Analysis of:
Unemployment Rates Vs. Suicides

Big Question:

Is there a correlation between Unemployment and Suicide Rates in America?

Table: Suicide Data

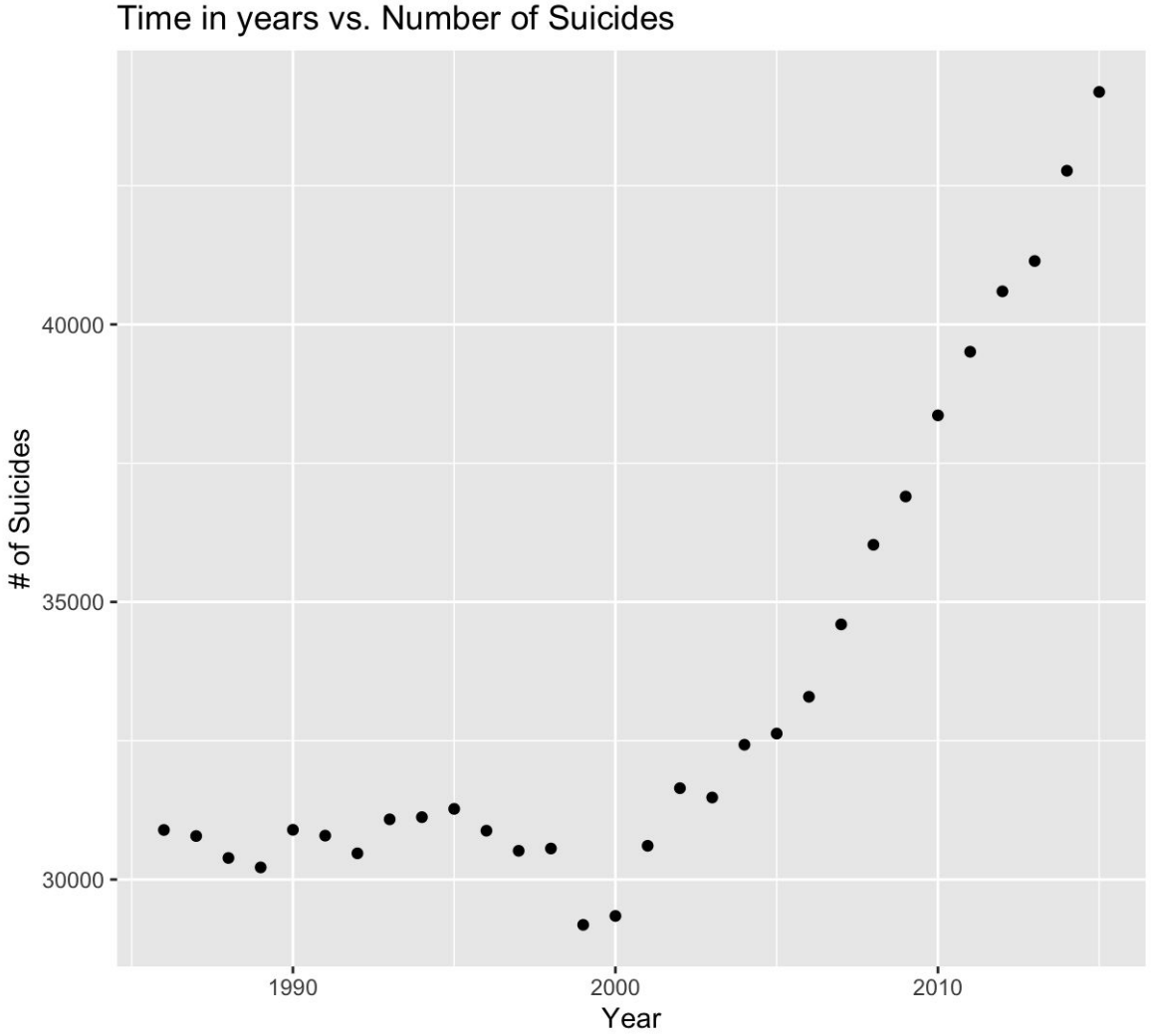
country	year	sex	age	suicides_no	population	suicides/100k pop	country-year	HDI for year
United States	1985	male	75+ years	2177	4064000	53.57	United States1985	0.841
United States	1985	male	55-74 years	5302	17971000	29.50	United States1985	0.841
United States	1985	male	25-34 years	5134	20986000	24.46	United States1985	0.841

