Market Definition and Merger Analysis for Multi-Sided Platforms

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This paper provides a brief progress report on market definition and the analysis of mergers for multi-sided platforms. It provides an update to an earlier article on multi-sided platform market definition. (For an overview of multi-sided platforms including the antitrust analysis of these platforms see Platform Economics.)

Market Definition

The literature on multi-sided platforms has examined three issues related to market definition.

The first concerns the consequences of applying analytical tools that were developed for single-sided firms to defining markets for a product offered on one side of a multi-sided platform. Evans and Noel show that the failure to consider positive feedback effects in demand can result in significantly overstating or understating the breadth of the market, depending on the analytical approach. Consider the simple hypothetical monopolist test. Suppose a small but significant, non-transitory price increase is profitable on one side under the assumption that nothing changes on the other side of the platforms included in the hypothetical monopoly. Therefore one could conclude that the products considered constitute a relevant antitrust market. However, a price increase on one side results in a reduction of demand by customers for that side and, through positive feedback effects, a reduction in the demand for the other side; the decline in demand on the other side further reduces the demand on the first side. Consequently, one might conclude after considering the positive feedback effects that the price increase is unprofitable. In that case the market is defined too narrowly. One can identify other techniques, such as those involving critical loss analysis, which when applied to a single side of a multi-sided platform would result in defining markets too broadly. The key point is that it is wrong as a matter of economics to ignore significant demand interdependencies among the multiple platform sides.

The second issue concerns determining cases in which it is possible to adapt existing tools for market definition to multi-sided platforms. A special case is when the two sides are tied together in a fixed proportion. It is then possible to define a composite price that is equal to the sum of the prices that each customer side pays. The analyst can in principle conduct the SSNIP, critical loss, and Lerner-type market power analysis using this composite price. In the case of a critical loss analysis the Lerner-based elasticity of demand would be based on the composite price and the composite marginal cost of providing the service to the two sides. Emch and Thompson proposed this approach to payment cards. The composite price includes the fees charged to merchant acquirers for each

transaction (a network fee plus an interchange fee they pay) and the fees charged to issuers for each transaction (a network fee minus the interchange fee which they paid). The US Department of Justice adopted this approach in a case involving payment cards.

Many multi-sided platforms do not, however, provide services that are consumed in fixed proportions by the multiple sides. For example, in the case of mobile software platforms software developers are provided access to users while users are provided access to applications. Often, multi-sided platforms charge access fees, such as a subscription fee for media or a membership fee for an exchange, and engage in other complex nonlinear pricing that makes it difficult to determine a composite price. Unfortunately, it has not proved possible to find simple back-of-the-envelope approaches for market definition for general multi-sided platforms.

The third area involves developing general tools that can be used for assessing market definition for multi-sided platforms. These generally involve econometric models that explicitly account for interdependencies in demand between the various platform sides. To date, these models have been developed and deployed entirely in the context of mergers, as discussed below in the context of unilateral effects.

Unilateral Effects of Multi-Sided Platform Mergers

There are four general points to be made here.

First, the "off-the-shelf" analytical tools for assessing unilateral effects from mergers between one-sided firms are wrong insofar as they fail to account of interdependencies in demand among the multiple sides. Unfortunately, the multi-sided extensions of the single-sided tools used for back-of-the-envelope calculations of unilateral effects result in complex formulae that require estimates that are not likely to be readily available to the analyst. For example, Affeldt and her coauthors show how the UPP analysis introduced by Farrell and Shapiro and subsequently included in the 2011 Horizontal Merger Guidelines, must be modified to account for indirect network effects in analyzing mergers of two-sided platforms. The formulas become a good deal more complex because a change in any one price affects all four quantities. To do a complete UPP analysis of a merger between two two-sided platforms, six diversion ratios must be estimated. These necessarily include estimates of indirect network effects.

Second, in some cases it is at least theoretically possible for a merger of two-sided firms to result in price reductions to both sides even in the absence of efficiency gains. In the Chandra and Collard-Wexler model of a two-newspaper market, the main initial effect of a merger is that if a price increase of one paper causes a reader so switch papers, she is not lost to the merged firm. The way the model is set up, the first reader to switch away is always the least profitable for that paper. In fact, both newspapers, which cannot price discriminate, could well be losing money on their marginal readers at their optimal pre-merger prices. In this case, the fact that a post-merger price increase would cause that marginal reader to switch to the firm's other paper and drag its profit down means that increase and would drag its profit down then means a post-merger price increase would reduce profits. As a matter of calculus it follows that a post-merger reduction in subscription prices at both papers would increase profits. Because consumers' propensity to subscribe to either paper is assumed to be correlated with their attractiveness to advertisers at that paper, these price cuts bring in subscribers who lower the average attractiveness to advertisers, thus making a lower per-subscriber advertising rate optimal.

