# BEGINNING OF SCRIPT

library(tidyverse)

library(extrafont)

loadfonts()

library(sf)

library(ggrepel)

library(scales)

rm(list = ls())

theme\_bar <- theme\_bw() +

theme(panel.grid.major = element\_line(color = "grey70", size = 0.1),

panel.grid.minor = element\_blank(),

axis.ticks = element\_blank(),

axis.text = element\_text(face = "bold"),

panel.border = element\_blank(),

legend.background = element\_rect(fill = "transparent", color = "transparent"),

legend.key = element\_rect(fill = "transparent"),

legend.title = element\_blank(),

legend.text = element\_text(margin = margin(l = 2)))

theme\_line <- theme\_bw() +

theme(legend.background = element\_rect(fill = "transparent", color = "transparent"),

legend.key = element\_rect(fill = "transparent"),

legend.text = element\_text(margin = margin(l = 2)),

panel.grid.minor = element\_blank(),

panel.grid.major = element\_line(color = "grey70", size = 0.1),

axis.ticks = element\_blank(),

axis.text = element\_text(face = "bold"),

panel.border = element\_blank())

theme\_sf <- theme\_bw() +

theme(axis.text.x=element\_blank(),

axis.text.y=element\_blank(),

axis.ticks=element\_blank(),

panel.background = element\_blank(),

panel.grid.major = element\_line(color = "white"),

panel.border = element\_blank(),

plot.title = element\_text(hjust = 0.5),

legend.title = element\_blank(),

legend.text = element\_text(margin = margin(l = 2)))

regions <- read\_csv("Data/Join docs/county\_regions.csv") %>%

select(5,6) %>%

unique()

counties.regions <- read\_csv("Data/Join docs/county\_regions.csv") %>%

mutate(countyfp = formatC(countyfp, width = 3, flag = "0"),

Name = str\_to\_title(Name),

Name = str\_replace(Name, "Q", "q"),

Name = str\_replace(Name, "Of The", "of the"),

Dem\_Desc = ifelse(Name == "Minnesota", "Minnesota", Dem\_Desc))

color.ruca <- c("Entirely rural" = "#5CA81F", "Town/rural mix" = "#C7EF99", "Urban/town/rural mix" = "#d8b365", "Entirely urban" = "#a6611a")

color.pr <- c("Northwest" = "#810f7c","Northeast" = "#fe9929", "Central" = "#076324", "Seven County Mpls-St Paul" = "#d8b365", "Southwest" = "#1f78b4", "Southeast" = "#d7301f", "Minnesota" = "black")

color.edr <- c("EDR 1 - Northwest" = "#b3cde3", "EDR 2 - Headwaters" = "#8c96c6", "EDR 3 - Arrowhead" = "#fe9929", "EDR 4 - West Central" = "#8856a7", "EDR 5 - North Central" = "#810f7c", "EDR 6E- Southwest Central" = "#e5f5f9", "EDR 6W- Upper Minnesota Valley" = "#bdc9e1", "EDR 7E- East Central" = "#99d8c9", "EDR 7W- Central" = "#2ca25f", "EDR 8 - Southwest" = "#74a9cf", "EDR 9 - South Central" = "#0570b0", "EDR 10 - Southeast" = "#d7301f", "EDR 11 - 7 County Twin Cities" = "#d8b365", "Minnesota" = "black")

# Import shapefiles

mn\_counties <- st\_read("Shapefiles/County shapefiles/MNCounties\_MNDOT.shp", quiet = TRUE)

# Factor levels

## RUCA

mutate(Dem\_Desc = fct\_relevel(Dem\_Desc, "Entirely rural", "Town/rural mix", "Urban/town/rural mix", "Entirely urban"))

## EDR

mutate(edr = fct\_relevel(edr, "EDR 1 - Northwest", "EDR 2 - Headwaters", "EDR 3 - Arrowhead", "EDR 4 - West Central", "EDR 5 - North Central", "EDR 6E- Southwest Central", "EDR 6W- Upper Minnesota Valley", "EDR 7E- East Central", "EDR 7W- Central", "EDR 8 - Southwest", "EDR 9 - South Central", "EDR 10 - Southeast", "EDR 11 - 7 County Twin Cities", "Minnesota"))

## Planning Region

mutate(planning.region = fct\_relevel(planning.region, "Northwest", "Northeast", "Central", "Seven County Mpls-St Paul", "Southwest", "Southeast"))

# Geom\_Line

ggplot(gov.jobs.ruca, aes(year, pct.govjobs, color = Name)) +

geom\_line(size=1.5) +

scale\_y\_continuous(labels=scales::percent)+

scale\_x\_continuous(breaks = seq(1900, 2050, 2)) +

theme\_line+

scale\_color\_manual(values=color.ruca,

guide = guide\_legend(ncol = 3)) +

theme(legend.position = "bottom") +

labs(x="", y = "", color="", title = "Percentage of jobs in government")

# Geom\_Bar

ggplot(compchange.ruca, aes(Dem\_Desc, annual, fill = type)) +

geom\_bar(stat = "identity", position = "dodge") +

geom\_label(aes(x = Dem\_Desc, y = annual, label = comma(round(annual))), show.legend = FALSE, position = position\_dodge(width = .9), color = "white", vjust = ifelse(compchange.ruca$annual > 0, -.1, 1)) +

labs(x="", y = "", title = "Average annual components of population change,\n2010 to 2017")+

scale\_y\_continuous(labels=scales::comma,

breaks = seq(-10000,45000, 5000))+

expand\_limits(y = c(-10000,40000)) +

theme\_bar+

theme(legend.position = "bottom",

legend.title = element\_blank())+

scale\_fill\_manual(values=c( "#5CA81F", "#a6611a", "black"),

labels = c(" Natural change (births minus deaths) ", " Total migration change (domestic and international) ", " Total population change "),

guide = guide\_legend(ncol = 2))

