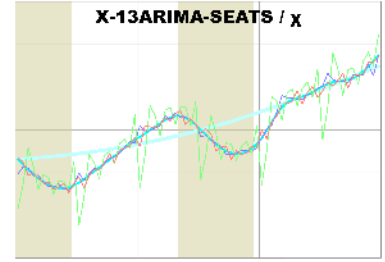# Official Holiday Dates Are Not Enough for Holiday Adjustments

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†Registered Financial Instruments Business Operator in Tokyo, which provides macro-economics driven investment strategies on global securities/currencies portfolios.
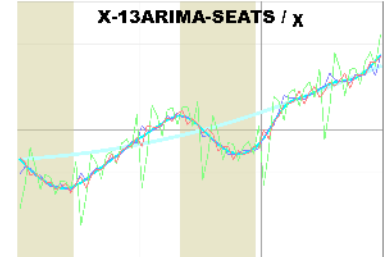
https://skanioglos.co.jp

Disclaimers

➢ This presentation is released to inform interested parties of research and to encourage discussion.

➢ This presentation is not released to recommend any investment action.

➢ The views expressed in this presentation are those of the author and not necessarily those of the SKANIOGLOS Investment Advisory Co., Ltd.

➢ This presentation adopts software under development. Results of calculations may be different from those of the futures.
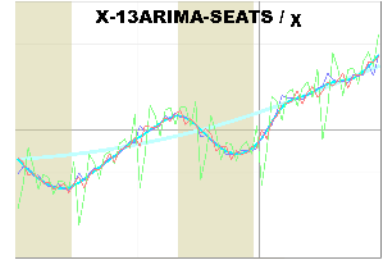
Mid Autumn
2024
Tuesday
September 17th
= Lunar 08/15

By Kiefer. from Frankfurt, Germany - 08.Sep.2014, Mid-Autumn Festival. 15. Tag des 8. Mondmonats nach dem traditionellen chinesischen Kalender. Das Mondfest / Mittherbstfest, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=38246745
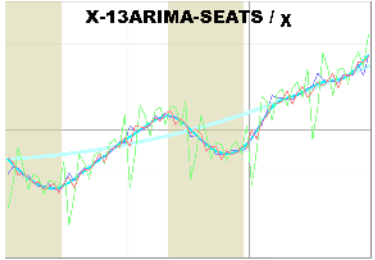
Mid Autumn Festival "Chuseok" of Korea has been expanded in 1989.

1 day

3 days

Lunisolar Calendar	08/10	08/11	08/12	08/13	**08/14**	**08/15**	**08/16**	08/17	08/18	08/19	08/20
1988	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
	September										
	20	21	22	23	24	25	26	27	28	29	30
						Chuseok (weekend)	Substitution Holiday				
KOSPI	662.55	662.84	683.73	674.69	680.10	-	-	671.29	670.64	670.28	677.54
1989	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue
	September										
	9	10	11	12	13	14	15	16	17	18	19
		weekend			Chuseok				weekend		
KOSPI	961.85	-	958.88	964.28	-	-	-	961.49	-	953.17	952.02

