

More on Oligopoly Strategies: Collusion and Commitment

This note explores the economics of first-mover advantages and collusion in oligopoly markets. Prior to class, please prepare the problem on p. 9-10.

Last session we examined two basic strategies in oligopoly markets: price competition and strategic capacity decisions. We emphasized that when setting your firm's strategy, it becomes important to consider your competitors' actions (or reactions). Your profit-maximizing strategy may depend, perhaps quite delicately, on what you expect your rivals to do and conversely.

This note examines two more sophisticated ways that firms may interact in oligopoly markets. In our analysis of market outcomes when firms make strategic capacity decisions—that is, Cournot's solution—there is an important feature that deserves more attention. This is the matter of *timing* and *commitment*. We'll first explore what happens if one firm has the advantage of setting its strategy *before* its rivals are able to. We call this a *first-mover advantage*, and we'll see that it can increase profits further yet.

Second, we'll then look at another market outcome that students and business managers often come up with and think about: *collusion*. This can raise firms' profits even further, but it is both rarely successful and it is prohibited by law (in the U.S. and E.U.) To understand why, we'll need to do a bit of economics.

First-Mover Advantages

To begin, let's consider the same market we examined at the start of the last *Session Note*. To recap: We have two firms (a *duopoly*) that produce the same product. The two firms have different cost structures, however. The total costs for firm 1 and firm 2 are, respectively,

$$TC_1 = 5 * q_1 \quad \text{and} \quad TC_2 = 0.5 * (q_2)^2$$

where q_1 is the output of firm 1, and q_2 is the output of firm 2. These imply that firm 1's cost structure provides significant economies at high volume, while firm 2's costs are initially lower but then rise quickly. Market demand for this product depends upon industry-wide production according to the demand function

$$P = 100 - .5[q_1 + q_2]$$

In our last *Session Note*, we found the market outcome differed quite dramatically depending on how the firms compete:

- 1) **With price competition:** If each firm first sets its price and then produces to meet demand, we found that the market price is driven down their marginal cost of \$5 at the quantities $q_1 = 185$ and $q_2 = 5$. Firm 1 makes no profit at all, and firm 2 makes a profit of \$12.5.
- 2) **With strategic capacity decisions:** If each firm first sets its own production level and then just takes the market-clearing price as given, then the industry's profitability can be quite different. We found $q_1 = 80$, $q_2 = 30$, and $P = \$45$. Firm 1's profit is now \$3200, and firm 2's profit is \$900, with a total industry profit of \$4100.

Now About Timing and Commitment

There is one subtlety in our analysis of Cournot's solution with strategic capacity decisions, and it is an important one. The logic of the "mutual no regrets" outcome implicitly assumed that each firm was making an educated guess about what its rival will do. This corresponds to a situation where your rival's capacity is *not yet fixed* at the time you make your capacity decision (and vice versa).

By contrast, in many markets one firm might already have built its capacity before others start doing so. In these cases, the later firms have to choose how much to produce knowing that the first firm has already committed to (let's say) a high level of capacity.

Before going through a problem of this sort quantitatively, think about the logic of why moving first might convey an advantage. If you are a later-arriving firm (we'll call a *follower*), how does observing an existing firm with high capacity affect your production decision? Recall from last class that if you expect your rival to have a high output level, your best response is to *reduce* your capacity so as to arrest the decline in the market price. (This is an important point: if it is unclear, take a minute to go back and read the middle paragraph about how to interpret a reaction function on page 5 in last session's note).

Now think one step ahead. Suppose *you* are the first firm in the market. We know that, if you build out a lot of extra capacity, a rival that enters the market later will find it optimal to build *less* capacity. What should you do, knowing this? Let's see what happens.

Example

The German economist Stackelberg developed this idea, and did one better than Cournot. He thought there might be an advantage to getting your plant capacity in the ground first. The key to solving first-mover problems is to remember the following rule:

Leaders act. Followers react.

This means that a follower obeys its reaction function, but a leader does not. A follower obeys its reaction function because it sets its output level to maximize profit conditional on the decisions of its rival (the leader). A leader maximizes profit knowing the follower will react to it.

This idea is illustrated in the following example.

Using the same cost and demand conditions as before, suppose that firm 1 is the industry *leader*. This means that firm 1 makes its strategic capacity decision first, and firm 2 (the *follower*) makes its decision after observing what firm 1 has done.

Firm 1's profits are total revenue minus total costs, or

$$\Pi_1 = P \cdot q_1 - 5 q_1$$

Substitute in the market demand function $P = 100 - .5 \cdot [q_1 + q_2]$ to get

$$\begin{aligned}\Pi_1 &= 100 q_1 - 0.5 \cdot [q_1 + q_2] \cdot q_1 - 5 q_1 \\ &= 95 q_1 - 0.5 \cdot q_1^2 - 0.5 \cdot q_1 \cdot q_2\end{aligned}$$

Mathematically, this means firm 1's profits depend on what firm 2 will do. Here is where the timing comes into play. Firm 1 knows its rival will move later, and that firm 2 will maximize its profit after seeing Firm 1's decision. What production level will maximize firm 2's profits at that point? Remember that firm 2's *reaction function* is, by definition, the firm's profit maximizing decision *given* what its rival does. The follower's prof-

it-maximizing strategy is therefore just its reaction function. In our last session note, we determined that firm 2's reaction function was:

$$\text{Firm 2's reaction function: } q_2 = 50 - .25 q_1$$

Now if firm 1 anticipates this is what firm 2 will do, then we can go back and finish the leader's decision problem. Substituting firm 2's reaction function into firm 1's profit function above gives

$$\begin{aligned} \Pi_1 &= 95 q_1 - 0.5 q_1^2 - 0.5 q_1 [50 - .25 q_1] \\ &= 95 q_1 - 0.5 q_1^2 - 25 q_1 + .125 q_1^2 \\ &= 70 q_1 - .375 q_1^2 \end{aligned}$$

Maximizing this profit function with respect to q_1 gives $q_1 = 93.33$. This is the leader's optimal production level, *anticipating* that its rival will see this and react to it.

