

Industrial statistics in India sources, limitations and data gaps

M. R. Saluja and Bhupesh Yadav
India Development Foundation
msaluja@idfresearch.org

Abstract

The authors discuss here the different sources of industrial statistics in India, their limitations and methods of filling the data gaps. The sources of data for the organised and unorganised sectors of manufacturing industry are discussed in Section II. Section III reviews the sources for large and small industries defined in terms of capital employed in plant and machinery. This section also discusses about the index of industrial production its limitations especially with reference to its use in the estimation of GDP from manufacturing at 2-digit level of industrial classification Section IV covers data sources for mining and Section V gives concluding remarks.

Introduction

The compilation of industrial statistics assumes importance, considering the pivotal role of industrial sector in the Indian economy, both for research and policy-making. The users should be conversant with the type of available data sets and the gaps therein. Besides it is of course, essential to know the quality of data. Therefore, an attempt has been made in this paper to discuss different sources, their limitations and the methods of filling up the data gaps.

For the purpose of collection of data on manufacturing industries, the entire industrial activity is divided into factory and non factory sectors based on the size of employment in different producing units under the activity. The factory sector covers units registered under the Factories Act 1948. The non-factory sector consists of the remaining manufacturing units. The factory sector is designated as registered or organised sector and non –factory sector is called as unregistered or unorganised sector. Moreover, electricity and major minerals are also parts of organised industrial sector, while, minor minerals belong to the unorganised sector. On the other hand, the manufacturing industries are divided into large and small scale industries on the basis of the limit of capital employed in plant and machinery. Units below that limit are called small scale industrial (SSI) units, while the rest are called large and medium –scale units.

The sources of data on industrial statistics regarding organised and unorganised sectors of manufacturing industries are discussed in Section II. Section III discusses the sources of data for large and small industries based on the definition of capital employed in plant and machinery. Section IV gives the data sources for mining. Section V gives concluding remarks.

Sources of Data: Organised and Unorganised Sectors

ORGANISED SECTOR

The main source of data pertaining to the organised sector is the Annual Survey of Industries. In most of the advanced countries, the censuses of manufacturing industries were started in the late 19th or early 20th century. In India, the importance of these censuses was not realised until 1942. In 1942, the government of India was empowered to collect statistics from various industries under the Industrial Statistics Act 1942. This act provided for the collection of statistics from establishments registered under the Indian Factories Act 1934. In 1945, the Directorate of Industrial Statistics was set up to co-ordinate and supervise the census operations and to compile and publish its results. An annual census of 29 industry groups (the entire industrial activity was divided into 63 groups) was conducted first in 1946 under the provisions of the Industrial Statistics Act 1942 and the Census of Manufacturing Industries (CMI) Rules, 1945 framed there under. As CMI covered only 29 industries, the Sample Survey of Manufacturing Industries (SSMI) was started in 1950 on the recommendations of the National Income Committee. The SSMI covered all the 63 industry groups on a sample basis. The Industrial Statistics Act 1942 was replaced in 1956 by a more comprehensive collection of Statistics Act 1953. The CMI continued on voluntary basis for the years 1957 and 1958. The SSMI also continued up to 1958.

The CMI was confined only to factories employing 20 or more workers and using power in any manufacturing process. The data were published for each industry regarding the quantity and value of output of different products and by-products in the industry, different kinds of fuels and materials consumed in value terms and in quantity terms wherever feasible, details of employment along with wages and salaries, component wise fixed and working capital employed, depreciation, value added, etc. The data were available state wise and for all India. The SSMI covered factories employing 10 or more workers if using power and 20 or more if not using power. Only value estimates regarding capital employed, output, total of all inputs, value added and emoluments to employees were published. Employment estimates were given in numbers.

The Annual Survey of Industries (ASI) replaced both the CMI and the SSMI in 1959. Although the collection of Statistics Act 1953 came into force on November 10, 1956, the collection of Statistics Rules, 1959 (given in Appendix I, Volume I of the ASI, 1960) under this act were notified only in January 1960 providing for a comprehensive Annual Survey of Industries in India for the reference year 1959. Since 1959, the survey is being conducted annually under the statutory provisions of the 1953 Act and 1959 Rules, except in Jammu and Kashmir where it is conducted under the State Collection of Statistics Act 1961 and the rules framed there under in 1964. The ASI extends to the entire country except the states of Arunachal Pradesh, Mizoram, Sikkim and union territory of Lakshadweep. The field work of the survey is carried out by the Field Operations Division (FOD) of the National Sample Survey Organisation (NSSO). The Director, FOD is the authority appointed under the act for the purposes of collection of data and also for the successful execution of the survey programme. Framing the instructions, processing of data and publication of reports are the responsibilities of the Central Statistical Organisation (CSO). However, the overall guidance regarding the sampling design, sample size, types and techniques of data collection, processing and tabulation is provided by the- Steering Committee on industrial Statistics constituted by the governing council of the NSSO.

The ASI covers all factories under sections 2m(i) and 2m (ii)of the Factories Act 1948, i.e. employing 10 or more workers and using power and those employing 20 or more workers if not using power on any day of the preceding 12 months. The survey also covers bidi and cigar-manufacturing establishments registered under the Bidi and Cigar Workers Act 1966, i.e.; employing 10 or more workers and using power and 20 or more if not using power. All the electricity undertakings engaged in the generation, transmission and distribution of electricity registered with the Central Electricity Authority are covered under ASI irrespective of their employment size. Certain services and activities like cold storage, water supply and repair services are also covered under the survey.

The ASI frame is based on the list of registered factories maintained by the Chief Inspector of Factories (CIF) in each state and those maintained by licensing authorities in respect of bidi and cigar establishments and electricity undertakings. The frame is revised once in three years (from 1989-90 onwards, between 1982-83 and 1988-89 the frame was revised once in 4 years, until 1981-82 it was revised once in two years.) but updated every year by the regional offices of the FOD which keeps close liaison with the offices of CIF in the states.

For the purposes of ASI, the factories in the frame are classified into two sectors, viz, the census sector and the sample sector. While the factories employing 100 or more workers constitute the census sector, the remaining factories constitute the sample sector. Once a factory is classified into census/sample sector, its status is not, altered till the frame is revised though change in employment might warrant it. All the factories in the census sector together with all the electricity undertakings and all the factories located in relatively less industrialised states and union territories (12 up to 1997-98 and 5 from 1998-99 onwards) for the sample sector continue to be completely enumerated every year. Besides, factories falling under category I as described below have also been completely enumerated since 1987-88.

The sampling design adapted from ASI 1987-88 to 1996-97 continued to be a stratified uni-stage one for the sample sector. The stratum was an industry group at 3-digit level of National Industrial Classification (NIC) 1987 in a state or union territory. The strata were divided into the following three categories for the purpose of sampling:

Category I: Those industry groups (at 3- digit level) or strata where the number of factories is 20 or less were designated as complete enumeration category. -

Category II: Those strata where the number of units, within each stratum, is between 21 and 60 were said to form segment S1.

Category III: Those strata where the number of factories, within each stratum, was 61 and more were known to be in segment S2,

All the factories in category I were completely enumerated. A fixed sample of 20 units from each stratum belonging to segment S1 was drawn while a sampling of one in three is adopted from each stratum of segment S2. Selection of factories in categories II & III was done circular systematically with a random start.

This sampling design is more complex than the one adopted till ASI 1986-87. Upto 1986-87, the factories under the non-census sector were covered either on complete enumeration basis or on a uniform 50 per cent sampling. The sampling fraction was $1/6^{\text{th}}$ until 1967 and $1/3^{\text{rd}}$ until 1971.

Also till 1986-87 all factories employing 50 or more workers and using power and those employing 100 and more if not using power were under the census sector. From 1987-88 onwards, the coverage of the census sector has been reduced. For the year 1997-98, 1998-99 and 1999-2000, the census sector was limited only to factories employing 200 or more workers. From 2000-01 onwards again the factories employing 100 or more workers are under the census sector. Because of these changes in the definition there may be some problems of comparison of the estimates over time. The change in the sampling design has been done to reduce work load and cost. Sampling design is being revised from 1997-98, so that about 60000 units being covered under the ASI up to 1996-97 are reduced to about 30000 units. The state wise allocations were made proportional to the number of factories in a state. Sample allocations to 4 digit industry group in a state were again proportional allotment. From 1998-99 onwards 4 digit level 1998 classification is used for making allotments. If the total number of factories in a state at 4 digit level is less than or equal to 8 then complete numeration is done otherwise a minimum value of 4 of sample size is maintained¹.

For ASI 1973-74 to 1988-89, the NIC 1970 was followed to classify factories. Previously, standard industrial classification was adopted. From 1989-90 to 1997-98 NIC 1987 was employed. NIC 1998 was used from 1998-99 to 2003-04. From 2004-05 onwards NIC 2004 is being used. The schedule of enquiry has been designed to meet substantially the national and international requirements for industrial data. (From ASI 1997-98, the schedule has been designed to make it shorter and more user-friendly. The schedule has been made more relevant with the introduction of some new pertinent questions on Quality Assurance, Information Technology, Capacity Utilisation of plant and machinery, International Trade, Pollution etc. Also all electricity undertakings except captive units, cold storage and water supply units are outside the purview of ASI from 1998-99 onwards.) The schedule is in three parts. Part I which is processed at the CSO aims to collect data on capital structure by type of assets, work-force by sex and category of workers, wage bill by type of payments, consumption by broad categories of inputs, output by type of products and by-products etc. Part II which is processed by the Labour Bureau, aims to collect data on different aspects of labour statistics, namely, working days, man-days worked, absenteeism, labour turnover, man-hours worked, earnings and social security benefits. Part III which is processed by the National Buildings Organisation, aims to collect data on housing activities, i.e. houses constructed by the employers for the benefit of their employees. Part three of the schedule has been removed from 1998-99 onwards.