Sources;
Korea Composite Stock Price Index (KOSPI) : Korea Exchange. Inserted to indicate business days.
Lunisolar Calendar dates: calculated by SKANIOGLOS. Korean variant of East Asian Lunisolar Calendar.
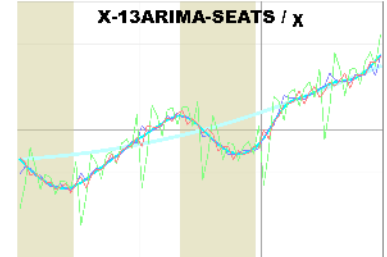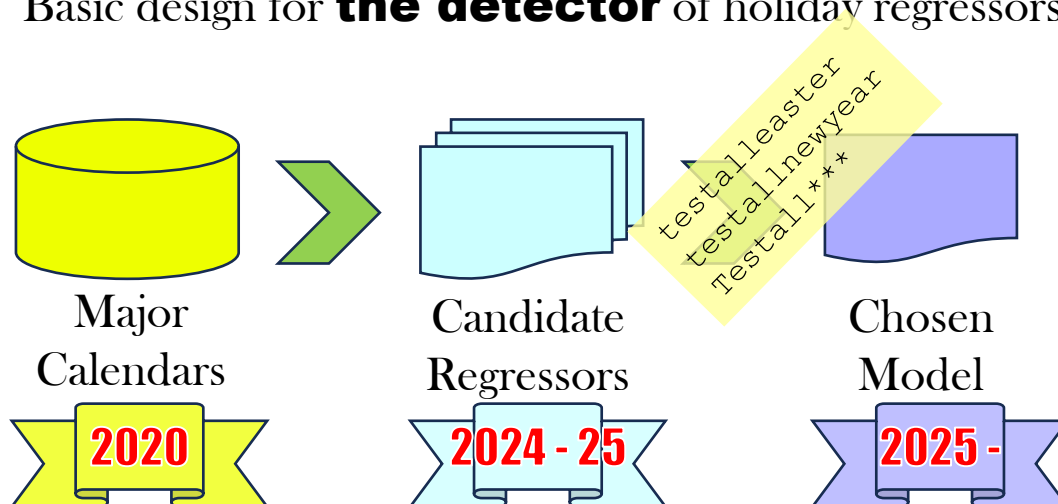
Holiday regressors — number of official holiday dates
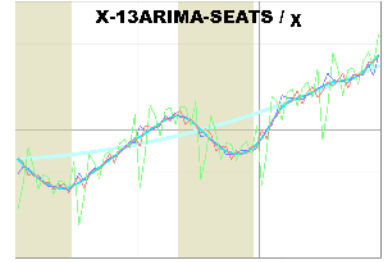
Pros 😃:   Easy to understand.

Cons 😣:   1 Sometimes statistically rejected.
            2 Time consuming
            — Imagine to collect laws and ordinances from dozens of countries.
            3 Unknown holiday dates "of effects"
            — Leads and lags for manufacturing, affected by day of weeks,
            affected by foreign holidays.

Basic design for **the detector** of holiday regressors

Major Calendars — 2020

Candidate Regressors — 2024 - 25

Chosen Model — 2025 -

testalleaster
testallnewyear
Testall***

Holiday effects in tourism (1)

