Reading input spec file from
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c

Reading data from
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c

U. S. Department of Commerce, U. S. Census Bureau

X-13ARIMA-SEATS monthly seasonal adjustment Method, Release Version 1.1 Build 39

This software application provides an enhanced version of
Statistics Canada's X-11-ARIMA extension (Dagum, 1980)
of the X-11 variant of the Census Method II of
Shiskin, Young and Musgrave (1967).

It also provides an ARIMA model-based method following
Hillmer and Tiao (1982) and Burman (1980) that is very similar
to the update of the method of SEATS (Gómez and Maravall, 1996)
produced at the Bank of Spain by G. Caporello and
A. Maravall for TSW (Caporello and Maravall, 2004).
The present application includes additional enhancements.

X-13ARIMA-SEATS includes an automatic ARIMA model
selection procedure
based largely on the procedure of Gómez and Maravall (1998)
as implemented in TRAMO (1996) and subsequent revisions.

Primary Programmers: Brian Monsell, Mark Otto and,
for the ARIMA model-based signal extraction,
Gianluca Caporello and Víctor Gómez

Series Title- ser
Series Name- iofile
Mar 30, 2020 16.55.08

- Period covered- 1st month,2007 to 9th month,2018
- Type of run - auto-mode seasonal adjustment
- Sigma limits for graduating extreme values are 1.5 and 2.5
.
- 3x3 moving average used in section 1 of each iteration,
  3x5 moving average in section 2 of iterations B and C,
  moving average for final seasonal factors chosen by
  Global MSR.
- Holiday adjustment factors applied directly to the final
  seasonally adjusted series
- Spectral plots generated for selected series
- Spectral plots generated for series starting in 2010.Oct

FILE SAVE REQUESTS (* indicates file exists and will be overwritten)

/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.mdl
model specifications (regression and arima specs)
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.est
regression and ARMA parameter estimates
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.rsd

residuals from the estimated model
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.d10
final seasonal factors
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.d11
final seasonally adjusted data
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.d12
final trend cycle
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.d13
final irregular component
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.d16
combined adjustment factors
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.e18
final adjustment ratios
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.html
program output file
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile_err.html
program error file
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.udg
seasonal adjustment and model diagnostics file

LINKS TO OTHER HTML FILES

- Error file for iofile
- Log entry for iofile

Contents of spc file
/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/iofile.spc

```
Line #
------
     1: series{
     2:   title = "ser"
     3:   file = "/var/folders/8l/csygwgmx5070g21qbnn234h00000gn/T//RtmpvkNJEX/x13outb44c5e08228b/data.dt
     4:   format = "datevalue"
     5:   period = 12
     6: }
     7:
     8: transform{
     9:   function = auto
    10:   print = aictransform
    11: }
    12:
    13: regression{
    14:   aictest = (td easter)
    15: }
    16:
    17: outlier{
    18:   critical = 5
    19: }
    20:
    21: automdl{
    22:   print = bestfivemdl
    23: }
    24:
    25: x11{
    26:   save = (d10 d11 d12 d13 d16 e18)
    27: }
    28:
    29: estimate{
    30:   save = (model estimates residuals)
    31: }
    32:
    33: spectrum{
    34:   print = qs
    35: }
```

Likelihood statistics for model fit to untransformed

series.

Likelihood Statistics	
Number of observations (nobs)	141
Effective number of observations (nefobs)	128
Number of parameters estimated (np)	3
Log likelihood (L)	-1066.6177
AIC	2139.2354
AICC (F-corrected-AIC)	2139.4290
Hannan Quinn	2142.7118
BIC	2147.7915

Likelihood statistics for model fit to log transformed series.

Likelihood Statistics	
Number of observations (nobs)	141
Effective number of observations (nefobs)	128
Number of parameters estimated (np)	3
Log likelihood	160.9781
Transformation Adjustment	-1228.2450
Adjusted Log likelihood (L)	-1067.2669
AIC	2140.5338
AICC (F-corrected-AIC)	2140.7273
Hannan Quinn	2144.0101
BIC	2149.0898

***** AICC (with aicdiff=-2.00) prefers **log transformation** *****

 ***** Multiplicative seasonal adjustment will be performed. ****

A 1 Time series data (for the span analyzed)

From 2007.Jan to 2018.Sep
Observations 141

A 1 Time series data (for the span analyzed)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2007	15354.	15859.	18107.	17290.	17818.	18783.	21034.	20897.	18789.	20891.	16229.	17190.	218241.
2008	13102.	14765.	16829.	15962.	17485.	16551.	19111.	18601.	17989.	18121.	14040.	13940.	196496.
2009	9999.	10372.	12415.	11230.	13236.	13824.	16853.	15808.	14888.	15972.	12892.	12958.	160447.
2010	9016.	9730.	10547.	10271.	11525.	12119.	17790.	15087.	15160.	16092.	12784.	13798.	153919.
2011	11371.	11038.	12304.	12458.	12838.	14424.	16858.	15372.	14402.	14519.	13086.	14106.	162776.
2012	10238.	11523.	13075.	13147.	13879.	14940.	16979.	16002.	15944.	15519.	12470.	15262.	168978.
2013	11174.	11177.	13897.	12011.	13534.	15120.	17289.	14655.	14175.	14576.	12953.	13832.	164393.
2014	12422.	12410.	15410.	15737.	14853.	14650.	17656.	14603.	15500.	17546.	14646.	15169.	180602.
2015	12343.	12949.	14472.	13956.	14832.	16223.	18060.	16463.	16927.	17561.	15681.	14364.	183831.
2016	12340.	14444.	15168.	17042.	15738.	16758.	19517.	17719.	17117.	17499.	14295.	14858.	192495.
2017	11910.	13564.	16281.	15523.	16782.	17599.	21448.	18563.	18539.	18271.	15449.	15030.	198959.
2018	11457.	15747.	17452.	15955.	16559.	19372.	24168.	20110.	19809.				160629.
AVGE	11727.	12798.	14663.	14215.	14923.	15864.	18897.	16990.	16603.	16961.	14048.	14592.	

Table Total- 2141766.   Mean- 15190.   Standard Deviation- 2682.

Minimum- 9016.   Maximum- 24168.

Automatic ARIMA Model Selection

Procedure based closely on TRAMO ,method of Gomez and
Maravall (2000)
"Automatic Modeling Methods for Univariate Series",
A Course in Time Series (Edited by D. Pena, G. C. Tiao, R. S. Tsay),
New York : J. Wiley and Sons

Maximum order for regular ARMA parameters : 2

Maximum order for seasonal ARMA parameters : 1

Maximum order for regular differencing : 2

Maximum order for seasonal differencing : 1

Results of Unit Root Test for identifying orders of differencing:

   Regular difference order : 1 Seasonal difference order : 1

Mean is significant.

Best Five ARIMA Models

   Model # 1 : (0 1 1)(0 1 1) (BIC2 = -2.402)
   Model # 2 : (1 1 0)(0 1 1) (BIC2 = -2.383)
   Model # 3 : (1 1 1)(0 1 1) (BIC2 = -2.367)
   Model # 4 : (2 1 0)(0 1 1) (BIC2 = -2.367)
   Model # 5 : (0 1 2)(0 1 1) (BIC2 = -2.364)

                Preliminary model choice : (0 1 1)(0 1 1)

Deleted trading day regressor(s) due to insignificant t-value.

Final Checks for Identified Model

Checking for Unit Roots.

No unit root found.

Checking for nonseasonal overdifferencing.

Nonseasonal MA not within 0.001 of 1.0 - model passes test.

Checking for insignificant ARMA coefficients.

                Final automatic model choice : (0 1 1)(0 1 1)

End of automatic model selection procedure.

Average absolute percentage error in within-sample forecasts:

   Last year: 7.29
   Last-1 year: 5.28
   Last-2 year: 5.44
   Last three years: 6.00

Estimation converged in 7 ARMA iterations, 40 function
evaluations.

