Short-term Forecast of Corporate Investment since 1970's - Three Decades in Retrospect

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The short-term forecasting of corporate investment based on time phasing of corporate projects assisted by financial institutions was pioneered by Dr. C. Rangarajan in 1970 and annual studies on 'one-year ahead' forecast of corporate investment following his methodology have since appeared regularly in the past three decades. This paper attempts to present a retrospective view of, how these short-term forecasts of corporate investment have performed and also to what extent the objectives of the forecasting exercise have been fulfilled.

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Key words : Assisted Corporate Projects, Envisaged Fixed Capital Expenditure

Introduction

It is indeed well known that the short-term forecasting of corporate investment was pioneered by Dr. C. Rangarajan over three decades ago in 1970 when for the first time, an elegant yet an operationally simple model based on time-phasing of corporate projects assisted by financial institutions was introduced in the seminal article 'Forecasting Capital Expenditure in Corporate Sector' published in the December 19, 1970 issue of the Economic and Political Weekly. We know of no other such exercise of short-term investment forecasting, taken up annually since 1970s, save for a very few years.

In his classic book titled 'Short-term Investment Forecasting - An exploratory Study' (co-author, Dr. Samuel Paul: 1974), the

quintessence of the role of short-term forecasting of corporate investment was elaborated in the following words:

"… Investment results in the creation of new productive capacity, which can augment the supply of goods and services in future periods. It is this ability of investment to add to the stock of capital and thereby help to raise the standard of living that has given it a pivotal role in national economic planning. Since investment today can increase the potential capacity of the economy to raise the level of output in subsequent periods, forecasters study and watch investment trends carefully. The critical role of investment in developing countries where productive capacity is often a major constraint on growth cannot be overemphasised. …

… There are two reasons why the forecasting of industrial investment must be accorded high priority. In the first place, investment is the most unstable among the national income components. Investment is more subject to larger relative variations from one period to the next than consumption because of the postponability of capital expenditures, the volatility of factors affecting profit expectations, and the role of external financing. Since variations in investment can affect the levels of economic activity significantly, any fresh clues on the likely movement of this variable will be of considerable value to the forecaster. Secondly, we know precious little about non-governmental investment in the industrial sector in India. …"

In countries like Australia, Japan, the UK and the USA, forecasts of corporate investment intentions are based on well-organised surveys of investment intentions of companies and the likely investment is predicted on the basis of these intentions. Such surveys were attempted in India in the late 1980s and also the late 1990s but the response from companies as also the quality of data did not turn out to be adequate for attempting short-term forecast of corporate investment. As already mentioned, annual articles based on Dr. C Rangarajan's model have appeared in the 1970s and the late 1980s mostly in the issues of Economic and Political Weekly and since 1989, the studies were published by the Reserve Bank of India (RBI) in the

monthly issues of the RBI Bulletin. We now have a valuable annual time series on corporate investment forecasted following the above methodology covering almost the 30-year period, similar to the time series data on gross fixed capital formation of the private corporate sector available from the National Account Statistics. This paper undertakes a retrospective view of the short-term forecast of corporate investment over the last three decades with the twin objectives of examining, (i) as to how these short-term forecasts of corporate investment have performed over the period and (ii) to what extent the objectives of the forecasting exercise have been fulfilled. The paper is divided into five sections: Section I deals with the evolution of the methodology for forecasting corporate investment – its adequacies and inadequacies. Growth trends as emerging from the forecasted corporate investment were compared with similar trends obtained from other independent data sources and limitations inherent in such comparison are examined in Section II. In Section III, an attempt is made to gauge the extent to which corporates adhere to time-phasing of the projects assisted by the institutions at the time of sanction, by suitably juxtaposing these data with the data on expenditure on fixed capital *(ex-post)* as obtained from the annual accounts of these companies. Apart from the time-phasing of capital expenditure, annual studies on corporate investment have provided data on industry-wise, state-wise and purpose-wise flows of fixed capital investment and the salient features as depicted by these data are presented in brief in Section IV. A summary of observations is given in Section V.

Section I
Methodological Issues

In countries like the US, a standard approach for short-term forecasting of fixed capital investment has been to survey the investment intentions of companies and to predict the likely investment on the basis of these intentions. As already mentioned, such surveys were also attempted in India but did not yield good results. In the book titled "Short-Term Investment Forecasting – An Exploratory Study" (referred to earlier) Dr. C. Rangarajan dealt with various issues connected with the short-term forecasting of corporate

investment extensively, both the theoretical as well as practical aspects, from different angles. Attempts to forecast plant and equipment expenditure, construction expenditure, and experiments with financial data as predictive tools for forecasting private corporate investment as well as their outcome were lucidly explained. Approaches to forecasting based on data on sources of funds for corporate investment as also forecasting corporate investment with data of term-lending institutions were systematically explored. Utility of behavioural and non-behavioural forecasting schemes have been examined. Finally, what emerged was that data on investment intentions were found to be more useful in making short-term forecast of corporate investment. In regard to the efficacy of data relating to investment intentions in making short term forecasts, Arthur Okun *inter alia* observed that "… I know of no naive model and no causal explanation resting on predetermined causal variables which rivals the anticipations data in accuracy". In the context of predictive ability of non-behavioural investment functions, D.W. Jorgenson, J. Hunter and M. I. Nadiri have stated "… Not unexpectedly, the anticipatory data provide an explanation of actual investment expenditures that is superior to that provided by econometric models for all but a very few of the fifteen industries *(studied by them)*. The performance of these data provides a clear indication of the value of the anticipation surveys. No econometric model currently available can compete with the anticipated investment data in explanatory power". After all forecasting is inseparable part of human intellectual activity, be it based on intuition or logic. For serious forecasters, forecasting is a perennial evolving process and the forecasts generated by this process, over the time, provide feedback to it.

By way of recapitulation, we give here a brief description of Dr. C. Rangarajan's model as outlined in the 1970 article. The rationale for an alternative approach based on the time phasing of the assisted corporate projects stemmed from the nature of the financing of the projects in India. Almost all major projects in the corporate sector approach the term-lending institutions such as the Industrial Credit and Investment Corporation of India (ICICI), the Industrial Development Bank of India (IDBI), the Industrial Finance Corporation of India (IFCI) etc., for obtaining finance. The term

lending institutions, thus have with them the most complete data on the projects for which they have been approached for loans or for underwriting. These data include the total value of the projects and the capital expenditure to be incurred in the various years on the projects. From the point of view of forecasting investment in the corporate sector, the data relevant are those relating to the time phasing of capital expenditure on the projects. By aggregating this information, one should at the beginning of any year be able to indicate the investment that is likely to be made in the course of the year on all projects for which assistance has been provided by the term-lending institutions. This will include expenditures on projects sanctioned not only in the immediate past year but also those sanctioned in all the previous years and on which expenditures are to be incurred during the year.

However, in using this approach for forecasting investment, there are difficulties, some of which are procedural and some more fundamental. At the time of granting of the loans, project proposals are very carefully examined by the term-lending institutions. The cash flow statements and the phasing of capital expenditures are given special attention to. But once the loans are granted, the same care is not exercised in revising the total value of the projects or the phasing of the capital expenditures. While some efforts are made in this direction as part of the follow-up procedure, the revisions undertaken are not thorough. One cannot, therefore, place as much confidence on the capital expenditures to be incurred during a given year on a project for which the loan had been sanctioned some years ago as the one for which sanction had been given only in the previous year. Most big projects approach more than one term-lending institutions to obtain assistance. Therefore, to avoid double counting the projects which receive assistance from more than one institution should be included only once.

From the point of view of forecasting, there are two fundamental difficulties. For the year for which forecast is made one can by collecting the information available with the various long-term institutions indicate expenditures likely to be incurred on projects for which loans or other assistance had been sanctioned in that and in the previous years. But the capital expenditures to be incurred in

the forecast year will also include projects for which assistance might be provided in that year itself. To some extent this can be anticipated by looking at the pending applications as at the beginning of the year. Thus in forecasting investments in the corporate sector for any year, there is a segment that is to be guessed and for which internal data available with the long-term institutions will not be of help. It is this segment, which depends upon the investment "climate" prevalent in that year and which in turn becomes difficult to forecast.

The second difficulty encountered is to relate the changes in capital expenditures on project, which go through the long-term institutions with the changes in total investments made by the corporate sector. Since these institutions are making an effort to expand their activities an increase in capital expenditures on projects sanctioned by them may reflect more their enlarged activities than a real rise in investment in the corporate sector. Since the capabilities of the institutions to provide finance may not change considerably from year to year, a rise or fall in the value of the projects going through these institutions may still provide an index of the change in investment in the corporate sector taken as a whole.

In the absence of any general formula by which one can modify the original phasing of capital expenditures, one has to be content with incorporating changes in the original phasing of capital expenditures as and when new information is made available to the financial institutions and using judgement so as to take into account the existence of major operating factors such as availability of necessary inputs, the performance of the infrastructure sector.

