# Anticompetitive Effects of Common Ownership: Overview of the Theory, and Review of the Empirical Findings of Azar, et al.

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**Abstract**

Recent empirical analysis by Azar, Schmalz, and Tecu (henceforth AST) finds that the common ownership of airlines by institutional investors is associated with higher airline prices. In this note, I briefly review the theory that underlies AST's empirical analysis, offer a brief critical summary of their empirical findings, and discuss some open issues.

## I. INTRODUCTION

Recent empirical analysis by Azar, Schmalz, and Tecu (2015a, 2015b) (henceforth AST) finds that the common ownership of airlines by institutional investors is associated with higher airline prices. In particular, under the assumption that the "control" institutional investors exert over the airlines they own is proportional to their ownership shares—a special case in the partial ownership framework developed in O'Brien and Salop (2000) (henceforth OS)—AST find that airline ticket prices are positively related to the modified-HHI delta that accounts for common ownership. In this note, I briefly review the theory that underlies AST's empirical analysis, offer a brief critical summary of their empirical findings, and discuss some open issues.

## II. ANALYTICAL BACKGROUND

To understand AST's work and put their empirical findings in context, it is important to begin with an understanding of the modified-HHI framework that underlies their analysis. Imagine five equally-sized firms competing in a market. By conventional measures, the industry is moderately concentrated, with an HHI of 2000. By conventional reasoning, we expect competition to hold prices in check moderately well.[2]

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[2] How well competition actually works depends on the nature of price competition and details relating to demand and cost.

But imagine that the five firms have some common owners.[3] Does this alter the conclusion?

Consider an analogy with mergers. A merger between two of the firms would increase concentration significantly (HHI delta of 800) and create a highly concentrated market (HHI of 2500).[4] Absent easy entry or sufficient merger-specific efficiencies, we expect less competition than before the merger. Such a *complete* acquisition of one of the firms by another generates an extreme case of common ownership—the acquiring firm's shareholders own 100 percent of the acquired firm after the merger. Thus, it seems clear that *some* amount of common ownership (here 100 percent) is likely to reduce competition, absent offsetting factors. But suppose that one of the firms or one of its large shareholders acquired less than 100 percent of another firm. How much common ownership is too much?

Starting in the mid 1980s, economists began examining this issue rigorously (Reynolds and Snapp, 1986; Bresnahan and Salop, 1986; Nye, 1992; Flath, 1991, 1992; Mauleg, 1992; Reitman, 1994; O'Brien and Salop, 2000; Gilo et al. (2006); Foros et al. 2011). The early analysis was done in the context of joint ventures and competing firms acquiring shares of their rivals. As an example, suppose firm 1 acquires 20 percent of firm 2. After the acquisition, firm 2 is effectively a joint venture owned partly by firm 1 and partly by previous owner(s) of firm 2.[5] The theory of joint ventures predicts that post-acquisition competition is likely to be less intense than suggested by an HHI of 2000 even though the acquisition does not directly affect the firms' market shares. There are two reasons. One reason is that the acquisition gives firm 1 an incentive to pull its competitive punches to some degree, because any benefit to itself from more aggressive competitive behavior is attenuated by the negative impact this would have on its 20 percent share of firm 2's profit.[6] This effect on competition arises solely from firm 1's *financial interest* in firm 2. A second reason the acquisition might diminish competition arises if the acquisition gives firm 1 some degree of *control* over the management of firm 2. Firm 1 would like firm 2 to pull its competitive punches, because this would increase firm 1's

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[3] I follow the authors in using the term "common ownership" to mean that a common owner holds shares in two or more entities that compete with each other in a market. It is understood that common ownership may involve partial ownership interests by common shareholders in more than one firm.

[4] Readers might notice that the HHI delta of 800 (= 2 x 20 x 20) does not equal the difference between the post-merger and pre-merger HHIs, which is 500. The reason is that the HHI delta is calculated using pre-merger shares. After the merger, these shares change in Cournot equilibrium, so the true delta is 500 in this example.