At present the reference period for ASI is the accounting year of the factory ending on any day during the financial year. For example, in the ASI 1993-94, data collected from respective establishments relate to their accounting year ended on any day between April 1, 1993 and March 31, 1994. However, most of the firms have by now adopted the financial year as their accounting year. From 1959 to 1965 the data were obtained on calendar year basis. The results of summary block of part I of the filled up schedules are presented by the CSO in Annual Survey of Industries Summary Results for Factory Sector. This report presents summary results in respect of 32 selected characteristics at various levels of aggregation, viz. (i) all industries by states: (ii) all India at 2—digit level of NIC with rural urban break-up: (iii) all-India at 3-digit level of NIC and (iv) state wise at 2 digit level. Information on employment in the non-responding units belonging to the factory sector, at all India 3-digit level of NIC and states at 2-digit level of NIC was also included up to 1996-97. The latest reports also contain, for the entire industrial activity,

¹ For details see volume 1 of ASI 1999-2000.

the results of principal characteristics by years of initial production and time series data from 1980-81 onwards. Summary reports also give principal characteristics by size of employment, by size of capital, by type of ownership, by type of organisation, by size of output and by size of net value added for the entire organised industrial sector. These reports also provide the explanatory notes on the scope, coverage, concepts and definitions etc.

Summary reports are published every year. Up to 1982-83 these were published separately for the census and factory sectors while from 1983-84 onwards, data are 'published only for the factory sector. However, the data for the census sector of 1983-84 and onwards are kept on magnetic tapes and are available to the users on request.

Up to 1973-74 the detailed results for the census sector were published every year in ten volumes. For sample sector, separate summary reports were published. For 1959, only summary results were published for the census sector. For 1967 no volume was published and for 1972, no survey was conducted because of lag in the work relating to earlier years. After that it was decided to publish the detailed results once in five years. The detailed results for 1978-79 are available in 10 volumes separately for the census and the factory sectors, while for 1983-84 the results are given only for the factory sector in 15 volumes. The data for 1989-90 and 1993-94 were published in 15 volumes for the factory sector only. For each year a supplement to ASI is issued. This supplement gives similar data for different states at 3-digit level of industrial classification. In the detailed volumes, the data are available regarding quantity and value of different fuels, raw materials, packing, etc. materials consumed and quantity and value of output of different products and by-products produced by each industry. Sex wise details are available regarding employment and wages. Also available for each industry are the quantity and value of different imported items consumed. Volume I gives the summary tables along with explanatory notes on the scope coverage, concepts and definitions, etc. It also contains tables on the value of additions to fixed capital and other transactions and the quantity of electricity produced, purchased and sold, The other volumes provide detailed all India, state wise, as well as industry wise data at 4-digit level of industrial classification. From 1998-99 onwards the 1998 classification is used and the results are tabulated at 4 digit level classification for all India and at 3 digit level for states/UT. Volume 1 contains tables related to capital and value added, employment and labour costs, fuels consumed etc. Volume 2 contains details of materials consumed (quantity and value) and products and by-products produced (quantity and value). The publishing of data in two volumes is being done since 1995-96.

Economic and Political Weekly Research Foundation (EPWRF) compiled and presented at one place in Volume I the summary results from 1973-74 to 1997-98. In addition it documented the different sources of data relating to Industrial activity. Some of the inconsistencies in the ASI results were also given in this volume. In January 2008 EPWRF repeated this exercise and updated the data from 1973-74 to 2003-04 in CD ROM. This volume also contains different sources of data relating to industrial activity and the limitations particularly of the ASI data.

The data collected through ASI are fairly reliable. There used to be a considerable time lag in the availability of data. For example summary results for the year 1993-94 were available only in January 1997. Up to the end of August 1997, the detailed results were available only for the year 1983-84. With the advent of structural reforms and openness of the economy and also the rapid

structural changes in the industrial sector, the available data with such a time lag were not of much use. The input-output relations of 1983-84 or of 1989-90, 1993-94 or 1998-99 are not very relevant for today even we are 5 years away from 2003-04. Also the structure of production under each industry group has undergone a sea change over the period. For example, during 1983-84 the contribution of electronics was not that important as it is today. There has been a revolution in the communication equipment industry. Overtime, however, there has been a considerable reduction in the time lag which is a welcome development.

Up to 1996-97 while presenting data, only the reporting factories were taken into account. The aggregates based on these data, therefore, needed adjustment because of non-reporting units. The CSO, while estimating gross value added from the registered sector used to inflate the gross value added given by ASI by using the number of workers in the non-reporting units. The implicit assumption was that value added per worker in the reporting units is the same as that in the non-reporting units. This assumption was, however, not correct as one of the reasons cited in ASI reports regarding non-reporting units was that the factory remained closed for the major part of the year due to labour and management disputes. This fact was verifiable from the data regarding number of workers and gross output of non-reporting units given for the first time in ASI 1993-94 based on only 34 percent of the non-reporting units. The value of output per worker in the non-reporting' units of all industries are only Rs 73,625 while the same for the reporting units was as high as Rs 6, 41,923. Hence, it is evident that some error will be there in the estimates of gross value added and other characteristics from the registered sector. From 1997-98 onwards, estimates of value added and other characteristics in the registered manufacturing industries as given by the ASI are inclusive of non-reporting units. The method of estimation of the characteristics of non-reporting units is, however, not given in the ASI reports.

Fixed capital represents the value of fixed assets owned by the factory as on the closing day of the accounting year. These values, for different components of fixed assets on the closing day of the accounting year are obtained by adding the values of additions during the year to the values as on the opening day of the year and subtracting depreciation from these values, Ratios like capital-labour and capital-output are worked out by making use of the book values of fixed capital for different industries and, therefore, have obvious limitations. Data on un-depreciated original values of plant and machinery are also being collected. These values again have a problem in cases where the factory purchased plant and machinery in phases. (From 1998-99 the collection of this data has been discontinued)

The ASI covers factories employing 10 or more workers on any day of the year if using power and 20 or more if not using power. Tables 3A to 3L of ASI 1992-93 give the principal characteristics by employment size for different sizes of gross investment in plant and machinery. According to these tables more than 26 per cent of the total factories are employing less than 10 workers on an average. And these should not have been taken as factories as normally units will try to avoid becoming factories and would not show such employment if it is only for a few days in a year. For 1994-95 and 2000-2001 this number was 29619 and 29185 respectively. However, employment in these factories employing less than 10 workers is only 2percent of total employment of all factories covered by the ASI. Besides for the same reason factories employing 10 to 19 workers those not using power should have been outside the scope of factories. The reason for inclusion of smaller units as factories need to be looked into.

Also according to the report of National Statistical Commission August 2001 in 1994-95, as estimated by the NSS 51st round, about 1.45 Lakhs eligible units(that is employing 10 or more workers and using power and 20 or more but not using power) were not included in the ASI frame. GVA of the missing units was, however, only 4.1% of the units covered under ASI. During 2000-01 the number of excluded units is 1.05 lakh. However, during this period value added rate increased from 4.0 to 12.7(See Bedi and Banerjee 2007). We could not get these estimates for 2004-05, because we did not have unit wise data for this year. We tried to work out some rough estimates on the basis of published data in Report No. 526. We could not, however, succeed because of some anomalies in these data on establishments by worker and GVA per worker. One explanation can be given for non-inclusion of such large number of units in ASI. A large number of units employ on regular basis less than the number required to be termed the unit as factory, but a large number of casual workers may be appointed for doing manufacturing work and under the NSSO survey they report the total number as workers. This usually happens in readymade garments industry.

Another deficiency of the list is that they include a large number of non operating units. For 1998-99 the percentage of non operating units was 19.2. The percentage was quite high even for census units (12%).

There are problems with some of the items of inputs as well as output like other chemicals, other packing materials, work done by and for others, etc. Also for each industry only 10 individuals items of inputs are given, the rest are put under others which in some cases forms substantial portion of the total value of inputs. Sometimes, because of some classification problems, even important items are either not covered individually or are misclassified. As an example Naptha (part of petroleum products) is an important input into fertilisers. The ASI data did not show it. In the 1998-99 input-output table, the input of petroleum products into fertilisers was much less than what it should have been. For 2003-04 I O tables also this problem was there with the ASI data and the input of Naptha into fertilisers was based on Indian Petroleum and Gas Statistics.

Total persons engaged have been divided into three categories: (i) working proprietors and their family members —who are actively engaged in the work of the factory even with out any direct pay (ii) workers are those employed directly or indirectly but do not include supervisory and managerial staff or persons employed in some specific departments like store keeping, administrative office, watch and ward staff, etc. and (iii) persons holding supervisory and managerial duties and also all workers not covered by the specific departments mentioned in (ii). Generally the wages and salaries of category (ii) employees and also that of specified department are on the lower side. Therefore, it is natural that the workers of those of specific departments should have been included under category (ii)and not in category(iii) Also the imputed values of benefits in kind as well as workmen and staff welfare expenses and old age benefits are also not available separately for workers and for other than workers. The suggested categorisation is quite useful for research and policy-making.

