

Monthly Seasonal Factors of Select Economic Time Series, 2013-14*

Analysis of seasonal behavior helps in differentiating between the seasonal changes and long-run changes of economic time series, which is useful for understanding the underlying economic phenomenon. This article presents the estimated monthly seasonal factors of selected 85 economic/financial time series from broad sectors, namely, Monetary and Banking; Price; Industrial Production; External Trade and Services Sector, covering the period 2004-05 to 2013-14. The exercise revealed gradual decline in variation of seasonality in major monetary aggregates. For Scheduled Commercial Banks (SCBs), the seasonal variation of Aggregate Deposits and Credit showed moderation in recent period. Seasonality in WPI-All commodities remained low during the reference period. Within WPI, 'Primary Articles' exhibited more seasonal variation than 'Manufactured Products'. Seasonality in different CPI series have been stable in the recent years but consistently higher than WPI-All Commodities. Seasonality of IIP-General Index increased steadily over the reference period. Merchandise export is found to have higher seasonal variation than merchandise import post 2007-08.

Introduction: Economic time series, when measured at an interval less than a year, exhibits seasonal fluctuations around its annual trend. Such repetitive seasonal variations can occur due to climatic conditions, production cycle characteristics, seasonal nature of economic activity, festivals, vacation practices etc. Even seasonality, being integral part of data generating process, its magnitude may vary from year to year. Analysis of its direction and magnitude is useful in interpretation of movements of economic variables over time. Seasonal adjustment, *i.e.*, removal of seasonal effects, helps differentiate between the seasonal changes and long-run changes in the variables and is useful from the policy perspective in understanding the underlying economic phenomenon. The predictable recurring of seasonal fluctuations also allows the economic agents to setup policies or

measurements to attenuate the impact. In this context, monthly seasonal factors for selected economic and financial time series of the Indian economy are being regularly published in the RBI Bulletin since 1980¹.

2. Data Coverage and Methodology

For estimating and analysing the seasonal factors, 85 monthly economic/financial time series covering (i) Monetary and Banking Indicators (17 series); (ii) Wholesale Price Index (WPI) (26 series); (iii) Consumer Price Index (CPI) (3 series); (iv) Industrial Production (30 series); (v) External Trade Sector (3 series) and (vi) Services Sector Indicators (6 series) have been considered in this article.

The reference period was broadly considered from April 1994 to March 2014, *i.e.*, last 20 years. For some series, the reference period was less than 10 years depending on the availability of consistent time series data.

The seasonal factors have been estimated using X-13ARIMA-SEATS software package developed by the US Bureau of Census², taking care of Diwali as major festival as well as trading day effects. The seasonality of the series is further subjected to various parametric and non-parametric statistical test procedures for their statistical significance.

3. Salient Findings

Seasonal Variation during Last Ten Years (2004-05 to 2013-14)

The average monthly seasonal factors over the last ten years (2004-05 to 2013-14) are presented in Table 1. The annual estimates of dispersion in seasonal factors, in terms of range (difference between peak and trough values of Seasonal Factors (SF) during a year), during the period, are presented in Table 2. The classification of variables as per range of seasonal factors during 2013-14 is provided in Table 3. The list of top-twenty and bottom-twenty series based on the average range of seasonal factors, during last five years (*i.e.*, 2009-10 to 2013-14) and the corresponding peak

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¹ The previous article in the series was published in October 2013 issue of the Reserve Bank of India, Bulletin.

² <http://www.census.gov/srd/www/x13as/>

and trough months are presented in Table 4. The salient features of observed seasonal variation over the reference period for some of the selected series during the last ten years are briefly discussed below.

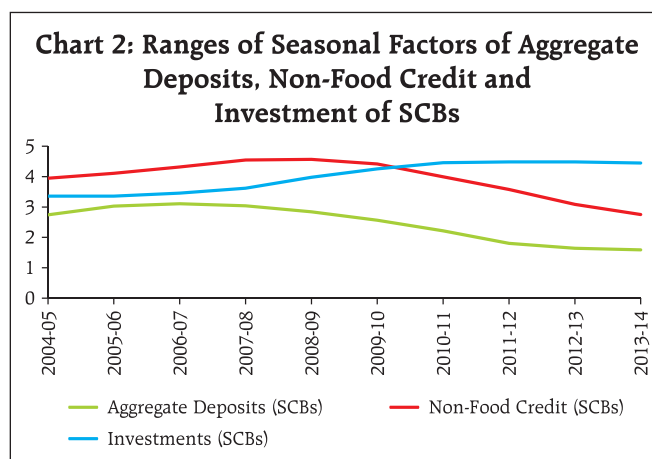
3.1 Monetary and Banking Indicators

3.1.1 The following chart (Chart 1) exhibits the peak (blue) and trough (red) of monthly seasonal factors of Broad Money (M₃) for every year in the secondary axis and their difference known as range (green) in the primary axis. Range of a series shows the change in seasonal variation over the period. Rest of the article explains the variation in seasonality by plotting the range of important economic series over time.

3.1.2 Seasonal variation in Broad Money (M₃) was observed to be lower than Currency in Circulation, Narrow Money (M₁) and Reserve Money (RM) over the years. After showing upward movement till 2006-07, the range of M₃ declined gradually (Table 2).

3.1.3 The seasonal variations of aggregate deposits (SCBs) and Non-Food Credit (SCBs) exhibited similar movements for the entire reference period while the range of estimated seasonal factors for Aggregate Deposits always remained lower than Non-Food Credit. The seasonality of these two series exhibited downward movement since last couple of years. Seasonality in Investment indicated an increasing pattern (Table 2 and Chart 2).

3.1.4 Within aggregate deposits, demand deposits of SCBs witnessed higher seasonal fluctuations than Time Deposits of SCBs, which remained stable within the

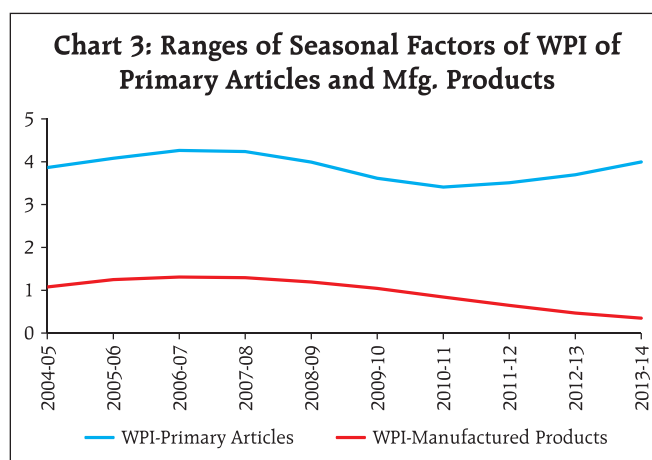
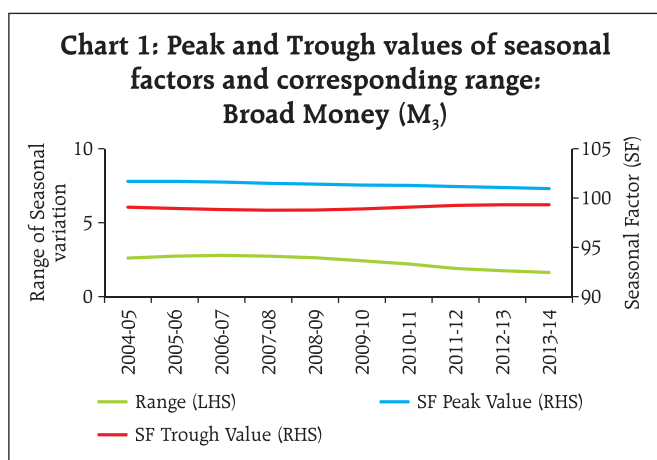


