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Discrepancies and Validation of Indian Manufacturing Data

It is important to remove the discrepancies in data in the various segments of the manufacturing sector, namely, factory, non-factory, small, medium and large-scale sectors, to have a proper estimate of the state of manufacturing. These have an important bearing on estimates of the performance of the sector and have long-term implications from the policy and planning perspective. This study makes use of unit-wise Annual Survey of Industries and National Sample Survey Organisation unorganised manufacturing sector data for 2000-01. The decision to upgrade the economic indicator series of the National Accounts Statistics to base year 1999-2000 from 1993-94 seems to have not taken into account the best possible options to upgrade base year weights.

JATINDER S BEDI, PURNENDU K BANERJEE

The National Statistical Commission (NSC), 2001 discussed various discrepancies in databases of different segments of the manufacturing sector as under:

Discrepancies in data related to factory and non-factory sector: A large number of units qualified for inclusion in the Chief Inspector of Factories' (CIF) list, are not there. At the same time, many defunct units have not been removed from the CIF's list of manufacturing units. The Annual Survey of Industries (ASI), CSO, uses the CIF's updated list (also called list for the factories' sector) as a basic frame for conducting the survey.

The ASI surveys list should be prepared by amalgamating units from:

- All factories registered under sections 2m (i) and 2m (ii) of the Factories Act, 1948, i.e., factories employing 10 or more workers and using power, or 20 or more workers but not using power on any day of the preceding 12 months;
- All bidi and cigar manufacturing establishments registered under the Bidi and Cigar Workers (Condition of Employment) Act, 1966, employing 10 or more workers using power, or 20 or more workers without using power.

The NSSO surveys on the unorganised manufacturing sector are essentially area frame based and exclude all the manufacturing units registered under any of the above. The exclusion/inclusion of units in the factories sector list has a reciprocal effect on the list of units from which the sample for the unorganised manufacturing (non-factories) sector is drawn. The survey on the unorganised manufacturing sector (including the eligible factory sector units not registered by the CIFs) is usually conducted by the NSSO on a quinquennial basis. The wrong listing of units in the unorganised manufacturing sector have similar and opposite impact on the listing of units for the organised manufacturing sector. Thus manufacturing sector units are either part of factory sector or non-factory sector surveys and no unit overlaps in both the sectors despite misrepresentation.

Review of Literature Related to Problems Associated with CIF Framework

The NSC (2001) pointed out that the major factors responsible for affecting the quality of ASI data are deficiencies in the frame and limitations imposed by the sample size in generating

disaggregated level estimates.¹ While examining the status of built-in mechanisms for updating the ASI frame every year, the NSC found that the frame has remained grossly incomplete. To assess the extent of non-inclusion of eligible units in the ASI frame, NSC compared the number of operating manufacturing and repairing enterprises estimated in ASI 1994-95, in the NSS 51st round (1994-95) and in the Fourth Economic Census [EC 1998]. The 51st round NSS results show about 1.45 lakh eligible units (i.e., employing 10 or more workers and using power, or 20 or more workers but not using power) were not included in the ASI frame. Of these 1.45 lakh missing units, about 1.19 lakh units belonged to the employment size class of 10 to 19 and the rest (i.e., about 0.26 lakh units) to the employment size class of 20 or more.

The ratio of the number of missing units (as estimated from the NSS 51st round) to estimated number of working units as per ASI was of the order of 117 per cent for the year 1994-95; and the corresponding ratios with respect to the other two variables were 28 per cent for total number of workers and 4.1 per cent for gross value added (GVA) (see the Appendix).

On the other hand, there were 29,619 registered units, which employed less than 10 workers. It is not known whether these units have temporarily squeezed employment, or administrative hurdles are coming in the way of their deregistration from CIF's framework. In fact, this is partially due to the fact that the lists maintained by the CIFs include a large number of units, which have not been operating for quite some time.

This huge magnitude of units missing from the ASI frame seems to raise serious doubt about the efficiency of CIFs in maintaining up to date registers of factories. Thus, the CIF's work of ensuring the registration of factories by making use of the provisions that are available to them under the Factories Act is unsatisfactory. The problem might have aggravated over time as the country has moved away from a highly controlled regime to a more liberalised economy, and it is not obligatory to either register or report the expansion in production or capacity. Thus it is important to estimate the total number of units eligible to fall under the factory sector for a recent base year period.

Discrepancies in data related to small scale and large scale manufacturing sector: The manufacturing sector can also be divided in another way, namely, small-, medium- and large-scale

sectors. But the definition and data of the small-scale industries (also called SSI sector) are such that all non-SSI units cannot straightaway be treated as medium or large-scale sector units. The long time gap between two consecutive small-scale surveys/census further compound the data limitations. The third all-India census on SSI units was carried out after 13 years.

I Objectives of the Study

It is important to remove discrepancies in the data in various segments of the manufacturing sector, namely factory and non-factory sectors and small, medium and large-scale sectors to have a proper estimate of the state of the manufacturing sector. This has important bearings on estimates of the performance of the sector and long-term implications from the policy and planning perspective. The main objectives of this study are listed below:

– To look into the discrepancies of data in the factory sector and non-factory sector by undertaking unitwise analysis of data from ASI and NSSO unorganised manufacturing sector. The shares of the factory and non-factory sectors in the overall manufacturing sector are revised based on the eligibility of each unit as per the definition of each sector. The analysis in this study is undertaken at the two-digit NIC classification level.

– The entire manufacturing sector can also be split into smaller and larger units. The definition used for the small-scale sector for this purpose is units with an upper investment limit in gross value of plant and machinery of Rs 1 crore. These units were called the broader small scale manufacturing sector (BSSMS). The remaining manufacturing sector may then be termed as non-small scale manufacturing sector, which can further be divided into medium- and large-scale sector.

Thus, an attempt has been made to clearly separate the smaller units from the medium and larger ones. There was overlapping of small and large sectors in case of the DCSSI definition and data of the SSI sector, which is avoided² using this framework in the study.