What will firm 2 do, exactly? If firm 2 treats firm 1's strategic output decision as an irreversible production commitment, then we can obtain firm 2's quantity by substituting $q_1 = 93.33$ into firm 2's reaction function:

$$\begin{aligned} q_2 &= 50 - .25 q_1 \\ &= 50 - .25 \cdot 93.33 = 26.67 \end{aligned}$$

So firm 2's profit-maximizing strategy is to produce only 26.67 units in response, given that firm 1 is already committed to a huge output level of $q_1 = 93.33$.

To finish the analysis, we can compute the market price noting that $P = 100 - .5 \cdot [q_1 + q_2]$, which gives $P = \$40$. The profit of firm 1 is

$$\begin{aligned} \Pi_1 &= \text{total revenue} - \text{total costs} \\ &= P \cdot q_1 - 5 \cdot q_1 \\ &= 40 \cdot 93.33 - 5 \cdot 93.33 \\ &= 3,266.55 \end{aligned}$$

And for firm 2, profit is

$$\begin{aligned} \Pi_2 &= P \cdot q_2 - 0.5 \cdot (q_2)^2 \\ &= 40 \cdot 26.67 - 0.5 \cdot (26.67)^2 \\ &= 711.15 \end{aligned}$$

Bottom line: It pays to be the leader. Compare these profit numbers with the Cournot solution earlier, which used the exact same demand and cost curves. In the Cournot case, firm 1 produces $q_1 = 80$ units for a profit of 3,200. With a first-mover advantage, it stakes out a bigger production level of $q_1 = 93.33$ units, and its profits are higher at \$3,266.55. Profits are higher when firm 1 is a first-mover, even though the higher overall industry production level means the market price, $P = \$40$, is *lower* than it was in the Cournot case where $P = \$45$.

What if firm 2 is the leader, and firm 1 is the follower? We could also do this problem for the case where firm 2 is the leader. The analysis is identical but the final answers would change, because the leader and follower have different cost functions. If firm 2 were the market leader then:

$$q_2 = 35 \text{ and } \Pi_2 = 918.75, \text{ and}$$

$$q_1 = 77.5 \text{ and } \Pi_1 = 3003.13$$

Who would pay the most to be the leader? Acquiring a first-mover advantage is often a costly thing to do. You might have to build your capacity faster, secure approvals more quickly, line up project financing at less-than-ideal terms right now, and so on. How much should each firm invest in a strategy that would allow it to become the leader?

The difference in firm 1's profits if it is the leader, rather than the follower, is $3266.55 - 3033.13 = 233.42$. So firm 1 should be willing to invest up to 233.42 to acquire a leadership position, if it is confident that firm 2 will see this and act as a follower. By contrast, the difference in firm 2's profits if it is the leader, rather than the follower, is only $918.75 - 711.15 = 207.60$. It is a close thing, but firm 1 would pay more to become the leader.

What if both firms try to be the leader? If both players want to be leaders then each assumes the other's behavior is governed by its reaction function—but, in fact, neither reaction function is obeyed. If this happens, each firm will find it has made a mistake in anticipating its rival's move, and has produced too much (or built too much capacity) to be profitable. In this case, both firms have regret—big time—once they discover what has happened. This is sometimes called a *Stackelberg disequilibrium*, or, if it persists, a *war of attrition*.

This happens sometimes in real markets. Usually, all firms wise up to their financially disastrous predicament (for everyone in the industry) quickly. A recent example is the build-out of fiber-optic capacity by telecommunications networking companies in the 1990s. Much of this capacity went unused for years, and sent industry profitability plummeting. (Some players who did this, notably WorldCom, hid their losses through accounting fraud rather than acknowledge their poor business capacity strategy decisions). Typically, however, firms are able to avoid these situations because timing or

technological leads make it clear which firm would ultimately win the leadership position.

Application: DuPont and Titanium Dioxide

Do firms ever build out capacity fast, in order to acquire a Stackelberg-leadership market position? Sure. When the U.S. government announced a significant tightening of environmental regulations on the production of titanium dioxide (a material used in paint and other coatings), the DuPont corporation saw a strategic opportunity. DuPont had a market share of about 1/3 at the time, its leading competitor had another 1/3, and a half dozen fringe players had the rest.

DuPont had a small initial advantage over its competitors in that its plants were newer, and would need only an upgrade to meet the new regulations. By contrast, its competitors would have to shutter their (old) production facilities and build anew to meet the new regulations—in effect having to “reenter” the market by building costly new plants, a process that would take more than a year.

DuPont pursued the following strategy: Invest nearly \$400 million in increased capacity to try to capture two-thirds of the market by the time the new environmental regulations were fully phased-in. This is much more capacity than would be profitable for DuPont to build *if its competitors built the same capacity they had* in the past. The idea, of course, was to deter the competitors from building the same level of capacity as they had in the past. Scale economies and first-mover advantages would give DuPont both a cost advantage and a Stackelberg-leader capacity position. This not only deterred DuPont’s rivals from investing in as much new capacity, but made credible the implicit threat that in the future, DuPont would fight rather than accommodate any new upstarts that tried to enter the TiO₂ industry. The strategy was sensible, and worked fairly well for several years.