Regression Model

Regression Model

	Parameter Estimate	Standard Error	t-value
Constant	0.0019	0.00154	1.23

ARIMA Model

ARIMA Model: (0 1 1)(0 1 1)

Nonseasonal differences: 1
Seasonal differences: 1

ARIMA Model

	Estimate	Standard Error
Nonseasonal MA		
Lag 1	0.38881	0.07929
Seasonal MA		
Lag 12	0.65756	0.07685

Model Innovation Variance

Variance	0.44331E-02
Standard Error of Variance	0.55414E-03

Likelihood Statistics

Number of observations (nobs)	141
Effective number of observations (nefobs)	128
Number of parameters estimated (np)	4
Log likelihood	161.6900
Transformation Adjustment	-1228.2450
Adjusted Log likelihood (L)	-1066.5550
AIC	2141.1100
AICC (F-corrected-AIC)	2141.4352
Hannan Quinn	2145.7452
BIC	2152.5181

Durbin-Watson Statistic for regARIMA Model Residuals

dw = 1.956022

Friedman Non-Parametric Test for regARIMA Model

Residuals

ken = 7.046154 (Asymptotically distributed as Chi-Square(11), P-Value = 0.795334)

QS Statistic for regARIMA Model Residuals

QS Statistic for regARIMA Model Residuals (full series): 0.00 (P-Value = 0.9982)

QS Statistic for regARIMA Model Residuals (starting 2010.Oct): 1.95 (P-Value = 0.3769)

At least one visually significant residual seasonal peaks has been found in the spectral plot of the following series starting in 2010.Oct:

- regARIMA model residuals (1 Seasonal peak(s))

10*LOG(SPECTRUM) of the regARIMA model residuals

Spectrum estimated from 2010.Oct to 2018.Sep.

```
        +++++++++I++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
    -16.16I                                        *              I    -16.16
        I                                          *        *     I
        I                                          *        *     I
        I            S                             *        *     I
    -17.63I           S                             *        *     I    -17.63
        I            S             *                *        *     I
        I            S             *                *        *     I
        I            S             *                *        *     I
    -19.10I           S             *                *        *     I    -19.10
        I            S             *                *        *     I
        I            S             *                *        *     I
        I            S             *   *            *        *   *  I
    -20.57I           S             *   *            *        *   *  I    -20.57
        I           *S             *   *            *        *   *  I
        I           *S*            *   *            *        *   *  I
        I           *S*            *   *            *        *   *  I
    -22.04I          *S*   *        *   *            **       **  *  I    -22.04
        I           *S*  **        *   *      S     **       **  *  I
        I           *S*****        *   *      S     **      ***  *  I
        I           *S*****        *   **     S     ***     *** **  I
    -23.51I          *S*****        *   **     S     ***     *** **  I    -23.51
        I           *S*****        *   **    *S  *   ***     *** **    *   *  I
        I           *S*****        *   **    *S  *   ***     *** **    *   *  I
        I           *S*****        **  **    *S  *   ***     *** **    *  **  I
    -24.98I          *S*****        **  **    *S* **   ***    ******   **  **  I    -24.98
        I          **S*******      **  **    *S****   ***    ******S  **  **  I
        I        *  **S*******      **  ***   *S****   ***    ******S  **  **  I
        I        *  **S*******      S** ***   *S****   ***S   ******S  **  **  I
    -26.45I         ****S*******      S** ***   *S**** ****S   ******S  **  **  I    -26.45
        I          ****S*******      S** ******S*********S* ******S  **  **  I
        I          ****S*******      S** ******S*********S*T*******S  **  **  I
        I          ****S*******      S*********S*********S*T*******S  *** **  I
    -27.91I         ****S*******      S*********S*********S*T*******S   ******  I    -27.91
        I          ****S*******      S*********S*********S*T*******S*T******  I
        I          ****S*******      S*********S*********S*T*******S*T******  I
        I          ****S********     S*********S*********S*T*******S*T******  I
    -29.38I         *****S********     S*********S*********S*T*******S*T******  I    -29.38
        I          *****S********     S*********S*********S*T*******S*T*******  I
        I        I*  *****S******** *S*********S*********S*T*******S*T*******  I
        I        I*  *****S******** *S*********S*********S*T*******S*T*******  I
    -30.85I*        *****S*********S*********S*********S*T*******S*T******* I    -30.85
        I*         *****S*********S*********S*********S*T*******S*T*******SI
        I*         *****S*********S*********S*********S*T*******S*T*******SI
        I*         *****S*********S*********S*********S*T*******S*T*******SI
    -32.32I*        *****S*********S*********S*********S*T*******S*T*******SI    -32.32
        I**        *****S*********S*********S*********S*T*******S*T*******SI
        I**        *****S*********S*********S*********S*T*******S*T*******SI
```

```
       I**   ******S**********S**********S**********S*T********S*T********SI
  -33.79I**   ******S**********S**********S**********S*T********S*T********SI       -33.79
       I**   ******S**********S**********S**********S*T********S*T********SI
       I**   ******S**********S**********S**********S*T********S*T********SI
       I**   ******S**********S**********S**********S*T********S*T********SI
  -35.26I**********S**********S**********S**********S*T********S*T********SI       -35.26
   +++++++++++I++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
          S=SEASONAL FREQUENCIES, T=TRADING DAY FREQUENCIES
```

FORECASTING

Origin : 2018.Sep
Number : 12

Forecasts and Standard Errors of the Transformed Data

Date	Forecast	Standard Error
2018.Oct	9.93227	0.669755E-01
2018.Nov	9.76843	0.789029E-01
2018.Dec	9.78049	0.894702E-01
2019.Jan	9.55709	0.991100E-01
2019.Feb	9.73375	0.108082
2019.Mar	9.86653	0.116535
2019.Apr	9.83802	0.124574
2019.May	9.87503	0.132276
2019.Jun	9.97199	0.139695
2019.Jul	10.1631	0.146876
2019.Aug	10.0244	0.153850
2019.Sep	10.0218	0.160645

Confidence intervals with coverage probability (0.95000)
On the Original Scale

Date	Lower	Forecast	Upper
2018.Oct	18051.8	20584.0	23471.5
2018.Nov	14969.7	17473.4	20395.7
2018.Dec	14840.8	17685.4	21075.2
2019.Jan	11647.4	14144.7	17177.3
2019.Feb	13655.7	16877.7	20860.0
2019.Mar	15338.5	19274.3	24219.9
2019.Apr	14674.3	18732.5	23913.0
2019.May	14999.6	19439.0	25192.2
2019.Jun	16288.1	21418.0	28163.5
2019.Jul	19443.0	25928.9	34578.4
2019.Aug	16694.6	22570.1	30513.4
2019.Sep	16431.5	22512.2	30843.2

B 1 Original series (prior adjusted)

From 2007.Jan to 2018.Sep
Observations 141

B 1 Original series (prior adjusted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2007	15354.	15859.	18107.	17290.	17818.	18783.	21034.	20897.	18789.	20891.	16229.	17190.	218241.
2008	13102.	14765.	16829.	15962.	17485.	16551.	19111.	18601.	17989.	18121.	14040.	13940.	196496.

2009	9999.	10372.	12415.	11230.	13236.	13824.	16853.	15808.	14888.	15972.	12892.	12958.	160447.
2010	9016.	9730.	10547.	10271.	11525.	12119.	17790.	15087.	15160.	16092.	12784.	13798.	153919.
2011	11371.	11038.	12304.	12458.	12838.	14424.	16858.	15372.	14402.	14519.	13086.	14106.	162776.
2012	10238.	11523.	13075.	13147.	13879.	14940.	16979.	16002.	15944.	15519.	12470.	15262.	168978.
2013	11174.	11177.	13897.	12011.	13534.	15120.	17289.	14655.	14175.	14576.	12953.	13832.	164393.
2014	12422.	12410.	15410.	15737.	14853.	14650.	17656.	14603.	15500.	17546.	14646.	15169.	180602.
2015	12343.	12949.	14472.	13956.	14832.	16223.	18060.	16463.	16927.	17561.	15681.	14364.	183831.
2016	12340.	14444.	15168.	17042.	15738.	16758.	19517.	17719.	17117.	17499.	14295.	14858.	192495.
2017	11910.	13564.	16281.	15523.	16782.	17599.	21448.	18563.	18539.	18271.	15449.	15030.	198959.
2018	11457.	15747.	17452.	15955.	16559.	19372.	24168.	20110.	19809.				160629.
AVGE	11727.	12798.	14663.	14215.	14923.	15864.	18897.	16990.	16603.	16961.	14048.	14592.	