After working out BSSMS, the share of SSI sector units (as per DCSSI definition) in BSSMS, is also attempted. The analysis is undertaken at two-digit level of NIC.

Sources of Data

The unit-level data, available from various official agencies, such as ASI data on organised manufacturing sector and NSSO data on unorganised manufacturing sector are used in this study to estimate revised estimates of the factory sector, non-factory sector and small-scale sector. The period of study taken is 2000-01, as that is the latest year for which data from NSSO on unorganised manufacturing sector is available. For data on the registered SSI sector, unit level data from the third all-India census on small-scale sector conducted by the DCSSI are used.

Preference for ASI Data for Organised Manufacturing

The ASI is the only primary source of data for the organised manufacturing sector and hence this study opted to use that data. But there is a problem as several non-eligible units

covered in the ASI frame and several eligible units are left over and the problem automatically spills over to unorganised sector NSSO data. An attempt has thus been made in this study to remove this limitation by using unitwise ASI and NSSO data and working out revised estimates of organised and unorganised sector separately on the basis of units satisfying the criteria.

But the National Accounts Statistics (NAS), since 2000-01, use IIP indicators³ to estimate the performance of the factory sector compared to the estimates based on ASI data. As the IIP is based on data collected from large units, it indicates the performance of the large manufacturing sector. Moreover, the IIP reflects the provisional estimates based on quantity indicators. Thus the NAS decision is quite surprising. Does this mean that the ASI data were alright till 1999-2000 and suddenly became redundant after that? What prompted the NAS to adopt a short-term indicator rather than the actual results? The major problem is that the performance derived from IIP is quite different from that of the ASI units. This is quite obvious due to the relative difference in performance of average larger and smaller units, vague sampling technique and method adopted to measure IIP and conceptual differences. Thus, this study relied on unitwise ASI and NSSO unorganised manufacturing sector data to remove the possible discrepancies even for small, medium and large scale manufacturing sectors.

Preference for ASI and 56th Round NSS Data for Unorganised Manufacturing

The units not covered by CIF's framework are covered by NSSO unorganised manufacturing data. Thus, the problem of several non-eligible units covered in the ASI frame and several eligible units left over automatically spill over to the unorganised sector as well. An attempt has been made in this study to remove this limitation by using unitwise ASI and NSSO data and working out revised estimates of the organised and unorganised sector separately on the basis of units satisfying the criteria.

The NAS-CSO also undertakes estimates of the unorganised manufacturing sector. The NAS-CSO opinion with regard to NSSO data (the only source on primary data on unorganised manufacturing sector) is that it underestimates the value added in the sector, as smaller units tend to under-report their gross receipts and overstate the expenses. The NAS tries to remove this deficiency by revising estimates for the unorganised manufacturing sector.

The NAS first divides unorganised manufacturing (i.e., the non-ASI manufacturing) into two parts, viz., the SSI and non-SSI sectors. It computes the gross values of the non-SSI non-SSI sector after combining data from three sources, namely, NSSO (unorganised manufacturing sector) data on GVA per worker from its follow-up surveys of the Economic Census, NSSO data on the worker population ratio (WPR) from its surveys on employment-unemployment and inter-censal population figures arrived at by the office of the Registrar General of India (RGI), responsible for conducting the decennial population censuses. The non-factory sector SSI data based on the second all-India 1987 SSI census, is used for the corresponding portion of the unorganised manufacturing sector SSI. The problems in using the second all-India SSI census are expressed below.

The second all-India Census was conducted in 1990-91 for the units registered up to March 1988. The data on the SSI sector for the intervening years between the two censuses were released on the basis of extrapolation and trends available from the IIP for the SSI sector. There is considerable difference in the estimates derived on the basis of extrapolation and the results derived from the third census. Firstly, the large time gap between the two censuses leaves considerable scope for error. Another reason for difference is that the information on SSI units is based on partial returns, as unregistered SSI units were not covered in the second census. Moreover, the units that are closed down over time were not taken out in the method of extrapolation adopted till now by the DCSSI.

Thus, the methodology adopted by NAS to work out unorganised manufacturing sector data has compounded the problem by combining data from various sources. Hence, this study prefers to rely on data available from primary sources, viz, combining the ASI and NSS data, which, despite limitations, is not derived on the basis of unreliable criteria.

The official data on the small-scale sector is not derived from the same source as the data for the overall manufacturing sector. This is the reason that SSI data cannot be compared with data for other manufacturing segments. The variables taken in these data sources are also different and hence make the comparison difficult. Moreover, the DCSSI data have several discrepancies: it is not able to capture non-registered units in a proper manner as the procedure is different from ASI and NSSO data on the unorganised manufacturing sector.

Thus, this study relied on unitwise ASI and NSSO unorganised manufacturing sector data to work out the small-scale sector universe by dropping the concept of fixed premises, which was part of the official DCSSI definition for SSI. Thus, all types of small units were able to be captured in this segment and it is termed as the BSSMS. The share of units without a fixed premise in BSSMS was estimated later to make a comparison with official estimates of the small-scale sector.

The medium and large manufacturing segment is the remaining portion of the manufacturing sector other than BSSMS. Thus, the small, medium and large scale manufacturing sectors are not overlapping in this study, which was not possible if official DCSSI data was used.

Thus, this study relied on unitwise ASI and NSSO unorganised manufacturing sector data to work out estimates for the SSI sector by applying criteria on each unit. However, for the registered small-scale sector segment, the estimates are derived using DCSSI data rather than ASI and NSSO unorganised manufacturing data. The reason for this preference over the NSS data lies in the sampling design adopted by the DCSSI to capture the registered SSI units, whereas no such separate stratification was done in the NSS survey.⁴

I Methodology

The objectives of this exercise are to find the discrepancies and validate the data for various segments of the manufacturing sector at two-digit NIC classification level from unitwise data for year 2000-01. Excluding non-eligible units and including eligible units from each segment as per the classification the idea is to basically work out the revised estimates. The analysis has been undertaken for the factory

and non-factory sector and also for small, medium- and large-scale sectors.