[5] In many joint ventures, the owners also own separate production units that may compete with the joint venture. In the example here, the pre-venture owner(s) of firm 2 whose shares are not acquired do not operate a competing entity.

[6] Reynolds and Snapp (1986) provided the first rigorous analysis of this effect under the assumption that each firm is controlled by a single owner.

profit. If corporate governance provisions or other factors give firm 1 enough control over firm 2 to make this happen, competition is likely to diminish further.[7] [8]

We see that the competitive effects of a joint venture depend on both the size of the financial interests and the amount of corporate control they carry. Bresnahan and Salop (1986) proposed a beautifully concise way to measure the net effect of these factors in the context of joint ventures— by using a modified Herfindahl-Hirschman index (MHHI) that adjusts the standard HHI to account for the effects of the competing firms' financial interests in the joint venture. The MHHI has the same interpretation as the HHI, the only difference being that it accounts for the effects of common ownership.[9] Bresnahan and Salop used this framework to examine the effects of joint ventures under a range of specific assumptions about which owner or set of owners control the joint venture.

In practice, common ownership arises in far more ways and is far more widespread than what occurs in joint ventures. It is common, for example, to see both individual and institutional investors—not the competing firms themselves—acquire shares of multiple firms in the same industry. This is common in the cable TV industry, for example.[10] AST observed that when account is taken of the activities of institutional investors, common ownership is common across many industries, including the airline industry they study.

Building on Bresnahan and Salop (1986), O'Brien and Salop (2000) developed a general framework for assessing the effects of common ownership that covers all cases: joint ventures owned by competing firms; effective joint ventures that arise when firms acquire fractional shares of other firms (effectively turning the acquired firm into a "joint venture" among firms); and individuals or institutional investors acquiring shares of multiple firms in the same industry. An innovation in OS exploited by AST is that it offers a convenient numerical way to capture how a shareholder's fractional financial interest in a firm translates into the shareholder's control over the firm's managers. In particular, a given shareholder's control-weight is the weight the manager assigns in its objective function to the shareholder's financial benefit from all of its ownership interests in the market. Given information on the financial interests of all investors in a

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[7] An additional potential effect of firm 1's ownership of firm 2 is an increased likelihood of coordination. For example, firm 1's ownership might provide a conduit for information sharing that makes coordination with firm 2 easier.

[8] In all of the hypothetical acquisitions in this note, I assume that the acquisition has no efficiency benefits.

[9] Both indices can be formally defined as the share-weighted average margin multiplied by the market elasticity of demand in a market characterized by (homogenous) Cournot competition.

[10] Mergers in the cable industry motivated the development of the MHHI in OS (2000). See also Besen et al. (1996).

market and an understanding of how financial interests map into the OS control weights, it is a straightforward to calculate the MHHI.[11]

AST's empirical analysis employs a specific equation derived by OS:

$$MHHI = HHI + \Delta MHHI \tag{1}$$

where MHHI is the modified-HHI, HHI is the standard Herfindahl-Hirschman index, and $\Delta MHHI$ is the component of the MHHI that accounts for common ownership. If there is no common ownership or if mangers ignore it, then $\Delta MHHI$ is zero, and the MHHI equals the HHI. If there is common ownership that affects managers' decisions, then $\Delta MHHI$ is positive and varies with the amount of control conferred by ownership. The following examples illustrate the roles of financial interests and corporate control in the MHHI calculation.

*Example 1: Silent financial interests*

Suppose that shares of five equally-sized firms are initially diffusely held by many small shareholders, and that each investor has no shares in rival firms.[12] Starting from this situation, imagine that one of firm 1's shareholders, perhaps a large institutional investor, purchases some significant percentage of firm 1's shares and 20 percent of firm 2's shares. I refer to the purchasing shareholder as the "large" shareholder and others as "small" shareholders. Will this acquisition diminish competition?