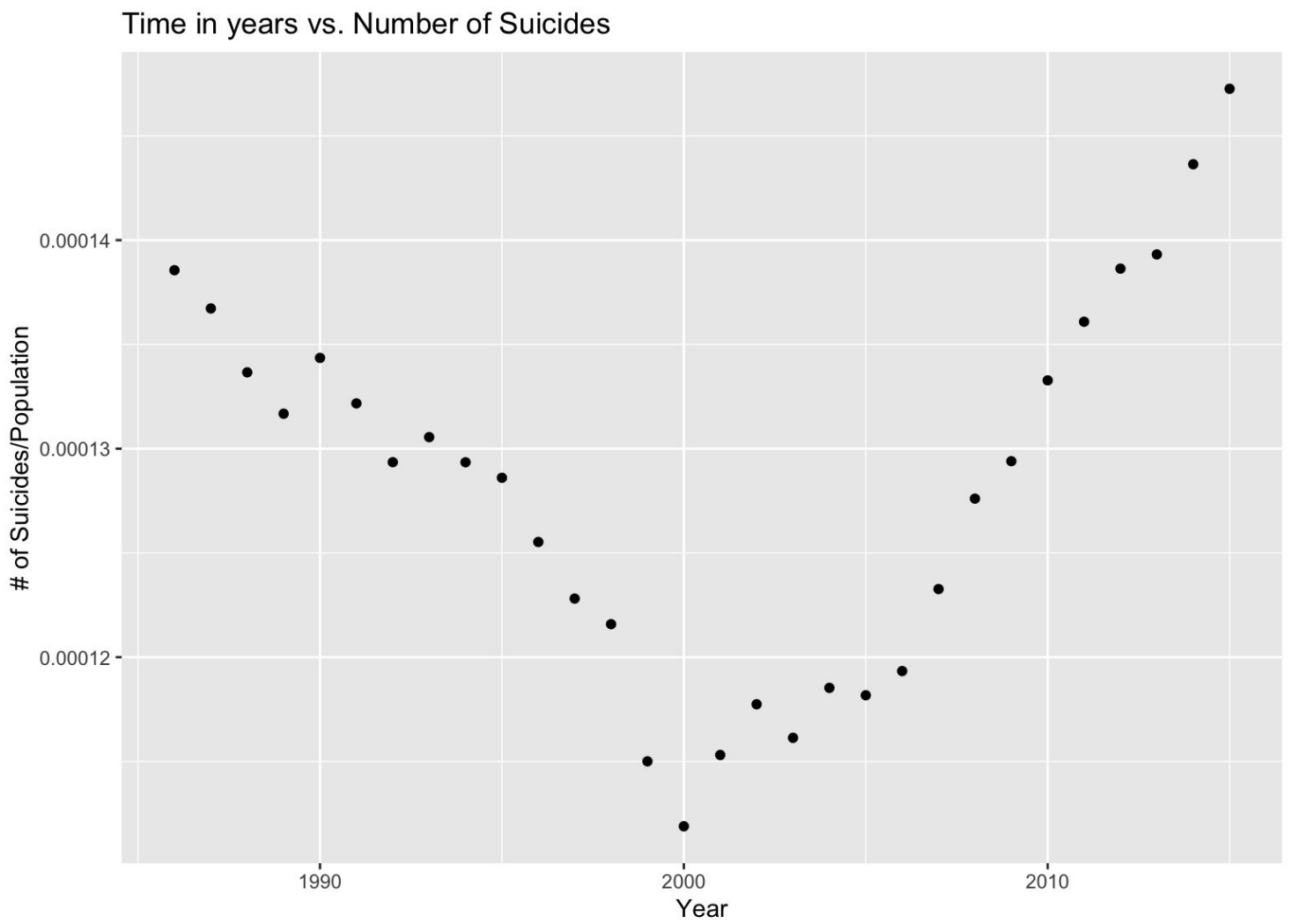
Table: Suicide Data Cont.

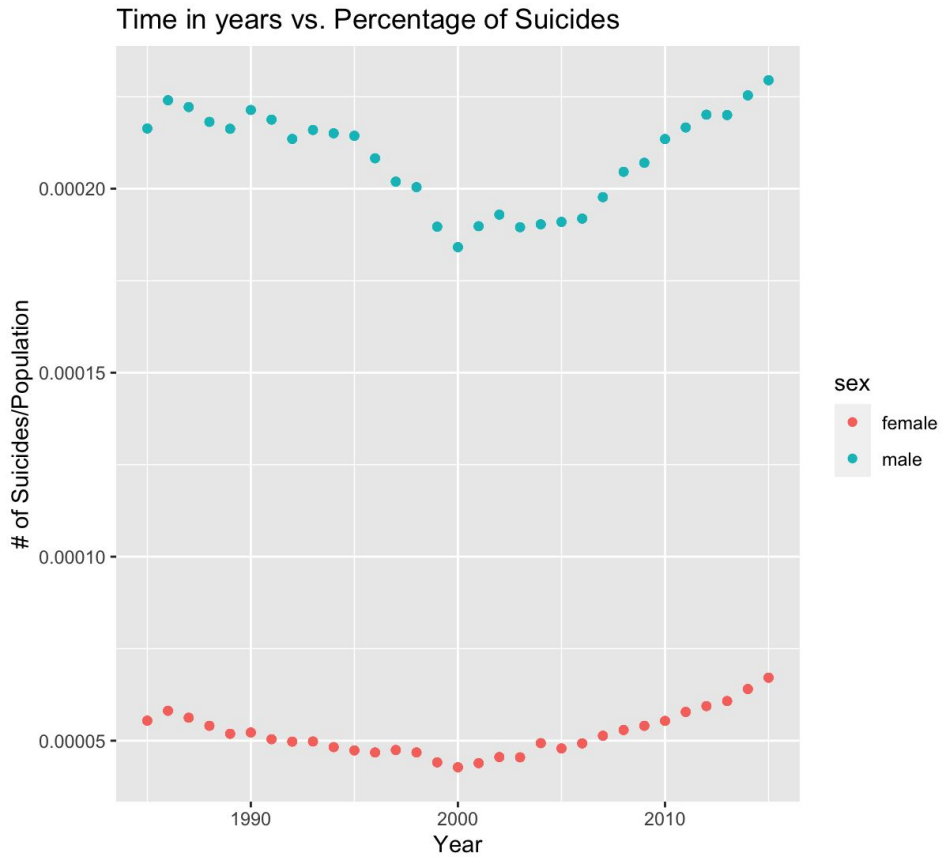
gdp_for_year ($)	gdp_per_capita ($)	generation	SS	SP	SOP
4.346734e+12	19693	G.I. Generation	2643	11533000	0.0002292
4.346734e+12	19693	G.I. Generation	6870	39337000	0.0001746
4.346734e+12	19693	Boomers	6376	42027000	0.0001517