# Geom\_SF

ggplot(filter(jobs.industry.map.county, naicstitle == "Farm employment")) +

geom\_sf(color = "black", aes(fill = bins.pctempYear)) +

scale\_fill\_manual(values = c("0% to 4%" = "#E7F5D9", "5% to 9%" = "#C7EF99", "10% to 14%" = "#6AC400", "15% to 19%" = "#5CA81F", "20% or more" = "#076324", "No data" = "#A9A9A9"),

labels = c(" 0% to 4%", " 5% to 9%", " 10% to 14%", " 15% to 19%", " 20% or more", " No data")) +

theme\_sf+

theme(legend.title = element\_blank())+

labs(title= paste("Farm employment as a percent of\ntotal employment, ", max(jobs.industry.map.county$year)))

# Colors for industries

industry.colors <- c('Accommodation and Food Services'='black', 'Construction'='#1f78b4', 'Educational Services'='#b2df8a', 'Health Care and Social Assistance'='grey', 'Manufacturing'='#fb9a99', 'Other Services, Ex. Public Admin'='#e31a1c', 'Public Administration'='#fdbf6f', 'Retail Trade'='pink', 'Wholesale Trade'='#cab2d6', 'Arts, Entertainment, and Recreation'='#6a3d9a', 'Transportation and Warehousing'='#ffff99', 'Finance and Insurance'='#b15928', 'Professional and Technical Services'='#ff7f00', 'Administrative and Waste Services'='#33a02c', 'Agriculture, Forestry, Fishing & Hunting'='#a6cee3', 'Management of Companies and Enterprises'='#800000', 'Mining'='#b2df8a', 'Real Estate and Rental and Leasing'='#C7EA46', 'Utilities'='#2f4f4f', 'Information' = '#8ffcff')

# Colors for occupations

occupation.colors <- c('Architecture and Engineering Occupations'='#b2df8a','Arts, Design, Entertainment, Sports, and Media Occ'='#6a3d9a','Building and Grounds Cleaning and Maintenance Occu'='#33a02c','Business and Financial Operations Occupations'='#b15928','Community and Social Service Occupations'='#cab2d6','Computer and Mathematical Occupations'='#8ffcff','Construction and Extraction Occupations'='#1f78b4','Education, Training, and Library Occupations'='#b2df8a','Farming, Fishing, and Forestry Occupations'='#a6cee3','Food Preparation and Serving Related Occupations'='black','Healthcare Practitioners and Technical Occupations'='grey','Healthcare Support Occupations'='#C7EA46','Installation, Maintenance, and Repair Occupations'='#2f4f4f','Internships'='black','Legal Occupations'='#ff7f00','Life, Physical, and Social Science Occupations'='black','Management Occupations'='#800000','Office and Administrative Support Occupations'='#fdbf6f','Personal Care and Service Occupations'='#ff0000','Production Occupations'='#fb9a99','Protective Service Occupations'='#ff9933','Sales and Related Occupations'='pink','Transportation and Material Moving Occupations'='#ffff99')

occupation.colors.short <- c('Architecture and Engineering'='#b2df8a','Arts, Design, Entertainment, Sports, and Media'='#6a3d9a','Building and Grounds Cleaning and Maintenance'='#33a02c','Business and Financial Operations'='#b15928','Community and Social Service'='#cab2d6','Computer and Mathematical'='#8ffcff','Construction and Extraction'='#1f78b4','Education, Training, and Library'='#b2df8a','Farming, Fishing, and Forestry'='#a6cee3','Food Preparation and Serving Related'='black','Healthcare Practitioners and Technical'='grey','Healthcare Support'='#C7EA46','Installation, Maintenance, and Repair'='#2f4f4f','Internships'='black','Legal'='#ff7f00','Life, Physical, and Social Science'='black','Management'='#800000','Office and Administrative Support'='#fdbf6f','Personal Care and Service'='#ff0000','Production'='#fb9a99','Protective Service'='#ff9933','Sales and Related'='pink','Transportation and Material Moving'='#ffff99')

# Industry Codes

|  |  |
| --- | --- |
| indcode | naicstitle |
| 11 | Agriculture, Forestry, Fishing & Hunting |
| 21 | Mining |
| 22 | Utilities |
| 23 | Construction |
| 31 | Manufacturing |
| 42 | Wholesale Trade |
| 44 | Retail Trade |
| 48 | Transportation and Warehousing |
| 51 | Information |
| 52 | Finance and Insurance |
| 53 | Real Estate and Rental and Leasing |
| 54 | Professional and Technical Services |
| 55 | Management of Companies and Enterprises |
| 56 | Administrative and Waste Services |
| 61 | Educational Services |
| 62 | Health Care and Social Assistance |
| 71 | Arts, Entertainment, and Recreation |
| 72 | Accommodation and Food Services |
| 81 | Other Services, Ex. Public Admin |
| 92 | Public Administration |

# GGSAVE

ggsave(filename = "wage percentiles.png", type = "cairo", dpi = "print", width = 6, height = 4)