LAB3 markdown

Assignment 3

1

```r
library(arsenal)
```

```
##
## Attaching package: 'arsenal'

## The following object is masked from 'package:lubridate':
##
##     is.Date
```

```r
expl_AS_full_join = expl_oper %>% left_join(AS_merged, by=c("NPD_id", "year"))

diff_dataset <- comparedf(expl_AS_full_join, expl_AS)
```

2

```r
brent_spotprices <- read.csv("Europe_Brent_Spot_Price_FOB.csv") %>% tail(., -4)

brent_spotprices %<>%
  mutate(year = as.numeric(rownames(brent_spotprices)),
         Europe.Brent.Spot.Price.FOB = as.numeric(Europe.Brent.Spot.Price.FOB)) %>%
  rename(spot_price = Europe.Brent.Spot.Price.FOB)


explAGG_spot <- explAgg_AS %>% inner_join(brent_spotprices, by = c("year"))

explAGG_spot %>% group_by(spot_price) %>%
  summarise(total_n_wells = sum(numbWells)) %>%
  ggplot(aes(x= spot_price, y= total_n_wells)) +
  geom_point() +
  geom_smooth(method = "lm") +
  xlab("Spot prices") +
  ylab("Total wells")
```
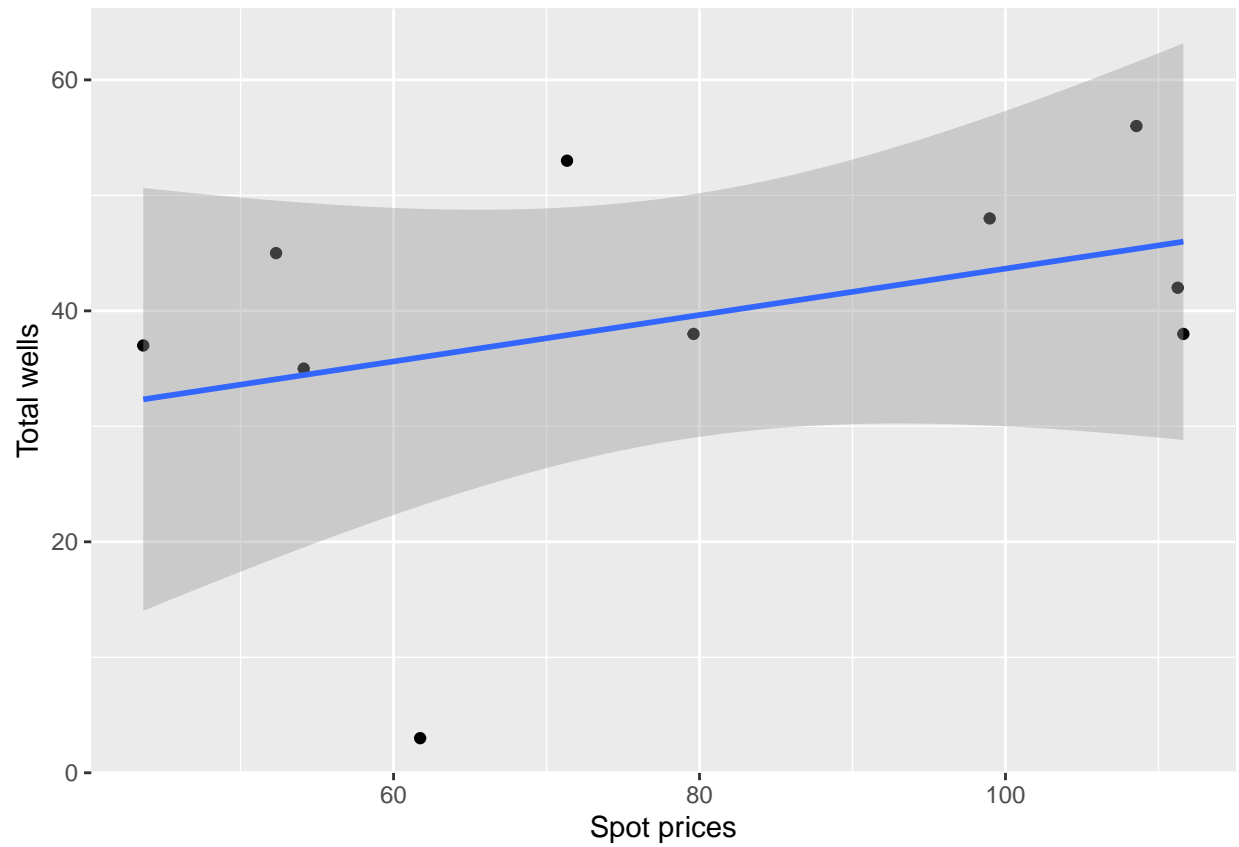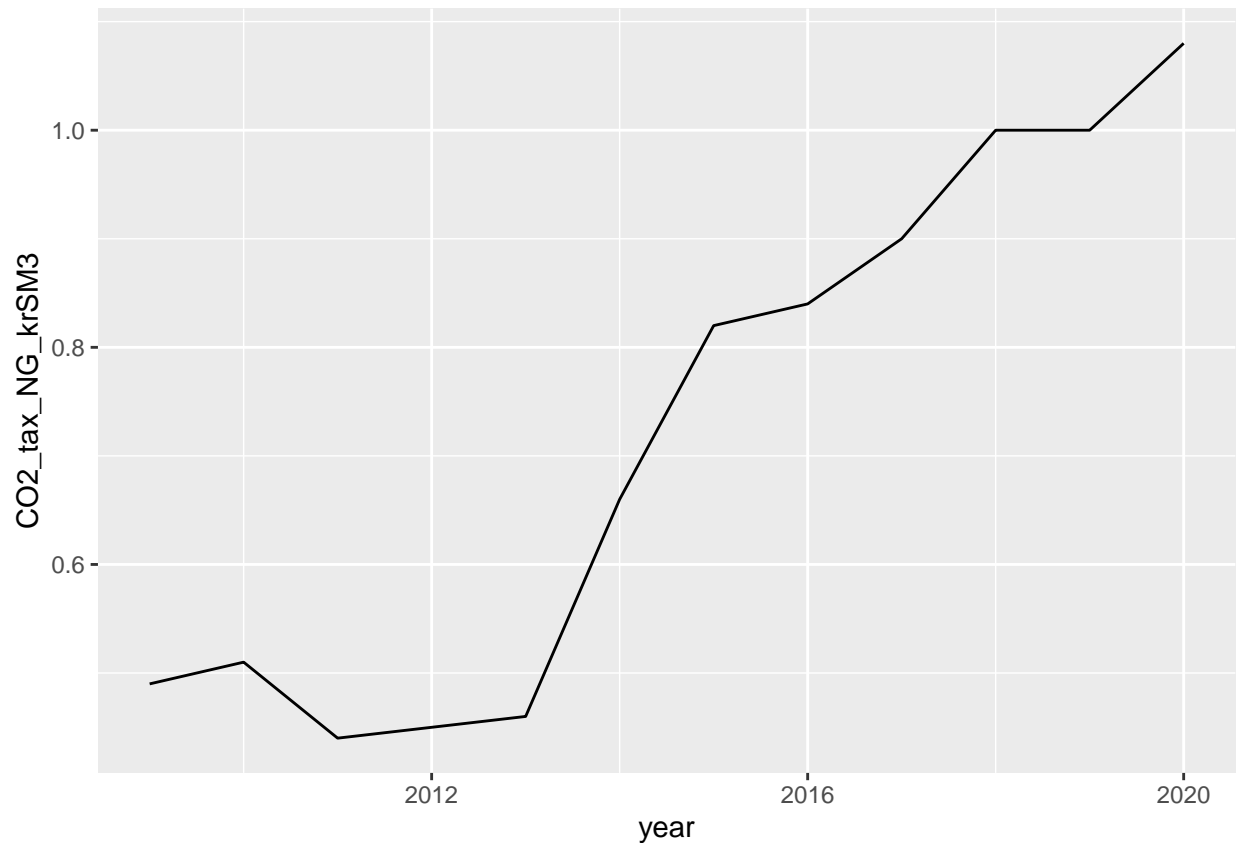
```
## `geom_smooth()` using formula 'y ~ x'
```

