

**STUDY ON INTERNAL
CONSISTENCY OF ALL INDIA
INDEX OF INDUSTRIAL
PRODUCTION (IIP) DATA**

Economic Statistics Division, CSO

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INTRODUCTION

The all India Index of Industrial Production (IIP) is a composite indicator that measures the short-term changes in the volume of production of a basket of industrial products during a given period with respect to that in a chosen base period. It is compiled and published monthly by the Central Statistics Office (CSO) with the time lag of six weeks from the reference month. It was first released by Office of Economic Adviser under the Ministry of Commerce & Industry with 1937 as the base year. CSO started compiling and releasing the series since 1950 with 1946 as the base year. The base year of IIP has been revised successively to 1951, 1956, 1960, 1970, 1980-81 1993-94 and 2004-05.

The base period of IIP is selected taking into consideration its normality, proximity to the comparison period, availability of all relevant data and synchronization with other macro-economic indicators. To capture the changes in the structure and composition of the industry over time due to the technological changes, economic reforms and consumption patterns of the people, it is necessary to revise the IIP periodically by changing its base to a more recent period.

The current series of All India Index of Industrial Production (IIP) with base 2004-05 includes mining, manufacturing and electricity sectors in its scope. It covers 682 items (clubbed in 399 item groups: Mining-1, Manufacturing – 397, Electricity – 1) comprising 61 from Mining & Quarrying, 620 from Manufacturing and 1 from Electricity Sector having the weightage of 14.16%, 75.53% and 10.32% respectively in the all-India IIP. This series was released in June 2011 starting with the index for the month of April 2011 along with the past indices from April 2005 onwards.

The monthly production data required for compiling the IIP are regularly made available to the CSO by sixteen (16) source agencies.

- The Indian Bureau of Mines (IBM) compiles the monthly indices for the mining sector and the same is suitably dovetailed with the indices for manufacturing and electricity sectors to arrive at the general index.
- The data pertaining to electricity is available from the website of Central Electricity Authority (CEA).
- The data for manufacturing sector are being made available by the following fourteen (14) source agencies:
 - Directorate of Sugar, O/o Salt Commissioner, Directorate of Vanaspati, Vegetable Oil & Fats, Tea Board, Coffee Board, O/o the Textile Commissioner, O/o the Jute Commissioner, O/o the Coal Controller, M/o Petroleum & Natural Gas, Joint Plant Committee (Iron & Steel), Railway Board, D/o Industrial Policy & Promotion, D/o Chemicals & Petrochemicals and D/o Fertilizers.

QUALITY OF CURRENT IIP DATA

The IIP is released as a Quick Estimate (Q.E.) with a time lag of six weeks from the reference month. The Q.E. of IIP are revised twice - the first revision takes place after one month followed by second and final revision after three months of release of Q.E. based on updated data received from source agencies. The monthly production data from industrial units is directly being collected by the source agencies themselves. Then the data aggregated at the item group level is provided to CSO for index compilation. After receiving the data from the source agencies, these are scrutinized and checked for consistency. Four types of scrutiny checks are performed every month to identify any inconsistency in data. These scrutiny checks i.e. types of inconsistencies are given below:

1. More than 10% variation in production data of Final Revision over First Revision
2. More than 20% variation in production data of First Revision over Quick Estimates
3. More than 20% variation in production data of current month over previous month
4. More than 30% variation in production data of the current month over the final data of the corresponding month of the previous year

In cases of inconsistency, they are referred back to the concerned source agencies for reconciliation and then the reconciled data are used in the compilation of the index. The quality of the current series of Index of Industrial Production (IIP), which has the base 2004-05, suffers mainly from the following reasons:

- **Non-representativeness of the index basket:** The base year of the old series 1993-94 has been shifted to 2004-05 only recently in June 2011. The base year of new series is still quite old (more than 6 years) and as such may not be able to appropriately capture the structural changes in the industry. Therefore, necessity is felt to revise the IIP series again to switch over to a more recent base period.
- **Effect of non-response:** The quality of data is affected due to non-response from a good number of industries. Often the data are estimated on the basis of past data or sometimes simply repeated. Although most of the source agencies collect this production data under some statutory provision, this problem of non-response becomes more acute where this information is sought on voluntary basis from industrial units. The source agencies are required to vigorously pursue the non-responding units through fax, e-mail and telephone for improving quality and reliability of data, which go into the compilation of index.

Moreover, IIP being a short term economic indicator is inherently volatile in nature. The curves of growth over the same period of previous year and also over the previous month for General and Manufacturing indices from October 2009 to October 2011 are given at **Annexure I**. It can be seen from there that the month on month IIP growth curve is highly fluctuating.

INTERNAL CONSISTENCY OF IIP DATA

To study the internal consistency of IIP data two methods have been used:

1. The presentation of percentage point contributions to the percent change of an index is a way to decompose the growth of an index into additive components (details given at **Annexure II**). Using this method, monthly growth rates of manufacturing sector for the period October 2009 to October 2011 were decomposed into percentage point contributions from each of the twenty two (22) two digit groups of NIC 2004 to identify the two digit groups which were mainly affecting the growth during this period. The growths from these identified two digit groups were again decomposed into percentage point contributions from the four digit groups of NIC 2004 falling under them. The monthly growth rates have been calculated both by **i)** Comparison over the same month of previous year and **ii)** Comparison over the previous month of the same year.
2. Some preliminary analysis has been carried out on annual production data (to remove the effect of seasonality) for the period 2005-06 to 2010-11 for all the 397 item groups present in the manufacturing sector.

By decomposition of growth of manufacturing sector into contributions from various two digit groups of NIC 2004, it was found that the following two digit groups were highly affecting the growth of manufacturing sector:

| NIC-2004 | Description |
|----------|---|
| 15 | Food products and beverages |
| 27 | Basic metals |
| 28 | Fabricated metal products, except machinery & equipment |
| 29 | Machinery and equipment n.e.c. |
| 31 | Electrical machinery & apparatus n.e.c. |
| 32 | Radio, TV and communication equipment & apparatus |
| 34 | Motor vehicles, trailers & semi-trailers |

The details of contributions from various two digit groups to the growth of manufacturing are given at **Annexure III**. The growth from each of these two digit groups was again decomposed into contributions from their respective four digit groups. Following four digit

groups were then identified that were highly impacting the growth in each of these two digit groups:

| NIC-2004 | Description |
|---|---|
| 15 Food products and beverages | |
| 1542 | Manufacture of sugar |
| 27 Basic metals | |
| 2714 | Manufacture of semi -finished products (ingots/ billets/ blooms/ slabs) |
| 2715 | Manufacture of non-flat steel products (bars, rods, structurals, rails) |
| 28 Fabricated metal products, except machinery & equipment | |
| 2813 | Manufacture of steam generators, except central heating hot water boilers |
| 29 Machinery and equipment n.e.c. | |
| 2919 | Manufacture of other general purpose machinery |
| 2929 | Manufacture of other special purpose machinery |
| 31 Electrical machinery & apparatus n.e.c. | |
| 3130 | Manufacture of insulated wire and cable |
| 32 Radio, TV and communication equipment & apparatus | |
| 3220 | Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy |
| 34 Motor vehicles, trailers & semi-trailers | |
| 3410 | Manufacture of motor vehicles |

The study of growth rates can be further extended to the five digit level of NIC 2004 to identify the item groups highly affecting the growth. Some preliminary analysis was also

carried out on annual production data (to remove the effect of seasonality) for all the 397 item groups present in the manufacturing sector. Mean, standard deviation and coefficient of variation for each of the 397 items was calculated and the results are given in the following summary table:

| Coefficient of variation (%) | No. of item groups |
|-------------------------------------|---------------------------|
| 0-30 | 324 |
| 30-60 | 59 |
| 60-90 | 11 |
| 90-120 | 1 |
| 120-150 | 0 |
| 150-180 | 2 |
| Total | 397 |

It was observed that 73 item groups with a weight of around 14% in manufacturing sector have a coefficient of variation greater than 30%. List of such item groups is placed at **Annexure IV**.