UNORGANISED SECTOR

There is no periodical collection and publication of statistics for the unorganised sector as a whole and on all India basis. The NSSO surveyed the unregistered sector at the national level

and collected data from house hold enterprises as part of their multi purpose surveys in some of their rounds. The first such survey was conducted during the 7th round covering the period from October 1953 to March 1954. It was regularly done up to the 10th round and again taken up in the 14th round (1958-59). The surveys were again conducted during the 23rd (1968-69) and 29th (1974-75) rounds. During these two rounds the data were collected on sample basis from household as well as non- household units. The idea behind these two surveys was to get the data for the entire unregistered sector which could be aggregated with the data for the registered sector so as to cover the entire manufacturing industries. However, the results for the non-household sector were not encouraging because of incomplete coverage. For 1970-71 series of national product, the data of 29th round only on household unorganised sector (along with other sources) were used for estimating industry wise gross value added per worker. The same sources were used for the 1980-81 base series until the results of the 1984-85 follow-up survey were available.

Although a number of surveys were conducted by the NSSO and other organisations, no reliable estimates could be prepared for the entire unregistered manufacturing sector. To remove the data gaps in the unorganised sectors of non-agricultural economy covering unregistered manufacturing, trade, transport and services, the CSO took a major step in 1976 by launching a Central Plan Scheme on Economic Censuses and Surveys. The first economic census was conducted in 1977 and follow up surveys based on this census were conducted in 1978-79 (unorganised manufacturing) and 1979-80 (other unorganised sectors). So far, five economic censuses, one each in 1977, 1980, 1990, 1998 and 2005 have been conducted .The first census covered units with at least one hired worker, while all the subsequent censuses covered own-account enterprises also. Six series of follow-up surveys covering non factory manufacturing, trade, hotels and restaurants, transport, storage and ware housing, mining and quarrying and services sectors have been undertaken.

Other than manufacturing, the recent surveys have been integrated ones, covering different components of services. It is, however, surprising that these surveys have not covered trade we therefore, do not have recent estimates of this very important sector of the economy.

The economic census provides a frame for conducting follow-up sample surveys to collect detailed information on an enterprise basis. Initially the surveys on Directory Manufacturing Establishments (DME) employing 6 or more persons with at least one hired worker were conducted by the CSO while Non-Directory Manufacturing Establishments (NDME) employing less than six persons with at least one hired worker and Own-Account Manufacturing Enterprises (OAME) were surveyed by the NSSO. The surveys on non-factory manufacturing have been conducted for 1978-79, 1984-85, 1989-90, 1994-95, 2000-01 and 2004-05.

These surveys are designed to collect detailed industry wise information on the nature of activity, employment, emoluments, inputs, output, inventory of fixed assets, working capital, outstanding loans etc. The results for DME were published by the CSO in the form of Reports on Directory Manufacturing Establishments and by NSSO for NDME and OAME and the integrated surveys in Sarvekshana and also in the form of individual reports. From 1994-95 onwards, the responsibility for collecting and analysing data and publishing the results for the entire unorganised sector lies with the NSSO.

Table I gives the estimated number of enterprises and principal characteristics per enterprise separately for OAME, NDME and DME and for rural and urban areas for the six follow-up surveys which have been conducted so far. Table 2 gives the estimates of gross value added (GVA) for 1984-85, 1989-90, 1994-95, 2000-01 and 2004-05 at 2-digit level of industrial classification, based on the follow up surveys and those given in the NAS. The following points regarding the reliability of the data emerge from these two tables.

Estimated number of manufacturing units in the OAME and NDME and also in the entire unorganised sector more than doubled between 1978-79 and 1984-85, while from 1984-85 to 1989-90 the absolute number of units decreased substantially for OAME and NDME for both rural as well as urban areas. In spite of the methodology of the surveys remaining almost the same, it is difficult to account for the difference of such magnitude. For DME there has been an annual growth of about 5 percent between 1st and 2nd and 2nd and 3rd survey. This decrease in the number of units continued for most of the components for the year 1994-95 also. There was, however, an increase of 17% in the number of units for the entire unorganised manufacturing sector between 1994-95 and 2000-01. The number for 2000-01 was still less than the number in 1984-85 and only 4% more than the number in 1989-90. Average employment per enterprise was almost the same for the three surveys but less for 1984-85 and more for 1994-95 for the entire unorganised manufacturing sector. For different components there were, however, differences in the average for different surveys.

There was no significant increase in the estimated number of enterprises for the entire unorganised manufacturing sector from 200-01 to 2004-05. For urban areas the number in fact decreased in 2004-05. This decrease was in the OAME and NDME enterprises. Even the estimated employment decreased in 2004-05.

For 1984-85, the difference between GVA for the entire unregistered sector based on the follow-up survey and that given by the NAS was only 12 per cent, this difference for 1989-90 increased to 55 per cent. It may be mentioned here that, for 1989-90, the NAS used the GVA per worker based on 1984-85 survey and the large difference may be due to other factors like use of physical indicators, price indices, etc. The differences, however, increased to 66% and 78% for the years 1994-95 and 2000-01 respectively. For 1994-95 and 2000-01, however there was a change in the methodology of getting GVA per worker.

For 2004-05, the difference was 64%. For food products the Value added according to NAS (1980-81 series) was much less than the NSS for the year 1984-85 and 1989-90. For the years 1994-95 onwards, with change in the series the value added according to NAS was substantially higher than the corresponding NSS values. For 2004-05 value added for wood products according to NSS was more (11%) than the corresponding NAS value. Also in case of tobacco products and wearing apparel the value added from both the sources were almost the same. In all other sectors the value added from NSS was much less than the same from NAS, sometimes the ratio being as low as 16%.

Although at aggregate level the difference between the estimates of GVA from the two sources for 1984-85 was not large, there were wide differences at 2-digit level of industrial classification.

For example the GVA for food products according to the follow-up survey, was more than three times the GVA reported in the NAS. The same dimension of difference was there for 1989-90. For metals and machinery taken together the estimates based on follow-up surveys were about half of those given in the NAS for 1984-85. For 1989-90, the corresponding estimates based on the follow-up survey are about one-fourth of those given in the NAS. For wood and wood products, the estimates based on the follow up survey are substantially higher than those given in the NAS for 1984-85 (40 per cent) as well as 1989-90 (85 percent).

According to the NAS, the increase in the aggregate GVA from 1984-85 to 1989-90 is 107 per cent while the corresponding increase according to follow-up surveys is only 47 per cent, while for later periods the difference between the estimates of the growth rates from the two sources has substantially reduced. The difference in the growth rate between the two sources from 2000-01 and 2004-05 is only about 10%

Comparing the first two follow up surveys, it can be seen that, in the textile industry, there was only 7 per cent increase in GVA in nominal terms. For leather and leather products and transport equipment there has been substantial decrease in GVA over the two survey periods. For 1984-85 and 1989-90 the NAS estimates for food products were about 1/3rd of the estimates based on the follow up surveys, while for 1994-95 and 2000-01 the NAS estimates are substantially higher than the estimates based on the follow up surveys. For beverages, wood and wood products and non metallic mineral products also the NAS estimates were less than the estimates of the follow up surveys, for the earlier two years, while the NAS estimates are higher for the later two periods. The value added in nominal terms more than doubled between 1994-95 and 2000-01 for food and beverages and tobacco products taken together and also for textiles (code 23+24+25). For textiles products and non metallic mineral products the value added for 2000-01 was about three times the same for 1994-95. For miscellaneous industries value added for 2000-01 was more than six times the value for 1994-95. On the other hand the value added for transport equipment for 2000-01 was about 1/4th of the value for 1994-95 survey while according to NAS the value added for 2000-01 was more than double that of the same for 1994-95.

It may be mentioned here that for 2000-01 the 1998 classification was used while for 1994-95, 1987 classification was taken. There might have been some differences because of different classifications but this can not be significant up to this extent at two digit level of classification. For metals and their products the value added given by the follow up surveys are too much on the lower side compared with those given by the NAS in the case of old as well as new series. It may be noted that in the new series the value added estimates of all products of metals, except base metals are much lower than the corresponding estimates in the series with 1980-81 as base. The growth rates (in nominal terms) obtained for these sectors don't seem to be reflective of the actual growth.

Besides a few more comments on the tables are in order, during all these surveys about 84 to 87 per cent of the enterprises were reported as OAME, while 10 to 11 per cent as NDME. The DME as percentage of total enterprises vary from 2.4 in 1984-85 to 4.5 in 1994-95. However, on the basis of value added, the share of OAME varied from 40 per cent to 47 per cent for these surveys, while the corresponding contribution of NDME varied from 20 per cent to 26 percent and that of DME from 27 percent to 40 per cent.

Another point worth noting is that the number of own-account enterprises in manufacturing industries according to 1998 economic census² is 38 lakhs while the number of establishments is 17.1 lakhs. While according to follow-up survey for 2000-01 the number of own-account enterprises is 146.6 lakhs and the number of establishments in the unorganised sector is 23.6 lakhs. The employment figures based on the economic census are 70 lakhs for own-account enterprises and 155 lakhs for establishments including 84 lakhs in the organised sector. The corresponding figures of employment for the two categories based on follow-up survey for 2000-01 are 251 and 120 lakhs respectively. The figures based on the two sources are wide apart. There seems to be some problem with the number of enterprises based on the economic census. The detailed data about 2005 economic census are not yet available.