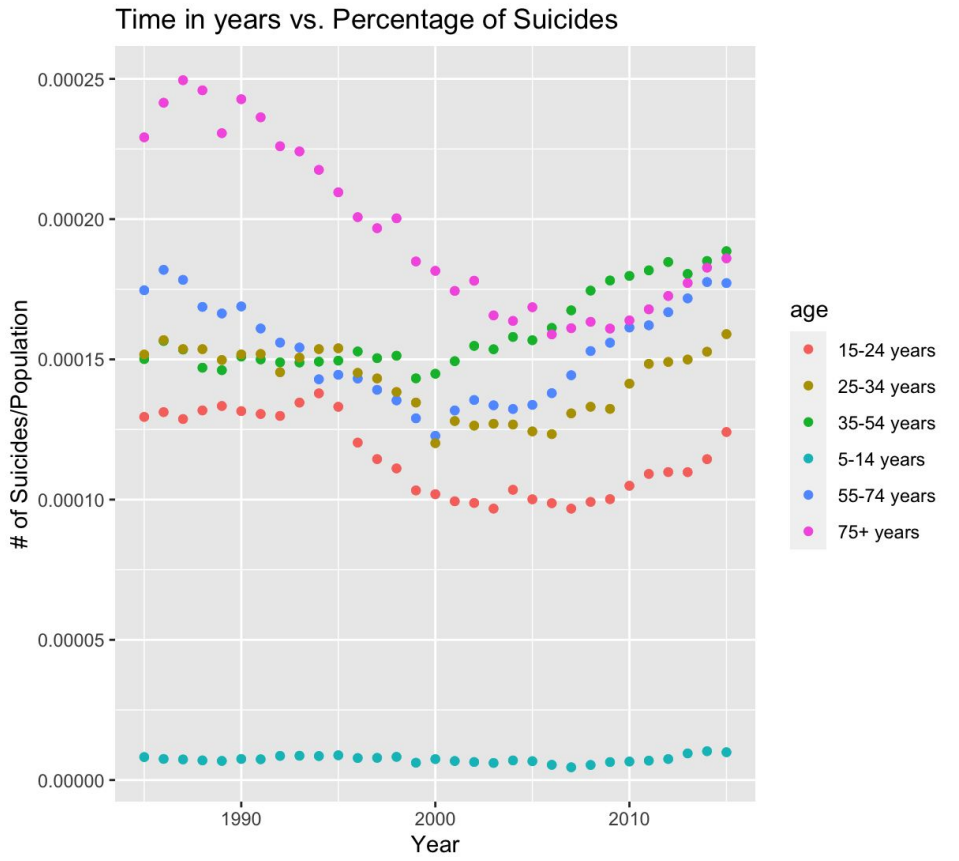
Table: Unemployment Data

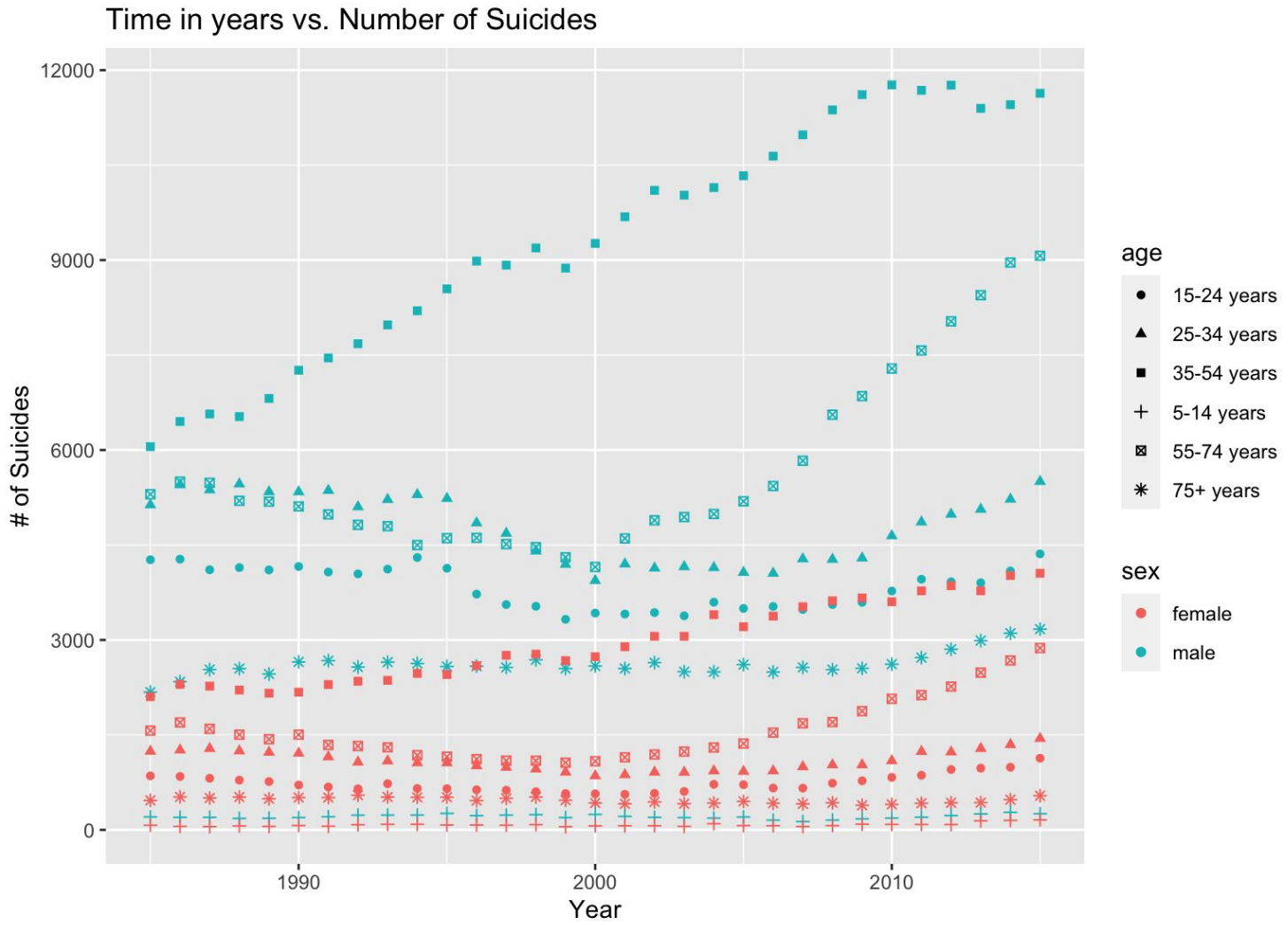
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TU
1948	3.4	3.8	4.0	3.9	3.5	3.6	3.6	3.9	3.8	3.7	3.8	4.0	3.750000
1949	4.3	4.7	5.0	5.3	6.1	6.2	6.7	6.8	6.6	7.9	6.4	6.6	6.050000
1950	6.5	6.4	6.3	5.8	5.5	5.4	5.0	4.5	4.4	4.2	4.2	4.3	5.208333