A few assumptions are however made in the absence of the required information for the categorisation of units in various segments of the manufacturing sector. For example, the NSSO data on the unorganised manufacturing sector does not explicitly enquire whether a unit uses electricity for its production process or not. Thus, a unit cannot be straightaway identified as one having “10 or more workers with power”/“20 or more workers without power” from the NSSO, unorganised manufacturing sector data. As a close approximation, this study considered all the enterprises reporting some expenditure on electricity as units with power.

Similarly, the definition of the term “worker” as per the Factories Act, 1948 is not exactly the same as the term “worker” used in the unorganised manufacturing surveys. In the Factories Act, workers are the labourers engaged in the production process. Thus, the supervisory and managerial staff, ‘chowkidars’, employees engaged in the administration, etc. are not “workers”. On the other hand, all the persons working regularly in an enterprise are considered as workers in the unorganised sector survey. In this study, the number of hired workers in the unorganised manufacturing enterprises has been considered as an approximation of the number of labourers engaged in the production process.

The need for reliable information for various segments of the manufacturing sector at two-digit NIC classification level is crucial for the policy and planning perspective. Moreover, the time lag of at least five years in the availability of data for the unorganised manufacturing⁵ sector makes it crucial to develop reliable short-term indicators. The revised base year weights developed in this study along with IIP (if IIP is prepared using proper sampling design and method) indicators could go a long way in bridging the gap between growth rates differences based on IIP and ASI data. The methodology adopted to remove discrepancies in factory sector and non-factory sector data and broader small-, medium- and large-scale sectors are described below.

Factory and Non-Factory Manufacturing Sectors

This study divides the manufacturing sector into two broad segments, namely factory sector and non-factory sector, which can further be subdivided into various segments as per convenience.

Factory sector: The factory sector is defined above and as per official data sections 2m(i) and 2m(ii), units are supposed to be covered under the ASI. The factory sector could be further divided into segments such as factory sector SSI and factory sector non-SSI as per requirements.

Non-factory sector: The unorganised sector units are those operating with less than 20 workers without power and less than 10 workers with or without power. The non-factory sector could also be further divided into various segments depending upon requirements.

The classification of the manufacturing sector into factory and non-factory sectors is based on employment criteria. The non-factory sector represents segments belonging to smaller units as per employment criteria, but fails to capture all the units belonging to the small-scale sector. On the other hand, the investment criteria adopted to define the small-scale sector has its relevance due to the scarcity of resources. The small-scale sector is officially defined as units with investment in gross value of plant and

machinery (GVP&M) less than or equal to certain ceiling limits and having fixed premises. The ceiling limit on GVP&M goes on changing over time and the present ceiling limit is less than or equal to Rs 1 crore. The problem with the official definition of small scale manufacturing sector is that the manufacturing units not belonging to the small-scale sector do not necessarily represent the medium or large scale manufacturing sector. To deal with the problem, the entire manufacturing sector is demarcated into BSSMS and the medium- and large-scale manufacturing sector.

BSSMS vs Medium- and Large-Scale Sectors

BSSMS: This is defined as that segment of the manufacturing sector with units that have investment in GVP&M less than or equal to the prescribed limit for SSI sector. The GVP&M limit for the small-scale sector is fixed at Rs 1 crore since 1997.

Small scale manufacturing sector (SSMS): An attempt is then made to find the share of eligible small-scale sector units as per the official definition in BSSMS, ie, units with investment in plant and machinery less than or equal to Rs 1 crore and having fixed premises. These units can be considered as eligible SSMS units.

Comparison of estimates of SSMS with DCSSI data: An attempt is made to compare the estimates of SSMS derived in this study from ASI and NSSO data on unorganised manufacturing sector with DCSSI data. The poor method of coverage of non-registered SSI units with DCSSI could be the reason for the difference in data obtained on SSI sector from these two data sets.

Registered small-scale manufacturing sector: The registered small scale manufacturing sector data is worked out using unitwise data from the third all-India census on the small-scale sector.⁶ The share of registered small scale manufacturing sector is then worked out in derived estimates of SSMS.

Medium- and large-scale manufacturing sector: The manufacturing units that have GVP&M greater than Rs 1 crore could further be divided into medium and large manufacturing sectors. For this purpose, the definition for large scale manufacturing sector (LSMS)

is taken as units with investment in plant and machinery more than Rs 4.5 crore during 2000-01. Thus, the medium scale manufacturing sector (MSMS) is one with investment in plant and machinery between Rs 1 crore and Rs 4.5 crore. This may be over Rs 5 crore at current prices.

III Analysis of Data

The unitwise data for 2000-01 for the organised sector from ASI and unorganised manufacturing sector from the 56th NSSO round are combined to work out the size of the overall manufacturing sector. The various variables of the manufacturing sector worked out by combining ASI and NSSO data on the unorganised manufacturing sector for 2000-01 are given in Table 1. The data in Table 1 show that there are around 17.15 million manufacturing units in the country. These units employ around 44.84 million workers and their annual output is worth around Rs 1.09 million crore. The value addition from these units amounts to Rs 2,36,385 crore. The share of the factory sector as per official records in the total manufacturing sector is very low in terms of units (0.7 per cent), but very high in terms of value added (74.3 per cent) and output (82.8 per cent). The share of employment belonging to the factory sector is low at 17.3 per cent. This means a large number of smaller units in the unorganised sector with large number of employees produce only a small percentage of value added and output in the overall manufacturing sector. The description of NIC 98 codes at two-digit level is given in Table 2.

