Does Beardsley et al. (2021) show anything?

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1 October 2024

A recurring problem in accounting research is poorly thought-out research designs where a null hypothesis is assumed to imply zero coefficients in some regression without any effort to check that this is the case. Beardsley et al. (2021) illustrates this problem nicely. Beardsley et al. (2021, p. 1) state that "using year-end effective tax rate (ETR) manipulation as our setting, we find that firms decrease ETRs from 3rd to 4th quarter to meet or beat a greater percentage of individual forecast. … Our study highlights the strategic nature of earnings management by providing evidence that managers consider individual forecasts to calibrate earnings management decisions."

The main result from Beardsley et al. (2021, p. 11) is provided by Table 5, which presents two regressions, one for each of two sub-samples. The key results are a positive coefficient on *PREBEAT_AMT* for *PREBEAT* firms and a negative coefficient on *PREMISS_AMT* for *PREMISS* firms.

But I can simulate precisely these results with no earnings management. I assume nothing more than random variation in ETRs from Q3 to Q4 and that analysts know the Q4 effective tax rate.

In writing this note, I use the packages listed below.[1] This note was written using Quarto and compiled with RStudio, an integrated development environment (IDE) for working with R. The source code for this note is available here and the latest version of this PDF is here.

```
library(tidyverse)
library(modelsummary)
```

In the code below, I generate data for 1,000 firms and draw ETRs for Q3 and Q4 independently from a uniform distribution over the range 33%–37%.

```
n <- 10000
n_analysts <- 10
set.seed(20241001)
etr_3 <- runif(n = n, min = 0.33, max = 0.37)
etr_4 <- runif(n = n, min = 0.33, max = 0.37)
```

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[1] Execute `install.packages(c("tidyverse", "modelsummary"))` within R to install all the packages you need to run the code in this note.

I then draw forecasts of pretax earnings from a normal distribution. Forecasts of after-tax earnings are simply pre-tax earnings times a factor equal to one minus Q4 ETR.

```
ebt_actual <- rnorm(n = n, mean = 1, sd = 0.1)
ni_actual <- ebt_actual * (1 - etr_4)
```

Realized pre-tax earnings are simply the forecast plus noise and realized after-tax earnings are realized pre-tax earnings times a factor equal to one minus Q4 ETR.

```
df_pre <-
  tibble(firm_id = 1:n, ebt_actual,
         etr_3, etr_4, ni_actual) |>
  cross_join(tibble(analyst_id = 1:n_analysts)) |>
  mutate(ebt_forecast = ebt_actual + rnorm(n = n * n_analysts, sd = 0.2),
         ni_forecast = ebt_forecast * (1 - etr_4),
         ni_premanaged = ebt_actual * (1 - etr_3)) |>
  group_by(firm_id) |>
  summarize(percent_miss = mean(ni_premanaged < ni_forecast),
            disp = sd(ni_forecast),
            ni_forecast = mean(ni_forecast),
            .groups = "drop")
```

I combine the relevant data from above into a data frame and calculate variables for the regression following the descriptions in Appendix A of Beardsley et al. (2021, pp. 14–15).

```
df <-
  df_pre |>
  mutate(amount = ni_forecast - ebt_actual * (1 - etr_3),
         premiss_amt = amount,
         premiss = premiss_amt > 0,
         prebeat = premiss_amt < 0,
         prebeat_amt = -amount) |>
  mutate(premiss_amt = if_else(premiss, premiss_amt, 0),
         prebeat_amt = if_else(prebeat, prebeat_amt, 0))
```

I then run the regressions shown in Table 5 of Beardsley et al. (2021, p. 11). Results are shown in Table 1. There you can see I have reproduced the key results of Beardsley et al. (2021). However, the null result of "no earnings management" is true here. As such, it is not clear that Beardsley et al. (2021) show anything.

Table 1: Replication of Table 5 of Beardsley et al. (2021)

	(1)	(2)	(3)
(Intercept)	0.001	0.007***	0.014***
	0.896	3.929	29.326
prebeat_amt	0.141***		
	13.358		
percent_miss	0.003	−0.005**	−0.029***
	1.154	−2.394	−31.353
disp	−0.022***	−0.031***	
	−2.972	−4.398	
premiss_amt		−0.118***	
		−11.364	
Num.Obs.	4980	5020	10 000
R2	0.054	0.057	0.090

I have written elsewhere that the scourge of near-ubiquitous p-hacking makes accounting research of very dubious merit. If null hypotheses can be rejected simply because it is assumed that they imply zero coefficients, then this only adds to these concerns.[2]

Beardsley et al. (2021) was published in the *Journal of Accounting and Economics*, one of the top journals in accounting. The acknowledgement note thanks an editor, a referee, at least three discussants, and many luminous members of the accounting firmament. This suggests that plausibly mechanical nature of the results in Beardsley et al. (2021) never occurred to any of these people.[3] From conceiving this simulation to writing this note took about half an hour; so the bar is not high!

```
fms <- list(
  lm(etr_4 – etr_3 ~ prebeat_amt + percent_miss + disp, data = df, subset = prebeat),
  lm(etr_4 – etr_3 ~ premiss_amt + percent_miss + disp, data = df, subset = premiss),
  lm(etr_4 – etr_3 ~ percent_miss, data = df))
```

References

Beardsley, E.L., Robinson, J.R., Wong, P.A., 2021. What's my target? Individual analyst forecasts and last-chance earnings management. Journal of Accounting and Economics 72, 101423. https:

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[2]One doesn't even need to p-hack if one runs regressions where the null hypothesis implies non-zero coefficients and one assumes that they do not.

[3]One has to be careful here, as one should not interpret any kind of endorsement of a paper from mentions in the acknowledgements.