

# Technical note on seasonal adjustment for Gross domestic product (Agriculture)

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## Contents

<b>1</b>	<b>GDP (Agriculture)</b>	<b>2</b>
<b>2</b>	<b>Diagnostic checks</b>	<b>4</b>
2.1	Presence of identifiable seasonality . . . . .	4
2.2	Sliding span diagnostics . . . . .	4
2.3	Spectral representation . . . . .	5
<b>3</b>	<b>Year on year growth versus seasonally adjusted point on point growth</b>	<b>5</b>

## List of Figures

1	GDP Agriculture (Non seasonally adusted) . . . . .	2
2	Quarterly growth rates across the years . . . . .	3
3	GDP Agriculture (NSA and SA) . . . . .	4
4	GDP (Agriculture) Spectral plot (NSA and SA) . . . . .	5

## List of Tables

1	Year on year and point on point growth rates . . . . .	7
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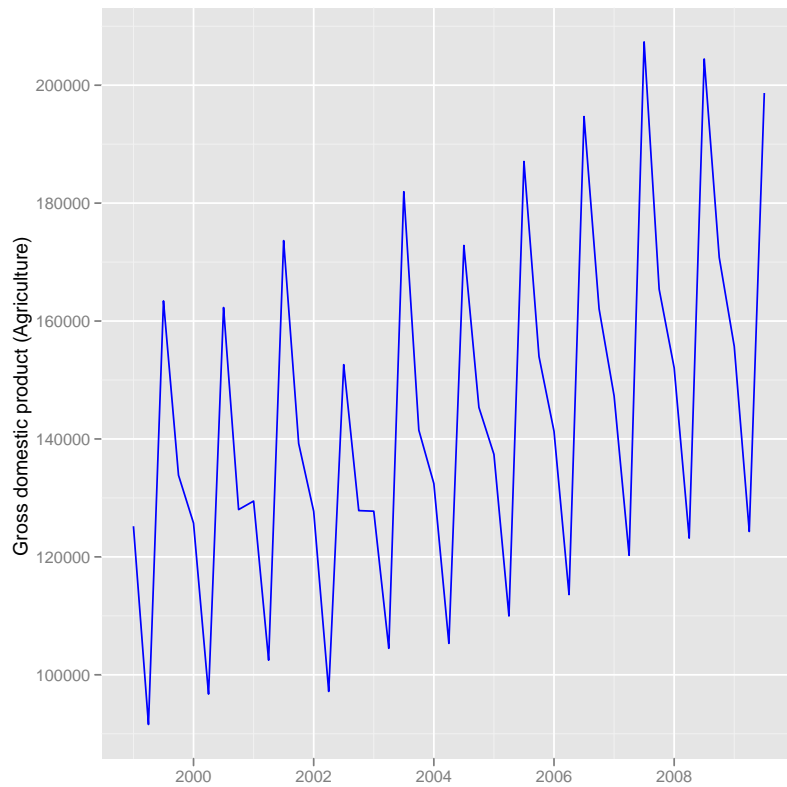
# 1 GDP (Agriculture)

We analyse the framework of seasonal adjustment for GDP (Agriculture), an important source of seasonality in GDP.

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**Figure 1** GDP Agriculture (Non seasonally adusted)

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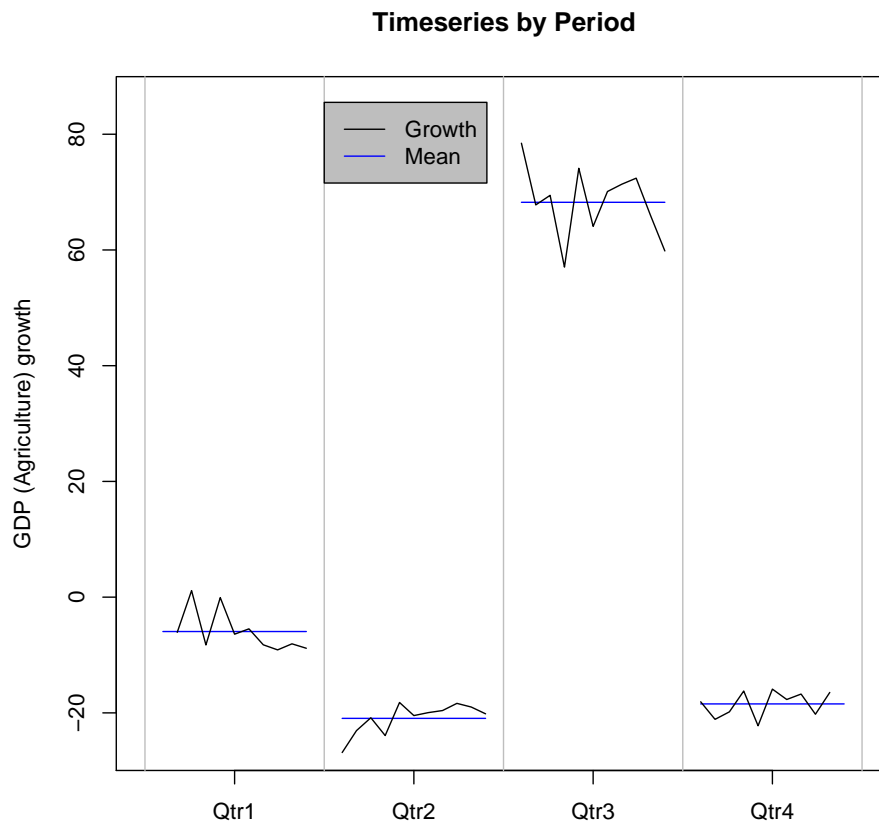
Figure 1 shows the original plot of GDP (Agriculture) from the first quarter of the fiscal year 1999-2000. The plot shows seasonal peaks.