Revision of Estimates for Factory and Non-Factory Sectors

The share of factory (organised) and unorganised sectors in the entire manufacturing sector is revised after removing (adding) the non-eligible (eligible) units. The reliable weights for each

Table 1: Factory Sector Share in Overall Manufacturing Sector (Un-revised): NIC Two Digit Analysis for Variables, 2000-01

NIC Codes	Overall Manufacturing Sector				Factory Sector (ASI Data Un-revised)			
	Units	Workers	Output	VA	Units	Workers	Output	VA
Values in Rs Lakh, Others in Numbers					Percentage Share in Overall Manufacturing Sector			
01405	6,503	15,333	6,237	2,357	1.0	13.9	14.9	22.2
15	30,35,292	81,74,582	191,81,807	29,55,176	0.8	16.3	76.8	63.6
16	21,06,616	38,91,988	15,65,386	6,65,400	0.1	12.4	76.1	63.9
17	24,26,727	74,69,929	1,12,13,372	25,81,463	0.6	17.3	81.1	66.4
18	28,12,981	49,03,979	28,77,870	11,28,864	0.1	6.7	57.8	32.2
19	1,78,349	5,37,307	12,39,071	2,33,639	1.3	25.7	80.2	59.3
20	28,15,041	52,71,345	13,05,113	5,92,657	0.1	0.9	17.1	6.4
21	92,447	4,31,567	20,62,077	5,11,815	3.7	41.6	90.7	89.7
22	1,47,169	5,98,015	13,88,368	4,42,564	2.2	19.7	71.3	62.4
23	7,791	89,873	78,84,755	8,80,542	11.8	75.5	99.6	99.3
24	2,30,918	13,67,247	162,99,721	38,53,690	4.6	58.5	97.2	97.5
25	1,02,164	5,85,704	32,96,743	7,22,910	6.7	43.1	85.8	81.7
26	8,31,754	34,94,128	44,94,224	14,94,441	1.4	12.7	72.7	66.3
27	45,988	6,95,930	96,44,525	18,88,394	15.3	81.0	96.8	96.7
28	6,50,723	18,80,527	32,05,697	8,59,242	1.3	15.7	68.3	55.4
29	1,75,786	9,18,744	48,86,995	12,90,533	5.3	46.4	89.2	85.6
30	419	20,314	4,76,401	94,202	53.5	95.2	99.3	99.5
31	69,409	4,85,582	55,68,081	7,23,027	5.6	47.7	48.6	85.5
32	8,047	1,53,179	20,71,723	4,00,031	14.7	73.1	98.1	95.8
33	9,695	96,517	6,02,629	1,74,594	10.2	67.2	93.5	91.3
34	25,005	3,65,124	43,22,853	8,30,797	10.7	70.6	97.0	94.3
35	18,178	2,47,591	22,91,261	4,18,017	10.6	74.2	96.3	92.7
36	13,35,830	31,04,604	26,23,115	8,85,454	0.2	3.7	45.7	24.9
37	15,489	37,586	33,520	8,682	0.1	1.9	26.6	5.0
Total	171,48,321	448,36,695	1,085,41,543	236,38,492	0.7	17.3	82.8	74.3

Source: Unitwise ASI, CSO data for 2000-01 and unitwise NSSO data on unorganised manufacturing sector.

Table 2: NIC '98 Codes at Two-digit Level

NIC '98 Code	Description
01405	Cotton Ginning, Cleaning and Baling
15	Manufacture of Food Products and Beverages
16	Manufacture of Tobacco Products
17	Manufacture of Textiles
18	Manufacture of Wearing Apparel; Dressing and Dyeing of Fur
19	Tanning and Dressing of Leather; Manufacture of Luggage, Handbags Saddlery, Harness and Footwear
20	Manufacture of Wood and of Products of Wood and Cork,
21	Manufacture of Paper and Paper Product
22	Publishing, Printing and Reproduction of Recorded Media
23	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel
24	Manufacture of Chemicals and Chemical Products
25	Manufacture of Rubber and Plastic Products
26	Manufacture of Other Non-Metallic Mineral Products
27	Manufacture of Basic Metals
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipments
29	Manufacture of Machinery and Equipment nec.
30	Manufacture of Office, Accounting and Computing Machinery
31	Manufacture of Electrical Machinery and Apparatus nec.
32	Manufacture of Radio, Television and Communication Equipment and Apparatus
33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers
35	Manufacture of Other Transport Equipment
36	Manufacture of Furniture; Manufacturing nec
37	Recycling

Source: National Industrial Classification (NIC), 1998, CSO.

segment at NIC two-digit level are estimated and the extent of discrepancies is measured in Table 3. It has been estimated that around 26 per cent of officially included ASI units are not eligible to be included in the factory sector framework. These units are part of the official ASI data, but are not eligible to be so as these units employ less than 20 workers without power or, are with less than 10 workers with power. The share of such units in the factory sector (official) is small in terms of output (0.9 per cent), value added (1.3 per cent) as well as employment (2.5 per cent) (Table 3). One may argue that some of these registered factory sector units may be employing fewer workers due to temporary slowdown in production, and hence appearing as if they are not eligible for the factory sector. But such occurrences are likely to be balanced with those employing more workers due to the temporary rise in production.

On the other hand, there are several units, which are part of the official NSSO data, but are actually eligible to become factory sector units, i.e., they employ "20 or more workers without power" or "10 or more workers with power". The percentage of such units in the official CIF's framework accounts for 85.2 per cent.

The number of units, which employ less than 10 workers, was 29,185 during 2000-01 in the CIF's framework as against 29,619 in 1994-95 as given by the NSC. This accounts for almost the same percentage of ASI units during 2000-01 and 1994-95. The share of units employing less than 10 workers was 23.6 per cent during 2000-01 as against 23.8 per cent during 1994-95.

