

Statistical Negligence in Title II Impact Analysis

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Introduction

In December 2017, the Federal Communications Commission (“FCC”) in its *Restoring Internet Freedom Order* (“RIFO”) reversed the Obama Administration’s 2015 decision to apply Title II regulation to broadband services.¹ This decision relied heavily on the argument that the heavy-handed regulatory approach embodied in the 2015 “*Open Internet Order*” significantly reduced investment in the telecommunications sector; a conclusion based largely on Phoenix Center research.² Naturally, proponents of Title II regulation aim to prove the Commission wrong by offering evidence of “no investment effect.”³

Last week, a new study seeking to rebut the Commission’s conclusion on investment was made public.⁴ The author of the study is Christopher Hooton, Chief Economist of the Internet Association⁵ (a proponent of Title II regulation) and a scholar at George Washington University’s Institute of Public Policy.⁶ The article – *Testing the Economics of the Net Neutrality Debate* – appears to be forthcoming in the journal TELECOMMUNICATIONS POLICY.⁷

Needless to say, advocates of Title II regulation were breathless. For example, Gigi Sohn, a former FCC lawyer who helped craft the 2015 rules, stated that Hooton’s new paper “once again validates what the FCC found in 2015 and what net neutrality advocates have said for years—that neither the net neutrality rules nor Title II classification had any impact on ISP investment.”⁸ Added Sohn, “Hopefully this comprehensive study, which studies ISP

investment over nearly a decade, will put this matter to rest.” Similarly, Derek Turner, the research director of Free Press (an advocacy group not particularly known for their civility in public debates) stated that he did not expect Hooton’s study “to kill the [Internet Service Providers’] zombie lies about net neutrality and investment” because the “telecom companies and their defenders in Congress have long operated unmoored from reality, and no smoking gun is going to change that, certainly not one they’ll never bother to read and consider fairly.”⁹

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But perhaps Ms. Sohn and Mr. Turner spoke too soon, and perhaps neither has “bother to read and consider fairly” Hooton’s work. This new paper is not Hooton’s first attempt at an empirical analysis of investment and Net Neutrality, the first being an unskilled effort in 2017.¹⁰ In that work, Hooton fabricated large portions of his data and failed to understand what sort of investments he was studying, including one case where he analyzed the effect of Net Neutrality on investment in ports, canals,

and other transportation infrastructure¹¹ and, unsurprisingly, the paper was thoroughly dismissed by the Commission in its *RIFO*.¹²

As detailed in this PERSPECTIVE, Hooton's latest paper is, once again, an exhibition in statistical negligence. While Hooton claims he has found the Holy Grail of investment data, Hooton's chosen measure of capital spending is not capital spending at all. *Capital Expenditures Incurred But Not Yet Paid*—Hooton's measure of investment—is a *credit* entry for accrued expenses.¹³ It does not equal capital spending; it equals, as the name implies, the portion of capital spending incurred in the past to be paid in the future. Since AT&T and Verizon do not employ this account or else did not file data for particular quarters, *capital spending by AT&T and Verizon do not appear in Hooton's sample at all. That is, Hooton's analysis excludes the two largest capital spenders in the nation, if not the world.*¹⁴

Further, Hooton's statistical analysis is as inept as his handling of the data. My review of the econometric model is limited, however, since a lengthy discussion of Hooton's empirical model would be a bit like describing the errors a surgeon might make trying to perform a hysterectomy on a male. Suffice it to say that Hooton measures the wrong thing, at the wrong level, and uses the wrong model.

Hooton's (Incorrect) Measure of Investment

Capital expenditures made by firms, including telecommunications firms, appear in the quarterly and annual filings publicly-traded firms must submit to the Securities and Exchange Commission ("SEC"). The SEC now makes available in a public dataset portions of the financial information contained in these reports (i.e., the 10Q and 10K forms), with entries beginning in 2009.¹⁵ Not all financial accounts are provided in the data and not all firms participate. Still, the SEC data contains large amounts of financial data available to researchers and analysts at no cost.

