GGplot Line Plot Multiple Categorical Variables With Continuous Variable

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2021-01-24

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1.1 Three Categories, One is Subplot

The outcome is CEV, generated for results with different productivity types (subplot), generated for PE vs GE (linetype), and at different parameter specifications (lower and higher gamma).

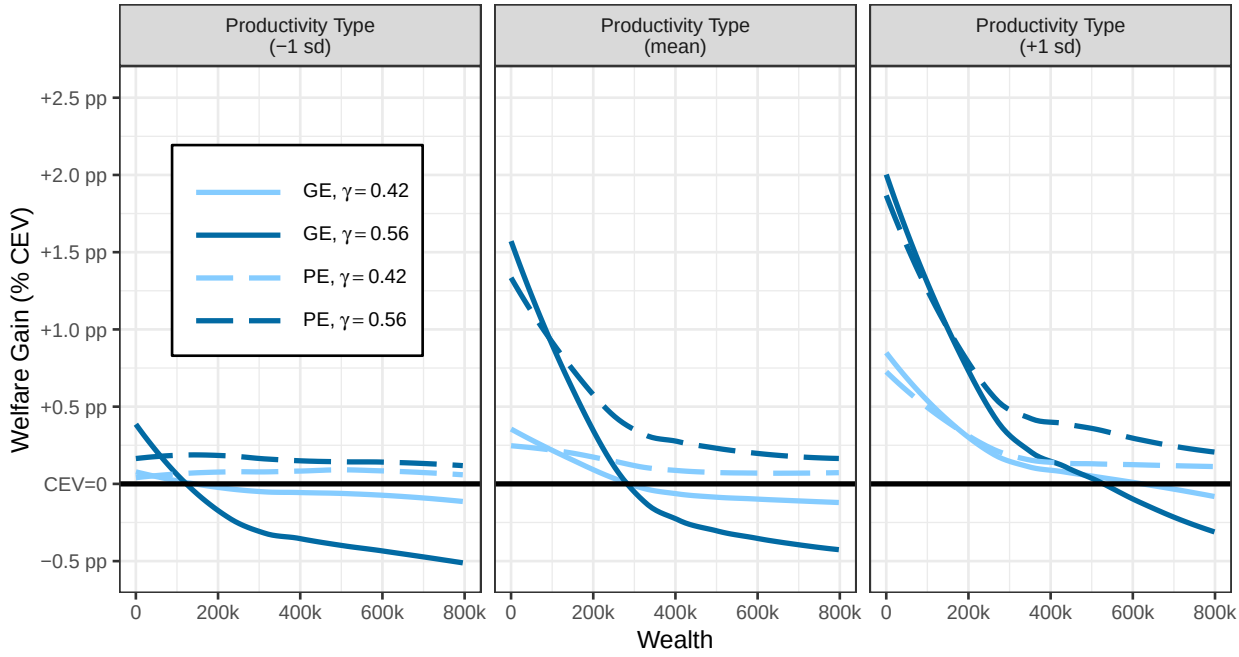
The graphs rely on this csv file cev_data.csv.

```
# Libraries
# library(tidyverse)

# Load in CSV
bl_save_img <- FALSE
spt_csv_root <- c('C:/Users/fan/R4Econ/tabgraph/ggline/_file/')
spt_img_root <- c('G:/repos/R4Econ/tabgraph/ggline/_file/')
spn_cev_data <- paste0(spt_csv_root, 'cev_data.csv')
spn_cev_graph <- paste0(spt_img_root, 'cev_graph.png')
spn_cev_graph_eps <- paste0(spt_img_root, 'cev_graph.eps')
df_cev_graph <- as_tibble(read.csv(spn_cev_data)) %>% select(-X)

# Dataset subsetting ------

# Line Patterns and Colors ------
# ar_st_age_group_leg_labels <- c("\nGE\n\u03B3=0.42\n", "\nGE\n\u03B3=0.56\n",
#                                 "\nPE\n\u03B3=0.42\n", "\nPE\n\u03B3=0.42\n")
ar_st_age_group_leg_labels <- c(bquote("GE,"~gamma == .(0.42)),
                                bquote("GE,"~gamma == .(0.56)),
                                bquote("PE,"~gamma == .(0.42)),
                                bquote("PE,"~gamma == .(0.56)))
ar_st_colours <- c("#85ccff", "#026aa3", "#85ccff", "#026aa3")
ar_st_linetypes <- c("solid", "solid", "longdash", "longdash")
```

```r
# Labels and Other Strings -------
st_title <- ''
st_x <- 'Wealth'
st_y <- 'Welfare Gain (% CEV)'
st_subtitle <- paste0('https://fanwangecon.github.io/',
                      'R4Econ/tabgraph/ggline/htmlpdfr/fs_ggline_mgrp_ncts.html')

# ar_st_age_group_leg_labels <- c("C\u2013Optimal", "V\u2013Optimal")

prod_type_recode <- c("Productivity Type\n(-1 sd)" = "8993",
                      "Productivity Type\n(mean)" = "10189",
                      "Productivity Type\n(+1 sd)" = "12244")

x.labels <- c('0', '200k', '400k', '600k', '800k')
x.breaks <- c(0,
              5,
              10,
              15,
              20)
x.min <- 0
x.max <- 20

# y.labels <- c('-0.01',
#               '\u2191\u2191\nWelfare\nGain\n\nCEV=0\n\nWelfare\nLoss\n\u2193\u2193',
#               '+0.01', '+0.02', '+0.03', '+0.04','+0.05')
y.labels <- c('-0.5 pp',