A question that often crops up is about the representative character of the short-term forecast of corporate investment following the above model. It may be mentioned that, in the studies for the last two years, attempts have been made to cover the projects directly financed by the major public sector banks. Though banks have been participating in consortium finance with financial institutions in funding corporate projects, direct project lending is a recent development, and on a limited scale. With the coverage of projects financed by the major public sector banks, one can say that the

representative character of the studies will be better. Essentially phased capital expenditure represents the ex-ante corporate investment and the success of the forecasts depends to the large extent on the adherence by corporates to the time-phasing of investment as envisaged by them at the time of seeking the financial assistance. In broader terms the main objective of the short-term forecast of corporate investment is not so much to estimate the quantum of corporate investment for corporate sector as a whole, but the endeavour is directed more towards obtaining an idea about the dimension and direction of growth of corporate investment a year ahead. To what extent this objective has been achieved is examined in the following section.

Section II
Trends in the Growth of Corporate Investment

A question which often lurks in the minds of the observers of the trends in the fixed capital investment of the corporate sector, is: How well the growth trends based on the envisaged fixed capital expenditure of the assisted corporate projects, serve as a proxy to investment trends of the overall private corporate sector? In search of an answer to this question, we make here an attempt to compare the growth trends based on series of capital expenditure of assisted corporate projects with the similar trends available from other independent data series viz., Gross Fixed Capital Formation (GFCF) of the private corporate sector of the National Accounts Statistics (NAS), Annual Survey of Industries (ASI) and the Annual company finance studies of the RBI, and explore if this approach would provide some useful insight on this aspect.

In the annual studies on the 'One year ahead' forecast of corporate investment of the private corporate sector, the growth in capital expenditure in the year of forecast is worked out as percentage change of the forecasted capital expenditure in the year of forecast over the envisaged fixed capital expenditure of assisted projects in the preceding year. Envisaged fixed capital expenditure on any project in a given year, for this paper is taken to be same as the annual fixed

capital expenditure planned to be incurred over time span of implementation of the project, as spelt out at the time of seeking assistance from the financial institutions.

In order to obtain an idea about the performance of forecast series, over the years the growth rates of the forecast of fixed capital expenditure (Col. 3, Table 1) of the assisted projects and that of the envisaged capital expenditure (Col. 5) were compared. From the growth trends of these two series depicted in Chart 1, it is clearly discernible that the forecast series captured the direction of growth of envisaged capital expenditure, well in the last three decades.

Chart 1
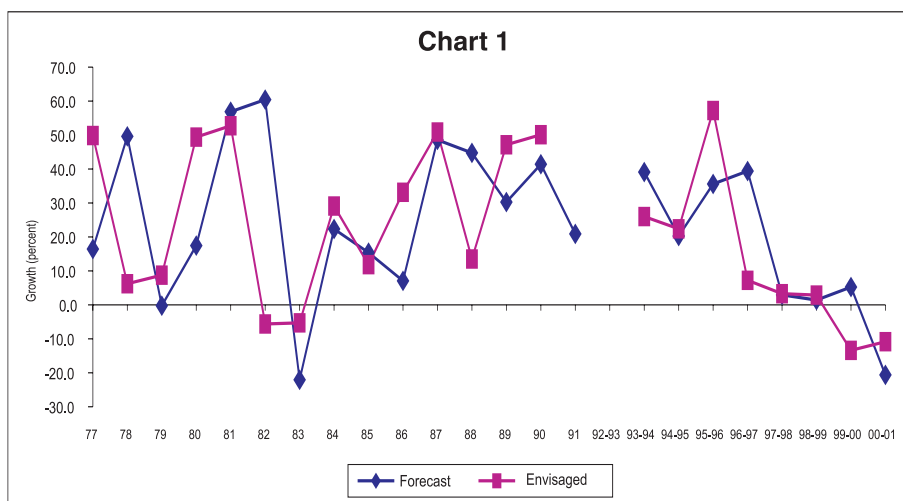
The annual studies of short term forecast of investment generated data on the envisaged fixed capital expenditure of assisted projects and an insight into these data, sheds some light on the fixed capital investment facet of the private corporate sector.

During the collection of data on the time phasing of investment of assisted projects for the annual studies, we do come across, occasionally, some companies reporting changes in the phasing of the projects assisted in the previous years. In such cases, the database is suitably modified, and the data on the phasing of investment gets updated over the years. In other words, investment figures of assisted projects get firmed up based on such information over the years. The

Table 1: Growth Trends in Forecast and Envisaged Fixed Capital Expenditure of the assisted corporate projects

Year of Forecast	Forecast		Envisaged @	
	Amount (Rs crore)	Growth (Per cent)	Amount (Rs crore)	Growth (Per cent)
(1)	(2)	(3)	(4)	(5)
1977	680	16.4	955	49.9
1978	1,018 *	49.6	1,015	6.2
1979	1,015	-0.2	1,104	8.7
1980	1,192	17.4	1,649	49.4
1981	1,870	56.9	2,519	52.8
1982	3,000	60.4	2,377	-5.6
1983	2,338 *	-22.1	2,251	-5.3
1984	2,860 *	22.3	2,906	29.1
1985	3,300	15.4	3,250	11.8
1986	3,533	7.1	4,328	33.2
1987	5,250 *	48.6	6,531	50.9
1988	7,600 *	44.8	7,413	13.5
1989	9,900	30.3	10,907	47.1
1990	14,000	41.4	16,372	50.1
1991	16,927	20.9	—	#
1992-93	22,443	#	25,794	#
1993-94	31,220	39.1	32,500	26.0
1994-95	37,551	20.3	39,778	22.4
1995-96	50,923	35.6	62,543	57.2
1996-97	70,993	39.4	67,067	7.2
1997-98	73,075	2.9	69,277	3.3
1998-99	74,105	1.4	71,270	2.9
1999-00	77,990 *	5.2	61,728	-13.4
2000-01	61,901	-20.6	55,032	-10.8

Note: @ Envisaged fixed capital expenditure in the year preceding the year of forecast.

  * The mid-value of the range.

  # Growth rates are not worked out due to the change in the reference period from calendar year to financial year.

series so revised (herein after referred to as 'Revised Series) is presented in col. 2 of Table 2 and the growth rates worked out using this series are presented in col. 3.

With a view to obtaining an idea of the relationship, if any, between series of envisaged fixed capital expenditure and the series of Gross Fixed Capital Formation (GFCF) from National Accounts Statistics (NAS), an attempt is made to trace the movement of these series, over the last three decades. It can be seen that both the series (Chart - 2) moved together showing a rising trend over the period.
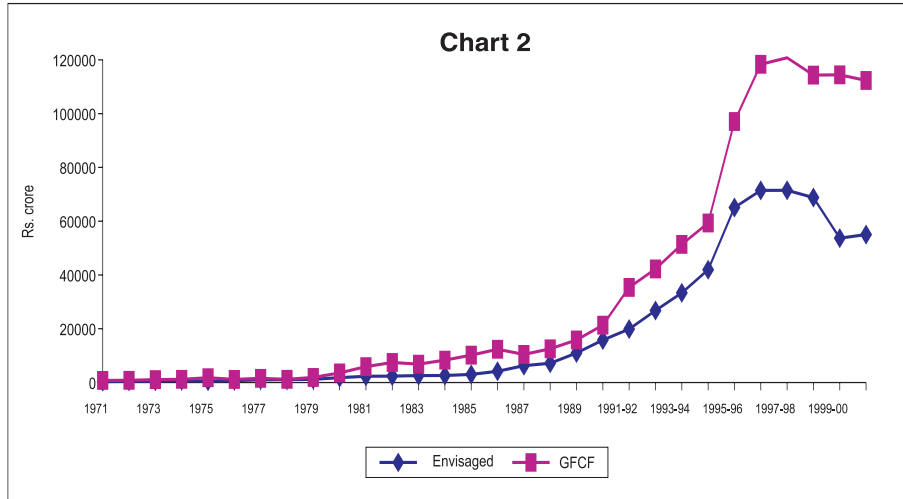
**Table 2: Envisaged Fixed Capital Expenditure (Revised) of
assisted corporate projects and Gross Fixed Capital Formation of
the Private Corporate Sector**

Fore-cast Year	Envisaged Fixed Capital expenditure-Revised@		GFCF of the Private Corporate Sector (at current prices)#		Ratio of envisaged fixed capital expenditure to GFCF (Per cent)
	Amount (Rs crore)	Growth rate (per cent)	Amount (Rs crore)	Growth rate (per cent)	
(1)	(2)	(3)	(4)	(5)	(6)
1971	319	-6.2	799	25.8	39.9
1972	463	45.1	843	5.5	54.9
1973	531	14.7	1,084	28.6	49.0
1974	681	28.2	1,185	9.3	57.5
1975	530	-22.2	1,793	51.3	29.6
1976	706	33.2	1,148	-36.0	61.5
1977	1,025	45.2	1,569	36.7	65.3
1978	1,068	4.2	1,182	-24.7	90.4
1979	1,207	13	1,904	61.1	63.4
1980	1,830	51.6	3,598	89.0	50.9
1981	2,337	27.7	5,896	63.9	39.6
1982	2,393	2.4	7,479	26.8	32.0
1983	2,572	7.5	6,836	-8.6	37.6
1984	2,637	2.5	8,318	21.7	31.7
1985	3,015	14.3	10,194	22.6	29.6
1986	4,176	38.5	12,383	21.5	33.7
1987	6,272	50.2	10,461	-15.5	60.0
1988	7,174	14.4	12,534	19.8	57.2
1989	10,981	53.1	15,834	26.3	69.4
1990	15,813	44.0	21,322	34.7	74.2
1991-92	19,884	*	35,391	66.0	56.2
1992-93	26,777	34.7	42,251	19.4	63.4
1993-94	33,362	24.6	51,388	21.6	64.9
1994-95	41,948	25.7	59,332	15.5	70.7
1995-96	65,074	55.1	97,062	63.6	67.0
1996-97	71,446	9.8	118,330	21.9	60.4
1997-98	71,479	0.0	120,752	2.0	59.2
1998-99	68,780	-3.8	114,336	-5.3	60.2
1999-00	53,709	-21.9	114,437	0.1	46.9
2000-01	55,032	2.5	112,326	-1.8	49.0

Note: #   Source: National Account Statistics,CSO

      *   Growth rate is not worked out due to the change in reference year from calendar year to financial year

      @   Envisaged fixed capital expenditure for years 1970 to 1990 was on the calender year basis.