While Hooton seeks to use the SEC data to quantify the effect of Net Neutrality on capital spending, the SEC data do not permit it. The *Capital Expenditure* account from the Cash Flow Statement is infrequently reported by firms in this data. Most submissions to the data include the broader category of *Net Cash Provided By (Used In) Investing Activities*, which includes Capital Spending and several other accounts.

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Hooton is not deterred, however, and opts to use another capital spending account labeled *Capital Expenditures Incurred But Not Yet Paid*.¹⁶ The definition of *Capital Expenditures Incurred But Not Yet Paid* is exactly what you would expect: a "[f]uture cash outflow to pay for purchases of fixed assets that have occurred."¹⁷ This account is an accrued expense or "an expense incurred but not yet paid; recorded in the accounts by debiting an expense account and crediting a liability account."¹⁸ It is a *supplemental* account rarely reported in 10Q or 10K forms.

Let me explain with a simple analogy: Say you hire a contractor to build a \$2,000 deck on your home. An agreement is made that you will pay the contractor \$1,500 up front and \$500 when the work is finished. You have an incurred an expense of \$2,000, but your bank account balance has not fallen by \$2,000 but only \$1,500, since \$500 is reserved. A bookkeeping entry of \$500 is made to square the difference (in an account that might be called *Capital Expenditures Incurred But Not Paid*). This \$500 entry is not the capital expense, it is a *liability* (an account payable).

Apparently, Hooton made no effort to understand the data he is using. Hooton claims:

the variable *Capital Expenditures Incurred But Not Yet Paid* is a measure of actual capital expenditures and not some other variable,¹⁹

and explains,

The author chose this particular metric since it measures new investment obligations assumed in the current period rather than actualized, previous obligations captured by capital expenditures paid. This paper’s metric offers a previously unexamined and more accurate method for tracking reactionary investment decisions to NN rule changes than current capital expenditures.²⁰

Hooton’s claim the variable measures capital spending is false and his description of the variable is utter nonsense. His chosen account is not a measure of capital expenditure at all but of delayed payment for past obligations. Hooton defines a liability as an expense. Going back to the analogy, the capital expenditure on the deck is \$2,000. Hooton’s approach is to measure investment as \$500—the portion of the capital expenditure withheld for future payment. Similarly, in 2017, CenturyLink spent about \$800 million per quarter on capital equipment, maintaining a balance in the *Capital Expenditures Incurred But Not Yet Paid* of around \$200 million. Thus, Hooton is not quantifying the effect of Net Neutrality rules on investment but on the accrual accounting practices of firms.

Plainly, Hooton failed to take the time to study the data and thus has no clue what his data measures, the benefit of which is that he gets to simply fabricate a description of it. In fact, Hooton’s description is precisely backward: this account does not measure “new investment obligations” but the delayed payment for past investment obligations—a delay that may span many quarters. Hooton is apparently more interested in rebutting the Commission than he is in doing careful research, and those touting his study are so blinded by confirmation bias

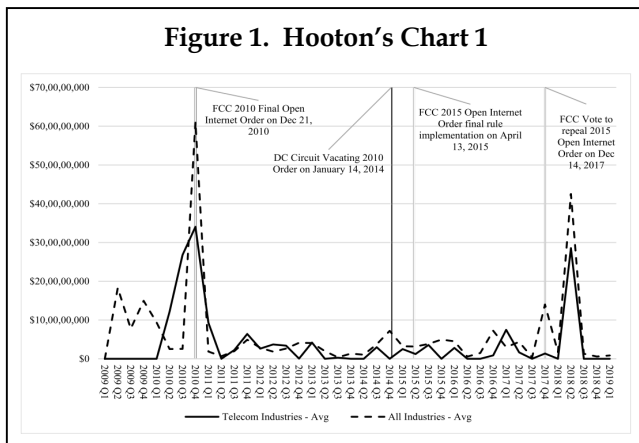
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Further evidence of his ignorance of the data is seen in Hooton’s claim that the “data provide exact dates” of the investment decisions.²¹ Apparently, Hooton believes he has stumbled on data accurate to the day the investment decision is made. Balderdash. Had Hooton bothered to take a couple of minutes to read the documentation accompanying the SEC data, he would know that date provided in the data is the “[period] end date for the data value, rounded to the nearest month end.”²² The date merely indicates the last month of the quarter (the month may vary by firm but is most often March, June, September, and December).²³ The “day” of the date is simply the last date of the month.