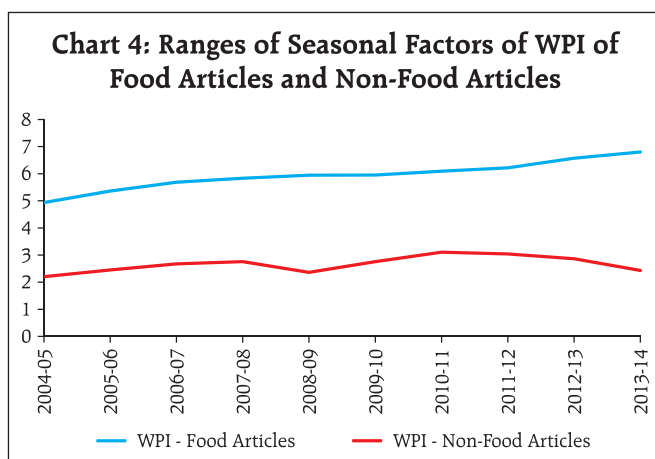
narrow band of 1.4 to 2.0 (Table 2). Seasonality of demand deposits remained within the range of 12.9-14.2 till 2008-09 and started declining steadily thereafter.

3.2 Wholesale Price Index (WPI)

3.2.1 The range of seasonal factors of WPI-All Commodities increased from 1.4 in 2004-05 to 1.7 in 2007-08, and thereafter, reverted to 1.1 in 2010-11 before the gradual increase to 1.4 in 2013-14 (Table 2). The seasonality in 'Primary Articles' prices was more than three times the seasonality in WPI-Manufactured Products. Also, during the last four years, seasonal variation for WPI-Manufactured Products narrowed down against gradual increase in WPI-Primary Articles (Table 2 and Chart 3).

3.2.2 Within the Primary Articles group, the seasonal variation in WPI-Food Articles increased from 4.9 in 2004-05 to 6.8 in 2013-14 whereas it ranged between



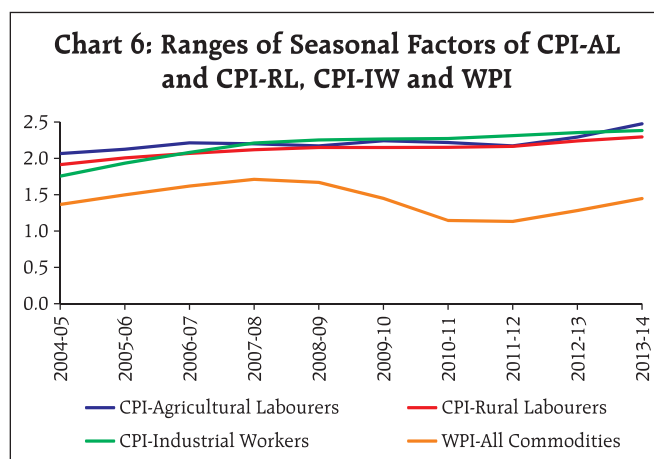
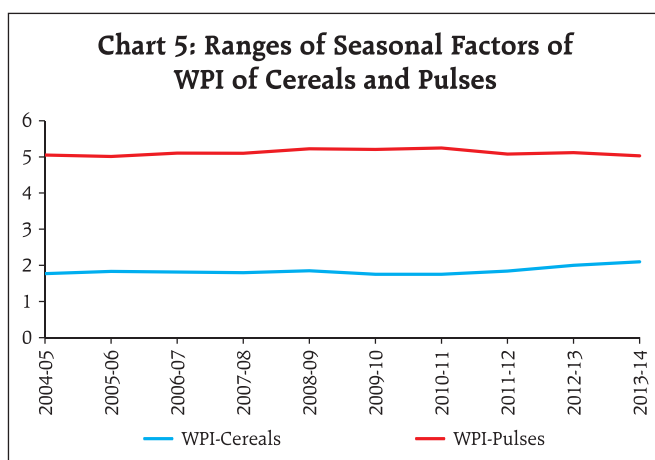


2.2-3.1 for WPI-Non Food Articles during the reference period (Table 2 and Chart 4).

3.2.3 Within the WPI-Food Articles, the pulses group displayed more seasonal variation than the Cereals group. Both WPI-Cereals and WPI-Pulses exhibited stable seasonality in the range of around 2 and 5 respectively (Table 2 and Chart 5).

3.3 Consumer Price Index (CPI)

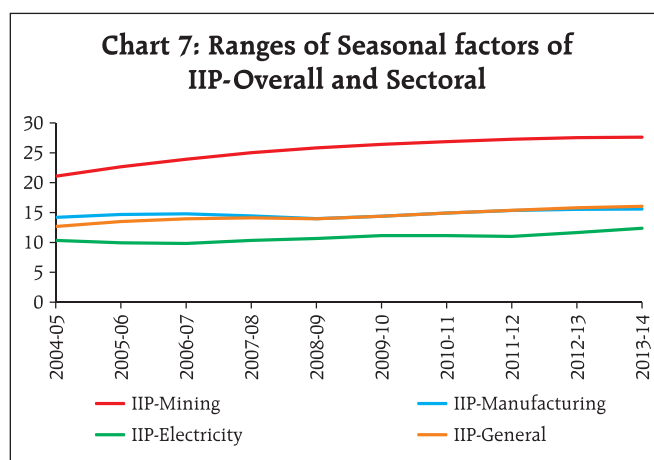
3.3.1 In the case of CPI for Agricultural Labourers (AL) and Rural Labourers (RL), similar movement in seasonal variations was observed during the last ten years with CPI-AL having slightly higher variation than the CPI-RL. The seasonality of different CPI series were consistently higher than WPI-All Commodities. The difference between the seasonal variations of CPI series and WPI-All Commodities have however, widened after 2008-09 (Table 2 and Chart 6).