Greece, Foreign Country

Legend: LTT Hodrick-Prescott Trend — D12 Trend-Cycle — A1 Original Series — D11 Final Adjusted — HOL Holiday Factor
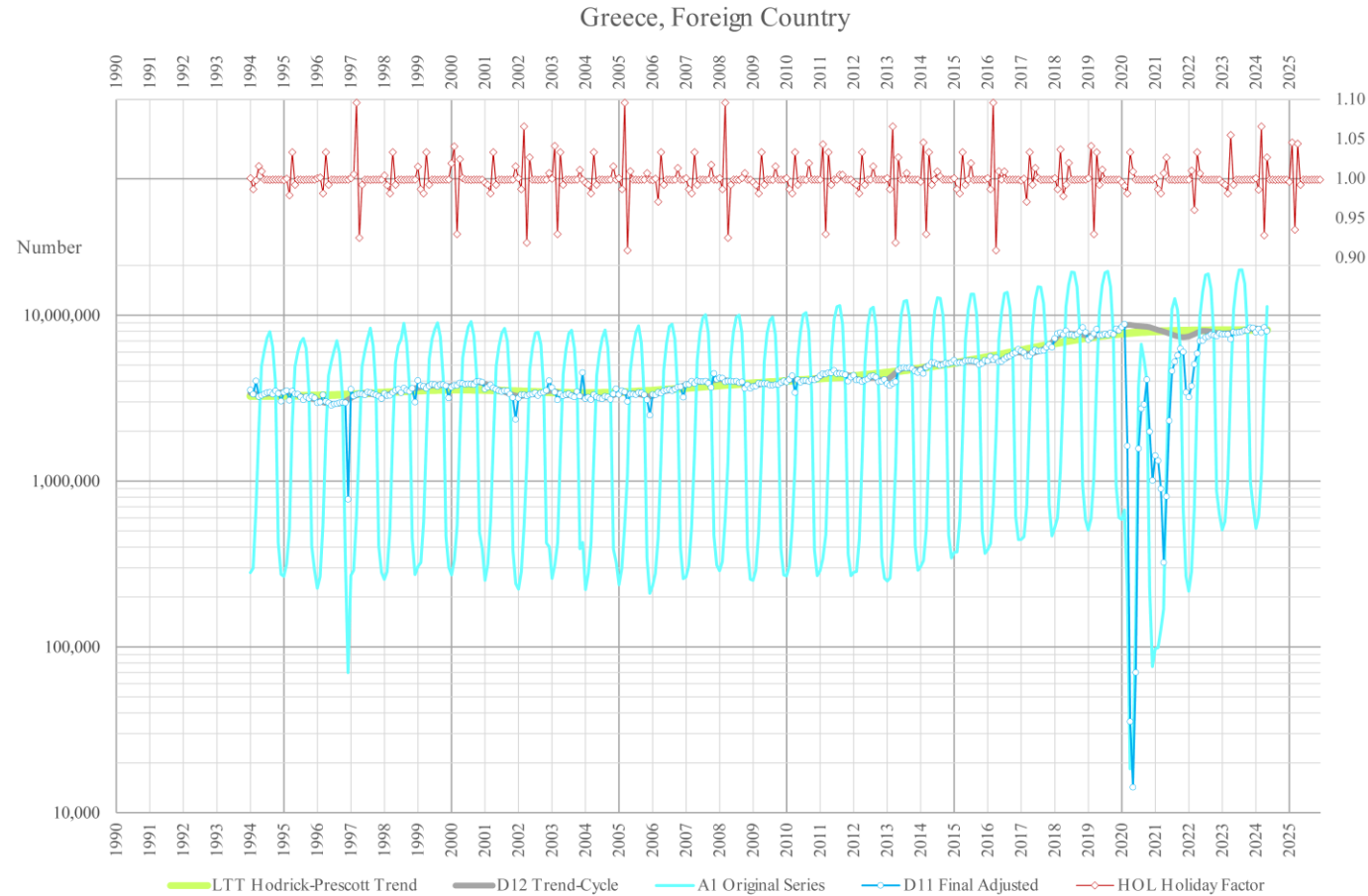
Source: EUROSTAT "Nights spent at tourist accommodation establishments - monthly data" [tour_occ_nim] as of 2024/08/01 23:00
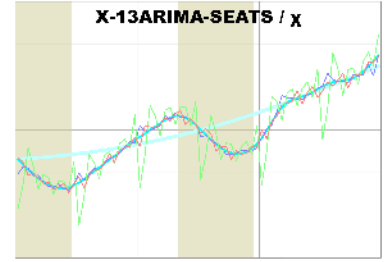Classification of activities: Hotels and similar accommodation
Country of residence: Foreign country and Domestic country
Unit of measure: Number
Source of working day variable: European Central Bank "Euro area and EU working days" as of 2022/06/28

Holiday regressors:
1. Carnival: From Saturday, 50 days preceding to Easter
                     To Ash Wednesday, total 5 days
2. Easter: From Good Friday
                     To Easter Monday, 4 days.
3. Pascha: Easter of Eastern Christianity. Same 4 days as Easter.
4. Eid ul-Fitr: End of Ramadan festival. Umm-l-Qura calendar was applied.
                     From last day of Ramadan (at sunset, next month Shawwal begins)
                     To Saturday right after the third day of Shawwal, inclusive.
5. Lunar New Year: Chinese variant of East Asian lunisolar calendar was applied.
                     If New Year's eve is Friday or Saturday, from eve, else,
                     From the preceding Saturday of New Year's eve.
                     To next Sunday of New Year 3rd (inclusive), 9 or 10 days.
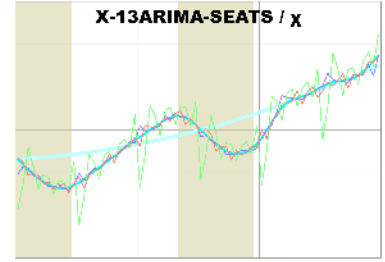
Country: 7 countries.
France, Germany, Greece, Italy, Spain, Switzerland, Türkiye