In particular, item groups having weight ≥ 1.0 and with a coefficient of variation more than 30% are:

| Sl.No. | NIC-04 | Item group | Use based category |
|---------------|---------------|--|---------------------------|
| 1 | 31300 | Cable, Rubber Insulated | Capital good |
| 2 | 32204 | Telephone Instruments including Mobile Phone and Accessories | Consumer Durable |
| 3 | 31200 | Conductor, Aluminium | Capital good |
| 4 | 29192 | Air Conditioner (Room) | Consumer Durable |
| 5 | 35119 | Ship Building & Repairs | Capital good |
| 6 | 27110 | Ferro manganese | Basic good |
| 7 | 36911 | Gems and Jewellery | Consumer Durable |
| 8 | 29198 | Heat Exchangers | Capital good |
| 9 | 28133 | Boilers | Capital good |
| 10 | 25209 | Biaxially Oriented Polypropylene (BOPP) Film | Intermediate good |
| 11 | 27110 | Ferro chrome | Basic good |
| 12 | 31901 | Generator/Alternator | Capital good |
| 13 | 28997 | Pressure Cooker | Consumer Durable |
| 14 | 29291 | Plastic Machinery including Moulding Machinery | Capital good |
| 15 | 15433 | Instant Food Mixes (Ready to eat) | Consumer Non-durable |
| 16 | 28121 | Cylinders | Capital good |
| 17 | 35912 | Scooter and Mopeds | Consumer Durable |

| Sl.No. | NIC-04 | Item group | Use based category |
|--------|--------|---------------------|----------------------|
| 18 | 25209 | PVC Pipes and Tubes | Consumer Durable |
| 19 | 24114 | Dyes | Intermediate good |
| 20 | 34103 | Passenger Cars | Consumer Durable |
| 21 | 15137 | Fruit Pulp | Consumer Non-durable |
| 22 | 17232 | Twine, jute (sutli) | Intermediate good |
| 23 | 29254 | Sugar Machinery | Capital good |
| 24 | 29297 | Cement Machinery | Capital good |
| 25 | 24232 | Vitamins | Consumer Non-durable |

Some of the above item groups are reported in value terms.

The curves of monthly production data for the period Apr'05 to Oct'11 for some of the items in the above table are given at **Annexure V**. Since production of some of the item groups is seasonal in nature, item group wise analysis may be further carried out on seasonally adjusted data.

Following table gives a comparison of IIP growth rates with that of ASI at two digit level of NIC 2004 for the period 2005-06 to 2007-08 (ASI data from the year 2008-09 onwards has been tabulated based on NIC 2008, which is not perfectly concordable with NIC 2004 at 2 digit level, thus growth from 2008-09 onwards has not been compared):

| NIC-2004 | IIP Growth Rates | | | Growth of ASI Output (at current prices) | | | *Growth of ASI Output (at constant prices of 2004-05) | | |
|----------|------------------|---------|---------|--|---------|---------|---|---------|---------|
| | 2005-06 | 2006-07 | 2007-08 | 2005-06 | 2006-07 | 2007-08 | 2005-06 | 2006-07 | 2007-08 |
| 15 | 13.2 | 15.9 | 12.5 | 11.9 | 24.4 | 18.7 | 10.0 | 18.2 | 14.2 |
| 16 | 1.0 | 1.8 | -4.4 | 8.6 | 11.4 | -3.3 | 6.6 | 6.0 | -12.3 |
| 17 | 8.3 | 7.8 | 6.6 | 15.8 | 30.7 | -1.1 | 17.0 | 28.2 | -1.8 |
| 18 | 14.1 | 20.3 | 9.3 | 17.0 | 12.3 | 9.2 | 18.3 | 10.2 | 8.4 |
| 19 | -9.1 | 14.4 | 5.8 | 24.3 | 12.3 | 38.3 | 19.3 | 4.0 | 34.2 |
| 20 | 6.8 | 18.0 | 17.5 | 17.5 | 16.5 | 25.5 | 11.1 | 10.1 | 17.6 |
| 21 | 6.3 | 4.4 | 1.4 | 9.7 | 11.2 | 29.6 | 5.8 | 6.3 | 25.9 |
| 22 | 13.7 | 8.0 | 14.2 | 30.5 | 16.0 | 16.9 | 26.0 | 14.8 | 11.5 |
| 23 | 0.6 | 11.9 | 6.2 | 24.6 | 27.4 | 16.4 | 9.7 | 19.6 | 16.3 |
| 24 | 1.0 | 9.3 | 7.2 | 14.5 | 14.0 | 9.4 | 10.3 | 8.6 | 5.6 |
| 25 | 12.3 | 6.6 | 13.4 | 1.0 | 25.7 | 18.7 | -0.9 | 19.0 | 13.8 |
| 26 | 7.8 | 10.9 | 9.3 | 7.3 | 34.0 | 28.9 | 3.7 | 20.1 | 15.9 |
| 27 | 15.5 | 14.7 | 17.9 | 4.3 | 37.4 | 19.0 | 2.0 | 25.7 | 7.9 |

| NIC-2004 | IIP Growth Rates | | | Growth of ASI Output (at current prices) | | | *Growth of ASI Output (at constant prices of 2004-05) | | |
|---------------|------------------|---------|---------|--|---------|---------|---|---------|---------|
| | 2005-06 | 2006-07 | 2007-08 | 2005-06 | 2006-07 | 2007-08 | 2005-06 | 2006-07 | 2007-08 |
| 28 | 11.1 | 19.9 | 7.8 | 31.2 | 41.6 | 33.7 | 19.8 | 29.6 | 29.7 |
| 29 | 26.1 | 19.7 | 22.6 | 31.0 | 18.4 | 28.3 | 26.5 | 11.4 | 23.7 |
| 30 | 45.3 | 7.0 | 6.0 | 36.5 | 20.4 | 9.4 | 45.6 | 23.9 | 11.4 |
| 31 | 16.8 | 12.7 | 183.5 | 57.2 | 44.8 | 5.7 | 51.7 | 36.2 | 2.0 |
| 32 | 22.7 | 155.0 | 93.1 | 10.1 | 6.6 | 20.1 | 14.4 | 10.5 | 16.8 |
| 33 | -4.7 | 9.9 | 6.3 | 7.2 | 24.2 | 32.4 | 3.5 | 16.8 | 27.7 |
| 34 | 10.1 | 25.3 | 9.5 | -15.8 | 16.7 | 15.9 | -17.9 | 14.2 | 13.2 |
| 35 | 15.3 | 15.2 | -2.9 | 13.9 | 21.5 | -8.1 | 4.3 | 16.4 | -12.1 |
| 36 | 16.2 | -3.9 | 18.7 | 39.0 | 20.1 | 13.8 | 35.7 | 13.6 | 8.6 |
| Manufacturing | 10.3 | 15.0 | 18.4 | 14.1 | 26.2 | 15.2 | 11.4 | 19.4 | 10.0 |

