Whither Merger Simulation?

David Scheffman

LECG

and

Owen Graduate School of Management

Vanderbilt University

Where Does My Perspective on Merger Simulations Come From?

- As a young economist I did a lot of work on both econometric models and theoretical models

- I taught modeling to Economics Ph.D. students

- My "formative" years were when computing power was very scarce
    - You learned to think carefully about the data you were using and how to use it/what modeling, *etc.*

- Spending last 14+ years as an MBA professor of business strategy and marketing and as a business consultant reinforced for me the importance of the institutional details and facts in analyzing any situation

- Many years at FTC and "outside" assessing potential competitive effects of mergers has convinced me that this is a complex highly fact intensive exercise

Models

- Models can be useful – sometimes very useful

- Models by their nature cannot incorporate "all" of reality

- Modeling is an "art" – the analyst has to determine whether the model incorporates "enough" of reality to be useful for the task at hand

- Economists' "beef" is that lawyers use "models" in making their assessment of mergers – but that they generally do not articulate their models sufficiently, at least in economic terms, for an economist to determine what the model is and what are its critical assumptions

Models

- In most mergers we investigate we don't have a formal economic model to predict merger effects

  - That does not mean that we don't use economic analysis

  - We just don't put forward a simple (to economists) analytical model that we think captures the potential effects of the merger

- Why is it that when we say "differentiated products" all of a sudden we have a simple and seemingly powerful model?

  - Consumer products industries are <u>more</u> complicated than the typical industrial products industries that are lion's share of merger investigations

    - Branding, consumer A&P, etc.

    - Dealing with retailers, shelf space, placement, promotions, *etc.*

  - The main data we use is aggregation of <u>consumer-level</u> data

Models

- In some situations the specifics of market participants' actions and interactions are not very important

    – For example, we do not need to model idiosyncrasies of every wheat farmer in modeling the wheat market

    or the idiosyncrasies of each consumer in modeling the consumer demand for consumer products

    (because, in part, there are large numbers and idiosyncrasies "average out")

- It is <u>possible</u> that a relatively simple model of economic <u>equilibrium</u> "explains" the <u>outcomes</u> of competition even though the modeling is inconsistent with apparently important features of actual competition BUT THIS CANNOT BE ASSUMED WITHOUT "TESTING"

- There is not enough published empirical literature to make a convincing case that Bertrand equilibrium "explains" real world markets "generally" or in any specific situation

Models

- However, in some situations the specifics of market participants' actions and interactions might be very important

  - We only investigate mergers in industries with a small number of major competitors

  - Those competitors recognize that what they do affects the market and may stimulate responses from other market participants

    "In a game, there are several decision makers, and the expectations players have about opponents [other participants] play are not exogenous." (Fudenberg & Tirole, *Game Theory*, p. 8).

  - Some competitors may believe and act on the belief that they can gain sales at the expense of specific competitors