The estimates for unorganised manufacturing industries are available only once in five years. For other years, the CSO carries forward the estimates by making use of physical indicators which are not quite reliable. Even for the years for which the surveys are done, the results are not used for getting the macro aggregates. Only value added per worker, in different industry groups, is used. Even the estimates of value added per worker as obtained from the first follow up survey (1978-79) were not considered reliable for estimation of gross value added from the unorganised manufacturing sector. The results of 1984-85 and 1989-90 survey have, however, been found satisfactory and have been used for estimating the GVA per worker.

For the series with 1980-81 as base the estimates of GVA from unregistered manufacturing sector were obtained as a product of work force and GVA per worker estimated from the nearest follow-up Survey of the Economic Census. However, in the series with base 1993-94 and 1999-2000 these estimates have been compiled separately for the units belonging to the Small Scale Industries (SSI) group and others. The unregistered manufacturing units have been divided into two separate groups. The estimates of GVA for the unregistered units belonging to Small Scale industries group have been made using the estimates of GVA per worker based on the results of Second All-India Census on Small Scale industrial Units, 1987-88 published by Development Commissioner, Small Scale Industries and the corresponding work force for 1993-94 base series and the Third Census conducted with reference to 2000-01 for the series with 1999-2000 as base. This GVA per worker has been duly inflated for the base year 1993-94 using WPI and the corresponding workforce has been duly extrapolated using the inter-survey growth rate of the working force of 43rd (1987-88) and 50th (1993-94) rounds of NSS. The estimates of other unregistered manufacturing units, i.e. the units other than the one belonging to SSI group mentioned above, have been compiled using information on GVA per worker from the follow-up surveys of the Economic Census for Directory Manufacturing Establishments (DMEs) and from the results of NSSO 51st round (1994-95) for Non-Directory Manufacturing Establishments (NDMEs) & Own Account Enterprises (OAEs). The GVA per worker from 51st round of NSS that relates to the year 1994-95 is suitably deflated to 1993-94. The estimate of work force for this portion of unregistered manufacturing, i.e. for the units neither belonging to ASI nor to SS1, has been obtained from the total work force, on manufacturing activities by subtracting the work force relating to ASI and SSI (non-ASI) segments. For the series with 1999-2000 as base the same methodology, with later data sets, has been used.

² The corresponding figures according to 1980 census are 46.6 and 13.2 lakhs respectively, and according to 1984-85 survey the numbers are 171 lakhs and 2.6 lakhs respectively. For 1990 census the corresponding numbers are 38 Lakhs and 15.5 Lakhs. The detailed results of the census conducted for 2005 are not yet available.

The reason for using two different sources for estimation of GVA is not clear specially when the sector wise estimate of GVA per worker for the entire unregistered manufacturing is available and workforce can be easily calculated. It has been assumed in the CSO methodology that the productivity of 1987-88 per worker will be same as of 1993-94. Also per worker GVA of the entire unorganised sector has been used for the remaining part (excluding SSI part). There is no justification for doing that.

Although because of the revisions from the old (1980-81 as base) to the new series (1993-94 as base) there is a difference of only six percent in the GVA for the entire unregistered manufacturing for the year 1993-94, there are wide differences at two digit level (see table 3). In some of the sectors like repair services and transport equipments the value added according to old series is 7 and 3.6 times more than the corresponding value added according to the new series. The value added in food products, beverages and the number of other sectors is double or more than the corresponding value added estimates in the old series. One cannot, therefore, say that the estimates for the benchmark year are reliable according to the revised series.

During the previous revision the difference in the total GVA from the unregistered sector for 1993-94 was only 6% while the difference in the series with 1999-2000 as base year this difference for 1999-2000 is 21.6%. For the series with 1999-2000 as base, the GVA for the new series in case food products increased substantially, although the increase was less than that in the previous series. In the previous series the GVA, in case of beverages and tobacco products more than doubled while the same in the current series was less than half of the previous series. Same was the case in wood and wood products, and paper and paper products, rubber, plastic and petroleum products. On the other hand in the previous series GVA from textiles and metal products, reduced substantially while it increased in the current series. For other sectors also one can compare the changes in GVA due to change in the base year (Table 3).

For such a vast unorganised sector it is not feasible to collect the detailed data annually. Only improvement that could be effected is to make the frame more reliable and to conduct surveys up to that level of confidence with which the aggregates like total employment, wages, inputs and value added could be estimated and used from the survey results at least at 2-digit level of industrial classification and at state level.

Also reliable physical indicators should be worked out by carrying forward the estimates to other years. For the series with 1980-81 as base the CSO used the GVA per worker from these surveys and population census reports for workforce for arriving at the aggregates for the bench-mark year. Using GVA per worker from one source and workforce from the other creates errors because of different concepts and definitions, specially, when industry wise workforce in the unorganised sectors are obtained by the CSO as residuals, i.e. after subtracting the workforce in the organised sector from the total work force for each industry group. There are, however, more problems in the methodology used for the series with 1993-94 as base.

The physical indicators used by the CSO for carrying forward the base year estimates are mainly the indices of industrial production (IIP). This is not justified as the indices relate mainly to the growth of large industries and the growth of large industries cannot be assumed as the growth for

small industries. From April 1984 onwards, the IIP includes production relating to 18 items produced in the small-scale sector. For the NAS series, the indices of small-scale production should be used as physical indicators to carry forward the estimates to different years. An alternative is to use the growth in GVA in the sample sector part of ASI at 2-digit level of NIC as indicators for the growth in the GVA of the corresponding industries in the unregistered manufacturing sector. Even CSO admits that the estimates of GVA for intervening years are not reliable because of non-availability of suitable physical indicators. For a few industry groups, the availability of main raw material in the group was used as an indicator upto the series with 1980-81 as base e.g., value of output of industrial wood and plywood for wood products duly adjusted for the use in the construction industry, hides and skins for leather and leather products and raw jute for jute products. For these industry groups, the indicators should have been used after netting the use of raw materials in the organised segments of the industry group. At present, however, for all industry groups the IIP is being used.

The responsibility for improvement in data collection in some particular segments of the unorganised sector rests with All-India Handicrafts Board, Central Silk Board, Coir Board and Khadi and Village Industries Commission. These organisations conduct industry and area surveys mainly to meet their data needs. For example All India Handloom Board and Coir Board are estimating production in these sectors by indirect method. The production of handloom is estimated on the basis of mill yam supplied to weavers. For coir, the output is based on the actual exports and assessed internal consumption.

Sources of Data: Small and Large Industries

MODERN SMALL-SCALE INDUSTRIES

As pointed out earlier, the definitions of small and large-scale industries are on the basis of capital employed in plant and machinery. The data are collected from time to time on sample/census basis regarding modern small-scale industries. The first such exercise carried out prior to 1960 was a field survey of 11 important industries conducted in 27 centres by Small Industries Development Organisation (SIDO) to collect data on production, employment etc. during 1958-59.

A system of voluntary registration of SSI units with states was introduced in 1960 with a view to build up a frame of small scale units which would facilitate sample surveys for collection of statistical information. Also at the time of registration, brief statistical information such as employment, investment and installed capacity was proposed to be collected from the units. These units were expected to give quarterly production returns. However the returns were not submitted regularly and no meaningful analysis of data was possible.

The SIDO collected production data from selected industries on sample basis during the period 1970-72. Initially, a statistical survey of 20 industries. 10 engineering and 10 non-engineering, was conducted. A brief report was brought out by SIDO for these 20 industries. This was followed by the second round of the survey covering 4 more industries and the results were tabulated and utilised for official purposes only.

The first major effort to provide realistic data base in respect of small industries was made in 1973-74 through the All-India Census of Registered Small Industrial Units with 1972 as the reference year. The coverage of the census was restricted to units registered with state Directorates of Industries as unregistered units were not covered because of non-availability of frame of such units. Also units under the purview of other specialised boards were excluded. The modern small-scale units were defined as those having capital investment of Rs 7.5 lakhs or less in terms of original value in plant and machinery having Rs 10 lakh or less in the case of ancillary units. The frame for the survey included 2.58 lakh units which were reported to be registered up to November 30, 1973. Out of these registered units, data could be collected from only 1.4 lakh working units. The remaining were either closed, non-traceable or outside the purview of SIDO. A few were non-responding also. The motivation of the survey was to generate the bench-mark estimates of employment, capital investment, capacity utilisation and production both at all India and state level. The data were collected for three years — 1970, 1971 and 1972. The results were published in the Report on All India Census of Small-Scale Industrial Units brought out in 1976.

In order to have an idea of the trend in production in the small-scale sector at broad industry group level, it was decided in 1976 to collect production data from a small sample i e, 2 per cent of the total working small-scale units and to compute an index of production with 1970 as the base year. A sample of 2,400 units covering 356 important products was thus drawn from the frame of working small-scale registered units. The effective sampling fraction over the years, got reduced due to significant increase in the total number of registered SSI units, and was thus much lower than 2 percent. The index thus computed may not therefore give a realistic picture of the trend in production in this sector.

The need for updating this data was felt and, as a result, the second census of small scale industrial units under the purview of SIDO was undertaken by the office of Development Commissioner Small Scale Industries (DC-SSI) in association with state / UT governments and National Informatic Centre (NIC) during the period 1989-91. The reference year of the census was 1987-88. Primary objectives of the census were to update the frame of the working units, to assess the contribution of the working small scale units (among the registered units) and to estimate the mortality rate for SSI units in different industry groups. The data were collected on employment, investment, working capital, capacity, production, exports, raw materials, energy consumption etc.