** List of WPI deflators used is given at Annexure VI.*

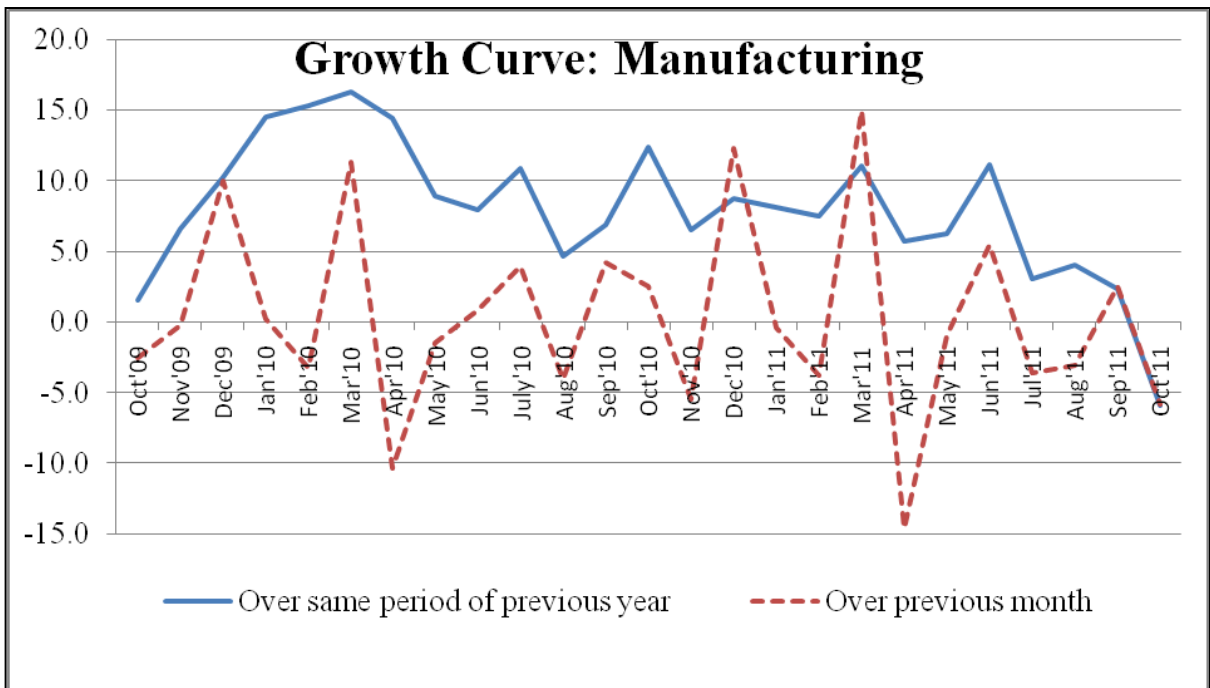
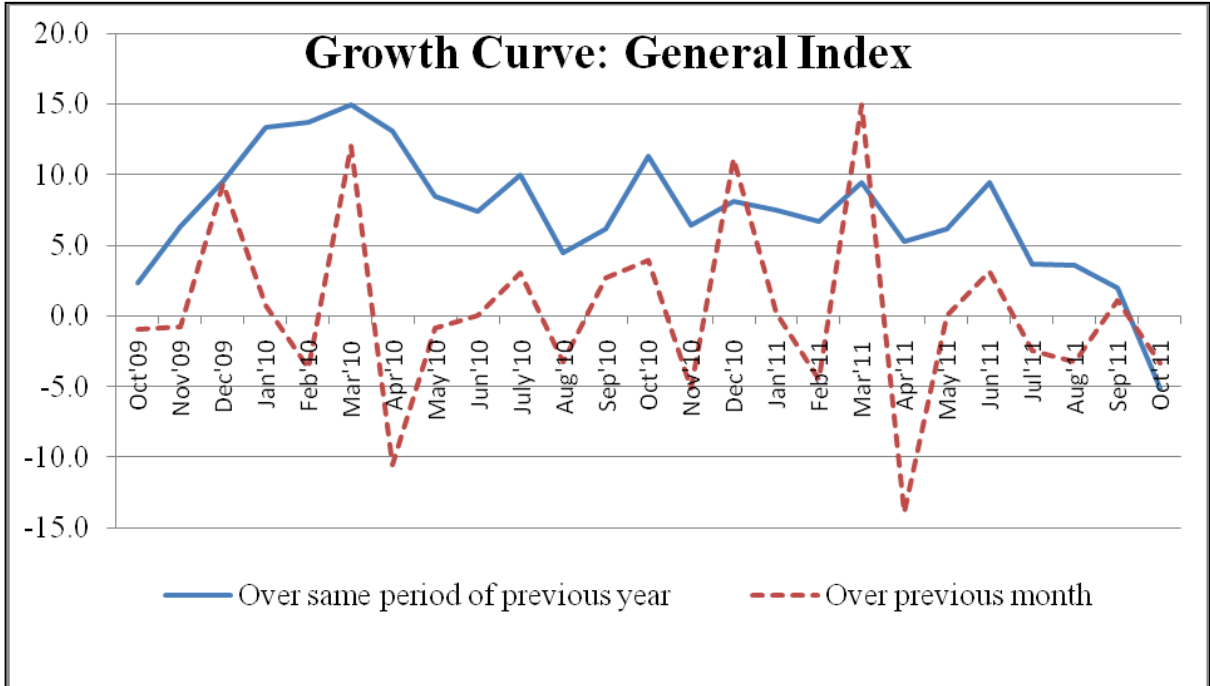
It is evident from the above table that IIP and ASI growth rates are highly varying at two digit level of NIC 2004 in different years.

To examine the quality of IIP data, its reconciliation with ASI dataset can be further extended to item group wise unit level data analysis, since provisional item basket as well as frame of units/factories for IIP is selected from ASI data itself. But the major obstacle in this kind of study is that while finalizing the item basket for IIP, some of the items are clubbed to form item groups for the convenience of data collection. Thus exact one-to-one matching of unit level production of such item groups between the two data sets may not be possible.

ANNEXURE

ANNEXURE I

Monthly Growth Curves



ANNEXURE II

Decomposition of Growth

The presentation of percentage point contributions to the percent change of an index is a way to decompose the growth of an index into additive components. Let I_{M1} and I_{M2} be the manufacturing indices for periods 1 and 2. These indices are weighted arithmetic average of indices of two digit industry groups 15 to 22 of NIC 2004. Let x_i and y_i be the index for the i^{th} two digit group of NIC 2004 for the periods 1 and 2 respectively, then

$$I_{M1} = \sum w_i x_i / \sum w_i ; i=15,16,\dots,22.$$

$I_{M2} = \sum w_i y_i / \sum w_i ; i=15,16,\dots,22$; where w_i is the weight assigned to the i^{th} two digit industry group.

Then the growth of manufacturing for period 2 over period 1 will be,

$$\begin{aligned} (I_{M2} - I_{M1}) / I_{M1} * 100 &= [\sum w_i \{(y_i - x_i) / \sum w_i\}] / I_{M1} * 100 \\ &= (\sum w_i / 100)^{-1} * [\sum w_i \{(y_i - x_i) / I_{M1}\}] \\ &= \sum C_i ; i=15,16,\dots,22. \end{aligned}$$

where $C_i = \{w_i / (\sum w_i / 100)\} * [(y_i - x_i) / I_{M1}] ; i=15,16,\dots,22$.

is the contribution of i^{th} two digit industry group of NIC 2004 to the growth of manufacturing sector.

Similar decomposition can be applied at the various levels of NIC.