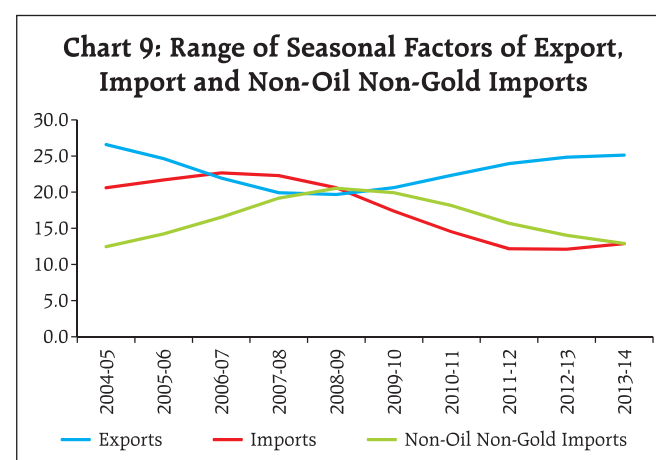
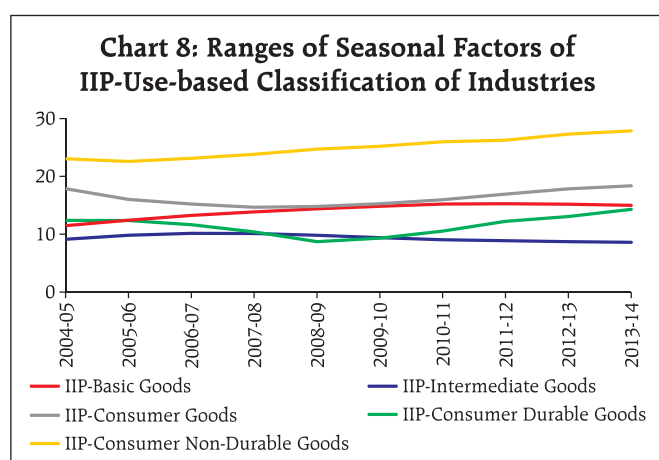


3.4 Industrial Production

3.4.1 Seasonal variation of IIP-General exhibited slight upward movement during the reference period. Among the three major sectors of IIP, (*viz.*, Mining, Manufacturing and Electricity), IIP-Mining and IIP-Electricity exhibited the highest and lowest seasonal variation respectively with IIP-Mining showing an upward trend. IIP-Manufacturing displayed similar seasonality as IIP-General (Table 2 and Chart 7).

3.4.2 Among the use-based classification goods, IIP-Consumer Non-durable goods exhibited highest seasonality, whereas IIP-Intermediate Goods was the only group where seasonality has reduced over the years and it showed lowest seasonal variations throughout the reference period, except for 2008-09 and 2009-10 (Chart 8). Seasonal variations in IIP for Basic goods and Consumer goods have increased in recent years.





3.4.3 The seasonal variations of production of 'Cement' and 'Steel' exhibited opposite movements during 2004-05 to 2013-14 with higher magnitude of seasonality in Cement than Steel. The seasonality in 'Production of Commercial Motor Vehicles' decreased from 37.4 in 2004-05 to 28.6 in 2007-08 and thereafter increased steadily to 31.6 in 2013-14 (Table 2).

3.5 Services Sector Indicators

3.5.1 Over the reference period, seasonality in 'Railway Freight Traffic' was higher as compared to that of 'Cargo Handled at Major Ports'. The seasonal variation of 'Railway Freight Traffic' gradually increased from 19.9 in 2004-05 to 21.6 in 2013-14 whereas seasonal variation of 'Cargo Handled at Major Ports' decreased from 18.0 in 2004-05 to 15.0 in 2013-14. In last 5 years, the gap in seasonality is widening between these two series (Table 2).

3.5.2 The seasonal variation of passenger flown in Domestic area has increased over the years compared to passenger flown internationally (Table 2).

3.6 External Trade (Merchandise)

The seasonal variation in export was higher than import except during 2006-09. The gap between variations of seasonality increased in subsequent years. Non-Oil Non-Gold Import and total merchandise import have shown similar seasonality (Table 2 and Chart 9).

4 High and Low Seasonal Variation

Based on the average range of monthly seasonal factors during last five years (*i.e.* 2009-10 to 2013-14), External trade data and Services Sector indicators have exhibited highest seasonal volatility followed by industrial production (IIP General and its components) while seasonal variations of WPI and CPI have been found to be lower than other series. Money and Banking series have shown lower seasonal variability relatively. Comparing seasonal variability of all 85 series, 'IIP-Food products and beverages', 'IIP-Fabricated metal products, except machinery & equipment', 'Coal Production', 'Sales of Commercial Motor Vehicles' and 'Production of Commercial Motor Vehicles' have exhibited high seasonal variation. On the other hand, 'WPI-Grain Mill Products', 'WPI-Rice', 'WPI-Non-Food Articles', 'WPI-Protein Items (*viz.*, Pulses, Milk, Egg, Meat and Fish) Group' and 'WPI-Food Grains (Cereals and Pulses)' have shown low seasonal variation. (Table 4).

5 Post Crisis: Seasonal Variation

It was observed that, out of 85 series the seasonal variation for 39 series increased post crisis (after 2008-09). The series with substantial increase in seasonal variation post crisis are mainly from production related except some of the directly affected Money and banking series like 'Assets with Banking System (SCBs)' and highly inelastic price related series like 'WPI-Sugar'.