Span: 6 spans.
1. Jan 1990 to May 2024
2. Jan 1990 to Dec 2000
3. Jan 2000 to Dec 2010
4. Jan 2010 to Dec 2019
5. Jan 2020 to May 2024
6. Jan 2010 to May 2024
France: from Jan 1994, Greece: from Jan 1993,
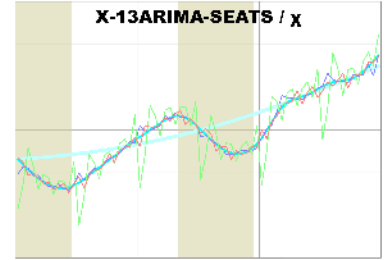Türkiye: only 1 span, from Jan 2013 to May 2023.
2020 to 2024 (almost midst of COVID) spans have no holiday factors but
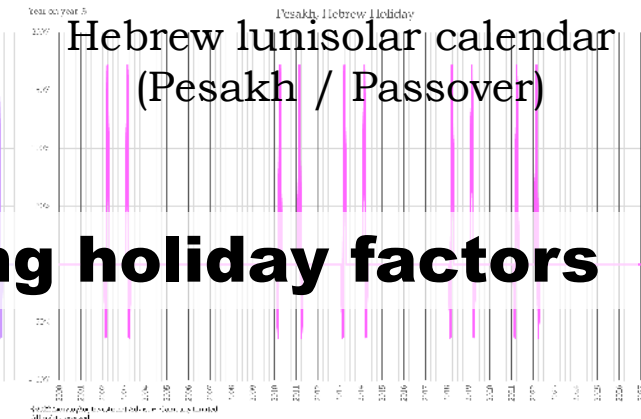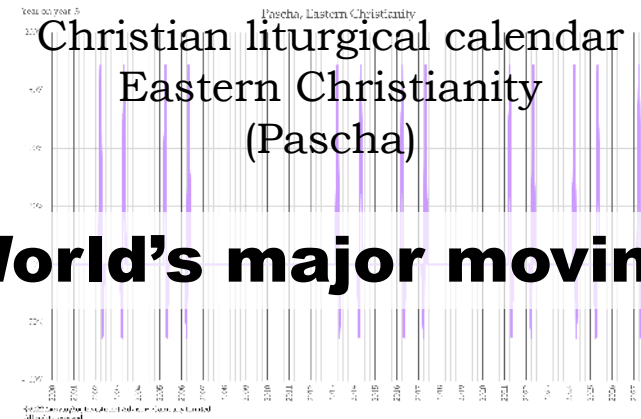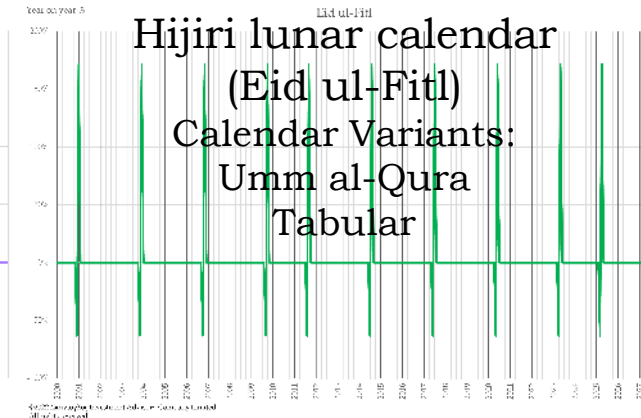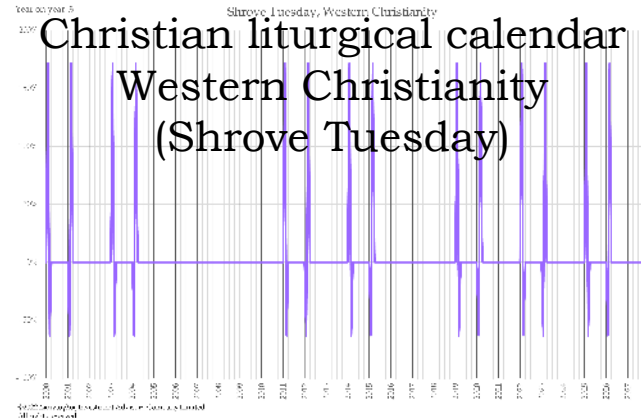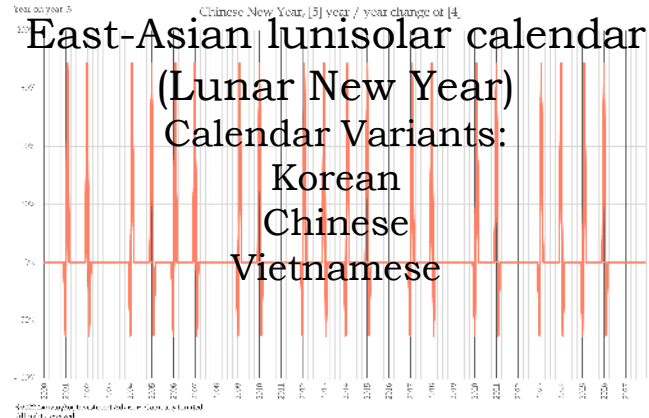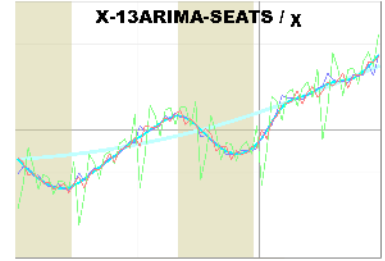only outliers.

