gain an insight into the behaviour of the general price level. In addition, fluctuations in the prices of petroleum

crude and natural gas also need to be monitored. We come back to these issues in Section IV.

The results of the statistical analysis* are presented in Annexure III and the time series of the composite indices in Annexure IV.

III

Monetised Sector

An understanding of the relationship between money supply and output facilitates an investigation of the inter-relationship between money supply and prices which is the focus of this paper. In the previous sections we have presented a newly constructed monetary aggregate M_{1R} , and have examined the key sector prices which move in line with the general price level. In this section we present an approximate measure of the monetised sector so that we can first establish the relationship between the monetised portion of output and M_{1R} , and thereafter proceed to analyse the inter-relationship between M_{1R} and prices.

Constructing a time series of the monetised portion of output is a complex and major task which has been attempted by some researchers. We do not propose to do so here nor is it necessary for our present purpose. The most important single element in the non-monetised portion of output is the retention by farmers of a part of the foodgrains produced by them. As variations in output from year to year in India owe much to variations in foodgrains production, an adjustment to output which reflects the variations in marketable surplus of foodgrains, thereby taking into account the retention by farmers of a part of the foodgrains produced by them, would provide a reasonable basis for arriving at variations in the monetised portion of output. Even such an adjustment, if properly to be made, calls for considerable specialised knowledge@.

If an estimate of the monetised portion of output should have operational significance in the context of a continuing analysis of inter-relationships among money supply, prices and output, it is

* My thanks are due to Shri A. K. Ray for working out the time series of the composite indices and undertaking the related statistical analysis.

@For a detailed methodology for estimating the marketable surplus of foodgrains reference may be made to Dr. S. S. Madalgi: Trends in Monetisation in the Indian Economy (1961-62 to 1974-75), Reserve Bank Staff Occasional Papers, June 1976.

necessary that the estimate be easily derived, each year, by researchers in the monetary field without the use of complex estimation procedures involving analysis of demographic and other data on the agricultural and rural sectors. The estimate should become available early enough for use in forecasting exercises and the estimation procedure should be neat and not distort the trends. We have, therefore, sought to obtain such an estimate of the minimum amount of retention of foodgrains by farmers rather than the actual amount of retention reflecting income-elasticities of demand for food of different sections of the farming population. In doing so we have ventured to experiment with a very simple approach with absolutely no pretensions as regards to sophistication. Any claim as regards the reasonableness of our estimate of marketable surplus derived as it is from our estimate presented in this Section, of retention of foodgrains by farmers, essentially depends for its validity on the results of the empirical analysis presented in Section IV and not so much on the methodology presented here. With this admission, we now outline the simple method adopted by us for obtaining an estimate of the retention of foodgrains by the farmers, and thereby obtaining an estimate of the marketable surplus of foodgrains and an estimate of the monetised portion of national income, for the period 1964-65 to 1981-82.

The first step in our procedure is to establish a norm for the minimum amount of foodgrains retained by the farmers. We find that the per capita net production of foodgrains (after providing for 12.5 per cent of the gross output of foodgrains towards seed, feed and wastage as is normally assumed) over the period 1963-64 to 1981-82 varied between 129.2 Kg. and 176.5 Kg., the average for these years being 157.6 Kg. The lowest net production per capita of 129.2 Kg. was recorded in 1965-66 and was followed by the next lowest net production per capita of 129.6 Kg. in 1966-67, the two successive severe droughts in these years being an unique occurrence during the past two decades. Even during 1979-80 which was a year of very severe drought the net production per capita was considerably higher at 143.5 Kg., though lower than in all other years during 1964-1982 barring, of course, 1965-66 and 1966-67. The period 1965-67 thus provides us with a starting point for obtaining a norm in respect of minimum level of retention of foodgrains by farmers.

During a period of severe drought as in 1966-67 following a severe drought of equal magnitude in the previous year, one would expect that the carry over stocks of foodgrains with farmers would be at the very minimum. Consumption of foodgrains would mostly be out of the current crop. It would also be mostly out of the

locally available supplies as possibilities of obtaining additional supplies of foodgrains to any significant extent from other areas would be remote as those areas themselves are also affected by drought and are short of foodgrain supplies to meet their own needs. In such a situation the needs of both the cultivating families and non-agriculturists in the village community would be met primarily by locally available supplies, supplemented by the public distribution system including drought relief operations. The non-agricultural products and services consumed by the cultivating families would have to be paid for more in the form of foodgrains than in normal years as the sellers of these products and services are unable to obtain their foodgrain requirements from other sources and might, therefore, well stipulate payment in kind.

The traditionally poor landless labourers and the unemployed would also obtain their subsistence requirements from cultivating families and local traders probably without cash payment, having regard to further attenuation of their purchasing power resulting from lack of opportunities for employment on the farm which a severe drought entails. They are also the section of the population who cannot take advantage of the public distribution system providing foodgrains against cash payments. The cultivating families themselves would like to market only the barest minimum out of their meagre food supplies in circumstances as prevailed in 1966-67 in order to meet unavoidable cash payments. The survival of the village community thus depends on sharing the available, limited, foodgrain supplies. In times of extreme food shortage, often regional in nature, migration to drought relief centres would be the only way open to the poorer sections of the rural population to obtain subsistence requirements. Thus, in a year of severe drought as in 1966-67, following an equally severe drought in the previous year, very little of foodgrains would enter the market economy in the rural areas, the minimum needs of the urban population with a relatively higher purchasing power being met out of the surplus foodgrains sold by the larger farmers, and by the public distribution system supported by imports of foodgrains.

On the basis of the above reasoning we may postulate that both urban and rural sections of the population consumed domestically produced foodgrains at the same average level of 129.6 Kg. in 1966-67 which was much lower than in normal years, and that the urban population whose purchasing power was less affected by the successive severe droughts in 1965-66 and 1966-67 were in a position to augment their domestic supplies by greater resort to the public distribution system than was possible for the rural population

who depended more on relief measures. We may further postulate that availability of foodgrains to the rural population at the average level of 129.6 Kg. per capita per annum, after meeting the requirements of the urban population as above, was barely enough to meet their requirements, as also that most of this foodgrains supply was retained by the farming population and did not enter the market economy for reasons discussed earlier. The proportion of these foodgrain supplies which may be expected to enter the market economy in rural areas, excluding supplies to the urban population already mentioned, may be placed at ten per cent to account for the absolute minimum cash requirements of the farming population. Thus the minimum retention of foodgrains by the farming population may be considered to be equivalent to an average per capita availability of foodgrains to the rural population, out of net domestic production, at a level of 129.6 Kg. per capita per annum less ten per cent of these supplies sold to the rural population, i.e., at a level of about 116 Kg. per capita per annum for the rural population.

Retention of foodgrains by the farming community at this minimum level of 116 Kg. per capita per annum for the rural population as a whole mentioned above is thus essential for providing the village community with their requirements of foodgrains at a subsistence level in times of severe droughts. We, therefore, conclude that it is reasonable to estimate the minimum quantity of foodgrains retained by the farmers in terms of average per capita availability of foodgrains out of net domestic production to the rural population as a whole, there being no outside sources of supplies in years of severe drought, other than the public distribution system, rather than in terms of per capita foodgrains requirements of the farming population alone. The minimum quantity of foodgrains retained by the farming community out of net production is accordingly estimated by us using the norm of per capita availability of 116 Kg. for the rural population as a whole for each year of the period under study. Having established a norm for the minimum level of retention of foodgrains out of net production, we now only have to estimate the rural population for each year of the study period to be able to obtain the minimum quantity of foodgrains retained by farmers each year and thereby compute the maximum marketable surplus of foodgrains which could form a part of the monetised portion of national income.

Data on total population and urban population available in the Census for the years 1961, 1971 and 1981 were used to obtain the proportion of rural population to total population in those years. As the proportion of urban population was found to be rising over

each decade, the proportion of urban population was obtained by simple interpolation, for each of the intervening years between successive Census dates. The proportion of urban population to total population stood at 23.7 per cent in 1981 and has been assumed to rise at the rate of 0.4 per cent per year thereafter on the basis of a rise from 19.9 per cent in 1971 to 23.7 per cent in 1981.

Applying the foodgrain retention norm of 116 Kg. per capita per annum for the rural population, we have obtained an estimate of the minimum quantity of foodgrains which would be retained by the farmers each year for the period 1964-65 to 1981-82. The estimates are given in Annexure V. The quantity retained has been estimated to rise from 45.12 million tonnes in 1964-65 to 61.94 million tonnes in 1981-82.

It would be useful to compare our estimates with those of S.S. Madalgi*. The relevant figures are given below.

Table 1: Quantity of Foodgrains retained by the Cultivating Families

(Million Tonnes)

	Our Estimate (on minimum retention basis)	Estimate made by S. S. Madalgi	Difference	Net Agri- cultural Production
1963-64	44.20	43.6	0.60	70.61
1964-65	45.12	46.1	-0.98	78.20
1965-66	45.94	43.6	2.34	63.30
1966-67	46.86	44.4	2.46	64.95
1967-68	47.79	48.6	-0.81	83.17
1968-69	48.84	49.4	0.56	82.26
1969-70	49.88	51.2	-1.32	87.06
1970-71	50.92	53.3	-2.38	94.87
1971-72	51.74	53.7	-1.96	92.02
1972-73	52.66	52.8	-0.14	84.90
1973-74	53.71	55.1	-1.39	91.58
1974-75	54.64	55.2	-0.56	87.35

* S. S. Madalgi: Trends in Monetisation of the Indian Economy 1961-62 to 1974-75. Reserve Bank Staff Occasional Papers, June 1976, p. 63.

It is interesting to note the similarity in the two estimates presented here despite the different methodologies used, and in particular the fact that Madalgi's estimates are higher than ours in most years. This is as is to be expected since our estimate refers to the minimum quantity of foodgrains likely to be retained by the farmers, whereas, Madalgi's estimates are of the actual amounts retained by the farmers. This aspect gets highlighted in good crop years such as 1964-65, 1969-70, 1970-71, 1971-72 and 1973-74 in which the actual amounts of foodgrains retained by the farmers as estimated by Madalgi are noticeably higher than our estimates, while in other years the differences are, predictably, relatively small. An exception to this is found in the two drought years 1965-66 and 1966-67 where the minimum retention by farmers as estimated by us has been found to be not low enough, if Madalgi's estimates are any guide.

We may, pardonably, draw some comfort from the above comparison and proceed to the estimation of the value of the minimum quantity of foodgrains retained by the farmers. We do so at 1970-71 prices, as our objective is to obtain an estimate of national income at constant 1970-71 prices, by excluding the portion represented by the quantity of foodgrains retained by the farmers which does not involve monetary transactions. As our estimate of foodgrains retention does not distinguish between foodgrains, we use the average value of all foodgrains per tonne in 1970-71, as computed from data published by Central Statistical Organisation as part of national income statistics compiled at 1970-71 prices to obtain the total value of foodgrains retained by the farmers for each of the years of the study period. This procedure, it must be recognised, ignores the changing commodity composition of the quantity of foodgrains retained by the farmers, and involves an implicit assumption that the share of different types of foodgrains in the total quantity retained by farmers remains the same over the years as in 1970-71. So long as the foodgrain consumption pattern of the rural population as distinguished from the farming population, is assumed to change slowly, in the absence of a significant rise in their per capita real incomes, our procedure does not appear to be unreasonable. This procedure will then, incidentally, result in ensuring that the valuation of the marketed portion of foodgrains output included in national income reflects more faithfully the changing composition of foodgrains production over the years.

On the above basis, we have obtained, for each of the years of the study period, net national product at factor cost, at constant 1970-71 prices, excluding the value of the estimated minimum

quantity of foodgrains retained by the farmers. We designate this aggregate as Net National Product-Adjusted or NNPA. Our estimates of NNPA are given in Annexure V. In our analysis of the inter-relationship between money and prices, we regard NNPA as our estimate of the monetised sector, while recognising that we have made a major, but only a partial, adjustment to national income in regard to exclusion of the non-monetised portion of output.

One useful feature of the above methodology for obtaining NNPA may now be noted. A study of the inter-relationship between money supply, prices and output is often intended to yield some forecasts of monetary aggregates for the ensuing year. If NNPA is to be used in such an analysis, this aggregate should become available as soon as some estimate of growth in output over the next year is arrived at. In India where agricultural production constitutes the major factor influencing changes in output and is at the same time itself influenced by changing weather conditions, an estimate of the likely growth in output in the following year must await an estimate of the likely level of agricultural production during the forecast year. Once the estimate of the growth in net national product for the forecast year is available, the necessary adjustment to obtain an estimate of the monetised sector mentioned above, however, can be readily made since our estimate of the value of the minimum quantity of foodgrains retained by the farmers is available in advance, dependent as it is on an estimate of the rural population for the forecast year and the use of two constants, viz., the minimum foodgrain retention norm and the average value of foodgrains per tonne at 1970-71 prices.

An estimate of the quantity of foodgrains which enters the monetised sector comes as a by-product of the above exercise. This estimate is in terms of the maximum amount of marketable surplus of foodgrains since our estimate of the retention of foodgrains by the farming population indicates the minimum level of retention.

As shown in Table 1, in good crop years the actual retention of foodgrains is upto five per cent higher than the minimum level estimated by us. During years when foodgrain production declined sharply the reverse situation is found to prevail. If an adjustment is made on this basis, the estimate of the maximum marketable surplus obtained by deducting the minimum quantity of foodgrains retained by the farming population from the net production of foodgrains should represent a fairly satisfactory estimate of the actual foodgrain supplies entering the market economy. Such an

adjustment could probably be best made by researchers on the basis of informed judgement rather than through a precise formula as the adjustment would depend on an assessment of several factors such as the sequence of good and bad crops, an assessment of the degree of variation in foodgrain production compared to the previous couple of years, income-elasticity of demand of the farmers, Government's price support and procurement policy and its impact on the prices of foodgrains, the ability of the larger farmers to withhold stocks in years of good harvests, etc. We have not attempted such an adjustment in specific years as it would come in the way of testing the validity of our methodology for obtaining an estimate of the maximum level of marketable surplus of foodgrains for the study period, after determining the minimum quantity of foodgrains likely to be retained by farmers even when agricultural production is affected by droughts.

From our estimate of the marketable surplus we finally obtain an estimate of the foodgrain supplies in the market economy by taking into account the net change in supplies resulting from the Government's procurement operations and the issue of foodgrains under the public distribution system.

The estimate of foodgrain supplies to the market computed as above has been found to be useful as an argument in explaining the behaviour of foodgrain prices (Annexure VI). We present our results in this regard in the next section along with other results relating to the inter-relationships between money supply and prices, which, incidentally, provide a test of the validity of our money supply series M_{1R} and our estimate of the monetised sector NNPA.

IV

Results

In this section we present our empirical results. The aggregates derived by us in the previous sections, viz., M_{1R} , Adjusted Net National Product (NNPA), and Foodgrain Supply are tested empirically by using them as arguments in regression equations which are also intended to throw light on relationships between money supply, output and prices. As a sequel to the analysis presented in Section II, we have attempted to formulate equations to explain the behaviour of foodgrain prices, and prices of selected commercial crops, and the empirical results are presented in the latter half of this section.

For purposes of empirical analysis the variables have been expressed in ratio form (e.g., price variable: P_t/P_{t-1}). The results

are presented for two periods viz. 1970-1982 (excluding two ratios—relating to 1974) denoted by $N=11$, and 1976-1982 denoted by $N=7$. Data relating to M_{1R} are as on the last Friday of June, and data on prices relate to June. The list of variables utilised in our regression analysis is given in Annexure VII.

Money Supply and Output

We have obtained the following results by regressing M_{1R} in real terms on NNP at factor cost at 1970-71 prices and M_{1R} in real terms on NNPA. The relationship between NNP and NNPA, both at 1970-71 prices, is also presented here. In equations (a) to (d) the variables are not in ratio form unlike in other equations which follow, and they accordingly include observations for June 1974 and June 1975.

Period : 1969-1982 : $N=14$

a) M_{1R} (in real terms)	$= -1046.57 + 0.2264 \text{ NNP}$	Correlation Coefficient r : 0.9379 elasticity : 1.1333
b) M_{1R} (in real terms)	$= -465.99 + 0.2405 \text{ NNPA}$	Correlation Coefficient r : 0.9403 elasticity : 1.0595
c) NNPA	$= -2505.10 + 0.9436 \text{ NNP}$	Correlation Coefficient r : 0.9999 elasticity : 1.0724

Period : 1976-1982 : $N=7$

d) NNPA	$= -2730.95 + 0.9488 \text{ NNP}$	Correlation Coefficient r : 0.9998 elasticity : 1.0691
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The high correlation between NNP and NNPA, and the stability of the regression coefficients and elasticities over different periods seen in (c) and (d) suggest that NNPA could be used as an income/output variable in our analysis. The relationship of M_{1R} in real terms with NNP and NNPA presented above indicates that the income elasticity of demand for money is close to unity, this feature being more prominently seen in the case of NNPA.

The above results suggest that we could proceed with our analysis using NNPA as an income/output variable and M_{1R} as a

money stock measure representing transactions balances. The equations which follow have all variables in ratio form.* M_{1R} ratios are denoted by 'Mr' and similarly the letter 'r' is added to the names of variables to indicate that they are in ratio form. The Durbin-Watson statistic is denoted by DW, and $\bar{R}-SQ$ stands for the square of the adjusted multiple correlation coefficient.

Money Supply and Prices

The following equations present the relationships between M_{1R} deflated by the Wholesale Price Index i.e. M^* as the dependent variable and NNP and NNPA respectively as the explanatory variable.

Equ: 1 $N=7 \quad \dot{M}_r = -0.3098 + 1.3249 \text{ NNPr}$

t-value	(0.819)	(3.670)	$\bar{R}-SQ$:	0.6752
			DW :	1.59
			Standard Error of Estimate :	0.0479
			Mean :	1.08

Equ: 2 $N=11 \quad \dot{M}_r = -0.3372 + 1.3422 \text{ NNPr}$

t-value	(1.210)	(5.017)	$\bar{R}-SQ$:	0.7074
			DW :	1.46
			Standard Error of Estimate :	0.0400
			Mean :	1.06

Equ: 3 $N=7 \quad M_r = -0.1518 + 1.1695 \text{ NNPAr}$

t-value	(0.450)	(3.648)	$\bar{R}-SQ$:	0.6722
			DW :	1.61
			Standard Error of Estimate :	0.0481
			Mean :	1.08

* As suggested by K. Krishnamurthy, a brief explanation may be in order :

If $y = ax^b$, then $\log y = \log a + b \log x$. Differentiating w.r.t. 't', $\frac{1}{y} \frac{dy}{dt} = b \frac{1}{x} \frac{dx}{dt}$. In discrete form, then $\frac{\Delta y_t}{y_{t-1}} = \frac{b \Delta x_t}{x_{t-1}}$ or $1 + \frac{\Delta y_t}{y_{t-1}} = b \frac{\Delta x_t}{x_{t-1}} + 1 + (b-b)$. Thus $\frac{y_t}{y_{t-1}} = (1-b) + b \left(\frac{x_t}{x_{t-1}} \right)$. It can be seen that the coefficient of $\frac{x_t}{x_{t-1}}$ is the elasticity of y w.r.t. x, and the sum of the coefficients is equal to unity.

Equ: 4 $N=11$ $M_r = -0.1742 + 1.1821 \frac{NNPA_r}{NNP_r}$

t-value	(0.703)	(4.982)	$\bar{R}-SQ$	0.7043
				1.46
			Standard Error of Estimate :	0.0402
			Mean :	1.06

The statistical properties of the above equations appear to be satisfactory. Considering that the variables are expressed in ratio form the levels of $\bar{R}-SQ$ are satisfactory. The coefficients of the income variables appear to be stable and they represent income-elasticity of demand for money. The elasticity is much closer to unity in the case of NNPA than for NNP. On the strength of this result, we may consider the next set of equations where WPIr representing the Wholesale Price Index in ratio form is the dependent variable, and M_{1R} and the components of M_{1R} , viz., currency and deposit money are individually taken as the explanatory variable, all in ratio form, and adjusted for year to year changes in NNP and NNPA.

Equ: 5 $N=7$ $WPIr = -0.2452 + 1.1974 \frac{M_r}{NNP_r}$

t-value	(0.640)	(3.448)	$\bar{R}-SQ$:	0.6447
			DW :	1.49
			Standard Error of Estimate :	0.0524
			Mean :	1.07

Equ: 6 $N=11$ $WPIr = -0.1911 + 1.1588 \frac{M_r}{NNP_r}$

t-value	(0.770)	(5.126)	$\bar{R}-SQ$:	0.7165
			DW :	1.30
			Standard Error of Estimate :	0.0440
			Mean :	1.08

Equ: 7 $N=7$ $WPIr = -0.1279 + 1.0944 \frac{M_r}{NNPA_r}$

t-value	(0.382)	(3.594)	$\bar{R}-SQ$:	0.6652
			DW :	1.51
			Standard Error of Estimate :	0.0509
			Mean :	1.07

Equ: 8 $N=11$ $WPIr = -0.0922 + 1.0712 \frac{M_r}{NNPA_r}$

t-value	(0.421)	(5.369)	$\bar{R}-SQ$:	0.7357
			DW :	1.36
			Standard Error of Estimate :	0.0425
			Mean :	1.08

The close association between M_{1R} and the general price level, given output, is well brought out by the above equations, which incidentally suggest that NNPA performs slightly better as an output variable than NNP in the analysis of inter-relationship between money supply and prices.

From the following equations we may infer that our estimate of deposit money component of M_{1R} is satisfactory, as the results obtained for M_{1R} which includes deposit money, and those obtained for currency C and deposit money DM are very satisfactory, as also similar, in regard to statistical parameters.

$$\text{Equ: 9 } N=7 \text{ WPIr} = -0.0790 + 1.0688 \frac{Cr}{NNPAr}$$

t-value	(0.249)	(3.635)	R-SQ :	0.6706
			DW :	1.84
			Standard Error of Estimate :	0.0505
			Mean :	1.07

$$\text{Equ: 10 } N=7 \text{ WPIr} = -0.1038 + 1.0486 \frac{DMr}{NNPAr}$$

t-value	(0.265)	(3.011)	R-SQ :	0.5735
			DW :	1.17
			Standard Error of Estimate :	0.0575
			Mean :	1.07

The statistical parameters slightly improve for equations for the period $N=11$ given below :

$$\text{Equ: 11 } N=11 \text{ WPIr} = -0.1055 + 1.0985 \frac{Cr}{NNPAr}$$

t-value	(0.533)	(6.005)	R-SQ :	0.7781
			DW :	1.83
			Standard Error of Estimate :	0.0389
			Mean :	1.08

$$\text{Equ: 12 } N=11 \text{ WPIr} = 0.0294 + 0.9429 \frac{DMr}{NNPAr}$$

t-value	(0.112)	(3.998)	R-SQ :	0.5997
			DW :	1.26
			Standard Error of Estimate :	0.0523
			Mean :	1.08

The coefficients of the currency and deposit money variables indicate, as expected, the stronger link with prices of expansion in currency as compared to that of deposit money.

The above results point towards the reasonableness of our estimates of the money stock measure M_{1R} and of the monetised sector represented by NNPA. On the strength of these results, we now proceed to examine the behaviour of foodgrain prices and the prices of commercial crops.

Foodgrain Prices

In our analysis of price behaviour presented in Section II we highlighted the induced effects of changes in foodgrain prices as also those of commercial crops on the general price level. For analysing foodgrain price behaviour we propose to make use of the following explanatory variables :

Foodgrain Supply (FGS) : This has been estimated by us in Section III taking into account marketable surplus of foodgrains and the net addition to supplies resulting from Government's procurement and public distribution operations.

Foodgrain Price Adjustment Factor (FGPA) : We have formulated a time series based on a weighted average of the year on year ratios of foodgrain prices over the previous two years, the weights being constant at 3 and 1 for the earlier year and the immediately preceding year respectively. Our hypothesis in using this formulation of price expectations is that a period of high rates of increase in prices is expected to be succeeded by a period of lower rise or fall in prices and vice-versa. As such we expect an inverse relationship between this variable and the change in foodgrain price in the current year.

Foodgrain Public Distribution Price (FPDP) : This variable represents the weighted average of the issue prices for rice and wheat, the weights being proportional to the quantities issued through the public distribution system. As the issue price is worked out on the basis of procurement price and costs related to the public distribution system, this variable may be expected to represent the impact on foodgrain prices of Government's decision each year on procurement prices for the two major crops, rice and wheat.

We have regressed foodgrain price ratio FGPr, on different combinations of the explanatory variables FGPAr, FPDPr and FGSr.

Equ: 13 N=7

$$\text{FGPr} = -0.1172 + 1.4034 \text{ FPDPr} + 0.3229 \frac{\text{Mr}}{\text{FGSr}} - 0.6170 \text{ FGPAr}$$

t-value	(0.391)	(5.380)	(5.544)	(6.059)
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$$\bar{R}-\text{SQ} : 0.9452$$

$$\text{DW} : 2.55$$

$$\text{Standard Error of Estimate} : 0.0338$$

$$\text{Mean} : 1.04$$

Equ: 14 N=11

$$\text{FGPr} = 0.1136 + 1.3611 \text{ FPDPr} + 0.3686 \frac{\text{Mr}}{\text{FGSr}} - 0.6176 \text{ FGPAr}$$

t-value	(0.417)	(5.344)	(6.275)	(5.945)
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$$\bar{R}-\text{SQ} : 0.9130$$

$$\text{DW} : 1.68$$

$$\text{Standard Error of Estimate} : 0.0372$$

$$\text{Mean} : 1.05$$

The statistical parameters of the above two equations are similar and satisfactory. It is interesting to note the stability of the coefficients over two different periods. The signs of FGPAr are as expected. The strong influence of FPDPr on foodgrain prices is brought out by the above two equations which have June 1982 as the common terminal point. A similar equation for the period ending June 1980 based on 9 ratios (excluding two ratios involving the year 1974 as mentioned earlier) gave the following results.