On the other hand, the estimated number of unregistered units (NSSO units) eligible to get registered with the factory sector are

Table 3: Eligible Units Excluded from CIF Framework and Non-eligible Units Included in CIF Framework in 2000-01

NIC '98 2-digit	ASI Units Not Eligible for Factory Sector as Percentage of Official ASI Data*				Unorganised Sector Units Eligible to Become Factory Sector Units as Percentage of Official ASI Data#			
	Units	Employees	Output	VA	Units	Employees	Output	VA
01405	37.5	6.6	2.6	1.1	101.6	50.3	44.4	502.7
15	26.1	2.3	2.3	1.1	39.6	26.6	0.3	9.2
16	40.2	1.0	1.0	0.4	161.4	7.9	0.7	20.8
17	18.4	1.0	1.0	0.6	199.3	28.2	1.3	27.1
18	15.5	0.8	1.8	1.2	302.2	52.5	4.0	44.7
19	22.9	2.3	1.5	1.3	88.1	18.1	0.9	23.4
20	55.6	18.9	9.0	9.2	37.4	45.8	2.8	48.3
21	15.8	1.9	0.7	0.4	26.9	16.8	0.3	3.4
22	28.0	4.1	2.0	1.5	48.8	41.2	1.6	10.1
23	26.0	1.8	0.2	0.3	0.0	0.0	0.0	0.0
24	21.4	1.7	1.1	1.1	33.9	8.4	0.1	1.7
25	24.3	3.9	1.9	1.2	46.6	23.4	0.6	7.5
26	34.9	5.2	1.4	1.2	173.9	114.2	5.5	75.5
27	24.3	1.8	0.9	0.4	19.8	22.6	0.2	1.3
28	32.2	5.3	3.1	2.5	30.5	24.2	0.7	7.7
29	26.4	3.3	1.8	1.3	16.7	14.9	0.3	2.2
30	14.7	0.8	0.2	0.1	6.3	7.7	0.0	0.2
31	17.7	1.7	0.7	0.4	28.6	8.6	0.2	3.5
32	19.1	1.0	0.2	0.1	55.2	8.7	0.2	3.1
33	17.5	1.5	0.5	0.6	10.9	4.5	0.3	1.0
34	18.1	1.1	0.3	0.3	27.6	6.3	0.1	1.4
35	21.2	1.4	0.5	0.5	18.8	5.8	0.2	1.3
36	33.6	3.7	2.0	1.5	617.2	113.1	6.0	116.1
37	0.0	0.0	0.0	0.0	117.6	74.9	2.1	72.0
All	25.9	2.3	1.3	0.9	85.2	27.6	0.7	12.7

ASI Estimates for 2000-01 in Absolute Terms								
	Units No	Employees No	Output Rs Lakh	VA Rs Lakh	Units No	Employees No	Output Rs Lakh	VA Rs Lakh
Total	31,960	1,75,948	11,33,710	1,55,205	1,05,335	22,34,449	21,42,518	6,30,486

Notes: * The units that are part of official ASI data, but are not eligible, i.e., units employing less than 20 workers without power and less than 10 workers with power. There may be certain units with a temporary slowdown in production. But these should be more or less balance units, where there is a temporary rise in production.

The units that are part of the estimates of the official 56th NSSO Round data, but are actually eligible to become factory sector units, i.e., units employing more than or equal to 20 workers without power and more than or equal to 10 workers with power.

Source: Unitwise ASI, CSO data for year 2000-01 and unitwise 56th NSSO round data on unorganised manufacturing sector.

estimated at 1.05 lakh during 2000-01 as against 1.45 lakh estimated by NSC during 1994-95. This is 85.2 per cent of the registered factory sector units during 2000-01 as against 117 per cent during 1994-95. This means despite improvement in the relevance of coverage in the CIF's framework over time, it still has to go a long way. Moreover, this improvement is only reflected in terms of number of units. These NSSO units are eligible to get registered with the factory sector as the registered factory sector is estimated as employing 27.6 per cent of workers during 2000-01 as against 28 per cent during 1994-95. In terms of value added, the ratio has in fact increased by more than three times from 12.7 per cent during 2000-01 against 4.1 per cent during 1994-95, showing some real big units missing from the ASI frame and falling under the official data of the non-factory sector.

The eligible factory sector units in ASI data by taking out non-eligible units from it and adding eligible units in it is presented in Table 4.

The revised estimates of unorganised sector share are thus 100 minus the values given in Table 4 for each NIC digit classification. The eligible ASI units derived in Table 4 needs to be compared with total ASI official data share in the manufacturing sector from Table 1. With these changes, the share of the revised factory sector in manufacturing during 2000-01 changes from 0.7 per cent to 1.1 per cent in terms of units, from 17.3 per cent to 21.9 per cent in terms of employment, from 82.8 per cent to 83.7 per cent in terms of output, and from 74.3 per cent to 76.3 per cent in terms of value added. Table 4 shows that 114.9 per cent of 56th NSSO round units are eligible to become part of the CIF's framework. These ratios are very low in terms of output (2.4 per cent) and value added (3.6 per cent) and modest in case of employment (29.5 per cent).

The two industries, which have a low share in the factory sector even in terms of value added are manufactures of wood and products of wood and cork, and recycling.

Revision of Estimates Related to Small-Scale Manufacturing Sector

BSSMS is estimated as units with investment in GVP&M, as prescribed by the DCSSI definition of SSI, that is within the limit of Rs 1 crore. This is considered a broader perspective of the small-scale sector as it includes all units with GVP&M equal to or less than Rs 1 crore, without taking into consideration the condition of the fixed premises. Thus all smaller units with or without fixed premises are covered under this definition.

The definition of the small-scale sector evolved by Bedi (2004) in an IAMR working paper combined employment criteria laid down by the CSO for non-factory sector and investment criteria laid down by DCSSI for the SSI sector. It was estimated by combining factory sector-small scale manufacturing sector with unorganised manufacturing sector. Thus the definition evolved by Bedi (2004) had wider coverage than even the BSSMS defined in this study. It was estimated that there were only a few units in the unorganised sector that had investment in GVP&M higher than Rs 1 crore. In fact this study made similar attempts in the revised worked out data for the unorganised manufacturing sector. The analysis of data shows that not even a single unit has an investment limit of more than Rs 1 crore in the revised⁷ estimates of the unorganised manufacturing sector. Thus all units in the revised unorganised manufacturing sector are eligible to be a part of the BSSMS and hence the definition of the small-scale sector

evolved in a broader perspective by Bedi (2004) was no different than the one evolved in this study.