              'CEV=0',
              '+0.5 pp', '+1.0 pp', '+1.5 pp', '+2.0 pp','+2.5 pp')
y.breaks <- c(-0.01, 0, 0.01, 0.02, 0.03, 0.04, 0.05)
y.min <- -0.011
y.max <- 0.051

# data change -------
df_cev_graph <- df_cev_graph %>%
  filter(across(counter_policy, ~ grepl('70|42', .))) %>%
  mutate(prod_type_lvl = as.factor(prod_type_lvl)) %>%
  mutate(prod_type_lvl = fct_recode(prod_type_lvl, !!!prod_type_recode))

# graph ------
pl_cev <- df_cev_graph %>%
  group_by(prod_type_st, cash_tt) %>%
  ggplot(aes(x=cash_tt, y=cev_lvl,
             colour=counter_policy, linetype=counter_policy, shape=counter_policy)) +
  facet_wrap( ~ prod_type_lvl, nrow=1) +
  geom_smooth(method="auto", se=FALSE, fullrange=FALSE, level=0.95)

# labels
pl_cev <- pl_cev +
  labs(x = st_x,
       y = st_y,
       subtitle = st_subtitle)

# set shapes and colors
```

```
pl_cev <- pl_cev +
  scale_colour_manual(values=ar_st_colours, labels=ar_st_age_group_leg_labels) +
  scale_shape_discrete(labels=ar_st_age_group_leg_labels) +
  scale_linetype_manual(values=ar_st_linetypes, labels=ar_st_age_group_leg_labels) +
  scale_x_continuous(labels = x.labels, breaks = x.breaks,
                     limits = c(x.min, x.max)) +
  scale_y_continuous(labels = y.labels, breaks = y.breaks,
                     limits = c(y.min, y.max))

# Horizontal line
pl_cev <- pl_cev +
  geom_hline(yintercept=0, linetype='solid', colour="black", size =1)
  # geom_hline(yintercept=0, linetype='dotted', colour="black", size=2)

# theme
pl_cev <- pl_cev +
  theme_bw() +
  theme(text = element_text(size = 10),
        legend.title = element_blank(),
        legend.position = c(0.16, 0.65),
        legend.background = element_rect(fill = "white", colour = "black", linetype='solid'),
        legend.key.width = unit(1.5, "cm"))


# Save Image Outputs -----
if (bl_save_img) {
  png(spn_cev_graph,
      width = 160,
      height = 105, units='mm',
      res = 150, pointsize=7)
  ggsave(
    spn_cev_graph_eps,
    plot = last_plot(),
    device = 'eps',
    path = NULL,
    scale = 1,
    width = 160,
    height =105,
    units = c("mm"),
    dpi = 150,
    limitsize = TRUE
  )

}
print(pl_cev)
```

https://fanwangecon.github.io/R4Econ/tabgraph/ggline/htmlpdfr/fs_ggline_mgrp_ncts.html




```
if (bl_save_img) {
  dev.off()
}
```