Equ: 15 N=9

$$\text{FGPr} = 0.0096 + 1.1458 \text{ FPDPr} + 0.4018 \frac{\text{Mr}}{\text{FGSr}} - 0.5612 \text{ FGPAr}$$

t-value	(0.013)	(1.364)	(4.553)	(4.868)
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$$\bar{R}-\text{SQ} : 0.9240$$

$$\text{DW} : 1.06$$

$$\text{Standard Error of Estimate} : 0.0378$$

$$\text{Mean} : 1.05$$

The signs and coefficients of Mr/FGSr and FGPAr are similar to those in earlier equations, but the lower influence of FPDPr on

foodgrain prices during the period ending June 1980 is suggested by its lower regression coefficient and the lower t-value as compared to the previous equations. It is interesting to note that the weighted average issue price of foodgrains under the public distribution system as computed by us was higher by 13.73 per cent for 1980-81 over the previous year and rose further by 8.33 per cent in 1981-82. In comparison, the maximum increase in any of the previous years covered by the equation was only 4.43 per cent barring 1973-74 when the rise was of the order of 39.5 per cent. It is, therefore, not surprising that FPDPr has a higher coefficient and a much higher t-value in the equations extending over the period 1980-82.

The equations given below have NNPA instead of money supply as an explanatory variable, the other price variables remaining the same as in the above equations, but in the form of relative prices.

Equ: 16 N=7

$$\frac{FGPr}{WPIr} = -0.1448 + 1.2164 \frac{FPDPr}{WPIr} - 0.6293 \frac{FGPAr}{WPIr} + 0.2699 \frac{NNPAr}{FGSr}$$

t-value (0.354) (3.874) (6.273) (1.928)

$$\bar{R}-SQ : 0.8798$$

$$DW : 2.83$$

$$\text{Standard Error of Estimate} : 0.0350$$

$$\text{Mean} : 0.96$$

Equ: 17 N=11

$$\frac{FGPr}{WPIr} = -0.0610 + 1.2096 \frac{FPDPr}{WPIr} - 0.6089 \frac{FGPAr}{WPIr} + 0.3440 \frac{NNPAr}{FGSr}$$

t-value (0.193) (4.578) (6.263) (2.972)

$$\bar{R}-SQ : 0.8233$$

$$DW : 2.03$$

$$\text{Standard Error of Estimate} : 0.0353$$

$$\text{Mean} : 0.97$$

From the above empirical results, it would appear that in order to arrest a steep rise in foodgrain prices, suitable Government action is called for in regard to releasing additional quantities of foodgrains through the public distribution system from time to time to

augment food supplies as also to help in reducing excess liquidity in the economy. A judicious drawdown of foodgrain stocks would also serve to provide timely additional short term resources to Government, net of additional subsidy involved. The dampening of inflationary pressures through an effective control of foodgrain prices may be expected to have a beneficial effect on the Government budget by helping to control inflation-induced rise in public expenditures. The empirical results presented here provide a quantitative dimension to policy measures aimed at influencing foodgrain price behaviour.

Prices of Commercial Crops

We present below some preliminary results of our empirical analysis of the factors affecting prices of commercial crops. Our approach here is similar to the one followed in the case of foodgrain prices. The following explanatory variables have been used in our prices equation for commercial crops.

Commercial Crop Supply (CCS): A time series of the value of output of selected commercial crops at 1970-71 prices has been worked out by us based on National Accounts Statistics published by Central Statistical Organisation. The crops covered by our estimate are fibres (cotton and jute), oilseeds and sugarcane.

Commercial Crop Prices (CCP): A time series of commercial crop prices for the same commodities as mentioned above has been prepared by using their weights in the Wholesale Price Index.

Commercial Crop Price Adjustment Factor (CCPAr): This series has been computed from the series of commercial crop prices using the same formula as in the case of Foodgrain Price Adjustment factor (FGPA). The related hypothesis is also the same.

Equ: 18 $N=6$

(1976-1981)

$$CCPr = -1.7203 - 1.3224 \text{ CCPAr} + 2.0814 \text{ Mr} + 1.7226 \frac{NNPAR}{CCSr}$$

t-value (1.012) (3.545) (1.640) (1.959)

$\bar{R}-SQ$: 0.7102

DW : 0.91

Standard Error of Estimate : 0.0890

Mean : 1.10

Equ: 19 N=10
(1970-1981)

$$CCPr = -0.2842 - 1.2245 CCPAr + 0.9184 Mr + 1.5694 \frac{NNPAr}{CCSr}$$

t-value (0.295) (4.564) (1.059) (2.869)

R-SQ : 0.7760

DW : 1.60

Standard Error of Estimate : 0.0895

Mean : 1.11

The above results are reasonably satisfactory and could probably be improved significantly by including explanatory variables representing imported supplies and administered prices.

V

Conclusion

The empirical analysis in the foregoing section points to the usefulness of the money stock measure M_{1R} and the estimate of the monetised sector viz. NNPA constructed by us in analysing the behaviour of money and prices. The similarity of regression coefficients of Mr in equations for periods $N=7$ and $N=11$ suggests that the procedure adopted for working out the M_{1R} series for 1969-1972 (in the absence of published data) is satisfactory. The analysis of the behaviour of prices presented in Section II has highlighted the importance of analysing the movements in foodgrain prices and those of commercial crops in order to be in a position to forecast the movements in the price level. Our attempt at formulating a suitable price equation for foodgrain prices has brought out some quantitative dimensions of the Government's decisions on procurement prices and hence on the issue prices of foodgrains under the public distribution system in the context of effectively controlling the rise in foodgrain prices. A tentative formulation of the price equation for commercial crops has yielded promising results. Similarly, our estimate of the marketable surplus of foodgrains has yielded useful empirical results.

Perhaps an interesting result obtained in this paper relates to the empirical verification of the presence of income-elasticity of demand for money at a level close to unity. In view of this finding, we were in a position to assess the impact on the general price level of expansion in money supply, in excess of the rate of growth of output. The extent of the close association between the price

level and excess liquidity has been brought out by the statistical parameters presented in Section IV. We have, however, not studied here the line of causation between money supply and prices. The general price level is, however, influenced by price expectations apart from other factors. The formulation of price expectations in regard to the general price level has not been attempted in this paper, but our efforts in regard to formulation of a price adjustment factor in the area of foodgrain prices and prices of commercial crops have yielded interesting results. Our empirical analysis has shown that real factors and price adjustment factor have a significant influence on the behaviour of foodgrain prices which, in turn, contributes to movements in the general price level.

MONEY STOCK MEASURE : M1R

(Rs. crores)

As on last Friday of June	Currency with the Public	Per cent change over previous year	Demand Deposits			Total	Percent change over previous year	Other Deposits with RBI	M1R	Per cent change over previous year
			Savings Deposits	Current Deposits	Fixed Deposits with maturities of 6 months or less					
1	2	3	4	5	6	7	8	9	10	11
1969	1789		623	1244	456	2323		49	6161	
1970	1190	10.6	717	1384	442	2543	9.5	40	6773	9.9
1971	4591	9.6	852	1535	464	2851	12.1	32	7474	10.3
1972	4979	8.5	1043	1699	464	3206	12.5	66	8251	10.4
1973	5789	16.3	1261	2001	564	3826	19.3	40	9655	17.0
1974	6552	13.2	1466	2202	649	4317	12.8	47	10916	13.1
1975	6662	1.7	1672	2405	501	4578	6.0	65	11305	3.6
1976	7235	8.6	1919	2664	676	5259	14.9	46	12540	10.9
1977	8298	14.7	2367	3061	827	6255	18.9	53	14606	16.5
1978	9228	11.2	3011	3842	708	7561	20.9	107	16896	15.7
1979	10994	19.1	3770	4587	865	9222	22.0	145	20361	20.5
1980	12052	9.6	4379	5119	1016	10514	14.0	240	22806	12.0
1981	13943	15.7	5298	6082	1216	12596	19.8	122	26661	16.9
1982	15591	11.8	6199	6705	1399	14303	13.6	148	30042	12.7

COMPONENTS OF M_{1R} AND RELATED RATIOS

As on Last Friday of June	Ratio of M _{1R} to NNP (per cent)	Share of currency with the public in M _{1R} (per cent)	Share of savings deposits in M _{1R} (per cent)	Share of current deposits in M _{1R} (per cent)	Share of fixed deposits with ma- turities of 6 months or less in M _{1R} (per cent)	Share of demand deposits in M _{1R} (per cent)	Ratio of currency with the public to demand deposits (C/DD)
1	2	3	4	5	6	7	8
1969	20.2	61.5	10.1	20.2	7.4	37.7	1.63
1970	20.9	61.9	10.6	20.4	6.5	37.5	1.65
1971	21.8	61.4	11.4	20.5	6.2	38.1	1.61
1972	23.8	60.3	12.6	20.6	5.6	38.9	1.55
1973	28.2	60.0	13.1	20.7	5.8	39.6	1.51
1974	30.4	60.0	13.4	20.2	5.9	39.5	1.52
1975	31.0	58.9	14.8	21.3	4.4	40.5	1.46
1976	31.3	57.7	15.3	21.2	5.4	41.9	1.38
1977	36.3	56.8	16.2	21.0	5.7	42.8	1.33
1978	38.4	54.6	17.8	22.7	4.2	44.8	1.22
1979	43.9	54.0	18.5	22.5	4.2	45.3	1.19
1980	51.9	52.8	19.2	22.4	4.5	46.1	1.15
1981	56.1	52.3	19.9	22.8	4.6	47.2	1.11
1982	60.2	51.9	20.6	22.3	4.7	47.6	1.09

ANNEXURE III

WHOLESALE PRICE INDEX AND SELECTED SECTORAL PRICES — REGRESSION ANALYSIS

I. The wholesale Price Index — All Commodities (WPI) as a linear function of the composite price index of Foodgrains, and Non-Food Articles (excluding Minerals) in the Primary Sector (WPA) with a weight of 23.543 in the Wholesale Price Index :

i) 1950-51 to : $WPI = 8.8526 + 0.8850 WPA$
1969-70
(20 years) t-value (32.58) Correlation
Coefficient : 0.98

Standard Error of Mean of WPI : 59.90
Estimate 2.34

ii) 1970-71 to : $WPI = -33.3771 + 1.2897 WPA$
1981-82
(12 years) t-value (17.11) Correlation
Coefficient : 0.98

Standard Error of Mean of WPI : 176.09
Estimate 10.77

iii) 1950-51 to : $WPI = 5.8750 + 1.1278 WPA$
1981-82
(32 years) t-value (43.21) Correlation
Coefficient : 0.99

Standard Error of Mean of WPI : 103.47
Estimate 8.66

II. Wholesale Price Index — All Commodities (WPI) as a linear function of the Revised Composite Index WPP (Wholesale prices of Foodgrains, Non-Food Articles (excluding Minerals) in the Primary Sector and Petroleum crude and natural gas in the Primary Sector) with a total weight of 24.145 per cent in the Wholesale Price Index.

1970-71 to : $WPI = 4.4018 + 0.9601 WPP$
1981-82
(12 years) t-value (30.62) Correlation
Coefficient : 0.99

Standard Error of Mean of WPI : 176.09
Estimate 6.09

ANNEXURE IV

**WHOLESALE PRICE INDEX NUMBERS OF CERTAIN GROUPS
OF COMMODITIES (1970-71 = 100)**

Groups:	Food-grains	Non-Food Articles	Food-grains + Non-Food Articles	Petroleum crude & Natural Gas	Food-grains + Non-Food Articles + Petroleum crude & Natural Gas	All Commodities
Weights:	12.922	10.621	23.543	0.602	24.145	100.000
1	2	3	4	5	6	7
Financial year						
1947—48	37.1	32.3	34.9			35.7
—49	49.0	38.0	44.0			43.6
—50	48.5	40.1	44.7			44.7
1950—51	51.4	45.6	48.8			47.5
—52	51.0	50.9	51.0			50.4
—53	48.2	36.9	43.1			44.1
—54	46.5	40.2	43.7			46.2
—55	36.5	37.3	36.9			43.0
—56	35.2	35.9	35.5			40.8
—57	45.0	41.7	43.5			46.5
—58	47.0	42.2	44.8			47.9
—59	51.2	41.9	47.0			49.8
—60	49.2	44.9	47.3			51.7
1960—61	49.3	52.7	50.8			55.1
—62	48.4	51.3	49.7			55.2
—63	51.0	49.9	50.5			57.3
—64	55.7	52.0	53.9			60.9
—65	70.4	60.4	65.9			67.5
—66	74.6	68.6	71.9			72.7

ANNEXURE IV (Contd.)

1	2	3	4	5	6	7
—67	88.4	80.2	84.7			82.8
—68	110.4	79.5	96.5			92.4
—69	97.2	83.0	90.8			91.3
—70	100.7	92.9	97.2			94.8
1970—71	100.0	100.0	100.0	100.0	100.0	100.0
—72	103.4	98.6	101.2	130.2	101.9	105.6
—73	119.5	107.5	114.1	142.0	114.8	116.2
—74	141.9	146.6	144.0	317.1	148.3	139.7
—75	195.8	163.7	181.3	686.5	193.9	174.9
—76	174.1	139.8	158.6	700.3	172.1	173.0
—77	152.7	167.4	159.3	740.3	173.8	176.6
—78	170.4	178.0	173.8	787.6	186.0	185.8
—79	172.6	170.4	171.6	802.9	187.3	185.8
—80	185.4	194.6	189.6	1384.0	219.4	217.6
1980—81	216.7	217.7	217.2	2041.8	262.7	257.3
—82	237.4	239.5	238.3	2140.5	285.7	280.6

Sources: 1) Wholesale price index numbers of the groups — Foodgrains, Non-Food Articles and all commodity, for the years 1947-48 to 1977-78 obtained from: "Wholesale price statistics India 1947-1978, Volume I" by H. L. Chandhok, Economic and Scientific Research Foundation, New Delhi, October 1978.

2) Similar figures for the years 1978-79 to 1981-82 obtained from the Report on Currency and Finance, Volume II Statistical Statements, 1981-82.

Note: Other figures are derived.

MONETISED SECTOR

	Net Production of Food-grains (million tonnes)	Estimated Rural Population (millions)	Minimum Retention of foodgrains by farming population @ 116 kg. per Capita per annum for Rural population		Net National Product at factor cost at 1970-71 prices (NNP) (Rs. crores)	Adjusted NNP or NNPA (Estimated Monetised Sector) (Rs. crores)	Maximum Marketable surplus of food-grains (million tonnes)
			(million tonnes)	Value at 1970-71 Prices (Rs. crores)			
1	2	3	4	5	6	7	8
1963-64	70.61	381	44.20	3781	26746	22965	26.41
1964-65	78.20	389	45.12	3861	28808	24947	33.08
1965-66	63.30	396	45.94	3931	27103	23172	17.36
1966-67	64.95	404	46.86	4009	27298	23289	18.09
1967-68	83.17	412	47.79	4089	29715	25626	35.38
1968-69	82.26	421	48.84	4179	30513	26334	33.42
1969-70	87.06	430	49.88	4268	32408	28140	37.18
1970-71	94.87	439	50.92	4357	34235	29878	43.95
1971-72	92.02	446	51.74	4427	34715	30288	40.28
1972-73	84.90	454	52.66	4506	34191	29685	32.24
1973-74	91.58	463	53.71	4595	35967	31372	37.87
1974-75	87.35	471	54.64	4675	36502	31827	32.71
1975-76	105.90	479	55.56	4754	40064	35310	50.34
1976-77	97.27	487	56.49	4833	40271	35438	40.78
1977-78	110.61	495	57.42	4913	43951	39038	53.19
1978-79	115.41	504	58.46	5002	46386	41384	56.95
1979-80	95.99	513	59.51	5092	43922	38830	36.48
1980-81	113.39	523	60.67	5191	47490	42299	52.72
1981-82	116.43	534	61.94	5300	49887	44567	54.49

ANNEXURE VI

FOODGRAIN SUPPLY

(Million Tonnes)

	Marketable Surplus of Foodgrains	Government Procurement	Public Distribution	Net Addition to Marketable Surplus	Foodgrain Supply Unad- justed*
1	2	3	4	5	6
1964-65	33.08	4.03	10.08	6.05	39.13
1965-66	17.36	4.01	14.09	10.08	27.44
1966-67	18.09	4.46	13.17	8.71	26.80
1967-68	35.38	6.81	10.22	3.41	38.79
1968-69	33.42	6.38	9.39	3.01	36.43
1969-70	37.18	6.71	8.84	2.13	39.31
1970-71	43.95	8.86	7.82	-1.04	42.91
1971-72	40.28	7.67	10.49	2.82	43.10
1972-73	32.24	8.42	11.41	2.99	35.23
1973-74	37.87	5.65	10.79	5.14	43.01
1974-75	32.71	9.56	11.25	1.69	34.40
1975-76	50.34	12.85	9.17	-3.68	46.66
1976-77	40.78	9.94	11.74	1.80	42.58
1977-78	53.19	11.09	10.18	-0.91	52.28
1978-79	56.95	13.84	11.66	-2.18	54.77
1979-80	36.48	11.17	14.99	3.82	40.30
1980-81	52.72	12.94	13.01	0.07	52.79
1981-82	54.49	15.35	14.78	-0.57	53.92

* Year to year adjustments to our estimate of the minimum quantity of foodgrains retained by the farming population may be made in order to reflect the income elasticity of demand for food etc. We have not done so as we wish to initially test our estimation procedure using the unadjusted foodgrain supply series.

Note: Data relating to procurement and public distribution of foodgrains (Economic Survey, 1982-83) relates to calendar year. 1964-65 = 1965.

LIST OF VARIABLES AND RELEVANT DATA

ANNEXURE VII

(Rs. crores)

M1R (M)	Net National Product at factor cost and at 1970-71 prices (NNP)	Wholesale Price Index (P)	Net National Product Adjusted at 1970-71 prices (NNPA)	Food- grains Supply (Mn. tonnes) unad- justed (FGS)	Food- grains Price Index (FGP)	Food- grains Price Adjust- ment factor (FGPAR)	Food- grains Public Distribu- tion Price Rs./quintal (Weighted average Price) (FPDP)	Commer- cial Crop Supply (CCS)	Commer- cial Crop Price Index (CCP)	Commer- cial Crop Price Adjust- ment factor (CCPA-)	
1	2	3	4	5	6	7	8	9	10	11	12
1969	6161	30513	97.9	26334	36.43	101.1			3311	92.6	
1970	6773	32408	102.8	28140	39.31	103.3	0.9183		3720	101.7	0.9912
1971	7474	34235	106.0	29878	42.91	99.4	1.0292	86.7	3725	97.0	1.2156
1972	8251	34715	113.3	30288	37.46	112.4	1.0069	85.8	3897	91.7	1.0622
1973	9655	34191	137.6	29685	35.23	133.3	1.0044	89.6	3386	135.2	0.9517
1974	10916	35967	176.0	31372	43.01	181.7	1.1446	125.0	3906	160.1	1.0777
1975	11305	36502	177.0	31827	34.40	194.4	1.2302	129.0	3945	139.4	1.4019
1976	12540	40064	173.9	35310	46.66	145.6	1.2898	128.0	4011	139.7	1.1058
1977	14606	40271	188.8	35438	42.58	165.8	0.9897	129.2	3756	184.2	0.9036
1978	16896	43951	186.0	39038	52.28	171.8	0.8464	128.2	4296	161.2	1.0813
1979	20361	46386	204.1	41384	54.77	173.9	1.1131	131.7	4266	161.8	1.2076
1980	22806	43922	251.4	38830	40.30	205.1	1.0302	136.2	3875	192.4	0.9073
1981	26661	47490	279.8	42299	52.79	232.8	1.0540	154.9	4099	232.4	1.0501
1982	30042	49887	284.9	44567	53.92	234.6	1.1683	167.8			

Sources : National Accounts Statistics (CSO) and various issues of Reserve Bank of India Bulletin and Report on Currency and finance for NNP and P. Other series computed. Data relating to prices and M_{g1} are for June.

ANNEXURE VIII

WEIGHTING PATTERN OF CERTAIN COMMODITIES
IN THE WHOLESALE PRICE INDEX *

Commodity	Weight		
FOODGRAINS	12.922		
Cereals		10.743	
Rice			5.131
Wheat			3.417
Jowar			0.839
Bajra			0.564
Barley			0.233
Maize			0.438
Ragi			0.121
Pulses		2.179	
Gram			1.039
Arhar			0.524
Moong			0.255
Masoor			0.159
Urad			0.202
NON-FOOD ARTICLES	10.621		
Fibres		3.173	
Cotton Raw			2.246
Jute Raw			0.429
Mesta			0.104
Hemp Raw			0.035
Wool Raw			0.113
Silk Raw			0.131
Coir Fibre			0.115
Oilseeds		4.201	
Groundnut seed			1.821
Rapeseed and Mustard seed			0.822
Cotton Seed			0.510
Gingelly Seed			0.236
Linseed			0.177
Copra			0.449
Nigerseed			0.048
Castor Seed			0.054
Safflower			0.036
Soyabean			0.013
Mahuaseed			0.035
Other Non-food Articles		3.247	
Hides Raw			0.192
Skin Raw			0.100
Tanning Materials			0.019
Sugarcane			1.642
Rubber			0.128
Lac			0.025
Logs, Timber and Bamboos			0.334
Tobacco, Raw			0.807

* All Commodities : Weight = 100.

ANNEXURE IX

DEPOSITS WITH CO-OPERATIVE BANKS

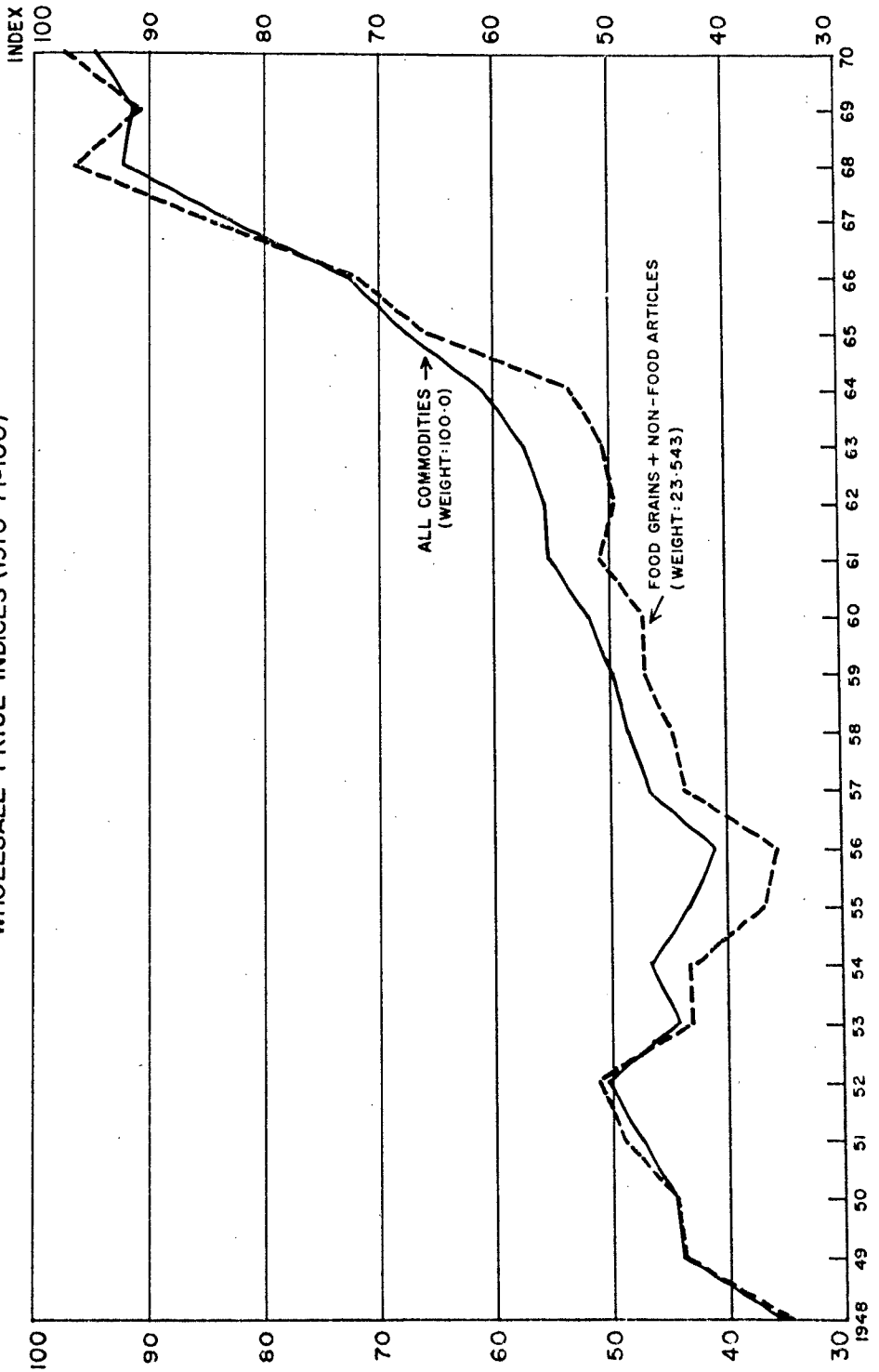
The demand deposits with non-scheduled commercial banks and the co-operative banks (viz. State Co-operative banks, Central Co-operative banks, Urban Co-operative banks and Salary Earners' Societies) have not been included in M_{1R}. These deposits constitute about 10 per cent of total deposits with all banks. Since these deposits are mostly at rural and semi-urban centres, their savings deposits would form part of time deposits according to the definition of M_{1R} adopted by us. The changes in current account deposits are relatively small and their exclusion from M_{1R} would not materially affect our analysis. The break-up of the demand deposits is not available for recent years. However, the data on co-operative bank deposits are presented below.