Table 1: Average Monthly Seasonal Factors of Selected Economic Time Series												
Series/Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	2	3	4	5	6	7	8	9	10	11	12	13
A.1.1 Broad Money (M3)	101.4	100.9	100.2	100.2	99.8	99.7	99.7	99.4	99.1	99.3	99.6	100.7
A.1.1.1 Net Bank Credit to Government	101.7	101.5	101.1	101.8	100.9	99.6	99.2	99.6	97.2	98.7	98.6	100.3
A.1.1.2 Bank Credit to Commercial Sector	101.7	101.5	101.1	101.8	100.9	99.6	99.2	99.6	97.2	98.7	98.6	100.3
A.1.2 Narrow Money (M1)	102.5	101.4	100.6	99.1	98.6	99.4	98.3	98.3	99.2	99.2	100.0	103.6
A.1.2.1 Currency with Public	103.1	103.5	101.9	99.3	98.4	97.2	98.2	99.1	99.1	99.6	100.3	100.3
A.1.3 Reserve Money (RM)	103.1	101.8	101.1	99.7	98.9	97.8	98.6	99.2	98.5	98.6	98.9	104.1
A.1.3.1 Currency in Circulation	103.0	103.3	102.0	99.3	98.4	97.1	98.5	99.1	99.2	99.6	100.2	100.5
A.1.3.1.1 Notes in Circulation	103.0	103.4	102.1	99.2	98.3	97.0	98.4	99.3	99.1	99.5	100.2	100.5
A.2.1 Aggregate Deposits (SCBs)	101.3	100.6	99.9	100.4	100.1	100.0	99.9	99.5	98.9	99.2	99.5	100.9
A.2.1.1 Demand Deposits (SCBs)	101.4	98.3	97.7	98.2	98.5	102.5	99.1	98.2	99.1	98.8	99.9	108.6
A.2.1.2 Time Deposits (SCBs)	100.8	100.7	100.1	100.6	100.2	99.7	100.2	100.0	99.1	99.6	99.5	99.6
A.3.1 Cash in Hand and Balances with RBI (SCBs)	104.4	98.8	100.8	101.4	101.9	101.4	99.2	100.4	97.8	96.8	98.4	99.6
A.3.2 Assets with the Banking System (SCBs)	102.8	100.9	102.1	97.9	99.0	99.7	98.4	94.0	97.8	95.6	99.4	112.4
A.3.3 Bank Credit (SCBs)	101.3	100.3	100.1	99.4	99.0	99.6	99.0	99.0	99.9	99.7	100.2	102.6
A.3.3.1 Loans, Cash, Credits and Overdrafts (SCBs)	100.6	100.0	100.1	98.9	98.6	100.7	99.2	99.3	100.3	99.7	100.1	102.5
A.3.3.2 Non-Food Credit (SCBs)	101.1	99.9	99.8	99.3	99.0	99.7	99.2	99.1	99.9	99.9	100.3	102.8
A.3.4 Investments (SCBs)	100.8	100.7	100.1	101.4	101.8	100.7	101.0	100.2	98.2	98.5	98.5	97.9
B. WPI (Base: 2004-05=100) All Commodities	100.2	100.0	100.1	100.4	100.5	100.6	100.4	100.1	99.4	99.6	99.3	99.3
B.1 WPI - Primary Articles	99.6	99.6	100.5	101.1	101.7	101.3	101.3	101.2	99.1	98.8	97.9	97.9
B.1.1 WPI - Food Articles	99.0	99.2	99.9	101.2	101.7	102.0	102.7	102.2	99.0	99.0	97.1	96.9
B.1.1.1 WPI - Food Grains (Cereals+Pulses)	99.1	99.0	99.1	99.6	100.1	100.2	101.2	101.1	100.7	100.4	100.1	99.3
B.1.1.1.1 WPI - Cereals	99.3	99.3	99.2	99.4	99.9	100.0	100.7	100.7	100.4	100.7	100.6	99.7
B.1.1.1.1.1 WPI - Wheat	98.8	98.1	98.3	98.6	99.2	99.6	99.5	101.2	101.9	102.2	102.3	100.2
B.1.1.1.1.2 WPI - Rice	99.2	99.5	99.4	99.9	100.5	100.7	101.3	101.0	100.2	99.7	99.5	99.2
B.1.1.1.2 WPI - Pulses	98.4	98.1	98.4	100.4	101.2	101.5	102.6	102.8	101.2	99.5	98.2	97.8
B.1.1.2 WPI - Fruits & Vegetables	97.7	98.3	100.7	104.6	105.7	106.7	108.8	106.9	95.1	93.5	90.5	90.9
B.1.1.3 WPI - Milk	99.9	99.8	100.0	100.3	100.1	100.1	100.2	100.1	99.8	99.9	100.0	99.7
B.1.1.4 WPI - Egg, Meat and Fish	98.6	100.4	100.7	101.7	100.9	100.7	99.0	99.5	99.8	100.3	100.0	98.7
B.1.1.4.1 WPI - Egg	95.6	95.6	98.1	97.8	97.3	98.8	99.7	104.2	105.0	105.5	102.5	99.8
B.1.1.4.2 WPI - Meat	98.7	99.7	100.5	100.5	100.0	99.2	99.0	99.9	100.3	101.4	100.7	100.1
B.1.1.4.3 WPI - Fish	99.2	101.6	101.1	102.6	102.3	101.4	99.3	99.2	98.7	98.8	98.8	98.2
B.1.1.5 WPI - Protein Items (viz., Pulses, Milk, Egg, Meat and Fish)	99.2	99.8	100.0	100.9	100.8	100.8	100.4	100.1	99.7	99.9	99.8	99.0
B.1.2 WPI - Non-Food Articles	100.5	100.3	100.4	100.4	100.7	100.5	99.0	99.2	99.5	99.9	99.4	100.5
B.1.2.1 WPI - Fibres	98.9	99.2	99.7	101.9	101.9	102.9	99.9	99.6	99.3	99.7	98.8	98.3
B.1.2.1.1 WPI - Raw Cotton	98.7	99.2	99.8	102.8	103.0	104.0	99.9	99.5	98.5	99.3	98.0	97.7
B.1.2.2 WPI - Oil Seeds	100.4	100.8	101.5	101.5	101.6	101.0	98.6	98.1	98.6	99.5	99.2	99.3
B.2 WPI - Manufactured Products	100.4	100.5	100.3	100.2	100.2	100.1	99.9	99.7	99.5	99.8	99.8	99.8
B.2.1 WPI - Food Products	99.8	99.7	99.7	100.2	100.4	100.6	100.3	100.1	99.9	100.1	99.9	99.3
B.2.1.1 WPI - Grain Mill Products	98.9	98.1	98.3	99.2	99.4	100.0	100.5	101.0	101.0	101.6	101.4	100.4
B.2.1.2 WPI - Sugar	99.0	98.6	98.1	99.0	100.2	101.5	101.4	101.7	101.5	100.7	99.4	99.0
B.2.1.3 WPI - Edible Oils	99.8	100.2	100.1	100.4	100.9	100.5	99.6	99.4	100.2	100.0	99.6	99.4
B.3 WPI - Non Food Manufactured Products	100.4	100.4	100.3	100.1	100.1	100.0	99.8	99.6	99.5	99.8	99.8	100.1
B.4 WPI - Non Food Non-Fuel	100.5	100.7	100.4	100.2	100.2	100.0	99.7	99.6	99.4	99.6	99.8	100.1
C.1 CPI for Industrial Workers (Base: 2001=100)	99.2	99.3	99.6	100.7	100.8	100.6	101.1	100.9	99.9	99.7	99.3	98.9
C.2 CPI for Agricultural Labourers (Base: 1986-87=100)	98.9	99.1	99.6	100.2	100.7	100.9	101.1	101.0	100.4	99.8	99.4	99.0
C.3 CPI for Rural Labourers (Base: 1986-87=100)	99.0	99.1	99.6	100.2	100.7	100.8	101.1	101.0	100.3	99.8	99.4	99.0