The total number of units belonging to BSSMS is estimated at 171.3 lakh in Table 5. All the remaining units not belonging to BSSMS are part of the factory sector non-SSI⁸ and could be termed as medium and larger scale manufacturing sector units. The number of such units is estimated at 17,926 and their share is estimated at only 0.1 per cent of the manufacturing sector (Table 5). The share of the medium and large scale sector is however very high in terms of output (64 per cent) and value added (61.28 per cent), while it is low in terms of employment at 9.47 per cent of the overall manufacturing sector.

Table 4: Revised Factory Sector* Share in Overall Manufacturing Sector

NIC '98 2-digit	Units	Workers	Output	VA
	Revised Share of Total Factory Sector Units in Manufacturing Sector			
01405	1.6	30.1	31.6	39.4
15	0.9	18.0	76.9	64.4
16	0.3	14.6	77.8	64.8
17	1.6	23.3	83.6	70.7
18	0.5	10.0	62.8	37.7
19	2.2	31.2	80.9	62.5
20	0.1	1.1	17.3	6.9
21	4.1	44.5	91.6	90.4
22	2.6	23.6	73.3	65.0
23	8.7	74.2	99.5	99.0
24	5.2	62.1	96.5	96.9
25	8.1	49.0	86.0	83.0
26	3.4	33.5	82.9	77.6
27	14.6	83.1	97.3	97.1
28	1.2	16.8	68.3	55.8
29	4.8	47.5	88.9	85.6
30	48.9	95.3	99.5	99.5
31	6.2	51.3	48.6	86.1
32	20.0	80.1	98.4	96.9
33	9.5	67.9	93.5	91.8
34	11.8	72.9	97.1	94.7
35	10.3	75.3	96.3	93.4
36	1.1	11.8	49.7	32.6
37	0.2	2.7	28.2	7.2
15-37	1.1	21.9	83.7	76.3
	Units No	Employees No	Output Rs Lakh	VA Rs Lakh
Revised estimates of total eligible factory sector units in manufacturing sector	1,96,988	98,14,389	908,32,622	180,34,026
Official ASI data	1,23,613	77,55,888	898,23,814	175,58,745
Eligible factory sector units in CIF's framework	91,653	75,79,940	886,90,104	174,03,540
Per cent increase in revised estimates as compared to eligible ASI units in CIF's framework	114.9	29.5	2.4	3.6

Notes: * The data for revised estimates of the factory sector in the overall manufacturing sector is estimated by using the following criteria:

- The units that are part of official ASI data, but are not eligible to fall under factory sector, i.e., these units employing less than 20 workers without power and all units with less than 10 workers are excluded from the factory sector. These revised ASI estimates are called eligible factory sector units in the CIF's framework.
- The units that are part of official 56th NSSO Round data, but are actually eligible to become factory sector units need to be included. Thus the revised estimates of total eligible factory sector units in the manufacturing sector are worked out by adding NSSO eligible units for the factory sector into eligible factory sector units in CIF's framework.

Source: Unitwise ASI, CSO data, 2000-01 and unitwise NSSO data on unorganised manufacturing sector.

The medium and large sector units can be further split into MSMS and LSMS. The definition for LSMS is taken as units with investment in plant and machinery of more than Rs 4.5 crore during 2000-01. This may be over Rs 5 crore at current price. The estimates derived from unitwise data shows that 69.5 per cent of units above Rs 1 crore investment in plant and machinery belong to MSMS.

The BSSMS definition adopted here is different from the DCSSI definition of the SSI sector, as units without fixed premises are not considered for DCSSI data analysis. From the NSSO unitwise data, the units with no fixed premises are estimated at 10.33 lakh units and all of these units are part of the revised unorganised manufacturing sector.⁹ By taking out units without fixed premises from BSSMS data in Table 5, an estimate of SSI units eligible to be registered with DCSSI is worked out in Table 6.

The total units eligible for registration (with investment in plant and machinery less than or equal to Rs 1 crore and with fixed premises) are estimated at 160.98 lakh, while DCSSI estimates put them at only 41.76 lakh. The poor method of coverage of non-registered sector units in DCSSI methodology is the reason for this and hence it is better to derive this information using unitwise NSSO data on the unorganised manufacturing sector and ASI data on factory sector. There is thus no need to unnecessarily conduct another survey/census on SSI sector.

On the other hand, the design used by the DCSSI (third census) was certainly more suitable to capture registered SSI units. In the 56th round NSS, no separate stratification was made to specifically capture the non-ASI units registered under the DCSSI. The DCSSI units, in many states are concentrated in a few geographical locations, often developed by the government

Table 6: SSI Units Eligible to be Registered with DCSSI in Overall Manufacturing Sector

NIC '98 2-digit	Units	Workers	Output	VA
	Organised and Unorganised Manufacturing Units with Fixed Premises and Investment in Plant and Machinery less than Rs 1 Crore			
14	89.9	89.3	93.0	89.4
15	94.1	87.6	52.7	50.5
16	99.9	99.3	61.4	59.4
17	99.1	87.3	36.9	45.7
18	99.6	97.8	81.5	88.8
19	96.7	86.2	53.6	63.6
20	81.3	86.4	83.5	77.9
21	98.7	72.9	30.2	35.2
22	99.6	91.4	54.8	55.5
23	78.5	46.3	5.1	5.1
24	96.8	59.2	14.7	11.2
25	98.3	74.6	37.3	34.5
26	86.6	83.2	35.8	37.3
27	94.5	37.2	18.7	9.6
28	98.1	91.8	56.9	61.0
29	98.7	73.7	33.3	30.0
30	69.9	26.9	29.7	24.2
31	98.6	69.3	61.0	27.0
32	95.7	47.3	17.3	16.5
33	97.5	60.0	36.0	35.9
34	97.4	46.0	10.9	14.8
35	80.4	43.8	21.9	17.0
36	88.3	91.8	71.1	79.9
37	99.7	99.1	83.9	97.6
15-37	93.9	86.4	35.5	37.0
	Units No	Employees No	Output Rs	VA Rs
	160,97,590	387,30,017	385,73,857	87,39,008
DCSSI DATA	41,75,815			

Source: Unitwise ASI, CSO data for year 2000-01 and unitwise NSSO data on unorganised manufacturing sector.

