04_figures.R

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```r
packages <-
  c('tidyverse', 'ggtext','gridExtra','grid','wesanderson','tinytex', 'glue', 'here',
    'lubridate')
lapply(packages, require, character.only = TRUE)
```

```
## Loading required package: tidyverse
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.2      v purrr   0.3.4
## v tibble  3.0.4      v dplyr   1.0.2
## v tidyr   1.1.2      v stringr 1.4.0
## v readr   1.4.0      v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
## Loading required package: ggtext
```

```
## Loading required package: gridExtra
```

```
##
## Attaching package: 'gridExtra'
```

```
## The following object is masked from 'package:dplyr':
##
##     combine
```

```
## Loading required package: grid
```

```
## Loading required package: wesanderson
```

```
## Loading required package: tinytex
```

```
## Loading required package: glue
```

```
##
## Attaching package: 'glue'
```

```
## The following object is masked from 'package:dplyr':
##
##     collapse
```

```
## Loading required package: here
```

```
## here() starts at /Users/malcalakovalski/Documents/Projects/Fiscal-Impact-Measure
```

```
## Loading required package: lubridate
```

```
##
## Attaching package: 'lubridate'

## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union

## [[1]]
## [1] TRUE
##
## [[2]]
## [1] TRUE
##
## [[3]]
## [1] TRUE
##
## [[4]]
## [1] TRUE
##
## [[5]]
## [1] TRUE
##
## [[6]]
## [1] TRUE
##
## [[7]]
## [1] TRUE
##
## [[8]]
## [1] TRUE
##
## [[9]]
## [1] TRUE
```

```r
# CONSTANTS -----------------------------------------------------------------------
start <- as_date("2000-01-01")
end <- as_date("2022-12-31")
last_hist_date <- end - years(2)
end_date_reccession <- last_hist_date + months(1)

# Load data -----------------------------------------------------------------------
thismonth <- format(Sys.Date(), "%m-%Y")
contributions <-
  readxl::read_xlsx(glue("results/{thismonth}/fim.xlsx")) %>%
  select(date, starts_with('fim'), ends_with('cont'), recession) %>%
  mutate(date = as_date(date)) %>%
  filter(date > start & date <= end)

max_y <-
  contributions%>%
  select(fim_bars:subsidies_cont) %>%
  max() %>%
  ceiling() + 1
min_y <-
  contributions %>%
```

```r
  select(fim_bars:subsidies_cont) %>%
  min() %>%
  floor() - 1

# Theme ----------------------------------------------------------------------------
# set plot formats, theme
uni.theme <- function() {
  theme_bw() +
    theme(legend.position = "bottom",
          panel.grid.minor.x=element_blank(),
          panel.grid.major.x=element_blank(),
          plot.margin=unit(c(1.2,.5,.5,.5),"cm"),
          plot.title = element_markdown(size=12),
          plot.subtitle = element_markdown(size=10) ,
          plot.caption =
            element_textbox_simple(size = 9,
                                   lineheight = 1,
                                   padding = margin(5.5, 5.5, 5.5, 5.5),
                                   margin = margin(0, 0, 5.5, 0)),
          legend.text=element_markdown(size=10),
          legend.title=element_blank(),
          legend.spacing.y = unit(2, 'cm')
    ) # , legend.margin = unit(c(rep(-.8, 4)),"cm")
}

## Legend formatting ----------------------------------------------------------------
guidez <- guides(
fill = guide_legend(keywidth = unit(0.8, "cm"),
                    keyheight = unit(0.4, "cm"),
                    ncol = 1),
colour = guide_legend(keywidth = unit(0.8, "cm"),
                      keyheight = unit(0.05, "cm"),
                      ncol = 1)
)


