CPI COMPETITION POLICY INTERNATIONAL

CPI Antitrust Chronicle
June 2013 (1)

The Consensus Among Economists on Multisided Platforms and the Implications for Excluding Evidence That Ignores It

David S. Evans
Global Economics Group

www.competitionpolicyinternational.com

The Consensus Among Economists on Multisided Platforms and the Implications for Excluding Evidence That Ignores It

David S. Evans[1]

I. INTRODUCTION

Multisided platforms create value by bringing two or more different types of economic agents together and facilitating interactions between them that make all agents better off. These platforms play critical roles in many economically important industries. There is considerable material on this subject; Richard Schmalensee and I have provided a survey[2] of the economics literature on multisided platform literature, as of 2012, with particular emphasis on antitrust applications.

This note draws out some of the implications of that literature for the reliability of economic models, tools, and theorems that have been commonly relied on in antitrust analysis. It makes seven key points, each of which is elaborated on below.

1. There is a well-developed, non-controversial, peer-reviewed economics literature on multisided platforms.
2. The fundamental defining characteristic of multisided platform businesses is that they supply multiple customer groups and that the demands of these customer groups are interdependent.
3. It is now well accepted among economists that a number of economically significant industries are based on multisided platforms.
4. Economic models that account for interdependent demand among customer groups yield profit-maximization conditions that differ, in significant and important ways, from economic models that do not account for such interdependent demand.
5. There is no reason to assume that models that do not consider interdependent demand apply to multisided platform businesses where such interdependent demand is important.
6. Many economic theorems, tools, and models that are routinely used in antitrust analysis are not reliable, at least not without explicit modification, to account for interdependent demand.

---

[1] Chairman, Global Economics Group; Lecturer, University of Chicago Law School; Executive Director of the Jevons Institute for Competition Law and Economics, and Visiting Professor, Faculty of Laws, University College London. I would like to thank Howard Chang, Steven Joyce, and Richard Schmalensee for very helpful comments on an earlier draft. This note is based on my remarks I made at the ABA Section of Antitrust Law Spring Meeting, April 10, 2013, in Washington, DC.

[2] David. S. Evans & Richard Schmalensee, *The Antitrust Analysis of Multi-Sided Platform Businesses*, OXFORD HANDBOOK ON INTERNATIONAL ANTITRUST ECONOMICS (Roger Blair & Daniel Sokol, eds., forthcoming) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2185373.

7. Economic analysis of antitrust issues that fails to account for interdependent demand for multisided platforms—either by explicitly considering this demand in the models relied upon or by accounting for possible biases from not doing so—is not reliable and should not be given weight by courts or competition authorities.

The last point has obvious implications for considering Daubert motions concerning economic experts in cases involving multisided platforms.

II. THE PROFESSIONAL CONSENSUS AMONG ECONOMISTS ON MULTISIDED PLATFORMS

In the survey I referred to above, Schmalensee and I identified more than 200 articles as of the end of 2012 concerning multisided platform businesses. Many of these articles were published in peer-reviewed journals, including such leading journals in economics as *The American Economic Review*, *Rand Journal of Economics*, and *Journal of the European Economic Association*. The authors of these articles hold teaching positions at some of the world's leading institutions of economic learning, including Harvard University, The Massachusetts Institute of Technology, Oxford University, the Toulouse School of Economics, and The University of Chicago.

We did not find any significant economic literature that argued there were theoretical or empirical failings in the basic multisided platform framework. Unlike, say, macroeconomics or behavioral economics, there is no serious controversy among economists. At this point, the multisided platform analysis is well within the economic mainstream.

III. BASIC CHARACTERISTIC OF MULTISIDED PLATFORMS

Multisided platforms arise when it is possible to create value by coordinating the demands of multiple groups of customers. That value arises because there are positive demand externalities. The quantity demanded by at least one type of customer depends positively on the demand for the other type of customers.

This demand relationship could arise from two types of externalities. The first is a usage externality where both types of customers benefit when the platform intermediates a relationship. A restaurant and a diner both benefit when each of them agrees to use the same online reservation platform. The second is a membership externality where the value received by one group is a positively increasing function of the number of members (or some other measure of the quantum of aggregate value) in the other group. Membership externalities involve the well-known phenomenon of positive indirect network effects. Each restaurant benefits when it can access more diners who want to make reservations; each diner benefits when it can access more restaurants to make reservations at. Finally, multisided platforms can have both sources of externalities—usage and membership.

These demand externalities that give rise to multisided platforms are subtle. They do not necessarily result from the existence of strictly increasing positive indirect network effects between both customer groups. Of course, multisided platforms could arise in this situation. That is probably the case with software platforms like Android where users value having more applications and application developers value having more users.