Other Applications: Boeing and Airbus, Post-9/11

Consider the *Financial Times* articles from mid-2002 titled “Storm Clouds Gathering” and “Boeing Takes Airbus to Task Over Production,” at the end of this note. Can you find the capacity problem and see how it undermines profits? How is Boeing trying to deal with this problem? Why do you think Airbus has not responded to Boeing’s efforts to “rationalize” the industry?

Collusion

Let's now look at another market outcome that students and business managers come up with and think about: *collusion*. Collusion is an illegal business practice, and it is important for business students to understand why. In addition, mergers and acquisitions that create a monopoly seller are effectively the same as colluding. This is why the US Department of Justice reviews and may block a merger among large firms in an oligopoly market.

Although collusion is rare, it is informative to consider why firms try at all. *Assume, for the sake of economic understanding, that we have no anti-trust laws.* That is, suppose managers of rival firms *could* talk to one another about pricing or how much to produce. If they recognize the mutual inter-dependence of their profits, they might decide to coordinate pricing and production—this will maximize the *market's* total payoff to the firms. By *colluding*, the firms try to act as a single entity. As a single entity we now have a monopoly, so total profit is maximized (as always) by choosing an output where $MR = MC$.

If we use the same total cost curves as in the previous example, the situation is similar to that of a two-plant monopolist (that is, we are now treating the two cost curves TC_1 and TC_2 from before as the total costs for each of two different plants). Profit is maximized when the MC of each plant is equal to MR, or $MR = MC_1 = MC_2$.

How much should they produce, in total? Look at the marginal cost curves for the two firms. Firm 1 has a constant marginal cost of 5 per unit. Firm 2's marginal cost curve is rising with quantity: $MC_2 = q_2$. That means firm 2 has a cost advantage for each unit up to $q_2 = 5$ units, and after that it would be cheapest for firm 1 to produce any additional units. So the cost minimizing way for the two firms to work together (i.e., collude) is to produce 5 units from firm 2, and for firm 1 to make all units beyond 5.

Algebraically, we have $TR = P \cdot Q = 100 \cdot Q - .5 \cdot Q^2$, where Q is the total quantity produced by the two plants. So $MR = 100 - Q$. But we know that $Q = q_1 + q_2 = q_1 + 5$ and firm 1 is the marginal producer, so we will maximize the joint profits by finding the quantity q_1 where

$$MR = 100 - (q_1 + 5) = MC_1 = 5.$$

Solving for q_1 we have $q_1 = 90$. We can now compute the market price that the two colluding firms can command at the profit-maximizing outputs of $q_1 = 90$ and $q_2 = 5$:

$$P = 100 - .5 \cdot [q_1 + q_2]$$

$$P = 100 - .5[95] \text{ or } P = \$52.5 \text{ per unit.}$$

Now calculate profits. The profit we can “attribute” to production from firm 1's plant:

$$90 \cdot [52.5] - 5 \cdot [90] = 4275$$

The profit we can “attribute” to production from firm 2's plant:

$$5 \cdot [52.5] - .5 \cdot [5]^2 = 250$$

Total profits earned by the combined firm will be $\$4275 + \$250 = \$4525$.

Now, suppose that this is an industry where capacity can be leased at low cost and is mobile, meaning that it can be added or unloaded quickly. (If you want a practical example, the US passenger airline industry is like that). Here we would expect price competition to prevail, if the firms provide similar services in the eyes of consumers. Now compare the firms' profits if they compete on price and the firms' profits if they collude. From the *Price Competition* section in the *Session 3 Note* for last class, we found that with head-on price competition total industry profits were $\$12.5 + \$0 = \$12.5$. If the firms collude instead, we just found that they'll divide up total industry profits of $\$4525$. What does this mean? In this example, collusion has increased total industry profitability by about *thirty-six thousand percent*.

Wow. Think about that. This profitability is achieved because the two firms agreed to cut back on their total production and drive up the market price—here achieving the monopoly outcome, and splitting their take based on the profits contributed by each plant. These numbers give you a sense of why firms in a homogenous-good, price-competitive industry often have a powerfully strong incentive to try to collude. It also explains why two active rivals in an industry can have a strong incentive to consummate a merger, which would allow them—legally—to act as one firm.

So why is collusion illegal? The economic reason is simple: Collusion isn't competitive—it is the *opposite* of competition. And the opposite of competition is a disaster for consumers, and means poor performance of the economy as a whole. You can see this in our problem by comparing total output, and market prices, under collusion versus any of our earlier strategies. With collusion, the market price is $\$52.5$ and total production is 95 units. If the firms compete strategically as Cournot thought they might, we get a market price of $\$45$ and total production of 110 units. This means that consumers are unambiguously worse off when firms collude.

Moreover, and importantly, the loss to consumers exceeds the gain to the firms' shareholders when the firms collude. That means that the economy as a whole is (unambiguously) worse if collusion occurs. This is why the US (and most developed nations) have vigorous *anti-competitive practices* laws, which prohibit firms from agreeing not to compete with one another.

Time for a Reality Check

In real markets, successful collusion does occur in some industries (for a time). But it is quite rare, at least in the United States and European Union nations. There are two reasons for this, and these are important for you to know.