The report on 1987-88 census gives data at 2-digit level of industrial classification regarding employment, wages, capital employed, energy consumption, production and capacity utilisation at state level. The report also provides the distribution of closed units by reasons of closure. Some important characteristics like output, investment in fixed assets, gross and net value added and employment are given for 100 leading industries classified at 4-digit level of NIC. Similar reports giving data at district level are published for different states and union territories. Table 4 reports a comparative picture of some important characteristics for the first and the second census. It also gives the data about some of the characteristics for a sample survey conducted with reference to the year 1999-2000 and the third census conducted with reference to the year 2001-02.

According to this table the average annual growth rate, between 1972-73 and 1987-88 was 9.4 per cent for the number of units in the frame as well as net value added; while the growth in the number of working units tabulated was 10 per cent. There was remarkable increase in the share of working units in backward areas, i.e., from 35 per cent to 62 percent. Production (at 1972-73 prices³) during this period increased by 11.6 per cent. i.e. by 2.2 percent more than the increase in net value added. Investment in fixed assets increased by 9.1 per cent while the growth in plant and machinery was slightly less at 8.2 per cent. On the other hand, the employment increased only by 5.5 per cent. The employment per unit, during 1987-88, was about half of that in 1972-73.

These results showed an impressive growth in the performance of the SSI sector during a span of 15 years. These results should, however, be used with caution as there are problems in comparing the two censuses because of changes in the definitions of a small-scale unit in the two censuses. As a matter of fact there will be some shift, over time, of units from medium-scale units to SSI units because of increase in the minimum limit on investment in plant and machinery, it may be added here that according to NAS, the growth rates in the net value added from registered and unregistered manufacturing industries were 5.8 percent and 5.0 percent, respectively, which were much lower than those reported in the two censuses,

In addition, data on 18 selected items are being collected from a sample of about 4800 units, located in areas of concentration of these products through field offices of SIDO to work out the estimate of production and these estimates are being supplied to CSO with effect from July, 1984. This is being done for the purpose of including these items in the Index of Industrial Production.

The following points should be kept in mind while using the data on small-scale industrial units.

- (i) The Development Commissioner (DC) publishes annual data about key parameters, like number of units, production and employment at the all-India level. This data may not be realistic because it is based on a mere 2 per cent sample of the working units (over time this percentage has gone down). This fact is acknowledged by the DC itself.
- (ii) The definition of small scale units has undergone changes over time. Investment ceilings in plant and machinery for a unit to be a small-scale one were Rs 7.5, 10, 20, 35, 60 and 100 lakhs, in 1966, 1975, 1980, 1985, 1991 and 1997, respectively. Overtime, a number of units got shifted from medium-scale to small scale units. The rate of growth of the sector shown in a number of documents is thus over estimated. This fact is verifiable from the data given in the above mentioned table.
- (iii) The total number of registered units under SSI during the first and the second censuses were- 2.5 and 10.8 lakhs, respectively. The data could be collected only from 1.4 lakh and 5.8 lakh units, respectively from these two censuses. Most of the remaining units were found to be closed. On this background of high mortality rate of the SSI units, the data thrown by these censuses can not be taken as reliable. Also, there is a sizeable number of unregistered units for which no data were available upto the conduct of the third census. A rough estimate of unregistered units, based on the data supplied by the DC-SSI was being published in various issues of the Economic Survey, Ministry of Finance. According to the Economic Survey 1992-93 the number of small units in 1991-92 is 20.8 Lakhs consisting of 14.96 lakh units registered with State Industries Departments and 5.84 lakh unregistered units. The Economic Survey also mentions that, according to 1987-88

³ The absolute values at 1972-73 prices are given in the Report on the Second Census.

census about 30 to 40 percent of these units may not be functional. These data should therefore be used with caution.

After a gap of another 15-years, third census was conducted during 2002-2003 with 2001-2002 as the reference year. All units registered up to 31/3/01 were surveyed on complete enumeration basis. NIC 1998 was used in this census as against 1970 classification for the second census. The third census for the first time, apart from covering the registered sector, on census basis, has attempted to cover the unregistered SSI sector by way of a two stage stratified sample survey⁴. The first stage units were the census villages in rural and blocks in urban sector. The second stage units were enterprises falling in the unregistered SSI sector. A sample size of 2.16 lakh units was fixed for the sample, but actually 167655 enterprises were surveyed.

In between, however, sample surveys were conducted with reference to the years 1992-93 and 1999-2000. The information collected during this census was similar to that collected during the previous censuses. The results for the third census have already been published. This report gives the estimates of the parameters for the registered as well as unregistered sector. The available results for the 3rd census as well for the 1999-2000 survey are given in Table 4. According to these results the increase in the number of tabulated units was 131% between the second and the third census, while the employment increased only by 68%. The employment per enterprise decreased during this period also. The reason for non registration of the units is also analysed. 53% of the units informed that they were not aware of the provision for registration, while 40% indicated that they were not interested in registration. The details about sickness of the units are also given in the report of this census.

Regarding the third census, two points need special mention.

- (1) No estimates have been or can be obtained for net or gross value added.
- (2) According to Economic Survey 2002-03 the total number of units in the SSI sector is 33.12 Lakhs consisting of 26.14 Lakhs registered and 6.98 Lakhs un-registered units. According to the third census the numbers are 22.6 Lakhs and 91.5 Lakhs respectively. There are wide differences in the numbers from the two sources. Employment according to the third census (249.32 Lakhs) is more than that given in the economic survey (185.64 Lakhs) only by 34%. On the other hand the production as given in the economic survey (Rs. 639024 crores) is more than double of the production according to the third census (Rs. 282270 crores). This sounds astonishing.

According to later Economic Surveys, however, the estimates have been corrected. Also in place of SSI, since 2nd October 2006, the name given is Micro-Small and Medium Enterprises (under the MSMED Act)⁵. To update the data accordingly the fourth census is being conducted during 2008-09 with 2006-07 as reference year. The results will be available next year (Annual Report 2006-07, Ministry of Small Scale Industries). From the questionnaire one can say that the values

⁴ For detailed sample design see Report on the Third all India Census of Small Scale Industrial units.

⁵ The enterprises have been categorized as Micro, Small and Medium based on the following criteria
Micro Enterprises- investment up to Rs. 10 lakh.
Small Enterprises- investment above Rs. 10 lakh & up to Rs. 2 crore.
Medium Enterprises- investment above Rs. 2 crore & up to Rs. 5 crore.

of output, input, and value added can be estimated from this census, while value added estimates could not be estimated on the basis of 3rd census.

LARGE SCALE INDUSTRIES (NON-SSI)

The DGTD (originally known as Development Wing) was set up in 1951, to cover units licensed or registered with its directorates in all the industries except iron and steel, sugar, tea, coffee, vanaspati, cotton textiles, jute textiles, petroleum products, etc. As against the entire factory sector covered by the ASI, the coverage of the DGTD was restricted to large and medium scale units having certain minimum investment in plant and machinery. The units covered by the DGTD are also called non SSI units. The minimum investment limit changed from time to time. The monthly data were being collected regarding installed capacity and quantity and value of output of different industries (products). The data on capacity and production of different products were being supplied to CSO which was using these for the compilation of the index of industrial production, it also used to publish these in Monthly Statistics of Production of Selected Industries of India. Now the publication has been discontinued, besides, the DGTD was publishing these data in its annual report. The DGTD was disbanded in 1995. The work on collection of data has been taken over by the Department of Industrial Policy and Production. Only production data on the items of the index are regularly being collected and supplied to the CSO in addition to being published in SIA on monthly basis.

Regarding specific items mentioned in the above paragraph (those not covered by the DGTD) the data are being collected and published by different official as well as non-official agencies like Indian Sugar Mills Association, Indian Cotton Mills Federation, Textile Commissioner, Ministry of Petroleum, Ministry of Chemicals and Fertilisers, Steel Authority of India, etc, pertaining to their own fields. Some of the agencies along with their publication are mentioned in the Appendix.

INDEX OF INDUSTRIAL PRODUCTION

The monthly index of industrial production (IIP) is being published since 1950. The index has been revised from time to time by shifting the comparison base to relatively recent period, by enlarging the coverage of items and by taking into account the changing structure of industries. The base years of the indices along with the item coverage are given below.

Base Year	Number of Items Covered
1946	35
1951	88
1956	201
1960	312
1970	352
1980	352
1993-94	543 (clubbed into 285 item groups)

The IIP's are being published by the CSO. The latest index with base 1993-94 is confined to mining, manufacturing and electricity. Items of this index are grouped according to NIC 1987. The number of items included in this index from these three sectors are 64, 478 and 1. There has been a merger of a few items or sub-division of some items of the old index. From April 1984, this index includes production relating to 18 items produced by the small-scale sector.

For the index, the CSO gets monthly production data from a number of official sources, the largest being the Department of Industrial Policy and Promotion (DIPP) which provides the monthly production data on 213 out of 285 groups of items included in the manufacturing sector. It may be noted that the returns received by the DIPP are on voluntary basis and there may be substantial non-reporting. For mining and quarrying, data are provided by the Indian Bureau of Mines (IBM) and for electricity by the Central Electricity Authority.