While Hooton should have taken the time to understand his data before opining on multi-billion-dollar regulatory policies, his Chart 1 was enough to signal a competent researcher of a problem. The chart is reproduced in Figure 1 above, illustrating the average capital expenditures by quarter for telecommunications and non-telecommunications firms. By inspection, in nearly half of the forty-quarters illustrated telecommunications capital spending is \$0 (or close to it). This is implausible. Also, in two quarters, his measure of “capital spending” jumps from near zero to about \$30 million (or billion, it’s hard to tell from the sloppy graphic), only to return to zero in a quarter or two. This

pattern is not characteristic of capital spending in any sector, much less telecommunications where investments are large and steady.



Another clear signal of a problem is that AT&T and Verizon do not appear in his dataset. That's right. Capital spending by AT&T and Verizon do not appear in Hooton's sample at all. Why? AT&T and Verizon do not accrue capital expenses in quarters they report and are not present in all years of the dataset, yet they invest more than any other firm in the nation.²⁴ The absence of these two firms from the sample would draw the attention of any competent researcher.

Finally, I note that despite numerous attempts, I was unable to replicate Hooton's analysis or even his descriptive statistics using the SEC data. One concern with the data is that the account often contains a running balance, so delayed payments may remain in the account for multiple quarters. How Hooton addressed this issue is unknown.

Statistical Problems

Hooton's study, and his competence as a researcher, is easily dismissed on the data alone. But there are serious problems with his statistical model as well.

First, Hooton claims to use "a standard difference-in-differences model to assess the causal impact of NN rules on

telecommunications industry investment."²⁵ The model is not standard. With panel data, the standard difference-in-differences ("DD") model is estimated as a two-way fixed effects regression (if the dependent variable is not differenced) included a fixed effect for the cross section and a fixed effect for time.

Capital Expenditures Incurred But Not Yet Paid—Hooton's measure of investment—is a credit entry for accrued expenses. It does not equal capital spending; it equals, as the name implies, the portion of capital spending incurred in the past to be paid in the future.

Hooton's data is organized at the firm level, so a *firm-level* fixed effect should be included. Yet, Hooton does not include firm-level fixed effects, choosing instead to use fixed effects for industry sectors. This approach is improper and does not resolve the problem the fixed effects are intended to fix. Also, with firms of varying sizes entering and existing the sample over time, this approach is nearly certain to lead to statistically insignificant results. Indeed, a review of his results reveals almost no statistically significant coefficients; I am not surprised.

Besides the improper modeling of firm-level data, looking at investment at the firm level is itself a mistake. There is no sensible argument that suggests the *average* investment of telecommunications firms will rise or fall in response to Net Neutrality regulation. The effect of the regulation must be measured at the industry level.

Say, for instance, Net Neutrality regulation (or its elimination) increases the entry of new firms into the telecommunications sector. As new firms are smaller, this competitive entry will reduce the average level of firm investment but

will increase industry investment. Entry is good, so a reduction in *average firm* investment is a success, not a failure, and the rise in industry investment provides the correct signal about the benefits of the policy.

Another problem with the model is the failure to include all the treatments in a single regression. Hooton tests the 2010 treatment date in one model, and then the 2015 treatment date in another. He never tests the 2017 rules, despite indicating he would and touting the ability to do so as a benefit of his study. Not including all the treatment dummies in a single model biases the coefficients on the treatment variables.²⁶ When the treatment dummy is excluded (depending on the overlap of the treatment dummies), the data from that period is either averaged into the treated data or averaged in with the untreated data.