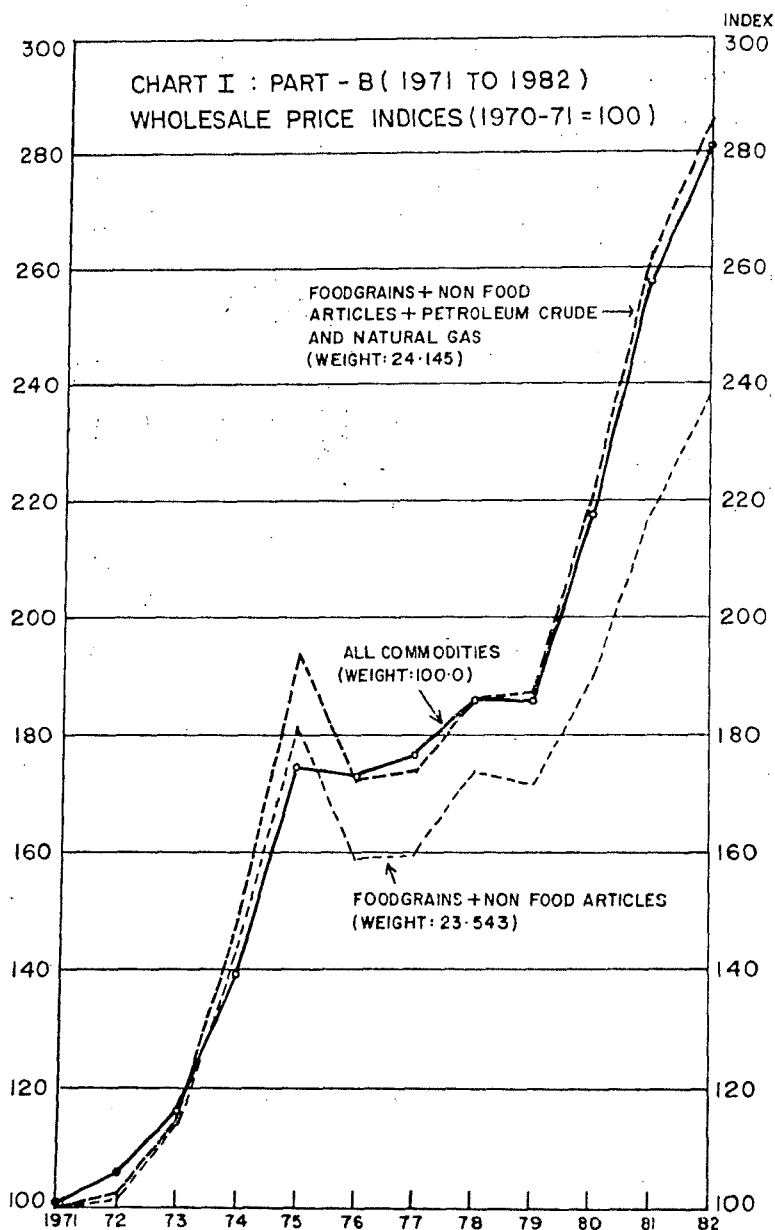
(Rs. Crores)

	Demand Deposits with Commercial and Co-op. banks, i.e., M ₁ —(Currency + Other Deposits)	Demand Deposits with Scheduled Commercial Banks	Demand Deposits with Non-Sch. Comm. banks, State Co-op. banks, Central Co-op. banks & Salary Earners' Societies	Current* Deposits in Col. 4	Balance, i.e., Savings Deposits Portion in Demand Deposits (4-5)
1	2	3	4	5	6
June 1969	2205	2104	101		
1970	2599	2329	270	150	120
1971	3031	2743	288	176	112
1972	3719	3358	361	210	151
1973	4415	3958	457	253	204
1974	5172	4647	525	261	264
1975	5815	5253	562	292	270
1976	6757	6106	651	319	332
1977	8019	7290	729	366	363
1978	5817	4890	927	417	510
1979	7325	6190	1135		
1980	7923	6597	1326		
1981	9796	8290	1506		
1982	10684	9055	1629		

* Current deposits of State Co-operative Banks, Central Co-operative Banks and Primary (Urban) Co-operative Banks.

CHART I : PART -A (1948 TO 1970)
WHOLESALE PRICE INDICES (1970-71=100)





DEMAND FOR COMMERCIAL BANK CREDIT FROM SUGAR FACTORIES IN PRIVATE AND STATE SECTORS (1973-1980)

A. Seshan*

Introduction

Sugar factories constitute one of the leading agro-industries in India. The vicissitudes of the industry are very much bound up with the cultivation of sugarcane, the peaks and troughs of which affect the industry in relation to output and prices. At the end of 1980 there were about 300 factories in the country, of which around 25 factories were in the State sector and the remaining number was equally distributed between co-operatives and joint stock companies. Sugar industry is one sector where co-operative processing has made spectacular strides in recent years. Co-operative factories accounted for 38 per cent of total production in 1972-73 (October-September), which rose to 57 per cent in 1980-81 (Table 1). Of the total stocks at the end of April 1973, 37 per cent was with co-operative factories. This proportion increased to 54 per cent in April 1980 (Table 2).

The industry is one of the important customers of the commercial and co-operative banking systems in the country. While the co-operative factories approach the central financing agencies for credit, the factories in the private and State sectors borrow from commercial banks. However, there are instances of co-operative factories borrowing from commercial banks too. While data on lendings of commercial banks to co-operative factories are not readily available, the available statistics on borrowings of sugar co-operatives from various agencies reveal that commercial banks account for less than 10 per cent of the total borrowings (Table 3). It is likely that a considerable proportion of these borrowings were in the nature of term loans for the installation of plant and machinery. Considering the magnitude of commercial bank credit to the sugar industry, which ranged from Rs. 160 crores to Rs. 380 crores during 1973-1980, their lending to co-operative factories should have constituted 15 per cent or less in their total sugar portfolio.

However, for private factories and those in the State sector commercial banks are an important source of credit. In view of

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the seasonal nature of production factories require credit not only for production but also for maintenance of stocks for eventual disposal in the slack season. Except for a brief period (August 16, 1978 to December 16, 1979), the supply and the price of sugar have been controlled by Government with a view to imparting some stability in the market. Currently 65 per cent of the production is earmarked as levy for public distribution at a price fixed by Government and 35 per cent as free-sale stocks, which the factories can sell at market price. Thus factories are required to hold stocks till such time they are released by Government. This necessitates special consideration in the provision of credit to the industry. The major part of the credit requirements of the industry is for stocking purposes. Thus between 1973 and 1980 more than 75 per cent of the outstanding credit was secured against the stocks of sugar and **khandsari** (Table 4). It is also worth noting that the utilisation of credit limit in the month of June, which falls in the peak period for stocks and credit, is generally found to be 44 per cent to 71 per cent indicating perhaps some amount of over-estimation of credit requirements by the industry at the time of applying for credit limits.

In credit planning and budgeting exercises by the commercial banks and the Reserve Bank of India the requirements of sugar industry figure prominently. It is the objective of this study to analyse the demand for bank credit emanating from sugar factories in the private and State sectors.

Supply of Credit : Credit Control¹

Certain "sensitive commodities" are covered by the Reserve Bank of India under its Selective Credit Control. They are those which are important from the point of view of the common man, any rise in their prices affecting the cost of living. To prevent the speculative holding of these sensitive commodities **with the help of bank credit**, the Reserve Bank of India has stipulated certain restrictions on advances against their securities under Section 21 of the Banking Regulation Act 1949. Sugar is one of the commodities covered by Selective Credit Control.

The three instruments of Selective Credit Control are minimum margin on advances, ceiling on the level of credit and minimum rate

¹ This section is based to a large extent on the booklet: **Selective Credit Control; Handbook on Directives to Scheduled Commercial Banks on Advances against Selected Securities** (incorporating amendments up to March 1, 1982), Reserve Bank of India.

of interest. Keeping in view the general credit policy and social and economic priorities exemptions are provided. The provisions are generally somewhat liberal for manufacturers than for others since a certain amount of stocking is necessary for the normal operations of production. While the first two instruments control the quantum of bank credit, the third instrument has a bearing on the cost of credit. Formerly there was no maximum prescribed for the rate of interest to be charged on the advances covered by Selective Credit Control although there was such a ceiling on other advances. However, effective March 1, 1978, advances against the securities of the commodities covered by Selective Credit Control have also been brought within the purview of the general ceiling on advances rate. In the case of all advances other than the advances made to sugar mills against sugar stocks, the minimum rate of interest under Selective Credit Control is the same as the general ceiling on advances rate, viz., 18.0 per cent per annum. Hence the rate is fixed for all practical purposes. However, in the case of advances to sugar manufacturers against the security of sugar, the interest rate could vary between 16.5 per cent and 18.0 per cent.²

Only the minimum margin and interest stipulations are applicable to advances against sugar, gur and khandsari. The minimum margin on advances to sugar factories against stocks of sugar is changed from time to time depending on conditions of supply and demand and trends in prices. It is now 75.0 per cent in respect of such stocks of sugar as have been released for sale by Government and have left the factory or mill premises and on which excise duty has been paid. Thus the margin is fairly stiff to prevent the use of bank credit for any speculative holding of sugar stocks released for sale. The minimum margin is 17.5 per cent on advances to manufacturers of sugar against stocks other than those referred to above, i.e., stocks which the factories are bound to keep because they are not released by Government. During the period of the study stocks of levy sugar were to be valued at the levy price fixed by Government and stocks of free-sale sugar at the tariff value fixed by Government or at market value, whichever was lower. Since Branch Managers found it difficult to keep track of market values from time to time to determine the drawing power against stocks, they generally adopted the tariff value announced by Government every month for valuing free-sale stocks.

Under the existing policy, without prior authorisation from the RBI, commercial banks can extend credit limits to sugar mills up

² Effective from April 1, 1983.

to a specified percentage of the maximum amount (excluding temporary excess drawings) availed of in the previous season, provided actual drawings are regulated on the basis of deficits as disclosed in the monthly cash budgets of mills.³ The limits are to be fixed in respect of individual sugar mills on the basis of the estimates of their sugar production keeping in view the minimum cane price fixed by the Union Government. Within the total limit banks can fix suitable sub-limits and allow them as cash credit against stocks of sugar pledged/hypothecated. In view of the liquidity problems faced by factories in recent years, clean loans up to specified limits have been allowed without prior authorisation for limited periods for meeting off-season maintenance/repair expenses.⁴

Methodology

The variations in outstanding (scheduled) commercial bank credit are sought to be explained by a number of variables selected on *a priori* grounds. These variables are production, stocks, price of sugar, price of sugarcane, rate of interest and seasonality. The rationale for selecting these variables is explained below.

As mentioned earlier, under the credit policy laid down by the RBI, the demand for credit and hence the credit limits are to be determined with reference to the anticipated **output**. Sub-limits are fixed for advances against **stocks**. While the **price of sugarcane** payable to farmers is to be taken into account for fixing the total credit limit, the **price of sugar** is relevant for valuation of stocks hypothecated/pledged. The **rate of interest** could also be expected, on theoretical grounds, to affect the demand for credit. There is a definite **seasonality** in the credit requirements of factories. The sugar year extends from October to September. However, the crushing operations gather momentum from January onwards and the peak stocks and credit requirements are observed around April, May and June after which there is a decline. Thus the first half of the year may be considered to be the busy period and the second half the slack period from the point of view of demand for credit.

The various types of advances included in Basic Statistical Return 1 are: (i) Cash Credit, (ii) Overdraft, (iii) Demand Loans, (iv) Term Loans, (v) Packing Credit, (vi) Bills purchased and discounted — export and inland, and (vii) Advances — import bills. Since demand

³ The percentage is 125 for the sugar year 1982-83.

⁴ As a general policy clean loans are not normally permissible for parties dealing in commodities covered by Selective Credit Control.

for credit for current production should strictly be related to short-term credit or cash credit, additional equations were compiled using total bank credit, excluding term loans, as dependent variable for which data are available.

Besides compiling regressions for nominal credit, separate equations have been estimated for the demand for real credit.

Data

The data used in the study relate to the calendar years 1973 to 1980. This period has been selected because of the availability, on a half-yearly basis, of comparable time-series on outstanding scheduled commercial bank credit for the manufacturing sector from Basic Statistical Return 1 (BSR 1) prescribed for all branches of scheduled commercial banks. The equations have been compiled by regressing the averages for half-years of the dependent variable on the averages of the independent variables for the corresponding period. For this purpose the averages of the variables for the first and the second halves of each of the calendar years were calculated. Thus the average of outstanding credit as at the end of June of a year and December of the previous year was deemed to indicate the average outstanding credit for the first half (January-June) of the year. Similar calculations were made for the second half of the calendar year.

The data available on sugar stocks and production relate to the entire sugar industry including co-operative and private sectors. The quantities relating to co-operative sectors have been deducted from the total in order to arrive at the balance attributable to the private and State sectors. Distribution and price of sugar were controlled for most of the time in the reference period. Government fixed the levy price for levy sugar and tariff value for free-sale sugar. The weighted price for sugar has been calculated using the proportion of levy sugar and free-sale sugar in total stocks as weights (Table 5). The weighted price of sugarcane was estimated taking into account the purchase price in different States and their relative share in cane crushed. The weighted rate of interest was calculated using the data on distribution of loans to sugar industry, according to the rate of interest, available from the publication on BSR 1. The data matrix for regressions is presented in Table 6.

A few limitations have to be borne in mind. There is an element of credit made available to co-operative factories in the data on dependent variable while production and stocks in the

co-operative sector are completely excluded from the data on independent variables. The limitation is not serious since credit extended to co-operatives is of a small proportion in total commercial bank credit for the sugar industry as stated in the Introductory Section. Data on production and stocks, put out by the Indian Sugar Mills Association, do not include those relating to a small number of mills which are not members of the Association.

Demand for Credit: Regression Analysis

Several equations were compiled to experiment with various sets of independent variables. Of these a few equations have been selected for discussion because of their interesting results. They are presented in Table 7 (for nominal credit) and Table 8 (for real credit). The salient features of the results are summed up below. Seasonal aspect (dummy variable) plays a dominant role in the explanation of the variations in the demand for credit. Thus, for example, in equation 1, price of sugar and sugar stocks account for only 41 per cent of the variations in total credit. The former variable is insignificant at 5 per cent level. On the addition of the dummy variable the explanatory power of the equation increases substantially to 90 per cent (equation 2). The standard error of estimate of the equation also gets reduced very much. Further, price of sugar too becomes significant. About eighty three per cent of the variations left unexplained by the first two variables (equation 1) is found to be associated with the seasonal aspect of sugar production. The same results are seen in equations 4 and 5 with reference to price of sugarcane introduced in the place of price of sugar.

The level of production of sugar is significant in affecting credit demand when considered jointly with price of sugar and sugar stocks⁵ (equation 6). The coefficient of determination is 0.83. However, it seems to be carrying the effect of dummy as it has a negative sign. The introduction of dummy renders it insignificant (equation 7). The addition of price of sugarcane (equation 8) and rate of interest (equation 9) increases the explanatory power only to a small extent. Due to high correlation between price of sugarcane and price of sugar ($r = 0.86$), PSC (the variable relating to price of sugarcane) turns out to be insignificant wherever PS (price of sugar) is present. Rate of interest, though significant, has a wrong (positive) sign (equation 9).

⁵ All references to "significance" relate to 5 per cent level.

The busy and slack seasons (January-June and July-December) were given the values of 1 and 10 for the purpose of regression analysis. If the effects of other variables are held constant, the change from busy to slack season results in an increase in credit. This is also reflected in the negative sign for production. *A priori*, this is enigmatic since one should expect credit needs to decrease rather than increase with a decrease in production. However, if one considers some of the peculiar features of the working of the sugar industry these results will be found to be in accordance with the real situation.

The sugar industry is seasonal in nature, the factories working to full capacity for about four to five months in a year. The cost of purchase of sugarcane constitutes about 60 per cent of the total cost of production of sugar. As the recovery of sugar from cane is not known at the time of delivery of the raw material, factories make only a partial payment to farmers at that time. The balance is paid in the later part of the season. The factories get credit facilities from farmers either with no interest or at low rate of interest compared with what is charged by banks. (See Annexure 1 for Government order on cane dues). This is certainly more advantageous to factories than to borrow from banks at high rates and pay off the farmers promptly. These arrears are large especially in years of bumper crop of sugarcane. In normal years the sugar industry absorbs about 30 per cent to 33 per cent of the cane output, another 55 per cent to 60 per cent being taken by the **gur** and **khandsari** manufacturers and the balance going to seeds, direct consumption, etc.⁶ However, in years of bumper harvest of cane, the **gur** and **khandsari** producers do not have the capacity to absorb the additional output which has to be taken up by the sugar industry. Thus it is estimated that of the total output of sugarcane of 190 million tonnes in 1981-82, 45 per cent was purchased by sugar factories.⁷ In February 1983 the cane payment arrears were reported to be around Rs. 200 crores (inclusive of Rs. 60 crores carried over from the previous year) and it was feared that by the end of the season it might go up to Rs. 500 crores.⁸

The effect of production lagged by one season on the demand for credit is also brought out by the regressions when the dummy variable is replaced by the lagged variable. (See equations

⁶ "Sugar Industry in Retrospect" by an Economist, *Financial Express*, January 18, 1983.

⁷ *Ibid.*

⁸ "Cane prices to be rolled back", *Financial Express*, February 4, 1983.

No. 3, 12, 21 and 30 in Table 6). However, it may be noted that the dummy variable also catches the effects of other factors, if any, relating to seasonality, besides production, and the explanatory power of the equations with dummy variable is higher when it replaces the lagged production variable referred to in the above-mentioned equations.

The RBI has, of course, evolved detailed guidelines for the operation of credit limits by sugar factories. *Inter alia*, they emphasise the need for banks to monitor the payment of cane dues to farmers by factories in relation to the drawals from their cash credit accounts. However, hypothetically, it may be argued that the question of banks' ensuring payment of cane arrears arises only as and when credit limits are drawn upon. To the extent that mills could get credit facilities from farmers at low or nil rate of interest in the form of "Dues payable", they do not have to approach banks for drawing upon credit limits carrying a high rate of interest. The low utilisation of credit limits by mills commented upon earlier in the Introductory Section with reference to Table 4 also bears this out. We do not have data to examine whether factories pledge all the stocks to banks or only a part of them at any point of time. The phenomenon observed in the equation, viz., increased demand for credit with a decline in production, in the slack season, *ceteris paribus*, relates to the need for settling cane arrears before the new year commences. The low explanatory power and the wrong sign observed for rate of interest should be seen in this context. However, it should be pointed out that the peak level of outstandings is generally observed in April-June during the busy season when stocks are high and not in the slack season. This is the result of the influence of the stock variable more than compensating the other seasonal effects on the demand for credit.

The relationship of output to credit demand in sugar industry is in contrast to that observed for many other industries. The elasticity of total bank credit with respect to production of manufactured goods ranges between 1.5 and 1.8 due to various reasons.⁹ The result observed in the case of sugar industry (negative elasticity) is attributable to the special features in its working explained earlier.

⁹ See, "Demand for Bank Credit from Manufacturing Sector", A. Seshan (Mimeo), presented at the 21st Annual Conference of the Indian Econometric Society held at Annamalai Nagar, January 10-12, 1983. Annexure 2 to this article contains an abstract on the findings of the above-mentioned study.

Sugar stocks constitute another important variable in explaining the variations in total bank credit. It is observed that this variable has a unitary elasticity in relation to demand for credit in all the equations where seasonal effect is allowed for. On the other hand, the elasticity of price of sugar ranges between 0.66 and 0.82 in equations with high $\bar{R}^2$.

The equations relating to total credit excluding term loans (SCS) reveal features which are more or less similar to those observed for total credit (TCS). Thus the dummy variable is important in explaining variations and the elasticity of demand with reference to sugar stocks is around 1. During the period under reference term loans constituted, on the average, around 15 per cent of total credit (TCS). The size of the coefficient for price decreases when SCS is considered as against TCS. The elasticities decrease much for variables other than sugar stocks.

The double-log formulation of the equations for TCS and SCS also broadly confirms the findings of the linear equations. The elasticities of variables are, however, different from those of the linear version. The elasticity of credit with reference to sugar stocks is generally less than 1. It is more than 1 with reference to price of sugar in many equations. It would appear that factories do not take full advantage of the increased drawing power available with an increase in stocks.

Besides compiling equations for demand for nominal credit, regressions were prepared for real credit also. As it was not clear whether real credit for mills should be interpreted in terms of the price of sugar or the price of cane, an average of these was used for deflating nominal credit. Most of the equations were found to be not acceptable. Six equations from this set are presented in Table 8. Further exercises were made using only the price of sugar for deflating credit. Here too only six equations were found to be presentable (Table 8). These twelve equations for real credit also more or less confirm the findings of the other equations discussed earlier. Thus dummy explains considerable variations. The elasticities for the independent variables, however, differ among the equations and in relation to equations considered earlier.

The extra-sample performance of the regressions also needs to be tested in this connection. Though tabulations BSR 1 for years subsequent to 1980 are not yet ready, data on sectoral deployment of credit available from the Credit Planning Cell of the Reserve

Bank of India can be utilised for the purpose. The peak outstanding was Rs. 527 crores at the end of June 1982 in 1981-82 of which Rs. 467 crores was secured against stocks of sugar, according to Basic Statistical Return 3. The tariff value and levy price of sugar were then Rs. 430 per quintal Rs. 300 per quintal, respectively giving a weighted average of Rs. 345.5 per quintal. Peak level stocks with all factories were 53.0 lakh tonnes last year.¹⁰ Stocks with factories other than co-operatives amounted to about 25.5 lakh tonnes. Plugging these values in equations, selected on the basis of statistical criteria, provide the following estimates.¹¹

Equation No. in Table 7	Nature of credit	Estimate (Rs. crores)	Actual	% error
2	TCS	504	527*	— 4.4
11	SCS	400	467†	— 14.3
20	Log TCS	665	527*	+ 26.2
29	Log SCS	463	467†	— 0.9

* Based on data collected in the return on Sectoral Deployment of Credit.

† Based on data collected in Basic Statistical Return 3.

The extra-sample results show the magnitude of error of double-log equation to be small for SCS, which is the variable of prime interest in this study.

To sum up, there is considerable stability in the underlying relationship between seasonal effect and sugar stocks on the one hand and demand for credit, on the other, irrespective of the type of formulation of the equations. Factories do get credit against stores and spares as well as against fixed assets. Clean loans are occasionally permitted as stated earlier. However, available data indicate the predominant nature of credit against stocks of sugar.

Data are available in Basic Statistical Return 3 on a monthly basis on the scheduled commercial bank credit outstanding against the security of sugar (including khandsari), though subject to limitations. Some additional exercises were made using these data which broadly confirm the findings of the equations based on BSR 1. The results are presented in Annexure 3.

¹⁰ "Sugar Units facing loss", Report in Times of India dated March 15, 1983.

¹¹ See Tables 9 and 10 for within-sample performance of the equations.

Concluding Remarks

The results of the study have certain policy implications. *Prima facie*, there appears to be a tendency on the part of mills to pitch their demand for credit at a high level at the beginning of the season. This may be true of borrowers in other sectors as well given the cash credit system and its operational features. Such an over-estimation of credit requirements upsets the calculations made in credit planning at the level of the RBI and commercial banks. The credit demand could be justified to the full extent, other things remaining the same, only if cane farmers are paid their dues in time. However, there is nothing in the existing arrangements to compel a factory to borrow from a bank for the purpose of paying off the cane price promptly. As long as farmers provide supplier's credit to mills at a rate of interest lower than that charged by commercial banks it is economical for mills not to borrow to the full extent warranted by the level of their production and stocks. Thus cane arrears appear to be not attributable to any lack of credit from banks at the macro level. Obviously the prompt settlement of these dues calls for administrative arrangements by government.

It should, however, be conceded that there may be cases where factories are really not able to pay off the cane arrears due to lack of funds. As against this there may also be other cases where mills take advantage of the (cane) supplier's credit and do not draw on their cash credit to the full extent to pay off the dues. This implies the need for the reallocation of credit between mills depending on their position *vis-a-vis* the cane dues, which could at best be a mid-term exercise on the part of commercial banks. This is not, however, feasible given the nature of the cash credit system and the distribution of factories as customers of various banks.

There is a need for a field-level study of the anatomy of cane overdues to understand their genesis and implications for factories and banks. Such a study could help to confirm or contradict the tentative conclusions of the study on the basis of macro-level data. One should also bear in mind that there are larger issues to be considered in relation to the viability of sugar mills in the context of the high cane prices fixed by State Governments over and above that indicated by the Government of India.

**Extracts from Sugarcane (Control) Order 1966
passed by Government of India**

“(3A) where a producer of sugar or his agent fails to make payment for the sugarcane purchased within 14 days of the date of delivery, he shall pay interest on the amount due at the rate of 15 per cent per annum for the period of such delay beyond 14 days. Where payment of interest on delayed payment is made to a cane growers society, the society shall pass on the interest to the cane growers concerned after deducting administrative charges, if any, permitted by the rules of the said society.

(4) Where sugarcane is purchased through an agent, the producer or the agent shall pay or tender payment of such price within the period and in the manner aforesaid and if neither of them has so paid or tendered payment, each of them shall be deemed to have contravened the provisions of this clause.

(7) In case, the price of the sugarcane remains unpaid on the last day of the sugar year in which cane supply was made to the factory on account of the suppliers of cane not coming forward with their claims therefor or for any other reason, it shall be deposited by the producer of sugar with the Collector of the district in which factory is situated, within three months of the close of the sugar year. The Collector shall pay, out of the amount so deposited, all claims, considered payable by him and preferred before him within three years of the close of the sugar year in which the cane was supplied to the factory. The amount still remaining undisbursed with the Collector, after meeting the claims from the Suppliers, shall be credited by him to the Consolidated Fund of the State, immediately after the expiry of the time limit of 3 years within which claims therefor could be preferred by the suppliers. The State Government shall, as far as possible, utilise such amounts, for development of sugarcane in the State.”

Note: The prescribed rate of interest of 15 per cent came into force from February 1978.

Source: The Gazette of India, Extraordinary, Part II — Section 3 — Sub-Section (i), February 2, 1978.

Annexure 2

Demand for bank credit from manufacturing sector — Abstract

The objective of this study is to bring out the factors determining the demand for bank credit from the manufacturing sector at the national level. Regression equations have been compiled for the manufacturing sector and selected industries, viz., Engineering, Iron and Steel, All Textiles, Cotton Textiles, Jute Textiles, Paper and Paper Products, Fertilisers, Cement, Rubber and Rubber Products, Chemicals and Chemical Products and Drugs and Pharmaceuticals. The variations in total bank credit and total short-term bank credit are sought to be explained by variations in index number of wholesale prices and index of industrial production. Besides, rate of interest has been used as an additional variable for the manufacturing sector while the trend variable is included in a few equations.