Table Total- 2141766.   Mean- 15190.   Standard Deviation- 2682.
Minimum- 9016.   Maximum- 24168.

B 1.A Forecasts of (prior adjusted) original series

From 2018.Oct to 2019.Sep
Observations 12

B 1.A Forecasts of (prior adjusted) original series

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2018										20584.	17473.	17685.	55743.
2019	14145.	16878.	19274.	18733.	19439.	21418.	25929.	22570.	22512.				180897.

C 17 Final weights for irregular component

From 2007.Jan to 2018.Sep
Observations 141

Lower sigma limit : 1.50
Upper sigma limit : 2.50

C 17 Final weights for irregular component

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	S.D.
2007	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	2.4
2008	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	33.8	100.0	100.0	100.0	2.4
2009	100.0	100.0	100.0	18.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	2.4
2010	100.0	100.0	100.0	100.0	100.0	45.4	0.0	100.0	100.0	100.0	100.0	100.0	2.9
2011	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.0
2012	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.9	13.6	3.5
2013	100.0	100.0	100.0	99.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.5
2014	7.9	100.0	100.0	0.0	100.0	65.8	100.0	0.0	100.0	100.0	100.0	100.0	3.5
2015	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.2	91.9	3.1
2016	100.0	91.9	98.9	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2
2017	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.0
2018	0.0	0.0	100.0	100.0	100.0	100.0	37.2	100.0	100.0				3.0

D 8 Final unmodified SI ratios

From 2007.Jan to 2018.Sep
Observations 141

D 8 Final unmodified SI ratios

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE

2007	74.9	79.1	92.6	90.8	96.1	103.8	118.7	119.8	108.8	121.1	93.4	97.5	99.7
2008	73.1	81.6	93.3	89.9	101.2	99.0	118.0	118.2	117.3	121.4	96.7	98.8	100.7
2009	72.7	76.7	92.5	83.6	98.2	102.2	124.5	117.0	110.9	120.2	98.6	101.3	99.9
2010	72.4	80.1	88.4	86.7	96.3	99.1	141.4	116.6	114.5	119.5	93.9	100.6	100.8
2011	82.7	80.2	89.5	90.9	94.2	106.9	125.9	115.5	108.3	108.8	97.2	103.6	100.3
2012	74.2	82.6	93.1	93.4	98.3	105.4	119.6	112.5	111.9	108.9	87.7	108.3	99.7
2013	80.2	80.9	101.1	87.4	98.4	109.9	126.0	107.5	104.5	107.4	94.4	98.5	99.7
2014	86.1	84.1	103.2	105.2	99.9	99.2	119.9	98.6	103.2	115.0	95.1	98.4	100.6
2015	80.6	85.3	96.1	93.1	98.9	107.6	118.6	107.0	109.0	112.1	99.3	90.5	99.8
2016	77.5	90.5	94.9	106.6	98.5	105.1	122.9	112.0	108.7	111.8	91.5	94.7	101.2
2017	75.1	84.3	99.5	93.6	100.2	104.6	127.4	110.6	110.9	109.6	92.5	89.6	99.8
2018	67.9	92.6	101.7	92.1	94.6	109.6	135.0	110.8	107.5				101.3
AVGE	76.4	83.2	95.5	92.8	97.9	104.4	124.8	112.2	109.6	114.2	94.6	98.3	

Table Total- 14139.   Mean- 100.   Standard Deviation- 14.
Minimum- 68.   Maximum- 141.

D 8.A F-tests for seasonality

Test for the presence of seasonality assuming stability.

	Sum of Squares	Degrees of Freedom	Mean Square	F-value
Between months	24048.3800	11	2186.216	84.522**
Residual	3336.68492	129	25.866	
Total	27385.06493	140		

**Seasonality present at the 0.1 per cent level.

Nonparametric Test for the Presence of Seasonality Assuming Stability

Kruskal-Wallis statistic	Degrees of Freedom	Probability level
122.4430	11	0.000%

Seasonality present at the one percent level.

Moving Seasonality Test

	Sum of Squares	Degrees of Freedom	Mean Square	F-value
Between Years	490.5446	10	49.054	3.183*
Error	1695.30506	110	15.412	

* Moving seasonality present at the one percent level.

COMBINED TEST FOR THE PRESENCE OF

D 8.B Final unmodified SI ratios, with labels for outliers and extreme values

From 2007.Jan to 2018.Sep
Observations 141

D 8.B Final unmodified SI ratios, with labels for outliers and extreme values

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	74.9	79.1	92.6	90.8	96.1	103.8	118.7	119.8	108.8	121.1	93.4	97.5
2008	73.1	81.6	93.3	89.9	101.2	99.0	118.0	118.2	117.3 *	121.4	96.7	98.8
2009	72.7	76.7	92.5	83.6 *	98.2	102.2	124.5	117.0	110.9	120.2	98.6	101.3
2010	72.4	80.1	88.4	86.7	96.3	99.1 *	141.4 *	116.6	114.5	119.5	93.9	100.6
2011	82.7 *	80.2	89.5	90.9	94.2	106.9	125.9	115.5	108.3	108.8	97.2	103.6
2012	74.2	82.6	93.1	93.4	98.3	105.4	119.6	112.5	111.9	108.9	87.7 *	108.3 *
2013	80.2	80.9	101.1	87.4 *	98.4	109.9	126.0	107.5	104.5	107.4	94.4	98.5
2014	86.1 *	84.1	103.2	105.2 *	99.9	99.2 *	119.9	98.6 *	103.2	115.0	95.1	98.4
2015	80.6	85.3	96.1	93.1	98.9	107.6	118.6	107.0	109.0	112.1	99.3 *	90.5 *
2016	77.5	90.5 *	94.9 *	106.6 *	98.5	105.1	122.9	112.0	108.7	111.8	91.5	94.7
2017	75.1	84.3	99.5	93.6	100.2	104.6	127.4	110.6	110.9	109.6	92.5	89.6
2018	67.9 *	92.6 *	101.7	92.1	94.6	109.6	135.0 *	110.8	107.5			

Key to symbols:

*	extreme value as determined by X-11 extreme value procedure

D 9 Final replacement values for SI ratios

From 2007.Jan to 2018.Sep
Observations 141

D 9 Final replacement values for SI ratios

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007												
2008									113.4			
2009			87.7									
2010						102.4	124.4					
2011	75.4											
2012											92.1	101.1
2013			87.4									
2014	80.0			93.6		101.5		108.2				
2015											97.7	90.9
2016		90.2	95.0	94.4								
2017												
2018	75.1	86.1					130.0					

D 9.A Moving seasonality ratio

D 9.A Moving seasonality ratio

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

I	2.473	3.509	3.532	2.768	2.531	3.638	3.060	1.510	3.465	2.750	3.508	2.701
S	0.752	0.902	0.965	0.547	0.272	0.624	0.435	0.835	0.527	1.105	0.401	1.013
RATIO	3.289	3.888	3.660	5.056	9.303	5.832	7.030	1.807	6.580	2.488	8.739	2.666

D 10 Final seasonal factors

From 2007.Jan to 2018.Sep
Observations 141

Seasonal filter : 3 x 5 moving average

D 10 Final seasonal factors

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007	73.35	79.24	92.09	89.03	98.15	101.76	120.95	118.02	111.51	120.65	95.87	99.41	100.00
2008	73.43	79.33	91.72	89.06	97.86	102.19	121.50	117.82	111.47	119.82	95.86	99.75	99.99
2009	73.45	79.67	91.41	89.27	97.73	102.74	122.11	117.11	111.61	118.12	95.74	100.27	99.94
2010	73.95	79.84	91.79	89.44	97.50	104.00	123.10	115.79	110.97	115.52	95.53	100.67	99.84
2011	74.82	80.52	93.08	89.85	97.58	104.84	123.45	114.02	110.06	113.39	95.00	100.64	99.77
2012	76.28	81.29	94.83	90.51	97.66	105.87	123.36	112.13	108.61	111.63	94.84	99.76	99.73
2013	77.49	82.85	96.44	91.52	98.13	105.98	122.44	110.69	107.81	111.06	94.56	98.41	99.78
2014	78.28	83.98	97.71	92.14	98.62	106.05	122.33	109.70	107.43	110.87	94.53	96.50	99.84
2015	78.22	85.13	98.52	92.63	98.70	105.76	122.82	109.53	107.62	111.37	94.12	94.82	99.94
2016	77.52	85.73	98.61	92.99	98.39	105.97	124.10	109.77	108.19	111.32	93.91	93.23	99.98
2017	76.38	86.33	98.45	93.39	97.90	106.18	125.40	110.38	108.82	111.11	93.37	92.42	100.01
2018	75.38	86.33	98.50	93.45	97.61	106.52	126.74	110.69	109.24				100.49
AVGE	75.71	82.52	95.26	91.11	97.99	104.82	123.19	112.97	109.45	114.08	94.85	97.81	

Table Total- 14090.   Mean- 100.   Standard Deviation- 13.
Minimum- 73.   Maximum- 127.