Resident: 3 series.
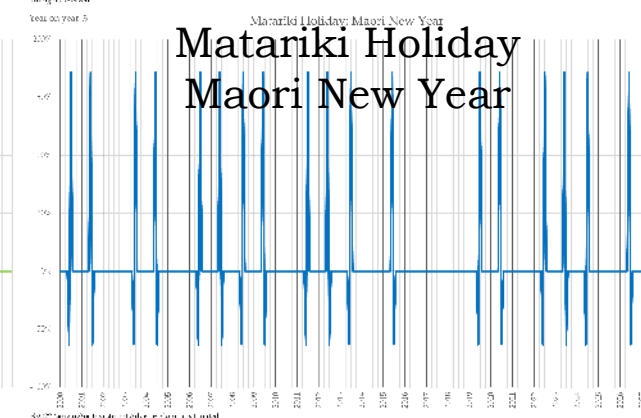Domestic, Foreign, and Total.

Holiday effects in tourism (4)

country	resident	span	acceptance	Holiday Variable		Parameter Estimate	Standard Error		t-value
country	resident	span	acceptance	χ2 test for	Degree of Freedom	χ2	p-value		
Greece	foreign	1994-2024	accepted	Carnival:		-0.010 765 905 793	0.002 404 068 169		-4.478
Greece	foreign	1994-2024	accepted	Easter:		0.027 541 686 800	0.003 428 194 883		8.034
Greece	foreign	1994-2024	accepted	Pascha:		0.008 630 305 728	0.003 774 721 288		2.286
Greece	foreign	1994-2024	accepted	Eid-ul-Fitr:		0.002 086 558 293	0.001 572 982 339		1.326
Greece	foreign	1994-2024	accepted	Lunar New Year:		-0.000 599 083 888	0.001 139 730 842		-0.526
Greece	foreign	1994-2024	accepted	All User-defined Holiday Regressors:	5	0.139612508473450E+03	0.000000000000000E+00		
Greece	foreign	2000-2010	accepted	Carnival:		-0.014 850 254 657	0.002 567 186 994		-5.785
Greece	foreign	2000-2010	accepted	Easter:		0.028 474 227 054	0.003 671 719 981		7.755
Greece	foreign	2000-2010	accepted	Pascha:		0.011 206 612 497	0.003 905 409 941		2.870
Greece	foreign	2000-2010	accepted	Eid-ul-Fitr:		0.001 516 717 806	0.002 075 206 998		0.731
Greece	foreign	2000-2010	accepted	Lunar New Year:		-0.000 602 796 575	0.001 050 552 093		-0.574
Greece	foreign	2000-2010	accepted	All User-defined Regressors:	6	0.219984985173872E+03	0.000000000000000E+00		
Greece	foreign	2010-2019	accepted	Carnival:		-0.012 983 867 343	0.002 460 519 605		-5.277
Greece	foreign	2010-2019	accepted	Easter:		0.022 424 216 599	0.004 386 108 839		5.113
Greece	foreign	2010-2019	accepted	Pascha:		0.016 834 388 122	0.004 526 420 604		3.719
Greece	foreign	2010-2019	accepted	Eid-ul-Fitr:		0.001 215 692 169	0.002 192 632 533		0.554
Greece	foreign	2010-2019	accepted	Lunar New Year:		0.002 321 643 439	0.001 497 853 035		1.550
Greece	foreign	2010-2019	accepted	All User-defined Holiday Regressors:	4	0.124488215896635E+03	0.000000000000000E+00		
Greece	foreign	2010-2019	accepted	All User-defined Regressors:	6	0.172001500430081E+03	0.000000000000000E+00		
Greece	domestic	2010-2019	accepted	Carnival:		0.004 483 543 683	0.004 279 893 196		1.048
Greece	domestic	2010-2019	accepted	Easter:		-0.009 351 913 221	0.007 230 527 358		-1.293