Chart 2

Prima facie, these two series are closely related. To test the relationship between these two series, GFCF of the private corporate sector is postulated to depend on the envisaged fixed capital expenditure of the assisted projects (ENVCAP) and adopting the regression approach, the following log-linear relationship is estimated.

ln GFCF =   1.1106 +   0.9468 ln ENVCAP

t- Statistic   4.3128   32.2655

Adj R^2 0.9729 F = 1041.06 DW= 0.9057
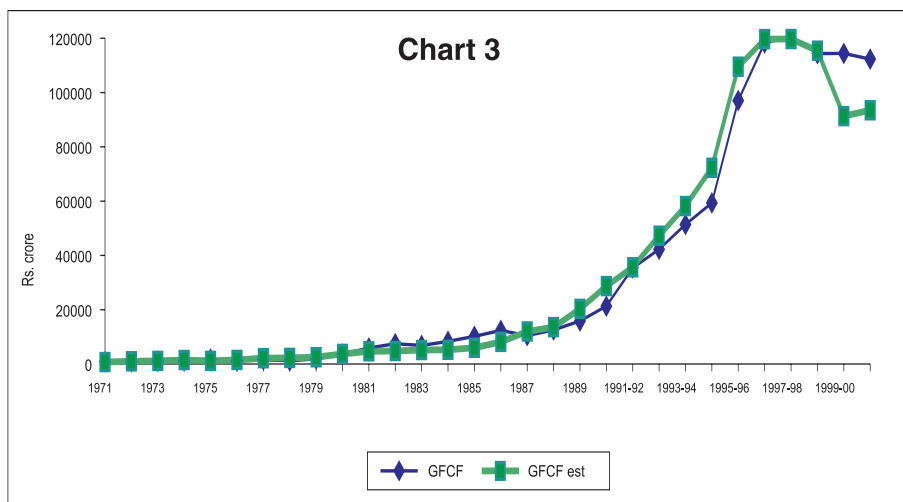
Chart 3

The regression coefficient of log ENVCAP estimated at 0.9468 is found to be statistically significant at 5 per cent level of significance. The plot of observed and estimated values of GFCF from this equation (Chart - 3) showed a close relationship between the two series.

The Durbin-Watson (DW) value of this regression worked out to 0.9057. However, the Co-integrated Regression Durbin-Watson (CRDW) test showed it was significantly different from zero confirming that there is a long-run relationship between these two variables. The elasticity of the GFCF with respect to envisaged fixed capital expenditure worked out to 0.9468 implying that a change of, say, 10 per cent in envisaged fixed capital expenditure would result in the corresponding change of 9.5 per cent in the GFCF of the private corporate sector. The above relationship should not, however, be interpreted as the rationale for method of forecasting of corporate investment based on the ex-ante corporate investment of assisted corporate projects; the argument, in fact, confirms the existence of long-run relationship.

Further, an attempt is made to compare the rate of growth of Envisaged fixed capital expenditure (Revised Series) with that of Gross Fixed Capital Formation (GFCF) of the private corporate sector (col. 4), from the National Accounts Statistics (NAS), to examine whether the growth trends based on the envisaged fixed capital expenditure of the assisted corporate projects would serve as a proxy to investment trends of the overall private corporate sector.

Growth trends of corporate investment, based on (i) Revised series and (ii) GFCF of the NAS when juxtaposed (Chart 4), indicate that growth trends based on the revised series could capture the direction of growth rates fairly well, more so in the 1980s and 1990s, however, for a few years (1983, 1987, 1999-2000 and 2000-01) these two series moved in opposite direction$^{\psi}$.

ψ While the causal economic factors for the observed counter movements in rates of growth of envisaged fixed capital expenditure and that of GFCF, in the years 1983 and 1987 are not easily identifiable, the substantial fall in the envisaged capital expenditure observed in 1999-2000 is mostly attributable to the cancellation of assistance to some major power projects by the financial institutions in 2000-01, resulting in the downward revision of envisaged capital expenditure in the previous years. In fact, companies implementing such projects, which are not operational, are not included in the regular RBI studies on the finances of companies.

Chart 4
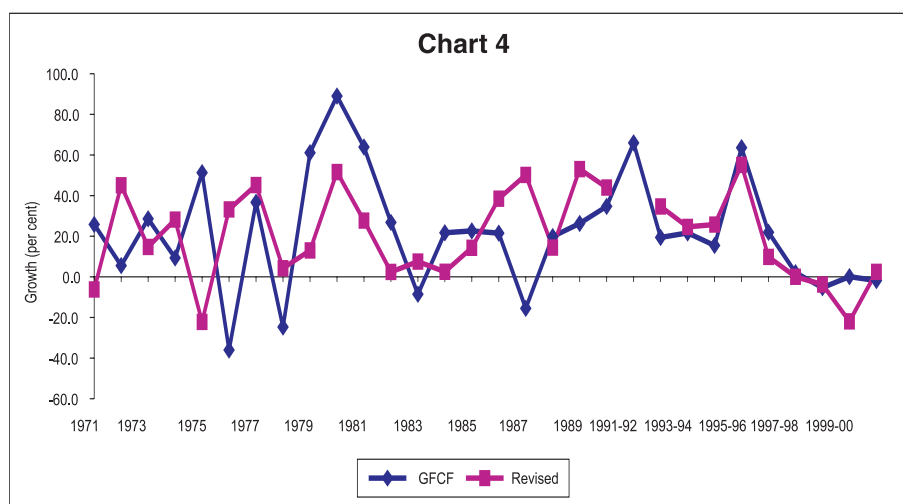
The differentials in the growth rates between the Envisaged fixed capital expenditure series (Revised series) and the series of GFCF of the private corporate sector would need to be viewed with some circumspection keeping in view the differences in the coverage, method of estimation, etc of these two data series. Some of the important limitations are:

(I)   It may be mentioned that the data on corporate investment available from other sources also have their own merits and limitations. The estimation of gross fixed capital formation of private corporate sector (NAS) has the two basic steps: (1) the gross fixed assets formation of selected companies, after adjusting for revaluation, is worked out separately for non-Government non-financial, (i) public and (ii) private limited companies and (iii) non-Government financial companies; and (2) The GFCF of all the non-Government companies is obtained using blow-up factor (which is the reciprocal of the coverage of selected companies in terms of population paid-up capital) for public and private limited companies and financial companies separately. Implicit in this method is the assumption that the relationship between individual items of a company's balance sheet and the paid-up capital is linear. To this estimate, the GFCF of co-operative enterprises is added by the Central Statistical Organisation to arrive at the gross fixed capital formation of the private corporate sector. The estimate of GFCF of private corporate sector is accordingly dependent on the twin components (i) the

capital formation of the selected companies, and (ii) the blow-up factor which in turn depends on the growth of population paid-up capital relative to the growth of paid-up capital of selected companies. From the coverage of companies selected in the published studies, it is observed that the growth of population paid-up capital considerably exceeded that of the selected companies which implies a rising trend in the blow-up factors. A broad dimensional comparison of the rates of growth of the GFCF (NAS) with that of the selected companies covered in the regular studies, indicated that the growth of the GFCF showed a tendency to over-state the growth and under-state the decline for the private corporate sector. Therefore, when we scrutinize the differentials in the rates of growth of these two series, it is necessary to keep in the background all these factors, particularly the role of blow-up factor in the estimation of GFCF.

It is also observed that the ratio of envisaged capital expenditure to the GFCF (Col. 5) over the 30-year period was fairly high for most of the years. The ratio averaged to 56.2 per cent in 1970s and 46.5 per cent in 1980s. However, during the 1990s the ratio had a relatively higher mean of 59.8 per cent.

(II) Another point to be noted is that in the 70s and the 80s, month of closure of annual accounts of companies was spread over the year and the companies with month of closure of account other than March and December were quite substantial in number. According to provisions of the Income Tax Act introduced by the Direct Tax Laws Amendments Act, 1987, a uniform accounting year has been introduced for all tax payers with effect from the financial year ended March 31, 1989* . Since the early 90s, many companies adopted the accounting year coinciding with the financial year (March as closing month), followed by the companies with the accounting year same as the calendar year (i.e. December closing). The point we wish to make here is that the GFCF for any year, say, prior to 1991-92, may not necessary imply that fixed capital expenditure was incurred in the period from April to March of that year.