ANNEXURE III

Manufacturing Sector Growth

| Month | Growth over same period of previous year | Percentage point contribution of the NIC 2004 two digit group | | | | | | | | | | | | | | | | | | | | | | | |
|---------|--|---|------|------|------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|--|--|
| | | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | | |
| Oct'09 | 1.5 | -0.1 | 0.0 | 0.7 | -0.2 | 0.0 | 0.1 | 0.0 | -0.2 | 0.3 | 0.3 | 0.4 | 0.2 | -0.4 | 0.7 | 0.2 | 0.0 | -1.4 | -0.6 | 0.0 | 1.1 | 0.3 | 0.4 | | |
| Nov'09 | 6.6 | 0.3 | -0.2 | 0.7 | -0.2 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.4 | 0.7 | 0.5 | 1.3 | 0.8 | 1.3 | 0.0 | -4.5 | 2.3 | 0.0 | 2.6 | 0.8 | -0.1 | | |
| Dec'09 | 10.2 | -0.2 | 0.1 | 0.6 | -0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.6 | 0.6 | 0.6 | 0.6 | -0.6 | 1.7 | 0.5 | -2.0 | 2.2 | 0.0 | 3.9 | 1.3 | 0.4 | | |
| Jan'10 | 14.5 | 0.1 | 0.1 | 0.2 | -0.5 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.6 | 0.7 | 0.7 | 1.4 | 1.1 | 2.4 | 0.0 | -2.2 | 3.1 | -0.1 | 3.4 | 1.3 | 1.7 | | |
| Feb'10 | 15.3 | 1.6 | 0.0 | 0.2 | 0.2 | 0.0 | 0.4 | 0.0 | 0.1 | -0.1 | 0.4 | 0.5 | 0.5 | 0.1 | 0.9 | 2.5 | 0.1 | 2.0 | 1.6 | -0.3 | 2.9 | 0.9 | 0.7 | | |
| Mar'10 | 16.3 | 1.8 | -0.1 | 0.4 | 0.5 | 0.0 | 0.2 | 0.0 | 0.1 | -0.1 | 0.3 | 0.7 | 0.4 | 0.9 | 1.7 | 2.8 | 0.0 | 3.0 | 0.2 | -0.2 | 2.5 | 1.0 | 0.2 | | |
| Apr'10 | 14.4 | 2.0 | 0.1 | 0.3 | -0.3 | 0.0 | 0.3 | 0.0 | 0.1 | 0.2 | -0.5 | 0.6 | 0.4 | 0.9 | 0.5 | 2.6 | 0.0 | 2.3 | 0.7 | 0.1 | 2.7 | 0.8 | 0.5 | | |
| May'10 | 8.9 | 0.3 | 0.0 | 0.4 | 0.4 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | -0.1 | 0.6 | 0.5 | 0.5 | 0.6 | 2.4 | -0.1 | -0.5 | 1.0 | 0.0 | 1.8 | 0.6 | -0.3 | | |
| Jun'10 | 7.9 | 1.2 | 0.3 | 0.3 | 0.3 | 0.0 | -0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.4 | 0.2 | 0.2 | 0.5 | 1.7 | 0.0 | -1.8 | 2.0 | 0.1 | 2.0 | 0.6 | -0.4 | | |
| July'10 | 10.8 | -0.3 | 0.2 | 0.2 | 0.1 | 0.0 | -0.1 | 0.1 | 0.1 | 0.3 | 0.1 | 0.5 | 0.0 | 0.2 | 0.5 | 1.6 | -0.1 | 3.7 | 1.3 | 0.0 | 2.2 | 0.7 | -0.6 | | |
| Aug'10 | 4.7 | 0.1 | 0.1 | 0.6 | 0.4 | 0.0 | 0.0 | 0.1 | 0.2 | -0.6 | -0.7 | 0.4 | 0.2 | 1.0 | 0.4 | 1.5 | 0.0 | -1.6 | 0.6 | 0.1 | 1.9 | 0.7 | -0.8 | | |
| Sep'10 | 6.9 | 0.3 | 0.1 | 0.6 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 | -0.7 | 0.0 | 0.2 | 0.4 | 1.3 | 0.7 | 1.8 | 0.0 | -1.6 | 0.8 | 0.0 | 1.9 | 0.6 | 0.2 | | |
| Oct'10 | 12.3 | -0.2 | 0.1 | 0.8 | 0.4 | 0.1 | -0.1 | 0.2 | 0.2 | -0.6 | 0.3 | 0.5 | 0.6 | 2.8 | 0.7 | 2.0 | 0.0 | 1.5 | 0.9 | 0.0 | 1.6 | 1.1 | -0.3 | | |
| Nov'10 | 6.5 | -1.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | 0.1 | 0.1 | -0.1 | 0.4 | -0.1 | -0.1 | 1.5 | 0.3 | 1.0 | 0.0 | 2.2 | 0.8 | 0.0 | 1.2 | 0.4 | 0.0 | | |
| Dec'10 | 8.7 | 0.1 | -0.3 | 0.3 | 0.0 | 0.1 | -0.1 | 0.1 | 0.1 | 0.4 | 0.3 | 0.3 | 0.0 | 2.0 | 0.7 | 1.5 | -0.3 | 1.5 | 0.3 | -0.1 | 1.9 | 0.3 | -0.4 | | |
| Jan'11 | 8.1 | 0.7 | -0.1 | 0.9 | 0.0 | 0.1 | -0.1 | 0.1 | 0.1 | 0.5 | 0.6 | 0.2 | 0.0 | 2.0 | 0.4 | 1.7 | 0.1 | -0.8 | 0.5 | 0.0 | 1.5 | 0.2 | -0.3 | | |
| Feb'11 | 7.5 | 1.4 | 0.0 | 0.5 | 0.0 | 0.1 | -0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.2 | 0.2 | 1.6 | 0.8 | 1.5 | 0.0 | -2.7 | 1.0 | 0.0 | 1.5 | 0.7 | -0.4 | | |
| Mar'11 | 11.0 | 2.0 | -0.2 | 0.3 | 0.3 | 0.1 | -0.1 | 0.1 | 0.1 | 0.1 | 0.6 | -0.2 | 0.2 | 1.7 | 1.2 | 2.3 | 0.0 | 0.5 | 0.3 | 0.1 | 1.6 | 0.6 | -0.5 | | |
| Apr'11 | 5.7 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.1 | 0.1 | 0.4 | 0.7 | -0.1 | -0.1 | 2.0 | 0.6 | -0.1 | 0.1 | 0.2 | -0.5 | 0.0 | 1.6 | 0.5 | -0.7 | | |
| May'11 | 6.3 | 1.7 | 0.0 | -0.3 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 | 0.5 | 0.4 | -0.1 | 0.0 | 2.0 | 0.5 | -0.5 | 0.1 | -0.3 | 0.0 | 0.1 | 1.5 | 0.6 | 0.3 | | |
| Jun'11 | 11.1 | 1.3 | 0.1 | -0.1 | -0.5 | 0.1 | 0.0 | 0.1 | 0.1 | 0.3 | -0.2 | 0.0 | 0.0 | 2.9 | 0.6 | 0.2 | 0.1 | 5.2 | -0.8 | -0.1 | 1.0 | 0.5 | 0.3 | | |
| Jul'11 | 3.1 | 1.4 | -0.1 | 0.0 | -0.4 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | -0.5 | 0.1 | 0.5 | 2.8 | 0.5 | -0.2 | 0.0 | -3.8 | 0.9 | -0.1 | 0.7 | 0.5 | 0.2 | | |
| Aug'11 | 4.1 | 0.7 | -0.3 | -0.2 | -0.4 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | -0.4 | 0.0 | 0.3 | 1.7 | 0.5 | 0.0 | -0.1 | -0.3 | 0.9 | 0.0 | 0.6 | 0.4 | 0.1 | | |
| Sep'11 | 2.4 | 0.5 | 0.2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | -0.6 | -0.1 | 0.1 | 1.6 | 0.5 | -0.2 | 0.1 | -2.4 | 1.7 | 0.1 | 0.4 | 0.6 | -0.3 | | |
| Oct'11 | -6.0 | 0.8 | 0.0 | -0.7 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.6 | -0.3 | 0.1 | 0.5 | 0.2 | -0.8 | 0.1 | -5.7 | 1.1 | 0.1 | -0.5 | 0.1 | 0.0 | | |