However, multisided platforms can also create value when one side benefits from more demand on the other side but the other side does not benefit or would even prefer less demand from the other side. Such asymmetric positive indirect network affects apply to some advertising-supported media platforms. In many cases consumers dislike advertising or dislike too much of it. Moreover, multisided platforms can create value when there are decreasing (and potentially negative) returns to the positive indirect network effects perhaps because of congestion. That is probably the case with shopping malls.

Finally, to obtain the key economic results concerning multisided platforms it is not necessary that the utility of agents in either group increase with the participation of agents in the other group. That is the case with usage externalities.

IV. MULTISIDED PLATFORM INDUSTRIES ARE A SIGNIFICANT PART OF THE ECONOMY

Whether a business serves multiple interdependent types of customers is usually obvious from inspection. As a result it is apparent that a number of industries are based on multisided platforms. Broad categories that have been discussed extensively in the multi-sided platform literature include:

- advertising-supported media,
- communication platforms,
- financial exchanges,
- matchmaking businesses,
- payment systems,
- shopping malls, and
- software platforms.

It is clear from the list of industries above that a significant portion of the economy involves multisided platforms. Many of the key businesses in the internet-based and smart-mobile device based economy are multisided platforms.

Economists now recognize the importance of the multisided platform framework in analyzing platforms and competition among platforms in these industries. In fact, in some cases a specialized literature has emerged using the multisided platform framework to analyze behavior in individual industries. In particular, there are extensive peer-reviewed literatures on advertising-supported media and payment card systems. It is unlikely today that a serious journal in economics would publish an article on advertising-supported media or payments systems that ignored the multisided platform aspects of these industries.

The above list of industries is not exhaustive. It is likely that further research by economists will identify other industries in which platforms are the central economic actors.

V. PROFIT MAXIMIZATION FOR MULTISIDED PLATFORMS CAN RESULT IN PRICE LESS THAN MARGINAL COST

In a traditional profit-maximization problem, the firm solves for the profit-maximizing price given the demand functions of a group of customers. In models involving price discrimination it is possible to choose profit-maximizing prices that account for differences in demand between individuals or groups of individuals. However, these demands are not interrelated.

In the case of multisided platforms the firm solves for the profit-maximizing prices given the interrelated demands of two or more groups of customers. This results in a set of simultaneous equations that, roughly speaking, correspond to marginal revenue equaling marginal cost for each group taking into account impacts on the demands of the other group(s). The simultaneity is a direct result of the dependence of demand by members of one group on the demand by members of another group.

There are three noteworthy consequences of interdependent demand:

1. The profit-maximizing long-run equilibrium price to one group of customers can be less than marginal cost and, indeed, zero or less than zero (for example, by providing reward points). Roughly speaking, a platform may be able to maximize profits by subsidizing the use of the platform for one group of customers and earning revenue from another group of customers that wants access to the first group. This can be an important confirmation of the multisided platform framework.

   The lesson to be learned is that the longstanding principle of microeconomics and antitrust that the long-run equilibrium profit-maximizing price is greater than marginal cost does not apply in theory—or in fact—to a significant portion of businesses in the economy. It is hard to overstate the importance of this theoretical and empirical result and its ramifications for antitrust economics.

2. The statement above for profit-maximizing prices is true for social-welfare maximizing prices. That is, a social planner could choose to establish long-run prices of less than marginal cost including zero or less than zero to one group of customers in order to maximize social welfare. As such, the result that price to one side can be less than marginal cost, including zero or less than zero, does not reflect a market failure. In general, of course, as is the case with single-sided firms, the profit-maximizing firm would not necessarily choose the same relative prices for the various sides as the social-planner would.

3. Business practices, regulatory interventions, or other perturbations that affect one group of customers can have indirect effects on the other groups of customers as a result of interdependent demand. A cap that lowers the prices charged to one group of customers would typically increase the prices charged to the other group of customers unless those prices are capped too. Like Siamese twins it is not really possible to separate the customer groups.

Some of the earlier literature on multisided platforms suggested that this skewed pricing structure results from businesses using low prices to get a group of customers on board the

platform during the startup phase, and that it is not necessary to continue these low prices in long-run equilibrium. For example, with payment cards some economic and legal commentators have argued that interchange fees might be needed during the startup stage of payment card systems but are not needed for mature systems that have gained high degrees of penetration.

In fact, the skewed pricing structure, and the possibility that one group of customers will be charged a price that is less than the marginal cost of serving them, results from static profit maximization in the face of interdependent demand. A price that is less than marginal cost could result even if there are no membership externalities or if membership externalities are exhausted at the long-run equilibrium output.

VI. MODELS WITH INDEPENDENT AND INTERDEPENDENT DEMAND ARE NOT EQUIVALENT

Formal economic models of firm profit-maximization that assume that consumers have independent demands yield different results than otherwise identical economic models that assume that consumers have related interdependent demands. This result is not surprising since the mathematical structure of the independent and interdependent demand models are very different.