In the OS framework, the answer depends critically on how ownership translates into control. For this example, suppose that the large shareholder has no influence over the managers of either firm 1 or firm 2, who continue to pursue strategies that maximize the value accruing to their respective small shareholders. In this case, the large shareholder's financial positions in both firms 1 and 2 are effectively "silent financial interests" that carry no control. The common ownership created by the acquisition does not affect competition at all, that is, $\Delta MHHI = 0$.

Interestingly, this result would continue to hold if the large shareholder owned nearly 100 percent of firm 1 and 20 percent of firm 2 as long as *both*

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[11] How ownership translates into control is a delicate question that depends on the nature of the stock that is held (e.g., voting versus nonvoting shares), whether the owner holds seats on the Board, and other corporate governance conditions. Under the law, managers have a fiduciary obligation to minority shareholders, but it is not obvious what this means in many contexts. (Consider a firm with multiple minority shareholders that have divergent interests.) The actual relationship between ownership and control in practice is ultimately an empirical question.

[12] Alternatively, any common ownership by individual investors is ignored by managers.

financial interests were silent.[13] This observation highlights the importance of the control assumption.

*Example 2: Total control of firm 1; silent financial interest in firm 2*

Suppose now that the large shareholder holds 100 percent of firm 1 and controls it, and has a 20 percent silent financial interest in firm 2. In this case, the theory implies that $\Delta$MHHI = 80.[14] This shows that a non-controlling financial interest in firm 2 can have anticompetitive effects (small ones here) if the investor exerts control over firm 1. The intuition is that the large shareholder pulls the competitive punches of firm 1 to some degree to benefit firm 2, as it captures 20 percent of this benefit.

*Example 3: Total control of firm 1; proportional control of firm 2*

Imagine now that the large shareholder exerts some degree of control over the manager of firm 2. What do I mean by "control," and by "some degree?" As noted earlier, control in the OS framework is a parameter equal to the weight the manager places in its objective function on the owner's total financial benefit from its shareholdings in the market in question. An intermediate case between zero control and total control is *proportional control*, where the weight the manager applies to each owner's financial benefit is precisely the owner's ownership share. This is the assumption AST make in their empirical analysis.[15] In the example here, calculations show that the component of the MHHI due to common ownership under proportional control of firm 2 by the large shareholder is $\Delta$MHHI = 198, more than twice the value of this component when the financial interest is silent.[16] The reason the effect is bigger than it is when the large shareholder's financial interest is silent is that the large shareholder now uses its control to pull the competitive punches of both firms 1 and 2.

*Example 4: Total control of firm 1; total control of firm 2*

Lastly, suppose that the large shareholder's 20 percent financial interest gives it complete control over firm 2. This means that the objective of firm 2's manager is to maximize the financial benefits that flow to the large shareholder from its participation in the market. This may seem like

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[13] It is likely uncommon for shareholders with high ownership percentages to exert no control. The point here is illustrative.

[14] In general, an $\alpha$ fractional silent financial interest in firm 2 by a shareholder that owns and controls 100 percent of firm 1 yields $\Delta$MHHI = $\alpha s_1 s_2$, which here is 80 = (0.2)(20)(20). See OS (2000) for all delta MHHI calculations that follow.

[15] This assumption is buried in a single sentence in the paper. Given its importance, it deserves much more discussion.