Hooton also largely ignores the common trends assumption that must be satisfied (or at least plausible) for the DD model to produce an accurate estimate. The common trends assumption implies that absent the Net Neutrality rules, the difference in investment for telecommunications firms would equal the difference for non-telecommunications firms. That is, the control group is valid. Rather than carefully selecting a control group, Hooton includes all non-telecommunications firms in the control group, which is almost certainly invalid.

Still, I find this to be an interesting choice. In 2017, Hooton criticized my work for using non-telecommunications firms as controls in a model of Net Neutrality and investment, yet he apparently has no problem doing the same today.²⁷ Hooton's study has also been promoted by Free Press, a group likewise critical of my selection of a control group.²⁸ I suppose as long as the model produces the desired result, the model satisfies the research standards of Hooton and Free Press.

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Hooton's treatment group is also excessively broad. While he claims the treatment groups involves "industry network investment," he includes firms such as Discovery, Crown Media Productions, GoGo, Roku, Madison Square Garden, MagicJack, Sebring Software (dental office software), among other firms that not generally considered broadband "network" companies.²⁹

There are other mistakes in the empirical model but considering the data it is hardly worth discussing them. For instance, the inclusion of GDP growth and interest rates could have been avoided with fully saturated time fixed effects (a dummy for each quarter-year pair). Also, his null hypothesis is incorrectly specified.³⁰ No matter how valid the econometric model, the data do not permit a meaningful estimate of the effect of Net Neutrality on investment (or anything else).

Conclusion

Advocates for Title II regulation of broadband services are desperate to prove that the Commission's is wrong on investment effects. In the latest attempt to do so, Christopher Hooton of the Internet Association and George Washington University claims to demonstrate the rules had "no effect" on investment. Hooton's measure of investment, however, does not measure investment at all, but is an accounting adjustment reflecting the occasional disconnect between the purchase of and payment for capital equipment. His description of this measure of investment measure is entirely fabricated, ignoring multiple signals of a data problem.

To describe Hooton's latest work as careless, would be accurate but an understatement. Regulation imposes costs, shifts funds among industry participants, and can harm consumers just as easily as it can benefit them. Net Neutrality is a multi-billion-dollar policy. As such, Hooton's paper amounts to statistical negligence. Even worse, it is not only Hooton's

reputation at stake here but also the journal planning to publish it. To shield the journal from (further) embarrassment, I have shared this document with the editors of TELECOMMUNICATIONS POLICY.

NOTES:

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¹ *Restoring Internet Freedom*, DECLARATORY RULING, REPORT AND ORDER, AND ORDER, FCC 17-166, 33 FCC Rcd. 311 (rel. January 4, 2018).

² For a summary, see G.S. Ford, *Net Neutrality and Investment in the US: A Review of Evidence from the 2018 Restoring Internet Freedom Order*, 17 REVIEW OF NETWORK ECONOMICS 175-205 (2019) (available at: <https://www.degruyter.com/downloadpdf/j/rne.2018.17.issue-3/rne-2018-0043/rne-2018-0043.pdf>).

³ What this strategy ignores is that statistically insignificant results prove very little since they are easily obtained with bad data and careless analysis. The absence of evidence is not evidence of absence, especially when there is strong evidence of presence.

⁴ K. Bode, *Study Proves The FCC's Core Justification for Killing Net Neutrality Was False*, VICE (September 27, 2019) (available at: https://www.vice.com/en_us/article/kz4g9x/study-proves-the-fccs-core-justification-for-killing-net-neutrality-was-false).

⁵ <https://internetassociation.org/team/chris-hooton>.

⁶ <https://gwipp.gwu.edu/christopher-hooton-senior-scholar-non-resident>.

⁷ C.A. Hooton, *Testing the Economics of the Net Neutrality Debate*, TELECOMMUNICATIONS POLICY (article in press) (available at: <https://assets.documentcloud.org/documents/6430695/Net-Neutrality.pdf>).