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*   'Finances of Large Public Limited Companies, 1991-92' published in September 1994 issue of the RBI Bulletin

(III) Another important point to be kept in view is that the forecasts represent the ex-ante investment, while the NAS data essentially represent the ex-post investment. To the extent the realisation falls short of intentions, the forecasted series may slightly overstate the corporate investment.

Notwithstanding the limitations above, an overall co-movement of the growth trends between series of the envisaged fixed capital expenditure and the GFCF of the private corporate sector is visible over the last three decades.

The limitations of the methods of estimating GFCF for the private corporate sector (NAS), as also comments thereon are too well known to warrant recapitulation here. Keeping such limitations of the above data series in view, we have also made an attempt to build a data series on the growth trends of gross fixed capital (assets) formation of non-government, non-financial public limited companies (RBI annual studies on the finances of public limited companies) which claim a lion's share in the GFCF of the private corporate sector. The choice of this series is somewhat deliberate, as it obviates the use of paid-up capital linked blow-up factor. The growth trend based on the fixed capital investment of public limited companies *vis-à-vis* that of revised series of assisted corporate projects may be seen in Chart 5.

Chart 5
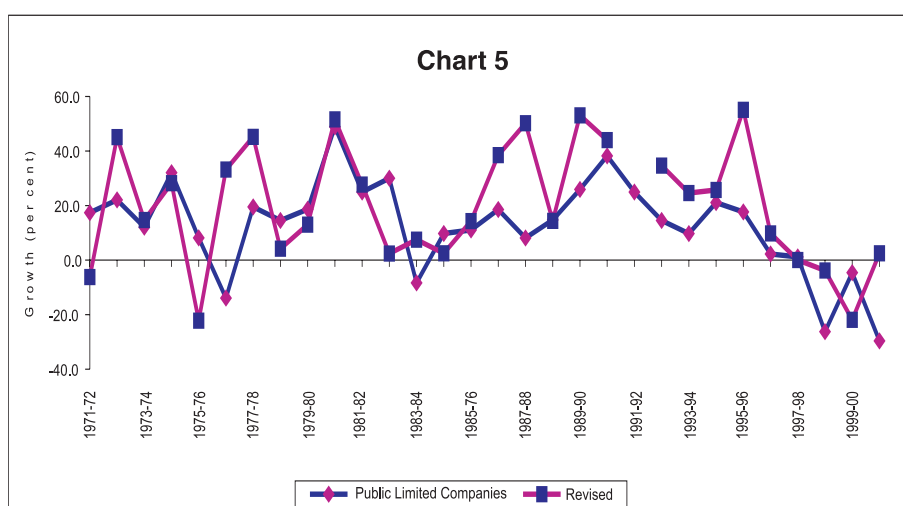
The growth trends of revised series of assisted projects are also found to be well aligned with those of the investment series of non-financial non-Government public limited companies. In regard to the data series of the growth of gross fixed capital formation of the public limited companies, it would be appropriate here to mention a few limitations. It may be noted that in respect of the data for the decade of the 70s, the first half related to 1,650 public limited companies and for later half to 1,720 public limited companies. However, in the 80's and the 90's the number of companies and the percentage of total paid-up capital covered in the annual studies on finances of public limited companies varied from study year to study year. As such, the growth trends of fixed capital investment are based on varying size of sample of selected companies. Gross fixed capital investment of public limited companies is derived as a difference between the stocks of gross fixed assets at the close of the accounting year adjusted for revaluation and the stock of gross fixed assets at beginning of the accounting year. It may also be mentioned that gross fixed assets formation of public limited companies presented in the Table 3 for the previous year (col. 3) and current year (col. 4) relate to same set of companies (col. 2).

The co-movement observed in the growth rates of fixed capital expenditure viz. (i) GFCF (ii) Revised envisaged fixed capital expenditure and (iii) Gross fixed assets formation of public limited companies is validated through a statistical test procedure based on the binomial distribution. It is observed that the growth rates of envisaged fixed capital expenditure are closer to that of public limited companies covered in the RBI studies as indicated by lower mean absolute differential of growth rates (mean of 16.7 percentage points and standard deviation of 13.3 percentage points) as compared with growth differentials between envisaged fixed capital expenditure and GFCF (mean 23.4 percentage points and standard deviation of 20.0 percentage points).

Some attempts are also made to compare the forecasted capital expenditure with similar estimates available from the Annual Survey of Industries, with a view to obtaining an idea of the share of gross fixed capital formation of the companies covered in the RBI studies

Table 3: Gross Fixed Capital Formation - Public Limited Companies and Assisted Corporate Projects

Year	Public limited companies				Growth of envisaged fixed capital investment (Revised) (per cent)
	No. of companies	Gross Fixed Assets Formation (Rs Crore)			
		Previous year	Current year	Per cent growth [col(4) over col(3)]	
(1)	(2)	(3)	(4)	(5)	(6)
1971-72	1650	325 $	381	17.4	-6.2
1972-73	1650	378	461	22.1	45.1
1973-74	1650	470	526	12.1	14.7
1974-75	1650	525	694	32.0	28.2
1975-76	1650	691	747	8.1	-22.2
1976-77	1720	732 $	630	-13.9	33.2
1977-78	1720	630	753	19.5	45.2
1978-79	1720	753	863	14.5	4.2
1979-80	1720	856	1016	18.7	13.0
1980-81	1720	1016	1512	48.9	51.6
1981-82	1651	1635 $	2043	25.0	27.7
1982-83	1651	2043	2657	30.0	2.4
1983-84	1838	2818 $	2583	-8.4	7.5
1984-85	1838	2583	2835	9.8	2.5
1985-86	1867	2947	3272	11.1	14.3
1986-87	1942	3278	3885	18.5	38.5
1987-88	1953	3916	4234	8.1	50.2
1988-89	1885	4297	4930	14.7	14.4
1989-90	1908	5140	6474	25.9	53.1
1990-91	2131	6465	8935	38.2	44.0
1991-92	1836	8690	10859	25.0	*
1992-93	1802	12362	14159	14.5	34.7
1993-94	1700	13923	15276	9.7	24.6
1994-95	1720	16327	19769	21.1	25.7
1995-96	1730	20389	23992	17.7	55.1
1996-97	1930	30666	31351	2.2	9.8
1997-98	1948	32427	32804	1.2	0.0
1998-99	1848	34906	25744	-26.2	-3.8
1999-00	1914	24455	23328	-4.6	-21.9
2000-01	1927	21190	14912	-29.6	2.5

$ Estimated due to break in the data series

Source: Annual Studies on Finances of Medium and Large Public and Public Limited Companies

* Growth rate is not worked out due to the change in reference year from calendar year to financial year

in that of the factory sector*. The 'Summary Results' of the ASI for the factory sector present data on some selected characteristics such as fixed assets, depreciation, etc., by type of ownership. The GFCF of the private corporate sector for the years 1991-92 to 1997-98 is derived based on the data relating to the public and private limited companies for the respective years. When compared with the estimates of GFCF of the private corporate sector (NAS), the estimates of the ASI are much lower in magnitude and the rates of growth showed considerable divergence. Population estimates of Gross Fixed Capital Formation (GFCF) based on ASI data and the aggregate corporate investment data from the studies based on the phasing details of corporate projects showed considerable divergence, even after accounting for the differences in coverage, concepts of these databases.

Firstly, GFCF for the entire factory sector in 1997–98 (as estimated from the ASI) amounted to only Rs.71,772 crore, which was of the same order as that of the RBI's investment estimates for private corporate sector during the same year at Rs.71,479 crore (Table 4). The earlier years also show similar high coverage, with the RBI estimate in 1993–94 being well above the GFCF estimate for the factory sector in the same year (122.6 per cent).

The differences in comparisons become even more glaring when the GFCF estimates for the private corporate sector are considered. In particular, RBI's investment estimates for private corporate sector at Rs.71,479 crore in 1997–98 was about twice (186.2 per cent) of ASI's corresponding figures for the private corporate sector derived at Rs.38,385 crore, which is, *prima facie*, not possible. Similar undercoverage of the ASI is also apparent in data for earlier years.

It is also true that one factor contributing to the divergence in estimates could be that the fixed capital expenditure made by companies, apart from that in the operating factories, *i.e.*, in factories

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*   "Data Base on Gross Fixed Capital Formation of the Indian Private Corporate Sector - Some Issues": R. Satyanarayana and Arnab Bhattacharjee, paper presented at the Biennial Conference of the Indian Association for Research in National Income and Wealth, at Pondicherry, in Sept. 2000.