D 10.A Final seasonal component forecasts

From 2018.Oct to 2019.Sep
Observations 12

D 10.A Final seasonal component forecasts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2018										110.66	92.90	91.98	98.51
2019	74.84	86.19	98.91	93.45	97.47	106.50	127.48	110.77	109.18				100.53

D 11 Final seasonally adjusted data

From 2007.Jan to 2018.Sep
Observations 141

D 11 Final seasonally adjusted data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2007	20932.	20013.	19663.	19420.	18154.	18459.	17391.	17706.	16849.	17315.	16928.	17291.	220121.
2008	17843.	18611.	18348.	17922.	17867.	16197.	15729.	15788.	16137.	15123.	14646.	13975.	198186.
2009	13613.	13019.	13582.	12580.	13544.	13455.	13801.	13498.	13339.	13522.	13466.	12923.	160343.
2010	12193.	12187.	11491.	11484.	11820.	11653.	14452.	13029.	13662.	13930.	13383.	13706.	152988.
2011	15198.	13708.	13219.	13865.	13156.	13758.	13656.	13482.	13086.	12805.	13774.	14017.	163724.
2012	13422.	14175.	13788.	14525.	14212.	14112.	13764.	14271.	14680.	13903.	13148.	15299.	169298.
2013	14420.	13491.	14411.	13123.	13791.	14266.	14121.	13240.	13149.	13124.	13699.	14056.	164890.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2014	15870.	14778.	15772.	17080.	15061.	13814.	14433.	13312.	14427.	15826.	15494.	15719.	181585.
2015	15780.	15211.	14689.	15066.	15028.	15339.	14705.	15030.	15728.	15768.	16661.	15148.	184154.
2016	15919.	16847.	15382.	18326.	15996.	15814.	15727.	16141.	15821.	15719.	15222.	15937.	192852.
2017	15593.	15712.	16537.	16622.	17142.	16574.	17104.	16818.	17037.	16443.	16546.	16262.	198391.
2018	15199.	18241.	17718.	17074.	16964.	18186.	19069.	18168.	18134.				158753.
AVGE	15498.	15499.	15383.	15591.	15228.	15136.	15329.	15040.	15171.	14862.	14815.	14939.	

Table Total- 2145284.   Mean- 15215.   Standard Deviation- 1905.
Minimum- 11484.   Maximum- 20932.

Test for the presence of residual seasonality.

No evidence of residual seasonality in the entire series at the 1 per cent level. F = 0.29

No evidence of residual seasonality in the last 3 years at the 1 per cent level. F = 1.02

No evidence of residual seasonality in the last 3 years at the 5 per cent level.

NOTE: sudden large changes in the level of the adjusted series will invalidate the results of this test for the last three year period.

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D 12 Final trend cycle

From 2007.Jan to 2018.Sep
Observations 141

Trend filter : 13-term Henderson moving average
I/C ratio : 2.46

D 12 Final trend cycle

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2007	20553.	20126.	19654.	19140.	18617.	18126.	17700.	17366.	17154.	17121.	17261.	17550.	220368.
2008	17899.	18137.	18140.	17858.	17362.	16769.	16211.	15747.	15343.	14943.	14517.	14081.	197006.
2009	13682.	13419.	13321.	13345.	13426.	13513.	13579.	13596.	13547.	13412.	13159.	12809.	160808.
2010	12399.	12015.	11744.	11669.	11832.	12183.	12621.	13053.	13410.	13632.	13737.	13743.	152038.
2011	13687.	13622.	13582.	13576.	13556.	13496.	13430.	13364.	13333.	13356.	13455.	13614.	162071.
2012	13816.	13988.	14084.	14127.	14161.	14185.	14175.	14164.	14159.	14164.	14161.	14104.	169290.
2013	14009.	13930.	13897.	13882.	13841.	13766.	13643.	13500.	13400.	13445.	13679.	14113.	165105.
2014	14601.	14974.	15143.	15085.	14882.	14669.	14565.	14653.	14918.	15247.	15490.	15566.	179792.
2015	15490.	15332.	15146.	15003.	14942.	14987.	15130.	15300.	15490.	15678.	15841.	15953.	184293.
2016	16009.	16014.	16005.	15992.	15976.	15939.	15884.	15836.	15759.	15663.	15609.	15639.	190325.
2017	15778.	16021.	16311.	16587.	16801.	16927.	16947.	16865.	16729.	16618.	16585.	16631.	198799.
2018	16740.	16917.	17136.	17370.	17591.	17799.	18008.	18220.	18420.				158201.
AVGE	15389.	15375.	15347.	15303.	15249.	15197.	15158.	15139.	15138.	14844.	14863.	14891.	

Table Total- 2138095.   Mean- 15164.   Standard Deviation- 1812.
Minimum- 11669.   Maximum- 20553.

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D 13 Final irregular component

From 2007.Jan to 2018.Sep
Observations 141

D 13 Final irregular component

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	S.D.
2007	101.8	99.4	100.0	101.5	97.5	101.8	98.3	102.0	98.2	101.1	98.1	98.5	1.6

2008	99.7	102.6	101.1	100.4	102.9	96.6	97.0	100.3	105.2	101.2	100.9	99.3	2.4
2009	99.5	97.0	102.0	94.3	100.9	99.6	101.6	99.3	98.5	100.8	102.3	100.9	2.2
2010	98.3	101.4	97.8	98.4	99.9	95.7	114.5	99.8	101.9	102.2	97.4	99.7	4.6
2011	111.0	100.6	97.3	102.1	97.1	101.9	101.7	100.9	98.1	95.9	102.4	103.0	3.9
2012	97.1	101.3	97.9	102.8	100.4	99.5	97.1	100.8	103.7	98.2	92.8	108.5	3.8
2013	102.9	96.8	103.7	94.5	99.6	103.6	103.5	98.1	98.1	97.6	100.1	99.6	2.9
2014	108.7	98.7	104.2	113.2	101.2	94.2	99.1	90.9	96.7	103.8	100.0	101.0	5.9
2015	101.9	99.2	97.0	100.4	100.6	102.3	97.2	98.2	101.5	100.6	105.2	95.0	2.7
2016	99.4	105.2	96.1	114.6	100.1	99.2	99.0	101.9	100.4	100.4	97.5	101.9	4.8
2017	98.8	98.1	101.4	100.2	102.0	97.9	100.9	99.7	101.8	98.9	99.8	97.8	1.5
2018	90.8	107.8	103.4	98.3	96.4	102.2	105.9	99.7	98.4				4.9
S.D.	5.1	3.2	2.7	6.3	1.9	2.9	4.9	2.9	2.5	2.1	3.1	3.3	

Table Total- 14146.   Mean- 100.   Standard Deviation- 4.
Minimum- 91.   Maximum- 115.