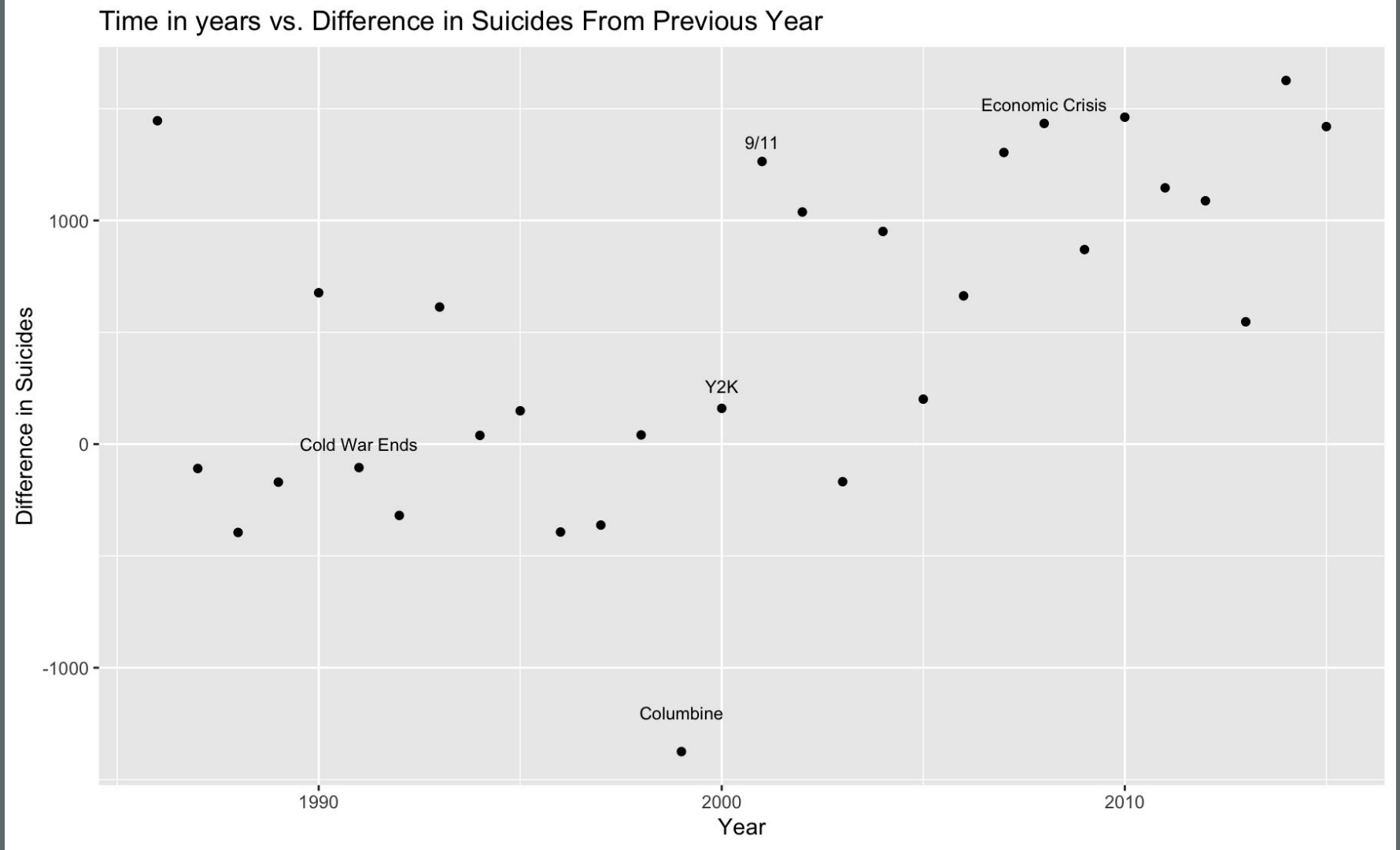

Time in years vs. Number of Suicides
40000
35000
30000
# of Suicides
1990
2000
2010
Year