The data used in the study relate to the calendar years 1973 to 1980. The equations have been compiled by regressing the half yearly averages of the dependent variables on the corresponding half-yearly averages of the independent variables. Linear and log-linear equations were estimated from the 16 observations available for the period under reference.

The three sets of data, viz., outstanding bank credit, index number of wholesale prices and index of industrial production are broadly comparable so far as they relate to the manufacturing sector. There are, however, a few limitations in the comparability of data.

The explanatory power of the equations for the manufacturing sector is high. Ninety eight to 99 per cent of the variations in total bank credit or short-term credit, as the case may be, are explained by variations in the index number of wholesale prices and the index of production.

The explanatory power of the equations for individual industries is also very high except for jute textiles, chemicals, chemical products and drugs and pharmaceuticals despite the inclusion of the trend variable in them. The equation for total credit for fertiliser industry has a poor fit. However, the value of $\bar{R}^2$ improves very much when the element of term loan is eliminated from the dependent variable, and the price variable also becomes significant.

In this industry term loan constitutes around 45 per cent of total credit. The relative importance of the output and price variables, as measured by the size of the regression co-efficient, differs from industry to industry.

The regression equations seek to explain the average relationship that prevailed over the period 1973-80 between outstanding bank credit, on the one hand, and prices and production of manufactured goods on the other. The turn-over of bank credit in relation to production operations can be affected by various factors. The elasticity of bank credit with respect to output differs from industry to industry. While in engineering industry it is near about 1 in others it is either above 1 or below 1. The high elasticity of total bank credit with respect to production of (total) manufactured goods ranging between 1.5 and 1.8 may be explained as due to the following factors.

i) Marginal recourse to bank borrowing could be greater than average borrowing, as production expands; it is perhaps easier to finance additional production or inventory building by bank credit than by other forms of finance (equity, debentures, etc.) in the short run.

ii) A decline in production may not be accompanied by a decline in credit if a higher level of inventory is maintained with the help of bank credit.

iii) The spreading sickness in industries implies a lower turn-over of credit and consequently higher outstanding credit.

iv) Bank credit could have been used for financing activities outside the manufacturing sector or of manufacturing activities of units affiliated to big firms, the production of which is not covered by the Index of Industrial Production.

v) As bank credit is generally less expensive than other types of credit, it is conceivable that over a period of time other sources of finance have been replaced by banks.

vi) Total bank credit includes development credit. At the end of 1980 term loans constituted around 13% of total bank credit. If term credit is excluded then the elasticity of bank credit with respect to production is slightly lower.

vii) The regression co-efficients may also be biased to some extent in view of inter-correlation between output and prices apart from simultaneity bias.

There are problems to be tackled before one can understand the factors determining the level of bank credit in any industry. An industry-by-industry study should be useful in this context. Such issues as multi-collinearity, specification and simultaneity also need to be investigated. Subject to these limitations, it would appear that demand for bank credit has an elasticity of about 1.5 with respect to production and unity with respect to prices. The elasticity of demand for short-term credit with respect to production is lower than that of total credit.

Annexure 3

Demand for Sugar Credit (based on monthly data)

Introduction

The main study on the "Demand for Commercial Bank Credit from Sugar Factories in the Private and State Sectors (1973-1980)" was based on the half-yearly data on credit available from Basic Statistical Return 1. A similar analysis has been made here by using the monthly data on outstanding commercial bank credit against the security of sugar collected in Basic Statistical Return 3 (BSR 3) for the same period (1973-80). The objective is two-fold:

- i) To find out whether the parameters and the underlying relationship discovered from half-yearly data remain the same when monthly data are used; and

- ii) To provide a profile of credit demand for each month of the year thus helping credit planning exercises.

Detailed background to the analysis and the manner of compilation of data for independent variables have already been furnished in the main study. Hence they are not repeated here.

Limitations of Data

BSR 3 is a return devised for quick collection of data on advances against sensitive commodities to facilitate the formulation of policy under Selective Credit Control. The data are supplied by the head office of each commercial bank by consolidating the figures on advances received from selected branches. They have to be selected in such a manner that together

they account for at least 85 per cent of the total advances of the bank against each of the commodities enumerated in the return. The total credit is then estimated by the Reserve Bank of India (RBI) by using a suitable bloating factor. The original selection of branches was made by banks in 1972 before the first return was filed under the new statistical system. They were then advised by the RBI that they should periodically modify the list of selected branches to ensure that they continued to reflect the required percentage coverage of total advances. However, it is known that this has not been strictly followed by many banks. Thus there could be either under-estimation or over-estimation of credit depending on the nature of changes in the advances portfolios of branches of each bank issuing credit to sugar factories and their inclusion or non-inclusion in the list of branches selected for BSR 3. Secondly, data on sugar credit include advances against *khandsari* also, separate figures being not available for the latter. However, this may be expected to constitute only a small proportion of the total credit.

Regression Analysis

Outstanding bank credit granted to factories against the security of sugar is the dependent variable, being the absolute value in one set of linear equations and the logarithmic value in another set of double-log equations. The format of the equations is the same as the one presented in the main study. Monthly data have been used for the independent variables. Besides some additional equations have been tried. These are explained below.

One hypothesis that is now tested is that over the years there is an acceleration in the demand for credit. This is done through the incorporation of a quadratic term for stocks in the equation, the positive sign of which would be indicative of acceleration and negative sign deceleration. Secondly, monthly dummies have been introduced in a set of equations to test the relative importance of various months and their upward or downward pulls on demand.

Thirdly, in another variation of the above-mentioned exercise, production lagged by 4, 5, 6, 7 or 8 months was used as an independent variable to get some idea of the lag in the effect of sugar production on the demand for credit.

The results of regression analysis are presented in Table 11. The main findings are summed up below.

1. The quadratic term for stocks is either not significant or, if significant, has a low value (in the fifth decimal place as in equation 4).
2. The elasticities for sugar stocks and price are less than 1 in many equations. In some equations the elasticity is above 1 for price but it is still less than 1 for sugar stocks. Only in a few equations do these two elasticities exceed 1 which is explained later. Thus the results confirm the earlier finding that factories do not take full advantage of the increased drawing power available with an increase in stocks.
3. Contemporaneous production has a minus sign (equations 5 and 20). However, lagged production has a positive effect on credit. It would appear that the lag is around 6 to 7 months.
4. The monthly dummies also confirm the contra-seasonal element (other than what is accounted for by stocks) in the demand for credit. The first five or six months which fall in the busy season for crushing of cane pull down the demand for credit while the remaining months push up credit (equations 3 and 18). However, a few months are found to be not significant (June to August in equation 3 and May to August in equation 18). The elasticities for stocks and price of sugar are more than 1 in equation 18 indicating that in the absence of seasonal effect there would have been a tendency for factories to increasingly substitute bank credit for other sources of finance. The seasonal effect, as extracted from a logarithmic equation, is presented in Table 12 for the first and the last years of the period under reference for purposes of illustration.
5. The sign of the coefficient is positive for rate of interest and negative for price of sugarcane which is not acceptable on *a priori* grounds. However, the negative sign for price of cane may be explained by cane arrears.
6. The DW values are found to be generally much lower than in the case of equations compiled earlier with half-yearly data. Also the estimated errors seem to be heteroscedastic being higher with higher values of credit demand.

To sum up, there is considerable stability in the underlying relationship irrespective of whether one uses monthly or half-yearly data. This is brought out in Table 13 through comparison of equations from half-yearly data with corresponding equations

for monthly data. The major conclusion of the main study was that cane arrears payable to farmers did not result from any lack of credit and that factories should be finding it more profitable to run into arrears rather than borrow from banks and pay them off.¹ This is confirmed further by the results of this study relating to the values of elasticities and the contra-seasonal effect shown by dummies.

One methodological note needs to be made before concluding. When prices/interest rates are partially or fully administered and cannot act as the variables which bring about equilibrium between demand and supply, a point may be raised on the identification of the observations as those relating to either supply or demand. The estimated relation with price as one of the explanatory variables could be of a hybrid type. However, the assumption in the study is that, given the total credit supply, the demand of sugar factories is met in full, any excess or deficit in the former being absorbed by some other sector. This assumption is corroborated by the non-utilisation of the credit limits to the full extent by the factories. Further even if one were to question this assumption, the inclusion of dummy/lagged production, which catches the effect of cane dues payable to farmers, incorporates a shift variable in the equations which takes care of the point raised. Thus the observed transactions in the credit market could be deemed to be falling on the demand curve.

¹ Recent press reports indicate that factories do not pay interest, as stipulated in the Sugarcane (Control) Order, to farmers for cane arrears. Factories are also reported to be pledging only a part of the stocks to banks to avail of credit.

Table 1: Sugar Production according to Origin

(Quantities in lakh tonnes)

Year (October to September)	Total	Of which production accounted for by	
		Co-operative Sugar Factories	Others
	(1)	(2)	(3)
1972-73	38.73	14.72 (38.00)	24.01 (62.00)
1973-74	39.48	15.56 (39.41)	23.92 (60.59)
1974-75	47.92	20.95 (43.71)	26.97 (56.29)
1975-76	42.62	20.43 (47.93)	22.19 (52.07)
1976-77	48.40	23.30 (48.14)	25.10 (51.86)
1977-78	64.57	31.79 (49.23)	32.78 (50.77)
1978-79	58.96	30.86 (52.34)	28.10 (47.66)
1979-80	38.68	20.54 (53.10)	18.14 (46.90)
1980-81	51.29	28.99 (56.52)	22.30 (43.48)

Figures in brackets indicate percentages to total production.

Sources: 1) Report on Currency and Finance, Reserve Bank of India.

2) Indian Sugar, Indian Sugar Mills Association.

3) Co-operative Sugar, National Federation of Co-operative Sugar Factories.

Table 2: Sugar Stocks with Factories according to Sector

(Quantity in 000 tonnes)

Year	Month	Total stocks	Of which stocks accounted for by	
			Co-operative sugar factories	Others
	(1)	(2)	(3)	(4)
1973	April	2196.0	813.0 (37.0)	1383.0 (63.0)
	May	1991.5	723.3 (36.3)	1268.2 (63.7)
	June	1722.1	629.6 (36.8)	1092.5 (63.2)
1974	April	2164.9	830.4 (38.4)	1334.5 (61.6)
	May	2038.0	764.9 (37.5)	1273.1 (62.5)
	June	1800.9	642.3 (35.7)	1158.6 (64.3)
1975	April	2835.0	1262.9 (43.8)	1622.1 (56.2)
	May	2811.0	1224.8 (43.6)	1586.2 (56.4)
	June	2537.0	1089.8 (43.0)	1447.2 (57.0)
1976	April	2439.1	1140.7 (46.8)	1298.4 (53.2)
	May	2186.8	1059.2 (48.4)	1127.6 (51.6)
	June	1886.9	902.7 (47.9)	984.2 (52.1)

Table 2 (Contd.)

	(1)	(2)	(3)	(4)
1977	April	2999.2	1456.6 (48.6)	1542.6 (51.4)
	May	2803.6	1361.5 (48.6)	1442.1 (51.4)
	June	2509.0	1202.8 (47.9)	1306.2 (52.1)
1978	April	4498.0	1904.4 (42.3)	2593.6 (57.7)
	May	4710.4	2348.3 (49.9)	2362.1 (50.1)
	June	4554.0	2252.4 (49.5)	2301.6 (50.5)
1979	April	4635.9	2354.9 (50.8)	2281.0 (49.2)
	May	4470.4	2264.2 (50.7)	2206.2 (49.3)
	June	3905.0	2040.8 (52.3)	1864.2 (47.7)
1980	April	2584.5	1398.5 (54.1)	1186.0 (45.9)
	May	2035.2	1117.4 (54.9)	917.8 (45.1)
	June	1605.6	889.5 (55.4)	716.1 (44.6)

Figures in brackets indicate percentages to total.

Source: 1) Indian Sugar, Indian Sugar Mills Association.

2) Co-operative Sugar, National Federation of Co-operative Sugar Factories.

Table 3 : Outstanding Borrowings of Co-operative Sugar Factory Societies (1972-80)

(Rs. in crores)

Year end-June	Total Borrowings				Of which borrowings from @	
	Short- Term Working Capital	Medium and Long Term Block Capital	Others	Total	Central Financ- ing Agencies	Commercial Banks (SBI & other Commercial Banks)
	(1)	(2)	(3)	(4)	(5)	(6)
1972	63.35 (41.56)	70.72 (46.40)	18.36 (12.04)	152.43	65.23 (42.79)	12.12 (7.95)
1973	78.94 (37.55)	77.98 (37.09)	53.30 (25.36)	210.21	84.39 (40.14)	15.19 (7.21)
1974	82.59 (35.94)	95.51 (41.56)	51.72 (22.50)	229.82	91.99 (40.03)	17.91 (7.79)
1975	145.28 (45.59)	114.16 (35.82)	59.20 (18.58)	318.64	155.87 (48.90)	25.65 (8.05)
1976	126.88 (39.54)	125.89 (39.23)	68.10 (21.23)	320.87	145.58 (45.37)	23.36 (7.28)
1977	180.74 (51.49)	152.59 (43.47)	17.68 (5.04)	351.01	178.91 (50.97)	27.84 (7.93)
1978	312.66 (56.33)	219.81 (39.60)	22.54 (4.07)	555.01	282.88 (50.97)	50.21 (9.05)
1979	273.38 (45.57)	289.22 (48.21)	37.31 (6.21)	599.90	236.71 (39.45)	49.86 (8.33)
1980	119.70 (25.90)	313.55 (67.87)	28.75 (6.22)	462.00	131.47 (28.13)	30.10 (6.43)

@ The borrowings from two sources only are indicated.

Figures in brackets are percentages to totals.

Source : Statistical Statements relating to Co-operative Movement in India,
Reserve Bank of India.

Table 4: Outstanding Commercial Bank Credit of Sugar Factories

As at the end of June	Credit Limit	Amount outstanding	(Rs. Crores)
			Of which amount outstanding against stocks of sugar and khandsari
	(1)	(2)	(3)
1973	265.26	162.44 (61.2)	122.66 (75.5)
1974	286.46	168.54 (58.8)	134.30 (79.7)
1975	349.85	236.72 (67.7)	216.48 (91.5)
1976	380.06	200.37 (52.7)	151.20 (75.5)
1977	460.06	256.20 (55.7)	204.09 (79.7)
1978	548.29	376.33 (68.6)	374.57 (99.5)
1979	513.97	363.20 (70.7)	303.29 (83.5)
1980	445.54	194.18 (43.6)	144.75 (74.5)

(Figures in brackets under columns 2 and 3 are percentages to totals under columns 1 and 2, respectively).

Note: While BSR 1 data used in columns 1 and 2 are collected from all the branches of commercial banks, BSR 3 data utilised in column 3 are based on a sample of branches of each bank which together account for at least 85 per cent of the total advances of the bank against sugar. The estimates of total amount of advances are made by Reserve Bank of India for each bank based on the sample coverage.

Source: (1) Banking Statistics, Basic Statistical Returns, Reserve Bank of India (for columns 1 and 2).

(2) Report on Currency and Finance, Reserve Bank of India, (for column 3).

Table 5: Price of Sugar

(Rs. per quintal — Ex-factory price
exclusive of excise duty)

Year/Month	1973				1974				1975				1976			
	TV	LP	WP	1.	TV	LP	WP	2.	TV	LP	WP	3.	TV	LP	WP	4.
January	275.00	151.50	188.55	275.00	260.00	158.63	189.04	275.00	360.00	158.74	229.18	300.00	153.55	204.81	208.29	208.29
February	275.00	151.50	188.55	275.00	260.00	158.63	189.04	275.00	345.00	158.74	223.93	295.00	161.60	208.29	208.29	208.29
March	275.00	151.50	188.55	275.00	260.00	158.63	189.04	275.00	330.00	158.74	218.68	295.00	161.60	208.29	208.29	208.29
April	265.00	151.50	185.55	265.00	260.00	158.63	189.04	275.00	310.00	158.74	211.68	295.00	161.60	208.29	210.04	210.04
May	255.00	151.50	182.55	260.00	260.00	158.63	189.04	275.00	310.00	158.74	211.68	300.00	161.60	210.04	210.04	210.04
June	260.00	151.50	184.05	290.00	290.00	158.63	198.04	275.00	320.00	158.74	215.18	300.00	161.60	210.04	210.04	210.04
Monthly average	267.50	151.50	186.30	265.00	265.00	158.63	190.54	275.00	329.17	158.74	218.39	297.50	160.26	208.29	208.29	208.29
for half year	270.00	151.50	187.05	286.00	286.00	158.63	196.84	275.00	320.00	154.47	212.41	310.00	161.60	213.54	217.80	217.80
July	270.00	151.50	187.05	290.00	290.00	158.63	198.04	275.00	305.00	154.47	207.16	310.00	168.15	217.80	217.80	217.80
August	270.00	151.50	187.05	300.00	300.00	158.63	201.04	275.00	305.00	154.47	207.16	310.00	168.15	217.80	217.80	217.80
September	265.00	151.50	185.55	320.00	320.00	158.63	215.11	275.00	305.00	154.47	207.16	310.00	168.15	217.80	217.80	217.80
October	260.00	151.50	184.05	350.00	350.00	158.63	225.61	275.00	310.00	154.47	208.91	335.00	170.02	227.76	227.76	227.76
November	260.00	158.63	189.04	360.00	360.00	158.74	229.18	275.00	300.00	153.55	204.81	335.00	170.02	227.76	227.76	227.76
December	265.83	152.68	186.60	317.67	317.67	158.65	210.97	275.00	307.50	154.32	207.94	318.33	167.68	220.41	220.41	220.41
Monthly average	265.83	152.68	186.60	317.67	317.67	158.65	210.97	275.00	307.50	154.32	207.94	318.33	167.68	220.41	220.41	220.41
for half year	265.83	152.68	186.60	317.67	317.67	158.65	210.97	275.00	307.50	154.32	207.94	318.33	167.68	220.41	220.41	220.41

Table 5 (Contd.)

Year/Month	1977			1978			1979			1980		
	TV	LP	WP	TV	LP	WP	TV	LP	WP	TV	LP	WP
	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
January	310.00	170.02	219.01	285.00	169.87	210.17	180.00	—	180.00	307.00	229.44	256.59
February	310.00	170.02	219.01	235.00	169.87	210.17	180.00	—	180.00	307.00	229.44	256.59
March	300.00	170.02	215.51	270.00	187.90	216.64	180.00	—	180.00	383.00	229.44	283.19
April	280.00	170.02	208.51	250.00	187.90	209.64	200.00	—	200.00	430.00	229.44	299.64
May	270.00	170.02	205.02	255.00	187.90	211.39	200.00	—	200.00	430.00	229.44	299.64
June	275.00	170.02	206.76	260.00	187.90	213.14	205.00	—	205.00	480.00	229.44	317.14
Monthly average for half year	290.83	170.02	212.30	267.50	131.89	211.86	190.83	—	190.83	389.50	229.44	285.47
July	275.00	170.02	206.76	255.00	187.90	211.39	205.00	—	205.00	480.00	229.44	317.14
August	275.00	170.02	206.76	215.00	—	215.00	215.00	—	215.00	520.00	229.44	331.14
September	270.00	170.02	205.02	215.00	—	215.00	225.00	—	225.00	520.00	229.44	331.14
October	270.00	170.02	205.02	215.00	—	215.00	225.00	—	225.00	520.00	229.44	331.14
November	270.00	170.02	205.02	205.00	—	205.00	225.00	—	225.00	520.00	283.74	366.43
December	300.00	169.87	215.42	190.00	—	190.00	307.00	229.44	256.59	630.00	283.74	404.93
Monthly average for half year	276.67	170.00	207.33	215.83	—	208.57	233.67	—	225.27	531.67	247.54	346.99

Source: Indian Sugar, Indian Sugar Mills Association (for levy price) The Sugar Situation, Government of India (for tariff value).

Note: (1) TV = Tariff Value; LP = Levy Price; WP = Weighted Price.

(2) There was complete decontrol of sugar price from August 16, 1978 to December 16, 1979.

(3) The weighted price is estimated by using the following proportions as weights in respect of levy price and tariff value. They refer to the percentage of levy sugar and free-sale sugar in total stocks.

Period	Levy Sugar	Free-sale Sugar
January 1973 — September 1974	70%	30%
October 1974 — July 1978	65%	35%
December 1979 — December 1980	65%	35%

Table 6: Data Matrix for Regression Analysis

Year/Half-Year	Total Bank Credit (Rs. in crores)	Total Bank Credit Minus Term loan (Rs. in crores)	Production per month (000 tonnes)	Stock (000 tonnes)	Average (weighted) price of sugar (Rs. per quintal)	Average (weighted) price of sugarcane (Rs. per quintal)	Average price of sugar & sugarcane (Rs. per quintal)	Average (weighted) interest rate	Seasonality
	TCS	SCS	IPS	SS	PS	PSC	APS	RI	D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1973 I	118.27	110.69	276.9	1174.3	186.30	11.98	99.14	0.100	1
1973 II	116.51	110.50	103.2	535.7	186.60	11.98	99.29	0.105	10
1974 I	119.56	111.53	297.9	1152.4	190.54	12.11	101.33	0.120	1
1974 II	138.24	125.60	107.1	543.1	210.97	12.11	111.54	0.140	10
1975 I	172.31	158.22	360.9	1347.1	218.39	13.32	115.86	0.150	1
1975 II	179.72	163.65	87.8	673.7	207.94	13.32	110.63	0.150	10
1976 I	161.59	139.84	283.9	1126.7	208.29	13.63	110.96	0.150	1
1976 II	177.55	159.49	123.9	533.5	220.41	13.63	117.02	0.150	10
1977 I	205.46	179.67	291.0	1357.1	212.30	12.67	112.49	0.150	1
1977 II	224.51	189.41	98.9	823.4	207.33	12.67	110.05	0.150	10
1978 I	284.58	251.75	443.8	2012.6	211.86	12.96	112.41	0.145	1
1978 II	325.97	289.41	105.9	1577.5	208.57	12.96	110.77	0.140	10
1979 I	319.42	281.16	374.2	1978.4	190.83	11.16	101.00	0.140	1
1979 II	284.74	241.86	83.5	1079.2	225.27	11.16	118.22	0.145	10
1980 I	200.22	154.64	218.8	1093.1	285.47	16.55	151.01	0.150	1
1980 II	170.89	125.92	102.7	254.7	346.99	16.55	181.77	0.155	10

Table 7: Demand for Commercial Bank Credit from Sugar Factories in Private and State Sectors (1973-1980) (Based on BSR 1 data)

Equation with t-statistics in brackets and elasticities (at the means) below them		2				
1			$\frac{2}{R}$	DW	SEE	Mean
			3	4	5	6
1. TCS =	- 22.49 (0.23)	+ 0.50 PS (1.37) 0.56	+ 0.10 SS (3.55)			
2. TCS =	-218.03 (4.59)	+ 0.65 PS (4.23) 0.71	+ 0.19 SS (11.68) 1.01	+ 13.20 D (7.97)		
3. TCS =	-185.47 (3.07)	+ 0.69 PS (3.55) 0.75	+ 0.15 SS (8.89) 0.77	+ 0.37 IPS ₋₁ (5.74) 0.40		
4. TCS =	57.61 (0.39)	+ 3.29 PSC (0.33) 0.21	+ 0.09 SS (3.0) 0.50			
5. TCS =	-268.01 (3.16)	+ 14.15 PSC (2.81) 0.92	+ 14.28 D (6.71)	+ 0.19 SS (9.18) 1.02		
6. TCS =	- 42.74 (0.81)	+ 0.60 PS (3.04) 0.66	+ 0.21 SS (8.6) 1.13	- 0.55 IPS (5.71) -0.58		
7. TCS =	-175.22 (3.07)	+ 0.64 PS (4.31) 0.71	+ 0.20 SS (10.9) 1.08	- 0.17 IPS (1.28) -0.18	+ 9.87 D (3.22)	

(For explanation of notation see Table 6)

Table 7 (Contd.)

Equation with t-statistics in brackets and elasticities (at the means) below them										
1		2				$\frac{2}{R}$				
							3	4	5	6
8.	TCS = -148.42 (1.72)	+ 0.75 PS (2.55) 0.82	+ 0.20 SS (10.19) 1.07	- 0.18 IPS (1.27) -0.19	+ 9.41 D (2.80)	- 3.42 PSC (0.43) -0.22	0.90	1.16	22.47	199.97
9.	TCS = -166.55 (2.61)	+ 0.64 PS (2.90) 0.70	+ 0.18 SS (12.10) 1.00	- 0.23 IPS (2.13) -0.24	+ 7.03 D (2.70)	- 8.03 PSC (1.33) -0.52	0.94 +1008.26 RI (3.06) 0.71	1.88	16.57	199.97
10.	SCS = -30.32 (0.36)	+ 0.22 PS (0.70) 0.28	+ 0.09 SS (3.55) 0.55				0.43	1.98	45.66	174.58
11.	SCS = -140.50 (3.98)	+ 0.35 PS (3.05) 0.44	+ 0.16 SS (13.54) 1.00	+11.53 D (9.36)			0.92	0.93	16.50	174.58
12.	SCS = -113.02 (2.44)	+ 0.38 PS (2.58) 0.47	+ 0.13 SS (9.99) 0.76	+ 0.33 IPS ₋₁ (6.57) 0.40			0.88	1.93	20.33	174.58
13.	SCS = -108.26 (0.91)	- 1.58 PSC (0.19) -0.12	+ 0.08 SS (3.22) 0.50				0.41	1.57	46.44	174.58

Table 7 (Contd.)

Equation with t-statistics in brackets and elasticities (at the means) below them									
1	2					2 R	DW	SEE	Mean
	1	2	3	4	5				
14. SCS =	-167.98 (2.91)	+ 7.62 PSC (2.23) 0.57	+ 0.16 SS (11.63) 1.01	+12.12 D (8.37)		0.91	0.96	18.48	174.58
15. SCS =	13.24 (0.28)	+ 0.30 PS (1.74) 0.38	+ 0.18 SS (8.26) 1.10	- 0.46 IPS (5.44) -0.56		0.82	2.08	25.52	174.58
16. SCS =	-118.02 (2.68)	+ 0.34 PS (2.99) 0.43	+ 0.17 SS (11.90) 1.04	- 0.09 IPS (0.87) -0.11	+ 9.78 D (4.14)	0.92	1.04	16.67	174.58
17. SCS =	-105.03 (1.57)	+ 0.40 PS (1.73) 0.50	+ 0.17 SS (11.11) 1.04	- 0.10 IPS (0.86) -0.11	+ 9.56 D (3.67)	0.92	1.00	17.42	174.58
18. SCS =	-119.64 (2.52)	+ 0.31 PS (1.87) 0.39	+ 0.16 SS (13.92) 0.97	- 0.13 IPS (1.66) -0.16	+ 7.64 D (3.95)	0.96	1.81	12.31	174.58
					+812.46 RI (3.32) 0.65				
					- 1.65 PSC (0.27) -0.12				
					- 5.38 PSC (1.20) -0.40				

Table 7 (Contd.)