Greece	domestic	2010-2019	accepted	Pascha:		0.036 607 361 983	0.007 590 146 747		4.823
Greece	domestic	2010-2019	accepted	Eid-ul-Fitr:		-0.003 869 266 260	0.002 974 008 867		-1.301
Greece	domestic	2010-2019	accepted	Lunar New Year:		-0.000 079 762 932	0.002 694 853 111		-0.030
Greece	domestic	2010-2019	accepted	All User-defined Holiday Regressors:	5	0.278169891000070E+02	0.395228183120400E-04		
Greece	domestic	2010-2019	accepted	All User-defined Regressors:	6	0.379733664127373E+02	0.113690857168663E-05		
France	foreign	1993-2000	accepted	Easter:		-0.000 067 576 599	0.001 298 753 244		-0.052
France	foreign	1993-2000	accepted	All User-defined Regressors:	2	0.197047170782291E+01	0.373351160220147E+00		
France	foreign	2000-2010	accepted	Carnival:		0.008 352 017 200	0.003 189 325 392		2.619
France	foreign	2000-2010	accepted	Easter:		0.036 304 821 756	0.004 142 911 225		8.763
France	foreign	2000-2010	accepted	Pascha:		0.001 650 746 817	0.005 085 851 373		0.325
France	foreign	2000-2010	accepted	Eid-ul-Fitr:		0.000 588 012 771	0.001 464 582 820		0.401
France	foreign	2000-2010	accepted	Lunar New Year:		0.000 267 729 151	0.001 415 874 187		0.189
France	foreign	2000-2010	accepted	All User-defined Holiday Regressors:	4	0.103844808850049E+03	0.000000000000000E+00		
France	foreign	2000-2010	accepted	All User-defined Regressors:	6	0.148306654384608E+03	0.000000000000000E+00		
France	foreign	2010-2019	accepted	Easter:		0.000 352 883 360	0.000 892 811 557		0.395
France	foreign	2010-2019	accepted	All User-defined Regressors:	2	0.187078786443829E+01	0.392431243767552E+00		
France	domestic	2000-2010	accepted	Eid-ul-Fitr:		0.000 121 408 465	0.000 434 226 713		0.280
France	domestic	2000-2010	accepted	All User-defined Regressors:	2	0.146421477094795E+00	0.929404947937892E+00		

East-Asian lunisolar calendar
(Lunar New Year)
Calendar Variants:
Korean
Chinese
Vietnamese

Christian liturgical calendar
Western Christianity
(Shrove Tuesday)

Hijiri lunar calendar
(Eid ul-Fitl)
Calendar Variants:
Umm al-Qura
Tabular

Christian liturgical calendar
Western Christianity
(Easter)

Christian liturgical calendar
Eastern Christianity
(Pascha)

Hebrew lunisolar calendar
(Pesakh / Passover)

To remove the World's major moving holiday factors

Deepavali
Navratri

Buddhist lunisolar calendar
Thai variant
(Celebration of Buddha)