[16] An $\alpha$ fractional interest in firm 2 that carries proportional control by a shareholder that owns and controls 100 percent of firm 1 yields $\Delta$MHHI = $(\alpha + \alpha/[(1 - \alpha)^2 + \alpha 2])s_1 s_2$, which works out to 198 = (0.2 + 0.2/[(1 − 0.2)2 + (0.2)2)](20)(20).

an extreme assumption for a 20 percent financial interest, but there is evidence suggesting that ownership shares below 50 percent can confer large degrees of control,[17] and according to Leech (2001), researchers have sometimes used 20 percent in empirical work as a threshold ownership level above which a large shareholder might have effective control.[18] If the 20 percent financial interest carries complete control, the common ownership component of the MHHI works out to be $\Delta$MHHI = 2080, an order of magnitude more than it is in the other control scenarios.[19]

The logic for this large effect is not hard to see. Observe that the large shareholder receives a relatively small share of firm 2's profit (only 20 percent), but a large share of firm 1's profit (here 100 percent). Because firms 1 and 2 compete, the large shareholder has an incentive to pull firm 2's competitive punches by a very large amount, thereby shifting profit from firm 2 where it collects only 20 percent of the earnings to firm 1 where it reaps 100 percent. Because the large shareholder completely controls the management of firm 2, it can do this. The large value of the $\Delta$MHHI reflects this ability.[20]

In summary, the predictions that emerge from an MHHI analysis of common ownership depend critically on both the size of the financial interests involved and how these interests translate into control. Thus, using the MHHI as an explanatory variable in empirical analysis requires either modeling or making assumptions about how different financial interests translate into control.

## III. THE ANALYSIS, FINDINGS, AND CONCLUSIONS OF AST

AST assume proportional control by institutional investors to calculate MHHIs for city-pair airline markets. (I discuss this control assumption in some detail in the next section.) They then divide the MHHI into the two components set out in condition (1) above: the HHI, which depends on market shares, and $\Delta$MHHI, which captures common ownership effects. The value of the $\Delta$MHHI component in most markets is positive because of the common ownership of airlines by large

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[17] In a classic early study, Berle and Means (1932) suggested that 20 percent was about the threshold required for working control, although it might be higher or lower depending on circumstances. See Cubbin and Leech (1983) for additional evidence.

[18] For example, La Porta et al (1999) use this rule in their study of corporate ownership across 27 wealthy countries.

[19] An $\alpha$ fractional interest in firm 2 that carries complete control by a shareholder that owns and controls 100 percent of firm 1 yields $\Delta$MHHI = $(\alpha + 1/\alpha)s_1 s_2$, which works out to 2080 = (0.2 + 1/0.2)(20)(20).

[20] See Foros et al. (2011) for an analysis showing how partial acquisitions that carry disproportionately large degrees of control can both arise in equilibrium and have large anticompetitive effects.

institutional investors and the assumption that managers weigh the institutional investors' investment returns across the industry. A table in AST (2015a) shows that the average ΔMHHI under their assumptions ranged from around 1000 to 2200 between 2001 and 2013. By comparison, the HHI ranged from about 5000 to 5500. Thus, the common ownership component is economically significant, contributing between 17 and 29 percent of the "concentration" in passenger airline market as measured by the MHHI under the assumption of proportional control.

AST then use regression analysis to relate airline ticket prices to both the HHI and ΔMHHI, controlling for other factors. Their key empirical findings are the following:

1.  An increase in the ΔMHHI—the common ownership component of concentration—is associated with an increase in airline ticket prices, other factors equal.

2.  The increase in price associated with an increase in the common ownership effect ΔMHHI typically has the same order of magnitude and is often quite close to the increase in price associated with an increase in the HHI. This is nominally consistent with the theory.

To address the potential endogeneity of the MHHI, AST conduct an additional analysis that uses the acquisition of Barclays Global Investors (BGI) by BlackRock to construct variables that serve as instruments for the MHHI. Their third main result from this component of the analysis is:

3.  The acquisition of BGI by BlackRock caused airfares to increase by 0.6 percent.

AST state that their results suggest that common ownership is a potentially important element in assessing mergers and partial acquisitions. They observe that this is true not only for acquisitions between competing airlines, but also for acquisitions among the institutional investors that give rise to common ownership across firms in concentrated markets. For example, if Blackrock owns a significant share of firm 1 and BGI owns a significant share firm 2, then a merger between Blackrock and BGI means that a common owner would own significant shares of both firms 1 and 2. AST are careful to acknowledge the efficiency benefits from common ownership by mutual funds, which allow retail investors to diversify their portfolios at lower transaction costs. They note that their findings suggest a tradeoff between potentially procompetitive and anticompetitive effects of common ownership. Finally, they recognize that more empirical research is needed to assess the robustness and potential importance of their findings.