Weights for the entire industrial sector have been divided into its three components on the basis of their gross value added in the base year as available from the NAS. For the first time the weighting diagram of IIP has taken into account the contribution of the unorganised manufacturing sector along with that from ASI. For estimating the 1993-94 gross value added for the unregistered sector, the data available in the follow up DME, NDME and OAME surveys of economic census, for 1989-90 and 1994-95 have been used. After interpolating the GVA at 2 digit level, the further allocation at 3-4 digit levels of NIC has been done by using the ratios of 1994-95 surveys. The consolidated contributions at 2/3/4 digit level of NIC have been arrived at by superimposing ASI data with unorganised data for the corresponding groups / subgroups. Further allocation of weights to the items within 4 digit industry groups has been done by using the value of output as available from ASI 1993-94. For mining sector, the total allotted weight is allocated to different minerals on the basis of their gross value added.

The index is a quantitative one, based on the production in physical quantities. However, in case of 26 items belonging to manufacturing sector, the production figures are available in value terms only. These values are first deflated by the indices of wholesale prices and then used for the compilation of IIP.

The weights thus obtained have been used to estimate the index of industrial production by using the formula:

$$I = \frac{\sum R_i W_i}{\sum W_i}$$

Where, I is the index, R_i is the production relative of the i th item for the month concerned, W_i is the production-weight of the item.

It may be noted that for getting the production relatives all these IIPs represent only large-scale industries (except for 18 items which are from SSI) and the coverage is not complete. These indices do not reflect the real growth rate of the total industrial activity even in the organised sector as it covers only the medium and large units in these sectors.

Table 5 gives the GVA for the organised manufacturing industries based on the ASI results as well as those obtained by applying IIP's and index numbers of wholesale prices to the estimates of the previous year based on ASI, for 1998-99 and 1999-2000. For 1998-99 the difference between these two set of estimates is more than 30 percent for two industry groups, between 20 per cent to 30 per cent for four industry groups and between 10-20 percent for another four industry groups. For 1999-2000 the corresponding numbers are 3, 4 and 4, respectively. These differences are due to the use of IIPs for increase in production and whole sale prices. It may be noted that for the entire registered sector the difference between the two sets of estimates is 3% for 1998-99 and 2% for 1999-2000. For 1992-93 there was no difference and the difference was

6% for 1993-94 (see Pradhan and Saluja). The fact however, remains that of IIPs are not representative of the increase of output even in the organised sector.

The base of this index is very old. A committee under the chairmanship of Professor B.N. Golder is set up to change the base year to a recent one and suggest the changes in the methodology and weighting diagram. In spite of the base year being very old, NAS since 2000-01 is using IIP and Index of wholesale prices (IWP) for estimating the value added for the registered manufacturing sector in place of the estimates based on ASI data. For 1999-2000 the estimates are based on ASI data. The reason for using IIP as a source for estimating value added; given in Sources and Methods 2007 is that growth rates according to ASI data are different from the growth rates obtained by using IIP and IWP. This logic is surprising. Infact from the above paragraph we can see that even for 1999-2000 the values based on ASI and the Index are quite different. Using this method for growth rates assumes that the growth remains same for the value added and value of output and also for the registered and unregistered parts at two digit level of industrial classification.

The growth rate of GVA for all registered manufacturing industries is higher according to NAS then according to ASI. The maximum difference is 22% for 2001-02 and the minimum 4.5% for 2004-05. For some sectors the growth of GVA according to NAS is higher than the corresponding growth rate according to ASI, for all the years. For a couple of sectors it is the other way. For remaining sectors there is year to year variation in the growth rates from the two sources (See Table 6)

This method, however, cannot be applied for estimating Gross state domestic product for manufacturing sector at state level, as relevant indices of growth are not available for different states. The states are using ASI GVA estimates for the years 2000-01 onwards also.

Also since 1993-94 there have been significant structural changes in the Indian industry and 1993-94 weights do not represent the present structure. The quality of the index will, however, improve significantly only when reliable estimates of production of small scale part are available. DC-SSI has to make special efforts to collect data through regular sample surveys, so that this problem can be rectified. With the conduct of the third census, it was expected that there will be improvement in the quality of the indices. Even today i.e. after the conduct of the 3rd census, only 18 items of SSI are covered in the index. However, DC-SSI is compiling and issuing quarterly indices with 2001-02 base. This is being done since April 2002.

Previously these indices were being issued with 1970-71 as base. The index with base 2001-02 has 465 items grouped into 29 major industry groups as against 356 items in the series with 1970-71 as base. The weighting diagram as well as number of units are based on the third census conducted with 2001-02 as the reference year. The items are arranged in descending order of the value of production. 75% cut off criteria in total production was adopted to select the number of items for the index and the same values were used for the weighting diagram. A sample of about 2% of the total number of registered working units as per the 3rd census; were selected for getting monthly data on production. The growth rates of SSI sector with 2001-02 as base are:-

Year	Growth rates
2002-03	8.68
2003-04	9.64

2004-05	10.88
2005-06	12.32

According to Economic Times (2.5.2008) the IIP is being revised. According to ET the base year of the revised index will be 1999-2000. This index will consist of more than 800 items as against around 400 in the current index. The weighting diagram will be changed accordingly. According to ET, CSO is hopeful of releasing the new index by the end of June. By now even 1999-2000 is too old to be taken as base. However, according to Pronab Sen, Chief Statistician, the work on shifting of IIP base to 004-05 along with expanded coverage and revised weights has already started (Business Standard, May 5, 2008). This is a welcome information. We are not however sure about the time of its start.

Sources of Data: Mining

Up to 1955 data on quantity and value of production of minerals were being published by the Geological Survey of India. From 1955 onwards, IBM has been entrusted with the task of collecting data on mining under the Mineral Conservation and Development Rules (MCDR) 1955. The rules were revised in 1958 and again in 1987. The rules apply to all minerals except (i) petroleum and natural gas, (ii) coal and lignite, (iii) minor minerals and (iv) any mineral declared as a prescribed substance for the purpose of Atomic Energy Act, 1962.

The mineral statistics division of the IBM maintains statistics on the following aspects of mining: i) mining leases, (ii) mining inventory, (iii) number of reporting mines (iv) mineral production — quantity and value at pithead prices, (v) mineral stocks, (vi) mineral dispatches, (vii) employment in mining, (viii) inputs in mining (ix) capital investment, (x) foreign trade in minerals and metals, (xi) metal production, and (xii) world mineral production and trade.

Under the MCDR monthly and annual returns of all major minerals, except coal and petroleum and natural gas are submitted by the mine owners to the IBM. In respect of petroleum and natural gas, the data are collected by the Economics and Statistics division of the Department of Petroleum. Monthly data on coal are collected by the IBM from Coal Controller.

Statistics regarding minor minerals are collected by the state geological departments under the Minor Minerals Concession Rules framed by the respective state governments for regulating the extraction of such minerals and relate to value only as quantities are not uniformly available for all states. The Director General of Mines Safety collects and maintains data on employment in all mines by district and by state.

A number of publications with different periods and contents are being published by the IBM the most exhaustive among these being the Indian Minerals Year Book (IMYB). The data published in IMYB constitutes of the quantity and pithead value of ores, the prices of ores, trade in minerals and metals, industry wise use of ores during the reference year. Mineral contribution to national income and variety of other data relating to mining. The production figures for ferrous and non-ferrous metals are also available. Figures for non-ferrous metals are obtained from individual producers while figures for ferrous metals are obtained from iron and steel controller.

The data on consumption of ores are received from industrial units consuming these minerals on non-statutory basis and are thus incomplete. In most of the cases state wise figures are available.

The data regarding different characteristics of all major minerals are fairly reliable. As far as the minor minerals are concerned, the reliability of the estimates is not of the same order as that of major minerals which is even admitted by NAS. One point may be kept in mind. According to NAS in the latest series of GDP; the values of output of coal have been revised by using different prices than used in the previous series. But still the value of output for 2000-01 given in the Statistical Abstract (issued by the same organisation) is 27% less than the value given in the NAS. Similar differences are there in the values of production of crude oil and natural gas. The same story is carried forward to other years.

Concluding Remarks

The sources and methodology of collection and compilation of data have been given in this paper. The data gaps have been specifically mentioned, the methods used for filling these gaps for estimating national product have been described. The problems with these methods have been highlighted. As already mentioned, manufacturing industries have been divided into organised and unorganised segments on the basis of employment criterion and on the other hand between large and small industries on the basis of limit on investment in plant and machinery.

For organised manufacturing industries fairly reliable data are available annually, but with a considerable time-lag, which is reducing over time. For unorganised industries follow up surveys of the economic censuses do not yet give reliable estimates of value of inputs, output, employment, value added, etc even at 2-digit level of industrial classification. Also the follow-up surveys are conducted once every five years and no data are available for the intervening years. The CSO estimates industry wise value added by using physical indicators which are not reliable. As suggested in the text these indicators need substantial improvement. Also the revised methodology used by the CSO for making use of the value added per worker on the basis of 1987-88 census of small scale industries for the SSI units and follow up surveys for the remaining units in no way improve the estimates. For large industries, the DGTD used to compile and publish data regarding quantity and value of outputs and other important characteristics regarding large number of products. After the disbanding of DGTD, data on physical quantities of output are compiled only for the items included in the index of industrial production. These data though reliable do not cover all non-SSI industries. Regarding small industries, the Dc-SSI publishes annual data about key parameters like number of units, production and employment at the all-India level. These data may not be realistic as these are based on only less than 2 percent sample of working units. The fairly reliable data in respect of small industries are the three censuses conducted with 1972-73, 1987-88 and 2000-01 as reference years.

Since 2000-01 CSO is estimating GVA even in the registered sector by using IIP and IWP (both with very old base) at 2 digit level of industrial classification. Instead they should directly use ASI data.