- 1) As noted above, collusion is illegal in the U.S., E.U., and most other nations (technically it is *anti-competitive*: Collusion is not a form of competition, because colluding firms are agreeing to *not* compete!). Remember this for the rest of your career.
- 2) Second, even without legal prohibitions firms typically have a strong incentive to “cheat” on any collusive agreement and secretly produce more than they agreed to. This economic incentive has been the bane of the international OPEC cartel’s efforts to control member nations output since the mid-1980s. We will explore this problem in subsequent sessions in a retailing context (look for the discussion of the Best Buy-Circuit City pricing problem).

Applications

The Memory Chip Market. As I mentioned, although collusion is rare it does occur. The attached *WSJ* article from 2005 describes the US government’s prosecution of a dozen executives from Samsung, Infineon Technologies AG, and Hynix Semiconductor for attempting to collude on pricing and production levels in the computer memory chip market. Lawyers tend to call collusion *price fixing*; price fixing is just collusion by another (legal) name.

Private Equity Club Deals. Two attached *WSJ* articles from 2006 describe an ongoing anti-trust investigation into collusion in multi-party (so called “club”) private equity deals. How does the alleged rotating-bid system yield collusive outcomes?

Problem to Prepare for Class

Please come to class with your answers to the following problem. You may find it easiest to use Excel (although that is not necessary). As usual, you do not need to turn in your work on class-session problems.

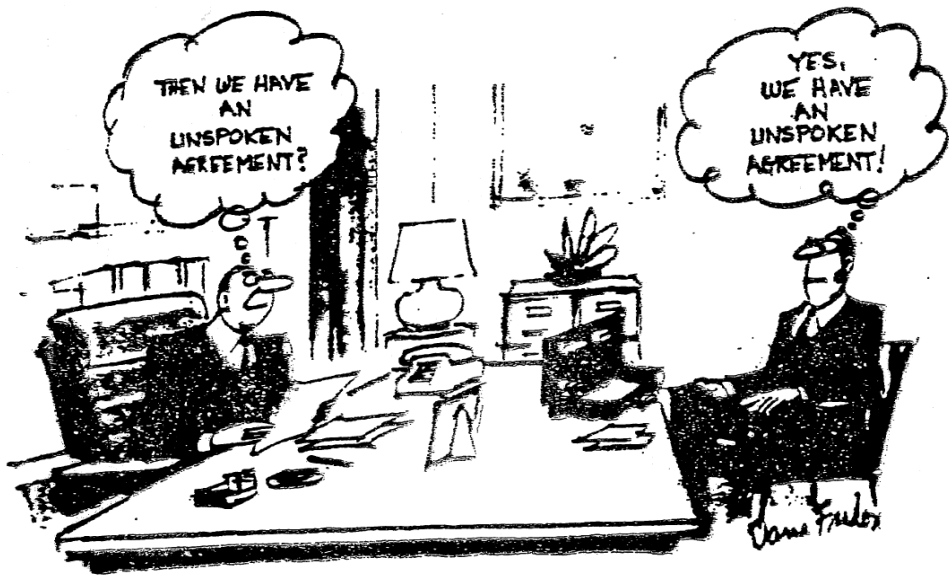
Consider the same market we examined in the Duopoly Game last session. To recall: Two firms compete in a market. Both firms produce identical goods. Each firm has a constant marginal cost of \$2 per unit, and each firm has a fixed cost of \$60. Market demand is $Q = 26 - P$, where P is the market price.

Questions:

- (a) Find each firm's production level, the market price, and profit if one of the two firms acts as a Stackelberg leader and the other as a follower. Assume here that neither firm can avoid its \$60 fixed cost.
- (b) Suppose now that the leader is already in the market (that is, cannot avoid its \$60 fixed cost), but the follower has not yet entered the market. If the follower could avoid incurring its fixed cost by deciding not to enter this market at all, would it be profit maximizing to enter or not?
- (c) Now think about part (b) from the leader's perspective. If the follower decides not to enter the market at all, what are the leader's profits now?

If you did this right, the answer here should be quite different from (a), and might give you pause. Do firms know about this? Go back and think about what DuPont was trying to do in the titanium dioxide market now. Pretty clever business strategy.

- (d) Last, to understand what (sometimes) happens in the duopoly game we played in class last session, find how much each firm would produce and make in profit if they were able to successfully achieve the collusive (monopoly) outcome. Assume here that both firms are already in the market, and neither firm can avoid its \$60 fixed cost.



Storm clouds gathering

Airbus and Boeing are likely to face tough decisions on the issue of overcapacity

The big two jet makers face tough decisions over coming months amid concerns that planned cuts in production have not gone deep enough and risk leaving the industry awash with overcapacity for years to come.

On the surface, the surprising flurry of aircraft orders so far in 2002 – a total of 258 up to the end of May – appears to support the proposed output by Airbus and Boeing over the next couple of years.

Airbus recently confirmed it was planning to deliver 300 aircraft in 2003, despite evidence that the crisis in the industry is far from over. The European jet maker's

plans would leave output little changed from this year when it is also planning to deliver 300 aircraft.

The target is well short of the 450 it had planned to deliver next year before the global economic downturn and September 11 terrorist attacks pushed the commercial aviation industry into what is expected to be the worst downturn in history.

Most analysts had anticipated more drastic cuts by Airbus next year, after output peaked at an all-time high of 325 aircraft in 2001.

Airbus, 80 per cent owned by European Aeronautic Defence and Space company and 20 per cent by BAE

Systems, was never going to have to take as drastic action as archrival Boeing.