total_pink <- rgb(231, 97, 159, maxColorValue = 255)
state_local_purple = rgb(174, 104, 169,  maxColorValue = 255)
federal_blue = rgb(33, 152, 199,  maxColorValue = 255)
taxes_transfers_green = rgb(27, 149, 83,  maxColorValue = 255)
# Shading --------------------------------------------------------------------------
economic_statistics <-
  readxl::read_excel(here('data', 'raw', 'haver', 'economic_statistics.xlsx')) %>%
  select(date, recessq) %>%
  mutate(date = as_date(date))
recessions <-
  contributions %>%
  select(date, recession) %>%
  mutate(recession = if_else(is.na(recession),
                             0,
                             recession),
         recession_event = recession - lag(recession),
         start = if_else(recession_event == 1,
```

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```
                         date,
                         NA_Date_) ,
          end = if_else(recession_event == -1,
                         date,
                         NA_Date_)
          ) %>%
  select(start, end) %>%
  pivot_longer(cols = c(start, end)) %>%
  na.omit() %>%
  group_by(name) %>%
  mutate(row = row_number()) %>%
  pivot_wider(names_from = name,
              values_from = value) %>%
  select(-row)


recession_shade <-
  geom_rect(data = recessions, aes(xmin = start, xmax = end, ymin=-Inf, ymax=+Inf),
            fill = 'grey', alpha = 0.3)



# Functions -------------------------------------------------------------------------
fim_plot <-
  function(df, title){
    df %>%
      ggplot() +
      geom_bar(aes(x = date, y = value, fill = variable),
               stat = 'identity', width = 50) +
      geom_line(
        aes(x = date,
            y = fim_bars_ma,
            colour = "4-quarter moving-average")
      ) +
      geom_point(
        aes(x = date,
            y = fim_bars_ma,
            colour = "4-quarter moving-average"), size = 1
      ) +
      labs(
        title = glue("**Hutchins Center Fiscal Impact Measure: {title}**"),
        x = '',
        y = '',
        subtitle = "Fiscal Policy Contribution to Real GDP Growth, percentage points",
        caption = "Source: Hutchins Center calculations from Bureau of Economic Analysis
        and Congressional Budget Office data; grey shaded areas indicate recessions
        and yellow shaded areas indicate projection.") +
      geom_richtext(aes(x = Sys.Date()+350,
                        y = max_y),
                    label = "Projection",
                    cex = 2,
                    fill = NA, label.color = NA, # remove background and outline
      ) +
      annotate("rect", xmin = last_hist_date + 40, xmax = end,
               ymin = -Inf, ymax = Inf, alpha = 0.1, fill = 'yellow') +
```

```r
      geom_rect(data = recessions,
                aes(x = NULL, y = NULL,
                    xmin = start, xmax = end,
                    ymin=-Inf, ymax=+Inf), fill = 'grey', alpha = 0.3) +
      scale_x_date(breaks = 0, date_breaks = "2 years", date_labels = '%Y',
                   expand = c(0,0)) +
      scale_color_manual(" ",
                         values=c("4-quarter moving-average" ="black",
                                  "4-quarter moving-average" ="black")) +
      guidez +
      uni.theme()
  }


# Figures -------------------------------------------------------------------------------
## Regular ------------------------------------------------------------------------------
total <-
  contributions %>%
  select(date, fim_bars, fim_bars_ma) %>%
  pivot_longer(cols = -c(date, fim_bars_ma), names_to = 'variable') %>%
  fim_plot(title = 'Total') +
  scale_fill_manual(labels = " Quarterly fiscal impact",
                    values = total_pink)


components <-
  contributions %>%
  select(date, state_local_cont, federal_cont, taxes_transfers_cont, fim_bars_ma) %>%
  pivot_longer(cols = -c(date, fim_bars_ma), names_to = 'variable') %>%
  fim_plot(title = 'Components') +
  scale_fill_manual(
    labels = c(" State & Local Purchases", " Federal Purchases", " Taxes, Transfers, & Subsidies"),
             values =  c(state_local_purple, federal_blue, taxes_transfers_green)
    )
## Expanded -----------------------------------------------------------------------------
components_govt <-
  contributions %>%
    select(date, fim_bars_ma, state_local_cont, state_taxes_transfers_cont,
           federal_cont, federal_taxes_transfers_cont) %>%
  pivot_longer(cols = -c(date, fim_bars_ma), names_to = 'variable') %>%
  fim_plot(title = "Components by Government") +
  scale_fill_brewer(labels = c(" State & Local Purchases",
                               " State & Local Taxes, Transfers, & Subsidies",
                               " Federal Purchases",
                               " Federal Taxes, Transfers, & Subsidies")
                    )
taxes_transfers <-
  contributions %>%
  select(date, fim_bars_ma,
         health_cont, social_benefits_cont,
         noncorp_cont, corporate_cont,
         purchases_cont, subsidies_cont) %>%
  pivot_longer(cols = -c(date, fim_bars_ma), names_to = 'variable') %>%
  fim_plot(title = "Taxes and Transfers Components") +
  scale_fill_brewer(labels = c(" Health Outlays", " Social Benefits",
```

```
                               " Noncorporate Taxes", " Corporate Taxes",
                               " Purchases", " Subsidies")
)
```