In brief, an enormous amount of resources are being spent on collecting the data from the follow-up surveys of the economic censuses and the Dc-SSI. But the data base for unorganised sector is still not reliable. The reliability for small industries is even worse. A co-ordinated effort by the CSO and DC-SSI could, with the same amount of resources enhance the reliability of the data base. However, for the organised industries the time- lag in the availability of data is reducing with the passage of time.

APPENDIX

Names of agencies providing data for different industries are given below:

Sl. No.	Source Agency
1	Deptt. Of Industrial Policy & promotion
2	Indian Bureau of Mines
3	Textile Commission
4	Development Commissioner, Iron & Steel
5	DC, SSI
6	M/O Petroleum
7	Director of Vanaspathi
8	Jute Commissioner
9	Railway Board
10	Coal Controller
11	Central Electricity Authority
12	Director of Sugar
13	Salt Commissioner
14	Tea Board
15	Coffee

**Table 1: Selected Characteristics per Enterprise by Type of Enterprise and Rural-Urban
1978-79, 1984-85, 1989-90, 1994-95, 2000-01 and 2004-05**

1978-9

	OAME			NDME			DME			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Estimated number of enterprises (lakh)	57.25	14.53	71.78	5.03	4.53	9.56	1.4	1.95	3.35	63.68	21.01	84.69
Total gross value added (Rs crore)	787	412	1199	235	381	617	332	883	1214	1354	1676	3030
Estimated employment per enterprise	1.61	1.65	1.62	2.79	3.05	2.91	13.44	9.92	11.39	1.96	2.72	2.15
Value added per enterprise (Rs)	1375	2832	1670	4679	8413	6448	23675	45277	36250	2126	7975	3577
Output per enterprise (Rs)	2490	4942	2986	9499	10173	9818	88796	204320	156041	4941	24575	9812
Value added per worker (Rs)	854	1716	1032	1677	2758	2213	1761	4565	3182	1083	2933	1663
Value added as proportion of output	0.55	0.57	0.56	0.49	0.83	0.66	0.27	0.22	0.23	0.43	0.32	0.36

1984-5

	OAME			NDME			DME			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Estimated number of enterprises (lakh)	134.39	36.48	170.87	10.25	11.34	21.59	1.79	2.96	4.75	146.43	50.78	197.21
Total gross value added (Rs crore)	4001	1961	5961	896	2369	3265	665	2790	3455	5561	7120	12681
Estimated employment per enterprise	1.63	1.46	1.59	2.3	2.24	2.27	11.14	9.14	9.89	1.79	2.08	1.87

Value added per enterprise (Rs)	2877	5374	3489	8736	20897	15122	35151	94257	72732	3798	14020	6430
Output per enterprise (Rs)	5267	9970	6271	17844	13248	31184	112626	322905	243663	7460	35640	14716
Value added per worker (Rs)	1826	3688	2189	3791	9338	6663	3335	10316	7354	2117	6744	3439
Value added as proportion of output	0.57	0.54	0.56	0.49	0.48	0.48	0.33	0.29	0.3	0.51	0.39	0.44

1989-90

	OAME			NDME			DME			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Estimated number of enterprises (lakh)	112.82	28.22	141.04	7.38	8.89	16.27	2.24	3.43	5.67	122.44	40.54	162.98
Total gross value added (Rs crore)	5588	2685	8273	1292	3534	4817	1597	4243	5840	8474	10452	18929
Estimated employment per enterprise	1.73	1.77	1.74	2.95	3.3	3.14	12.29	9.02	10.31	2	2.71	2.18
Value added per enterprise (Rs)	4953	9514	5866	17518	39622	29600	71307	123663	102981	6924	25781	11614
Output per enterprise (Rs)	9588	6915	11054	39925	96902	71069	288006	603579	47892	16509	84113	33325
Value added per worker (Rs)	2861	5386	3374	5943	11997	9422	5804	13711	9989	3466	9510	5336
Value added as proportion of output	0.52	0.56	0.53	0.44	0.41	0.42	0.25	0.21	0.22	0.42	0.31	0.35

1994-5

	OAME			NDME			DME			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total

Estimated number of enterprises (lakh)	95.4	27.2	122.6	6.7	9.3	16	2.9	3.6	6.5	105	40.1	145.1
Total gross value added (Rs crore)	8448	5334	13782	1954	5705	7659	2482	7993	10474	12884	19032	31915
Estimated employment per enterprise	1.87	1.77	1.85	2.73	3.29	3.05	8.46	8.9	8.7	2.11	2.76	2.29
Value added per enterprise (Rs)	8860	19648	11241	29252	61214	478669	96571	221881	161138	12270	47461	21995
Output per enterprise (Rs)	17126	35813	21272	68683	143807	112349	284672	766017	551263	27805	126413	55057
Value added per worker (Rs)	4743	11073	6081	10683	18662	15675	11586	24958	18522	5823	17182	9612
Value added as proportion of output	0.517	0.548	0.528	0.425	0.427	0.426	0.344	0.29	0.292	0.441	0.375	0.399

2000-01

	OAME			NDME			DME			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Estimated number of enterprises	110.58	36.07	146.65	6.3	10.82	17.12	2.47	4	6.47	119.35	50.9	170.24
Total gross value added (Rs crore)	16,817	8,632	25,447	3,692	11,368	15,060	6,163	13,521	19,684	26,672	33,521	60,193
Estimated employment per enterprise	1.73	1.64	1.71	3.07	3.35	3.25	11.77	8.88	9.98	2.01	2.57	2.18
Value added per enterprise (Rs)	15208	23929	17352	58656	105045	87984	249615	337858	304240	22349	65863	35358
Output per enterprise (Rs)	30,146	49,408	34,884	145,073	272,338	225,534	878,214	1,892,320	1,505,622	53,752	241,724	109,948
Value added per worker (Rs)	8783	14595	10154	19103	31328	27079	21210	38064	30481	11120	25598	16233
Estimated employment(000)	19147.15	5914.10	25061.25	1932.89	3628.75	5561.63	2905.66	3552.25	6457.91	23985.70	13095.09	37080.79
Value added as proportion of output	0.504	0.484	0.497	0.404	0.386	0.39	0.284	0.179	0.202	0.416	0.272	0.322

2004-05

	OAME			NDME			DME			TOTAL		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Estimated number of enterprises	11108720	3504186	14612907	745269	1025013	1770282	274277	413355	687632	12128266	4942554	17070820
Total gross value added (Rs crore)	1882484	923563	2806117	641498	1470484	2111982	1278808	2561701	3840514	3802818	4955751	8758569
Value added per enterprise (Rs)	16946	26356	19203	86076	143460	119302	466247	619734	558513	31355	100267	51307
Value added per worker (Rs)	10446	16300	11846	26909	43308	36543	41887	65298	55052	16211	38167	24034
Output per enterprises	32446	54230	37670	237579	455735	363894	1887791	5664321	4157971	87009	606679	237470
Estimated employment per enterprise	1.62	1.62	1.62	3.2	3.31	3.26	11.13	9.49	10.15	1.93	2.63	2.13
Estimated employment(000)	18021.31	5665.99	23687.29	2383.98	3395.43	5779.41	3053	3923.09	6976.09	23458.29	12984.51	36442.80
Value added as proportion of output	0.522	0.486	0.510	0.362	0.351	0.328	0.247	0.109	0.134	0.36	0.165	0.216

Table 2: Estimated Value Added in Unorganised Manufacturing based on

Industry	1984 - 85		1989-90		1994-95		
	FS	NAS	FS	NAS	NAS	FS	
20-21	Food products	2201	702	3230	1210	6078	4948
22	Beverages, tobacco and tobacco products	465	440	915	738	3123	1367
23	Cotton textiles					5726	1759
24	Wool-silk, synthetic textiles	3263	4042	3494	6435	903	1336
25	Jute textile					327	122
26	Textile products					2391	2519
27	Wood and wood products	1493	1064	2255	1221	5257	4082
28	Paper, paper products and printing, etc.	285	409	717	772	1985	904
29	Leather and leather products	421	293	314	500	1279	673
30	Rubber, plastic, petroleum and coal products	172	260	436	583	2911	386
31	Chemicals and chemical products	189	285	423	376	1407	787
32	Non-metallic mineral products	609	523	1003	862	2525	1813
33	Basic metals and alloys	139	213	259	507	1979	310
34	Metal products	823	1405	1099	3389	3971	2081
35-36	Electrical and non-electrical machinery	420	1095	616	3054	3905	1427
37	Transport equipment	525	851	245	1879	1013	2982
38	Miscellaneous industries	515	626	1433	1979	5115	1092
39	Repair services	1162	2002	449	2951	986	3657
97	Repairs services	0	0	1793	2944	2796	30
	All industries	12682	14210	18681	29400	53677	32275
		2000-2001		2004-05			
		NAS	FS	NAS	FS		
20-21	Food products	10797	10765*	23038	15406		
22	Beverages, tobacco and tobacco products	9234	2404**	2713	2863		
23-25	Textiles	11198	8704***	17291	12234		
26	Textile products	5005	7653	9303	9331		
27	Wood and wood products	4673	2192	4924	5463		

28	Paper, paper products and printing, etc.	3022	951	5592	2766
29	Leather and leather products	8963	5547	4368	1358
30	Coke, Refined Petroleum prods	6884	970	9300	1495
31	Chemicals and chemical products	3282	1387	6237	1632
32	Other Non-Metallic Mineral prods	6143	5039	9410	6610
33	Basic Metals	3388	618	8403	1168
34	Metal products	7057	3832	20158	13053
35	Non-electrical machinery	4182	1859		
36	Electrical machinery	3598	1215	6517	1551
37	Transport equipment	9464	6798	3009	55250
38	Miscellaneous industries	2280	780	113536	32533
39	Repair services	2446		261	57
97	Other services	6937	82		
	All industries	108553	60796	144062	87585
	* Including beverages				
	** Only tobacco products				
	***Jute textile				