Equation with t-statistics in brackets										
1		2					R			
							3	4	5	6
19.	Log TCS =	-1.509 (1.02)	+ 1.035 Log PS (2.01)	+ 0.459 Log SS (3.07)			0.34	1.61	0.121	2.28
20.	Log TCS =	-3.878 (4.17)	+ 1.444 Log PS (4.86)	+ 0.891 Log SS (7.77)	+ 0.258 Log D (5.48)		0.80	2.08	0.067	2.28
21.	Log TCS =	-3.866 (3.35)	+ 1.362 Log PS (3.90)	+ 0.375 Log IPS ₋₁ (4.13)	+ 0.713 Log SS (6.40)		0.73	2.05	0.074	2.28
22.	Log TCS =	0.705 (0.61)	+ 0.476 Log PSC (0.61)	+ 0.350 Log SS (2.18)			0.16	0.93	0.136	2.28
23.	Log TCS =	-1.870 (1.76)	+ 1.416 Log PSC (2.34)	+ 0.818 Log SS (4.86)	+ 0.269 Log D (3.76)		0.58	1.46	0.096	2.28
24.	Log TCS =	-2.116 (1.86)	+ 1.257 Log PS (3.15)	+ 0.795 Log SS (5.16)	- 0.406 Log IPS (3.24)		0.62	1.81	0.019	2.28
25.	Log TCS =	-5.037 (4.76)	+ 1.528 Log PS (5.56)	+ 0.877 Log SS (8.35)	+ 0.449 Log D (3.98)	+ 0.404 Log IPS (1.84)	0.82	1.82	0.061	2.28
26.	Log TCS =	-5.038 (4.70)	+ 1.827 Log PS (4.04)	+ 0.854 Log SS (7.77)	- 0.541 Log PSC (0.84)		0.82	1.70	0.062	2.28
27.	Log TCS =	-3.022 (2.01)	+ 0.431 Log D (3.70)	+ 0.396 Log IPS (1.77)						
			+ 1.502 Log PS (3.34)	+ 0.758 Log SS (6.66)	- 0.716 Log PSC (1.21)	+ 0.624 Log RI (1.76)	0.86	1.73	0.057	2.28
			+ 0.356 Log D (3.12)	+ 0.305 Log IPS (1.46)						

Table 7 (Contd.)

Equation with t-statistics in brackets		2		R		DW	SEE	Mean
1	2	3	4	5	6			
28. Log SCS =	-0.508 (0.36)	+ 0.612 Log PS (1.23)	+ 0.436 Log SS (3.02)		0.32	1.66	0.117	2.22
29. Log SCS =	-2.830 (3.26)	+ 1.012 Log PS (3.66)	+ 0.252 Log D (5.75)	+ 0.859 Log SS (8.03)	0.81	2.16	0.063	2.22
30. Log SCS =	-2.848 (2.69)	+ 0.936 Log PS (2.93)	+ 0.372 Log IPS ₋₁ (4.47)	+ 0.688 Log SS (6.74)	0.76	2.17	0.068	2.22
31. Log SCS =	1.117 (1.07)	+ 0.048 Log PSC (0.07)	+ 0.352 Log SS (2.42)		0.25	1.07	0.123	2.22
32. Log SCS =	-1.357 (1.53)	+ 0.951 Log PSC (1.88)	+ 0.258 Log D (4.34)	+ 0.802 Log SS (5.72)	0.68	1.67	0.080	2.22
33. Log SCS =	-1.091 (0.98)	+ 0.825 Log PS (2.13)	+ 0.759 Log SS (5.07)	- 0.390 Log IPS (3.20)	0.60	1.86	0.089	2.22
34. Log SCS =	-4.124 (4.48)	+ 1.106 Log PS (4.63)	+ 0.844 Log SS (9.25)	+ 0.466 Log D (4.75)	0.86	1.80	0.053	2.22
35. Log SCS =	-4.125 (4.42)	+ 1.364 Log PS (3.47)	+ 0.824 Log SS (8.62)	+ 0.451 Log IPS (2.36)	0.85	1.65	0.054	2.22
			+ 0.468 Log PSC (0.84)	+ 0.451 Log D (4.45)				
36. Log SCS =	-2.268 (1.77)	+ 1.066 Log PS (2.78)	+ 0.444 Log IPS (2.29)	- 0.629 Log PSC (1.24)	0.89	1.79	0.048	2.22
		+ 0.575 Log RI (1.91)	+ 0.735 Log SS (7.60)	+ 0.360 Log IPS (2.02)				

Table 8: Demand for Commercial Bank Credit from Sugar Factories in Private and State Sectors, (Based on BSR 1 Data)

(Real Credit)

Equation with t-statistics in brackets and elasticities (at the mean) below them

2

1.	2.					
	R	DW	SEE	Mean		
1. TAPS	= - 0.73226 (3.27)	+ 0.11915 D (7.72)	+ 0.00170 SS (12.03)	0.90	1.32	0.21
2. SAPS	= - 0.67122 (3.92)	+ 0.10512 D (8.90)	+ 0.00151 SS (14.04)	0.93	1.63	0.15
3. SAPS	= - 0.58052 (1.90)	+ 0.00154 SS (11.51)	+ 0.09790 D (4.20)	0.92	1.71	0.16
4. Log TAPS	= - 2.28232 (7.00)	+ 0.24024 Log D (4.98)	+ 0.79853 Log SS (7.71)	0.79	1.34	0.07
5. Log SAPS	= - 2.51140 (9.06)	+ 0.25232 Log D (6.14)	+ 0.85413 Log SS (9.69)	0.86	2.14	0.06
6. Log SAPS	= - 3.49325 (7.28)	+ 0.45508 Log D (4.90)	+ 0.82112 Log SS (10.64)	0.90	1.59	0.05
7. TCPS	= - 0.38600 (3.29)	+ 0.06289 D (7.78)	+ 0.00090 SS (12.17)	0.91	1.36	0.11
8. SCPS	= - 0.35360 (3.91)	+ 0.05549 D (8.91)	+ 0.00080 SS (14.09)	0.93	1.65	0.08

— 0.00038 IPS
(0.36)
-0.05

+ 0.43521 Log IPS
(2.36)

1.05

Table 8 (Contd.)

Equation with t-statistics in brackets and elasticities (at the mean)		below them		2		SEE		Mean	
				R		DW		5.	
1.		2.		3.		4.		5.	
9.	SCPS = - 0.30775 (1.91)	+ 0.05184 D (4.21)	+ 0.00082 SS (11.53) 1.08	-- 0.00019 IPS (0.34) -0.05	0.92	1.71	0.09	0.82	0.82
10.	Log TCPS = - 2.56488 (7.97)	+ 0.23979 Log D (5.03)	+ 0.80090 Log SS (7.83)		0.80	1.36	0.07	-0.06	-0.06
11.	Log SCPS = - 2.79396 (10.14)	+ 0.25186 Log D (6.17)	+ 0.85650 Log SS (9.78)		0.86	2.15	0.06	-0.12	-0.12
12.	Log SCPS = - 3.78067 (7.98)	+ 0.45563 Log D (4.96)	+ 0.82333 Log SS (10.80)	+ 0.43736 Log IPS (2.40)	0.90	1.62	0.05	-0.12	-0.12

TAPS =	Nominal Total Credit
	Average of prices of sugar and sugarcane
SAPS =	Nominal Total Credit — Term Loans
	Average of prices of sugar and sugarcane
TCPS =	Nominal Total Credit
	Price of sugar
SCPS =	Nominal Total Credit — Term Loans
	Price of sugar

Table 9 : Estimated and Actual Values of Total Bank Credit for Sugar Industry in Private and State Sectors (TCS)

TCS = -218.03 + 0.65 PS + 0.19 SS + 13.20D					Log TCS = -3.88 + 1.44 Log PS + 0.89 Log SS + 0.26 Log D	
Year/Half year		Actual (Rs. crores)	Estimated (Rs. crores)	Col (2-1) —————x100 Col. 1 (%)	Estimat- ed (Rs. crores)	Col (4-1) —————x100 Col. 1 (%)
		(1)	(2)	(3)	(4)	(5)
1973	I	118.27	136.89	15.7	136.10	15.1
	II	116.51	135.44	16.2	122.70	5.3
1974	I	119.56	135.50	13.3	138.25	15.6
	II	138.24	152.56	10.4	148.20	7.2
1975	I	172.31	190.20	10.4	193.47	12.3
	II	179.72	175.24	— 2.5	175.94	— 2.1
1976	I	161.59	142.11	—12.1	154.10	— 4.6
	II	177.55	156.85	—11.7	155.56	—12.3
1977	I	205.46	188.15	— 8.4	186.94	— 9.0
	II	224.51	203.08	— 9.5	209.49	— 6.7
1978	I	284.58	311.49	9.5	264.75	— 7.0
	II	325.97	346.10	6.2	376.99	15.7
1979	I	319.42	291.47	— 8.8	224.20	—29.8
	II	284.74	262.90	— 7.7	300.46	5.5
1980	I	200.22	185.59	— 7.3	236.50	18.1
	II	170.89	185.97	8.8	155.00	— 9.3

Table 10: Estimated and Actual Values of Total Bank Credit (Less Term Loans) for Sugar Industry in Private and State Sectors (SCS)

SCS = -140.50 + 0.35 PS + 0.16 SS + 11.53 D			Log SCS = -2.83 + 1.01 Log PS + 0.86 Log SS + 0.25 Log D		
Year/Half Year	Actual (Rs. crores)	Estimated (Rs. crores)	Col(2-1) Col. 1 (%) x100	Estimated (Rs. crores)	Col(4-1) Col. 1 (%) x100
	(1)	(2)	(3)	(4)	(5)
1973 I	110.69	126.62	14.4	127.25	15.4
II	110.50	126.53	14.5	116.14	5.1
1974 I	111.53	124.52	11.6	128.10	14.9
II	125.60	136.17	8.4	133.15	6.0
1975 I	158.22	165.84	4.8	168.18	6.3
II	163.65	156.38	- 4.4	157.80	- 3.6
1976 I	139.84	126.47	- 9.6	137.50	- 1.7
II	159.49	137.87	-13.6	136.98	-14.3
1977 I	179.67	165.36	- 8.0	164.49	- 8.5
II	189.41	180.53	- 4.7	186.95	- 1.3
1978 I	251.75	271.91	8.0	230.25	- 8.5
II	289.41	303.72	4.9	328.70	13.6
1979 I	281.16	259.07	- 7.9	204.10	-27.4
II	241.86	228.38	- 5.6	256.50	6.1
1980 I	154.64	147.70	- 4.5	284.33	19.20
II	125.92	136.26	8.2	114.90	- 8.8

Note: For testing the first order of auto-correlation the residuals of the linear equation for SCS were regressed on their lags and the following equation was estimated.

$$e_t = 0.722 + 0.492 e_{t-1} \quad \bar{R}^2 = 0.197$$

t-Statistics .. (0.21) (2.11)

This indicates that the prediction error for the projection one period ahead can be reduced by half, if adjustment is made for the above serial correlation in residuals.

Table 11: Demand for Commercial Bank Credit from Sugar Factories in Private and State Sectors (1973-80) (Based on BSR 3 Data)

Sl. No.	Equation with t-statistics in brackets and elasticities (at the means) below them						2	DW	SEE	Mean
							$\bar{R}$			
1.	2.						3.	4.	5.	6.
1. SCS =	-60.05 (2.87)	+ 0.32 PS (4.03) 0.48	+ 0.13 SS (21.03) 0.93				0.83	0.49	30.57	146.70
2. SCS =	-62.00 (2.41)	+ 0.32 PS (3.92) 0.49	+ 0.13 SS (5.80) 0.95	- * SS ² (0.13) -0.01			0.82	0.49	30.73	146.70
3. SCS =	-204.25 (2.49)	+ 0.39 PS (6.47) 0.58	+ 0.16 SS (25.04) 1.17	+ 2.59 D1 (2.26)	+ 4.66 D2 (3.91)	+ 5.70 D3 (4.57)	0.91	0.92	22.21	146.70
		+ 2.60 D5 (2.10)	- 0.02 D6 (0.02)	- 1.64 D7 (1.38)	- 0.80 D8 (0.69)	- 2.42 D9 (2.08)			- 3.27 D10 (4.04)	
		- 2.80 D11 (2.45)								

SCS = Total bank credit minus term loan (Rs. in crores)

PS = Weighted price of sugar (Rs. per quintal)

SS = Stocks of sugar (000 tonnes)

IPS = Production of sugar during the month (000 tonnes)

D_{it} = Dummy for the ith month of tth observation

= 1 for t = i

= 10 for t ≠ i

i = 1, 2, ... 11 (January to November)

* = negligible

Sl. No.	Equation with t-statistics in brackets and elasticities (at the means) below them	$\frac{2}{R}$				
1.	2.	3.	4.	5.	6.	
4.	SCS = -353.08 (4.38) + 0.47 PS (8.27) 0.70 + 6.45 D4 (5.49) - 3.66 D10 (5.00) + 0.31 PS (4.73) 0.47 + 0.32 PS (4.01) 0.47 + 0.33 PS (4.63) 0.49 + 0.36 PS (5.50) 0.54 + 0.40 PS (6.00) 0.59	+ 0.24 SS (12.59) 1.78 + 3.86 D5 (3.37) - 3.79 D11 (3.62) + 0.13 SS (26.11) 0.99 + 0.12 SS (17.01) 0.87 + 0.12 SS (21.70) 0.88 + 0.13 SS (26.10) 0.95 + 0.14 SS (26.62) 1.03	$-(3) \binom{-5}{10} SS$ (4.56) -0.30 + 1.33 D6 (1.20) - 0.48 D7 (0.44) - 0.11 D8 (0.11) - 0.08 IPS (6.52) -0.12 + 0.04 IPS ₄ (2.18) 0.05 + 0.07 IPS ₅ (5.03) 0.10 + 0.08 IPS ₆ (6.79) 0.12 + 0.09 IPS ₇ (6.98) 0.13	+ 7.38 D3 (6.26) - 2.30 D9 (2.21)	0.93 0.88 0.83 0.86 0.88 0.88 0.88	1.04 25.41 29.97 27.22 25.09 24.85 146.70
5.	SCS = -50.51 (2.90)		0.66	25.41	146.70	
6.	SCS = -57.89 (2.82)		0.49	29.97	146.70	
7.	SCS = -69.19 (3.70)		0.54	27.22	146.70	
8.	SCS = -89.75 (5.07)		0.71	25.09	146.70	
9.	SCS = -189.89 (5.96)		0.96	24.85	146.70	

Table 11 (Contd.)

Sl. No. Equation with t-statistics in brackets and elasticities (at the means) below them

Sl. No.	Equation with t-statistics in brackets and elasticities (at the means) below them	2.					SEE	Mean
		1.	2.	3.	4.	5.		
10.	SCS = -119.38 (5.90)	+ 0.40 PS (5.83) 0.61	+ 0.15 SS (24.05) 1.08	+ 0.09 IPS ₈ (6.08) 0.13	0.87	0.92	25.95	146.70
11.	SCS = -112.47 (3.96)	+ 0.29 PS (2.57) 0.43	+ 0.11 SS (18.48) 0.80	- 7.81 PSC (2.63) -0.69	+ 1219.34 RI (6.61) 1.16	+ 0.05 IPS ₄ (3.40) 0.07	0.89	24.64
12.	SCS = -124.48 (4.90)	+ 0.29 PS (2.89) 0.43	+ 0.11 SS (24.84) 0.83	- 6.76 PSC (2.56) -0.60	+ 1143.10 RI (6.97) 1.09	+ 0.07 IPS ₅ (6.11) 0.10	0.91	22.00
13.	SCS = -141.34 (5.81)	+ 0.30 PS (3.13) 0.44	+ 0.12 SS (29.12) 0.90	- 5.15 PSC (2.05) -0.46	+ 1016.28 RI (6.49) 0.97	+ 0.74 IPS ₆ (7.19) 0.11	0.92	20.86
14.	SCS = -156.17 (6.02)	+ 0.30 PS (3.03) 0.45	+ 0.13 SS (27.43) 0.97	- 3.69 PSC (1.39) -0.33	+ 907.87 RI (5.43) 0.87	+ 0.08 IPS ₇ (6.32) 0.11	0.91	21.79
15.	SCS = -161.30 (5.63)	+ 0.29 PS (2.74) 0.44	+ 0.14 SS (23.07) 1.00	- 3.18 PSC (1.09) -0.28	+ 883.38 RI (4.82) 0.84	+ 0.07 IPS ₈ (4.76) 0.10	0.90	23.40
16.	Log SCS = -3.065 (6.96)	+ 1.112 Log PS (6.92)	+ 0.869 Log SS (20.96)				0.82	0.100
17.	Log SCS = -3.065 (6.93)	+ 1.112 Log PS (6.89)	+ 0.650 Log SS (n.s.)	+ 0.109 Log SS ² (n.s.)			0.82	0.100

n.s. = not significant

Table 11 (Contd.)

Sl. No.	Equation with t-statistics in brackets	2					
		$\bar{R}$					
1.		3.	4.	5.	6		
18.	Log SCS = - 4.455 + 1.356 Log PS + 1.118 Log SS + 0.094 Log D1 + 0.119 Log D2 + 0.120 Log D3 + 0.120 Log D6 + 0.039 Log D7 - 0.032 Log D8 - 0.086 Log D9 - 0.136 Log D10 - 0.132 Log D11	0.90	0.92	0.077	2.11		
	(8.97) (10.41) (22.18) (2.58) (3.12) (3.01) (1.35) (0.32) (1.03) (3.63)						
19.	Log SCS = - 4.455 + 1.356 Log PS + 1.762 Log SS - 0.322 Log SS + 0.094 Log D1 + 0.119 Log D2 + 0.120 Log D3 + 0.039 Log D7 - 0.120 Log D4 + 0.102 Log D5 + 0.058 Log D6 - 0.012 Log D7 + 0.012 Log D8 - 0.086 Log D9 - 0.136 Log D10 - 0.132 Log D11	0.89	0.92	0.077	2.11		
	(8.92) (10.35) (0.00) (n.s.) (2.57) (3.10) (1.34) (0.32) (1.02) (3.61)						
20.	Log SCS = - 3.008 + 1.082 Log PS + 0.921 Log SS - 0.074 Log IPS	0.87	0.57	0.087	2.11		
	(7.83) (7.72) (24.64) (5.50)						
21.	Log SCS = - 2.953 + 1.095 Log PS + 0.825 Log SS + 0.028 Log IPS ₄	0.83	0.47	0.100	2.11		
	(6.67) (6.85) (16.57) (1.54)						
22.	Log SCS = - 3.117 + 1.134 Log PS + 0.830 Log SS + 0.059 Log IPS ₅	0.85	0.52	0.092	2.11		
	(7.66) (7.64) (21.07) (4.12)						
23.	Log SCS = - 3.656 + 1.24 Log PS + 0.907 Log SS + 0.083 Log IPS ₆	0.88	0.62	0.083	2.11		
	(9.74) (9.28) (26.06) (6.61)						
24.	Log SCS = - 4.091 + 1.313 Log PS + 0.993 Log SS + 0.097 Log IPS ₇	0.85	0.92	0.080	2.11		
	(10.70) (9.92) (26.40) (7.16)						

n.s. = not significant

Table 11 (Contd.)

Sl. No.	Equation with t-statistics in brackets	R				
		2	DW	SEE	Mean	
1.	2.	3.	4.	5.	6	
25.	Log SCS = $-4.135 + 1.309 \text{ Log PS} + 1.017 \text{ Log SS} + 0.088 \text{ Log IPS}_8$ (9.45) (8.95) (22.09) (5.28)	0.86	0.90	0.088	2.11	
26.	Log SCS = $-0.067 + 0.832 \text{ Log PS} + 0.732 \text{ Log SS} - 0.763 \text{ Log PSC} + 1.378 \text{ Log RI} + 0.047 \text{ Log IPS}_4$ (0.13) (4.02) (18.67) (2.80) (8.24) (3.41)	0.90	0.72	0.075	2.11	
27.	Log SCS = $-0.462 + 0.871 \text{ Log PS} + 0.769 \text{ Log SS} - 0.674 \text{ Log PSC} + 1.298 \text{ Log RI} + 0.060 \text{ Log IPS}_5$ (1.04) (4.63) (25.63) (2.70) (8.61) (5.62)	0.92	0.78	0.068	2.11	
28.	Log SCS = $-1.197 + 0.947 \text{ Log PS} + 0.847 \text{ Log SS} - 0.512 \text{ Log PSC} + 1.152 \text{ Log RI} + 0.071 \text{ Log IPS}_6$ (2.86) (5.47) (31.01) (2.22) (8.24) (7.34)	0.93	0.92	0.063	2.11	
29.	Log SCS = $-1.700 + 0.964 \text{ Log PS} + 0.916 \text{ Log SS} - 0.372 \text{ Log PSC} + 1.039 \text{ Log RI} + 0.075 \text{ Log IPS}_7$ (3.64) (5.31) (28.08) (1.51) (6.93) (6.43)	0.92	1.12	0.066	2.11	
30.	Log SCS = $-1.490 + 0.972 \text{ Log PS} + 0.907 \text{ Log SS} - 0.487 \text{ Log PSC} + 1.075 \text{ Log RI} + 0.052 \text{ Log IPS}_8$ (2.60) (4.69) (21.07) (1.72) (6.10) (3.39)	0.90	0.93	0.075	2.11	

Table 12: Impact of Seasonal Factor on Demand for Commercial Bank Credit from Sugar Factories in Private and State Sectors

(Rs. crores)

	1973			1980		
	Actual credit	Systematic part	Seasonal effect	Actual credit	Systematic part	Seasonal effect
1	2	3	4	5	6	7
January	58.64	72.81	— 14.17	153.45	190.53	— 37.08
February	83.78	110.19	— 26.40	178.65	234.96	— 56.31
March	110.71	145.94	— 35.23	201.89	266.14	— 64.25
April	122.54	154.98	— 32.44	203.86	257.82	— 53.97
May	115.29	130.25	— 14.96	159.11	179.76	— 20.65
June	116.91	120.19	— 3.28	138.11	141.98	— 3.87
Average for half-year			— 21.08			— 39.36
July	97.62	89.24	+ 8.38	110.90	101.38	+ 9.52
August	69.90	64.93	+ 4.97	91.79	85.27	+ 6.52
September	53.99	44.29	+ 9.70	66.26	54.36	+ 11.90
October	39.21	28.67	+ 10.54	56.60	41.38	+ 15.22
November	26.51	19.56	+ 6.95	60.74	44.82	+ 15.92
December	37.20	31.30	+ 5.90	85.27	71.75	+ 13.52
Average for half-year			+ 7.74			+ 12.10

(This is based on equation 18 in Table 11).

Note: The seasonal effect refers to factors other than the seasonal movements in stocks. It mainly relates to the payment for purchases of cane. The table is to be interpreted in the following manner. In January 1980, but for the seasonal effect, outstanding bank credit would have been Rs. 190.53 crores instead of Rs. 153.45 crores. The amount of Rs. 39.36 crores averaged for the first half of 1980 represents cane arrears, i.e., substitution of bank credit by supplier's credit. The arrears are liquidated by factories in the second half of the year by borrowing from banks. The average positive amount (+ Rs. 12.10 crores), however, does not match the average negative amount (—Rs. 39.36 crores) because factories have improved cash flow position in the second half of the year when production and other expenses are much lower than cash realisations from sale of stocks. Hence a part of the arrears can be paid off from owned funds. There is also the possibility of cane arrears being carried over to the next year.

Table 13: Comparison of equations based on half-yearly and monthly data

Half-yearly Data (BSR 1)	$\frac{2}{R}$	DW	SEE	Mean	Monthly Data (BSR 3)	$\frac{2}{R}$	DW	SEE	Mean
1	2	3	4	5	6	7	8	9	10
1. SCS = -140.50 + 0.35 PS (3.98) (3.05) 0.44	0.92	0.93	16.50	174.58	1. SCS = -204.25 + 0.39 PS (2.49) (6.47) 0.58	0.91	0.92	22.21	146.70
+ 0.16 SS + 11.53 D (13.54) (9.36) 1.00					+ 0.16 SS + 2.59 D1 (25.04) (2.26) 1.17				
					+ 4.66 D2 + 5.70 D3 (3.91) (4.57)				
					+ 5.34 D4 + 2.60 D5 (4.18) (2.10)				
					- 0.02 D6 - 1.64 D7 (0.02) (1.38)				
					- 0.80 D8 - 2.42 D9 (0.69) (2.08)				
					- 3.27 D10 - 2.80 D11 (4.04) (2.45)				

Table 13 (Contd.)

Half-yearly Data (BSR 1)		2		Monthly Data (BSR 3)		2		SEE		Mean	
		$\bar{R}$		DW		SEE		Mean			
1		2		3		4		5		6	
2		Log SCS =		— 2.83 + 1.01 Log PS		0.81		2.22		2. Log SCS =	
		(3.26)		(3.66)						— 4.455	
										(8.97)	
										+ 1.118 Log SS	
										(22.18)	
										+ 0.119 Log D2	
										+ 0.120 Log D3	
										(3.12)	
										+ 0.102 Log D4	
										+ 0.053 Log D5	
										(2.54)	
										+ 0.012 Log D6	
										— 0.039 Log D7	
										(0.32)	
										— 0.032 Log D8	
										— 0.086 Log D9	
										(0.87)	
										— 0.136 Log D10	
										— 0.132 Log D11	
										(5.32)	
										(3.63)	
										0.90	
										0.92	
										0.077	
										2.11	

t statistics are given in brackets and elasticities below them.

