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1
2
3 ##' Run Statistical Analysis of Monthly Background Checks of Gun Purchase
4 ##'
5 ##' @param debug Optional boolean switch to indicate whether interim data is displayed;
6 ##' default is \Quote{FALSE}
7 ##'
8 ##' @return A \code{data.frame} is returned, contained all different prepared columns.
9 ##'
10 ##' @author Gregor Aisch and Josh Keller wrote the R code; Dirk Eddelbuettel created
11 ##' and maintains the package.
12 ##' @seealso The NY Times article presenting this analysysi undertaken by this package is
13 ##' at \url{http://www.nytimes.com/interactive/2015/12/10/us/gun-sales-terrorism-obama-
restrictions.html?}
14 ##'
15 ##' @examples
16 ##' \dontrun{
17 ##'   gs <- analysis()
18 ##'   plot_gunsales(gs)
19 ##'   ggplot_gunsales(gs)
20 ##' }
21 analysis <- function(debug=FALSE) {
22
23   ## estimate gun sales using formula by Jurgen Brauer, published here
24   ## http://www.smallarmssurvey.org/fileadmin/docs/F-Working-papers/SAS-WP14-US-
Firearms-Industry.pdf
25   ##
26   ## note: the column `multiple_corrected` is a copy of `multiple` in which
27   ## we set the checks in the "multiple" category to 0 for California
28   alldata <- alldata %>% mutate(guns_sold=(handgun + longgun) * 1.1 +
multiple_corrected * 2)
29   #alldata <- mutate(alldata, guns_sold=(handgun + longgun) * 1.1 + multiple_corrected
* 2)
30
31   ## let's look at the total numbers; state_ts() is a helper function
32   total <- alldata %>% state_ts('Totals', 'guns_sold')
33   #total <- state_ts(all, 'Totals', 'guns_sold')
34
35   ## compute seasonally adjusted gun sales (using final() and seas() from seasonal)
36   totalSeas <- total %>% seas %>% final
37   #totalSeas <- final(seas(total))
38
39   poptotal <- poptotal %>%
40     filter(year >= 2000) %>%
41     #filter(year < 2015 | month <= 11) %>%
42     with(ts(res_pop, start=c(2000,1), frequency = 12))
43   #poptotal <- ts(select(filter(poptotal, year >= 2000), "res_pop"),
44     #
45     #
46     start=c(2000,1),
47     frequency=12)
48
49   ## normalize gun sales by population
50   totalSeasPop <- totalSeas / poptotal * 1000
51   totalSeasScaled <- totalSeas / 280726
52
53   ## create a new data frame that eventually stores all the
54   ## data we need in the final piece

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53 out_data <- ts_to_dataframe(total, 'guns_total') %>%
54   mutate(guns_total=round(guns_total, 3))
55
56   ## expand the data.frame, adding more columns
57   out_data <- data.frame(out_data,
58                           guns_total_seas=as.matrix(totalSeas),
59                           guns_total_per_1000=round(as.matrix(totalSeasPop), digits=3),
60                           guns_total_per_1000_scaled=round(as.matrix(totalSeasScaled),
61 digits=3))
62   if (debug) {
63     print(head(out_data))
64     print(tail(out_data))
65   }
66
67   ## create a temporary matrix for computing the
68   ## handgun_share and longgun_share columns
69   ## cbind works correctly here as it operates on timeseries object
70   tmp <- cbind(final(seas(state_ts(alldata, 'Totals', 'handgun'))),
71               final(seas(state_ts(alldata, 'Totals', 'longgun'))),
72               final(seas(state_ts(alldata, 'Totals', 'other'))),
73               final(seas(state_ts(alldata, 'Totals', 'multiple_corrected'))))
74   colnames(tmp) <- c('handgun', 'longgun', 'other', 'multiple')
75   out_data <- data.frame(out_data, tmp)
76
77   ## convert NAs to 0 in column other
78   out_data$other[is.na(out_data$other)] <- 0
79
80   ## compute the handgun/Longgun share
81   out_data <- within(out_data, {
82     handgun_share=round(handgun / (handgun+longgun+other+multiple*0.5), 4)
83     longgun_share=round(longgun / (handgun+longgun+other+multiple*0.5), 4)
84   })
85
86   ## plot percent of national for selected states
87   show_states <- c('New Jersey', 'Maryland', 'Georgia',
88                   'Louisiana', 'Mississippi', 'Missouri')
89
90   for (s in show_states) {
91     s.ts <- state_data(alldata, s, total, totalSeas)
92
93     ## merge with out_data
94     temp <- mutate(ts_to_dataframe(s.ts), value=round(value,3))
95     colnames(temp) <- c('year', 'month', gsub(' ', '_', tolower(s)))
96     out_data <- data.frame(out_data, temp[,3,drop=FALSE])
97   }
98   if (debug) {
99     print(head(out_data))
100    print(tail(out_data))
101  }
102
103  ## compute handgun sales for DC: handung * 1.1 + multiple
104  dchandgun_checks <- state_ts(alldata, 'District of Columbia', 'handgun',
105 outer_zeros_to_na=F)
106  dcmultiple <- state_ts(alldata, 'District of Columbia', 'multiple',
107 outer_zeros_to_na=F)
108  dchandgun <- (dchandgun_checks * 1.1 + dcmultiple + 1) %>% seas %>% final - 1
109  totalHandgun <- (state_ts(alldata, 'Totals', 'handgun') * 1.1 +

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107         state_ts(alldata, 'Totals', 'multiple')) %>% seas %>% final
108     dchandgunPct <- dchandgun / totalHandgun * 100000
109
110     ## merge with out_data
111     temp <- ts_to_dataframe(round(dchandgunPct, 1),
112 'dc_handguns_per_100k_national_sales')
113     out_data <- data.frame(out_data, temp[,3,drop=FALSE])
114
115     ## estimate how much more guns are sold missouri after law change
116     missouri <- state_data(alldata, 'Missouri', normalize = F, adj_seasonal = F)
117     missouri.avg_pre_2007 <- mean(missouri[73:84])
118     missouri.avg_post_2008 <- mean(missouri[97:108])
119     print(paste('Increase in monthly gun sales in Missouri =',
120 round(missouri.avg_post_2008 - missouri.avg_pre_2007, digits=2)))
121
122     invisible(out_data)
123 }
124
125 ## R-devel CMD check still whines about these:
126 Date <- dc_handguns_per_100k_national_sales <- guns_total <- guns_total_per_1000 <- NULL
127 guns_total_per_1000_scaled <- guns_total_seas <- handgun <- handgun_share <- longgun <-
128 NULL
129 longgun_share <- month.num <- multiple <- multiple_corrected <- other <- res_pop <- NULL
130 state <- value <- year <- NULL
```