Table 3: GDP from Unregistered Manufacturing - Old and New Series of NAS (Rs crore)

		1993-94			1999-200		
		Old Series	New Series	%	Old Series	New Series	%
		1980-81 (as base)	1993-94 (as base)	%	1993-94 (as base)	1999-2000 (as base)	%
20-21	Food products	1983	4491	44.15	9993	13247	75.44
22	Beverages, tobacco and tobacco products	1190	2563	46.43	8571	4081	210.02
23	Cotton textiles						
24	Wool-silk, synthetic textiles	12635*	7988*	158.17	15342*	17978*	
25	Jute textile						
26	Textile products						85.34
27	Wood and wood products	2703	4774	56.62	9386	7217	130.05
28	Paper, paper products and printing, etc.	1505	1723	87.35	4642	3743	124.02
29	Leather and leather products	906	1346	67.31	2821	3763	74.97
30	Rubber, plastic, petroleum and coal products	1162	2371	49.01	6058	3702	163.64
31	Chemicals and chemical products	545	1230	44.31	2375	3677	64.59
32	Non-metallic mineral products	1522	2102	72.41	5914	6872	86.06
33	Basic metals and alloys	1001	1614	62.02	3201	4101	78.05
34	Metal products	4289	3582	119.74	5947	12475	47.67
35	Non-electrical machinery	2329	1501	155.16	3739		
36	Electrical machinery	2264	1672	135.41	3118	3177	98.14
37	Transport equipment	2981	835	357.01	2196	1806	121.59
38	Miscellaneous industries	2154	4198	51.31	8207	6225	131.84
39	Repair services	5880	827	711	2202	127	1733.86
97	Other services	2877	2345	122.69	6246		
	All industries	47926	45162	106.12	99958	82203	121.60

*The figures are the total of sectors 23-26

Table 4: Comparison of Selected Characteristics of First, Second and Third (All India) Census and 1999-2000 Survey of SSI Units

	First Census (1972-73)	Second Census (1987-88)	Third Census ⁶ (2001-02)	1999-00 Survey
Number of units in the frame	257797	986861	2262401	1963000
Number of working units	159321	593769	1374974 (9146216)	1398000
Number of units for which data could be tabulated	139577	582368	1348451	
Distribution of units				
(i) Backward areas (percent)	35	62		
(ii) Non-back ward areas (percent)	65	38		
Production (Rs. lakh)	260274	4297205	20325462 (7901536)	18611830
Employment (000 Nos)	1653	3666	6163 (18769)	5040
Net value added (Rs.Lakh)	84100	1026105		6095637
Investment in fixed assests (Rs Lakh)	79674	929603	9179207 (6255660)	3864661
Investment in plant and machinery(Rs lakh)	53696	554258	3032868 (2456492)	2258922

⁶ The figures in brackets are that of the un-registered units while other figures belong to the registered units only.

Table 5: Sectoral Gross Value Added based on ASI, IIP and WPI

(Rs.Crore)

	1998 - 1999			1999 - 2000		
	ASI	IIP	ASI / IIP	ASI	IIP	ASI / IIP
20-21	16773	16504	1.02	16314	17643	0.92
22	5540	5486	1.01	7081	6226	1.14
23	8917	7518	1.19	8545	9455	0.9
24	3663	6289	0.58	4169	4067	1.03
25	1321	1317	1	1374	1396	0.98
26	4433	3513	1.26	5725	4472	1.28
27	1028	494	2.08	1124	839	1.34
28	4925	5673	0.87	5642	5978	0.94
29	1457	1453	1	1650	1963	0.84
30	39189	34692	1.13	41462	45654	0.91
31	13600	15372	0.88	13750	14296	0.96
32	6972	8709	0.8	9740	8442	1.15
33	21438	24239	0.88	23304	23012	1.01
34	4251	4613	0.92	5493	4229	1.3
35	10963	9905	1.11	10376	13202	0.79
36	13224	11570	1.14	12516	15416	0.81
37	10535	14681	0.72	14027	11397	1.23
38	6646	6412	1.04	8294	6253	1.33
39	3395	4371	0.78	3841	3859	1
97	223	912	0.24	66	257	0.26
Total GDP unadjusted for FISIM	178492	183723	0.97	194493	198056	0.98

Table 6: Index of growth in GVA from ASI and NAS

		1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
15	Food Products & Beverages						
	ASI	100	95.81	100.38	101.94	100.63	112.95
	NAS	100	106.93	109.60	134.80	152.21	166.94
16	Tobacco & Related Products						
	ASI	100	108.16	103.88	127.74	128.15	133.44
	NAS	100	96.67	85.09	80.89	74.01	83.97
17	Textiles Products						
	ASI	100	109.25	94.81	106.01	112.32	124.89
	NAS	100	108.34	108.56	115.38	123.43	139.71
18	Wearing Apparel, Dressing & Dyeing of Fur						
	ASI	100	99.93	90.17	107.70	103.78	138.21
	NAS	100	128.39*	105.76*	130.35*	135.14*	166.04*
19	Leather & Related Products						
	ASI	100	88.83	100.29	94.38	104.50	105.54
	NAS	100	104.78**	105.61**	93.38**	100.45**	116.05**
20	Wood & Wood Products						
	ASI	100	85.30	100.94	112.24	116.89	112.07
	NAS	100	95.51	82.25	69.66	74.61	68.31
21+22	Paper and printing etc						
	ASI	100	127.02	108.51	131.80	134.94	137.49
	NAS	100	100.64	108.33	116.52	134.52	149.43
23+25	rubber, petroleum products etc.						
	ASI	100	108.14	134.99	216.02	270.03	322.02
	NAS	100	149.29	174.15	195.06	217.62	251.23
24	Chemicals & chemical products etc						

		ASI		88.00	85.56	94.81	102.19	117.80
		NAS		113.65	122.40	130.59	143.90	169.63
26	Non-Metallic Mineral Products	ASI	100	101.98	106.14	102.56	110.40	155.69
		NAS	100	103.86	112.99	118.27	126.78	136.94
27	Basic Metals	ASI	100	78.85	74.54	108.22	148.78	247.52
		NAS	100	105.85	110.81	125.15	159.34	204.90
28+29+30	Metal products and machinery	ASI	100	102.42	103.44	104.60	124.56	145.96
		NAS	100	107.77	102.94	117.54	129.94	154.92
31+32	Electrical machinery	ASI	100	95.06	101.73	115.44	117.61	130.77
		NAS	100	124.79	147.51	130.26	156.31	205.14
34+35	Other manufacturing	ASI	100	80.69	95.41	112.93	152.48	202.19
		NAS	100	110.17	116.76	129.36	142.04	161.10
33+36	Transport equipment	ASI	100	76.48	101.86	89.49	109.34	139.90
		NAS	100	103.86	113.56	130.74	152.79	166.63
	All Industries	ASI	100	94.58	97.17	113.68	131.40	164.19
		NAS	100	112.10	118.39	129.58	146.47	171.63

* Only wearing apparels

** Including fur products

References

- Annual report, Ministry of Small Scale-Industries, 2006-07
- An Overview of Revision of Base Year of All-India Index of industrial Production (IIP) for SSI Sector; Ministry of Small Scale Industries.
- Bedi J.S and P.K. Banerjee, Discrepancies and Validation of Indian Manufacturing Data, Economic and Political Weekly Vol. XLII, No.10, March 10, 2007
- Central Statistical Organisation (CSO), Annual Survey of Industries — Summary Results for Factory Sector 1993-94
- CSO, Economic Census 1998-All India Report May 2001.
- CSO, Government of India, Guide to Official Statistics 1999
- CSO, Monthly Abstract of Statistics July 1982, April 1989 and September-October 1995.
- CSO, National Accounts Statistics — Sources and Methods 1989.
- CSO, National Accounts, Statistics 1990. 1996, 1997, 2002.
- CSO, New series on National Accounts Statistics (Base year 1993-94), 1999.
- CSO, National Accounts Statistics Sources and Methods 2007
- Development Commissioner, Small Scale Industries Ministry of Industry. Government of India, Report on the Second-All India Census of small Industrial units August 1992.
- Development Commissioner, Ministry of Small Scale Industries, Government of India Report on Sample Survey of Registered SSI Units 2000-01, February 2002.
- Development Commissioner, Small Scale Industries Ministry of Small Scale Industries, Government of India. Third All India Census of Small Scale Industries 2001-2002 forthcoming, 2004.
- Economic and Political Weekly Research Foundation, Annual Survey of Industries 1973-74 to 1997-98-A data base on Industrial Sector in India.
- Indian Bureau of Mines, Indian Minerals Year Book.
- Ministry of Finance, Government of India, Economic Survey 1992-93, 1996-97 and 2002-03
- National Statistical Commission, Report of National Statistical Commission August 2001.
- Pradhan B.K and M.R.Saluja, Industrial Statistics in India Sources, Limitations and Data Gaps, Economic and Political Weekly Vol.XXXIII, No.21, May 23, 1998
- Secretariat for Industrial Assistance, Department of Industrial Policy and Promotion, Ministry of Industry, Government of India, SIA Statistics.