Table 4: Estimates of Capital Formation - ASI and RBI Corporate Investment Data

(Rs. Crore)

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
ASI estimates								
1. Gross Fixed Capital Formation	24293	30610	36041	27223	59522	69120	79937	71772
(All factories)		(26.0)	(17.7)	(-24.5)	(118.6)	(16.1)	(15.6)	(-10.2)
2. Gross Fixed Capital Formation	—-	21179	30203	16961	49334	65426	64413	38385
(Private Corporate Sector)			(42.6)	(-43.8)	(190.9)	(32.6)	(-1.5)	(-40.4)
CSO Estimate								
3. Gross Fixed Capital Formation	21322	35391	42251	51388	59332	97062	118149	122705
of the Private corporate sector		(66.0)	(19.4)	(21.6)	(15.5)	(63.6)	(21.7)	(3.9)
(NAS,CSO)								
RBI studies on Corporate Investment Forecast								
4. Investment	19079	19884	26777	33362	41948	65074	71446	71479
(Private Corporate Sector)		(4.2)	(34.7)	(24.6)	(25.7)	(55.1)	(9.8)	(0.0)
5. Share of RBI estimates								
a) 4 as % of 1	78.5	65.0	74.3	122.6	70.5	94.1	89.4	99.6
b) 4 as % of 2	—-	93.9	88.7	196.7	85.0	99.5	110.9	186.2

Figures in brackets indicate growth rates

under construction, does not get reflected in the ASI data. In particular, capital expenditure incurred by existing companies in new factories is not covered in the ASI, as also a portion of fixed investment in land and buildings, administrative premises, staff quarters, townships etc. It may also be noted that while for the ASI an operating factory is the primary unit for selection, for the RBI studies on short-term corporate investment forecast the assisted project is the basic unit. Other factors, which may also have to be considered in this respect are, differential treatment for revaluation of fixed assets, and capital work–in-progress.

Further, the RBI data on company finances may perhaps be considered a more reliable indicator among the two, being, as it were, based on audited (and, by implication more reliable) annual accounts, as compared to the data collected in the ASI at the factory level. However, as already mentioned, the selection of companies for RBI studies on company finances is, to some extent, purposive, and aimed at covering a larger segment of corporate operations. Perforce, the global estimates of GFCF in the private corporate sector are worked out using blow-up factors based on the data on paid-up capital of companies in the DCA list. But, foremost of all reasons for the high

level of incompatibility between estimates from these two sources could be the more fundamental differences between the population frame of companies and factories. When we view the corporate investment as emerging from the RBI studies based on time-phasing of corporate projects assisted by the institutional agencies and those available from the regular company finances studies of RBI with similar estimates of ASI, the ASI estimates turned out to be lower consistently during the years 1990-91 to 1997-98 and more importantly growth trends as emerging from the two data series were out of alignment.

As mentioned in the preceding discussion, the divergence observed among the different series on growth trends of corporate investment are, *inter-alia,* attributable to the definitional, conceptual and coverage factors. In the strict sense, we do not have independent data series of growth trends of corporate sector, which can be compared with the investment forecast series of assisted corporate projects. A point which needs to be highlighted here is that the chief merit of corporate investment forecast series of assisted projects, is that this series covers the investment of under-construction projects better than the series of the NAS or RBI's studies on the finances of public and private limited companies. On the balance, the growth trends emerging from the data series on investment of assisted projects indicate the direction of corporate investment, a year ahead - a lead indicator - fairly well and more importantly these data are available with the minimal timelag.

In this context, it is necessary to recall the important recommendations made by the National Statistical Commission (NSC) in regard to the data of the corporate sector. The NSC observed that the RBI studies on Company Finances are based on the annual reports and balance sheets of certain sample companies. In the absence of a reliable population frame, the RBI is not in a position to apply suitable sampling techniques. Further, the RBI is also constrained by the poor response from companies and non-receipt of annual reports directly from the ROCs. The RBI's findings are, thus, based mainly on the data of responding companies and the Fact Sheets prepared by the DCA. The reliability of the estimates of savings and investment

in the private corporate sector arrived at by blowing up the sample results available from the RBI's studies in proportion of the coverage of the paid-up capital (PUC) of the sample companies to the PUC to all companies has been questioned time and again. Major recommendations that need to be mentioned in this context are:

- A one-time census of all registered companies to create a frame by eliminating closed down and defunct companies should be conducted. This will also facilitate the estimation of population parameters.

- The Registrars of Companies (ROCs), vested with the responsibility of allotting the Corporate Index Number (CIN), should monitor the submission of Annual Reports rigorously for a proper implementation of the Act and for purposes of annual updation of the frame as well as improvement of the database.

- In the long run, this process of assigning CINs along with updation in respect of closed down and defunct companies would result in a complete frame. It should be made compulsory through the provisions of the Companies Act to mention the unique code (CIN) in all returns submitted by the companies.

- Since some attributes, like listing status, ownership, industrial activity and State of registration are likely to change over a period of time, the CIN should take into account the likely changes in these attributes with the passage of time, to maintain the continuity in information at the individual company level.

- At present, the DCA or ROCs are not processing the information contained in the Annual Reports and Balance Sheets. They should be entrusted with the responsibility of processing and dissemination of information in respect of a set of variables for monitoring and policy formulation. To accomplish these tasks, suitable strengthening of the statistical personnel should be provided.

- The DCA should also ensure that annual reports of companies required by RBI whether listed, deemed or private limited are available to RBI so that further detailed analysis can be conducted. A mechanism for smooth supply of annual reports of

all companies, both public limited and private limited, and both listed and non-listed, should be mutually agreed upon by the DCA and RBI.

In regard to the Annual Survey of Industries, the Commission had observed that a large number of units, which are qualified for inclusion in the Chief Inspector of Factories (CIF) list, have not been included and at the same time many defunct units have not been removed. The data generated by the ASI system based upon this deficient ASI frame do not, therefore, depict the true situation of organised industrial sector. Urgent steps should be taken for making the ASI frame more comprehensive by including in it all units that are eligible for registration with the CIF, followed by an appropriate updating mechanism. With the objective of generating reliable benchmark estimates at the disaggregated level, of providing an efficient weighting diagram for revision of the base year of Index of Industrial Production and also of updating the ASI frame, the commission has recommended a one-time census of units eligible for registration. The estimates of different variables of industrial statistics derived by the ASI are often associated with large sampling and non-sampling errors. To enhance the credibility and utility of these estimates, sampling errors need to be published along with the estimates of important survey characteristics. Further, a periodic review of the sampling design and of the sample size in the ASI must be undertaken with the objective to improve the precision of the estimates at the industry-group levels.

It is, therefore, necessary that the above far-reaching recommendations of the NSC are implemented with all earnestness. With the changes becoming reality the methods of short-term forecasting of corporate investment can further be refined with a view to improving their reliability further.

We would, however, like to stress that the reference to the limitations of independent data series of the NAS, ASI on the fixed capital investment of the private corporate sector, is incidental to the comparison of growth rates of corporate investment derived from these data series, attempted in this paper and does not intend to be

critique on their relative merits/demerits. These independent data series indeed shed valuable light on the several facets of the corporate activities over the years.

Section III

Corporate Investment - Intentions versus Actual

The projections made on the basis of time phasing of corporate investment will be reliable to the extent corporates adhere to investment plan envisaged at the time of sanction of projects by the institutional agencies. The relevant question, which often crops up in this context is, to what extent corporates realise their investment intentions. In search of an answer to the question, we have made an attempt to juxtapose the data of the phasing of capital expenditure of assisted projects of companies with the data on gross fixed capital formation as derived from their annual accounts, with a view to arrive at some measure of realisation of the intention of fixed capital investment. In this exploratory but indicative exercise, the focus was on corporates, which had undertaken projects each with an aggregate cost of Rs. 25 crores and above in years upto 1998-99. For the year 1998-99, 70 such companies planned to invest about Rs.24,600 crore and annual accounts of these companies showed the gross fixed assets formation (change in the gross fixed assets during 1998-99) was of the order Rs.18,800 crore and the realisation ratio (ratio of gross fixed capital formation to planned investment) worked out to 76.3 per cent. In the preceding year, 1997-98, 68 companies planned to invest about Rs. 26,700 crore and annual accounts of these companies showed the gross fixed capital formation of about Rs. 24,300 crore with the realisation ratio working out to 91.1 per cent. A limitation to be noted is that the gross fixed capital formation of the companies as derived from the annual accounts of companies may include capital expenditure other than that envisaged for the assisted projects and to that extent realisation ratio may have some upward bias. These data indicated that at the aggregate level, the planned fixed capital investment is fairly in alignment with the actual investment. At least it would indicate that realisation may not be very low, as one might fear. It may, however, be stressed that further detailed work needs to be taken up in this area, before we arrive at a more definite conclusion.

Section IV
Flow of Corporate Investment

The annual studies on short-term forecast of corporate investments also provide valuable information on fixed capital investment according to industry, state and purpose of projects. Cost of assisted corporate projects, in the year of sanction, is classified according to these characteristics and a snapshot view of major features emerging through these data is presented here.

Over quinquennial intervals from 1975 to 1999-2000, industry groups, which occupied top slot, claiming the largest share in the total cost of projects, were automobiles and cycles in 1975 (18.6 per cent), metals and metal products in 1980 (24.8 per cent), pesticides and fertilizers in 1985 (19.1 per cent), metals and metal products in 1990 (26.2 per cent), chemical and petrochemicals in 1994-95 (27.0 per cent) and power (electricity, gas and steam) in 1999-2000 (19.9 per cent) (Table 5).