The Chicago-based manufacturer in contrast is well advanced with plans to lay off 30,000 workers and is cutting deliveries from 527 in 2001 to 380 this year.

Boeing says it plans to deliver between 275 and 300 aircraft next year. This leaves a combined delivery rate at the bottom of the market of 575 to 600 aircraft, not low enough in the view of many.

Yet Toby Bright, Boeing's head of commercial aircraft sales, is already talking of "upward pressure" on production in 2004.

But analysts are warning that both jet makers and the three big aero-engine makers – GE Engines, Pratt & Whitney and Rolls-Royce – are deluding themselves about the shape of the recession.

"We are increasingly concerned that the airline industry recovery has run out of steam," says Chris Avery, airline and aerospace analyst at JP Morgan. The investment bank estimates the US airline industry will rack up losses of \$4.7bn this year. The top seven US airlines lost more than \$7bn in 2001.

Senior airline officials in

the US fear the problems exposed by the downturn and September 11 run much deeper than business travel drying up. They fear the industry's fare structure is irreparably damaged with heavy discounting continuing. The fear is that manufacturers will try to stave off a raft of cancellations and deferrals by ramping up customer financing to airlines.

"First it could lead to the manufacturers committing a great deal of risk capital to the aircraft finance market, second it could lead to aircraft deliveries staying higher than they should through the trough of the cycle," says Nick Cunningham, aerospace analyst at Schroder Salomon Smith Barney.

GE, largely through its GECAS aircraft leasing unit, has already committed \$4bn in financing to airlines since September 11.

The decision by the low-cost airline sector, the one part of the airline industry to escape unscathed from the recession, to cash in on a buyers market, has helped keep orders this year at unsustainable levels.

Mr Avery estimates total orders could reach 500 aircraft this year but highlights three reasons why that rate

is unlikely to be sustained in 2003, forcing manufacturers into a rethink.

He argues that the order bubble generated by the low-cost airlines will burst next year.

Traditional airlines will not be able to afford to come back to the market. "The network carrier industry prospects appear to us to be getting worse, not better," Mr Avery says.

Furthermore, any upturn is also expected to be met by airlines pulling aircraft out of desert storage, where the number has doubled to more than 2,000 in less than a year.

Estimates of how many of those grounded aircraft could return to service range from 600 to 1,000, representing at least one year's production at current rates.

In the past, downturns in the civil aviation market have followed a four-year cycle. The current recession started in late 2000.

History would suggest orders and deliveries may not hit rock-bottom until 2004 or 2005.

Mr Cunningham uses a skiing analogy. "In that sense we are still on the baby slopes and haven't got on to the black slopes yet for the aerospace downturn."

Boeing takes Airbus to task over production

US aircraft maker says rival's output too high and will further damage industry

Boeing and Airbus became embroiled in a war of words yesterday after the US aircraft maker branded its European rival irresponsible for failing to cut production rates enough to match the deep recession facing its customers.

Alan Mulally, chief executive of Boeing's commercial jet business, warned that the production rates proposed by Airbus over the next few years would further damage the airline industry, which is already facing its worst downturn of modern times.

However, Gustav Humbert,

Airbus chief operating officer, hit back at the suggestion that his company was undermining the aircraft market by failing to cut output to meet the downturn.

He said: "They [Boeing] want volume, volume, volume, because they have not adapted as much as Airbus has. We feel this in the market in prices."

The warning came as Airbus indicated it was planning to increase output again after only two years of falling deliveries. The company plans to deliver 300 aircraft this year and next, down from an all-time high of 325 in

2001, before boosting the figure to between 320 and 340 aircraft in 2004.

On the eve of the biennial Farnborough air show, one of the world's leading aerospace trade fairs which is expected to open today, Mr Mulally said that the outlook was gloomier than Boeing had first anticipated.

"We were thinking that 2003 would be the low point... but this sure does look like it's going to be slower than people thought a year ago."

Executives at the US aerospace and defence group are dismayed

that Airbus has not reacted more aggressively to the downturn, which has just seen the six biggest US airlines report cumulative net losses of \$1.5bn in the second quarter.

Analysts are warning that the slower airline recovery than expected, together with up to half of the 2,000 aircraft in desert storage returning, could push jet makers into a prolonged recession with delivery rates not bottoming out until 2004 or 2005.

Boeing, which has almost completed a redundancy programme to lay off 30,000 employees, is cut-

ting its deliveries from 527 last year to 380 this year.

Last week it confirmed that it would deliver between 275 and 300 aircraft in 2003 and said it had sold 90 per cent of the delivery slots at the bottom end of that range.

Mr Mulally said yesterday: "We knew we had to move decisively to reduce our production, however painful it was, to help our industry."

"We still have 2,000 airplanes that are not being used - they are on the ground - so it just seems like the responsible thing

to do is to reduce production of new airplanes."

Mr Humbert said Airbus was more efficient. To reach the same ratio of employee numbers per aircraft delivered as Airbus, Boeing would have to cut a further 8,000 to 15,000 jobs.

Airbus had not shed jobs and did not have to resort to the same drastic action as Boeing because it was building from a lower base towards its target of a 50 per cent market share. Yet most analysts had expected deeper cuts.

.....
Airbus output, Page 17
Aerospace survey, Separate section
www.ft.com/aerospace



October 14, 2005

Samsung to Pay Fine For Price Fixing

Chip Maker Pleads Guilty For Role in Global Cartel; A \$300 Million Penalty

By JOHN R. WILKE and DON CLARK
The Wall Street Journal
October 14, 2005; Page A3

Samsung Electronics Ltd., the world's largest memory-chip maker by revenue, pleaded guilty to a U.S. criminal price-fixing charge and will pay a \$300 million fine for its role in a global cartel that drove up prices for electronic memory.