ANNEXURE III

Manufacturing Sector Growth

| Month | Growth over previous month | Percentage point contribution of the NIC 2004 two digit group | | | | | | | | | | | | | | | | | | | | | | |
|---------|----------------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| | | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | |
| Oct'09 | -2.5 | 0.4 | 0.0 | 0.1 | -0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | -0.6 | -0.1 | 0.2 | -0.3 | -0.3 | -0.5 | -0.1 | -1.5 | 0.4 | 0.0 | -0.1 | -0.2 | 0.0 | |
| Nov'09 | -0.3 | 2.1 | 0.0 | 0.1 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | -0.7 | -0.1 | 0.3 | 0.0 | 0.6 | 0.3 | 0.1 | 0.0 | -3.3 | 0.2 | -0.1 | 0.3 | 0.2 | -0.7 | |
| Dec'09 | 10.0 | 2.8 | 0.1 | 0.1 | 1.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.3 | 0.3 | 0.1 | 0.5 | 0.0 | 0.3 | 0.7 | 0.5 | 1.5 | 0.4 | 0.1 | 0.0 | 0.3 | 0.5 | |
| Jan'10 | 0.2 | -0.3 | 0.0 | -0.3 | -0.4 | 0.0 | -0.1 | 0.0 | 0.0 | 0.2 | -0.2 | 0.0 | 0.1 | 1.0 | -0.1 | 0.3 | -0.5 | -0.2 | 0.2 | -0.1 | 0.5 | 0.1 | 0.1 | |
| Feb'10 | -3.3 | -0.4 | -0.1 | -0.2 | 0.2 | 0.0 | 0.1 | 0.0 | -0.1 | -0.6 | -0.6 | -0.1 | -0.2 | -1.1 | 0.0 | 0.8 | 0.1 | -0.1 | -1.0 | 0.0 | 0.4 | -0.3 | 0.0 | |
| Mar'10 | 11.3 | -0.8 | 0.0 | 0.4 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.5 | 0.6 | 0.4 | 0.6 | 1.9 | 2.1 | 2.5 | 0.2 | 1.0 | -0.3 | 0.2 | 0.8 | 0.6 | 0.3 | |
| Apr'10 | -10.3 | -1.1 | 0.1 | 0.1 | -0.2 | 0.0 | -0.1 | -0.1 | 0.0 | -0.5 | -0.3 | -0.2 | -0.3 | -1.6 | -2.5 | -1.7 | -0.2 | -0.1 | 0.2 | -0.2 | -0.9 | -0.5 | -0.1 | |
| May'10 | -1.4 | -0.8 | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.5 | 0.1 | -0.1 | 0.5 | 0.3 | -0.1 | 0.0 | -1.2 | 0.1 | 0.0 | -0.5 | 0.0 | -0.5 | |
| Jun'10 | 0.8 | 0.7 | -0.2 | -0.1 | 0.0 | -0.1 | -0.2 | 0.0 | -0.1 | 0.3 | 0.3 | -0.1 | -0.3 | -0.4 | 0.4 | -0.7 | 0.1 | -0.9 | 1.6 | 0.1 | 0.2 | 0.1 | -0.1 | |
| July'10 | 4.0 | -1.1 | 0.2 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 | 0.0 | -0.1 | 0.2 | 0.0 | -0.2 | -0.1 | 3.7 | -0.5 | 0.0 | 0.9 | 0.2 | 0.2 | |
| Aug'10 | -4.0 | -0.6 | 0.0 | 0.3 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | -0.2 | -0.1 | -0.1 | 0.6 | 0.1 | 0.0 | 0.1 | -2.8 | -0.7 | 0.0 | -0.1 | 0.1 | -0.1 | |
| Sep'10 | 4.2 | -0.1 | 0.0 | -0.1 | -0.4 | 0.0 | -0.1 | -0.1 | -0.1 | -0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 0.9 | 0.0 | 2.4 | 0.2 | 0.0 | 0.4 | 0.0 | 0.7 | |
| Oct'10 | 2.5 | -0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | -0.3 | 0.1 | 0.4 | 1.1 | -0.3 | -0.4 | -0.1 | 1.5 | 0.4 | 0.0 | -0.4 | 0.3 | -0.5 | |
| Nov'10 | -5.4 | 1.3 | -0.2 | -0.6 | -0.1 | 0.0 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 | -0.2 | -0.6 | -0.6 | -0.1 | -0.8 | 0.0 | -2.3 | 0.1 | 0.0 | -0.2 | -0.4 | -0.3 | |
| Dec'10 | 12.3 | 3.6 | -0.1 | 0.3 | 1.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.3 | 0.5 | 0.6 | 0.6 | 0.7 | 1.3 | 0.1 | 0.8 | 0.1 | 0.1 | 0.9 | 0.2 | 0.0 |
| Jan'11 | -0.4 | 0.3 | 0.2 | 0.2 | -0.4 | 0.0 | -0.1 | 0.0 | 0.0 | 0.3 | 0.1 | -0.1 | 0.1 | 0.9 | -0.4 | 0.4 | -0.1 | -2.3 | 0.3 | 0.0 | 0.2 | 0.0 | 0.2 | |
| Feb'11 | -3.8 | 0.2 | 0.0 | -0.5 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | -0.9 | -0.4 | -0.1 | -0.1 | -1.4 | 0.4 | 0.6 | 0.0 | -1.7 | -0.4 | 0.0 | 0.3 | 0.2 | -0.1 | |
| Mar'11 | 14.9 | 0.0 | -0.2 | 0.2 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | 0.5 | 0.4 | 0.0 | 0.6 | 2.0 | 2.5 | 3.3 | 0.2 | 4.0 | -0.9 | 0.3 | 0.9 | 0.4 | 0.1 | |
| Apr'11 | -14.6 | -2.0 | 0.3 | -0.2 | -0.4 | 0.0 | -0.2 | -0.1 | 0.0 | -0.2 | -0.2 | -0.1 | -0.6 | -1.4 | -2.8 | -3.7 | -0.2 | -0.4 | -0.6 | -0.3 | -0.9 | -0.5 | -0.2 | |
| May'11 | -0.9 | -0.2 | -0.1 | -0.2 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.5 | 0.2 | -0.5 | 0.0 | -1.6 | 0.6 | 0.1 | -0.6 | 0.0 | 0.4 | |
| Jun'11 | 5.4 | 0.4 | 0.0 | 0.1 | -0.4 | 0.0 | -0.1 | 0.0 | -0.1 | 0.1 | -0.2 | 0.0 | -0.2 | 0.5 | 0.4 | -0.1 | 0.1 | 4.4 | 0.8 | 0.0 | -0.3 | 0.1 | -0.1 | |
| Jul'11 | -3.6 | -0.9 | 0.0 | 0.4 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | 0.1 | 0.3 | 0.2 | -0.1 | -0.5 | -0.1 | -4.9 | 1.1 | 0.0 | 0.6 | 0.2 | 0.1 | |
| Aug'11 | -3.1 | -1.2 | -0.2 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | -0.2 | -0.2 | -0.2 | -0.6 | 0.0 | 0.1 | 0.0 | 0.7 | -0.7 | 0.0 | -0.3 | 0.0 | -0.3 | |
| Sep'11 | 2.5 | -0.3 | 0.4 | -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | -0.7 | -0.2 | 0.0 | -0.2 | 0.0 | 0.5 | 0.8 | 0.2 | 0.2 | 1.1 | 0.1 | 0.2 | 0.2 | 0.4 | |
| Oct'11 | -5.8 | 0.2 | -0.1 | -0.4 | -0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | -0.3 | -0.2 | 0.5 | 0.0 | -0.6 | -1.0 | -0.1 | -1.9 | -0.2 | 0.0 | -1.3 | -0.2 | -0.2 | |

ANNEXURE IV

List of item groups with coefficient of variation > 30%

| Sl.No. | NIC-2004 | Item Group | Unit | Weight | Coefficient of variation |
|--------|----------|--|-------------|---------|--------------------------|
| 1 | 34103 | Passenger Cars | Numbers | 19.7397 | 31.88 |
| 2 | 36911 | Gems And Jewellery | Rs.Crore | 17.6721 | 45.25 |
| 3 | 27110 | Ferro manganese | Th. tonnes | 6.3869 | 45.69 |
| 4 | 28133 | Boilers | Rs.Crore | 4.0111 | 40.76 |
| 5 | 27110 | Ferro chrome | Th. tonnes | 3.4280 | 35.55 |
| 6 | 24232 | Vitamins | Rs.Crore | 3.0131 | 30.14 |
| 7 | 29192 | Air Conditioner (Room) | Numbers | 2.8741 | 59.56 |
| 8 | 29291 | Plastic Machinery including Moulding Machinery | Rs.Crore | 2.5524 | 34.77 |
| 9 | 25209 | Biaxially Oriented Polypropylene (BOPP) Film | Tonnes | 2.5199 | 37.21 |
| 10 | 32204 | Telephone Instruments including Mobile Phone And Accessories | Th.Nos. | 2.1784 | 61.82 |
| 11 | 35912 | Scooter and Mopeds | Numbers | 2.1398 | 32.69 |
| 12 | 28997 | Pressure Cooker | Numbers | 2.1342 | 35.39 |
| 13 | 31200 | Conductor, Aluminium | Tonnes | 2.0043 | 61.02 |
| 14 | 25209 | PVC Pipes and Tubes | Tonnes | 1.8906 | 32.67 |
| 15 | 17232 | Twine, jute (sutli) | Th. tonnes | 1.4791 | 31.60 |
| 16 | 24114 | Dyes | Rs.Crore | 1.3942 | 32.26 |
| 17 | 28121 | Cylinders | Numbers | 1.3742 | 34.21 |
| 18 | 31901 | Generator/Alternator | Rs.Crore | 1.3179 | 35.52 |
| 19 | 15433 | Instant Food Mixes (Ready to eat) | Tonnes | 1.3171 | 34.65 |
| 20 | 15137 | Fruit Pulp | Tonnes | 1.3143 | 31.73 |
| 21 | 31300 | Cable, Rubber Insulated | Kilo metres | 1.2276 | 78.88 |
| 22 | 29297 | Cement Machinery | Rs.Crore | 1.2150 | 30.99 |
| 23 | 29254 | Sugar Machinery | Rs.Crore | 1.1399 | 31.45 |
| 24 | 15141 | Soyabean oil | MT | 1.0839 | 74.57 |
| 25 | 35119 | Ship Building & Repairs | Rs.Crore | 1.0457 | 47.11 |
| 26 | 29198 | Heat Exchangers | Rs.Crore | 1.0215 | 44.94 |
| 27 | 31104 | UPS/Inverter/Converter | Numbers | 0.9285 | 62.32 |
| 28 | 29119 | Turbines & Accessories | Rs.Crore | 0.9113 | 47.50 |
| 29 | 33130 | Cooling Towers | Rs.Crore | 0.8911 | 32.02 |
| 30 | 15142 | Groundnut Oil | MT | 0.8830 | 53.15 |
| 31 | 29242 | Drilling Equipment | Numbers | 0.8627 | 35.53 |