Table 5: Share of Broader Small-scale Manufacturing Sector Units in Overall Manufacturing Sector

NIC '98 2-digit	BSSMS Share in Manufacturing Sector				Medium- and Large-Scale Manufacturing Sector			
	Units	Employees	Output	VA	Units	Employees	Output	VA
14	99.98	96.55	93.71	92.66	0.02	3.45	6.29	7.34
15	99.91	92.75	53.20	52.67	0.09	7.25	46.80	47.33
16	100.00	99.46	61.43	59.97	0.00	0.54	38.57	40.03
17	99.87	87.68	37.02	46.25	0.13	12.32	62.98	53.75
18	99.98	97.98	81.56	89.52	0.02	2.02	18.44	10.48
19	99.83	88.01	53.68	64.54	0.17	11.99	46.32	35.46
20	100.00	99.78	93.41	97.30	0.00	0.22	6.59	2.70
21	99.45	73.33	30.16	35.54	0.55	26.67	69.84	64.46
22	99.71	91.46	54.84	56.99	0.29	8.54	45.16	43.01
23	97.51	49.57	5.17	5.46	2.49	50.43	94.83	94.54
24	98.90	62.66	14.74	12.19	1.10	37.34	85.26	87.81
25	98.83	74.76	37.35	35.48	1.17	25.24	62.65	64.52
26	99.90	94.17	37.67	41.66	0.10	5.83	62.33	58.34
27	96.79	37.30	18.71	9.93	3.21	62.70	81.29	90.07
28	99.90	92.97	57.02	62.43	0.10	7.03	42.98	37.57
29	99.40	73.94	33.35	31.11	0.60	26.06	66.65	68.89
30	77.09	26.89	29.67	24.17	22.91	73.11	70.33	75.83
31	99.10	69.45	60.99	27.24	0.90	30.55	39.01	72.76
32	96.09	47.26	17.28	16.43	3.91	52.74	82.72	83.57
33	97.82	60.02	35.99	36.53	2.18	39.98	64.01	63.47
34	97.54	46.04	10.90	15.07	2.46	53.96	89.10	84.93
35	98.47	47.83	22.03	17.83	1.53	52.17	77.97	82.17
36	99.98	98.50	73.03	84.59	0.02	1.50	26.97	15.41
37	99.99	99.14	83.95	97.70	0.01	0.86	16.05	2.30
All	99.90	90.53	35.90	38.72	0.10	9.47	64.10	61.28
	Units No	Employees No	Output Rs	VA Rs	Units No	Employees No	Output Rs	VA Rs
All	171,30,395	405,91,124	389,67,635	91,52,521	17,926	42,45,571	695,73,908	144,85,971

Note: Broader small-scale manufacturing sector consists of units with investment in plant and machinery equal or less than Rs 1 crore. It is equivalent to revised unorganised manufacturing sector plus factory sector SSI.

Source: Unitwise ASI, CSO data for 2000-01 and unitwise NSSO data on unorganised manufacturing sector.

for promoting the small-scale sector. In an area frame based survey, unless this information is not used at the time of stratification, capturing an adequate number of these registered DCSSI units becomes almost impossible. Thus, the estimated number of registered DCSSI units obtained from the 56th round NSS is on the lower side, when compared to the figures obtained from the third census of DCSSI, adjusted for the DCSSI units also registered under Sections 2m (i) and 2m (ii) of the Factories Act, 1948. Hence, DCSSI data are used to capture registered units, while total eligible units for registration with DCSSI is taken from the unitwise 56th NSSO round and ASI data. It may however be pointed out that only 6.38 per cent of units belonging to BSSMS are registered¹⁰ with the DCSSI (Table 7).

The data in Table 7 presents various segments of the manufacturing sector in terms of large, medium and broader small manufacturing sector. The various segments of BSSMS are then further classified into units not eligible as per DCSSI definition, registered SSI units and non-registered SSI units.

IV Conclusion

The above analysis clearly brings out the fact that the revised estimates of the factory sector, non-factory sector, small scale, medium and large scale can be worked out from the available data. This study brings out clearly that the CIF's framework is faulty, does not cover many eligible units and at the same time covers several non-eligible units. The impact of these limitations is very high in terms of the share of units, but is low in terms of value added and output. Similarly the small scale sector is defined and worked out in broader perspective in this study using unitwise ASI and NSSO data on the unorganised manufacturing sector. Thus this study brings out that there is no need to unnecessarily conduct another survey/census on the SSI sector. To capture the non-ASI units registered under the DCSSI in a better way, there is a need to make separate stratification. This is necessary as DCSSI units, in many states are concentrated in a few geographical locations, often developed by the government for promoting the small-scale sector.

Thus it is better to stick to ASI and NSSO unorganised manufacturing data after removing discrepancies for all purposes to avoid problems related to different sampling techniques. Once the base year reliable weights at two digit for each segment (organised, unorganised, SSS) are estimated, the yearwise

indicators for each segment for various NIC industry classifications could be used for updating the estimates over a period of time.

The discrepancies corrected in the base year (2000-01) have important bearings on the estimates of the performance of the sector and have long-term implications from the policy and planning perspective. Thus, the NAS' recent decision to upgrade its economic indicator series to base year 1999-2000 from 1993-94 seems to have not taken into account the best possible options to upgrade its base year weights.

