

## Review for Beyond Horizontal and Vertical: The Welfare Effects of Complex Integration

The authors present a model of demand for downstream goods and supply by an arbitrary market structure of downstream sellers and upstream suppliers. The model is used to analyze mergers where the parties have different types of vertical relationships: for example, a horizontal merger when one of the parties is vertically integrated.

The contribution I see in this paper is twofold. First, it provides a comprehensive discussion of economic intuition for various merger settings when both vertical and horizontal concerns are present. Second, it provides simulation evidence for the distribution of welfare effects that regulators/academics should expect from different mergers. Importantly, in many of the mergers analyzed, the EDM benefit of vertical mergers is not large enough to outweigh anti-competitive forces.

Overall, I like this paper and I think this could appear in graduate syllabi as a reference for vertical modeling – there are lots of modeling results in a single place, which is extremely useful. I have some comments which I hope maximize the impact of the paper.

1. I hope that the authors provide the code so that researchers can (a) run their own simulations and (b) use the code for their own research. The authors should follow the AER/ReStud guidelines that are becoming standard in the profession (<https://aeadataeditor.github.io/aea-de-guidance/preparing-for-data-deposit.html>). Basically, make the code easily readable and post it to a code/data archive website like Zenodo (and link to it from the author's webpage and the paper).

Note: Footnote 16 states that the antitrust R package contains the code to do the simulations. I could not easily find the relevant parts of the package. It would be great if this machinery was also added to antitrust, but I would like to see a stand-alone replication package.

2. I think the authors could ditch the Republic/Santek example. The authors admit that the example is for “illustrative” purposes. Instead of a single example, the authors could choose a few representative mergers and look at specific fake data that mimics those cases. Eg. many upstream and few downstream or vice versa.

3. There is one thing I really like about Section 4: the comparison between a naive merger analysis (eg. downstream/upstream horizontal effects only) and the more comprehensive analysis that includes all of the vertical effects. I would like to see this type of analysis in Section 3.

4. I think that the authors overclaim a bit. In the abstract (and this sentiment is repeated in the paper, for example on page 2) the authors: “In our model, we find that mergers with both horizontal and vertical characteristics typically harm consumers.”

First, I think the more important contribution is to point out that a naive analysis that ignores the vertical aspect of a merger can mis-quantify the effects of the merger (see point 3 above) or that the EDM benefits are typically small (a point already made).

Second, mergers arise in nature (and are prosecuted) endogenously. The median pre-merger HHI in the simulations is between 2800 and 4300 and the median Delta HHI is over 1000. Most of the mergers analyzed would be presumed harmful based on the classic Cournot intuition or the more recent Nocke/Whinston intuition. I think the authors should avoid statements like in their abstract that make it seem they are drawing generic conclusions about merger enforcement.

### **Smaller Comments**

5. Table 1: It seems a bit suspicious that the price quantiles are all integers. Maybe I am missing something, but the domain should be some subset of the real number line, making integers very unlikely.
6. Simulation details. I don't understand why shares are drawn from a Dirichlet distribution (or any distribution). Shares are endogenous functions of model primitives. Do you mean that you sampled  $\delta$  from a distribution?
7. Simulation details. It might make more sense to calibrate  $\alpha$  to a market elasticity (for example -1) instead of the way it is done in the paper.
8. It might make sense if a retailer and manufacturer had meaning in the model. One suggestion is to have  $\delta$  be comprised of two components, a manufacturer effect, and a retailer effect, where the retailer effect is perfectly correlated across manufacturer products within a retailer, and the manufacturer effect is perfectly correlated across retailer for the same product. So something like  $\delta_{rw} = \delta_r + \delta_w$ .
9. In Section 2.2 (first paragraph), referencing a particular retailer with index  $r$  is confusing because  $r$  is the generic index for a retailer.
10. In Equation 4, I think there is an additional effect in the first term that Luco and Marshall (2020) would call the *Edgeworth-Salinger* effect.
11. The authors mention on multiple occasions that a retailer could cease to trade with a wholesaler (eg. page 8). I don't see how this is a possibility in the model.
12. I don't think "Vertical" and "Horizontal" need to be quoted in the title.