ANNEXURE IV

List of item groups with coefficient of variation > 30%

| Sl.No. | NIC-2004 | Item Group | Unit | Weight | Coefficient of variation |
|--------|----------|--------------------------------|-------------|--------|--------------------------|
| 32 | 29294 | Printing Machinery | Rs.Crore | 0.8342 | 31.04 |
| 33 | 15142 | Mustard/ Rapeseed Oil | MT | 0.7779 | 37.84 |
| 34 | 24116 | Acetic acid | MT | 0.6127 | 32.51 |
| 35 | 19122 | Leather Bags, Wallets, Purses | Numbers | 0.6069 | 31.30 |
| 36 | 29195 | Packaging Machinery | Rs.Crore | 0.5901 | 37.48 |
| 37 | 24295 | Gelatin | Tonnes | 0.4953 | 31.21 |
| 38 | 21098 | Computer Stationery | Rs. Lakh | 0.4728 | 31.57 |
| 39 | 15134 | Fruit Juices | Th. Ltr. | 0.4275 | 50.85 |
| 40 | 15149 | Castor oil | MT | 0.4236 | 37.98 |
| 41 | 31300 | Cable, Jelly Filled | Core Km | 0.4217 | 63.59 |
| 42 | 15142 | Sunflower oil | MT | 0.3464 | 43.62 |
| 43 | 15142 | Soyabean Extraction | MT | 0.3166 | 40.14 |
| 44 | 15543 | Mineral Water | Th. Ltr. | 0.3149 | 34.55 |
| 45 | 24246 | Hair Shampoo | Tonnes | 0.2925 | 31.53 |
| 46 | 15142 | Coconut oil | MT | 0.2817 | 30.75 |
| 47 | 30007 | Printers | Numbers | 0.2582 | 33.93 |
| 48 | 24211 | Triazophos | MT | 0.2521 | 32.51 |
| 49 | 32102 | Power Capacitors | Rs.Crore | 0.2460 | 33.07 |
| 50 | 25202 | Plastic Bottles | Th.No. | 0.2334 | 44.79 |
| 51 | 24134 | Synthetic Rubber | Tonnes | 0.2259 | 30.50 |
| 52 | 31300 | XLPE Cable | Kilo metres | 0.2025 | 38.42 |
| 53 | 29305 | Solar Power Systems | kw | 0.2004 | 44.42 |
| 54 | 32105 | IC Chips & Transistors | Th. No. | 0.1994 | 35.47 |
| 55 | 29251 | Dairy Machinery | Rs.Lakh | 0.1953 | 33.29 |
| 56 | 31103 | DC Motors | Numbers | 0.1724 | 76.64 |
| 57 | 29191 | Forklift | Numbers | 0.1522 | 39.60 |
| 58 | 29119 | Construction Machine/Equipment | Rs.Crore | 0.1490 | 31.12 |
| 59 | 29211 | Agricultural Machinery | Rs.Crore | 0.1313 | 38.03 |
| 60 | 29244 | Loaders | Numbers | 0.1295 | 33.89 |
| 61 | 33122 | Water meter of all kinds | Numbers | 0.1257 | 55.28 |
| 62 | 29249 | Mining Equipment | Rs.Crore | 0.1212 | 33.04 |
| 63 | 31901 | Stabilisers | Rs.Crore | 0.1001 | 30.25 |
| 64 | 28994 | Cock (Faucets) | Th. No. | 0.0993 | 30.41 |
| 65 | 29306 | Chillers | Numbers | 0.0773 | 77.19 |
| 66 | 24116 | Maleic anhydride | MT | 0.0652 | 79.31 |
| 67 | 24211 | Carbendzim(Bavistin) | MT | 0.0619 | 70.75 |

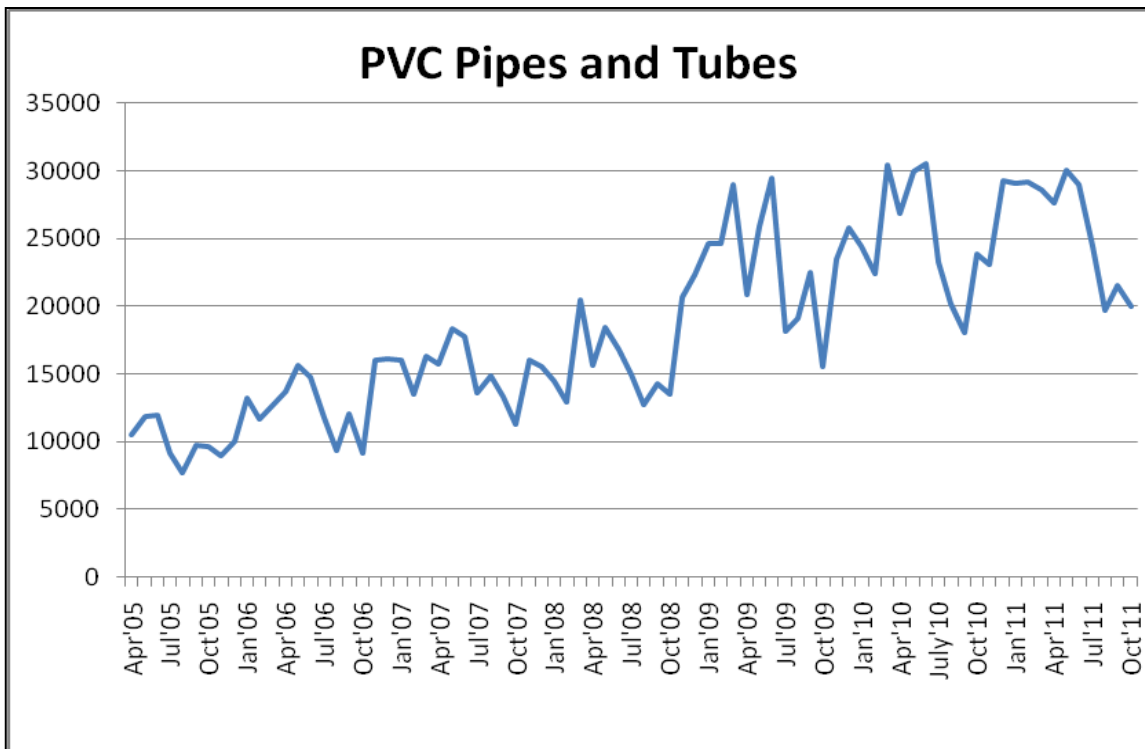
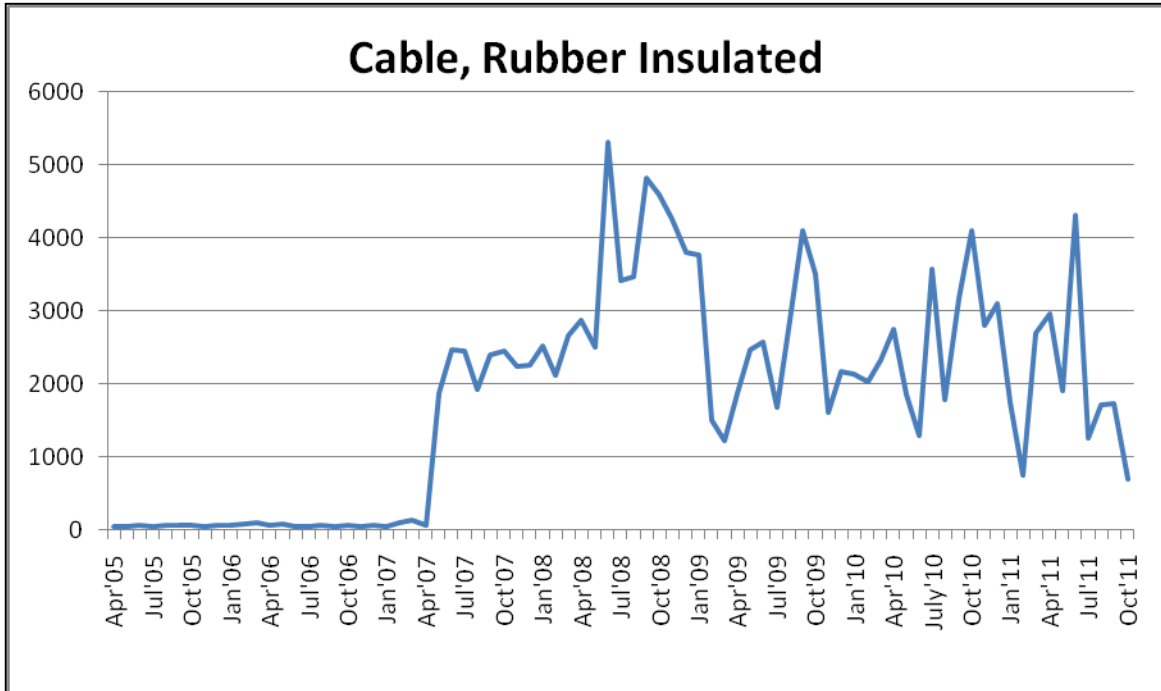
ANNEXURE IV