SHIFTS IN THE FACTOR INCOME SHARES — A COMPARATIVE STUDY OF THE PUBLIC AND PRIVATE INDIAN CORPORATE SECTOR, 1960-61 TO 1977-78

Kripa Shanker* and T. G. Nayak*

Introduction

The present article attempts to examine whether there are any shifts in the factor income shares of the non-financial corporate sector of the Indian economy over the period of 18 years ending 1977-78. In addition to the entire non-financial corporate sector, important sub-sectors, viz., public limited companies, private limited companies of the private sector and Government companies, have also been studied separately so as to analyse the differentials in performance of the public and private corporate sector. To bring out inter-industry variations in the composition of factor incomes, the results have also been presented for major industry groups for the public and private limited companies and for certain selected industries of the former.

Data and Methodology

The relevant data for the study have been culled out from various annual studies on the finances of non-financial non-Government medium and large public and private limited companies and Government companies, published by the Department of Statistical Analysis and Computer Services, Reserve Bank of India, in the Reserve Bank of India Bulletin. The procedure of estimating the income generated and shares of various factor incomes follows the same method as in the earlier study⁽¹⁾. The figures relating to the selected companies of the Reserve Bank of India studies have been suitably raised to obtain the population estimates of various items, separately for each of the sub-sectors of the corporate sector. The blowing-up factors are the ratios of

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(1) Divatia, V. V., and Kripa Shanker, 'Value Added by the Non-financial Corporate Sector, 1970-71 to 1973-74', Reserve Bank Staff Occasional Papers, Vol. 2, No. 2, December, 1977.

the population paid-up capital of the respective categories to the corresponding class of the selected companies. A linear relationship between the paid-up capital and the characteristics estimated was thus assumed in the method of estimation. In the article, the results based on these estimated totals only are discussed. However, estimates of value added by main industry groups/selected industries pertaining to the selected companies of the Reserve Bank of India studies are also presented in Annexures I and II so that research workers may use these time series data for other analytical purposes.

The Results

(A) Value Added (Income Generated)

The gross value added, at current prices, by the non-financial corporate sector estimated at Rs. 1400 crores in 1960-61 rose to Rs. 9000 crores in 1977-78, thus registering an increase of more than five-folds. The percentage growth in the case of net value added was also more or less of the same order, the absolute figures being Rs. 1200 crores and Rs. 7800 crores for the two points of time, respectively.

The share of the non-financial corporate sector in the total gross domestic product of the economy at factor cost and current prices was more than 9 per cent at the end of the Second Plan (1960-61). It increased to more than 11 per cent by the end of the Third Plan but came down to its previous level during the subsequent period. The share touched the highest level of around 12 per cent at the terminal year of the Fourth Plan (1973-74) but again declined to about 10 per cent by 1977-78.

Over the period of the study, the share of both the public and private limited companies in the total value added (both gross and net) by the non-financial corporate sector declined steadily. The decline in the share of private corporate sector was made good by the Government companies whose share in the value added by the non-financial corporate sector rose sharply from 4 per cent at the end of the Third Plan to more than 30 per cent by the end-year of the Fourth Plan. During the subsequent period it came down to around 25 per cent (Table 1).

Non-Government public limited companies' share of value added was larger throughout the period (1960-61 to 1977-78) with private limited companies at the second place for the major

Table 1: Gross and Net Value Added (at Current Prices) by Type of Companies

(Rs. in Crores)

Type of Company	Gross Value Added					Net Value Added				
	1960-61	1965-66	1968-69	1973-74	1977-78	1960-61	1965-66	1968-69	1973-74	1977-78
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
A. Non-Govt. Cos.	1337 (95.7)	2503 (91.1)	2656 (85.2)	4675 (67.6)	6600 (73.9)	1190 (95.9)	2231 (92.2)	2334 (88.4)	4125 (69.6)	5862 (75.4)
1. Public Limited	1030 (73.7)	1869 (68.0)	2016 (64.7)	3678 (53.2)	5327 (59.6)	904 (72.9)	1638 (67.7)	1744 (66.1)	3232 (54.5)	4726 (60.8)
2. Private Limited	307 (22.0)	634 (23.1)	640 (20.5)	997 (14.4)	1273 (14.3)	286 (23.0)	593 (24.5)	590 (22.3)	893 (15.1)	1136 (14.6)
B. Govt. Cos.	60 (4.3)	246 (8.9)	463 (14.8)	2244 (32.4)	2335 (26.1)	51 (4.1)	190 (7.8)	305 (11.6)	1802 (30.4)	1915 (24.6)
TOTAL	1397 (100.0)	2749 (100.0)	3119 (100.0)	6919 (100.0)	8936 (100.0)	1241 (100.0)	2421 (100.0)	2639 (100.0)	5927 (100.0)	7778 (100.0)

Figures in parenthesis relate to percentages to totals.

portion of the period covered. At the end of 1973-74, the Government companies' share in income generated exceeded that of non-Government private limited companies. The shift in the ratio, in favour of Government sector was partly on account of nationalisation of some of the key industries in private sector from time to time (for example 'coal' in 1972-73) and partly on account of new Government companies coming on stream, or faster expansion of operations of existing Government companies.

For the entire period of the study, the annual (geometric) growth rate in value added (at current prices) for the non-financial corporate sector worked out to about 12 per cent (Table 2).

The growth rates (both in gross and net value added) displayed wide fluctuations during the various Plan periods. While the rate was highest for the Fourth Plan, followed by the Third Plan, it was during the Annual Plan period of 1966-67 to 1968-69, a period of general industrial recession, that it touched the rock bottom level. The poor performance reflects the general industrial recession during this period. During the Fifth Plan, the non-financial corporate sector recorded an annual increase of around 7 per cent in value added. It may be mentioned here that during the same period (1973-74 to 1977-78), 'net domestic product' at current prices in the economy showed a rate of growth of 10 per cent per annum, the rates for the earlier periods being 12 per cent for 1968-69 to 1973-74, 12 per cent for 1965-66 to 1968-69 and 9 per cent during the Third Plan. Since the rates of growth, both for the corporate sector and for the Indian economy, are calculated from the income estimates at current prices, the effect of price increases for the respective sectors has to be allowed for, to evaluate the increases in real terms. Differential in price rises for the product of the corporate sector and the total domestic product may be one of the factors underlying the differences in the annual growth rates in nominal terms. For this purpose corporate sector's income generated estimates at current prices were adjusted by the implicit price indices which are worked from the CSO's estimates of gross domestic product at current and constant prices under the industrial categories, viz., plantations, mining and quarrying, manufacturing (registered), transport other than railways, hotels, restaurants and eating houses and trade, etc. With this adjustment the rate of growth in the value added by the corporate sector at constant (1960-61) prices worked out to around 8 per cent per annum for the period of the study. The corresponding increases

Table 2: Annual Growth Rates in Gross and Net Value Added at Current Prices by Type of Companies

Type of Company	Gross Value Added					Net Value Added					(Per cent per annum)				
	1965-66 over 1960-61	1968-69 over 1965-66	1973-74 over 1968-69	1977-78 over 1973-74	1977-78 over 1960-61	1965-66 over 1960-61	1968-69 over 1965-66	1973-74 over 1968-69	1977-78 over 1973-74	1977-78 over 1960-61	6.	7.	8.	9.	10.
A. Non-Govt. Cos.	13.4	2.0	12.0	9.0	9.8	13.4	1.5	12.1	9.2	9.8					
1. Public Limited	12.7	2.6	12.8	9.7	10.1	12.6	2.1	13.1	10.0	10.2					
2. Private Limited	15.6	0.3	9.3	6.3	8.7	15.7	-0.2	8.6	6.2	8.5					
B. Govt. Cos.	32.6	23.5	37.1	1.0	24.0	30.1	17.1	42.7	1.5	23.8					
TOTAL	14.5	4.3	17.3	6.6	11.5	14.3	2.9	17.6	7.0	11.4					

in output for the registered manufacturing sector and in the total domestic product, were 5.5 per cent per annum and 3.7 per cent per annum, respectively.

(B) Factor Income Shares

Compensation to employees by the non-financial corporate sector, accounted for the largest share of total gross value added in that sector during the period. It amounted to roughly 56 per cent though some fluctuations were noticed during the 18 years (Table 3).

Table 3: Factor Income Shares in Gross and Net Value Added (at Current Prices) by Non-financial Corporate Sector

Year	Compensation to employees	Interest	Gross profits	(Per cent)		
				Of which		
				Depreciation	Corporate tax	Profits after tax
	1.	2.	3.	4.	5.	6.
1960-61	56.0 (63.1)	4.7 (5.3)	39.3 (31.6)	11.2	11.3 (12.7)	16.8 (18.9)
1965-66	54.8 (62.3)	8.2 (9.3)	37.0 (28.4)	12.0	13.2 (15.0)	11.8 (13.4)
1968-69	56.7 (67.0)	12.3 (14.5)	31.0 (18.5)	15.4	9.5 (11.3)	6.1 (7.2)
1973-74	52.4 (61.1)	11.2 (13.0)	36.4 (25.9)	14.3	10.5 (12.3)	11.6 (13.6)
1977-78	56.8 (65.2)	15.0 (17.2)	28.2 (17.6)	12.8	11.7 (13.4)	3.7 (4.2)

Figures in brackets relate to factor income shares in 'net value added'.

While the shares of 'depreciation' and 'tax provision' in the gross value added remained more or less at the same level throughout the period of study, the share of cost of borrowing viz., 'interest' rose steadily from about 5 per cent in 1960-61 to 15 per cent in 1977-78. This seems to be the result of both an increase in the interest rates over the years and the increased reliance of companies on external sources of funds in the form of borrowed capital. The observation is confirmed by an earlier study according to which the share of external sources in the total sources of funds increased during the period 1961-62 to 1975-76, from around 44 per cent to more than 57 per cent in the case of public limited

companies and to 54 per cent for the private limited companies, respectively; the major increase being on account of 'borrowings' from financial institutions and 'others' (2). It is worth noting that 'entrepreneur share' expressed in terms of profits after-tax in the total value added of the non-financial corporate sector, declined sharply from around 17 per cent to around 4 per cent during the period under reference. While both the public and private limited companies of the private corporate sector contributed to the decline, the steep fall was mainly because of the losses incurred by Government companies.

More or less a similar trend is observed for factor shares in the net value added. The share of compensation to employees in the net value added varied between 61 per cent and 65 per cent, except in the year 1968-69 when it was high at 67 per cent. It may be pointed out in this context that the share of compensation to employees in the net value added by the "Organised Sector" of the economy (CSO estimates), though higher than that of the corporate sector, has also shown an increase from about 67 per cent in 1960-61 to about 70 per cent in 1977-78; the share was highest at about 72 per cent in 1968-69 (3). The "Organised Sector" as defined by the Central Statistical Organisation, covers activities like plantations in agriculture, production of major minerals, manufacturing — registered — private corporate construction enterprises, production and distribution of gas, mechanised road, water and air transport, private corporate trading activities, private educational institutions, hospitals and similar other establishments of the private organised sector and Government administrative departments as well as Government departmental and non-departmental enterprises. The "Organised Sector" therefore, encompasses much larger area of activity than the corporate sector of RBI studies.

During the period 1960-61 to 1977-78, while the share of compensation to employees in gross value added came down marginally for public limited companies, it improved in the case of private limited companies; the share in the case of latter was low in the intervening periods (Table 4).

In the case of Government companies, the share of compensation to employees in gross value added declined in the initial years

(2) Divatia, V. V., and Kripa Shanker, 'Capital Formation and its Financing in the Private Corporate Sector, 1961-62 to 1975-76, *Journal of Income and Wealth, IARNIW*, Volume 3, No. 2, April 1979.

(3) Central Statistical Organisation, *National Accounts Statistics*, February, 1976, January 1979 and February 1980.

Table 4: Factor Income Shares in Gross and Net Value Added (at Current Prices) by Type of Companies

(Per cent)

Type of Company	Year	Compensation to employees	Interest	Gross profits	Of which		
					Depreciation	Corporate tax	Profits after tax
	1	2	3	4	5	6	7
A. Non-Govt. Cos.							
1. Public							
Limited	1960-61	56.2 (64.0)	4.7 (5.4)	39.1 (30.6)	12.2	10.3 (11.8)	16.6 (18.8)
	1965-66	56.0 (63.7)	7.5 (8.5)	36.5 (27.8)	12.4	12.3 (14.3)	11.8 (13.5)
	1968-69	57.2 (66.1)	10.8 (12.5)	32.0 (21.4)	13.4	9.2 (10.6)	9.4 (10.8)
	1973-74	53.4 (60.8)	10.0 (11.3)	36.6 (27.9)	12.2	11.7 (13.4)	12.7 (14.5)
	1977-78	55.2 (62.5)	13.6 (15.2)	31.2 (22.3)	11.3	12.4 (13.9)	7.5 (8.4)
2. Private							
Limited	1960-61	55.9 (60.1)	5.0 (5.3)	39.1 (34.6)	6.9	15.2 (16.3)	17.0 (18.3)
	1965-66	55.6 (59.5)	7.7 (8.2)	36.7 (32.3)	6.6	19.7 (21.2)	10.4 (11.1)
	1968-69	60.6 (65.8)	9.9 (10.7)	29.5 (23.5)	7.9	14.2 (15.4)	7.4 (8.1)
	1973-74	53.7 (59.9)	12.4 (13.8)	33.9 (26.3)	10.4	13.8 (15.4)	9.7 (10.9)
	1977-78	58.2 (65.0)	14.0 (16.7)	27.8 (18.3)	10.5	11.0 (12.3)	6.3 (6.0)
B. Govt. Cos.							
	1960-61	54.5 (64.0)	4.1 (4.8)	41.4 (31.2)	14.8	8.4 (9.9)	18.2 (21.3)
	1965-66	43.6 (56.4)	14.9 (19.2)	41.5 (24.4)	22.7	3.8 (5.0)	15.0 (19.4)
	1968-69	49.1 (74.5)	22.5 (34.1)	28.4 (-8.6)	34.0	4.6 (6.9)	-10.2 (-15.5)
	1973-74	50.3 (62.6)	12.5 (15.6)	37.2 (21.8)	19.6	7.1 (8.8)	10.5 (13.0)
	1977-78	58.9 (71.9)	18.0 (21.9)	23.1 (6.2)	18.0	10.4 (12.6)	-5.3 (-6.4)

Figures in brackets relate to factor income shares in 'net value added'.

of the study but went up by 1977-78; the level at this point was around 59 per cent as compared to that of about 55 per cent in 1960-61. "Depreciation provision" as percentage of gross value added remained steady (around 12 per cent) throughout the period of study for the public limited companies of the private corporate sector. This share was low for the non-Government private limited companies and varied between 7 per cent to 10 per cent during the period of study. For Government companies, the component 'depreciation provision' was found to be quite significant in terms of its share in gross value added due to the capital intensive nature of companies in this sector. The rise in the share of "depreciation provision" in 1965-66 as compared to 1960-61, for Government companies was indicative of the relative shifts in the importance of factor income shares, mainly of the considerable decline in the share of remuneration to employees (from about 55 per cent to about 44 per cent). During 1968-69, these companies suffered heavy losses. Further, prior to this year, a number of capital-intensive industries had been established. These two factors resulted in pushing up the share of depreciation provision in the gross value added for these companies in 1968-69. Interest payments had an increasing share for each of the three sub-sectors over the period 1960-61 to 1977-78, the exception being the companies in the Government sector at the end-year of the Fourth Plan. At the end of each Plan period, the share of interest in gross value added was more for Government companies as compared to the public or private limited companies. On the other hand Government companies contributed much less in the form of 'corporate tax' as a proportion of gross value added, as many companies incurred losses.

The four main industry groups of the non-Government sector viz., 'agriculture and allied activities', 'mining and quarrying', 'manufacturing' and 'other activities' showed similar pattern of factor income shares though with varying degree (Statement I).

(C) Factor Income Shares by Broad Nature of Industries

The twelve selected industries among the public limited companies have been grouped into three broad categories of 'capital intensive', 'labour intensive' and 'technology oriented' industries and average values of factor shares in respect of these groups are analysed separately (Statement II). Factor shares for each of the twelve selected industries are also presented in Statement III.

In capital intensive industries group (cement, iron and steel, basic industrial chemicals, motor vehicles, paper and paper products and electricity generation and supply), the share of compensation to employees in gross value added, hovered between 42 and 45 per cent. Within this group, the share of compensation to employees in the respective value added was the highest for the "iron and steel" industry (45 to 64 per cent) and the lowest (about 30 per cent) for the 'electricity generation and supply'. The proportion of depreciation provision was quite high for this group of industries taken together as also for almost all the individual industries comprising the group. Profits after-tax ranked next and accounted for the share of around 13 to 20 per cent. The share of interest at 8 per cent in 1960-61, increased to 12.6 per cent in 1977-78.

Labour intensive industries (cotton-textiles, sugar, trading and electrical machinery, apparatus and appliances, etc.) as could be expected, had the highest share of compensation to employees (63 to 67 per cent) throughout the period except during 1973-74 when the share came down to 58 per cent. The decline in 1973-74 was mainly due to the dwindling down of the share to 60 per cent in the major constituent of this group, viz., 'cotton textiles' which had the highest share (67 to 75 per cent) throughout the period except in 1973-74. The share was also high in the 'trading', industry. It may be added that 'cotton textiles' showed an insignificant or negative share of profits after-tax for almost the entire period except 1973-74. For other industries of this group, the profits after-tax generally came next to the compensation to employees in terms of share in the value added. However, "sugar" industry in the terminal year of the study (1977-78), had a negative contribution in terms of profits after tax.

In technology oriented industries (medicines and pharmaceutical preparations and rubber and rubber products), the share of post-tax profits in value added was found to be 19 per cent in 1960-61 which gradually came down to 8 per cent in 1977-78. It was due to a spurt in the wage bill which rose to Rs. 111 crores in 1977-78 from a meagre amount of Rs. 12 crores at the end of First Plan period, that the share of compensation to employees for this group of industries registered increase from 45 per cent in 1960-61 to 53 per cent in 1977-78. The major contributor to this was the "medicines and pharmaceutical preparations" industry. In the case of rubber and rubber products also, the share of compensation to employees increased from 51 per cent to 59 per cent during the period. This industry showed a high share of depreciation. In the

terminal year of the study, its share of profits after-tax in the gross value added became negative.

(D). Shifts in Relative Importance of Various Sub-sectors.

Compensation to employees, being the major component of value added, showed a similar shift during the period of the study for various types of companies as that of value added (earlier discussed with reference to Table 1). Thus while the relative contribution of compensation to employees of non-Government public and private limited companies to the total of the entire non-financial corporate sector declined from 74 per cent to 58 per cent and from 22 per cent to 15 per cent, respectively, that of Government companies increased from a meagre 4 per cent to 27 per cent during the period 1960-61 to 1977-78; the rate of increase was quite high from the first half of the seventies. As stated earlier, this change could be attributed partly to shifting of companies from private sector to Government sector as also growth of Government companies at a more rapid rate, (Table 5).

Table 5: Relative Importance of various Sub-Sectors and Shifts therein as seen through Compensation to Employees and Profits after-tax

(Per cent)

Year	Compensation to employees			Profits after-tax		
	Public Ltd. Cos.	Private Ltd. Cos.	Government Cos.	Public Ltd. Cos.	Private Ltd. Cos.	Government Cos.
	1.	2.	3.	4.	5.	6.
1960-61	73.8	22.0	4.2	73.0	22.3	4.7
1961-62	72.3	23.4	4.3	71.1	23.4	5.5
1962-63	70.4	24.1	5.5	71.8	21.0	7.2
1963-64	67.6	24.2	8.2	75.4	20.3	4.3
1964-65	68.6	25.0	6.4	74.6	24.2	1.2
1965-66	69.5	23.4	7.1	68.3	20.3	11.4
1966-67	65.7	23.3	11.0	80.6	24.9	-5.5
1967-68	66.2	22.6	11.2	103.1	31.9	-35.0
1968-69	65.2	22.0	12.8	99.8	25.1	-24.9
1969-70	64.3	21.5	14.2	91.0	17.6	-8.6
1970-71	64.7	19.8	15.5	95.0	14.0	-9.0
1971-72	63.4	18.6	18.0	98.8	16.1	-14.9
1972-73	62.0	18.3	19.7	84.4	16.6	-1.0
1973-74	54.2	14.8	31.0	58.5	12.1	29.6
1974-75	61.6	16.8	21.6	69.8	10.0	20.2
1975-76	61.3	15.9	22.8	75.7	3.3	21.0
1976-77	59.5	14.7	25.8	62.8	7.6	29.6
1977-78	58.0	14.9	27.1	117.2	12.9	-30.1

The profits after-tax of non-Government public limited companies, as a percentage of the total for the non-financial corporate sector, remained more than 70 per cent in 14 years out of the 18 years covered in the study. In fact during the period 1966-67 to 1972-73, the share was well above 80 percent and touched almost the level of 100 per cent in 1968-69 and 1971-72. In 1967-68 and 1977-78, the public limited companies of the private corporate sector accounted for more than hundred per cent share in the total profits after-tax of the entire corporate sector. Private limited companies which shared about 20 per cent to 25 per cent of the profits after-tax of the non-financial corporate sector upto 1968-69, registered gradual decline in their shares subsequently. On the other hand, Government companies which had the lowest share upto 1965-66 and even negative profits after-tax (losses) thereafter upto 1972-73, recorded improved shares during the next four years and accounted for as much as 20 to 30 per cent of the profits after-tax of the corporate sector. There was again a setback in 1977-78 for these companies. Throughout the period of the study, private corporate sector accounted for a major share of after-tax profits of the entire non-financial corporate sector.

(E) Shifts in Money and Nominal Wages

An attempt is made here to study the shifts, if any, in the compensation to employees, when the same is measured at current prices and at constant prices of 1960-61. These aspects have been studied by constructing a series of index numbers of compensation to employees, with 1960-61 as base for the entire non-financial corporate sector.

It may be recalled that the changes in absolute figures of compensation to employees represent two components, viz., the rise due to increase in working force and the rise due to the increase in wage rates. To take account for the first, we have deflated the absolute figures of compensation to employees for various years by an index of labour force, constructed from the figures of the estimated average daily employment as available in the publication of the Labour Bureau⁽⁴⁾. These estimates of labour force relate to the 'private sector factories' and 'Government and local fund factories'. The series of remuneration so adjusted, is then used to work out the indices of remuneration at current prices. These current price indices are further deflated with the all-India con-

(4) Government of India, Labour Bureau, Ministry of Labour 'Indian Labour Statistics', 1977.

sumer price index numbers for industrial workers (1960 = 100), as published by the Labour Bureau, Government of India (Table 6).

The index (1960-61 = 100) of remuneration to employees in the non-financial corporate sector, at current prices, adjusted for increase in working force stood at around 425 points in 1977-78, thus registering a four-fold rise during the 18 years covered in the study, the rate of increase being 8.4 per cent per annum. The rate of increase was more rapid from 1972-73. It is worth noting that in real terms (at constant prices of 1960-61), the index of remuneration for the non-financial corporate sector increased only by about 32 per cent points during the period of 18 years ending 1977-78, with the index touching 132.1 in the terminal year. The average annual rate of increase works out to 1.6 per cent.

Table 6: Index Numbers of Compensation to Employees of the Non-financial Corporate Sector at Current and Constant (1960-61) Prices, 1960-61 to 1977-78

(1960-61 = 100)

Year	Index Numbers of Compensation to Employees at:	
	Current prices *	Constant (1960-61) prices
	1.	2.
1961-62	102.3	98.4
1962-63	110.9	103.4
1963-64	128.2	114.4
1964-65	146.4	113.5
1965-66	166.0	119.4
1966-67	160.1	102.0
1967-68	185.9	101.2
1968-69	189.1	108.7
1969-70	200.4	113.2
1970-71	222.5	119.6
1971-72	223.9	116.6
1972-73	252.5	121.5
1973-74	308.7	123.5
1974-75	340.4	107.4
1975-76	376.3	120.2
1976-77	384.3	127.7
1977-78	424.7	132.1

* In these indices, the working force is taken at the base (1960-61) level.

It may be pointed out that the annual remuneration per employee, covered by the Census Sector of the Annual Survey of Industries⁽⁵⁾ also showed a similar trend. As per these data the average annual remuneration per employee for 1977-78 worked out to about 409 with 1960-61 as equal to 100 which compares well with the index of remuneration at current prices (424.7) derived by us. The A.S.I. data also provides a break-up of remuneration per employee by type of companies viz., the public and private limited companies in the private corporate sector and the public corporations, representing the public corporate sector of the Indian economy. These details are, however, available from 1973-74 and that too for a few selected years. The index numbers of remuneration of employees at current and constant (1973-74) prices with 1973-74 as base for the various types of companies (A.S.I. data) are presented so as to provide an idea about the differences in the movement of remuneration in money and real terms within and between the public and private limited companies of the private corporate sector as also between the Government and private corporate sectors (Table 7).

Table 7: Index numbers of compensation to employees at current and constant (1973-74) prices by type of companies

(1973-74 = 100)

Type of company	Index numbers of remuneration							
	At current prices			Average annual rate of increase (%)	At constant (1973-74) prices*			Average annual rate of increase (%)
	1974-75	1976-77	1977-78		1974-75	1976-77	1977-78	
	1	2	3	4	5	6	7	8

A. Private								
Corporate								
Sector	115.6	122.9	135.5	7.8	91.1	102.1	104.6	1.1
(a) Public								
Limited								
Companies	119.9	126.2	138.0	8.3	94.6	104.8	106.5	1.6
(b) Private								
Limited								
Companies	109.2	118.1	132.0	7.2	86.2	98.1	101.8	0.4
B Public								
Corporate								
Sector	118.3	150.9	166.5	13.6	93.3	125.4	128.5	6.5
(Government								
Companies)								

* These have been obtained by deflating the indices at current prices by using the all-India consumer price index numbers for industrial workers as deflators.

(5) Central Statistical Organisation, Industrial Statistics Wing, Reports on Annual Survey of Industries — Census Sector.