Samsung of South Korea is the third big memory-chip maker to plead guilty in the three-year federal investigation, after **Infinion Technologies** AG of Germany and **Hynix Semiconductor Inc.**, also of South Korea. Its penalty is the largest antitrust fine imposed to date by the Bush administration, and the second-largest ever.

The probe so far has resulted in \$646 million in fines and jail terms for five executives; at Samsung, seven more individuals could face criminal charges, lawyers close to the case said, though none were charged yesterday.



probe and related legal action.

Samsung, Infineon, Hynix and a fourth alleged conspirator, **Micron Technology** Inc. of Boise, Idaho, are the largest makers of dynamic random-access memory chips. Micron agreed to cooperate early in the investigation, providing evidence against other conspirators. So-called DRAM chips generate annual world-wide sales exceeding \$26 billion and are used in everything from computers to consumer electronics to autos.

The four companies now face hundreds of millions of dollars more in damage claims from computer makers and in consumer class-action cases. **Dell Inc.**, **Hewlett-Packard Co.**, **Apple Computer Inc.** and other PC makers are expected to seek individual settlements with the chip makers, and some companies are already in secret negotiations to determine damages, the lawyers close to the case said. Some settlements will likely combine cash payments with discounts on



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FURTHER READING

- Korea's Hynix to Plead Guilty, Pay Large Antitrust Fine
- 4/22/05

future chip orders, those close to the case said.

Several PC makers declined comment. But an H-P spokesman said it had reached a settlement with Samsung "regarding this matter," stating that the terms of the agreement are confidential.

Bad Memories

Penalties to date for alleged price-fixing of memory chips

COMPANY	AMOUNT	OTHER PENALTIES
Samsung	\$300 million	Seven employees may face charges
Hynix	\$185 million	N.A.
Infinion	\$160 million	Four employees jailed
Micron¹	N.A.	One employee convicted

¹Micron expected to avoid fine by cooperating with investigation
²Amount company set aside for potential penalties
 Source: WSJ research

Thomas Barnett, Justice Department's acting antitrust chief, said that cracking global cartels is the "highest priority" of U.S. antitrust enforcers. He also said that the memory-chip case "demonstrates the need for vigorous antitrust enforcement in high-tech markets" and the "worldwide scope" of these efforts. Mr. Barnett was nominated to the post by President Bush earlier this year and is expected to be confirmed shortly by the Senate.

The chip case also shows how a government amnesty program is being used against corporate conspirators. Micron was the first to abandon the cartel and agree to cooperate in the investigation, providing evidence against other conspirators. Because of its cooperation in the case, Micron won't face government fines for its conduct. But it isn't shielded from damage claims by computer makers.

Robert Hanson, senior associate dean of the Tuck School of Business at Dartmouth College, said the penalty could give customers leverage in price negotiation and deliver a severe blow to the company's image.

In its filing yesterday in federal court in San Francisco, the Justice Department said it found evidence that between 1999 and 2002 rival chip makers met to discuss prices on dynamic random-access memory chips, agreed on the prices to be quoted to customers and exchanged information about sales volume in order to monitor compliance with those agreements.

Some evidence of the chip makers' conduct also came to light as part of a Federal Trade Commission case involving **Rambus Inc.**, a maker of memory technology that has filed its own civil suit against the chip makers.

For example, a Nov. 26, 2001, email sent by a Micron manager described efforts by Infineon and Samsung to raise prices on memory chips, and said Micron planned to raise its prices to all PC makers. "The consensus from all suppliers is that if Micron makes the move all of them will do the same and make it stick," the email said, according to court documents.

Rambus of Los Altos, Calif., is suing Samsung, Hynix, Micron and others on the grounds that they conspired against Rambus and its efforts to license a technology that makes memory chips more efficient. In the case, the court is also considering whether to unseal the rest of the documents relied upon by the government in the prosecution of the price-fixing case.

Prices for memory chips have been in decline for years. But that pattern masks sharp swings in price for chips with different capacities, as companies gear up production of new products and face gluts of older models. When prices of memory chips go up, consumers either face higher

prices or computer makers' profits get squeezed.

In this case, Apple and Dell raised prices in response to a spike in memory prices three years ago, while other companies reduced the amount of memory in computers they sold, the Justice Department said.

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October 11, 2006

Probe Brings 'Club Deals' to Fore

By DENNIS K. BERMAN and HENNY SENDER
October 11, 2006; Page C1

When hospital operator HCA Inc. announced a deal to be taken private by a trio of private-equity firms earlier this summer for \$21.3 billion, the buyers worried that a rival bidding group would crash the party and force the price higher. But no such bid materialized.

At least some of these rivals held off, say people familiar with the decision making, because they feared a competing bid for HCA would open the door for other firms to jump in on the rivals' own, other buyout deals, these people said. (In other words, *you don't bid on my deal, I won't bid on yours.*)

WALL STREET JOURNAL VIDEO



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Reporter Dennis Berman explains² the concept of "club deals" among private-equity firms and talks about the latest in the Justice Department's inquiry.

Such calculations on whether to join forces or face off against competitors have been at the heart of private-equity investing over the last three years. Assessing these rules of engagement in the

multibillion-dollar world of corporate buyouts is also part of a new Justice Department inquiry into private equity's auction practices since 2003, according to people familiar with the effort.