D 16 Combined adjustment factors

From 2007.Jan to 2018.Sep
Observations 141

D 16 Combined adjustment factors

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007	73.35	79.24	92.09	89.03	98.15	101.76	120.95	118.02	111.51	120.65	95.87	99.41	100.00
2008	73.43	79.33	91.72	89.06	97.86	102.19	121.50	117.82	111.47	119.82	95.86	99.75	99.99
2009	73.45	79.67	91.41	89.27	97.73	102.74	122.11	117.11	111.61	118.12	95.74	100.27	99.94
2010	73.95	79.84	91.79	89.44	97.50	104.00	123.10	115.79	110.97	115.52	95.53	100.67	99.84
2011	74.82	80.52	93.08	89.85	97.58	104.84	123.45	114.02	110.06	113.39	95.00	100.64	99.77
2012	76.28	81.29	94.83	90.51	97.66	105.87	123.36	112.13	108.61	111.63	94.84	99.76	99.73
2013	77.49	82.85	96.44	91.52	98.13	105.98	122.44	110.69	107.81	111.06	94.56	98.41	99.78
2014	78.28	83.98	97.71	92.14	98.62	106.05	122.33	109.70	107.43	110.87	94.53	96.50	99.84
2015	78.22	85.13	98.52	92.63	98.70	105.76	122.82	109.53	107.62	111.37	94.12	94.82	99.94
2016	77.52	85.73	98.61	92.99	98.39	105.97	124.10	109.77	108.19	111.32	93.91	93.23	99.98
2017	76.38	86.33	98.45	93.39	97.90	106.18	125.40	110.38	108.82	111.11	93.37	92.42	100.01
2018	75.38	86.33	98.50	93.45	97.61	106.52	126.74	110.69	109.24				100.49
AVGE	75.71	82.52	95.26	91.11	97.99	104.82	123.19	112.97	109.45	114.08	94.85	97.81	

Table Total- 14090.   Mean- 100.   Standard Deviation- 13.
Minimum- 73.   Maximum- 127.

D 16.A Combined adjustment component forecasts

From 2018.Oct to 2019.Sep
Observations 12

D 16.A Combined adjustment component forecasts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2018										110.66	92.90	91.98	98.51
2019	74.84	86.19	98.91	93.45	97.47	106.50	127.48	110.77	109.18				100.53

E 4 Ratios of annual totals

From 2007 to 2017

E 4 Ratios of annual totals

	Unmodified (D11)	Modified (E3)
2007	99.15	99.15
2008	99.15	99.15
2009	100.07	100.07
2010	100.61	100.34
2011	99.42	99.65
2012	99.81	99.81
2013	99.70	99.70
2014	99.46	99.62
2015	99.82	99.82
2016	99.81	99.90
2017	100.29	100.29

E 5 Month-to-month percent change in the original series

From 2007.Feb to 2018.Sep
Observations 140

E 5 Month-to-month percent change in the original series

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007		3.3	14.2	-4.5	3.1	5.4	12.0	-0.7	-10.1	11.2	-22.3	5.9	1.6
2008	-23.8	12.7	14.0	-5.2	9.5	-5.3	15.5	-2.7	-3.3	0.7	-22.5	-0.7	-0.9
2009	-28.3	3.7	19.7	-9.5	17.9	4.4	21.9	-6.2	-5.8	7.3	-19.3	0.5	0.5
2010	-30.4	7.9	8.4	-2.6	12.2	5.2	46.8	-15.2	0.5	6.1	-20.6	7.9	2.2
2011	-17.6	-2.9	11.5	1.3	3.1	12.4	16.9	-8.8	-6.3	0.8	-9.9	7.8	0.7
2012	-27.4	12.6	13.5	0.6	5.6	7.6	13.6	-5.8	-0.4	-2.7	-19.6	22.4	1.7
2013	-26.8	0.0	24.3	-13.6	12.7	11.7	14.3	-15.2	-3.3	2.8	-11.1	6.8	0.2
2014	-10.2	-0.1	24.2	2.1	-5.6	-1.4	20.5	-17.3	6.1	13.2	-16.5	3.6	1.6
2015	-18.6	4.9	11.8	-3.6	6.3	9.4	11.3	-8.8	2.8	3.7	-10.7	-8.4	0.0
2016	-14.1	17.1	5.0	12.4	-7.7	6.5	16.5	-9.2	-3.4	2.2	-18.3	3.9	0.9
2017	-19.8	13.9	20.0	-4.7	8.1	4.9	21.9	-13.5	-0.1	-1.4	-15.4	-2.7	0.9
2018	-23.8	37.4	10.8	-8.6	3.8	17.0	24.8	-16.8	-1.5				4.8
AVGE	-21.9	9.2	14.8	-3.0	5.7	6.5	19.7	-10.0	-2.1	4.0	-16.9	4.3	

Table Total- 154.   Mean- 1.   Standard Deviation- 14.
Minimum- -30.   Maximum- 47.

E 6 Month-to-month percent change in seasonally adjusted series (D11)

From 2007.Feb to 2018.Sep
Observations 140

E 6 Month-to-month percent change in seasonally adjusted series (D11)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007		-4.4	-1.7	-1.2	-6.5	1.7	-5.8	1.8	-4.8	2.8	-2.2	2.1	-1.7
2008	3.2	4.3	-1.4	-2.3	-0.3	-9.3	-2.9	0.4	2.2	-6.3	-3.2	-4.6	-1.7
2009	-2.6	-4.4	4.3	-7.4	7.7	-0.7	2.6	-2.2	-1.2	1.4	-0.4	-4.0	-0.6
2010	-5.7	-0.0	-5.7	-0.1	2.9	-1.4	24.0	-9.8	4.9	2.0	-3.9	2.4	0.8
2011	10.9	-9.8	-3.6	4.9	-5.1	4.6	-0.7	-1.3	-2.9	-2.1	7.6	1.8	0.3

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2012	-4.2	5.6	-2.7	5.3	-2.2	-0.7	-2.5	3.7	2.9	-5.3	-5.4	16.4	0.9
2013	-5.7	-6.4	6.8	-8.9	5.1	3.4	-1.0	-6.2	-0.7	-0.2	4.4	2.6	-0.6
2014	12.9	-6.9	6.7	8.3	-11.8	-8.3	4.5	-7.8	8.4	9.7	-2.1	1.4	1.3
2015	0.4	-3.6	-3.4	2.6	-0.3	2.1	-4.1	2.2	4.6	0.3	5.7	-9.1	-0.2
2016	5.1	5.8	-8.7	19.1	-12.7	-1.1	-0.6	2.6	-2.0	-0.6	-3.2	4.7	0.7
2017	-2.2	0.8	5.3	0.5	3.1	-3.3	3.2	-1.7	1.3	-3.5	0.6	-1.7	0.2
2018	-6.5	20.0	-2.9	-3.6	-0.6	7.2	4.9	-4.7	-0.2				1.5
AVGE	0.5	0.1	-0.6	1.4	-1.7	-0.5	1.8	-1.9	1.0	-0.2	-0.2	1.1	

Table Total- 9.   Mean- 0.   Standard Deviation- 6.
Minimum- -13.   Maximum- 24.

E 7 Month-to-month percent change in final trend cycle (D12)

From 2007.Feb to 2018.Sep
Observations 140

E 7 Month-to-month percent change in final trend cycle (D12)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007		-2.1	-2.3	-2.6	-2.7	-2.6	-2.4	-1.9	-1.2	-0.2	0.8	1.7	-1.4
2008	2.0	1.3	0.0	-1.6	-2.8	-3.4	-3.3	-2.9	-2.6	-2.6	-2.8	-3.0	-1.8
2009	-2.8	-1.9	-0.7	0.2	0.6	0.7	0.5	0.1	-0.4	-1.0	-1.9	-2.7	-0.8
2010	-3.2	-3.1	-2.3	-0.6	1.4	3.0	3.6	3.4	2.7	1.7	0.8	0.0	0.6
2011	-0.4	-0.5	-0.3	-0.0	-0.2	-0.4	-0.5	-0.5	-0.2	0.2	0.7	1.2	-0.1
2012	1.5	1.2	0.7	0.3	0.2	0.2	-0.1	-0.1	-0.0	0.0	-0.0	-0.4	0.3
2013	-0.7	-0.6	-0.2	-0.1	-0.3	-0.5	-0.9	-1.0	-0.7	0.3	1.7	3.2	0.0
2014	3.5	2.6	1.1	-0.4	-1.3	-1.4	-0.7	0.6	1.8	2.2	1.6	0.5	0.8
2015	-0.5	-1.0	-1.2	-0.9	-0.4	0.3	1.0	1.1	1.2	1.2	1.0	0.7	0.2
2016	0.4	0.0	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.5	-0.6	-0.3	0.2	-0.2
2017	0.9	1.5	1.8	1.7	1.3	0.7	0.1	-0.5	-0.8	-0.7	-0.2	0.3	0.5
2018	0.7	1.1	1.3	1.4	1.3	1.2	1.2	1.2	1.1				1.1
AVGE	0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.1	

Table Total- -9.   Mean- -0.   Standard Deviation- 2.
Minimum- -3.   Maximum- 4.