It comes out that during the period 1973-74 to 1977-78, the remuneration, both in nominal and real terms to employees of the public (Government) corporate sector, rose much faster than that of their counterparts in the private corporate sector. In fact, the real remuneration of the employees in the private corporate sector showed only a marginal increase even after four years from 1973-74. Within the private corporate sector, the indices of remuneration for public limited companies rose relatively more as compared to that of the private limited companies. The real remuneration of each of the categories of companies declined in 1974-75, as a result of a steep rise during that year in the all-India consumer price index numbers for industrial workers (1960 = 100) from its previous year's level (317 in 1974-75 as compared to 250 in 1973-74).

Summary and Conclusions

For the 18-year period ending March 1978, the gross income generated at current prices by the non-financial corporate sector registered more than a five-fold increase and stood at Rs. 9,000 crores in 1977-78. However, inspite of this increase, the share of the non-financial corporate sector in the total gross domestic product increased only marginally to about 10 per cent in 1977-78 from the level of 9 per cent existing in 1960-61; it fluctuated between 11 per cent to 12 per cent in the intervening years. Non-financial, non-Government public limited and private limited companies accounted for about 74 per cent and 22 per cent, respectively, of the total income generated by the non-financial corporate sector in 1960-61. These shares declined over the period to about 18 per cent and 15 per cent respectively, but were compensated by the rise in the share of the Government companies from about 4 per cent to 25 per cent.

The annual (geometric) growth rate in value added at current prices for the period studied, was about 12 per cent for the entire non-financial corporate sector. This has to be viewed in the light of increase in prices. If adjustments for rise in prices were made with the help of implicit price indices of domestic product at current and constant prices for the respective sectors, the real increase in income generated by the non-financial corporate sector may be about 8 per cent per annum. As against this, the gross domestic product at constant (1960-61) prices registered an annual increase of more than 5.5 per cent for the registered manufacturing sector and about 3.7 per cent for the economy as a whole during the period. Government companies as compared to non-Government public and private limited companies, registered the

maximum growth rate in all the Plan Periods studied, except in the period 1973-74 to 1977-78, when the former's growth was the lowest. During the Annual Plan period (1965-66 to 1968-69), private corporate sector companies registered the minimum growth. The extent of general industrial recession around these years is reflected by the low income generated in the corporate sector. Annual growth rates were also low during 1973-74 to 1977-78.

In terms of factor income shares in the total income generated (at current prices), "compensation to employees" accounted most. Its share at 56 per cent at the end of Second Plan (1960-61), remained more or less at the same level even after a period of 17 years. During the period, while the share of "depreciation" and "tax" remained almost constant at around 12 per cent each, that of "interest" rose sharply from about 5 per cent to 15 per cent. This was the result of both an increase in interest rates over the years and of increased reliance of companies on external sources of funds in the form of borrowed capital. It is worth noting that the share of "profits after-tax" in the total income generated came down sharply from about 17 per cent in 1960-61 to around 4 per cent in 1977-78. This was mainly due to a negative share of Government companies; no doubt, both the public and private limited companies of the private corporate sector, recorded declines in the shares. By categories of industries of the public limited companies, the share of "compensation to employees" was relatively low (42 per cent to 45 per cent) in "capital intensive" industries; the "labour intensive" industries had the highest share (58 to 67 per cent). While "depreciation" accounted for the second major component in the case of "capital-intensive" industries, it was the "technology oriented" industries which had the highest share of "post-tax profits" in the gross value added.

Making adjustments for the increase in working force, the index (base 1960-61 = 100) of compensation to employees at current prices, for the non-financial corporate sector increased four-fold; the increase was more rapid from 1972-73. However, the index of real remuneration (base 1960-61 = 100) per employee for the entire non-financial corporate sector rose marginally by 32 points during the 18 years i.e. at the rate of 1.5 per cent per annum.

Based on the A.S.I. Census data, it is seen that the growth of remuneration, both in nominal and real terms, during the period 1973-74 to 1977-78, for which the relevant data are available, was more for the public (Government) corporate sector as compared to the private corporate sector. These estimates may be reflective

of the narrowing/widening gap in the wage rates in the two sectors if the relative differences in the real wage rates in absolute terms were lower/higher in the Government sector compared to those in the private sector. While interpreting the results of the study, the limitations of data on company finances in the context of methodology followed for estimating the income generated (value added) including the preparation of global estimates⁽⁶⁾ and other adjustments made, have to be kept in mind.

(6) These are discussed in detail by Divatia, V. V. and Kripa Shanker, "Value Added by the Non-financial Corporate Sector, 1970-71 to 1973-74", (1977), Op. cit.

Statement — I : Factor Income Shares in Gross and Net Value Added (at Current Prices) by Public and Private Limited Companies —
(Per cent)
Main Industry Group-wise

End of Plan Period	PUBLIC LIMITED COMPANIES					PRIVATE LIMITED COMPANIES						
	Comp. to employees	Inte- rest	Gross Profit	Of which		Comp. to employees	Inte- rest	Gross Profit	Of which			
				Depn.	Corp. tax				Depn.	Corp. tax	P. A. T.	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
AGRICULTURE AND ALLIED ACTIVITIES												
1960-61	64.1 (68.2)	1.5 (1.4)	34.4 (30.0)	5.8 (14.4)	13.6 (14.4)	15.0 (16.0)	66.7 (69.0)	4.3 (4.5)	29.0 (26.5)	3.3 (14.3)	13.8 (14.3)	11.9 (12.2)
1965-66	66.1 (70.9)	2.9 (3.1)	31.0 (26.0)	6.8 (14.5)	13.5 (14.5)	10.7 (11.5)	64.4 (66.6)	5.6 (5.8)	30.0 (27.6)	3.3 (13.2)	12.8 (13.2)	13.9 (14.4)
1968-69	74.6 (80.5)	4.3 (4.6)	21.1 (14.9)	7.3 (14.9)	7.7 (8.3)	6.1 (6.6)	74.5 (79.4)	7.1 (7.5)	18.4 (13.1)	6.1 (7.4)	4.7 (5.0)	7.6 (8.1)
1973-74	70.6 (74.9)	4.9 (5.2)	24.5 (19.9)	5.8 (10.4)	9.8 (10.4)	8.9 (9.5)	76.2 (82.3)	7.7 (8.3)	16.1 (9.4)	7.4 (7.3)	6.7 (7.3)	2.0 (2.1)
1977-78	54.6 (56.8)	2.9 (3.0)	42.5 (40.2)	3.7 (25.8)	24.9 (25.8)	13.9 (14.4)	59.0 (62.1)	4.2 (4.4)	36.8 (33.5)	4.9 (19.5)	18.5 (19.5)	13.4 (14.0)
MINING AND QUARRYING												
1960-61	—	—	—	—	—	—	75.9 (89.8)	0.9 (1.0)	23.2 (9.2)	15.5 (4.1)	3.4 (4.1)	4.3 (5.1)
1965-66	83.4 (89.5)	2.9 (3.1)	13.7 (7.4)	6.8 (7.4)	2.9 (3.1)	4.0 (4.3)	86.3 (90.6)	3.0 (3.2)	10.7 (6.2)	4.8 (8.2)	7.8 (8.2)	-1.9 (-2.0)
1968-69	66.4 (73.5)	5.6 (6.3)	28.0 (20.2)	9.8 (20.2)	6.3 (7.0)	11.9 (13.2)	84.4 (88.3)	2.3 (2.4)	13.3 (9.3)	4.5 (31.4)	4.8 (5.1)	4.0 (4.2)
1973-74	85.6 (93.2)	5.0 (5.5)	9.4 (1.3)	8.3 (1.3)	1.5 (1.7)	-0.4 (-0.4)	42.7 (62.4)	10.3 (15.0)	47.0 (22.6)	31.4 (11.4)	7.9 (11.4)	7.7 (11.2)
1977-78	87.5 (94.0)	7.5 (8.2)	5.0 (-2.2)	7.1 (8.2)	2.4 (2.6)	-4.5 (-4.8)	42.6 (54.2)	9.7 (12.4)	47.7 (33.4)	21.5 (14.0)	11.0 (14.0)	15.2 (19.4)

Statement — I (Concl'd.): Factor Income Shares in Gross and Net Value Added (at Current Prices) by Public and Private Limited Companies — Main Industry Group-wise (Per cent)

End of Plan Period	PUBLIC LIMITED COMPANIES						PRIVATE LIMITED COMPANIES					
	Comp. to employees	Inte- rest	Gross Profit	Of which		P.A.T.	Comp. to employees	Inte- rest	Gross Profit	Of which		P.A.T.
				Depn.	Corp. tax					Depn.	Corp. tax	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
MANUFACTURING												
1960-61	54.9 (62.8)	4.8 (5.5)	40.3 (31.7)	12.6	10.4 (11.9)	17.3 (19.8)	55.4 (59.9)	4.6 (5.0)	40.0 (35.1)	7.5 (16.0)	14.8 (19.1)	17.7 (19.1)
1965-66	55.3 (63.4)	7.6 (8.7)	37.1 (27.9)	12.9	12.5 (14.4)	11.7 (13.5)	52.8 (57.3)	6.8 (7.4)	40.4 (35.3)	7.9 (23.2)	21.4 (23.2)	11.1 (12.1)
1968-69	56.6 (65.8)	11.1 (12.9)	32.3 (21.3)	14.0	9.4 (11.0)	8.9 (10.3)	59.1 (64.7)	9.5 (10.5)	31.4 (24.8)	8.7 (15.8)	14.4 (15.8)	8.3 (9.0)
1973-74	53.2 (60.7)	9.9 (11.2)	36.9 (28.1)	12.2	12.0 (13.6)	12.7 (14.5)	54.0 (59.6)	12.6 (13.9)	33.4 (26.5)	9.4 (15.7)	14.2 (15.7)	9.8 (10.8)
1977-78	55.5 (62.4)	13.8 (15.6)	30.7 (22.0)	11.1	12.0 (13.5)	7.6 (8.5)	60.0 (66.1)	16.8 (18.4)	23.2 (15.5)	9.2 (11.8)	10.7 (11.8)	3.3 (3.7)
OTHER ACTIVITIES												
1960-61	51.7 (60.7)	7.3 (8.6)	41.0 (30.7)	14.9	10.6 (12.5)	15.5 (18.2)	53.7 (57.1)	6.0 (6.4)	40.3 (36.5)	6.1 (18.0)	16.9 (18.0)	17.3 (18.5)
1965-66	48.6 (55.0)	9.4 (10.6)	42.0 (34.4)	11.5	13.7 (15.5)	16.8 (18.9)	54.6 (57.5)	10.7 (11.2)	34.7 (31.3)	4.8 (20.8)	19.9 (20.8)	10.0 (10.5)
1968-69	52.5 (60.3)	12.5 (14.3)	35.0 (25.4)	12.8	8.5 (9.7)	13.7 (15.7)	58.1 (62.2)	12.9 (13.8)	29.0 (24.0)	6.6 (17.9)	16.7 (17.9)	5.7 (6.1)
1973-74	47.9 (55.7)	13.0 (15.1)	39.1 (29.2)	14.0	10.5 (12.2)	14.6 (17.0)	53.1 (58.7)	12.5 (13.8)	34.4 (27.5)	9.6 (15.7)	14.2 (15.7)	10.6 (11.8)
1977-78	50.9 (62.1)	17.9 (21.7)	31.2 (16.2)	17.9	9.7 (11.8)	3.6 (4.4)	58.8 (67.4)	13.0 (14.9)	28.2 (17.7)	12.8 (12.8)	11.1 (12.8)	4.3 (4.9)

Figures in brackets relate to factor income shares in net value added.

Statement — II: Factor Income Shares in Gross and Net Value Added by Broad Nature of Industries

(Per cent)

End of Plan Period	Compensation to employees	Interest	Gross Profits	Of which		
				Depreciation	Corporate tax	Profit after tax
1.	2.	3.	4.	5.	6.	7.
LABOUR INTENSIVE INDUSTRIES						
1960-61	63.2 (69.5)	4.8 (5.3)	32.0 (25.2)	9.0	8.8 (9.6)	14.2 (15.6)
1965-66	64.9 (73.0)	9.0 (10.1)	26.1 (16.9)	11.0	9.3 (10.4)	5.8 (6.5)
1968-69	67.0 (74.9)	12.8 (14.3)	20.2 (10.8)	10.6	6.4 (7.2)	3.2 (3.6)
1973-74	57.8 (63.1)	10.4 (11.3)	31.8 (25.6)	8.4	10.1 (11.0)	13.3 (14.6)
1977-78	65.5 (71.3)	16.8 (18.2)	17.7 (10.5)	8.0	7.1 (7.7)	2.6 (2.8)
TECHNOLOGY ORIENTED INDUSTRIES						
1960-61	45.3 (56.3)	5.6 (6.9)	49.1 (36.8)	19.5	10.2 (12.7)	19.4 (24.1)
1965-66	47.1 (52.1)	5.0 (5.5)	47.9 (42.4)	9.4	19.8 (21.8)	18.7 (20.6)
1968-69	38.1 (48.2)	4.6 (5.8)	57.3 (46.0)	20.9	19.6 (24.7)	16.8 (21.3)
1973-74	52.7 (58.2)	6.8 (7.6)	40.5 (34.2)	9.6	17.5 (19.4)	13.4 (14.8)
1977-78	53.2 (58.4)	13.9 (15.3)	32.9 (26.3)	8.9	16.3 (17.9)	7.7 (8.4)
CAPITAL INTENSIVE INDUSTRIES						
1960-61	42.1 (55.2)	7.6 (9.9)	50.3 (34.9)	23.8	5.6 (7.4)	20.9 (27.5)
1965-66	42.4 (51.7)	8.3 (10.0)	49.3 (38.3)	18.0	12.8 (15.6)	18.5 (22.7)
1968-69	45.1 (57.4)	12.7 (16.2)	42.2 (26.4)	21.4	7.6 (9.6)	13.2 (16.8)
1973-74	43.2 (54.0)	11.3 (14.1)	45.5 (31.9)	20.0	10.5 (13.2)	15.0 (18.7)
1977-78	42.7 (50.7)	12.6 (14.9)	44.7 (34.4)	15.8	14.6 (17.3)	14.3 (17.1)

Figures in brackets relate to factor income shares in 'net value added'.

Statement III: Factor Income Shares in Gross and Net Value Added (at Current Prices) By Selected Industries of Public Limited Companies

(Per cent)

End of Plan Period	Compensation to employees	Interest	Gross Profits	Of which		
				Depreciation	Corporate tax	Profit after tax
1.	2.	3.	4.	5.	6.	7.

COTTON TEXTILES

1960-61	67.3 (74.2)	4.0 (4.4)	28.7 (21.4)	9.3	6.8 (7.5)	12.6 (13.9)
1965-66	72.9 (83.3)	8.6 (9.8)	18.5 (6.9)	12.4	4.9 (5.6)	1.2 (1.3)
1968-69	75.5 (85.0)	12.1 (13.6)	12.4 (1.4)	11.1	2.5 (2.8)	-1.2 (-1.4)
1973-74	60.4 (66.0)	9.2 (10.0)	30.4 (24.0)	8.4	6.8 (7.4)	15.2 (16.6)
1977-78	72.0 (78.7)	16.2 (17.6)	11.8 (3.7)	8.5	3.4 (3.8)	-0.1 (-0.1)

SUGAR

1960-61	46.4 (52.5)	9.3 (10.5)	44.3 (37.0)	11.3	13.8 (15.5)	19.2 (21.5)
1965-66	44.1 (51.2)	12.5 (14.5)	43.4 (34.3)	13.9	15.3 (17.8)	14.2 (16.5)
1968-69	40.3 (45.3)	13.9 (15.8)	45.8 (38.9)	11.5	17.6 (19.9)	16.7 (19.0)
1973-74	46.2 (52.9)	15.9 (18.1)	37.9 (29.0)	12.6	12.6 (14.4)	12.7 (14.6)
1977-78	57.4 (65.0)	25.8 (29.2)	16.8 (5.8)	11.6	8.7 (9.8)	-3.5 (-4.0)

IRON AND STEEL

1960-61	44.6 (61.0)	8.0 (10.8)	47.4 (28.2)	26.8	2.6 (3.6)	18.0 (24.6)
1965-66	45.8 (56.2)	4.2 (5.1)	50.0 (38.7)	18.5	14.3 (17.6)	17.2 (21.1)
1968-69	54.5 (70.1)	6.6 (8.4)	38.9 (21.5)	22.2	5.3 (6.8)	11.4 (14.7)
1973-74	59.3 (75.1)	8.5 (10.8)	32.2 (14.1)	21.1	4.2 (5.4)	6.9 (8.7)
1977-78	64.4 (77.8)	10.1 (12.1)	25.5 (10.1)	17.2	0.1 (0.1)	8.2 (10.0)

**Statement III (Contd.): Factor Income Shares in Gross and Net Value Added
(at Current Prices) by Selected Industries of Public Limited Companies**

End of Plan Period	Compensa- tion to employees	Interest	Gross Profits	(Per cent)		
				Of which		
				Depre- ciation	Corporate Profit tax	after tax
1.	2.	3.	4.	5.	6.	7.
MOTOR VEHICLES						
1960-61	—	—	—	—	—	—
1965-66	49.6 (57.5)	8.8 (10.2)	41.6 (32.3)	13.7	12.6 (14.6)	15.3 (17.7)
1968-69	48.4 (58.5)	13.9 (16.9)	37.7 (24.6)	17.4	7.7 (9.4)	12.6 (15.2)
1973-74	51.8 (62.2)	10.8 (12.9)	37.4 (24.9)	16.7	11.3 (13.6)	9.4 (11.3)
1977-78	52.4 (59.6)	15.1 (17.0)	32.5 (23.4)	11.9	10.8 (12.3)	9.8 (11.1)
ELECTRICAL MACHINERY, APPARATUS AND APPLIANCES ETC.						
1960-61	47.8 (51.2)	4.1 (4.4)	48.1 (44.4)	6.9	17.7 (19.1)	23.5 (25.3)
1965-66	48.3 (52.2)	7.2 (7.8)	44.5 (40.0)	7.5	20.5 (22.2)	16.5 (17.8)
1968-69	56.0 (63.7)	13.9 (15.8)	30.1 (20.5)	12.0	11.2 (12.7)	6.9 (7.8)
1973-74	53.7 (58.8)	11.3 (12.4)	35.0 (28.8)	8.7	16.7 (18.3)	9.6 (10.5)
1977-78	54.9 (59.3)	14.6 (15.8)	30.5 (24.9)	7.3	13.0 (14.0)	10.2 (10.9)
BASIC INDUSTRIAL CHEMICALS						
1960-61	31.6 (38.9)	9.1 (11.3)	59.3 (49.8)	18.9	11.9 (14.7)	28.5 (35.1)
1965-66	30.2 (39.4)	10.0 (13.0)	59.8 (47.6)	23.2	17.8 (23.1)	18.8 (24.5)
1968-69	32.7 (45.2)	14.7 (20.3)	52.6 (34.5)	27.6	14.0 (19.3)	11.0 (15.2)
1973-74	27.8 (35.8)	10.8 (14.0)	61.4 (50.2)	22.6	13.8 (17.9)	25.0 (32.3)
1977-78	29.0 (35.3)	10.7 (13.0)	60.3 (51.7)	17.8	21.2 (25.8)	21.3 (25.9)

**Statement III (Contd.): Factor Income Shares in Gross and Net Value Added
(at Current Prices) by Selected Industries of Public Limited Companies**

(Per cent)

End of Plan Period	Compensa- tion to employees	Interest	Gross Profits	Of which		
				Depre- ciation	Corporate tax	Profit after tax
1.	2.	3.	4.	5.	6.	7.

MEDICINES AND PHARMACEUTICAL PREPARATIONS

1960-61	43.3 (56.0)	5.8 (7.4)	50.9 (36.6)	22.7	9.1 (11.8)	19.1 (24.8)
1965-66	45.4 (49.5)	4.7 (5.2)	49.9 (45.3)	8.6	24.7 (27.1)	16.6 (18.2)
1968-69	34.2 (47.2)	4.3 (5.9)	61.5 (46.9)	27.4	19.4 (26.7)	14.7 (20.2)
1973-74	50.6 (54.7)	5.5 (6.0)	43.9 (39.3)	7.4	21.9 (23.6)	14.6 (15.7)
1977-78	50.4 (53.5)	8.5 (9.0)	41.1 (37.5)	5.9	22.4 (23.9)	12.8 (13.6)

CEMENT

1960-61	43.4 (56.0)	5.7 (7.4)	50.9 (36.6)	22.7	9.1 (11.8)	19.1 (24.8)
1965-66	41.1 (50.1)	7.7 (9.4)	51.2 (40.5)	17.9	12.5 (15.2)	20.8 (25.3)
1968-69	46.2 (57.0)	12.1 (15.0)	41.7 (28.0)	19.1	6.8 (8.4)	15.8 (19.6)
1973-74	61.8 (79.5)	17.0 (21.9)	21.2 (-1.4)	22.3	2.8 (3.6)	-3.9 (-5.0)
1977-78	52.6 (61.7)	12.4 (14.4)	35.0 (23.9)	14.6	13.9 (16.3)	6.5 (7.6)

RUBBER AND RUBBER PRODUCTS

1960-61	51.3 (56.9)	5.2 (5.7)	43.5 (37.4)	9.9	13.4 (14.9)	20.2 (22.5)
1965-66	49.9 (55.7)	5.3 (5.9)	44.8 (38.4)	10.4	12.8 (14.3)	21.6 (24.1)
1968-69	45.1 (49.8)	5.0 (5.5)	49.9 (44.7)	9.3	19.9 (21.9)	20.7 (22.8)
1973-74	56.6 (65.9)	9.4 (10.9)	34.0 (23.2)	13.9	9.0 (10.4)	11.1 (12.8)
1977-78	58.8 (69.3)	25.0 (29.5)	16.2 (1.2)	15.1	3.8 (4.4)	-2.7 (-3.2)

**Statement III (Concl.) : Factor Income Shares in Gross and Net Value Added
(at Current Prices) by Selected Industries of Public Limited Companies**

(Per cent)

End of Plan Period	Compensa- tion to employees	Interest	Gross Profits	Of which		
				Depre- ciation	Corporate tax	Profit after tax
1.	2.	3.	4.	5.	6.	7.

PAPER AND PAPER PRODUCTS

1960-61	45.3 (55.8)	4.7 (5.8)	50.0 (38.4)	18.9	11.3 (14.0)	19.8 (24.4)
1965-66	44.4 (55.6)	12.5 (15.6)	43.1 (28.8)	20.1	4.5 (5.6)	18.5 (23.2)
1968-69	47.5 (60.3)	18.0 (22.8)	34.5 (16.9)	21.3	1.6 (2.1)	11.6 (14.8)
1973-74	43.8 (52.7)	11.6 (14.0)	44.6 (33.3)	17.0	9.3 (11.2)	18.3 (22.1)
1977-78	47.2 (58.8)	14.4 (17.9)	38.4 (23.3)	19.7	11.1 (13.8)	7.6 (9.5)

ELECTRICITY GENERATION AND SUPPLY

1960-61	30.0 (37.1)	11.0 (13.6)	59.0 (49.3)	19.2	4.3 (5.3)	35.5 (44.0)
1965-66	26.8 (33.3)	13.9 (17.2)	59.3 (49.5)	19.2	8.6 (10.6)	31.5 (38.9)
1968-69	31.1 (38.7)	17.3 (21.5)	51.6 (39.8)	19.6	7.2 (9.0)	24.8 (30.8)
1973-74	29.4 (35.6)	16.3 (19.8)	54.3 (44.6)	17.5	17.9 (21.6)	18.9 (23.0)
1977-78	27.5 (31.1)	15.7 (17.8)	56.8 (51.1)	11.9	21.0 (23.9)	23.9 (27.2)

TRADING

1960-61	60.3 (62.6)	6.4 (6.6)	33.3 (30.8)	3.7	14.3 (14.9)	15.3 (15.9)
1965-66	54.3 (56.7)	9.8 (10.3)	35.9 (33.0)	4.4	17.3 (18.1)	14.2 (14.9)
1968-69	59.2 (62.2)	13.9 (14.6)	26.9 (23.2)	4.8	11.4 (12.0)	10.7 (11.2)
1973-74	57.0 (59.2)	12.8 (13.2)	30.2 (27.6)	3.6	18.0 (18.7)	8.6 (8.9)
1977-78	62.4 (65.1)	20.3 (21.2)	17.3 (13.7)	4.2	11.9 (12.4)	1.2 (1.3)

Figures in brackets relate to factor income shares in net value added.