The inquiry, reported yesterday by The Wall Street Journal, centers on how groups of private-equity firms conduct their bidding in corporate auctions, according to people familiar with letters sent to buyout firms.

In many of these transactions, powerhouse private-equity firms -- which pool large sums of capital from wealthy investors and institutions -- team up to make bids to take companies private, hoping to cash in by selling them later at a higher price.

Charter Members

Value of deals since 2004 by the top sponsors of U.S. 'club' deals, or private-equity deals with more than one sponsor; in billions*:



*Deal values include assumed debt of target Source: Dealogic

The inquiry, run by the Justice Department's antitrust division in Manhattan, is preliminary and like other such matters, may eventually lead in a different direction or nowhere at all. Those receiving letters include Kohlberg Kravis Roberts & Co., Silver Lake Partners and Carlyle Group, according to people familiar with the matter, and the list is likely to grow. All three firms declined to comment.

The two-page document is described by someone who has read it as being relatively generic, asking a general set of questions about the firms' bidding history, bidding partners and timing and nature of pricing changes in auctions.

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The Justice Department has put a priority on combating business collusion and price-fixing in recent years. But such cases usually proceed as criminal investigations with subpoenas, and the letters that were sent in this instance were non-compulsory requests for information. That suggests the inquiry is at an early stage. The head of the antitrust division's New York office, Ralph Giordano, referred calls to a Justice Department spokesman, who declined to comment.

The Justice Department's antitrust record on Wall Street is mixed at best. Back in the 1950s the Justice Department sued 17 Wall Street investment banks -- then known as Club 17 -- on antitrust charges, but the case was thrown out of federal court.

Today, legal and economic scholars say it would be hard to prove that private-equity shops -- who actively bid share prices higher and not lower -- are colluding to suppress prices of the companies they buy.

Nonetheless, the firms were preparing yesterday for what could be a long legal challenge. The general counsel of one major buyout firm advised employees to preserve documents in case regulators send a request for information. In addition, private-equity attorneys held a conference call yesterday afternoon to discuss strategy and compare notes.

WHO'S WHO IN PRIVATE EQUITY



³ • See a rundown of high-profile private-equity firms, their histories, holdings and biggest deals.⁴

News of the letters touched off a range of reactions around Wall Street, where the buyout funds have become powerful presences, having paid out some \$9.6 billion globally in fees to investment banks year-to-date for advice, capital raising and other activities, according to data analysis firm Dealogic.

If there is going to be any slowdown in deal making, it didn't show up in markets. In the latest multibillion-dollar deal, private-equity firm Texas Pacific Group and one of its investors clinched a deal to buy French television and cellphone transmission business TDF SA.

At least some described the inquiry as an "inevitable" outgrowth of the evolution of the big-ticket buyout game. Wielding smarts, ego and capital, elite firms have clustered at auctions for a virtual buffet of the nation's largest companies: movie chains, satellite operators, newspaper companies, and semiconductor-makers among others.

To pay for such large targets -- with total price-tags of upward of \$30 billion -- the firms have in recent years begun to partner into what have come to be known as "club deals." These clubs are largely limited to a handful of buyout firms with roughly more than \$10 billion each in capital, such as Kohlberg Kravis Roberts & Co., Blackstone Group, Texas Pacific Group, and the investment arm of **Goldman Sachs Group Inc.**

These clubbing arrangements present both opportunities and problems for companies on the auction block. On the plus side, they allow for the assembly of the immense pools of cash necessary to bid on a large target in the first place. That in turn helps buyers spread the risk of any one transaction, which is another essential ingredient to making a bid.

Yet inside these clubbing arrangements is a fraught dynamic. While often ferocious competitors, the firms are just as likely to end up co-owners of a number of targets. For instance, two of the buyout world's top firms, Blackstone Group and Carlyle Group, are often on different sides of transactions. For example, when Kinder Morgan Inc. was considering a management buyout involving Carlyle earlier this year, Kinder's board hired Blackstone's advisory arm to evaluate the bid. But they are also bidding together to buy Freescale Semiconductor Inc.

In all, Carlyle has done 20 club deals since 2005, and Texas Pacific Group 25 club deals, according to

Dealogic data. Some 44% of all \$1 billion-plus buyouts are done in club deals this year.

Legal scholars are far from convinced that any legal case may arise from the inquiry.

"These are hard [cases] to make for a variety of reasons. One of them is an evidentiary reason. There is not going to be a document where somebody says, 'What we really need to do is team up so we can keep the price down,'" said Todd Henderson a professor at the University of Chicago Law School.

Lauren S. Albert, an attorney at New York's Axinn, Veltrop & Harkrider said that a case was possible given a certain set of conditions. "If a bidder or group was able to bid on its own -- but to avoid competition joined with other bidders capable of bidding on their own -- that could be viewed as unlawful."

One area that could receive significant attention is the use of confidentiality agreements in auction situations. These agreements are designed to contractually hold competing parties to a vow of silence with each other, unless permission is granted by the seller.

Nonetheless, information can leak between these parties and their bankers, at times conveyed in media stories or via a third party. Attorneys suggested yesterday that one point of inquiry could be the investment banks and lending desks of major Wall Street firms who oftentimes will fund multiple bidders in the same auction.

It is these fulcrum points that could at least theoretically keep the flow of information going between two rival groups -- and potentially affect pricing of an auction.

---- John R. Wilke, Paul Davies and Jason Singer contributed to this article.