## IV.    DISCUSSION

AST's empirical findings are interesting and intriguing. I applaud them for taking the generalized MHHI framework to the data. I also

applaud them for their measured assessment of the policy implications of their findings at this stage in the development of our understanding of economic effects of common ownership. In what follows I offer three main observations about their paper. All three pertain to the appropriate use and interpretation of this methodology generally as well as to the specific analysis conducted by AST.

## A.    The Control Assumption

The description of the theory employed by AST presented in Section II above highlighted the critical role of control in the analysis of the competitive effects of common ownership. We saw that the contribution of the common ownership component ΔMHHI to concentration can range from zero to very large, depending on how financial interests translate into control. Unfortunately, there is no empirical evidence that I know of indicating that AST's control assumption—proportional control—is an accurate description of corporate control in the real world.

How financial interests map into control given the complexities of corporate governance is a difficult question, and the assumption of proportional control does have some intuitive appeal. What we know is that a financial interest of 100 percent of voting shares should automatically imply complete control, and a financial interest of 0 percent should confer no control, absent unusual governance provisions. It would seem that any mapping of financial interest into control should yield these end points, and a simple rule that does this is proportional control. When we do not have specific information about how control actually works in practice, perhaps this is a reasonable rule of thumb.

However, suppose that control arises out of a majority rule voting process, just as one example. Suppose that the shareholders are involved in every decision (unrealistic, but it conveys the point), that the large shareholder has different preferences than small shareholders for whatever reason, and that small shareholders have common interests. Under majority rule, the large shareholder would not have control unless its holdings exceeded 50 percent. In the MHHI analysis, the large shareholder's control weight would be 0 for financial interests between 0 and 50 percent, and 1 for financial interests above 50 percent. If this shareholder takes a financial position in another firm, the concentration effects of its holdings in both firms—measured by the ΔMHHI (assuming no other common ownership)—will depend on the control it has over *both* firms. In this example, its control over the first firm would not vary one-for-one with its financial interest as in the proportional control assumption employed by AST.

Beyond the theory of voting, there is empirical evidence suggesting that control likely does not vary one-for-one with ownership.[21] Evidence suggests that when one owner holds *X* percent of the voting shares of a firm

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[21] See Berle and Means (1932), Cubbin and Leach (1983), Leach (2001).

and the remaining $1 - X$ percent of the shares are diffusely held, financial interests well below 50 percent may confer substantially greater control than $X$.[22]

The general point that emerges from both theoretical reasoning (e.g., voting models) and empirical evidence is this: the relationship between control and financial interest is likely to be nonlinear, not proportional. What does this mean for AST's empirical analysis? Suppose we accept price-concentration regressions as legitimate (i.e., hold aside for now the deeper issues of interpretation discussed in the next subsection.) If the proportional control assumption is wrong, then the key explanatory variable in their analysis, ΔMHHI, is mis-measured. Pure measurement error generally biases regression results toward zero. However, the measurement error here is more complex, as it depends on how control departs from proportionality in the real world. It is not obvious how this would bias the results.

The control-weights in the OS framework, while useful as an analytical device, capture in a single parameter all the complexities of corporate governance. Although this is admittedly a difficult black box to crack, the proportional control assumption is clearly special. One way to address this would be to consider alternative control assumptions. Another approach might be to estimate control parameters along the lines of the methodology discussed in the next subsection.

To gain confidence in the control assumptions, it would also be useful to look directly at the contracts of airline managers. Are contracts structured so that managers have incentives to take into the account the financial benefits of their actions to owners with fractional interests? If so, what does this imply for the appropriate control weights? Beyond the implications for control weights, direct evidence suggesting that managers' contracts do account for the interests of institutional shareholders would help corroborate empirical findings that common ownership has important competitive effects.

