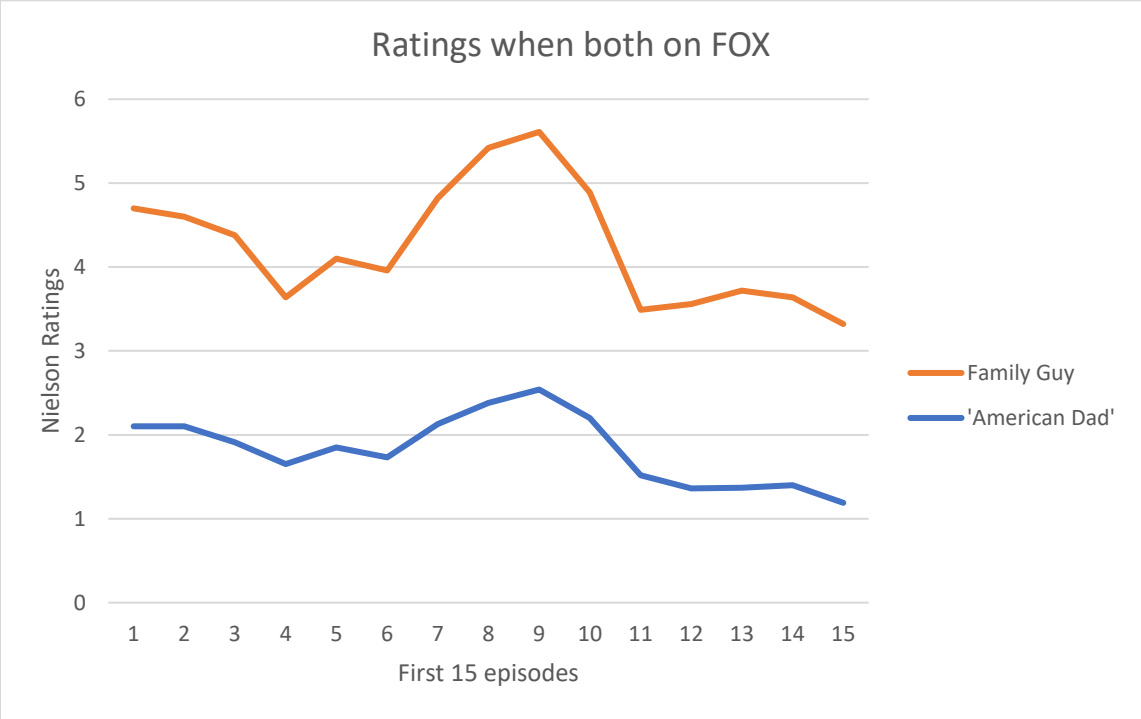
How Did Moving to TBS Effect American Dad's Ratings?

I am an artist who loves cartoons and one of my favorite animators is Seth Mcfarlane. Seth Mcfarlane is known for a variety of shows, but two of his most famous are Family Guy and American Dad. Family Guy has stayed on FOX. However, American Dad changed stations from FOX to TBS in 2014. How exactly has this change to TBS effected American Dad? I plan to explore this question using a differences-in-differences(DID) framework.

I want to determine the causal effect of a treatment. The treatment in this case would be the movement from FOX to TBS. To determine the causal effect of network movement, I need to compare the 2014 season of American Dad on TBS to its counterfactual. In layman terms, I would need to compare the show to an alternative reality where the 2014 season of American Dad never moved to TBS. This is not possible. But, one could use Family Guy's 2014 season as an approximation of this counterfactual because of the similarities of the shows. Family Guy, obviously, is not the same as American Dad. But, with a DID framework, causal effect analysis is still possible as long as the two shows share similar trends in ratings prior to the treatment.

A DID method cannot be valid unless the parallel trends assumption holds. So, I plotted the 2013 season's ratings for both shows using *Excel*. Each show had different number of episodes per season. To account for this, I only plotted the first 15 episodes. I believe that based off the plot, the parallel trend assumption is met.



Now I can determine the actual causal effect through a linear regression. In my data I calculated the difference between the post and pre-treatment ratings("diff"). I also calculated the growth between these differences in ratings("diff_diff"). I performed two regressions in R where I individually regressed these variables over the treatment variable("treat").

Regression 1:

```
Call:
lm(formula = diff ~ treat, data = data)

Residuals:
    Min      1Q  Median      3Q     Max
-0.8232 -0.3533 -0.1632  0.2176  2.3468

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  -0.2468     0.1650  -1.496 0.144524
treat        -0.9932     0.2485  -3.997 0.000353 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7194 on 32 degrees of freedom
Multiple R-squared:  0.333,     Adjusted R-squared:  0.3122
F-statistic: 15.98 on 1 and 32 DF,  p-value: 0.000353
```

Regression 2:

```
Call:
lm(formula = diff_diff ~ treat, data = data)

Residuals:
     Min       1Q   Median       3Q      Max
-2.65368 -0.26843  0.02682  0.20657  2.65632

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.01632    0.18023  -0.091    0.928
treat        0.06898    0.27134   0.254    0.801

Residual standard error: 0.7856 on 32 degrees of freedom
Multiple R-squared:  0.002016,  Adjusted R-squared:  -0.02917
F-statistic: 0.06463 on 1 and 32 DF,  p-value: 0.8009
```

Due to the nature of the DID framework, the coefficient on "treat" would give an estimate of the impact that moving to TBS had on American Dad. Regression 1 would estimate the impact that moving to TBS would have on nominal ratings (-.9932). Regression 2 would estimate the impact that moving to TBS would have on ratings' growth (0.06898).

Not surprisingly, the analysis demonstrates that American Dad's movement to TBS did significantly decrease its nominal ratings. Surprisingly though, American Dad did demonstrate minutely higher growth rates in viewership when on TBS. The implication is, if a network executive is purely interested in expanding viewership, it may be beneficial to allow shows to switch networks.