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October 12, 2006

Antitrust Law's Delicate Dance

By NATHAN KOPPEL
October 12, 2006; Page C1


When does an alliance that is legal cross the line to become a collusion that is illegal?

It is a standard antitrust law question that is now being asked by lawyers who follow the private-equity industry, in the wake of news that the Justice Department is pursuing an inquiry into how private-equity firms conduct their bidding for control of public companies. Antitrust cases are often tough to make. The Justice Department, for instance, battled with Microsoft Corp. for years before reaching a settlement with the software giant in 2002. On Wall Street, these cases can be even tougher, as U.S. officials have discovered more than once.

Unlike some industries dominated by one or two players, Wall Street is a highly competitive arena, says Keith Shugarman, an antitrust lawyer with Goodwin Procter LLP. Private equity represents only one pool of capital competing for company shares. "There is so much money out there that there is almost unlimited potential competition," says Steven Newborn, a partner at law firm Weil, Gotshal & Manges LLP. "There are so many alternative bidders" for attractive investment targets that it is hard to artificially depress prices, he says.

WALL STREET JOURNAL VIDEO

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Journal reporter Henry Sender discusses² the growing tension between private-equity firms and public shareholders.

In the late 1990s, the Justice Department launched an investigation into whether Wall Street firms conspired to fix their commissions at 7% as part of their "underwriting" business -- the lucrative process of helping corporations issue new stock.

The investigation followed a 1998 study by University of Florida professors Jay Ritter and Hsuan-Chi Chen, who found that many midmarket companies issuing stock in the mid-1990s paid the exact same fees to banks that underwrote the offerings and that those fees seemed to move in unison. By 2001, however, the Justice Department closed an investigation into whether the Wall Street firms had conspired to fix their commission and no charges were brought. "They were looking for a smoking gun, and they weren't able to find it," says Mr. Ritter.

In the mid-1990s, the government investigated securities firms, including **Merrill Lynch & Co.** and **Goldman Sachs Group Inc.**, for allegedly conspiring to fix trading costs on Nasdaq Stock Market shares. The Justice Department reached a settlement with the securities firms prohibiting them from colluding in the future, but the firms weren't forced to pay fines and didn't admit or deny wrongdoing. (There was also private litigation and damages were paid.)

In the 1950s, U.S. officials alleged that 17 Wall Street firms monopolized the securities-underwriting business. The case was thrown out of federal court. Federal antitrust law typically involves a delicate dance of identifying when free-market arrangements hamper the market itself. Companies are allowed to band together for business purposes -- moves they ostensibly make to stay competitive. But issues arise

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when the agreements are seen as stifling competition.

The private-equity inquiry, run by the Justice Department's antitrust unit in New York, is preliminary and like other such matters, may eventually lead in a different direction or nowhere at all. Private-equity firms generally are pools of capital collected usually from wealthy investors and institutions, and used to bid for control of companies. People familiar with the matter say the Justice Department has asked relatively generic questions of a few private-equity firms about how they bid for control of the companies they pursue.

Regulators could have questions about whether private-equity firms' practices when they team up to make bids to take companies private cross the antitrust-law line. Such deals are known in the industry as "club deals." A legal issue would be whether, absent the creation of such teams, there would have been more competition that would have pushed the price of pursued companies higher.

The theory is "a company's shareholders are hurt if they don't have the full panoply of competition" in corporate auctions, says Mr. Newborn, of Weil Gotshal. The Justice Department declines to comment.

Judgment Call		Three antitrust matters involving Wall Street firms	
	IPO COMMISSIONS	TRADING NASDAQ STOCKS	SECURITIES UNDERWRITING
DATE	Investigation closed 2001	Settlement 1996	Court decision 1953
ISSUE	Whether Wall Street securities firms conspired to fix commissions on certain IPOs at 7%	Whether market makers conspired to raise trading costs for investors.	Whether banks were monopolizing the underwriting business
OUTCOME	The government did not bring charges	A settlement was designed to prevent firms from following a practice that fixed transaction costs.	A federal judge in New York dismissed the antitrust suit

Cases typically proceed in one of two fashions, attorneys say. If the government can muster actual evidence -- such as email or witness testimony -- that firms have entered an agreement to limit competition, the government can argue a "per se" violation of the Sherman Antitrust

Act, meaning that no proof of harm to shareholders is necessary. "Certain agreements are so obviously harmful to the free-market system that they are automatically condemned," says Todd Henderson, a professor at the University of Chicago School of Law.

Regulators could probe whether firms colluded by agreeing not to compete on every auction: "I'll bid on this case, and you bid on the next one," says Harry First, a professor at New York University School of Law and the former lead antitrust regulator in the New York attorney general's office. "If they find that, it is per se illegal. No fancy analysis is needed."

But antitrust cases rarely work out that way. Without smoking-gun evidence, the government would have a much tougher time. It would have to show actual economic harm, a process that involves economic analysis of prices, and the players' powers in that market.

Some economists say making such a case could be difficult. Steve Kaplan, a University of Chicago economist who follows the private-equity industry, notes that private-equity firms don't have ultimate control over the value of the companies they target. "The seller doesn't have to sell," he says. "The board can always say, 'I'm not going to sell.'"

Mr. Kaplan adds that the large deals that have attracted club bids -- such as recent bidding for companies like Harrah's Entertainment Inc. or Freescale Semiconductor Inc. -- probably wouldn't have occurred without private-equity firms teaming up, because so much capital was required. In the absence of these team bids, he notes, the share prices of target companies might have been lower. In other words, teaming up helped to raise share prices, not lower them.

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