As this discussion indicates, this particular result depends on a number of special assumptions and even then whether prices go up or down depends on the values of particular parameters in this model. This model is certainly not generally applicable. But it remains to be seen whether the possibility to which it points—a platform merger lowering profit-maximizing prices to both sides even without efficiency gains—is also present in other models that are descriptive of other market settings. In the absence of further study, one must conclude that it appears possible that some mergers of multi-sided firms can lead to price cuts on all sides of the market even in the absence of efficiency gains—something that is simply impossible for mergers of single-sided firms. Although this possibility may turn out to be a very rare occurrence, its existence emphasizes once more that analysts need to consider the multi-sided aspects of mergers carefully and avoid mechanical analysis of multi-sided mergers with traditional one-sided tools.

Third, all else equal merger of multi-sided platforms would ordinarily increase indirect network externalities by increasing the size of all customer groups and thereby provide offsetting efficiency benefits. There is no similar presumption in the case of mergers of single-sided firms. To evaluate the impact of the merger on consumer (or social) welfare analysts need to assess the value of these externalities. It is particularly important to do so since price could increase to consumers on one or more side because the value consumers are receiving on that side has increased as a result of positive externalities.

Fourth, to evaluate the impact of a merger of multisided platforms on consumer (or social) welfare it is necessary to consider the impact of all sides. A merger could benefit consumers on one side but harm those on the other side and the net effect of the merger across all customer groups could therefore be positive or negative. Suppose, for instance, that Open Table proposed a merger with a competitor and that it is determined that the merged firm would likely increase prices to restaurants. It does not follow that the merger is undesirable, however. Restaurants would likely have access to more consumers, and that might more than make up for the price increase. And if restaurants single-home and the merged firm does not take the radical step of charging consumers to make reservation, consumers are clearly better off: they still face a zero price and can access more restaurants on a single platform.

Newspaper and Magazine Mergers

A number of empirical papers on multi-sided platform mergers have considered newspapers and magazines for which extensive data are available. This literature provides support for many of the points made above.

Chandra and Collard-Wexler conduct a reduced-form examination of the effects of the consolidation of the Canadian newspaper industry in the late 1990s on prices charged to consumers and to advertisers. They find no evidence that mergers let to increases in either price, contrary to expectations derived from one-sided models, and they interpret this as consistent with their theoretical model discussed above.

Several authors have evaluated the effect of newspaper and magazine mergers on prices and welfare by developing and estimating structural models of these platforms that account for the possible demand interdependencies between the two sides. Both Affeldt et al and Fillistrucchi et al use detailed econometric models of the Dutch newspaper market, and they study how taking account of two-sidedness affects the evaluation of hypothetical mergers. Affeldt et al find that when two-sidedness is ignored, the estimate of upward pricing pressure on advertising is essentially zero, while substantial upward pressure on advertising rates when account is taken of two-sidedness.

Filistrucchi et al find similar results with a SSNIP test and a full simulation of the post-merger equilibrium: taking into account two-sidedness reveals potential unilateral effects on the advertising side that do not show up in analysis that ignores indirect network effects. These authors conclude that the estimated effect on price is smaller when the two-sided nature of the business is accounted for than when it is not. That result is expected, as Evans and Noel pointed out, the new owner would increase price less after taking into account the impact that higher prices on one side would have on the demand from the complementary side and therefore overall profits.

Fan develops a structural model of newspapers that considers the value of characteristics to readers and advertisers and the possibility that the owners could change these characteristics following a merger. She estimates the model for newspapers in Minneapolis and finds that a hypothetical merger increases subscription prices, lowers the quality of content from the readers' perspectives, reduces circulation, and lowers the value that advertisers receive. Given that multisided platform businesses typically offer a variety of services to attract economic agents to the platform, analyses such as Fan's that consider the impact of mergers on non-price dimensions are likely to prove important in practice.

Finally, Song estimates a structural model of German TV magazines that ignores two-sidedness and one that takes it into account. He simulates a merger to monopoly in this market and concludes that this drastic merger would be much less harmful than an analysis that ignores two-sidedness would conclude. For many magazines he estimates that the merged firm would lower the per-copy price, making consumers better off. While advertising rates would generally increase, the greater circulation induced by lower per-copy prices would generally make advertisers better off as well.

Some Practical Guidance

Analysts face a quandary in examining mergers of multi-sided platforms. The literature discussed above indicates that standard back-of-the envelope calculations may give highly misleading results for the merger of platforms that have significant interdependencies in demand between customer groups. At least at this point the analogous formulas for multi-sided platforms require more information than an analyst could easily obtain for an initial screening exercise. They essentially require the estimation of a structural econometric model. But if such a model can be estimated, the analyst should just use that model to estimate the unilateral effects of the merger. Of course, in practice, the data necessary for

estimating structural models are rarely available, the estimated models may not be robust, and it may take too much time to collect the data and estimate structural models even when this is feasible.

Nevertheless, the best has never been the enemy of the good in merger analysis, and it need not be just because multi-sided platforms are involved. The important point is to recognize the economic structure of these platforms, especially the role of competitive constraints and demand-side efficiencies, and factor that into the overall judgment concerning the merger. In some cases, it may be possible to analyze unilateral effects on each side using traditional tools but factoring in biases that have been identified in the literature. What analysts should not do is commit the classic drunk's mistake—looking under the streetlight for his lost keys just because the light is better there—by conducting a standard one-sided analysis just because it is easier.

[*]This article is an excerpt for a longer forthcoming survey piece on multi-sided platforms.