The consequence of these different assumptions is most apparent in the relationship between profit-maximizing prices and marginal costs discussed above. With independent demands the long-run equilibrium profit-maximizing price is necessarily greater than or equal to marginal cost. With interdependent demands the long-run equilibrium profit-maximizing price is not necessarily greater than or equal to marginal cost. And, as a matter of empirical fact, as noted above we know that that the price on one side is often lower then marginal cost.

Although these independent and interdependent demand models are not mathematically equivalent, it is possible that they can result in the same qualitative conclusions. It is also possible that they can result in dramatically different qualitative conclusions as with the price-cost relationship. Unfortunately, the only way to know for sure whether the results obtained under the assumption of independent demand also hold under the assumption of interdependent demand is to do the math. That is easier said than done since the interdependent demand (multisided platform) case is often much more challenging mathematically and empirically than the independent demand (single-sided business) case.

VII. THE POTENTIAL UNRELIABILITY OF SINGLE-SIDED MODELS FOR MULTISIDED PLATFORMS

As discussed further in my survey with Schmalensee, the economics literature to date has shown that a number of the standard economic models, theorems, and tools that are relied on in antitrust do not apply to multisided platform businesses without significant modification. To highlight the seriousness of this problem consider the excellent survey[3] by Kaplow & Shapiro of antitrust economics which brings together many of the key formulas that underlie antitrust

[3] Louis Kaplow & Carl Shapiro, Antitrust, Harvard Law and Economics Discussion Paper No. 575 (January 2007), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=961264.

analysis. Virtually all of those formulas are wrong when applied to multisided platforms because they are based on profit maximization by firms facing independent demand by customers.

The following is a not necessarily complete compendium of known and well-documented problems with applying results based on single-sided analysis to multisided platforms:

- The Lerner Index based on the elasticity of demand for a single group of customers does not hold.
- The SSNIP test is wrong conceptually when applied to one group of platform customers.
- Critical loss formulas based on diversion ratios and estimates of the elasticity of demand for a single group of customers are wrong.
- Estimates of structural models are biased if the econometric model specified does not consider the demand interdependencies.
- The upward pricing pressure formulas derived for single-sided firms are wrong for multisided platforms.
- Price less than marginal cost for one group of customers is consistent with non-exclusionary profit-maximizing behavior.
- The conditions under which a tie could exclude competition found by traditional models do not apply.

There are many other areas where the standard results of economic models may not apply because of the failure of the assumptions of those models. In many of the cases above the multisided platform literature has derived extensions of single-sided formulas to the multisided platform context. Unfortunately, many of the simple formulas used for "back of the envelope" calculations turn out to be quite complicated for multisided platforms and require much more information to implement. Generally, following on the earlier discussion concerning non-equivalence, any formal economic model that is based on independent demand will not necessarily provide the correct results for platforms that face interdependent demand.

Of course, there are many situations in which it would be reasonable for economists to consider the simple case of independent demand because the nature of the issue being analyzed is such that it is unlikely that considering interdependent demands would alter the basic conclusion or insight. Many of the findings of the industrial organization literature apply equally to multisided platforms as to single-sided businesses.

The key point is that when economists examine issues involving multisided platforms it is incumbent on them to ensure that they do not rely on models, tools, theorems, or results that are likely affected by the existence of interdependent demand. Standard results are particularly dubious when they depend closely on the structure of demand.

VIII. THE UNRELIABILITY OF SINGLE-SIDED ANALYSIS WHEN APPLIED TO MULTISIDED PLATFORMS

As a result of the work that economists have conducted since 2000 we can now rely on a well-developed theoretical and empirical literature on multisided platforms. This literature provides considerable guidance for how to conduct the economic analysis of multisided

platforms. It has also documented fairly exhaustively that economic models that do not account for interdependent demand of customer groups do not necessarily provide reliable results for multisided platforms.

Put most simply, in applying formal economic models based on independent customer demand to businesses based on interdependent demand there are mathematical errors that can render these models unreliable. This inconsistency is potentially as serious as finding a major estimation bias in an econometric model or a major error in a calculation for a spreadsheet.

While the result that traditional models may not be applicable to multisided platforms is inconvenient in practice, it is not controversial among professional economists. Consequently, economic evidence that fails to account for interdependent demand between customer groups of multisided platforms is not reliable and should not be accorded any weight in decisions by courts or competition authorities. In the United States, at this point in the state of the multisided platform literature, there are sound grounds for parties to pursue Daubert Motions against economists who apply single-sided economic tools to multisided platform problems and do not acknowledge and evaluate the biases that result from doing so.