Since seasonal peaks are increasing with the level of the series, a multiplicative model for seasonal adjustment is appropriate.

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**Figure 2** Quarterly growth rates across the years

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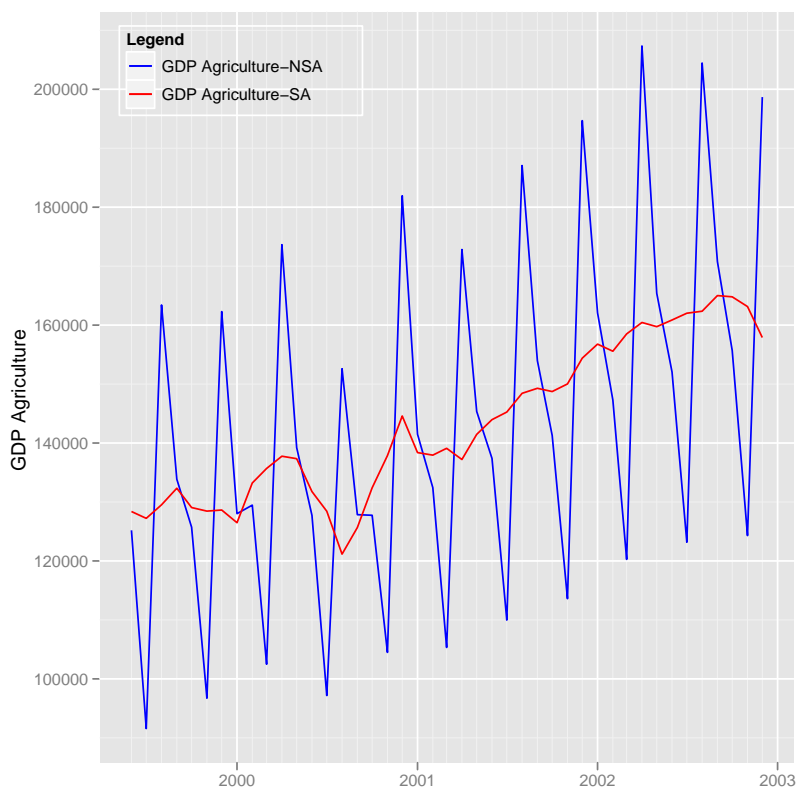
Figure 2 shows the quarter on quarter growth rate for all quarters across the years i.e. the growth rate of Q4 over Q3 for all years. This gives some idea of the nature of seasonality period wise across the different years. Figure 2 shows that mean growth rate in quarter 3 (October-December) is higher than the growth rate in other quarters.

Figure 3 shows the non seasonally and seasonally adjusted GDP Agriculture. Figure shows that seasonal peaks are dampened after seasonal adjustment.

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**Figure 3** GDP Agriculture (NSA and SA)

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## 2 Diagnostic checks

After seasonal adjustment a series of diagnostic checks are performed to check the quality of seasonal adjustment procedure.

### 2.1 Presence of identifiable seasonality

The statistic M7 shows the amount of moving seasonality present relative to stable seasonality. It shows the combined result for the test of stable and moving seasonality in the series. A value lesser than 0.7 is desirable to show identifiable seasonality in the series. The value of M7 statistic for GDP(agriculture) is 0.064.

*GDP agriculture shows identifiable seasonality on the basis of the M7 statistic.*

### 2.2 Sliding span diagnostics

Sliding span gives the percentage of quarters (A%) for which the seasonal adjustment is unstable. It also gives the percentage of quarters (MM%) for which the month on month changes

of the seasonally adjusted values is unstable i.e exceeding the threshold value. The seasonal adjustment produced by the procedure chosen should not be used if  $A\% > 25.0$  ( $> 15.0$  is considered problematic) or if  $MM\% > 40.0$ . For GDP (Agriculture) both  $A\%$  and  $MM\%$  is 0.