The sectorwise estimates (for factory sector, non-factory sector and small-scale manufacturing sector) derived in this study could have used revised weights for the short- and long-term growth indicators. The revised base year weights developed in this study along with IIP (if IIP is prepared using proper sampling design and method) indicators could go a long way in bridging the gap between growth rates differences based on IIP and ASI data. jsbedi@ncaer.org

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Appendix: Estimated Number of Working Units in ASI for Various Employment Size Classes 1994-95

(India excluding Arunachal Pradesh, Mizoram, Sikkim and Lakshadweep)

Employment Size Class	Number of Units		Percentage Ratio of Non-included of Each Class from NSSO Data in ASI Data		
	ASI	NSS	Number of Enterprises	Employment	GVA
1	2	3	4	5	6
0 - 9	29,619				
10 - 19	32,715	1,18,767#	363# (95**)	326# (18**)	90# (2.83**)
20 or more	62,201	26,611	43# (21**)	11# (10**)	1.34# (1.26**)
10 or more	94,916	1,45,378#	153# (117**)	28# (28**)	4.20# (4.08**)
All (incl <10)	1,24,535				

Notes: # Considers only those units using power in 10-19 employment size class category.

* Percentage shares of non-included in each class from NSSO data in ASI data for that class eg, 363 = 118767*100/32715.

** Percentage shares of non-included in each class from NSSO data in total ASI data, e g, 363 = 118767*100/32715.

Source: National Statistical Commission, 2001.

In fact, the total number of units reported by ASI during 1994-95 was 1.19672 lakhs and more than 1.45 lakhs eligible were not registered. Considering the fact that the NSS does not include those units operated less than 30 days (15 days in the case of seasonal enterprises) during one year proceeding the date of survey, but the ASI includes factories operated even for a day, the number of units missing in the ASI frame is likely to be larger than the figure of 1.45 lakhs.

Table 7: Share of Various Segments of Manufacturing Sector

	Units	Employment	Output	VA
A Share of large, medium, and BSSMS in manufacturing sector				
Manufacturing sector (NIC Code 15-37)	100.00	100.00	100.00	100.00
Large scale manufacturing sector	0.03	4.13	29.63	24.31
Medium scale manufacturing sector	0.07	5.37	34.37	27.09
Broader small scale manufacturing sector	99.90	90.50	36.00	48.60
B Share of BSSMS units not eligible for SSI sector as per DCSSI definition, registered SSS Units and non-registered SSS units in BSSMS				
BSSMS	100.00	100.00	100.00	100.00
Units without premises (not eligible as per DCSSI definition)	6.21	4.97	4.17	24.28
Small scale registered manufacturing sector*	6.38	13.59	45.92	5.14
Small scale non-registered manufacturing Sector	87.42	81.44	49.92	70.58

Notes: * Small scale registered manufacturing sector data is worked out using unitwise the third all-India census on small-scale sector. The use of unitwise data was important to estimate the number of registered SSI units for the year 2000-01 and the method is explained in the note 6 and Foot Note 10.

Source: ASI, CSO data for year 2000-01, NSSO data on unorganised manufacturing sector, registered SSI units for year 2000-01 are taken from DCSSI third census on SSI.

Notes

[Thanks are due to R Nagaraj, who has gone through this work and made a few useful suggestions.]

- 1 The sample size in the present design results in fairly large sampling errors of estimates even at the all-India level for the main variables such as input, output and GVA, in some cases, even at the level of the two-digit industry groups. Hence, it does not permit generation of reasonably precise estimates for many industry groups covered in the survey.
- 2 All non-SSI units worked by subtracting manufacturing sector data from DCSSI data cannot be treated as medium and large sector units.
- 3 The average growth rates are worked out using ASI 1999-2000 as base year weights.
- 4 As the DCSSI units in many states are concentrated in a few geographical locations, often developed by the government for promoting the small scale sector, unless this information is not used at the time of stratification, an area frame based survey tends to under-represent these units in the sample.
- 5 Recently, DCSSI came out with data on an all-India census of the small scale sector, after a gap of 13 long years, during 2001-02.
- 6 The published data on DCSSI is for year 2000-02. The unitwise DCSSI data is thus used to estimate values for the year 2000-01. The DCSSI census collected data on output for three years, 1999-2000, 2000-01 and 2001-02. To arrive at the number of enterprises for year 2000-01, only enterprises whose initial year of production started before 2001 were considered. The limitation however is that a few units, which existed during 2000-01 and closed down during 2001-02, could not be captured in this method.
- 7 The revised unorganised manufacturing sector means removing units from the unorganised sector, which are eligible for the factory sector, and adding eligible unorganised manufacturing sector units from ASI data in it. In the un-revised estimates of unorganised manufacturing sector, there were however 119 units (0.0008 per cent share in the unorganised sector in terms of units) with investment in P&M more than Rs 1 crore. All of these units were employing 10 or more workers with power and 20 or more workers without power. In the revised unorganised manufacturing sector data, not even a single unit has investment in P&M limit more than Rs 1 crore.
- 8 The entire unorganised manufacturing sector (revised) is part of BSSMS.

- 9 These units account for 6.1 per cent of the revised unorganised manufacturing units, 5.3 per cent of employment, 2.2 per cent of the output and 7.4 per cent of the value added. These shares indicate that despite the fact that these units operate without fixed premises, they have higher value added per unit compared to other units in the unorganised manufacturing sector, which have fixed premises. This indicates that these units are operating with efficiency and using very low input.
- 10 After obtaining the number of registered SSI units from unitwise DCSSI data, the problem relates to deriving other variables for registered SSI units as output per unit and value added per unit derived from NSSO data for unorganised sector is quite different as compared to ratios derived from DCSSI data. For the sake of consistency with our earlier estimates, the ratios derived from the 56th NSSO Round data are applied on the number of units registered with SSI separately for non-factory sector units and factory sector units. For the factory sector units registered with SSI, the ratios derived from the 56th NSSO Round data for units eligible to be included in the factory sector are used. For the non-factory sector units registered with SSI, the ratios derived from 56th NSSO Round data for units not eligible to be included in factory sector, but registered with the SSI factory sector, are used. Though this improves the results for the overall registered SSI sector, it is still plagued with major limitations due to the fact that data is used from two different sampling designs and procedure. The share of registered units for NIC 30 classification (not presented in the study) turns out to be higher than eligible units, maybe due to the product identification problem in two sampling techniques.

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