Series/Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	2	3	4	5	6	7	8	9	10	11	12	13
D. IIP (Base 2004-05 = 100) General Index	96.4	98.5	97.8	98.0	96.0	97.3	98.9	98.4	104.7	104.5	99.6	110.1
D.1.1 IIP - Basic Goods Industries	98.1	100.9	98.1	98.4	97.5	95.0	99.7	97.9	103.2	104.6	97.7	109.1
D.1.2 IIP - Intermediate Goods Industries	96.5	100.3	99.5	101.5	100.3	98.4	99.3	97.9	102.7	101.0	96.7	105.8
D.1.3 IIP - Consumer Goods Industries	98.7	98.1	96.5	97.5	92.9	95.1	96.2	96.9	106.2	108.8	104.3	108.5
D.1.3.1 IIP - Consumer Durable Goods Industries	98.0	100.4	98.2	100.0	96.4	101.8	106.5	100.9	96.0	99.5	97.7	104.8
D.1.3.2 IIP - Consumer Non-Durable Goods Industries	98.6	96.2	95.2	94.9	90.6	90.1	90.1	96.2	114.7	114.5	108.6	110.2
D.2.1 IIP - Mining	97.6	100.3	95.7	94.2	92.2	90.5	98.2	99.6	106.6	107.9	101.5	116.0
D.2.2 IIP - Manufacturing	95.8	97.7	97.7	98.3	96.1	98.1	98.7	98.1	104.9	104.4	100.2	110.1
D.2.2.1 IIP - Food products and beverages	97.3	90.1	88.6	81.2	72.3	70.2	77.1	98.2	135.6	135.7	126.6	126.3
D.2.2.2 IIP - Textiles	98.4	99.7	98.3	102.6	102.5	100.2	101.4	99.6	101.6	101.3	94.4	100.0
D.2.2.3 IIP - Wood and products of wood & cork except furniture; articles of straw & plating materials	90.5	102.6	98.0	100.6	99.7	96.0	95.9	98.6	108.6	100.6	103.7	106.0
D.2.2.4 IIP - Paper and paper products	97.0	101.4	99.0	102.5	101.6	99.7	100.5	98.2	100.1	99.3	95.4	105.6
D.2.2.5 IIP - Publishing, printing & reproduction of recorded media	98.6	101.4	98.7	103.0	101.4	98.3	103.0	99.4	102.1	99.9	94.6	99.8
D.2.2.6 IIP - Coke, refined petroleum products & nuclear fuel	94.7	98.8	100.7	102.4	100.8	96.6	101.0	97.2	101.8	103.8	96.5	105.5
D.2.2.7 IIP - Chemicals and chemical products	96.4	101.0	102.5	103.6	102.6	102.1	99.5	98.0	100.9	99.6	93.9	100.0
D.2.2.8 IIP - Rubber and plastics products	99.1	103.3	102.2	99.8	95.8	97.3	98.7	99.0	101.8	101.0	96.6	105.5
D.2.2.9 IIP - Other non-metallic mineral products	101.3	101.6	98.1	98.9	94.7	93.9	100.3	95.1	102.5	103.3	99.3	111.6
D.2.2.10 IIP - Basic metals	98.0	100.3	98.5	99.2	100.2	97.9	100.2	97.9	101.1	102.2	97.4	107.4
D.2.2.11 IIP - Fabricated metal products, except machinery & equipment	84.2	91.7	97.4	95.0	95.6	102.2	95.7	97.8	104.8	99.8	100.9	135.9
D.2.2.12 IIP - Motor vehicles, trailers & semi-trailers	97.2	97.2	89.8	98.5	97.2	97.4	101.9	101.2	92.4	105.9	105.4	116.2
D.2.2.13 IIP - Other transport equipment	91.1	95.3	94.6	96.8	98.4	103.7	110.2	105.5	96.3	100.8	98.3	109.5
D.2.3 IIP - Electricity	100.3	104.3	98.5	100.3	99.9	97.8	102.1	96.1	100.0	101.7	94.1	104.6
D.3 Cement Production	105.2	104.3	100.0	95.9	90.8	91.3	98.0	92.2	102.1	105.9	101.2	113.9
D.4 Steel Production	96.8	100.0	97.8	98.8	100.1	97.7	100.7	96.8	101.7	104.5	98.2	106.7
D.5 Coal Production	90.9	93.3	88.8	86.6	84.7	83.4	97.5	103.0	113.0	116.3	109.9	133.7
D.6 Crude Oil Production	98.9	101.3	99.4	101.4	100.8	98.0	102.0	98.7	102.1	101.6	92.8	102.9
D.7 Petroleum Refinery Production	96.1	100.5	100.0	101.8	101.0	95.9	100.4	97.9	101.7	103.6	96.4	104.5
D.8 Fertiliser Production	81.5	94.8	98.8	105.8	106.5	103.9	108.2	106.8	108.2	102.3	93.9	89.1
D.9 Natural Gas Production	97.5	101.4	98.4	102.0	100.8	98.0	102.9	99.6	102.6	102.0	92.0	102.7
D.10 Production of Commercial Motor Vehicles	91.7	94.3	89.1	97.0	97.2	99.3	101.2	102.8	96.4	107.3	104.3	118.2
E.1 Cargo handled at Major Ports	99.6	102.9	95.1	97.6	96.5	92.5	99.9	99.7	103.5	105.8	96.9	109.3
E.2 Railway Freight Traffic	97.7	101.1	96.7	97.7	95.3	92.6	97.8	97.9	104.3	106.4	98.6	113.8
E.3 Sales of Commercial Motor Vehicles	83.0	89.0	95.6	92.0	95.0	105.6	100.0	96.5	100.4	105.7	105.9	129.5
E.4 Passenger flown (Km) - Domestic	100.8	112.2	104.2	95.5	92.9	88.5	98.6	100.2	109.4	103.8	96.3	97.0
E.5 Passenger flown (Km) - International	96.1	99.9	101.1	107.1	104.5	92.9	92.2	94.8	106.8	110.4	94.2	100.7
E.6 Freight Tonne Km flown - Domestic	94.1	99.4	96.6	100.7	102.5	104.1	110.6	100.8	101.9	95.2	91.5	102.2
F.1 Exports	97.5	100.0	99.8	99.5	97.1	100.4	98.0	93.1	100.6	100.6	97.1	116.1
F.2 Imports	100.5	107.4	100.0	102.5	99.1	103.9	104.1	97.1	97.5	98.7	90.0	99.3
F.3 Non-Oil Non-Gold Imports	96.0	105.6	103.0	102.8	99.1	101.9	103.4	99.3	101.3	98.7	89.8	98.4