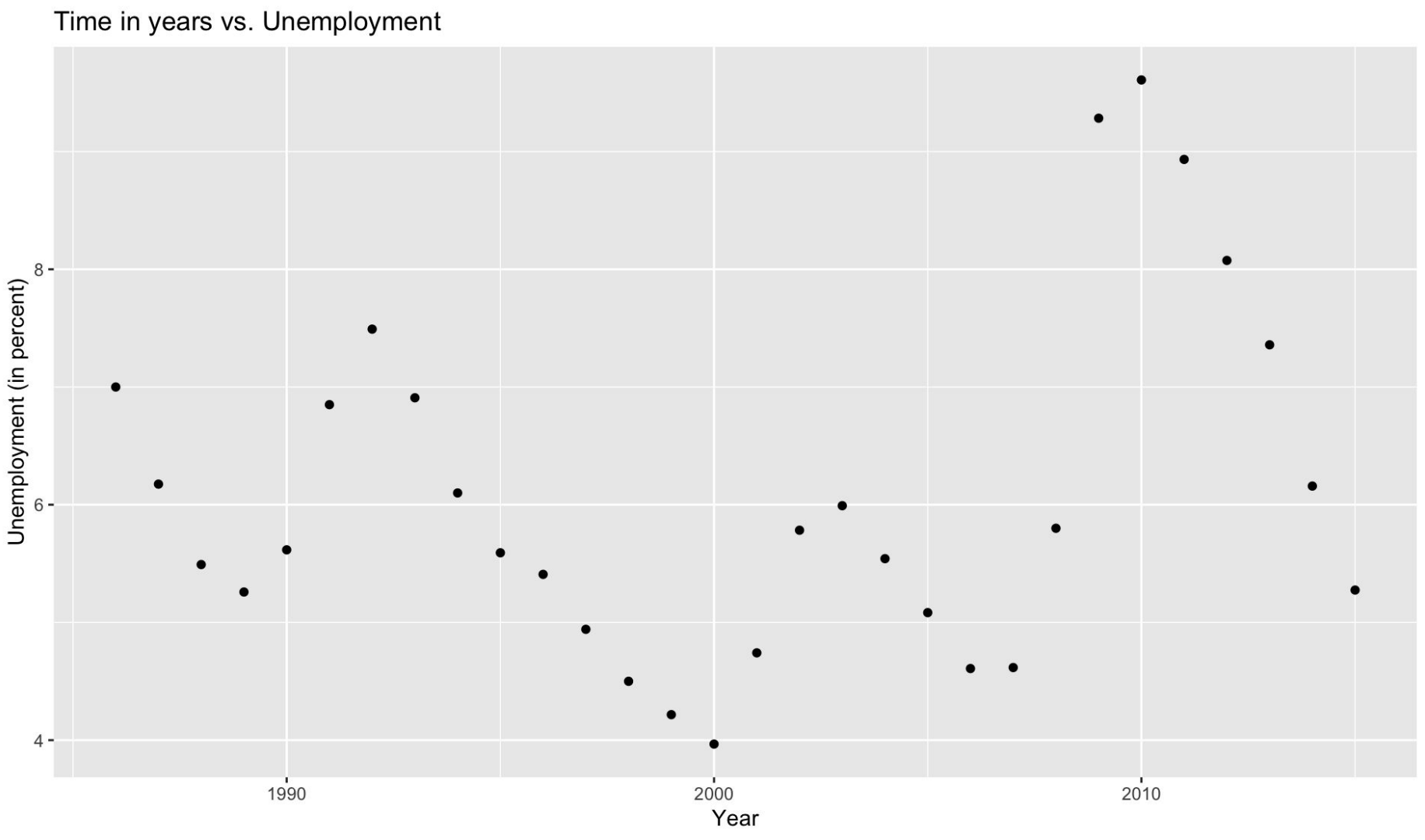

Time in years vs. Number of Suicides
# of Suicides/Population
0.00014
0.00013
0.00012
1990
2000
2010
Year

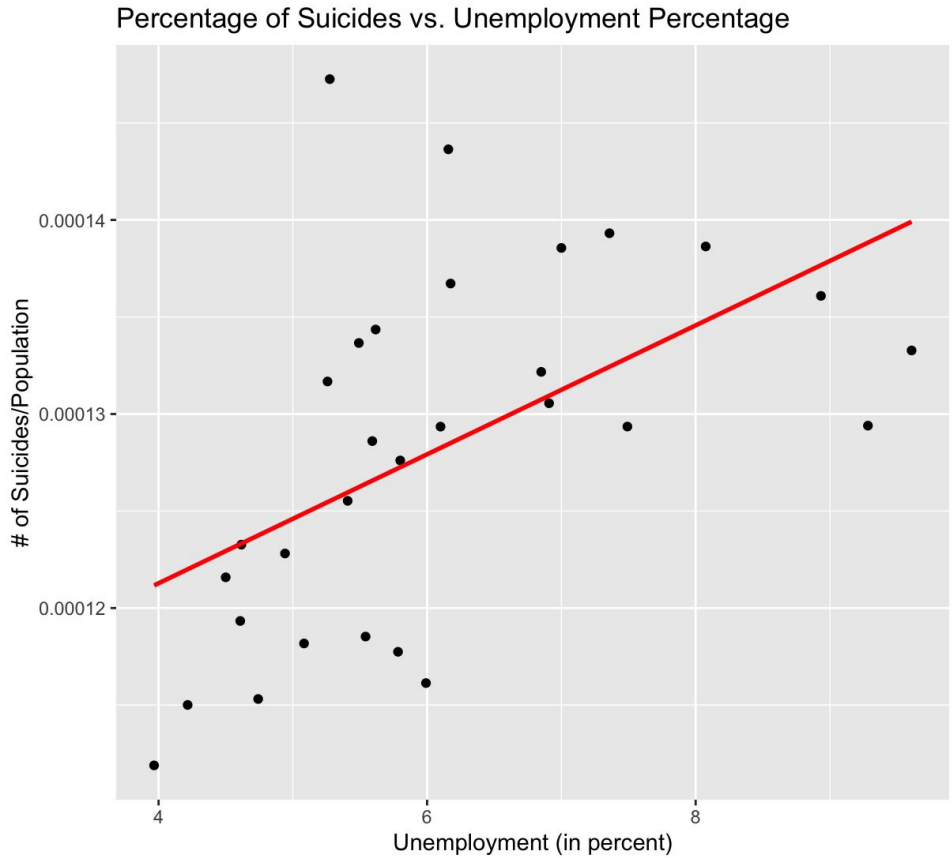

Time in years vs. Percentage of Suicides
# of Suicides/Population
0.00020
0.00015
0.00010
0.00005
1990
2000
2010
Year
sex
female
male