In this vein, Elhauge (2015) points out that corporations often compensate executives with stock options, the value of which are "70 percent driven by general market profitability and 30 percent driven by individual corporate performance."[23] Consider the incentives of a manager compensated this way. Suppose the manager initially behaves so as to maximize the profits of the firm. Starting from the output level that does this, a small unilateral output reduction would reduce the profits of the firm by a very small amount (because the firm is initially choosing output to maximize the firm's profits), but it would increase industry profits by a

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[22] By "greater control than $X$" I mean that the appropriate control-weight when applying OS's MHHI analysis exceeds $X$.

[23] Elhauge (2015), p. 11.

larger amount. The gain to the manager would be .7 times the increase in industry profit minus .3 times the decrease in the firm's profit, which would be positive overall. Thus, a manager compensated in this way would restrict output below the unilaterally profit-maximizing level.

The output restriction here is driven by compensation via stock options whose prices partly reflect the profitability of the industry rather than only the profitability of the firm. Although the connection between this mechanism (assuming it exists) and common ownership is not immediately obvious, evidence of such a linkage would be an empirical finding that this type of compensation scheme is more prevalent the greater the degree of common ownership. Elhauge (2015) discusses this possible linkage in detail.

### B.    On Relating Price to Concentration

In this subsection I discuss conceptual issues that arise in the interpretation of price-concentration studies. These points apply to all such studies, including that of AST.

At the outset, it is important to understand that the MHHI has essentially the same interpretation regarding concentration in an industry as the HHI. Formally, both indices equal the share-weighted average margin in a market multiplied by the market elasticity under the assumption that firms are Cournot players. The only substantive difference between the indices is that the MHHI accounts for common ownership in a rigorous way, which adds the additional term, ΔMHHI. If one accepts the HHI as relevant for assessing market performance when there is no common ownership, then one should also accept the MHHI generalization of the HHI as relevant for assessing market performance in the presence of common ownership. In this sense, AST's analysis should not raise controversy.

However, it is also important to understand that using either the HHI or MHHI to evaluate market performance raises significant issues of interpretation, and the issues are quite well know.[24] It is fair to say that the accepted view is that these indices provide only a rough, and quite imperfect, gauge of the likely competitive effects of mergers, and by extension, the competitive effects of common ownership. The technical reason for this is that economic theory does not imply a specific relationship, positive or negative, between the HHI, MHHI and price or welfare except under very limited circumstances.[25]

As a simple example illustrating this point, imagine a market with five symmetric Cournot players and no common ownership, which yields an initial HHI (and MHHI) of 2000. Now suppose that one of the firms, say

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[24] See Farrell and Shapiro (1990).

[25] See Whinston (2007), pp. 2411-2414. Theory does yield a relationship between the MHHI and the share-weighted average margin when firms are Cournot players. However, this is not the relationship estimated in price-concentration studies, including that of AST.

firm 1, makes an investment that lowers its marginal cost. In most oligopoly models, the reduction in firm 1's cost raises its market share, lowers the market shares of the other firms, and typically *raises* the HHI (and MHHI). However, prices typically *fall* with the cost reduction, and welfare typically rises. Thus, an increase in the HHI (and MHHI) is associated with a reduction in prices and an increase in welfare. This starkly illustrates why the HHI (and MHHI) cannot possibly be any more than a rough gauge of market performance.