Table 5: Pattern of Corporate Investment according to Major Industries

Continued

Year	Industry	% share	Industry	% share	Industry	% share
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1975	Automobiles and Cycles	18.6	Metals & Metal Products	16.7	Cement	12.1
1980	Metals & Metal Products	24.8	Textiles (other than Jute)	17.5	Cement	15.2
1985	Pesticides & Fertilisers	19.1	Cement	15.7	Chemicals & Petrochemicals	14.9
1990	Metals & Metal Products	26.2	Chemicals & Petrochemicals	22.1	Textiles (other than Jute)	8.0
1994-95	Chemicals & Petrochemicals	27.0	Electricity Gas & Steam	17.7	Textiles (other than Jute)	14.1
1995-96	Chemicals & Petrochemicals	28.2	Metals & Metal Products	19.1	Electricity Gas & Steam	7.8
1996-97	Metals & Metal Products	17.2	Automobiles and Cycles	16.4	Chemicals & Petrochemicals	13.5
1997-98	Electricity Gas & Steam	21.8	Metals & Metal Products	11.6	Chemicals & Petrochemicals	11.1
1998-99	Electricity Gas & Steam	30.5	Metals & Metal Products	12.8	Chemicals & Petrochemicals	10.8
1999-00	Electricity Gas & Steam	19.9	Storage, Roads and Ports	15.8	Metals & Metal Products	14.7
2000-01	Electricity Gas & Steam	30.6	Storage, Roads and Ports	22.1	Metals & Metal Products	10.3

Note: For details Statement 1 may be referred .

Table 5: Pattern of Corporate Investment according to Major Industries

Concluded

Year	Industry	% share	Industry	% share	Combined share of top five industries	Total cost of projects (Rs. Crore)
(1)	(8)	(9)	(10)	(11)	(12)	(13)
1975	Chemicals & Petrochemicals	11.9	Rubber Products	11.8	71.1	784
1980	Chemicals & Petrochemicals	10.3	Pulp, Paper & Paper Products	5.3	73.1	1,669
1985	Textiles (other than Jute)	13.1	Metals & Metal Products	11.4	74.2	4,070
1990	Automobiles and Cycles	7.2	Cement	4.3	67.8	17,040
1994-95	Metals & Metal Products	13.1	Food Products	2.8	74.7	60,582
1995-96	Textiles (other than Jute)	7.5	Cement	6.8	69.4	69,009
1996-97	Textiles (other than Jute)	7.9	Electricity Gas & Steam	7.0	62.0	56,669
1997-98	Telecom	8.5	Textiles (other than Jute)	6.2	59.2	61,950
1998-99	Telecom	8.6	Automobiles and Cycles	6.3	69.0	65,932
1999-00	Chemicals & Petrochemicals	10.3	Telecom	7.3	68.0	47,009
2000-01	Telecom	9.8	Chemicals & Petrochemicals	7.5	80.3	69,400

Note: For details Statement 1 may be referred .

In fact, in the last four years from 1997-98 to 2000-01, power sector was at the top, with the share varying from 19.9 per cent to 30.6 per cent. Old economy industries like engineering (metals and metal products), chemicals & petrochemicals and infrastructure projects by and large occupied the second and third positions in these years. The top five industry groups together claimed a lion's share (bulk pertaining to engineering, chemical and infrastructure industries) of the total cost of projects and it was generally in the range of 68.0 - 75.0 per cent (lowest at 59.2 per cent in 1997-98 and highest at 80.3 per cent in 2000-01).

Bulk of the corporate investment seemed to flow to five major states, accounting for about three-fourths of the cost of corporate projects (Table 6). While Uttar Pradesh occupied the top position in

Table 6: Pattern of Corporate Investment according to Major States

Continued

Year	State	% share	State	% share	State	% share
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1985	Uttar Pradesh	25.2	Maharashtra	16.2	Tamil Nadu	8.8
1990	Maharashtra	26.6	Gujarat	18.6	Bihar	12.4
1994-95	Gujarat	24.8	Maharashtra	17.3	Tamil Nadu	12.4
1995-96	Gujarat	30.0	Maharashtra	15.0	Karnataka	11.4
1996-97	Gujarat	24.0	Maharashtra	14.2	Uttar Pradesh	12.0
1997-98	Tamil Nadu	21.1	Gujarat	19.5	Maharashtra	13.4
1998-99	Maharashtra	29.2	Gujarat	18.5	Tamil Nadu	13.6
1999-00	Maharashtra	23.4	Tamil Nadu	16.1	Gujarat	14.3
2000-01	Gujarat	20.2	Maharashtra	17.4	Tamil Nadu	16.5

Year	State	% share	State	% share	Combined share of top five States	Total cost of projects (Rs. Crore)
(1)	(8)	(9)	(10)	(11)	(12)	(13)
1985	Rajasthan	8.4	Madhya Pradesh	7.2	65.8	4,070
1990	Madhya Pradesh	8.4	Andhra Pradesh	7.5	73.5	17,040
1994-95	West Bengal	11.7	Karnataka	6.5	72.7	60,582
1995-96	Tamil Nadu	7.7	Madhya Pradesh	6.7	70.8	69,009
1996-97	Tamil Nadu	9.3	Andhra Pradesh	8.2	67.7	56,669
1997-98	Andhra Pradesh	11.8	Madhya Pradesh	7.5	73.3	61,950
1998-99	Karnataka	6.1	West Bengal	6.0	73.4	65,932
1999-00	Andhra Pradesh	10.9	Orissa	8.4	73.1	47,009
2000-01	Andhra Pradesh	13.1	Uttar Pradesh	7.8	75.0	69,400

Note: For details Statement 2 may be referred .

1985 (share of 25.2 per cent), Maharashtra (26.6 per cent), Gujarat (24.8 per cent) were in the top slot in 1990 and in 1994-95 respectively. During the period 1995-96 to 2000-01, Gujarat occupied the top position (in 1995-96, 1996-97 and 2000-01) and Maharashtra was top in 1998-99 and 1999-2000. Over the last fifteen years, the top two positions were usually claimed either by Gujarat or Maharashtra. The share of the top five states, over this period moved usually in a narrow band of 72.0 per cent to 75.0 per cent. These data clearly indicate that the corporate investment is taking place mostly in the western and southern regions of the country.

In 1990, projects for expansion (25.2 per cent), modernisation (24.9 per cent) and new projects (18.7 per cent) together accounted for 68.8 per cent of the total cost of projects (Table 7).

In 1994-95, new projects (60.9 per cent) predominated the scene and in the later years, the share varied between 43.0 per cent (1995-96) and 77.1 per cent (2000-01). In the second half of 1990s, the combined share of new projects and projects for expansion was in the range of 77.8 per cent to 88.1 per cent.

Table 7: Pattern of Corporate Investment according to Major Purposes

Year	Top three purposes							Total cost of projects (Rs. Crore)
	Purpose	% share	Purpose	% share	Purpose	% share	Combined share of top three purposes	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1990	Expansion	25.2	Modernisation	24.9	New projects	18.7	68.8	17,040
1994-95	New projects	60.9	Expansion	22.3	Diversification	9.9	93.1	60,582
1995-96	New projects	43.0	Expansion	34.8	Diversification	11.3	89.1	69,009
1996-97	Expansion	53.0	New projects	30.2	Overrun	7.3	90.5	56,669
1997-98	New projects	68.7	Expansion	15.3	Overrun	6.8	90.8	61,950
1998-99	New projects	49.0	Expansion	31.4	Overrun	16.3	96.7	65,932
1999-00	New projects	52.6	Expansion	26.5	Overrun	13.3	92.4	47,009
2000-01	New projects	77.1	Expansion	11.0	Overrun	9.8	97.9	69,400

Note: For details Statement 3 may be referred .

Section V
Summary of Observations

Investment is more subject to relatively larger variations from one period to the next than consumption because of the postponability of capital expenditures, the volatility of factors affecting profit expectations, and the role of external financing. Since variations in investment can affect the levels of economic activity significantly, any fresh clues on the likely movement of this variable will be of considerable value to the forecaster. In countries like Australia, Japan, the UK and the USA, forecasts of corporate investment intentions are based on well-organised surveys of investment intentions of companies and the likely investment is predicted on the basis of these intentions. Such surveys were attempted in India in the late 1980s and also the late 1990s but the response from the companies as also the quality of data did not turn out to be adequate for attempting short-term forecast of corporate investment. Over three decades ago, Dr. C. Rangarajan developed an elegant yet an operationally simple model of short-term forecasting of corporate investment in 1970 based on time-phasing of capital expenditure of corporate projects financed by the leading term-lending institutions. This paper presents a retrospective view of the short-term forecasts of corporate investment over the last three decades with the twin objectives of examining, (i) as to how these short-term forecasts of corporate investment have performed over the last three decades and (ii) to what extent the objectives of the forecasting exercise have been fulfilled. Dr. C. Rangarajan extensively dealt with various issues connected with the short term forecasting of corporate investment, both theoretical as well as practical aspects, from different angles. Various approaches to forecasting, inter alia, based on data on sources of funds for corporate investment as also forecasting corporate investment with data of term-lending institutions, were systematically explored. Utility of behavioural and non-behavioural forecasting schemes were examined. Finally, what emerged was that data on investment intentions were found to be more useful in making short-term forecast of corporate investment. An alternative approach based on the same idea then stemmed from the nature of the financing of the projects in India. Interestingly, this approach is equally valid even after the lapse of three decades. There is a perception that the corporate

investment estimated on the basis of the corporate projects financed by the financial institutions may not represent well, the trends of the corporate sector. With a view to examining the validity of this proposition, we explored relationship between the envisaged corporate investment and the Gross Fixed Capital Formation (GFCF) of the private corporate sector, as available from the National Accounts Statistics (NAS).