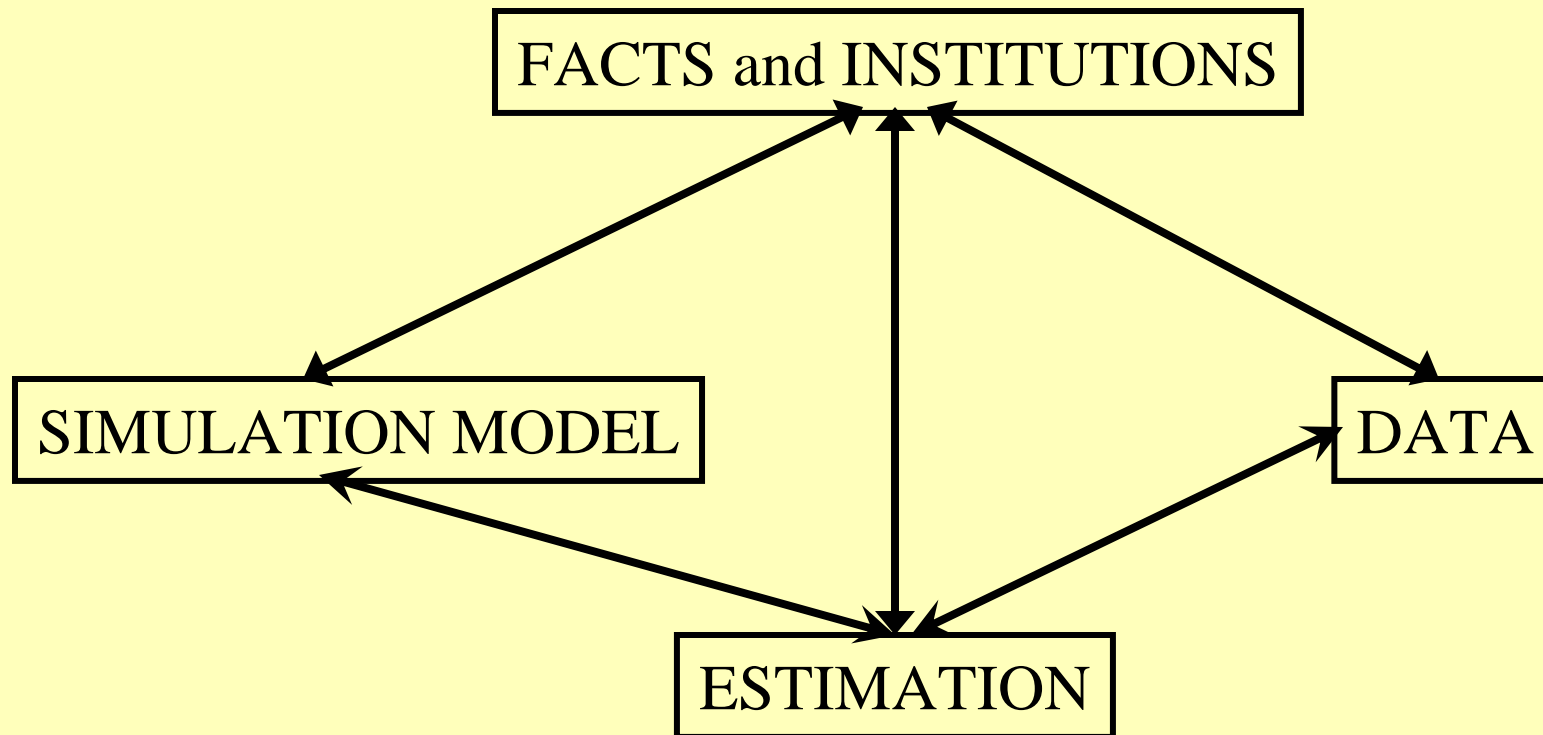 - Customers (*e.g.*, retailers) may be important players in the game

Models

– Thus, it is possible that the specifics of participants' strategies and actions and the interactions of market participants and the specifics of the competitive process might be quite important in understanding the competitive process and in assessing the potential effects of a merger

– Specifically, it is "not right" to infer competitor conduct based on estimates of demand elasticities (particularly <u>consumer</u> demand elasticity) and costs without checking the "facts" to see if it is sufficiently "accurate" (*i.e.,* "explains" market outcomes)

Complexity

- Merger Simulation, in terms of the economics is pretty straightforward

- But Merger Simulation involves lots of interrelated assumptions and hypotheses that as a matter of statistical inference make assessing the reliability of the model's predictions' very complex

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Complexity

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The complexity is in trying to identify key facts/ assumptions and determining what difference they might make

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Complexity

- This complexity also exists without using a simulation model – *i.e.* in the way the lawyers analyze mergers

- The model might be able to clarify what are important facts/assumptions

- But the model introduces additional sources of complexity
  - Assumptions that might be difficult to "track" against facts
  - Assumptions that it might be difficult to assess the importance of which to the "results"

Conclusion

- Merger Simulation is a Tool – It is NOT an "Answer"

- **Merger Simulation is not a substitute for Thinking and assessing the TOTALITY of the institutional setting and the facts**

  - **At best is a tool for assessing the net effects of the totality of the institutional setting and the facts**

- Use of Merger Simulation requires sound theory and data analysis

- Like any modeling of basically complex situations, Merger Simulation is an "Art"

Game Theory and Bertrand Model

- The Bertrand model used in the Merger Simulation model is a particularly simple game theory model (the Bertrand model was originally published in 1883)

- The strategies of the competitors in the simple Bertrand game are to choose a single price ("normally" a strategy – in a multi-period setting - is an action taken contingent on all players' [in our context, competitors and customers] past actions, and may be based on conjectures about what competitors/customers do in reaction to "your" actions)

- For example, another old oligopoly model is the Stackelberg duopoly model, in which one duopolist uses the knowledge of its competitor's strategy as an input into its strategy.