It turns out that changes in common ownership can also affect the MHHI in counter-intuitive ways. For example, suppose a controlling owner of firm 1 takes a silent financial interest in firm 2. Although most oligopoly theories predict that prices will rise, they do not predict that the MHHI must rise. In fact, it is possible for prices to rise and the MHHI to fall with the size of the financial interest. The reason for this is that the anticompetitive effect of the financial interest typically causes the acquiring firm's share to fall relative to the shares of its rivals, and this can lead to a reduction in the MHHI even though the financial interest leads to higher prices.[26] Because an increase in the size of the financial interest raises price but may raise or lower the MHHI, it is difficult to interpret the coefficients in a regression of price on the MHHI.[27]

Note that the problem here is not simply that price and concentration are endogenous variables that are codetermined by common factors. If this were the only problem, it might be overcome by using instrumental variables techniques.[28] The problem also does not disappear if all relevant cost and demand factors are included in the regression equation to control for these factors in exploring the relationship between price and concentration. The core issue is that the theory does not imply a particular relationship between price and concentration except under limited circumstances.

Theory does yield a relationship between price and common ownership that the might be exploited in potentially two ways. First, OS show in their Appendix C that the profit-maximizing output decision of each firm *j* yields the following relationship under Cournot oligopoly:[29]

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[26] Loosely, if the financial interest reduces the heterogeneity of shares, the HHI and possibly the MHHI may fall.

[27] The author has a work in progress that elaborates on this point and its implications for price-concentration analysis.

[28] AST attempt to do this by using the Blackrock/BGI merger to construct instruments for the ΔMHHI. For reasons I do not understand, however, they instrument for the ΔMHHI, but do not instrument for the HHI. The HHI is clearly endogenous, indeed, probably more so than the ΔMHHI.

[29] A similar relation holds under Bertrand oligopoly.

$$P_j = \frac{C'_j(q_j) - a_j}{1 - \frac{1}{\eta}\left[ s_j + \theta \sum_{k \neq j} M_{jk} s_k \right]}$$

where $P_j$ is firm $j$'s price; $q_j$ is firm $j$'s quantity; $C'_j$ is firm $j$'s marginal cost; $a_j$ is a parameter that measures the quality of firm $j$'s product;[30] $s_j$ is firm $j$'s market share; $\eta$ is the absolute value of the market elasticity of demand; $M_{jk}$ is a "mergers and acquisitions" variable that captures the common ownership of firms $j$ and $k$,[31] and $\theta$ is a parameter reflecting the extent to which common ownership affects firm $j$'s pricing decision.[32] This equation is an exact representation of the relationship between price and common ownership under a variant of Cournot oligopoly, the theory that motivates the MHHI. In principle, one could estimate the parameter $\theta$ to determine the extent to which common ownership affects pricing decisions. With the proper estimation techniques that recognize and deal with the endogeneity of quantities, shares, and possibly the common ownership terms $M_{jk}$, this procedure would not be subject to the interpretation issues that arise from regressing prices on concentration indices like the HHI and ΔMHHI.

Estimating (2) may be difficult if there are not good instruments for quantities and shares. As an alternative, theory also yields a "reduced-form" relationship between price, the common ownership terms $M_{jk}$, and the other factors that influence cost and demand that may be easier to estimate.[33] In principle, one could estimate a flexible functional form representing this relationship to assess the influence of common ownership on price.

Using regression analysis to relate price to measures of concentration has a long history in industrial organization, despite well-grounded criticisms. The reason for this may be that such regressions are relatively simple to run, and it seems hard not to accept that a positive relationship between price and concentration tells us something—it "feels" like it should. However, the theory is now sufficiently well-developed that there is no need to pursue an empirical approach that does not have firm

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[30] This term is absent from analysis of OS. I have introduced it here to capture quality differentiation between firms that can explain why they might have different prices.

[31] In particular, $M_{jk}$ depends on the ownership and control parameters. See Appendix C in OS (2000).

[32] This parameter $\theta$ is implicitly set equal to 1 in OS. I allow it to vary here to illustrate how one could test the theory by estimating it. One could consider alternative parameterizations that allow estimating the extent to which financial interest translates into control.