List of item groups with coefficient of variation > 30%

| Sl.No. | NIC-2004 | Item Group | Unit | Weight | Coefficient of variation |
|--------|----------|------------------------------------|------------|--------|--------------------------|
| 68 | 31109 | Battery Charger | Numbers | 0.0323 | 153.04 |
| 69 | 17119 | D.W.Tarpaulin | Th. tonnes | 0.0227 | 170.95 |
| 70 | 17295 | canvas | Th. tonnes | 0.0078 | 32.07 |
| 71 | 24211 | Di ethyl easter technical(2, 4-D) | MT | 0.0062 | 112.79 |
| 72 | 17119 | carpet backing cloth | Th.tonnes | 0.0034 | 35.60 |
| 73 | 24211 | Atrazin | MT | 0.0026 | 62.67 |

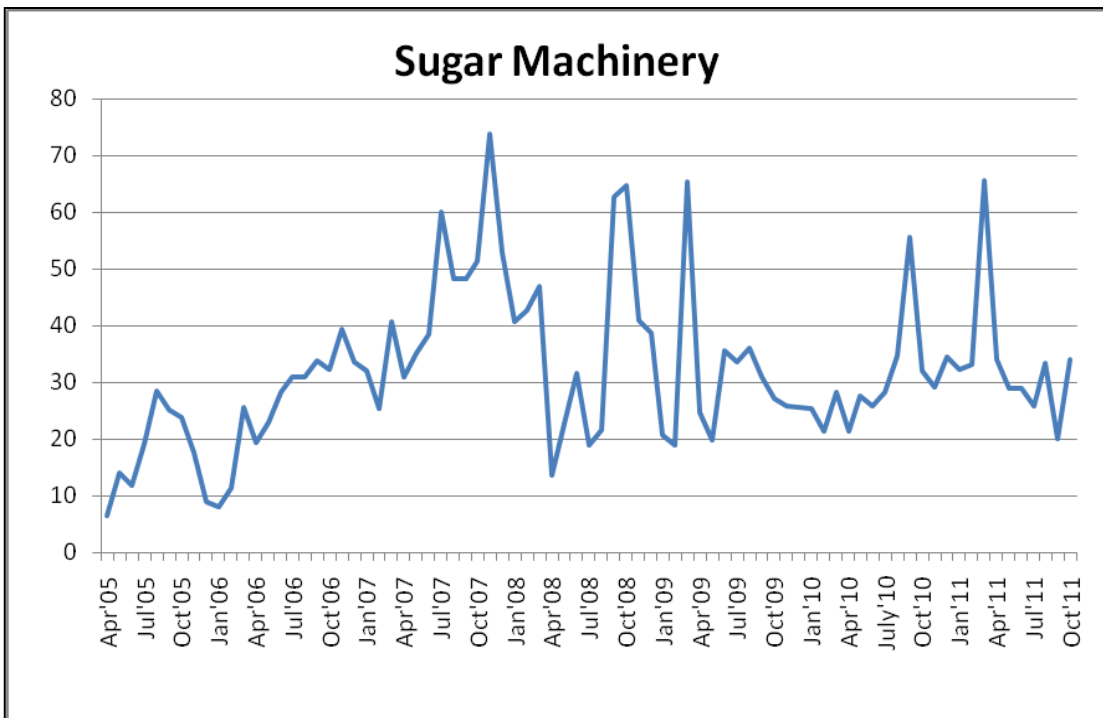
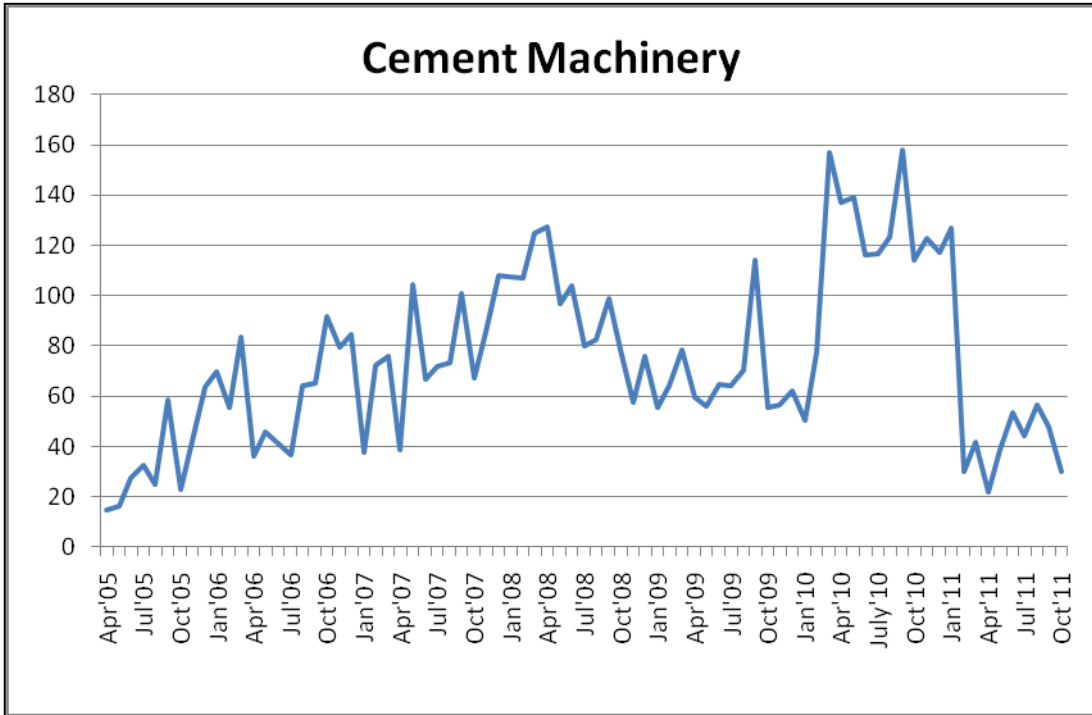
ANNEXURE V