Firstly, the series of *ex-post* gross fixed capital formation (GFCF) of the private corporate sector and the series of *ex-ante* envisaged fixed capital expenditure of assisted corporate projects are co-integrated. Secondly, growth trends of corporate investment, based on (i) revised series and (ii) GFCF of the NAS when juxtaposed (Chart 2), indicate that growth trends based on the revised series could capture the direction of growth rates fairly well. It needs to be, however, stressed that other databases like the NAS have also their own limitations, and cannot be taken to be providing exhaustive and superior estimates. It would, therefore, be reasonable to conclude that the corporate investment forecasted following Dr. C. Rangarajan's model was fairly in alignment with the trends depicted by the other independent source say, National Accounts Statistics and would serve as lead indicator of growth of corporate investment. Some attempts were made to compare the forecasted capital expenditure with the estimates available from the Annual Survey of Industries, with a view to obtaining an idea of the share of gross fixed capital formation of the companies covered in the RBI studies in that of the factory sector. It is observed that the ASI estimates in general were of much lower order during the years 1990-91 to 1997-98 and more importantly growth trends as emerging from the two data series were out of alignment. The National Statistical Commission made far-reaching recommendations relating to database of corporate sector. With the changes consequent upon the implementation of the recommendations becoming a reality, the methods of short-term forecasting of corporate investment can further be refined with a view to enhancing their predictive power.

Another relevant question, which often crops up is to what extent corporates realise their investment intentions. An exploratory but indicative exercise was attempted by comparing the time-phasing of projects of some companies assisted by financial institutions with

the actual investment measured from annual accounts of those companies, as the change in the gross fixed assets during the accounting year, for the years 1997-98 and 1998-99. These data indicated that at the aggregate level, the envisaged gross fixed capital expenditure of these companies at the time of seeking assistance was fairly in alignment with the actual investment. It may, however, be stressed that further detailed work needs to be taken up in this area, before we arrive at a more definite conclusion.

The annual studies on short-term forecast of corporate investment also provide some interesting data on fixed capital flows according to industry, location and purpose of projects. The top five industry groups claimed a lion's share (bulk pertaining to engineering, chemical and infrastructure industries) of the total cost of projects and it was usually in the range of 68.0 - 75.0 per cent over the years 1975 to 2000-01. Like-wise these data also clearly indicated that the corporate investment was taking place in five or six large states, and mostly confined to the western and the southern regions of the country.

References

Rangarajan, C. (1970): 'Forecasting Capital Expenditures in the Corporate Sector', *Economic and Political Weekly*, December 19, 1970.

Rangarajan, C. (1972): 'Investment in Private Corporate Sector in 1972: A Forecast', *Economic and Political Weekly*, February 26, 1972.

Rangarajan, C. (1974): 'Capital Expenditures in Corporate Sector: Forecast for 1974', *Economic and Political Weekly*, August 31, 1974.

Rangarajan, C. (1975): 'Capital Expenditure by Corporate Sector: A Forecast for 1975', *The Economic Times*, February 26, 1975.

Rangarajan, C. (1978): 'Corporate Investment in 1977: A Forecast', *Economic and Political Weekly*, March 11, 1978.

Rangarajan, C. (1980): 'Corporate Investment in 1980: A Forecast', *Economic and Political Weekly; Review of Mangement*, February 23, 1980.

Rangarajan, C. (1981): 'Corporate Investment in 1981: A Forecast', *Economic and Political Weekly*; *Review of Management*, February 28, 1981.

Rangarajan, C. (1982): 'Corporate Investment in 1982: A Forecast', *Economic and Political Weekly*, March 6, 1982.

Thomas, Philip and R. Pendharkar (1983): 'Corporate Investment in 1983: A Forecast', *Economic and Political Weekly*, May 1983.

Thomas, Philip and R. Pendharkar (1984): 'Corporate Investment in 1984: A Forecast', *Economic and Political Weekly*, July 7, 1984.

Thomas, Philip and R. Pendharkar (1985): 'Corporate Investment in 1985: A Forecast', Economic and Political Weekly, May 25, 1985.

Patil, R.H. and R. Pendharkar (1986): 'Corporate Investment in 1986: A Forecast', *Economic and Political Weekly*, May 31, 1986.

Thomas, Philip and R. Pendharkar (1987): 'Corporate Investment in 1987: A Forecast', *Economic and Political Weekly*, July 11, 1987.

Patil, R.H. and R. Pendharkar (1988): 'Corporate Investment in 1988: A Forecast', *Economic and Political Weekly*, August 27, 1988.

Reserve Bank of India : 'Corporate Investment .... - A Forecast'*, RBI Bulletin*, February 1989, January 1990, March 1991, September 1992, July 1993, June 1994, June 1995 and August 1997.

Satyanarayana, R. and Bose, Sanjoy (1999): 'Growth of Corporate Investment: An Attempt at Projection for 1999-2000', *Reserve Bank of India Occasional Papers,* Monsoon 1999.

Reserve Bank of India: 'Growth of Corporate Investment in 2000-01',*RBI Bulletin*, June 2001.

Reserve Bank of India: 'Corporate Investment in 2001-02: An Attempt at Projection', *RBI Bulletin*, November 2001.

A. Okun, 'The Predictive Value of Surveys of Business Intentions', *American Economic Review* (May 1962)*, p.221.

D. W. Jorgenson, Jerald Hunter, and M. I. Nadiri, 'A Comparison of Alternative Econometric Models of Quarterly Investment Behaviour', *Econometrica* (March 1970), p.209.

Paul, Samuel and C. Rangarajan (1974): '*Short-term Investment Forecasting – An Exploratory Study'.*

Satyanarayana, R. and Bhattacharjee, A. (2000): 'Data Base on Gross Fixed Capital Formation of the Indian Private Corporate Sector - Some Issues', paper presented at the Biennial Conference of the Indian Association for Research in National Income and Wealth, at Pondicherry, in Sept. 2000

Rangarajan C., 'National Statistical Commission: An Overview of the Recommendations', *Economic and Political Weekly,* October 20-26, 2001.

Statement 1 : Industry-wise Distribution of Total Cost of Projects (continued)

(Per cent share)

Indusry	1975	1977	1978	1979	1980	1981	1982	1983
Metals and Metal Products	16.7	12.8	22.0	11.9	24.8	10.6	14.8	11.9
Automobiles and Cycles	18.6	4.3	1.1	4.6	3.2	7.6	3.9	9.9
Electrical Equipment	2.7	1.7	2.3	3.2	4.5	2.8	2.2	4.4
Electronics	–	–	–	–	–	–	1.4	1.5
Non-Electrical Machinery	5.5	2.9	2.2	4.0	5.0	2.4	2.8	3.0
Chemicals & Petrochemicals	11.9	2.8	6.4	12.5	10.3	2.6	12.2	14.8
Pharmaceuticals & Drugs	–	–	–	–	–	–	0.5	0.5
Pesticides & Fertilisers	2.0	24.2	1.6	22.6	3.7	3.4	3.7	0.9
Cement	12.1	6.5	8.0	11.2	15.2	8.9	17.6	27.6
Electricity Gas & Steam	3.8	5.0	27.6	2.9	–	7.9	6.5	1.6
Construction	–	–	–	–	–	–	–	–
Textiles (other than Jute)	3.0	13.4	18.8	16.1	17.5	31.9	16.7	9.8
Sugar	1.1	3.6	2.3	0.7	1.4	1.0	–	0.8
Food Products	0.2	0.6	0.3	0.6	0.3	–	1.3	1.9
Rubber Products	11.8	1.4	1.2	–	2.5	1.6	3.0	4.5
Pulp, Paper & Paper products	4.1	15.5	2.9	5.1	5.3	4.4	2.0	2.2
Printing & Publishing	–	–	0.2	–	–	2.3	2.1	0.5
Glass & Pottery	2.6	–	2.3	2.1	0.5	1.1	0.4	1.6
Transport	–	–	–	–	–	–	–	–
Hotels	–	–	–	–	–	–	–	–
Storage,Roads and Ports	–	–	–	–	–	–	–	–
Telecom	–	–	–	–	–	–	–	–
Others	4.0	5.3	–	2.2	5.8	11.4	8.8	2.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
(Total cost of projects in Rs crore)	**(784)**	**(1129)**	**(1101)**	**(1182)**	**(1669)**	**(2641)**	**(1560)**	**(2280)**