Table 2: Range (Difference Between Peak and Trough) of Seasonal Factors											
Series/Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Average Range
1	2	3	4	5	6	7	8	9	10	11	12
A.1.1 Broad Money (M3)	2.6	2.7	2.8	2.7	2.6	2.4	2.2	1.9	1.8	1.6	2.3
A.1.1.1 Net Bank Credit to Government	4.3	4.8	5.2	5.3	5.3	5.0	4.6	4.4	4.4	4.3	4.7
A.1.1.2 Bank Credit to Commercial Sector	4.3	4.8	5.2	5.3	5.3	5.0	4.6	4.4	4.4	4.3	3.8
A.1.2 Narrow Money (M1)	5.7	5.9	6.3	6.3	6.0	5.7	5.3	4.8	4.5	4.3	5.5
A.1.2.1 Currency with Public	6.9	6.8	6.9	6.7	6.6	6.3	6.0	5.7	5.5	5.4	6.3
A.1.3 Reserve Money (RM)	7.5	7.4	7.0	6.4	6.5	6.6	6.5	6.3	6.0	5.6	6.3
A.1.3.1 Currency in Circulation	7.0	6.9	6.9	6.8	6.6	6.3	5.9	5.6	5.3	5.1	6.2
A.1.3.1.1 Notes in Circulation	7.2	7.1	7.0	6.9	6.7	6.4	6.1	5.8	5.6	5.5	6.4
A.2.1 Aggregate Deposits (SCBs)	2.7	3.0	3.1	3.0	2.8	2.6	2.2	1.8	1.6	1.6	2.5
A.2.1.1 Demand Deposits (SCBs)	12.9	14.2	14.7	14.4	14.2	13.0	11.2	9.1	7.1	6.4	11.9
A.2.1.2 Time Deposits (SCBs)	1.7	1.8	1.8	1.9	1.9	2.0	1.9	1.7	1.4	1.4	1.8
A.3.1 Cash in Hand and Balances with RBI (SCBs)	14.0	13.7	12.7	11.2	9.9	7.9	6.1	5.4	4.6	4.3	7.9
A.3.2 Assets with the Banking System (SCBs)	13.1	14.3	16.2	17.9	19.0	20.2	21.3	21.7	21.1	20.1	17.6
A.3.3 Bank Credit (SCBs)	3.5	3.7	3.9	4.1	4.3	4.2	3.9	3.5	3.1	2.8	3.7
A.3.3.1 Loans, Cash, Credits and Overdrafts (SCBs)	3.3	3.6	4.0	4.2	4.3	4.2	4.0	3.7	3.5	3.6	3.8
A.3.3.2 Non-Food Credit (SCBs)	3.9	4.1	4.3	4.5	4.6	4.4	4.0	3.6	3.1	2.8	3.9
A.3.4 Investments (SCBs)	3.4	3.4	3.5	3.6	4.0	4.3	4.5	4.5	4.5	4.4	4.3
B. WPI (Base 2004-05=100) All Commodities	1.4	1.5	1.6	1.7	1.7	1.4	1.1	1.1	1.3	1.4	1.4
B.1 WPI - Primary Articles	3.9	4.1	4.3	4.2	4.0	3.6	3.4	3.5	3.7	4.0	3.5
B.1.1 WPI - Food Articles	4.9	5.4	5.7	5.8	5.9	6.0	6.1	6.2	6.6	6.8	5.9
B.1.1.1 WPI - Food Grains (Cereals+Pulses)	1.6	1.9	2.2	2.4	2.4	2.3	2.4	2.5	2.7	2.8	2.3
B.1.1.1.1 WPI - Cereals	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.0	2.1	1.9
B.1.1.1.1.1 WPI - Wheat	5.8	5.4	4.7	4.3	3.8	3.5	3.4	3.7	4.1	4.2	4.3
B.1.1.1.1.2 WPI - Rice	2.0	1.8	1.5	1.4	1.6	1.9	2.3	2.9	3.5	3.8	2.3
B.1.1.1.2 WPI - Pulses	5.1	5.0	5.1	5.1	5.2	5.2	5.2	5.1	5.1	5.0	5.1
B.1.1.2 WPI - Fruits & Vegetables	20.1	20.1	19.4	18.6	17.7	17.0	16.8	17.0	18.1	19.0	18.4
B.1.1.3 WPI - Milk	1.2	1.0	0.7	0.5	0.4	0.6	0.9	1.1	1.2	1.3	0.9
B.1.1.4 WPI - Egg, Meat and Fish	5.2	5.1	4.6	3.8	3.0	2.6	3.5	4.1	4.4	4.3	4.1
B.1.1.4.1 WPI - Egg	13.9	12.3	10.6	9.1	8.1	7.6	8.6	10.2	11.4	12.2	10.4
B.1.1.4.2 WPI - Meat	5.2	4.7	3.8	2.9	2.0	1.5	1.4	1.8	2.1	2.4	2.8
B.1.1.4.3 WPI - Fish	7.9	8.3	7.6	6.0	4.8	3.9	4.4	5.2	5.6	5.7	5.9
B.1.1.5 WPI - Protein Items (viz., Pulses, Milk, Egg, Meat and Fish)	1.8	1.9	1.9	1.9	2.0	2.2	2.4	2.7	2.8	2.8	2.2
B.1.2 WPI - Non-Food Articles	2.2	2.5	2.7	2.8	2.4	2.8	3.1	3.0	2.9	2.4	2.7
B.1.2.1 WPI - Fibres	4.0	4.5	5.1	5.5	5.4	5.0	4.5	4.4	4.9	5.2	4.9
B.1.2.1.1 WPI - Raw Cotton	6.1	7.2	7.8	7.7	7.4	6.7	6.0	5.5	5.7	5.9	6.6
B.1.2.2 WPI - Oil Seeds	3.7	3.5	3.5	3.5	3.8	3.9	3.8	3.9	3.9	3.8	3.7
B.2 WPI - Manufactured Products	1.1	1.2	1.3	1.3	1.2	1.0	0.8	0.6	0.5	0.3	0.9
B.2.1 WPI - Food Products	1.9	1.6	1.2	1.0	1.0	1.2	1.3	1.5	1.7	2.0	1.4
B.2.1.1 WPI - Grain Mill Products	4.9	4.3	3.8	3.4	3.2	3.1	3.1	3.1	3.1	3.1	3.5
B.2.1.2 WPI - Sugar	2.0	1.9	2.2	2.9	3.9	4.9	5.3	5.1	4.7	4.3	3.7
B.2.1.3 WPI - Edible Oils	2.1	2.0	2.1	2.0	1.9	1.8	1.6	1.4	1.2	1.1	1.7
B.3 WPI - Non Food Manufactured Products	0.7	0.9	1.1	1.2	1.2	1.1	1.0	0.8	0.6	0.5	0.9
B.4 WPI - Non Food Non-Fuel	0.9	1.1	1.4	1.6	1.8	1.8	1.6	1.3	1.1	0.9	1.3
C.1 CPI for Industrial Workers (2001=100)	1.8	1.9	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.2
C.2 CPI for Agricultural Labourers (Base: 1986-87=100)	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.2
C.3 CPI for Rural Labourers (Base: 1986-87=100)	1.9	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1