Time in years vs. Percentage of Suicides
# of Suicides/Population
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
1990
2000
2010
Year
age
15-24 years
25-34 years
35-54 years
5-14 years
55-74 years
75+ years

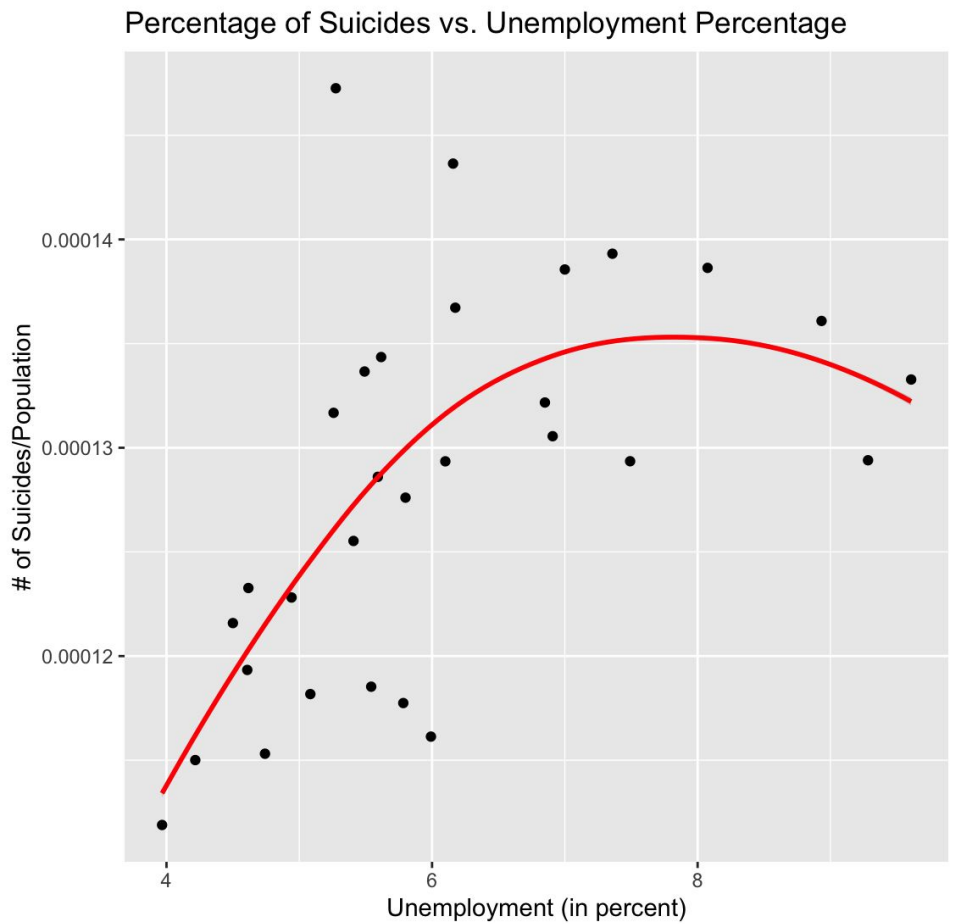

Time in years vs. Number of Suicides
12000
9000
6000
3000
0
# of Suicides
1990
2000
2010
Year
age
15-24 years
25-34 years
35-54 years
5-14 years
55-74 years
75+ years
sex
female
male

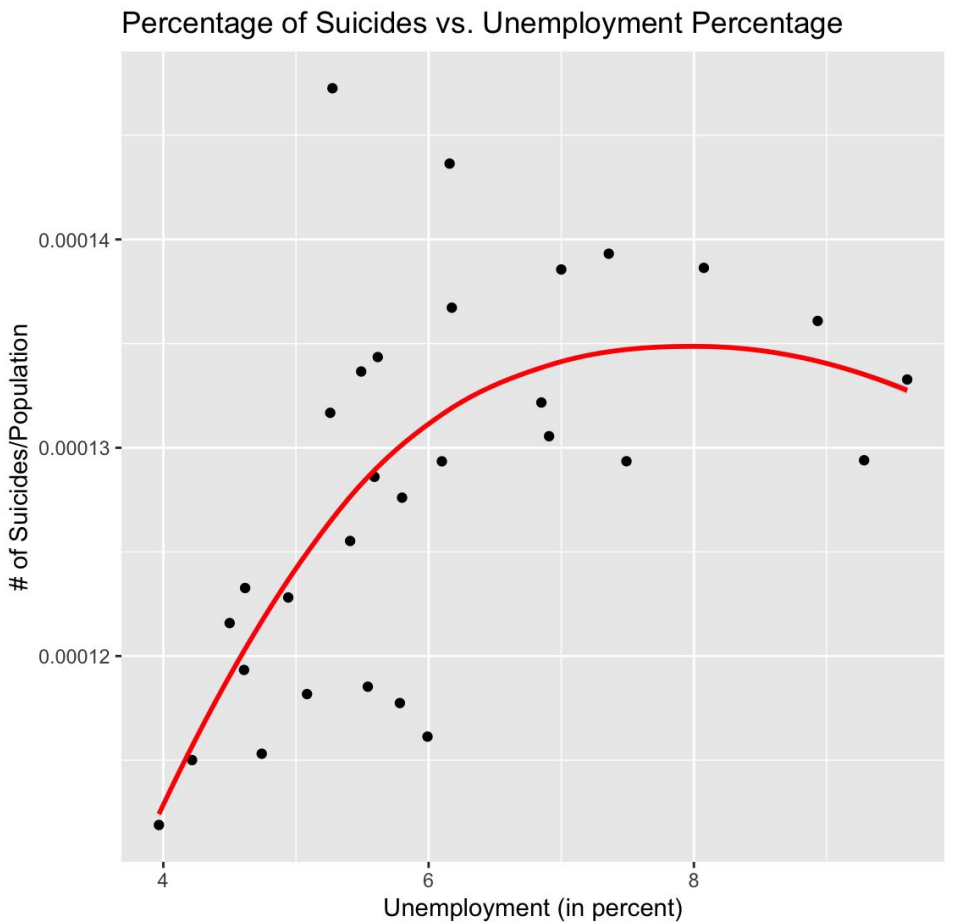

Time in years vs. Difference in Suicides From Previous Year
Economic Crisis
9/11
Y2K
Cold War Ends
Columbine
1000
0
-1000
Difference in Suicides
1990
2000
2010
Year