### 2.3 Spectral representation

**Figure 4** GDP (Agriculture) Spectral plot (NSA and SA)

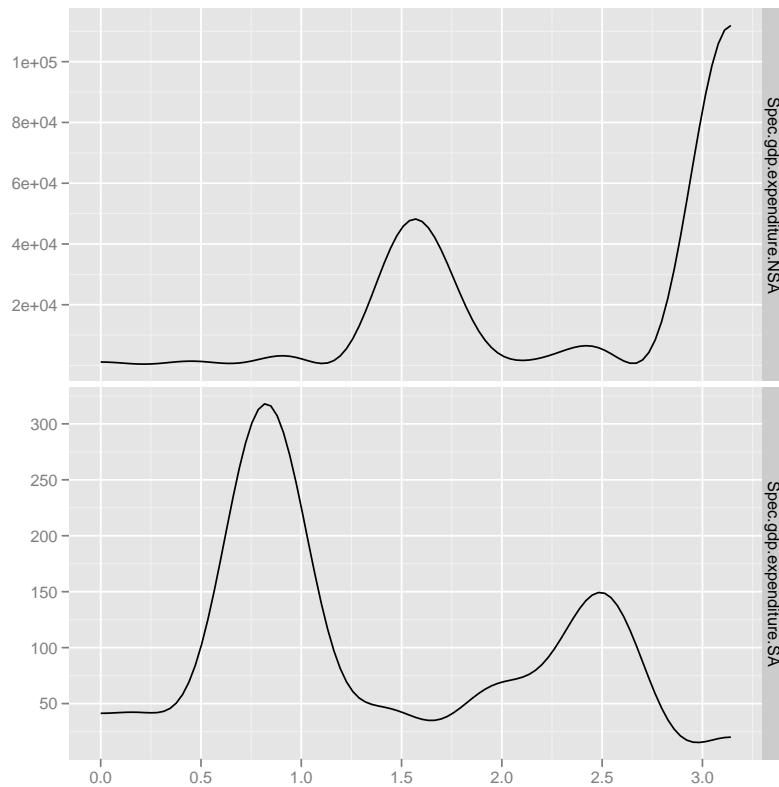


Figure 4 shows the spectral plot of the growth rate of the unadjusted and seasonally adjusted series. Spectral plot, an important tool of the frequency domain analysis shows the portion of variance of the series contributed by cycles of different frequencies. In case of quarterly series, the seasonal frequencies are  $\pi/2$  (1.57 on the X-axis) and  $\pi$  (3.14 on the X-axis) which correspond to periods of 4 quarters and 2 quarters. Figure shows that seasonal adjustment removes the peaks at seasonal frequencies.

### 3 Year on year growth versus seasonally adjusted point on point growth

Growth rates can be computed either year on year or point on point. The year on year growth rate is computed as the percentage change with respect to the corresponding month

(or quarter) in the preceding year, while the point on point growth rate is computed as the percentage change with respect to the preceding period.

Table 2 shows the year on year growth and seasonally adjusted annualized rate in percent, point on point.

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**Table 1** Year on year and point on point growth rates

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	Y.o.Y.growth	Point.on.point.growth
1999 Q2		-3.63
1999 Q3		7.17
1999 Q4		8.58
2000 Q1	0.42	-10.02
2000 Q2	5.63	-1.88
2000 Q3	-0.69	0.58
2000 Q4	-4.36	-6.74
2001 Q1	2.98	20.74
2001 Q2	5.95	7.33
2001 Q3	6.99	6.08
2001 Q4	8.75	-1.22
2002 Q1	-1.35	-16.59
2002 Q2	-5.18	-10.24
2002 Q3	-12.12	-23.34
2002 Q4	-8.17	14.61
2003 Q1	0.02	20.91
2003 Q2	7.53	16.17
2003 Q3	19.22	19.03
2003 Q4	10.67	-17.56
2004 Q1	3.67	-1.24
2004 Q2	0.80	3.34
2004 Q3	-5.01	-5.49
2004 Q4	2.73	12.24
2005 Q1	3.74	6.99
2005 Q2	4.41	3.56
2005 Q3	8.24	8.66
2005 Q4	5.93	2.29
2006 Q1	2.84	-1.48
2006 Q2	3.30	3.45
2006 Q3	4.07	11.50
2006 Q4	5.26	6.12
2007 Q1	4.26	-3.09
2007 Q2	5.86	7.48
2007 Q3	6.51	4.86
2007 Q4	2.04	-1.77
2008 Q1	3.22	2.82
2008 Q2	2.42	2.85
2008 Q3	-1.40	0.84
2008 Q4	3.26	6.47
2009 Q1	2.40	-0.51
2009 Q2	0.91	-4.03
2009 Q3	-2.82	-13.09

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