Growth Curves for monthly production data



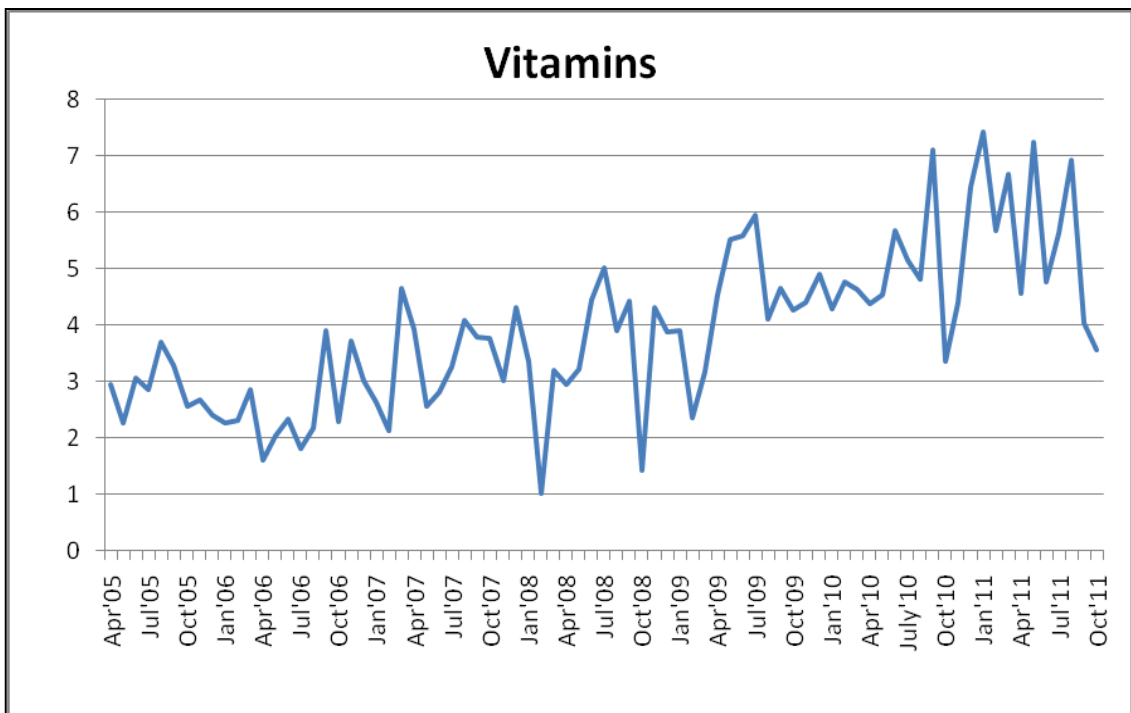
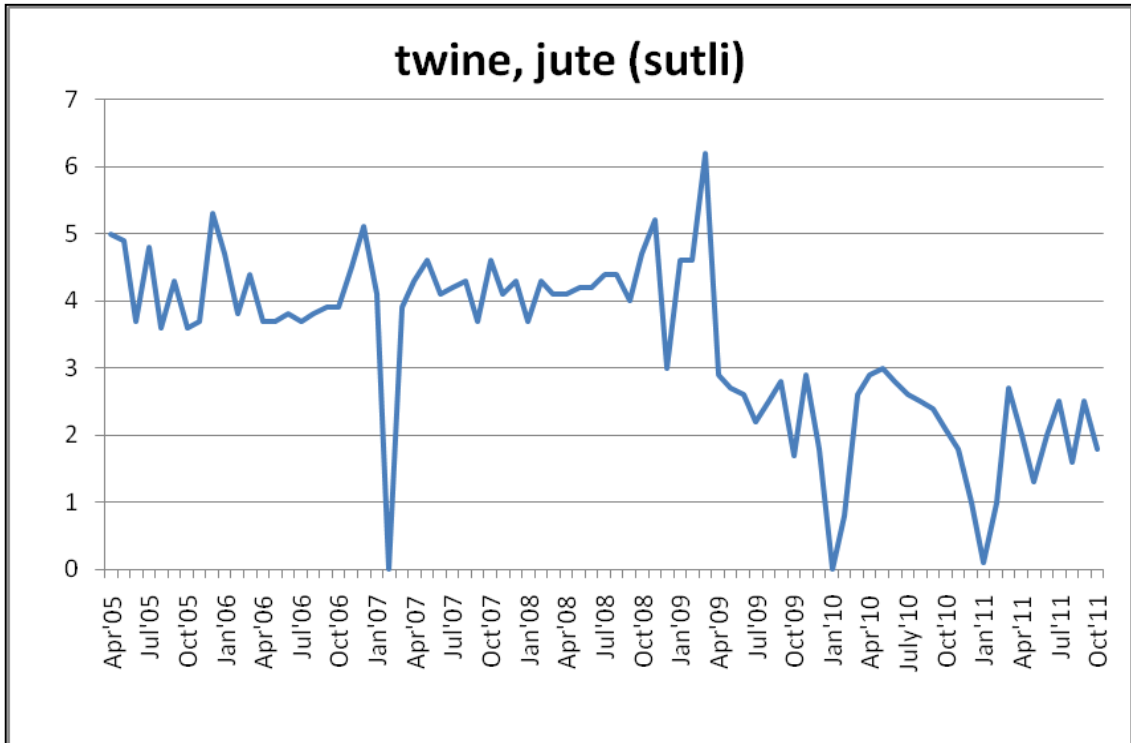
ANNEXURE V

Growth Curves for monthly production data



ANNEXURE V

Growth Curves for monthly production data



ANNEXURE VI

List of WPI deflators used

| NIC 2004 | Description | WPI Deflator used |
|----------------------|---|--|
| 15 | Food products and beverages | Weighted average of: 'FOOD PRODUCTS' and 'BEVERAGES, TOBACCO & TOBACCO PRODUCTS' |
| 16 | Tobacco products | 'MANUFACTURE OF BIDI, CIGARETTES, TOBACCO & ZARDA' |
| 17 | Textiles | 'TEXTILES' |
| 18 | Wearing apparel; dressing and dyeing of fur | 'TEXTILES' |
| 19 | Luggage, handbags, saddlery, harness & footwear; tanning and dressing of leather products | 'LEATHER & LEATHER PRODUCTS' |
| 20 | Wood and products of wood & cork except furniture; articles of straw & plating materials | 'WOOD & WOOD PRODUCTS' |
| 21 | Paper and paper products | 'PAPER & PAPER PRODUCTS' |
| 22 | Publishing, printing & reproduction of recorded media | 'Other Printing and Publishing' |
| 23 | Coke, refined petroleum products & nuclear fuel | 'FUEL & POWER' |
| 24 | Chemicals and chemical products | 'CHEMICALS & CHEMICAL PRODUCTS' |
| 25 | Rubber and plastics products | 'RUBBER & PLASTIC PRODUCTS' |
| 26 | Other non-metallic mineral products | 'NON-METALLIC MINERAL PRODUCTS' |
| 27 | Basic metals | 'BASIC METALS, ALLOYS & METAL PRODUCTS' |
| 28 | Fabricated metal products, except machinery & equipment | 'Fabricated Metal Products' |
| 29 | Machinery and equipment n.e.c. | 'MACHINERY & MACHINE TOOLS' |
| 30 | Office, accounting & computing machinery | 'IT HARDWARE' |
| 31 | Electrical machinery & apparatus n.e.c. | 'MACHINERY & MACHINE TOOLS' |
| 32 | Radio, TV and communication equipment & apparatus | 'COMMUNICATION EQUIPMENTS' |
| 33 | Medical, precision & optical instruments, watches and clocks | 'MACHINERY & MACHINE TOOLS' |
| 34 | Motor vehicles, trailers & semi-trailers | Weighted average of: 'AUTOMOTIVES' and 'AUTO PARTS' |
| 35 | Other transport equipment | 'OTHER TRANSPORT EQUIPMENTS' |
| 36 | Furniture; manufacturing n.e.c. | 'MANUFACTURED PRODUCTS' |
| Manufacturing | | 'MANUFACTURED PRODUCTS' |