E 8 Month-to-month percent change in original series adjusted for calendar factors (A18)

From 2007.Feb to 2018.Sep
Observations 140

E 8 Month-to-month percent change in original series adjusted for calendar factors (A18)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007		3.3	14.2	-4.5	3.1	5.4	12.0	-0.7	-10.1	11.2	-22.3	5.9	1.6
2008	-23.8	12.7	14.0	-5.2	9.5	-5.3	15.5	-2.7	-3.3	0.7	-22.5	-0.7	-0.9
2009	-28.3	3.7	19.7	-9.5	17.9	4.4	21.9	-6.2	-5.8	7.3	-19.3	0.5	0.5
2010	-30.4	7.9	8.4	-2.6	12.2	5.2	46.8	-15.2	0.5	6.1	-20.6	7.9	2.2
2011	-17.6	-2.9	11.5	1.3	3.1	12.4	16.9	-8.8	-6.3	0.8	-9.9	7.8	0.7
2012	-27.4	12.6	13.5	0.6	5.6	7.6	13.6	-5.8	-0.4	-2.7	-19.6	22.4	1.7
2013	-26.8	0.0	24.3	-13.6	12.7	11.7	14.3	-15.2	-3.3	2.8	-11.1	6.8	0.2
2014	-10.2	-0.1	24.2	2.1	-5.6	-1.4	20.5	-17.3	6.1	13.2	-16.5	3.6	1.6
2015	-18.6	4.9	11.8	-3.6	6.3	9.4	11.3	-8.8	2.8	3.7	-10.7	-8.4	0.0

2016	-14.1	17.1	5.0	12.4	-7.7	6.5	16.5	-9.2	-3.4	2.2	-18.3	3.9	0.9
2017	-19.8	13.9	20.0	-4.7	8.1	4.9	21.9	-13.5	-0.1	-1.4	-15.4	-2.7	0.9
2018	-23.8	37.4	10.8	-8.6	3.8	17.0	24.8	-16.8	-1.5				4.8
AVGE	-21.9	9.2	14.8	-3.0	5.7	6.5	19.7	-10.0	-2.1	4.0	-16.9	4.3	

Table Total- 154.   Mean- 1.   Standard Deviation- 14.
Minimum- -30.   Maximum- 47.

E 18 Final adjustment ratios

From 2007.Jan to 2018.Sep
Observations 141

E 18 Final adjustment ratios

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2007	73.4	79.2	92.1	89.0	98.2	101.8	120.9	118.0	111.5	120.7	95.9	99.4	100.0
2008	73.4	79.3	91.7	89.1	97.9	102.2	121.5	117.8	111.5	119.8	95.9	99.7	100.0
2009	73.5	79.7	91.4	89.3	97.7	102.7	122.1	117.1	111.6	118.1	95.7	100.3	99.9
2010	73.9	79.8	91.8	89.4	97.5	104.0	123.1	115.8	111.0	115.5	95.5	100.7	99.8
2011	74.8	80.5	93.1	89.9	97.6	104.8	123.4	114.0	110.1	113.4	95.0	100.6	99.8
2012	76.3	81.3	94.8	90.5	97.7	105.9	123.4	112.1	108.6	111.6	94.8	99.8	99.7
2013	77.5	82.8	96.4	91.5	98.1	106.0	122.4	110.7	107.8	111.1	94.6	98.4	99.8
2014	78.3	84.0	97.7	92.1	98.6	106.1	122.3	109.7	107.4	110.9	94.5	96.5	99.8
2015	78.2	85.1	98.5	92.6	98.7	105.8	122.8	109.5	107.6	111.4	94.1	94.8	99.9
2016	77.5	85.7	98.6	93.0	98.4	106.0	124.1	109.8	108.2	111.3	93.9	93.2	100.0
2017	76.4	86.3	98.4	93.4	97.9	106.2	125.4	110.4	108.8	111.1	93.4	92.4	100.0
2018	75.4	86.3	98.5	93.4	97.6	106.5	126.7	110.7	109.2				100.5
AVGE	75.7	82.5	95.3	91.1	98.0	104.8	123.2	113.0	109.4	114.1	94.8	97.8	

Table Total- 14090.   Mean- 100.   Standard Deviation- 13.
Minimum- 73.   Maximum- 127.

E 18.A Final adjustment ratio forecasts

From 2018.Oct to 2019.Sep
Observations 12

E 18.A Final adjustment ratio forecasts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVGE
2018										110.7	92.9	92.0	98.5
2019	74.8	86.2	98.9	93.5	97.5	106.5	127.5	110.8	109.2				100.5

F 2. Summary Measures

F 2.A: Average percent change without regard to sign over the indicated span

Table F 2.A

	B1 O	D11 CI	D13 I	D12 C	D10 S	A2 P	D18 TD&H	F1 mcd	E1 Mod.O	E2 Mod.CI	E3 Mod.I
Span 1	10.70	4.37	4.06	1.15	9.86	0.00	0.00	1.43	10.33	3.51	3.18
Span 2	14.00	4.98	3.99	2.23	13.61	0.00	0.00	2.66	13.65	4.16	3.07
Span											

3	15.97	5.67	3.88	3.20	15.88	0.00	0.00	3.70	15.96	4.83	3.02
Span 4	20.15	6.55	3.74	4.02	19.80	0.00	0.00	4.56	20.02	5.61	2.76
Span 5	21.44	7.10	3.71	4.68	21.38	0.00	0.00	5.17	21.42	6.26	2.83
Span 6	22.12	7.41	3.68	5.16	21.93	0.00	0.00	5.54	22.41	6.62	2.81
Span 7	21.74	7.70	3.79	5.50	21.39	0.00	0.00	5.80	21.74	6.85	2.80
Span 8	20.96	7.97	3.97	5.78	20.48	0.00	0.00	5.88	20.93	7.11	2.98
Span 9	16.84	7.68	3.61	6.06	16.25	0.00	0.00	6.04	16.87	7.06	2.73
Span 10	14.85	7.85	3.58	6.40	13.39	0.00	0.00	6.39	14.57	7.12	2.70
Span 11	12.84	8.05	3.75	6.74	10.11	0.00	0.00	6.75	12.46	7.54	2.94
Span 12	8.74	8.64	4.09	7.07	0.64	0.00	0.00	7.10	8.19	8.12	3.16

F 2.B: Relative contributions to the variance of the percent change in the components of the original series

Table F 2.B

	E3 I	D12 C	D10 S	A2 P	D18 TD&H	TOTAL	Ratio (X100)
Span 1	9.29	1.21	89.50	0.00	0.00	100.00	101.79
Span 2	4.73	2.48	92.79	0.00	0.00	100.00	107.21
Span 3	3.36	3.78	92.86	0.00	0.00	100.00	106.63
Span 4	1.83	3.88	94.29	0.00	0.00	100.00	103.75
Span 5	1.65	4.49	93.86	0.00	0.00	100.00	106.10
Span 6	1.53	5.16	93.31	0.00	0.00	100.00	102.61
Span 7	1.58	6.10	92.31	0.00	0.00	100.00	104.87
Span 8	1.92	7.24	90.84	0.00	0.00	100.00	105.32
Span 9	2.41	11.92	85.67	0.00	0.00	100.00	108.23
Span 10	3.21	17.98	78.81	0.00	0.00	100.00	107.15
Span 11	5.55	29.07	65.38	0.00	0.00	100.00	100.68
Span 12	16.57	82.75	0.68	0.00	0.00	100.00	90.01

F 2.C: Average percent change with regard to sign and standard deviation over indicated span