Time in years vs. Unemployment
Unemployment (in percent)
8
6
4
1990
2000
2010
Year




```
Call:
lm(formula = SOP ~ TU, data = SuicideUnemp)

Residuals:
       Min         1Q     Median         3Q        Max
-1.176e-05 -6.684e-06 -4.076e-07  5.619e-06  2.175e-05

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.080e-04  6.261e-06  17.247  < 2e-16 ***
TU          3.322e-06  1.002e-06   3.315  0.00254 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’

Residual standard error: 7.92e-06 on 28 degrees of freedom
Multiple R-squared:  0.2819,    Adjusted R-squared:  0.2562
F-statistic: 10.99 on 1 and 28 DF,  p-value: 0.002539
```

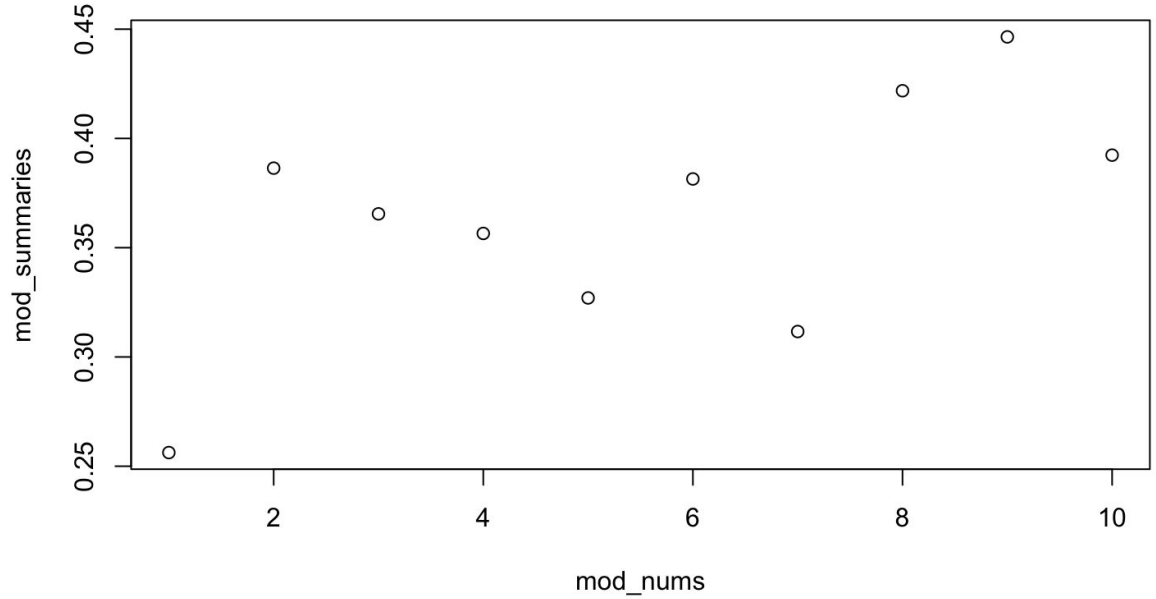

Percentage of Suicides vs. Unemployment Percentage
0.00014
0.00013
0.00012
# of Suicides/Population
4
6
8
Unemployment (in percent)