⁸ Bode, *supra* n. 4.

⁹ *Id.*

¹⁰ C. Hooton, *An Empirical Investigation of the Impacts of Net Neutrality*, Internet Association (2017) (available at: <https://internetassociation.org/publications/an-empirical-investigation-of-the-impacts-of-net-neutrality>).

¹¹ G.S. Ford, *A Review of the Internet Association's Empirical Study on Network Neutrality and Investment*, PHOENIX CENTER POLICY PERSPECTIVE No. 17-09, (July 24, 2017) (available at: <http://phoenix-center.org/perspectives/Perspective17-09Final.pdf>); G.S. Ford, *A Further Review of the Internet Association's Empirical Study on Network Neutrality and Investment*, PHOENIX CENTER POLICY PERSPECTIVE No. 17-10 (August 14, 2017) (available at: <http://phoenix-center.org/perspectives/Perspective17-10Final.pdf>); see also G. Macri, *Net Neutrality Investment Study Used "Corrupted, Made Up Data,"* ECONOMIST SAYS, GOVERNMENT TECHNOLOGY (August 18, 2018) (available at: <https://www.govtech.com/policy/Net-Neutrality-Investment-Study-Used-Corrupted-Made-Up-Data-Economist-Says.html>).

¹² *Supra* n. 1.

¹³ A useful description of accrual accounting is provided here: <https://corporatefinanceinstitute.com/resources/knowledge/accounting/accrual-accounting-guide/>.

¹⁴ M. Mandel and E. Long, *Investment Heroes 2018: Encouraging and Diffusing Innovation Throughout the Economy*, Progressive Policy Institute (February 2019) (available at: https://www.progressivepolicy.org/wp-content/uploads/2019/02/PPI_Investment-Heroes_V6-2.pdf) at p. 4 ("In 2017, AT&T led the field, having invested an estimated \$19 billion in the United States, based on the need to meet growing demand for highspeed broadband and invest in infrastructure to bring 5G wireless online. Verizon came in second in 2017, investing \$15.4 billion.")

¹⁵ The data is available at: <https://www.sec.gov/dera/data/financial-statement-data-sets.html>.

¹⁶ Hooton, *supra* n. 7 at p. 6.

¹⁷ <https://www.calcbench.com/element/CapitalExpendituresIncurredButNotYetPaid>.

¹⁸ *Id.*; R.W. Estes, *DICTIONARY OF ACCOUNTING* (1981) at p. 5; P.D. Kimmel, J.J. Weygandt, D.E. Kieso, *ACCOUNTING, LOOSE-LEAF: TOLLS FOR BUSINESS DECISION MAKING* (2018) at pp. 4-16.

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¹⁹ Hooton, *supra* n. 7 at p. 6.

²⁰ *Id.* at p. 2.

²¹ *Id.* at p. 6.

²² <https://www.sec.gov/files/aqfs.pdf>.

²³ Most firms use the standard March, June, September, and December convention, but not all do.

²⁴ Mandel and Long, *Investment Heroes 2018*, *supra* n. 14.

²⁵ Hooton, *supra* n. 7 at Table 10.

²⁶ By excluding treatments from the model, Hooton has assumed no effect (that is, by the exclusion, he assumes the coefficient is zero).

²⁷ Hooton (2017), *supra* n. 10 at p. 6.

²⁸ See *supra* n. 4; G.S. Ford, *In Response to Criticisms of Phoenix Center Research on Net Neutrality*, @LAWANDECONOMICS BLOG (September 14, 2017) (available at: <http://www.phoenix-center.org/blog/archives/2250>).

²⁹ Author's analysis of the data. Hooton defines the treated group as those with SIC Codes of: 4812, 4813, 4822, 4841, 4899, 4822, 4841, 4899, and 4375.

³⁰ The null hypothesis tested is one of "no effect" and not a "decrease in network investment." Hooton, *supra* n. 7 at p. 6-7.