Industry	1984	1985	1986	1987	1988	1989	1990
Metals and Messtal Products	9.9	11.4	13.4	14.1	9.3	26.9	26.2
Automobiles and Cycles	8.2	3.2	10.5	4.9	2.6	1.2	7.2
Electrical Equipment	1.8	2.8	4.7	6.5	3.8	2.1	2.0
Electronics	1.0	0.4	3.9	2.4	1.1	4.1	4.1
Non-Electrical Machinery	2.8	2.9	3.8	2.4	4.2	3.9	3.3
Chemicals & Petrochemicals	9.3	14.9	14.0	13.3	27.2	18.7	22.1
Pharmaceuticals & Drugs	0.5	0.4	0.2	0.3	—	2.2	0.6
Pesticides & Fertilisers	4.6	19.0	8.9	12.3	16.1	0.4	1.0
Cement	12.0	15.7	14.3	11.7	8.4	4.4	4.3
Electricity Gas & Steam	12.8	6.2	4.7	—	—	—	—
Construction	—	—	—	—	—	—	—
Textiles (other than Jute)	18.7	13.1	8.9	17.3	4.1	15.0	8.0
Sugar	0.4	—	0.5	—	1.5	0.8	1.7
Food Products	1.2	1.0	2.2	2.4	2.4	1.8	0.9
Rubber Products	1.9	0.6	0.6	0.8	—	0.9	1.2
Pulp, Paper & Paper products	3.1	1.1	1.8	2.4	0.8	1.2	2.3
Printing & Publishing	1.8	0.5	0.2	0.2	—	—	—
Glass & Pottery	0.9	2.4	4.3	2.2	1.1	4.8	1.6
Transport	—	—	—	—	—	—	—
Hotels	—	—	0.7	2.2	2.8	2.2	0.9
Storage,Roads and Ports	—	—	—	—	—	—	—
Telecom	—	—	—	—	—	—	—
Others	9.2	4.2	2.4	4.3	14.5	9.5	12.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
(Total cost of projects in Rs crore)	**(3243)**	**(4070)**	**(4122)**	**(6080)**	**(10426)**	**(12050)**	**(17040)**

Statement 1: Industry-wise Distribution of Total Cost of Projects (concluded)

(Per cent share)

Industry	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
Metals and Metal Products	39.0	16.1	18.4	13.5	19.1	17.2	14.0	15.3	14.7	10.3
Automobiles and Cycles	1.3	2.1	2.3	2.3	1.8	16.4	2.2	7.5	1.2	0.4
Electrical Equipment	1.3	2.0	1.5	1.2	1.5	4.8	1.3	0.4	0.8	0.2
Electronics	2.9	2.2	1.6	1.6	2.2	1.5	1.2	1.2	1.0	1.9
Non-Electrical Machinery	1.1	1.6	0.9	0.7	1.1	1.8	0.5	0.7	1.4	—
Chemicals & Petrochemicals	10.0	27.8	32.7	27.9	28.2	13.5	13.3	13.0	10.3	7.5
Pharmaceuticals & Drugs	0.9	1.0	2.2	1.4	1.9	2.1	1.6	0.3	0.2	0.6
Pesticides & Fertilisers	2.2	5.1	0.6	0.2	1.8	3.2	0.3	2.7	—	1.6
Cement	6.0	4.5	6.6	2.8	6.8	3.9	2.4	1.8	3.5	2.7
Electricity Gas & Steam	—	—	—	17.7	7.8	7.0	21.8	30.5	19.9	30.6
Construction	—	—	—	—	—	—	—	—	3.1	1.0
Textiles (other than Jute)	9.6	16.6	9.5	14.6	7.5	7.9	7.5	3.5	7.1	3.2
Sugar	1.7	1.2	1.7	1.2	1.8	1.4	2.4	1.5	2.1	0.5
Food Products	1.9	2.8	2.4	2.9	1.8	1.6	1.9	0.7	—	—
Rubber Products	0.2	0.5	0.4	0.8	—	0.9	6.9	0.5	—	—
Pulp, Paper & Paper products	3.2	2.5	2.4	2.4	4.8	3.0	1.2	1.2	1.0	0.9
Printing & Publishing	—	—	—	—	—	—	—	—	—	—
Glass & Pottery	1.9	2.8	2.7	0.2	—	0.7	—	—	—	—
Transport	—	—	—	1.3	—	4.1	0.6	0.8	1.4	—
Hotels	0.7	0.5	0.7	0.9	—	1.8	3.4	1.5	3.4	2.3
Storage, Roads and Ports	—	—	—	—	—	—	3.9	2.9	15.8	22.1
Telecom	—	—	—	—	3.5	3.2	10.3	10.4	7.3	9.8
Others	16.3	10.7	13.5	6.3	8.5	3.9	3.3	3.7	5.8	4.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
(Total cost of projects in Rs crore)	(24000)	(25829)	(35653)	(60582)	(69009)	(56669)	(61950)	(65932)	(47009)	(69400)

Note: — Nil / negligible

Statement 2: State-wise Distribution of Total cost of Projects (continued)

(Per cent share)

State/ Union territories	1985	1986	1987	1988	1989	1990
Andhra Pradesh	7.0	5.9	20.0	7.1	8.3	7.5
Bihar	2.0	0.8	1.9	1.7	0.9	12.4
Delhi	0.7	—	1.4	1.7	1.1	0.5
Gujarat	6.9	28.1	13.5	21.8	27.3	18.6
Haryana	1.6	2.2	3.6	1.4	3.1	1.2
Himachal Pradesh	0.5	0.4	0.3	0.5	0.6	1.6
Karnataka	3.2	3.2	6.5	3.9	3.2	3.5
Kerala	0.5	1.8	0.6	0.5	0.4	0.5
Madhya Pradesh	7.2	7.4	3.8	5.8	4.5	8.4
Maharashtra	16.2	16.4	15.4	13.3	24.2	26.6
Orissa	0.8	1.6	1.8	3.8	2.4	1.1
Punjab	2.7	3.7	3.4	3.8	1.0	2.1
Rajasthan	8.4	4.2	8.0	9.9	2.2	2.0
Tamil Nadu	8.8	7.2	7.1	7.7	6.3	5.3
Uttar Pradesh	25.2	13.7	9.0	12.9	6.9	5.5
West Bengal	6.0	0.8	2.2	2.5	4.0	1.5
Others	2.2	2.5	1.4	1.8	3.6	1.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total cost of Projects (Rs. Crore)	**4070**	**4122**	**6080**	**10426**	**12050**	**17040**

Note: — Nil / negligible

Statement 2: State-wise Distribution of Total cost of Projects (concluded)

(Per cent share)

State/ Union territories	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
Andhra Pradesh	4.7	8.0	9.0	5.8	6.7	8.2	11.8	4.3	10.9	13.1
Bihar	14.5	2.0	0.3	0.1	1.4	1.9	0.2	4.0	—	—
Delhi	0.3	0.8	1.0	1.3	0.8	0.9	—	—	2.1	2.0
Gujarat	19.5	14.4	30.2	24.8	30.0	24.0	19.5	18.5	14.3	20.2
Haryana	1.6	2.4	1.8	1.1	2.8	3.1	1.2	2.7	1.0	1.3
Himachal Pradesh	3.1	0.7	0.3	3.0	0.6	0.6	—	—	—	—
Karnataka	2.0	10.5	1.7	6.5	11.4	3.7	5.5	6.1	4.3	3.8
Kerala	0.6	0.7	0.3	0.6	0.9	0.5	0.4	1.4	1.2	0.3
Madhya Pradesh	5.7	8.9	8.1	2.2	6.7	7.5	7.5	1.8	2.7	1.4
Maharashtra	15.2	24.2	17.7	17.3	15.0	14.2	13.4	29.2	23.4	17.4
Orissa	1.0	1.4	1.4	0.2	1.7	7.5	1.5	2.9	8.4	5.2
Punjab	1.8	4.5	2.5	2.0	1.5	1.8	2.3	0.5	4.5	5.7
Rajasthan	3.9	4.7	4.1	3.7	3.1	4.4	1.1	0.5	—	—
Tamil Nadu	6.9	5.2	5.9	12.4	7.7	9.3	21.1	13.6	16.1	16.5
Uttar Pradesh	7.3	8.8	11.7	3.8	6.1	12.0	5.2	5.0	4.1	7.8
West Bengal	10.4	1.7	1.7	11.7	1.3	2.7	5.9	6.0	4.6	0.9
Others	1.8	1.2	2.3	3.3	2.3	1.5	3.5	3.5	2.4	4.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total cost of Projects (Rs. Crore)	**24000**	**25829**	**35653**	**60582**	**69009**	**56669**	**61950**	**65932**	**47009**	**69400**

Note: — Nil / negligible

Statement 3: Purpose-wise Distribution of Total cost of Projects

(Per cent share)

Purpose	1988	1989	1990	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
New projects	46.0	33.4	18.7	12.4	29.1	56.6	60.9	43.0	30.2	68.7	49.0	52.6	77.1
Modernisation	15.0	12.9	24.9	23.9	8.7	4.4	3.0	2.6	3.6	2.5	2.3	2.7	1.6
Diversification	8.5	30.4	12.1	3.1	9.9	11.6	9.9	11.3	3.9	5.8	0.7	4.5	0.2
Overrun	7.3	4.2	3.7	6.3	14.2	4.2	1.4	4.3	7.3	s6.8	16.3	13.3	9.8
Expansion	19.3	14.3	25.2	44.4	21.2	20.3	22.3	34.8	53.0	15.3	31.4	26.5	11.0
Eqipment Finance	2.6	2.4	1.9	1.6	1.2	1.8	0.8	1.3	1.9	—	—	—	—
Rehabilitation	0.8	0.7	1.6	1.0	1.0	—	0.2	—	0.1	—	—	—	—
Others	0.5	1.6	12.0	7.3	14.6	1.1	1.6	2.7	—	1.0	0.2	0.4	0.3
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Total cost of projects (Rs. Crore)	**10,426**	**12,050**	**17,040**	**24,000**	**25,829**	**35,653**	**60,582**	**69,009**	**56,669**	**61,950**	**65,932**	**47,009**	**69,400**

Note: — Nil / negligible