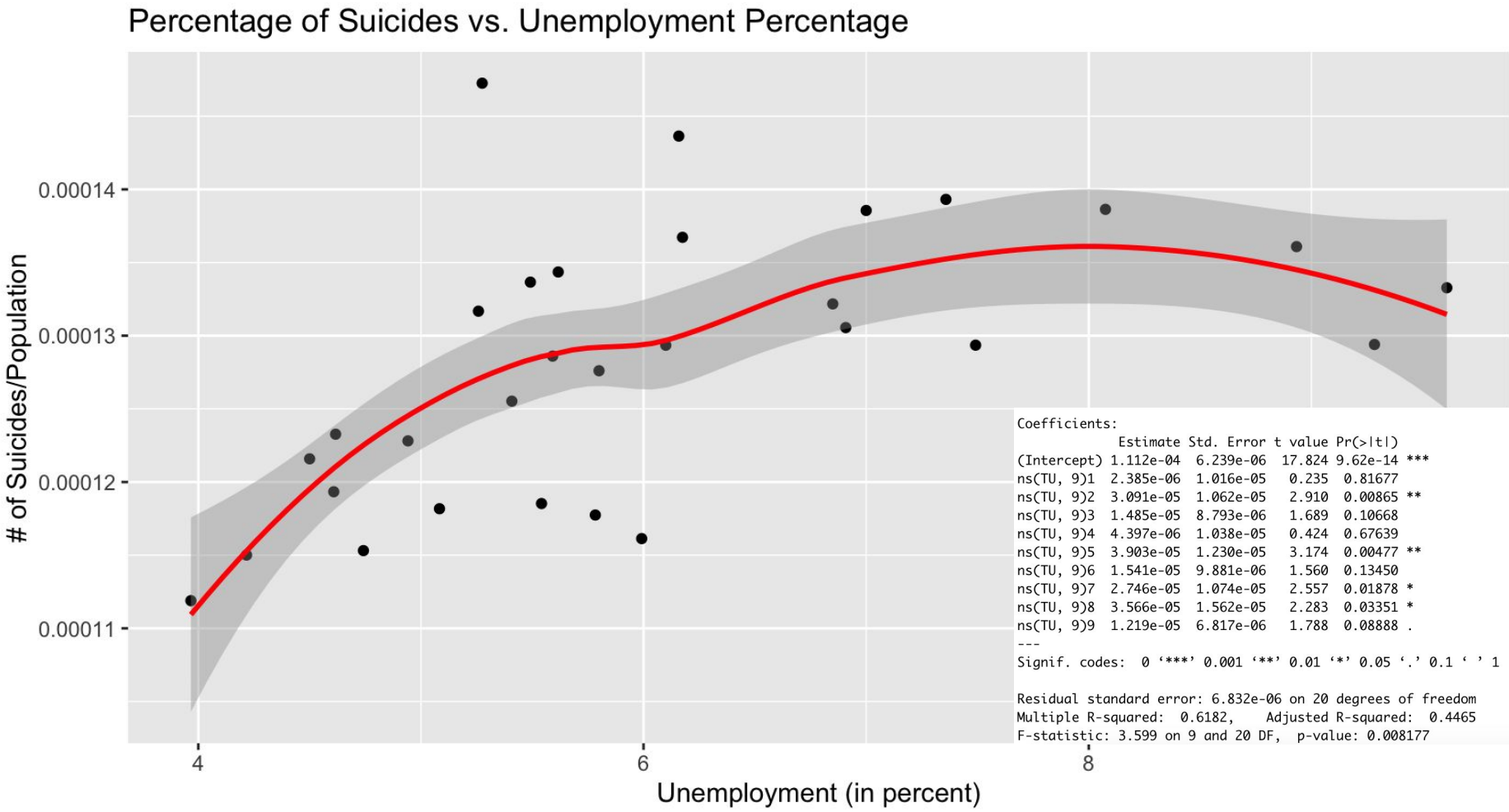

Percentage of Suicides vs. Unemployment Percentage
0.00014
0.00013
0.00012
# of Suicides/Population
4
6
8
Unemployment (in percent)

```
Call:
lm(formula = SOP ~ ns(TU, 2), data = SuicideUnemp)

Residuals:
       Min         1Q     Median         3Q        Max
-1.494e-05 -3.412e-06 -6.329e-07  3.923e-06  2.106e-05

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.136e-04  3.705e-06  30.658  < 2e-16 ***
ns(TU, 2)1  3.771e-05  8.727e-06   4.321 0.000188 ***
ns(TU, 2)2  9.406e-06  4.919e-06   1.912 0.066495 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘

Residual standard error: 7.193e-06 on 27 degrees of freedom
Multiple R-squared:  0.4287,    Adjusted R-squared:  0.3864
F-statistic: 10.13 on 2 and 27 DF,  p-value: 0.0005218
```

```
lm(formula = SOP ~ ns(TU, 3), data = SuicideUnemp)

Residuals:
       Min         1Q     Median         3Q        Max
-1.494e-05 -3.143e-06 -6.695e-07  4.372e-06  2.062e-05

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.126e-04  4.939e-06  22.806  < 2e-16 ***
ns(TU, 3)1  1.841e-05  5.974e-06   3.081  0.00483 **
ns(TU, 3)2  3.455e-05  1.081e-05   3.196  0.00363 **
ns(TU, 3)3  1.342e-05  5.292e-06   2.536  0.01757 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘

Residual standard error: 7.315e-06 on 26 degrees of freedom
Multiple R-squared:  0.4311,    Adjusted R-squared:  0.3655
F-statistic: 6.568 on 3 and 26 DF,  p-value: 0.001877
```

```
for(i in 1:10) {

  mod_summaries[[i]] <- summary(
    lm(SOP ~ ns(TU, i), data = SuicideUnemp))$adj.r.squared

}
```




Percentage of Suicides vs. Unemployment Percentage
# of Suicides/Population
0.00014
0.00013
0.00012
0.00011
4
6
8
Unemployment (in percent)
Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.112e-04 6.239e-06 17.824 9.62e-14 ***
ns(TU, 9)1 2.385e-06 1.016e-05 0.235 0.81677
ns(TU, 9)2 3.091e-05 1.062e-05 2.910 0.00865 **
ns(TU, 9)3 1.485e-05 8.793e-06 1.689 0.10668
ns(TU, 9)4 4.397e-06 1.038e-05 0.424 0.67639
ns(TU, 9)5 3.903e-05 1.230e-05 3.174 0.00477 **
ns(TU, 9)6 1.541e-05 9.881e-06 1.560 0.13450
ns(TU, 9)7 2.746e-05 1.074e-05 2.557 0.01878 *
ns(TU, 9)8 3.566e-05 1.562e-05 2.283 0.03351 *
ns(TU, 9)9 1.219e-05 6.817e-06 1.788 0.08888 .

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Residual standard error: 6.832e-06 on 20 degrees of freedom
Multiple R-squared: 0.6182, Adjusted R-squared: 0.4465
F-statistic: 3.599 on 9 and 20 DF, p-value: 0.008177

Conclusions

- There are large disparities with suicide rates based on gender and age group.
- Based on the models suicide rates and unemployment seem to be correlated, best model created between suicide and unemployment includes a natural spline of 9.
- If I were to continue analysis into this subject, I would try to find a different dataset that would be suitable for dynamic effects. As well as find an unemployment set that includes identifiers such as gender or age group variables so that further conclusions regarding disparity can be drawn

Data Sets:

Suicide:
https://www.kaggle.com/russellyates88/suicide-rates-overview-1985-to-2016

Unemployment:
https://www.kaggle.com/tunguz/us-monthly-unemployment-rate-1948-present