Series/Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Average Range
1	2	3	4	5	6	7	8	9	10	11	12
D. IIP (Base 2004-05 = 100) General Index	12.7	13.5	13.9	14.1	14.0	14.4	14.9	15.4	15.8	16.0	14.5
D.1.1 IIP - Basic Goods Industries	11.5	12.4	13.2	13.9	14.4	14.8	15.2	15.3	15.2	15.0	14.1
D.1.2 IIP - Intermediate Goods Industries	9.1	9.8	10.1	10.1	9.8	9.4	9.0	8.9	8.7	8.6	9.4
D.1.3 IIP - Consumer Goods Industries	17.9	16.0	15.2	14.7	14.8	15.3	16.0	16.9	17.9	18.4	16.3
D.1.3.1 IIP - Consumer Durable Goods Industries	12.4	12.4	11.6	10.4	8.7	9.3	10.5	12.2	13.1	14.3	11.5
D.1.3.1 IIP - Consumer Non-Durable Goods Industries	23.0	22.6	23.1	23.8	24.7	25.2	26.0	26.3	27.3	27.9	25.0
D.2.1 IIP - Mining	21.1	22.7	23.9	25.0	25.8	26.4	26.9	27.3	27.5	27.6	25.4
D.2.2 IIP - Manufacturing	14.2	14.7	14.8	14.4	14.0	14.4	14.9	15.4	15.6	15.6	14.8
D.2.2.1 IIP - Food products and beverages*			68.0	67.6	66.4	65.4	64.7	64.2	65.2	66.7	67.9
D.2.2.2 IIP - Textiles*			9.2	9.2	9.0	8.5	8.0	7.8	8.0	8.3	8.5
D.2.2.3 IIP - Wood and products of wood & cork except furniture; articles of straw & plating materials*			20.4	20.2	19.7	19.2	18.5	17.6	16.6	15.8	18.5
D.2.2.4 IIP - Paper and paper products*			11.0	11.0	11.0	10.6	10.1	9.6	9.1	9.0	10.2
D.2.2.5 IIP - Publishing, printing & reproduction of recorded media*			8.8	8.7	8.6	8.4	8.2	8.4	8.8	9.2	8.6
D.2.2.6 IIP - Coke, refined petroleum products & nuclear fuel*			11.3	10.9	10.6	10.7	10.8	10.7	10.8	10.9	10.8
D.2.2.7 IIP - Chemicals and chemical products*			10.0	10.3	10.7	10.6	10.3	9.5	8.8	9.0	9.9
D.2.2.8 IIP - Rubber and plastics products*			8.5	8.9	9.1	9.4	9.8	10.2	10.6	10.8	9.7
D.2.2.9 IIP - Other non-metallic mineral products*			16.4	16.5	16.8	17.4	18.0	18.6	19.0	19.4	17.7
D.2.2.10 IIP - Basic metals*			10.6	10.7	10.6	10.4	10.1	10.7	11.1	11.1	10.7
D.2.2.11 IIP - Fabricated metal products, except machinery & equipment*			42.1	43.4	46.1	49.6	53.6	56.9	59.2	60.5	51.4
D.2.2.12 IIP - Motor vehicles, trailers & semi-trailers*			25.9	25.9	26.0	26.2	26.5	26.6	26.7	26.9	26.3
D.2.2.13 IIP - Other transport equipment*			23.5	22.6	21.3	19.6	19.5	18.5	17.5	16.7	19.9
D.2.3 IIP - Electricity	10.3	9.9	9.8	10.3	10.7	11.2	11.2	11.0	11.7	12.4	10.8
D.3 Cement Production	21.7	21.3	21.2	21.6	22.5	23.4	24.1	25.0	25.7	26.2	24.2
D.4 Steel Production	12.6	12.2	11.7	10.7	10.1	10.5	10.7	10.9	10.8	11.0	11.1
D.5 Coal Production	39.2	42.2	45.7	48.5	50.4	52.3	54.5	56.3	57.2	57.2	50.4
D.6 Crude Oil Production	10.1	10.1	10.1	10.2	10.0	10.2	10.3	10.4	10.1	10.0	10.2
D.7 Petroleum Refinery Production	9.5	9.3	8.9	8.6	8.1	8.6	9.6	10.5	10.7	10.6	9.4
D.8 Fertiliser Production*	27.5	27.5	27.3	26.7	26.3	26.0	26.6	27.3	28.3	27.0	27.0
D.9 Natural Gas Production*	11.1	11.5	12.0	12.1	11.8	11.2	10.9	10.6	10.3	10.4	11.2
D.10 Production of Commercial Motor Vehicles	37.4	32.5	28.8	28.6	29.0	29.5	29.8	30.1	30.6	31.6	30.8
E.1 Cargo handled at Major Ports	18.0	18.3	18.2	17.8	17.3	16.7	16.3	15.7	15.3	15.0	16.9
E.2 Railway Freight Traffic	19.9	20.7	21.3	21.5	21.5	21.5	21.4	21.4	21.4	21.6	21.2
E.3 Sales of Commercial Motor Vehicles	57.5	53.3	50.4	47.5	45.2	43.3	42.0	41.5	41.7	42.3	46.5
E.4 Passenger flown (Km) - Domestic	21.7	20.8	21.1	22.6	23.8	25.3	26.0	26.5	26.3	26.2	24.0
E.5 Passenger flown (Km) - International	20.7	20.0	19.3	18.4	17.8	16.9	16.9	17.4	18.1	18.6	18.4
E.6 Freight Tonne Km flown - Domestic	13.6	14.6	16.4	18.3	20.0	21.5	22.5	22.4	21.6	20.9	19.2
F.1 Exports	26.6	24.6	21.9	19.9	19.7	20.6	22.3	23.9	24.8	25.1	23.0
F.2 Imports	20.6	21.7	22.7	22.3	20.6	17.4	14.5	12.2	12.1	12.9	17.7
F.3 Non-Oil Non-Gold Imports	12.5	14.2	16.5	19.2	20.5	19.9	18.1	15.7	14.0	12.9	16.4

*Seasonal adjustment for these series is based on 8 to 9 years data depending on availability. Guidelines of both, Office of National Statistics (ONS), UK, and US Census Bureau, however, suggest using more than ten years data for estimating stable monthly seasonal factors.

Table 3: Change in seasonal variation in 2013-14 vis-à-vis previous 5-years (2008-09 to 2012-13)