[33] The relationship may not be a true reduced-form if the common ownership variables or other variables are endogenous. The point is that theory implies an equilibrium relationship between price and the common ownership variables $M_{jk}$, whereas the relationship between price and concentration is murky.

economic foundations. Estimating an equation like (2) or the "reduced-form" relationship between price and the common ownership variables are two alternative approaches that would avoid the interpretational difficulties that arise in price-concentration regressions.

### C.     The Efficiency Benefits of Common Ownership by Institutional Investors

Mutual funds dramatically reduce the transaction costs of portfolio diversification by retail investors. True diversification may require positions in the stocks of more than one firm in an industry. The ability to diversify in this way through a single transaction—e.g., by investing in a mutual fund that owns multiple firms in the same industry—may have significant benefits.

AST are careful to highlight the potential importance of these benefits and the need to develop a means to weigh them against the potential anticompetitive effects of common ownership. More research will be required to do this.

## V.     CONCLUSION

Mergers result in special case of common ownership where the acquiring firms' shareholders obtain 100 percent ownership of the acquired firm. Just as mergers can have procompetitive and anticompetitive effects, so can common ownership that involves fractional ownership shares provided the financial interests give owners some control over the decisions of the managers of one or both firms. A methodology for obtaining rough estimates of merger effects uses the HHI and change in the HHI caused by merger. The analogous methodology for financial interests that involve common ownership is the MHHI and change in the MHHI introduced by Bresnahan and Salop (1986) and elaborated by O'Brien and Salop (2000). Azar et al. (2015a) represents the first serious attempt to test and apply this framework empirically.

Their results suggest that the MHHI may be as reasonable a predictor of the price effects of common ownership as the HHI is a predictor of the price effects of mergers. This is an intriguing result. However, their empirical work makes restrictive assumptions about control, and well-grounded criticisms of price-concentration analysis also apply to their analysis. More empirical work on common ownership is called for to (1) explore the extent to which financial interest translates into control; (2) strengthen the connection between the empirical methodology and economic theory; and (3) assess the transaction cost benefits of mutual funds and other institutions that make it easier for retail investors to diversify, and weigh these benefits against any reduction in competition caused by common ownership.

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# Overlapping Ownership by Institutional Investors: A Legal Perspective

*By Allen Grunes and David L. Meyer*[1]

## I.   INTRODUCTION

Recent economic work summarized in this newsletter has generated considerable interest by suggesting that the minority ownership positions held by large institutional investors in multiple, competing companies in the same concentrated industry might lead to higher prices (the "AST Study").[2]  The specific finding of the AST Study was that such ownership overlaps involving domestic airlines were associated with (and from AST's perspective may have caused) higher airline prices.  The Antitrust Division has reportedly expanded its investigation of alleged coordination among the major U.S. airlines to encompass CIDs directed to the major institutional investors in those airlines.[3]  And Professor Einer Elhauge has argued that the AST findings provide a sufficient basis for an antitrust challenge to such "horizontal" institutional shareholdings.[4]

In this note we take the AST Study's findings at face value, assuming them to be valid as an econometric matter at least to the extent they suggest that overlapping institutional investor ownership positions in "oligopoly" industries tend to co-exist with higher levels of pricing by the partially-owned firms.  We resist the temptation to engage in the policy debate whether the  AST Study should motivate some sort of legal or enforcement action, although we note that

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[2] See José Azar, Martin C. Schmalz & Isabel Tecu, *Anticompetitive Effects of Common Ownership*, Ross School of Business Paper No. 1235 (April 21, 2015), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2427345 ("AST Study").

[3] See David McLaughlin and Mary Schlangenstein, *U.S. Looks at Airline Investors for Evidence of Fare Collusion*, Bloomberg (Sept. 22, 2015), http://www.bloomberg.com/news/articles/2015-09-22/do-airfares-rise-when-carriers-have-same-investors-u-s-asks.

[4] See Einer Elhauge, *Horizontal Shareholding as an Antitrust Violation*, forthcoming, Harvard L. Rev., Vol. 109, No. 5 (2006), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2632024.