Matariki Holiday
Maori New Year
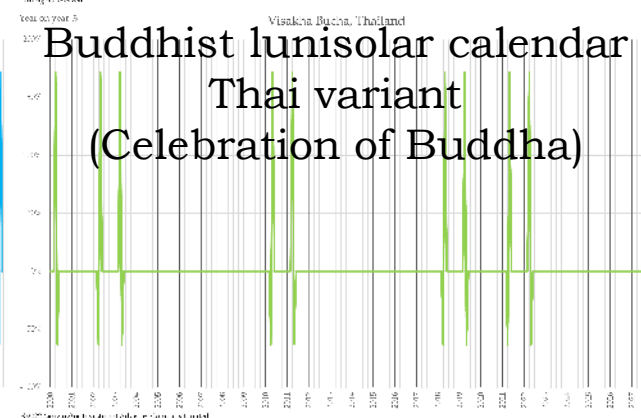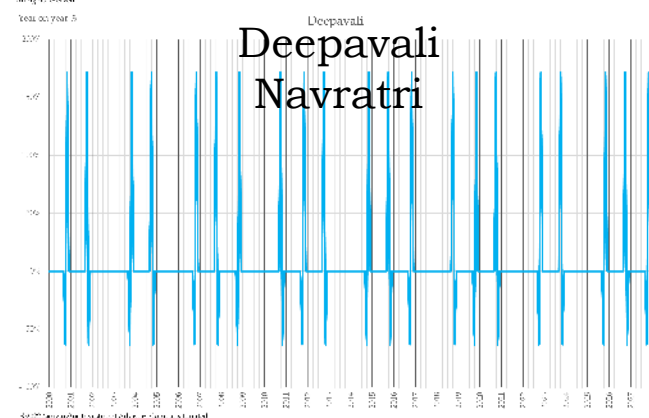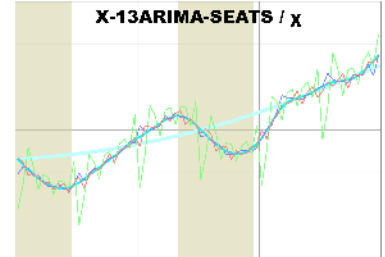
References and links (1)

Software:

Census Bureau, USA, X-13ARIMA-SEATS Seasonal Adjustment Program https://www.census.gov/data/software/x13as.X-13ARIMA-SEATS.html.

SUGA, Takashi "When_exe - A multicultural and multilingualized calendar library" Gems for Ruby are here https://github.com/suchowan/when_exe. Usages can be seen on http://hosi.org/. When_exe aims to express and convert the calendar used in all cultures and languages of all ages. This aim kicked off my plan to include almost all the world's statistically significant calendars.

Articles:

Anirban Sanyal, Pratik Mitra, Tucker S. McElroy, and Anindya Roy, August 2017, "Holiday Effects in Indian Manufacturing Series", https://www.census.gov/library/working-papers/2017/adrm/rrs2017-04.html.

Australian Bureau of Statistics, November 2005, "Estimating and Removing the Effects of Chinese New Year and Ramadan to Improve the Seasonal Adjustment Process" https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1350.0Technical%20Note1Nov%202005?OpenDocument.

Furuya, Hideki, August 2002, "Chinese New Year Effects Estimated by X-12-ARIMA" https://www.jcer.or.jp/report/research_paper/detail3606.html, sorry written in Japanese and no translations, and pdf here is members only. Draft in Japanese is available.

Lin, Jin-Lung and Liu, Tian-Syh July 2002, "Modeling Lunar Calendar Holiday Effects in Taiwan" https://www.census.gov/library/working-papers/2002/adrm/lin-01.html.