Table F 2.C

	B1 O		D13 I		D12 C		D10 S		D11 CI		F1 mcd	
	Avg.	S.D.	Avg.	S.D.	Avg.	S.D.	Avg.	S.D.	Avg.	S.D.	Avg.	S.D.
Span 1	1.10	13.47	0.12	5.49	-0.07	1.50	1.01	11.74	0.06	5.85	-0.04	1.81
Span 2	1.77	17.14	0.12	5.44	-0.11	2.93	1.73	15.64	0.04	6.61	-0.04	3.39
Span 3	2.54	19.93	0.15	5.04	-0.13	4.22	2.53	18.58	0.07	7.31	-0.03	4.74
Span 4	3.36	23.07	0.17	5.43	-0.13	5.32	3.37	21.96	0.11	8.53	-0.00	5.84
Span 5	3.83	26.09	0.14	5.04	-0.12	6.22	3.92	25.14	0.10	8.95	0.03	6.65
Span 6	4.37	29.10	0.11	4.96	-0.10	6.91	4.47	27.90	0.08	9.42	0.05	7.23
Span 7	3.67	26.23	0.17	5.31	-0.09	7.42	3.72	25.13	0.15	9.92	0.05	7.65

Span 8	3.20	25.62	0.21	5.26	-0.08	7.80	3.11	24.00	0.19	10.16	0.04	7.93
Span 9	1.99	21.51	0.14	5.03	-0.07	8.09	2.05	20.35	0.11	10.06	0.02	8.15
Span 10	1.15	17.84	0.10	4.84	-0.07	8.36	1.14	15.41	0.07	10.12	0.00	8.41
Span 11	0.75	16.10	0.12	5.04	-0.08	8.65	0.71	12.82	0.08	10.38	-0.02	8.72
Span 12	0.13	10.93	0.15	5.38	-0.09	8.98	0.04	0.84	0.09	10.81	-0.04	9.08

F 2.D: Average duration of run

Table F 2.D

CI	I	C	mcd
1.73	1.47	7.00	4.00

F 2.E: I/C Ratio for months span

Table F 2.E

	Span 1	Span 2	Span 3	Span 4	Span 5	Span 6	Span 7	Span 8	Span 9	Span 10	Span 11	Span 12
I/C	3.54	1.79	1.21	0.93	0.79	0.71	0.69	0.69	0.60	0.56	0.56	0.58

months for cyclical dominance: 4

Relative contribution of the components to the stationary portion of the variance in the original series

Table F 2.F

I	C	S	P	TD&H	Total
2.10	42.62	59.58	0.00	0.00	104.30

F 2.G: The autocorrelation of the irregulars for spans 1 to 14

Table F 2.G

	Span 1	Span 2	Span 3	Span 4	Span 5	Span 6	Span 7	Span 8	Span 9	Span 10	Span 11	Span 12	Span 13	Span 14
ACF	-0.13	-0.13	0.03	-0.14	0.02	0.10	-0.08	-0.06	0.02	0.08	0.02	-0.10	0.10	-0.06

F 2.H:
   The final I/C Ratio from Table D12: 2.46
   The final I/S Ratio from Table D10: 4.25

F 2.I: Seasonality tests

Table F 2.I

	Statistic	Probability level
F-test for stable seasonality from Table B 1.	55.237	0.00%
F-test for stable seasonality from Table D 8.	84.522	0.00%
Kruskal-Wallis Chi Squared test for stable	122.443	0.00%

seasonality from Table D 8.		
F-test for moving seasonality from Table D 8.	3.183	0.13%

F 3. Monitoring and Quality Assessment Statistics

All the measures below are in the range from 0 to 3 with an acceptance region from 0 to 1.

Monitoring and Quality Assessment Statistics

1. The relative contribution of the irregular over threemonths span (from Table F 2.B).	M1 = 0.336
2. The relative contribution of the irregular component to the stationary portion of the variance (from Table F 2.F).	M2 = 0.210
3. The amount of month to month change in the irregular component as compared to the amount of month to monthchange in the trend-cycle (from Table F2.H).	M3 = 0.728
4. The amount of autocorrelation in the irregular as described by the average duration of run (Table F 2.D).	M4 = 0.104
5. The number of months it takes the change in the trend-cycleto surpass the amount of change in the irregular (from Table F 2.E).	M5 = 0.651
6. The amount of year to year change in the irregular as compared to the amount of year to year change in the seasonal (from Table F 2.H).	M6 = 0.099
7. The amount of moving seasonality present relative to the amount of stable seasonality (from Table F 2.I).	M7 = 0.313
8. The size of the fluctuations in the seasonal component throughout the whole series.	M8 = 0.477
9. The average linear movement in the seasonal component throughout the whole series.	M9 = 0.350
10. Same as 8, calculated for recent years only.	M10 = 0.434
11. Same as 9, calculated for recent years only.	M11 = 0.327

ACCEPTED at the level 0.36

Q (without M2) = 0.38 **ACCEPTED**

QS Statistics for seasonality

QS statistic for seasonality (Full series)

	QS	p-value
Original Series	131.46	0.0000
Original Series (extreme value adjusted)	131.46	0.0000
Residuals	0.00	0.9982
Seasonally Adjusted Series	0.00	1.0000
Seasonally Adjusted Series (extreme value adjusted)	0.00	1.0000
Irregular Series	0.00	1.0000
Irregular Series (extreme value adjusted)	0.00	1.0000

QS statistic for seasonality (Series start in 2010.Oct)

	QS	p-value
Original Series	83.04	0.0000

Original Series (extreme value adjusted)	83.04	0.0000
Residuals	1.95	0.3769
Seasonally Adjusted Series	0.00	1.0000
Seasonally Adjusted Series (extreme value adjusted)	0.00	1.0000
Irregular Series	0.00	1.0000
Irregular Series (extreme value adjusted)	0.00	1.0000

G 0 10*LOG(SPECTRUM) of the differenced, transformed Original Series (Table A1 or B1)

Spectrum estimated from 2010.Oct to 2018.Sep.

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+++++++++I+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
   -3.93I                                                 S         I    -3.93
        I                                                 S         I
        I                                                 S         I
        I                                                 S         I
   -6.08I                                                 S         I    -6.08
        I                                                 S         I
        I                                                 S         I
        I                                                 S         I
   -8.23I                        S                        S         I    -8.23
        I          S             S                        S         I
        I          S             S                        S         I
        I          S             S         S              S         I
  -10.38I          S             S         S              S         I   -10.38
        I          S             S         S              S         I
        I          S             S         S              S         I
        I          S             S         S              S         I
  -12.53I          S             S         S              S         I   -12.53
        I          S             S         S              S         I
        I          S             S         S              S         I
        I          S             S         S            S*          I
  -14.67I          S             S         S            S*          I   -14.67
        I          S             S         S            S*          I
        I          S           S*        *S            S*          I
        I          S*          S*        *S            S*          I
  -16.82I          S*        *   S*        *S          *S*          I   -16.82
        I          S*        *   S*        *S*         *S*T         I
        I         *S*        *   S*        *S*    *    *S*T         I
        I         *S*        *   S*        *S*    *    *S*T*        I
  -18.97I         *S*        *  *S*        *S*    *    *S*T*        I   -18.97
        I         *S*        *  *S**       *S*    *    *S*T*       SI
        I         *S*        *  *S**      **S*    *    *S*T*      *SI
        I         *S*        *   *  *S**      **S*   **    *S*T*      *SI
  -21.12I         *S*        *  ** *S**      **S*  ***   *S*T*      *SI   -21.12
        I         *S**       *  ** *S***     ***S*  ***   *S*T**     *SI
        I         *S**       *  ** *S***     ***S*  *** **S*T**    **SI
        I         *S**       *  ** *S****  ****S*T ******S*T**    **SI
  -23.27I        **S**       *  ** **S**********S*T ******S*T**    **SI   -23.27
        I        **S** *     *   *****S**********S*T*******S*T**   ***SI
        I        **S****    **  *****S**********S*T*******S*T*** ***SI
        I        **S*****    **  *****S**********S*T*******S*T*******SI
  -25.42I        **S*****  S** *****S**********S*T*******S*T*******SI   -25.42
        I        **S*****  S** *****S**********S*T*******S*T*******SI
        I       ***S*****  S** *****S**********S*T*******S*T*******SI
        I       ***S*****  S********S**********S*T*******S*T*******SI
  -27.56I       ***S*****  S********S**********S*T*******S*T*******SI   -27.56
        I       ***S*****  S********S**********S*T*******S*T*******SI
        I      ****S******  S********S**********S*T*******S*T*******SI
        I      ****S******  S********S**********S*T*******S*T*******SI
  -29.71I     *****S******  S********S**********S*T*******S*T*******SI   -29.71
        I    ******S*****  S********S**********S*T*******S*T*******SI
        I    ******S****** *S********S**********S*T*******S*T*******SI
        I   *******S******* *S********S**********S*T*******S*T*******SI
  -31.86I*********S*********S********S**********S*T*******S*T*******SI   -31.86
+++++++++I+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
       S=SEASONAL FREQUENCIES, T=TRADING DAY FREQUENCIES
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G 1 10*LOG(SPECTRUM) of the differenced, transformed Seasonally Adjusted Data (Table E2).