Game Theory and Bertrand Model

- "The fact that Nash equilibria pass the test of being consistent predictions does not make them good predictions, and in situations it seems rash to think that a precise prediction is available. By "situations" we mean to draw attention to the fact that the likely outcome of a game depends on more information than is provided by the strategic form [the payoff functions, strategic choice possibilities, etc.]."
(Fudenberg & Tirole, *Game Theory*, p. 13).

Game Theory and Bertrand Model

- Bertrand model is static/one shot game. Presumably, if it is useful it, at best, describes some sort of long run equilibrium of a dynamic game, for example players follow some sort of "adjustment process" that converges to some sort of equilibrium. But:

"Thus, even assuming that behavior follows some sort of adjustment process does not imply that play must converge to a Nash equilibrium. And the adjustment processes [discussed earlier] are not compelling as a description of players' behavior. One problem with all the processes we have discussed so far is that the players ignore the way their current action will influence their opponents [and customers] actions in the next period. That is, the adjustment process itself may not be an equilibrium of the "repeated game" where players know they face one another repeatedly."
(Fudenberg & Tirole, *Game Theory*, p. 26).

Issues With Bertrand Model

- Manufacturer vs. Retail

  - Who are the game participants?

  - How can you leave out large retailers?

- Bertrand does not capture typically important features of competition and institutional setting – particularly for branded consumer products

  - Non-price competitive instruments

    - Advertising, distribution and packaging ("Positioning")

    - New Product Introductions (increasingly important)

    - Line Extensions (increasingly important)

- Brand managers maximize profits – but profit maximization may be more complex than it is modeled in Bertrand

More on Bertrand

- "All" there is to Bertrand model is the change in apparent *incentives* of the merged entity to price appropriately for the cannibalization between its own competing brands.

- There is no role for "*Real World Competition*" in Bertrand model

  - No role for "real" marketing and sales

  - No competition "for" retailers

    - Shelf space, placement, promotions, advertising

  - No "competition" for consumers

- In every business consulting project with a consumer products company I have been involved in, a key if not paramount issue was how were competitors, retailers, and consumers going to react

More on Bertrand

- As a matter of formal economics <u>there is "no" competition (even w.r.t. price) in the Bertrand model</u>
  - Each competitor takes the external environment as given and maximizes short run profits
    - Bertrand actually is a "reduced form monopoly model" in which the equilibrium condition requires the consistency of the individual reduce form monopoly decisions
  - Competitors do not take into account that when they change their price that their competitors will probably react
    - **The basic *strategy* of a Bertrand competitor is the same if he has 100 competitors as if he has 1 competitor**

- **Real world competition in consumer products markets can be significantly more or less "competitive" than indicated by Bertrand**
  - **One example is RTE Cereals industry in 1970s vs. today**

Competition *"vs."* Bertrand

- **The** economic issue is whether the competition between the parties to the merger makes their prices lower than if they did not compete

- Bertrand model focuses on *incentives* to internalize "cannibalization"

- Bertrand is an input into the **The** economic issue

- Bertrand is not and cannot be **The** answer

- We need more focus by economists on **The** economic issue

"Problem"

- There are no obvious implementable formal models of differentiated products competition other than Bertrand

- This makes it hard to "test" the Bertrand assumption because: test against what?

- However, some testing can and SHOULD BE done

  - Lerner equation

  - Do changes in costs have the predicted effects on prices?

  - Do other "shocks" (entry and exit, new product introductions and line extensions) have predicted effects?

  - Is there volatility in shares? Is it explainable by Bertrand?

  - Are market share objectives "consistent"?

  - What can be determined about the importance of non-price strategies/tactics?

A Good Merger Simulation Will:

- Firmly place the Merger Simulation in the institutional setting and key facts

- There should be "testing" of the Simulation Model as indicated in preceding slide

- Be able to explain why any inconsistencies with apparently important facts do not materially change conclusions

- Conduct insightful Sensitivity Analyses (in Business School jargon, sensitivity analyses and scenario analyses)