Matariki Advisory Committee, New Zealand, May 2021, "Matariki Dates 2022 – 2052" https://www.mbie.govt.nz/assets/matariki-dates-2022-to-2052-matariki-advisory-group.pdf

Yap, Bee Wah, Norhayati Shuja', and Mohd Alias Lazim, 2007, "Moving Holiday Effects Adjustment for Malaysian Economic Time Series", https://www.academia.edu/20549481/Moving_Holiday_Effects_Adjustment_for_Malaysian_Economic_Time_Series.
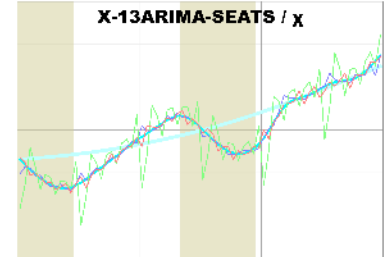
Formulae:

Christian liturgical calendars:
Western https://en.wikipedia.org/wiki/Date_of_Easter#Anonymous_Gregorian_algorithm
Eastern https://en.wikipedia.org/wiki/Date_of_Easter#Meeus's_Julian_algorithm

Thai traditional Songkran: https://th.wikipedia.org/wiki/สงกรานต์ในประเทศไทย. English wiki seems strange.

References and links (2)

Sites:

Hindu festivals: https://www.drikpanchang.com/. Among the panchang sites, span of this site is extremely long.
The author is thankful that this site allowed to retrieve very many times as a free user.
{1001 years from 1600 to 2600 + (10 year backcast span + 10 year forecast span) + (maximum 1 year lead + maximum 1 year lag)} × 6 cities × 4 holidays
= 28,872. At least, 28,872 times.

The Gregorian Calendar was introduced to set proper dates of Easter (*ad rectam Paschalis festi*). In the today's title "Inter Gravissimas", Pope Gregory XIII stated as three appropriate that
  · first, correct placement of the vernal equinox; **The first condition is, March equinox to fall around March 21st.**
  · next, correct placement of the fourteenth day of the moon in the first month, which [fourteenth day] either occurs on the day of the equinox itself or is the next to follow after;
  · and lastly, the first Sunday which follows that same fourteenth day of the moon.

Photocopy of *Clavius, Christoph,* **Romani Calendarii A Gregorio XIII. P. M. restitvti explicatio S. D. N. Clementis VIII. P. M. Ivssv edita : accesit confutatio eorum, qui Calendarium aliter instaurandum esse contenderunt**, *1603*
was taken from
https://echo.mpiwg-berlin.mpg.de/ECHOdocuView?pn=53&ws=3&url=/mpiwg/online/permanent/library/YXK9FE9W/pageimg&start=51&viewMode=images&mode=imagepath,
and English translation taken from https://en.wikipedia.org/wiki/Inter_gravissimas.
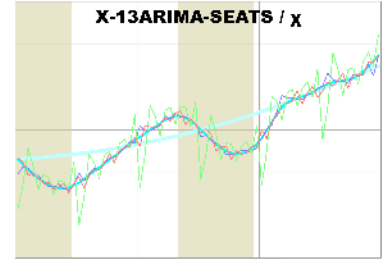
Euro area and EU working days to build Calendar Adjustment Regressor
https://ec.europa.eu/eurostat/cros/content/euro-area-and-eu-working-days-build-calendar-adjustment-regressor_en

Archived site

https://cros-legacy.ec.europa.eu/content/euro-area-and-eu-working-days-build-calendar-adjustment-regressor_en

References and links (3)

Further references:

Pew Research Center

The Future of World Religions: Population Growth Projections, 2010-2050
https://www.pewresearch.org/religion/2015/04/02/religious-projections-2010-2050/

Comment by HF — % of global population: Christians and Muslims 30%, Hindus 15%, Buddhists 5%, and so on.

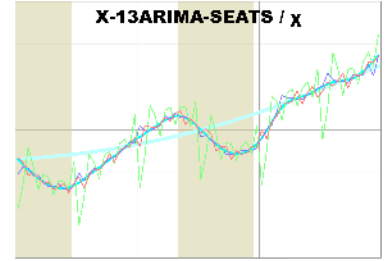"Umm al Qura" is a variant of Hijili Lunar calendar which seems to be broadly adopted (still checking)

R.H. van Gent, "The Umm al-Qura Calendar of Saudi Arabia"

https://webspace.science.uu.nl/~gent0113/islam/ummalqura.htm

Umm al Qura calendar site

https://ummulqura.org.sa/default.aspx

Thank you for viewing.

https://skanioglos.co.jp

hidekifuruya@skanioglos.co.jp