

## democracy\_index\_confounding

### Analysis of democracy index as a confounding variable

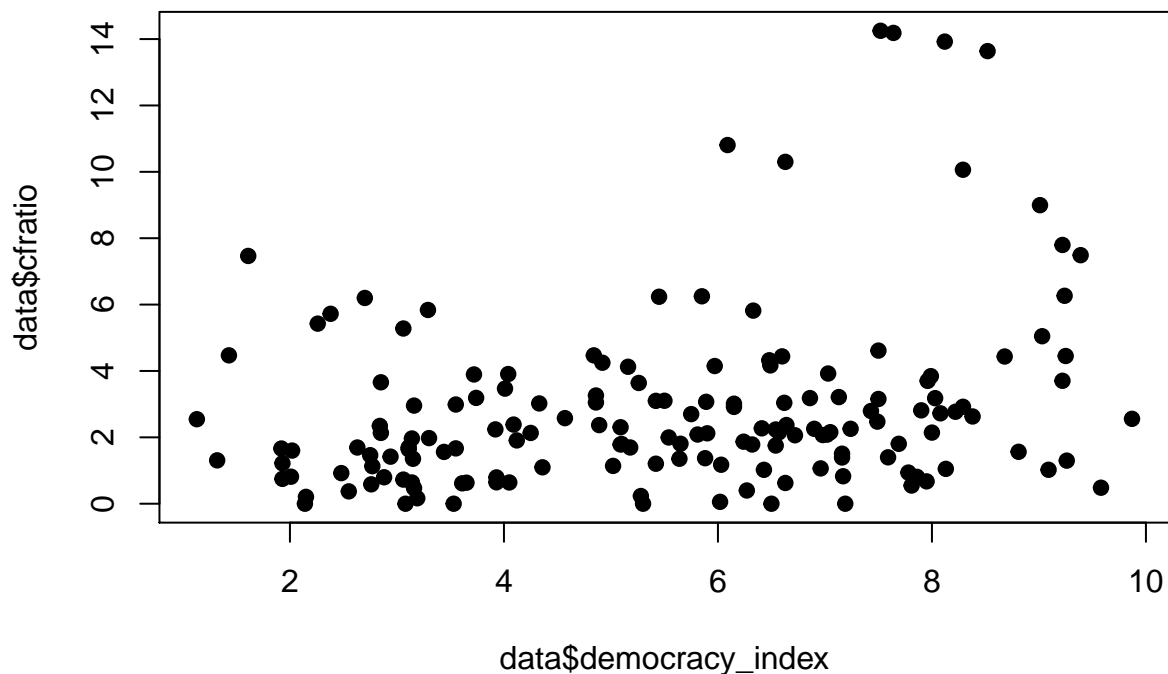
Start by loading the six month data:

```
data <- read.csv(file = '../prepped_data/six_month_outlier_screened.csv')
```

### Regressions on democracy index

```
summary(lm(formula = cfratio ~ democracy_index, data = data))

##
## Call:
## lm(formula = cfratio ~ democracy_index, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.7472 -1.5162 -0.5804  0.5813 10.7166
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.99233    0.55854   1.777 0.077548 .
## democracy_index 0.33782    0.09398   3.595 0.000434 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.609 on 158 degrees of freedom
## (19 observations deleted due to missingness)
## Multiple R-squared:  0.0756, Adjusted R-squared:  0.06975
## F-statistic: 12.92 on 1 and 158 DF, p-value: 0.0004337
plot(data$democracy_index, data$cfratio, pch=19)
```



From these plots, it appears that democracy index isn't a good predictor of poor Covid-19 outcomes, but when you look at deaths-per-capita, there is a trend where the highest deaths-per-capita are in high democracy index countries.

### Regressions on GHSI subcomponent scores and democracy index

```
summary(lm(formula = casepc ~ prev_emergence_pathogens + early_detection + rapid_response + robust_heal
```

```
##
## Call:
## lm(formula = casepc ~ prev_emergence_pathogens + early_detection +
##      rapid_response + robust_health_sector + commitments + risk_environment,
##      data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -8.571  -3.183  -1.095   1.306  32.683
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.772536    2.218248   1.701   0.0908 .
## prev_emergence_pathogens  0.009756    0.050505   0.193   0.8471
## early_detection   -0.002145    0.028763  -0.075   0.9406
## rapid_response     0.078784    0.046541   1.693   0.0923 .
## robust_health_sector  0.019663    0.051965   0.378   0.7056
## commitments     -0.174823    0.043297  -4.038 8.11e-05 ***
```

```

## risk_environment          0.088802   0.032589   2.725   0.0071 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.425 on 172 degrees of freedom
## Multiple R-squared:  0.1671, Adjusted R-squared:  0.138
## F-statistic: 5.749 on 6 and 172 DF,  p-value: 1.783e-05
summary(lm(formula = casepc ~ prev_emergence_pathogens + early_detection + rapid_response + robust_heal

##
## Call:
## lm(formula = casepc ~ prev_emergence_pathogens + early_detection +
##     rapid_response + robust_health_sector + commitments + risk_environment +
##     democracy_index, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -10.201  -3.143  -1.001   1.114  30.494
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      2.772824   2.458242   1.128  0.26111
## prev_emergence_pathogens -0.016628   0.056237  -0.296  0.76788
## early_detection      0.005831   0.029863   0.195  0.84546
## rapid_response      0.077178   0.047467   1.626  0.10603
## robust_health_sector  0.029305   0.055370   0.529  0.59739
## commitments      -0.141732   0.047345  -2.994  0.00322 **
## risk_environment      0.159219   0.052284   3.045  0.00274 **
## democracy_index    -0.741934   0.313041  -2.370  0.01904 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.387 on 152 degrees of freedom
## (19 observations deleted due to missingness)
## Multiple R-squared:  0.1831, Adjusted R-squared:  0.1455
## F-statistic: 4.868 on 7 and 152 DF,  p-value: 5.615e-05

```

For this regression, we see that the democracy index coefficient is statistically significant and that it has a negative relationship with deaths-per-capita.