ANNEXURE — I
GROSS AND NET VALUE ADDED BY SELECTED NON-FINANCIAL NON-GOVERNMENT MEDIUM AND LARGE
PUBLIC AND PRIVATE LIMITED COMPANIES — MAIN INDUSTRY GROUP-WISE, 1960-61 TO 1977-78
(Rs. in crores)

Year	MEDIUM AND LARGE PUBLIC LIMITED COMPANIES											
	Agriculture and allied activities			Mining and quarrying			Manufacturing			Tertiary activities		
	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1960-61	175	32	30	55	32	30	640	577	504	131	57	48
1961-62	199	31	29	—	—	—	893	706	617	241	104	92
1962-63	197	34	32	63	37	35	896	775	677	177	78	68
1963-64	198	36	34	60	42	40	899	861	748	176	88	78
1964-65	191	35	33	60	42	39	904	971	840	178	97	86
1965-66	188	36	34	57	46	43	910	1042	907	178	107	94
1966-67	200	39	36	62	65	57	1044	1179	1017	195	119	105
1967-68	200	41	38	58	75	68	1052	1223	1054	191	128	111
1968-69	186	37	35	55	74	67	1072	1321	1136	188	132	116
1969-70	187	52	48	55	80	71	1072	1506	1301	187	134	117
1970-71	188	62	58	56	83	74	1067	1713	1484	190	156	136
1971-72	177	64	60	54	81	72	1224	2022	1748	195	172	147
1972-73	162	63	59	28	33	30	1250	2225	1928	210	183	157
1973-74	165	73	69	13	13	12	1268	2575	2262	204	217	186
1974-75	168	105	100	13	40	34	1263	3127	2786	206	306	268
1975-76	175	112	107	13	42	34	1266	3178	2828	196	319	277
1976-77	162	160	154	9	14	13	1353	3300	2926	196	312	261
1977-78	162	210	202	9	14	13	1353	3611	3208	196	317	260

ANNEXURE — I (Concl'd.)
GROSS AND NET VALUE ADDED BY SELECTED NON-FINANCIAL NON-GOVERNMENT MEDIUM AND LARGE
PUBLIC AND PRIVATE LIMITED COMPANIES — MAIN INDUSTRY GROUP-WISE, 1960-61 TO 1977-78
 (Rs. in crores)

Year	MEDIUM AND LARGE PRIVATE LIMITED COMPANIES														
	Agriculture and allied activities				Mining and quarrying				Manufacturing				Tertiary activities		
	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.	No. of Cos.	G.V.A.	N.V.A.
	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.			
1960-61	12	5	6	4	1	1	166	60	55	151	27	25			
1961-62	20	8	7	—	—	—	242	68	62	239	37	35			
1962-63	21	9	8	34	8	8	247	77	70	199	39	37			
1963-64	18	9	8	31	9	8	251	90	83	201	43	40			
1964-65	17	10	10	28	8	8	258	100	91	198	46	44			
1965-66	17	10	10	26	9	8	258	109	100	200	51	49			
1966-67	23	4	3	28	9	8	428	148	135	222	43	40			
1967-68	23	4	4	28	11	10	428	149	136	222	46	43			
1968-69	24	4	4	28	12	11	408	140	128	241	47	43			
1969-70	21	4	4	25	12	11	415	147	134	240	47	43			
1970-71	24	5	5	26	12	11	416	162	147	235	47	43			
1971-72	36	6	5	33	15	15	633	231	209	299	57	52			
1972-73	34	5	5	25	11	7	644	255	231	298	70	63			
1973-74	33	7	6	21	17	12	649	265	240	298	78	71			
1974-75	31	9	8	20	18	15	651	277	251	299	78	70			
1975-76	34	11	10	22	24	20	641	260	234	304	85	76			
1976-77	36	11	11	23	26	22	642	254	229	310	78	67			
1977-78	36	15	14	23	27	21	642	279	253	310	86	75			

ANNEXURE — II
GROSS AND NET VALUE ADDED BY SELECTED NON-FINANCIAL NON-GOVERNMENT MEDIUM AND LARGE
PUBLIC LIMITED COMPANIES — SELECTED INDUSTRIES, 1960-61 TO 1977-78

Year	Sugar		Cotton textiles			Iron & steel			Motor vehicles			Elec. mach. appts. appliances etc.			Basic industrial chemicals		
	No. of Cos.		No. of Cos.			No. of Cos.			No. of Cos.			No. of Cos.			No. of Cos.		
	G.V. A.	N.V. A.	G.V. A.	N.V. A.	N.V. A.	G.V. A.	N.V. A.	N.V. A.	G.V. A.	N.V. A.	N.V. A.	G.V. A.	N.V. A.	N.V. A.	G.V. A.	N.V. A.	N.V. A.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1960-61	75	31	27	211	188	171	2	63	46	—	—	21	13	12	13	8	7
1961-62	80	32	28	257	242	219	2	66	49	—	—	45	24	22	35	21	18
1962-63	79	30	26	262	231	207	2	69	54	3	3	45	30	27	35	24	20
1963-64	81	35	30	260	250	218	2	77	64	—	—	45	38	35	36	29	23
1964-65	81	39	33	260	288	252	2	80	65	—	—	45	45	42	35	35	27
1965-66	82	43	37	256	280	245	2	80	65	75	65	47	55	50	36	42	32
1966-67	81	37	32	275	278	248	2	71	55	23	71	74	69	62	56	55	43
1967-68	81	32	27	276	295	263	2	72	55	24	77	76	74	65	57	55	43
1968-69	82	51	46	271	300	267	2	78	61	24	82	77	75	66	61	64	46
1969-70	81	52	46	265	338	301	2	81	63	25	82	79	93	83	61	80	63
1970-71	77	48	40	261	359	322	2	87	66	25	103	78	116	105	62	98	76
1971-72	78	66	57	272	367	328	2	93	71	31	121	102	167	152	79	173	131
1972-73	73	79	70	270	450	404	2	87	64	32	131	106	179	163	80	193	147
1973-74	70	65	57	271	595	545	2	105	83	34	151	126	191	174	82	218	169
1974-75	70	78	69	249	584	535	2	140	120	34	180	155	237	218	82	300	244
1975-76	66	77	68	249	536	486	2	131	110	34	203	176	253	234	82	327	267
1976-77	60	84	75	241	529	477	1	106	89	42	226	201	273	252	91	354	287
1977-78	60	77	68	241	629	516	1	106	88	42	254	224	295	274	91	392	322

(Rs. in crores)

ANNEXURE — II (Concl'd.)
GROSS AND NET VALUE ADDED BY SELECTED NON-FINANCIAL NON-GOVERNMENT MEDIUM AND LARGE
PUBLIC LIMITED COMPANIES — SELECTED INDUSTRIES, 1960-61 TO 1977-78

(Rs. in crores)

Year	Medicines & pharmaceutical preparations			Cement			Rubber and rubber products			Paper and paper products			Electricity generation & supply			Trading		
	No. of Cos.	G.V. A.	N.V. A.	No. of Cos.	G.V. A.	N.V. A.	No. of Cos.	G.V. A.	N.V. A.	No. of Cos.	G.V. A.	N.V. A.	No. of Cos.	G.V. A.	N.V. A.	No. of Cos.	G.V. A.	N.V. A.
1960-61	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
1961-62	13	20	16	12	20	16	5	7	6	18	15	12	30	12	10	42	17	17
1962-63	31	12	11	15	23	10	8	10	9	21	16	13	—	—	—	70	26	25
1963-64	33	16	15	15	27	22	9	27	22	21	18	15	32	14	11	72	28	27
1964-65	32	17	15	15	29	23	9	12	11	21	22	17	32	18	15	70	32	31
1965-66	32	20	18	15	31	25	8	15	13	20	24	18	29	19	16	73	36	34
1966-67	32	23	21	16	37	30	8	17	15	20	26	21	30	19	16	74	42	40
1967-68	33	37	34	16	45	38	12	22	19	29	31	24	33	20	16	80	42	40
1968-69	34	39	36	16	46	38	12	28	26	29	30	24	33	22	18	79	45	42
1969-70	35	60	44	16	42	34	12	34	31	29	35	27	33	23	19	79	48	46
1970-71	38	67	63	16	48	38	13	38	34	29	43	34	32	26	21	79	48	46
1971-72	39	70	65	16	55	44	13	39	35	30	57	46	32	28	23	81	57	55
1972-73	40	78	72	18	58	47	14	44	39	37	65	54	31	34	27	79	56	54
1973-74	42	86	79	18	51	40	15	49	43	36	67	54	31	35	28	84	61	59
1974-75	46	98	90	18	45	35	17	50	43	37	73	61	23	34	28	86	68	65
1975-76	50	110	103	18	53	42	20	70	62	36	125	111	20	39	34	88	91	88
1976-77	52	125	117	18	76	65	19	75	68	36	124	106	15	45	39	88	92	88
1977-78	52	129	121	18	80	67	19	71	61	42	103	79	10	49	43	90	86	82
	52	140	132	18	96	82	19	69	58	42	107	86	10	55	48	90	85	81

NOTES AND COMMENTS

Measurement of Efficiency in Banking Industry

V. B. Angadi

In common parlance, the concept of efficiency of a commercial bank is connected with such diverse aspects of its operations, as its financial soundness, its profitability or its customer service. The actual definition of the concept and the selection of appropriate indicators are beset with difficulties. Admittedly, operational efficiency in a service industry like banking has a wide connotation. This connotation is considerably enlarged where banks are required to assume responsibilities in serving social as well as economic objectives. There can, thus, be no single appropriate index of the operational efficiency of commercial banks. In their study, Divatia and Venkatachalam have identified as many as eighteen indicators of the operational efficiency of the banking industry in India*. It has also to be remembered that under changing conditions, the relevance of suitability of an indicator can alter basically in the course of time.

The purpose of this note is limited to examining one aspect of commercial banks' efficiency and the scope for its measurement. The relationship between the operating costs and output is chosen for this purpose. While it cannot be claimed that this relationship is the most important index of operational efficiency of banks, it is certainly one of the significant indicators which reveals operating cost responsiveness to output changes. In the present context of almost total administered interest rate, cost effectiveness would appear as a particularly apt measure of efficiency. However, in taking account of banks' involvement in socio-economic objectives such as lending to priority sectors, etc. the social benefits reaped have also to be taken into account. In similar exercises, some American economists have adopted somewhat elaborate technique. The method employed in this study is considerably simpler and may be used to measure variations in efficiency at different levels of output and is also applicable to branch-level operations.

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* V. V. Divatia and T. R. Venkatachalam — "Operational Efficiency and Profitability of Public Sector Banks", Reserve Bank Staff Occasional Papers Vol. 3 No. 1, June 1978.

The first step in measuring efficiency as per the chosen indicator is to define costs and output. The costs that correctly reflect the production of the multiple services provided by banks are the operating costs. The measurement of output is more complicated because of the variety of aspects in banking services. For the purpose of this study, the output of banks is taken as aggregate deposits and the total number of deposit accounts, total credit and the number of credit accounts and also the number of branches opened during the relevant period. The last factor is taken into account because it reflects the geographical or horizontal expansion of banks which influences their cost effectiveness in the same way as their functional or vertical expansion. This note is based on the data taken from the Reserve Bank publications — the Statistical Tables Relating to Banks in India and the Volume of Banking Statistics (Basic Statistical Returns) for the period 1974-1980.

The analysis attempted here assumes that all scheduled commercial banks are homogeneous. Although, the methodology can be extended to study cost responsiveness of bank group, individual banks and even individual branch, this is not taken up here for lack of published data. The qualitative differences in assets, number of accounts and amount (brought about by such factors as differences in the type of accounts, type of borrowers, etc.) and bank Offices (brought about by their location) are also ignored.

The basic proposition considered here is that the operational efficiency of banks is inversely related to the responsiveness of operating cost to the changes in output. In other words, if the percentage increase in operating costs is lower than the increase in output, the responsiveness of operating costs is less than one. In such a case, average costs would show a decelerating trend as output expands which would indicate cost effectiveness or efficiency. Conversely, when the responsiveness of operating costs is greater than the percentage increase in output, it indicates a rise in average cost as the size of output expands or a decline in efficiency.

The formula for measuring the degree of responsiveness of operating costs is as follows :

$$\text{Degree of Responsiveness of Operating Cost} = \frac{\text{Proportionate change in operating cost}}{\text{Proportionate change in output}}$$

$$\text{Symbolically } R = \frac{\frac{\Delta OC}{OC}}{\frac{\Delta P}{P}}$$

Where R is responsiveness

OC is operating cost

P is output

Statement 1 presents the responsiveness of operating costs to each of the selected output indicators for the years 1975-1980 for the system as a whole. This is graphically presented in figure 1. The graph shows that the responsiveness of operating cost to additions to output in respect of all chosen indicators was lowest at the 'J' level of output, corresponding to the year 1976. At this level, the responsiveness of operating cost to additional output was as low as 0.2. Beyond the 'J' level of output, responsiveness of operating costs rose progressively. At 'M' level of output (corresponding to the year 1979) an increase in output led to a more than proportionate increase in cost, in respect of all indicators of output with the exception of total assets in which case the ratio was 1 : 1. Thus, it may be seen that by the measure discussed here, the level of efficiency of Indian commercial banks has been declining since 1976, the deterioration being marked in 1979 and 1980.

Statement 2 presents the gross profit of commercial banks in relation to their total assets, total credit and aggregate deposits in each of the selected years. The range of cost responsiveness to the selected output indicators is also given. It may be seen that in 1976, when cost responsiveness was lowest, the ratio of profits was highest in respect of total assets, credit and deposits. Between 1974 and 1976, the ratio of profit to total assets of the banking system as a whole rose continuously from 0.82 per cent in 1974 to 0.87 per cent in 1975 and further to 0.92 per cent in 1976. Similarly, the ratio of profit to deposits went up from 1.06 per cent in 1974 to 1.38 per cent in 1976. The ratio of profit to total credit increased to 1.92 per cent in 1976 from 1.58 per cent in 1974. After 1976, along with the rise in cost responsiveness, there was also a decline in the profit ratio. The ratio of profit to the total assets declined to 0.70 per cent in 1979, from 0.86 per cent and 0.82 per cent, respectively, in 1977 and 1978. However, there was a

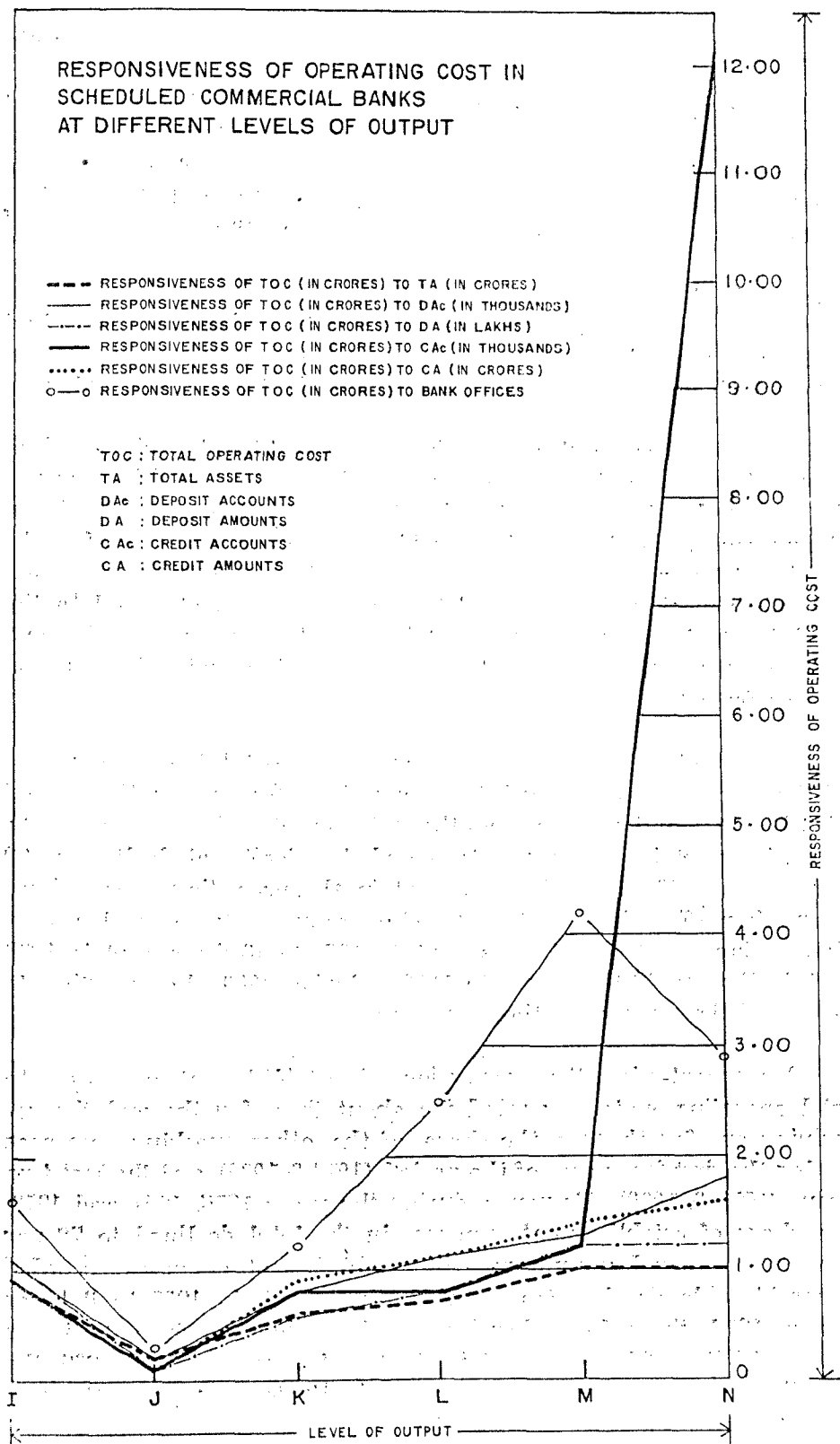


Figure 1

marginal improvement in profitability in 1980. Similarly, the ratio of profit to total credit showed a continuous decline from 1.72 per cent in 1977 to 1.69 per cent in 1978 and further to 1.49 per cent in 1979. In 1980, there was a marginal increase in the profitability. The ratio of profit to aggregate deposits also decelerated to 0.95 per cent in 1979 from 1.16 per cent in 1977 and 1.10 in 1978. But 1980 witnessed a slight improvement in the profitability.

While the above analysis establishes some relationship between cost responsiveness and profitability, it has to be borne in mind that there are a number of other factors, both endogenous and exogenous, which influence the profitability of banks to a greater extent.

It would be useful to examine the constituents of operating costs whose responsiveness to the changing output would appear to be one of the significant determinants of the efficiency of banks in the present context. Broadly speaking, the operating costs of banks consist of two main components, *viz.*, (1) establishment expenses and (2) other working expenses. The salaries, wages, etc. paid to the banks' staff constitute the establishment expenses and rent, stationery, printing, power, travelling and other miscellaneous expenses form the other working expenses.

Statement 3 gives the percentage share in total operating costs of the two components and their growth rates during the period 1974-80. It would be seen from the statement that the annual growth rate of the total operating costs recorded a significant decline to 4.0 per cent in 1976 from 20.8 per cent in the preceding year. However, after 1977, the growth rate of operating costs, showed a continuous increase from 14.0 per cent in 1977 to 18.6 per cent in 1978 and further to 22.0 per cent in 1979. During 1980 the growth rate remained the same as in the previous year.

Component-wise, the proportion of establishment expenses to total operating costs accounted for about three-fourths and the remaining one-fourth was the share of the other working expenses during the first two years of the period (1974 & 1975) and the last two years (1979 & 1980). However, during the years 1976, 1977 and 1978, the share of establishment expenses in the total declined to 72 per cent. The annual growth rate of establishment expenses recorded a considerable deceleration from 21.7 per cent in 1975 to 0.1 per cent in 1976, thereafter, there was a sharp increase from 14.4 per cent in 1977 to 25.1 per cent in 1979. However, during 1980 the growth rate at 21.2 per cent was marginally lower than in the preceding year.

In contrast, the annual growth rate of other working expenses showed a moderate decline to 15.8 per cent in 1976 and further to 12.8 per cent during 1977. In the subsequent year, the growth rate went up substantially to 20.2 per cent. But the growth rate of other working expenses at 13.9 per cent in 1979 was significantly lower than in the preceding year while the growth rate showed a sizeable increase to 24.5 per cent during 1980.

Broadly, the decelerating trend in the operating costs during the period 1974-76 and the rising trend during the period 1977-80 could partly be attributed to two main factors, viz., firstly, changes in "staff-mix", extent of utilisation of man-power and secondly the changes in the heterogeneous group, other working expenses. Between these two factors the changes in "staff-mix" would have had a greater impact on operating costs as the expenses on staff works out to nearly three-fourths of the total costs. Therefore, it is necessary to analyse the changes in "staff-mix" in some detail.

Statement 4 shows that the annual growth rate of clerical and officer staff together registered a substantial decline from 12.4 per cent in 1974 to 4.8 per cent in 1975, while, it showed a moderate rise by 4 percentage points to 8.8 per cent in 1976. However, during the following years, the growth rate of staff rose considerably to 13.5 per cent in 1977 and further to 15.3 per cent in 1978 as against a substantial decline to 5.0 per cent in 1979 and 3.3 per cent in 1980.

Category-wise, the annual growth rate of officer staff recorded a considerable decline from 14 per cent in 1974 to 7 per cent in 1975, while, the growth rate of clerical staff declined substantially during the corresponding years. In the case of officer staff, the growth rate went up substantially to 23.4 per cent in 1977 from 12.1 per cent in 1976, while in 1978 the growth rate accounted for 19.4 per cent. Contrarily, the growth rate of clerical staff showed a moderate increase during the corresponding years. Since 1979, the growth rate of both clerical and officer staff showed a deceleration.

Consequent to the variation in the growth rates of clerical and officer staff during the period 1974-80, the percentage share of these categories in the total had undergone change. The share of clerical staff in the total stabilised at about 74 per cent during the period 1974-76, while the share of officer staff at about 26 per cent. The share of clerical staff declined to about 71 per cent in 1977 and further to 70 per cent in 1978 at which it stabilised in the subsequent years.

Correspondingly, the proportion of officer staff to total rose to 29 per cent in 1977 and further to 30 per cent in 1978 at which it stabilised in the following years. In addition to the changes in "staff-mix" the spurt in other working expenses particularly in 1978 and 1980 might have, in part, contributed to upward trend in the operating costs.

From the above analysis, it is clear that since the efficiency measured in terms of responsiveness of operating cost influences profitability of the banking industry, it can be used as one of the criteria for policy decision pertaining to functional and geographical expansion of the business. Similarly, an individual bank can employ this technique to assess the efficiency of a branch and to maintain a certain level of profitability. For, in the context of administered prices/interest rates, the operating cost responsiveness or cost effectiveness to output would appear as an important yardstick of operational efficiency.

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Statement — 1: Responsiveness of Operating Cost in Scheduled Commercial Banks

Items	I* 1975	J* 1976	K* 1977	L* 1978	M* 1979	N* 1980
1. Total operating cost (in crores)	629	654	744	883	1078	1316
2. Total Assets (in crores)	19033	23698	29570	37206	45346	54728
3. Responsiveness of (1) to (2)	0.90	0.20	0.60	0.70	1.00	1.00
4. Deposit Accounts (in thousands)	58815	72692	85870	100014	116761	130928
5. Responsiveness of (1) to (4)	1.10	0.20	0.80	1.10	1.30	1.80
6. Deposit Amounts (in lakhs)	1371073	1759545	2136452	2649153	3122521	3677818
7. Responsiveness of (1) to (6)	1.10	0.10	0.60	0.80	1.20	1.20
8. Credit Accounts (in thousands)	7359082	10369706	12231258	14943076	17717729	18041363
9. Responsiveness of (1) to (8)	0.90	0.10	0.80	0.80	1.20	12.10
10. Credit Amounts (in crores)	10015	13132	15144	17744	20638	23430
11. Responsiveness of (1) to (10)	0.90	0.10	0.90	1.10	1.40	1.70
12. Bank Offices	20290	23036	25612	27514	28980	31188
13. Responsiveness of (1) to (12)	1.60	0.30	1.20	2.50	4.20	2.90

* Refers to levels of output.

Source: RBI, Statistical Tables Relating to Banks in India and Banking Statistics.

Statement — 2: Profitability of Scheduled Commercial Banks in India

Year	Responsiveness of operating cost to Total Assets	Responsiveness of operating cost to Deposits	Responsiveness of operating cost to credit	Profit per Rs. 100 of assets	Profit per Rs. 100 of deposits	Profit per Rs. 100 of credit
1974	—	—	—	0.82	1.06	1.58
1975	0.90	1.10	0.90	0.87	1.15	1.65
1976	0.20	0.10	0.10	0.92	1.38	1.92
1977	0.60	0.60	0.90	0.86	1.16	1.72
1978	0.70	0.80	1.10	0.82	1.10	1.69
1979	1.00	1.20	1.40	0.70	0.95	1.49
1980	1.00	1.20	1.70	0.72	0.98	1.55

Source: RBI Statistical Tables Relating to Banks in India and Banking Statistics.

Statement — 3 : Category-wise Distribution of Operating Costs of Scheduled Commercial Banks in India

Category	1974	1975	1976	1977	1978	1979	1980
(Rs. Lakhs)							
1. Establishment Expenses	388.63	473.01	473.67	541.87	639.35	799.85	969.52
(a) Percentage to total	(74.7)	(75.3)	(72.5)	(72.7)	(72.4)	(74.2)	(73.7)
(b) Absolute Variation over the year		+84.38	+66	+68.20	+97.48	+160.50	+169.67
(c) Percentage Variation		(+21.7)	(+0.1)	(+14.4)	(18.0)	(+25.1)	(+21.2)
2. Other Working Expenses	131.67	155.44	180.00	203.00	244.00	278.00	346.00
(a) Percentage to total	(25.3)	(24.7)	(27.5)	(27.3)	(27.6)	(25.8)	(26.3)
(b) Absolute Variation over the year		+23.77	+24.56	+23.00	+41.00	+34.00	+68.00
(c) Percentage Variation		(+18.1)	(+15.8)	(+12.8)	(+20.2)	(+13.9)	(+24.5)
TOTAL	520.30	628.45	653.67	744.87	883.35	1077.85	1315.52
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
(a) Absolute Variation over the year		+108.15	+25.22	+91.20	+138.48	+194.50	+237.67
(b) Percentage Variation		(+20.8)	(+4.0)	(+14.0)	(+18.6)	(+22.0)	(+22.1)

Source: RBI — Statistical Tables Relating to Banks in India.

Statement — 4 : Category-wise Distribution of Number of Employees of Scheduled Commercial Banks in India

Year	Clerical Staff	Officers	Total
1974	2,09,017	71,248	2,80,265
Percentage to total	(74.6)	(25.4)	(100.0)
Percentage variation over the year	(12.0)	(13.8)	(12.4)
1975	2,17,414	76,243	2,93,657
Percentage to total	(74.0)	(26.0)	(100.0)
Percentage variation over the year	(4.0)	(7.0)	(4.8)
1976	2,33,874	85,500	3,19,374
Percentage to total	(73.2)	(26.8)	(100.0)
Percentage variation over the year	(7.6)	(12.1)	(8.8)
1977	2,57,121	1,05,515	3,62,636
Percentage to total	(70.9)	(29.1)	(100.0)
Percentage variation over the year	(9.9)	(23.4)	(13.5)
1978	2,92,220	1,26,128	4,18,348
Percentage to total	(69.9)	(30.1)	(100.0)
Percentage variation over the year	(13.6)	(19.4)	(15.3)
1979*	3,05,440	1,33,475	4,38,915
Percentage to total	(69.6)	(30.4)	(100.0)
Percentage variation over the year	(4.6)	(5.9)	(5.0)
1980	3,15,485	1,38,028	4,53,513
Percentage to total	(69.6)	(30.4)	(100.0)
Percentage variation over the year	(3.3)	(3.4)	(3.3)

* These figures are not comparable as the source is different.

Source : RBI — Statistical Tables Relating to Banks in India.