3

```
CO2_tax = tibble(
  year=2009:2020,
  CO2_tax_NG_krSM3=c(0.49, 0.51, 0.44, 0.45, 0.46, 0.66,.82, 0.84, 0.90, 1, 1, 1.08)
  )

CO2_tax %>% ggplot(aes(x=year, y=CO2_tax_NG_krSM3)) +
  geom_line()
```

```
## Run regression tests

num_wells <- left_join(explAGG_spot, CO2_tax, by = "year")
num_reg <- lm(numbWells ~ CO2_tax_NG_krSM3, data = num_wells)
summary(num_reg)
```

```
##
## Call:
## lm(formula = numbWells ~ CO2_tax_NG_krSM3, data = num_wells)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.1415 -2.4305 -1.6938  0.4444 19.5695
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)         2.825      1.367   2.067   0.0412 *
## CO2_tax_NG_krSM3    1.317      1.976   0.666   0.5067
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.328 on 105 degrees of freedom
## Multiple R-squared:  0.00421,    Adjusted R-squared:  -0.005274
## F-statistic: 0.4439 on 1 and 105 DF,  p-value: 0.5067
```

```
## Plot CO2 tax vs exploration

num_wells %>%
  ggplot(aes(x = year, group = 1)) +
  geom_smooth(aes(y = numbWells, color = "Number of wells")) +
  geom_smooth(aes(y = CO2_tax_NG_krSM3, color = "Co2 tax")) +
  xlab("Years") +
  ylab("Total wells/ CO2 tax") +
  labs(colour = "Series")
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
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```
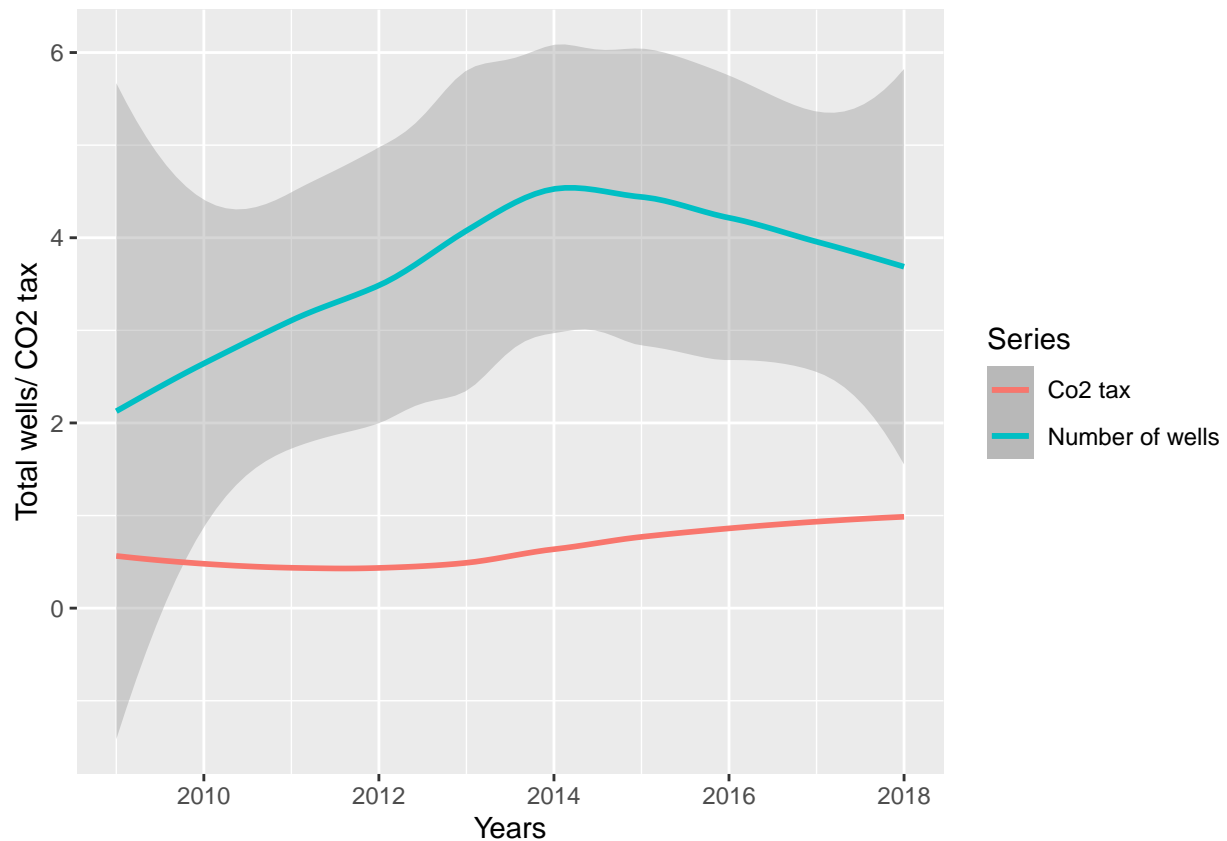

The exploratory drilling seems to be unaffected by the hike in the Co2 taxes. Simply plotting the number of exploratory wells against the the increase Co2 tax levels, does not seem to correspond with the rate or time period in which the number of exploratory wells increase

4

```
reg1 = lm(numbWells ~ total_assets + profitability, data=explAgg_AS)
summary(reg1)
```

```
##
## Call:
## lm(formula = numbWells ~ total_assets + profitability, data = explAgg_AS)
```

```
## 
## Residuals:
##     Min      1Q Median      3Q     Max
## -9.8817 -1.9410 -1.3936  0.4946 11.2441
## 
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.428e+00  3.798e-01   6.391 5.13e-09 ***
## total_assets   2.673e-08  3.491e-09   7.656 1.18e-11 ***
## profitability -4.859e-03  1.015e-02  -0.479    0.633
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 3.47 on 101 degrees of freedom
##   (3 observations deleted due to missingness)
## Multiple R-squared:  0.3789, Adjusted R-squared:  0.3667
## F-statistic: 30.81 on 2 and 101 DF,  p-value: 3.572e-11
```