Series	2013-14	Average Range*	Change	Series	2013-14	Average Range*	Change
1	2	3	4	1	2	3	4
A.1.1 Broad Money (M3)	1.6	2.2	-0.5	C.1 CPI for Industrial Workers (Base: 2001=100)	2.4	2.3	0.1
A.1.1.1 Net Bank Credit to Government	4.3	4.8	-0.4	C.2 CPI for Agricultural Labourers (Base: 1986-87=100)	2.5	2.2	0.3
A.1.1.2 Bank Credit to Commercial Sector	4.3	4.8	-0.4	C.3 CPI for Rural Labourers (Base: 1986-87=100)	2.3	2.2	0.1
A.1.2 Narrow Money (M1)	4.3	5.3	-1.0	D. IIP (Base: 2004-05=100) General Index	16.0	14.9	1.1
A.1.2.1 Currency with Public	5.4	6.0	-0.6	D.1.1 IIP - Basic Goods Industries	15.0	15.0	0.0
A.1.3 Reserve Money (RM)	5.6	6.4	-0.7	D.1.2 IIP - Intermediate Goods Industries	8.6	9.2	-0.6
A.1.3.1 Currency in Circulation	5.1	5.9	-0.8	D.1.3 IIP - Consumer Goods Industries	18.4	16.2	2.2
A.1.3.1.1 Notes in Circulation	5.5	6.1	-0.6	D.1.3.1 IIP - Consumer Durable Goods Industries	14.3	10.8	3.5
A.2.1 Aggregate Deposits (SCBs)	1.6	2.2	-0.6	D.1.3.2 IIP - Consumer Non-Durable Goods Industries	14.3	10.8	3.5
A.2.1.1 Demand Deposits (SCBs)	6.4	10.9	-4.6	D.2.1 IIP - Mining	27.6	26.8	0.8
A.2.1.2 Time Deposits (SCBs)	1.4	1.8	-0.4	D.2.2 IIP - Manufacturing	15.6	14.8	0.8
A.3.1 Cash in Hand and Balances with RBI (SCBs)	4.3	6.8	-2.4	D.2.2.1 IIP - Food products and beverages	2.4	2.3	0.1
A.3.2 Assets with the Banking System (SCBs)	20.1	20.7	-0.6	D.2.2.2 IIP - Textiles	8.3	8.3	0.0
A.3.3 Bank Credit (SCBs)	2.8	3.8	-1.0	D.2.2.3 IIP - Wood and products of wood & cork except furniture; articles of straw & plating materials	15.8	18.3	-2.5
A.3.3.1 Loans, Cash, Credits and Overdrafts (SCBs)	3.6	4.0	-0.4	D.2.2.4 IIP - Paper and paper products	9.0	10.1	-1.1
A.3.3.2 Non-Food Credit (SCBs)	2.8	3.9	-1.2	D.2.2.5 IIP - Publishing, printing & reproduction of recorded media	9.2	8.5	0.7
A.3.4 Investments (SCBs)	4.4	4.3	0.1	D.2.2.6 IIP - Coke, refined petroleum products & nuclear fuel	10.9	10.7	0.2
B. WPI (Base 2004-05=100) All Commodities	1.4	1.3	0.1	D.2.2.7 IIP - Chemicals and chemical products	9.0	10.0	-1.0
B.1 WPI - Primary Article	4.0	3.6	0.3	D.2.2.8 IIP - Rubber and plastics products	10.8	9.8	1.0
B.1.1 WPI - Food Articles	6.8	6.2	0.6	D.2.2.9 IIP - Other non-metallic mineral products	19.4	17.9	1.4
B.1.1.1 WPI - Food Grains (Cereals+Pulses)	2.8	2.5	0.3	D.2.2.10 IIP - Basic metals	11.1	10.6	0.6
B.1.1.1.1 WPI - Cereals	2.1	1.8	0.3	D.2.2.11 IIP - Fabricated metal products, except machinery & equipment	60.5	53.1	7.4
B.1.1.1.1.1 WPI - Wheat	4.2	3.7	0.4	D.2.2.12 IIP - Motor vehicles, trailers & semi-trailers	26.9	26.4	0.5
B.1.1.1.1.2 WPI - Rice	3.8	2.5	1.3	D.2.2.13 IIP - Other transport equipment	16.7	19.3	-2.6
B.1.1.1.2 WPI - Pulses	5.0	5.2	-0.1	D.2.3 IIP - Electricity	12.4	11.1	1.3
B.1.1.2 WPI - Fruits & Vegetables	19.0	17.3	1.7	D.3 Cement Production	26.2	24.1	2.0
B.1.1.3 WPI - Milk	1.3	0.8	0.5	D.4 Steel Production	11.0	10.6	0.4
B.1.1.4 WPI - Egg, Meat and Fish	4.3	3.5	0.8	D.5 Coal Production	57.2	54.1	3.1
B.1.1.4.1 WPI - Egg	12.2	9.2	3.0	D.6 Crude Oil Production	10.0	10.2	-0.2
B.1.1.4.2 WPI - Meat	2.4	1.8	0.6	D.7 Petroleum Refinery Production	10.6	9.5	1.1
B.1.1.4.3 WPI - Fish	5.7	4.8	0.9	D.8 Fertiliser Production	27.0	26.9	0.2
B.1.1.5 WPI - Protein Items (viz., Pulses, Milk, Egg, Meat and Fish)	2.8	2.4	0.4	D.9 Natural Gas Production	10.4	11.0	-0.5
B.1.2 WPI - Non-Food Articles	2.4	2.8	-0.4	D.10 Production of Commercial Motor Vehicles	31.6	29.8	1.8
B.1.2.1 WPI - Fibres	5.2	4.9	0.4	E.1 Cargo handled at Major Ports	15.0	16.3	-1.3
B.1.2.1.1 WPI - Raw Cotton	5.9	6.3	-0.4	E.2 Railway Freight Traffic	21.6	21.4	0.1
B.1.2.2 WPI - Oil Seeds	3.8	3.9	-0.1	E.3 Sales of Commercial Motor Vehicles	26.2	24.1	2.0
B.2 WPI - Manufactured Products	0.3	0.8	-0.5	E.4 Passenger flown (Km) - Domestic	42.3	42.7	-0.4
B.2.1 WPI - Food Products	2.0	1.3	0.7	E.5 Passenger flown (Km) - International	18.6	17.4	1.1
B.2.1.1 WPI - Grain Mill Products	3.1	3.1	0.0	E.6 Freight Tonne Km flown - Domestic	20.9	21.6	-0.7
B.2.1.2 WPI - Sugar	4.3	4.8	-0.5	F.1 Exports	25.1	22.3	2.8
B.2.1.3 WPI - Edible Oils	1.1	1.6	-0.5	F.2 Imports	12.9	15.4	-2.5
B.3 WPI - Non Food Manufactured Products	0.5	1.0	-0.5	F.3 Non-oil Non-Gold Imports	12.9	17.7	-4.8
B.4 WPI - Non Food Non-Fuel	0.9	1.5	-0.6				

*Average Range of Monthly Seasonal Factors for the last 5-years (2008-09 to 2012-13).

Table 4: List of Top-Twenty and Bottom-Twenty Series based on Average Range of Monthly Seasonal Factors during Last Five Years							
Top-Twenty Series	Average Range	Peak Month	Trough Month	Bottom-Twenty Series	Average Range	Peak Month	Trough Month
1	2	3	4	1	2	3	4
D.2.2.1 IIP - Food products and beverages	65.3	Jan	Sep	B.2.1.1 WPI - Grain Mill Products	3.1	Jan	May
D.2.2.11 IIP - Fabricated metal products, except machinery & equipment	56.0	Mar	Apr	B.1.1.1.1.2 WPI - Rice	2.9	Oct	Mar
D.5 Coal Production	55.5	Mar	Sep	B.1.2 WPI - Non-Food Articles	2.8	Apr	Oct
E.3 Sales of Commercial Motor Vehicles	42.2	Mar	Apr	B.1.1.5 WPI - Protein Items (<i>viz.</i> , Pulses, Milk, Egg, Meat and Fish)	2.6	Sep	Apr
D.10 Production of Commercial Motor Vehicles	30.3	Mar	Jun	B.1.1.1 WPI - Food Grains (Cereals+Pulses)	2.5	Oct	May
D.2.1 IIP - Mining	27.1	Mar	Sep	C.1 CPI for Industrial Workers (Base: 2001=100)	2.3	Oct	Mar
D.8 Fertiliser Production	27.0	Oct	Apr	C.2 CPI for Agricultural Labourers (Base: 1986-87=100)	2.3	Nov	Mar
D.2.2.12 IIP - Motor vehicles, trailers & semi-trailers	26.6	Mar	Jun	C.3 CPI for Rural Labourers (Base: 1986-87=100)	2.2	Oct	Mar
D.1.3.1 IIP - Consumer Non-Durable Goods Industries	26.5	Jan	Sep	A.1.1 Broad Money (M3)	2.0	Apr	Dec
E.4 Passenger flown (Km) - Domestic	26.1	May	Sep	A.2.1 Aggregate Deposits (SCBs)	2.0	Apr	Dec
D.3 Cement Production	24.9	Mar	Aug	B.1.1.1.1 WPI - Cereals	1.9	Oct	Apr
F.1 Exports	23.0	Mar	Nov	B.1.1.4.2 WPI - Meat	1.8	Jan	Apr
E.6 Freight Tonne Km flown - Domestic	21.8	Oct	Feb	A.2.1.2 Time Deposits (SCBs)	1.6	Apr	Dec
E.2 Railway Freight Traffic	21.4	Mar	Sep	B.2.1 WPI - Food Products	1.5	Sep	Mar
A.3.2 Assets with the Banking System (SCBs)	20.9	Mar	Nov	B.2.1.3 WPI - Edible Oils	1.4	Aug	Nov
D.2.2.9 IIP - Other non-metallic mineral products	18.5	Mar	Sep	B.4 WPI - Non Food Non-Fuel	1.3	May	Dec
D.2.2.13 IIP - Other transport equipment	18.4	Mar	Apr	B. WPI (Base 2004-05=100) All Commodities	1.3	Sep	Mar
F.2 Imports	17.7	May	Feb	B.1.1.3 WPI - Milk	1.0	Jul	Mar
E.5 Passenger flown (Km) - International	17.6	Jan	Sep	B.3 WPI - Non Food Manufactured Products	0.8	Apr	Dec
B.1.1.2 WPI - Fruits & Vegetables	17.6	Oct	Feb	B.2 WPI - Manufactured Products	0.7	May	Dec