Spectrum estimated from 2010.Oct to 2018.Sep.

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++++++++++I+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
   -19.95I                                    *                        I    -19.95
        I                                    *           *            I
        I                                    *           *            I
        I                                    *           *            I
   -21.62I                                    *           *       *    I    -21.62
        I                                   **           *       *    I
        I                                   **      *  *       *    I
        I                                   **      *  **    *  **   I
   -23.28I                                   **      *  **    *  **   I    -23.28
        I                                   **      ****    *  **   I
        I                                   **      ****    *  **   I
        I                                   **      ****    *  **   I
   -24.95I                                   **      ****    *  **   I    -24.95
        I                      **           ***    ****    *  **   I
        I                      **           ***    ****    ** **   I
        I                      **           ***    *****    *****   I
   -26.62I                      **          ****    *****    ****** I    -26.62
        I          *           **      *  ****    ******    ****** I
        I          *      *    **      ** ****    ******    ****** I
        I          *      *    **      ** ****    ******    ******* I
   -28.29I          *      *    **      *******    ******    *******SI    -28.29
        I        **    *    *    **      *******S   ******    *******SI
        I        *** *   *    *** *  ********S   ******    *******SI
        I        *** **   *    *****  ********S   ******    *******SI
   -29.96I        *** **   *    *****S ********S* *******    *******SI    -29.96
        I      S*** **   *    *****S*********S* *******    *******SI
        I      S******   **  ******S*********S*T*******    *******SI
        I      S******   **  ******S*********S*T*******S   *******SI
   -31.62I      S******   **  ******S*********S*T*******S T*******SI    -31.62
        I     *S******   S** ******S*********S*T*******S T*******SI
        I     *S******   S** ******S*********S*T*******S*T*******SI
        I     *S*******  S*********S*********S*T*******S*T*******SI
   -33.29I     *S*******  S*********S*********S*T*******S*T*******SI    -33.29
        I     *S*******  S*********S*********S*T*******S*T*******SI
        I  **  *S*******  S*********S*********S*T*******S*T*******SI
        I  ** **S*******  S*********S*********S*T*******S*T*******SI
   -34.96I  *****S******* *S*********S*********S*T*******S*T*******SI    -34.96
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
   -36.63I  *****S*********S*********S*********S*T*******S*T*******SI    -36.63
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
   -38.29I  *****S*********S*********S*********S*T*******S*T*******SI    -38.29
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
        I  *****S*********S*********S*********S*T*******S*T*******SI
   -39.96I  *****S*********S*********S*********S*T*******S*T*******SI    -39.96
        I* *****S*********S*********S*********S*T*******S*T*******SI
        I* *****S*********S*********S*********S*T*******S*T*******SI
        I** *****S*********S*********S*********S*T*******S*T*******SI
   -41.63I*********S*********S*********S*********S*T*******S*T*******SI    -41.63
++++++++++I+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
          S=SEASONAL FREQUENCIES, T=TRADING DAY FREQUENCIES
```

G 2 10*LOG(SPECTRUM) of the Modified Irregular (Table E3).

Spectrum estimated from 2010.Oct to 2018.Sep.

```
++++++++++I+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
   -23.93I                                    *                        I    -23.93
        I                                    *                        I
        I                                    *                        I
        I                                    *                        I
```

```
 -25.61I                                        *                          I    -25.61
      I                              *          *                          I
      I                              *         **          *               I
      I                              *         **          *          *    I
 -27.28I                             **         **          *          *    I    -27.28
      I                             **         **          *          *    I
      I                             **         **         **      *   *    I
      I                             **         **        ****     *   *    I
 -28.96I                             **         **        ****     *   *    I    -28.96
      I                    *        **         **        ****     *  **    I
      I                    *        **         **        ****     *  **    I
      I               *    *        ***        **        ****     *  **    I
 -30.63I               *    *        ***        ***       ****     *  **    I    -30.63
      I          *    *    *        ***       ** ****     ****     ** **    I
      I          **   *    *        ***       ** ****    ****     ** **    I
      I          **   *    **  *****         *******    ****     ** **    I
 -32.31I          **   *    S** ******   ********    ******    ** **    I    -32.31
      I          **   *    S** ******S  ********    ******    ******    I
      I          **  ***   S**********S*********    ******    ******    I
      I          **  ***   S**********S*********    ******    ******    I
 -33.98I          **  ***   S**********S*********S   ******    ****** I    -33.98
      I          **  ***   S**********S*********S   *******   ****** I
      I          S**  ***   S**********S*********S   *******   *******SI
      I          S*** ***  *S**********S*********S*T*******   *******SI
 -35.65I          S**********S**********S*********S*T*******   *******SI    -35.65
      I          S**********S**********S*********S*T*******   *******SI
      I          S**********S**********S*********S*T*******   *******SI
      I         *S**********S**********S*********S*T*******S  *******SI
 -37.33I         *S**********S**********S*********S*T*******S  *******SI    -37.33
      I         *S**********S**********S*********S*T*******S  *******SI
      I         *S**********S**********S*********S*T*******S T*******SI
      I        **S**********S**********S*********S*T*******S*T*******SI
 -39.00I        **S**********S**********S*********S*T*******S*T*******SI    -39.00
      I        **S**********S**********S*********S*T*******S*T*******SI
      I        **S**********S**********S*********S*T*******S*T*******SI
      I        **S**********S**********S*********S*T*******S*T*******SI
 -40.68I        **S**********S**********S*********S*T*******S*T*******SI    -40.68
      I        **S**********S**********S*********S*T*******S*T*******SI
      I       ***S**********S**********S*********S*T*******S*T*******SI
      I   *   ***S**********S**********S*********S*T*******S*T*******SI
 -42.35I   *   ***S**********S**********S*********S*T*******S*T*******SI    -42.35
      I  **   ***S**********S**********S*********S*T*******S*T*******SI
      I  **    ***S**********S**********S*********S*T*******S*T*******SI
      I  ***  ****S**********S**********S*********S*T*******S*T*******SI
 -44.03I  ***  ****S**********S**********S*********S*T*******S*T*******SI    -44.03
      I  *********S**********S**********S*********S*T*******S*T*******SI
      I *********S**********S**********S*********S*T*******S*T*******SI
      I *********S**********S**********S*********S*T*******S*T*******SI
 -45.70I*********S**********S**********S*********S*T*******S*T*******SI    -45.70
 +++++++++I++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++I
         S=SEASONAL FREQUENCIES, T=TRADING DAY FREQUENCIES
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Previous Table | Index | Next Table

Peak probabilities for Tukey spectrum estimator

Tukey spectrum estimated from 2010.Oct to 2018.Sep.

Peak probabilities for Tukey spectrum estimator

	S1	S2	S3	S4	S5	S6	TD
Model Residuals	0.690	0.144	0.011	0.263	0.284	0.250	0.931 *
Original Series (Table A1 or B1)	0.955 *	0.362	0.998 **	0.978 *	0.999 **	0.546	0.030
Seasonally adjusted series (E2)	0.571	0.288	0.075	0.069	0.002	0.207	0.089
Modified Irregular (E3)	0.735	0.279	0.050	0.053	0.002	0.218	0.092

** - Peak Probability > 0.99,
* - 0.90 < Peak Probability < 0.99