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In This Issue

Deterrence Value of Punitive Damages

Jonathan L. Walker and Laura A. Malowane discuss the economic basis for the amount of punitive damages necessary to achieve the desired deterrence effect. They argue that firms can be deterred from breaking the law if they do not expect to profit from law-breaking. A proper evaluation of punitive damages requires consideration of factors like the probability of detection, legal defense costs, reputation costs and social costs from over-deterrence.

Synergies in Innovation and Mergers

Tessie Su considers a type of efficiency-synergy in innovation—that is often overlooked in merger analysis. These efficiencies are especially important between producers of complementary products. Depending on the nature of innovation research technology, it may be effectively impossible to capture the gains through contracts. In these circumstances, merger may be the best path for achieving the synergies.

Competitive Effects of International Airline Code Sharing

Stuart D. Gurrea discusses economic analyses of the competitive effects of code sharing among international airlines. He notes that code sharing, which essentially creates an operational merger on the affected routes, can create economic efficiencies. Antitrust concerns, however, may also arise. Economic analysis of airline data related to prices and entry decisions by rivals can provide important insights into the competitive effects.

The Deterrence Value of Punitive Damages

By Jonathan L. Walker and Laura A. Malowane

The Supreme Court has endorsed punitive damages as a means of deterring unwanted conduct and achieving other social goals. At the same time, the Constitution limits courts' and legislatures' authority to impose excessive fines or unnecessarily interfere with interstate commerce. While continuing to approve of punitive levies in principle, the Supreme Court has rejected disproportionately large awards and stated that punitive damage awards are subject to *de novo* appellate review to ensure that awards are not excessive. Consequently, the size of punitive award necessary to achieve deterrence, if any, has become a central issue in court proceedings.

In principle, companies can be deterred from violating the law by eliminating the expected profit from lawbreaking. Companies may expect to profit from lawbreaking if there is some likelihood of evading detection, i.e., not being brought to task, or if the consequences of being detected are small. For any particular likelihood of detection, some sufficiently high penalty will eliminate the expected profit. With a higher probability of detection, a lower punitive award is necessary to deter wrongdoing. As the probability of detection approaches 100%, the need for *any* punitive award falls to zero.

In the real world, if a company is detected violating the law, it may also incur substantial legal defense costs and impair its reputation with its customers, suppliers and other business partners. A company is equally worse off paying \$1 in legal fees or losing \$1 in profits due to diminished business reputation as it would be paying \$1 in punitive damages. Consequently, defense costs and damage to business reputation have a deterrent effect independent of any punitive damage award, and the penalty necessary to deter is reduced dollar-for-dollar by defense and reputation costs.

It may be argued that concern about overly large punitive awards is unnecessary because only malfeasors must pay them. Such arguments are invalid: excessive deterrence is costly. The cost to society is evident in the prophylactic measures rational, law-abiding companies and individuals take to avoid mistaken prosecution. Companies and individuals limit commerce when excessive fines are possible and adjust their prices when their purchases or sales expose them to risk of mistaken prosecution. This effort raises costs to consumers and reduces income to producers beyond that necessary for adequate deterrence.

In addition, individuals and companies may violate the law mistakenly. Mistakes may be due to human error or renegade agents or employees. Although individuals and companies may be legally responsible for their agents' and employees' actions, as a practical

Synergies in Innovation and Mergers

By Tessie Su

The notion that mergers enable firms to capture efficiency gains resulting from cost or demand synergies is well understood. Cost synergies result from economies of scale or scope in functions like materials purchasing, manufacturing, financing, marketing and selling, or research and development. Demand synergies, which occur

when the demand for complementary products marketed together exceeds their individual demands, also arise from some mergers. Another form of efficiency gains-innovation synergies-can also create important gains from mergers, but they are often overlooked. Innovation synergies occur when a merger of producers of complementary products yields more innovation in those products than would have occurred without the merger.

Because complementary products are used together, innovation (or a lack of innovation) in one product may affect the demand for both. For example, suppose one firm makes computer hardware and another makes computer software. Suppose further that the hardware firm could invest in increasing the power of its processing unit, and the software firm has the opportunity to upgrade its software by providing more functions. If the increased hardware processing power would increase the value of an upgraded version of the software by making it work more smoothly, more users would buy the software if faster processing units were available. Similarly, more consumers would buy the faster processing hardware if more sophisticated software were available. While it is possible for a firm to innovate without explicit coordination with firms whose products are complements of its own (e.g., Intel and Microsoft), it is not always the case that optimal innovation occurs.

When investments in innovation of complementary products are made unilaterally, each firm might not generate enough incremental profit to cover its investment cost. Under some circumstances, no innovation would take place if each firm moved unilaterally. If, however, the investments are made jointly, the increased size of the markets for both products may make both investments profitable. The question arises, then, of how to achieve the goal of joint investments in those circumstances. Merger is one obvious solution. The merged firm would pay for both of the innovation costs, and it would capture the profits from the improvements of both products. Apple Computer, for example, produces new generations of both its hardware and software products. The ability to generate the necessary increased demand increases the incentive to innovate.

Is merger the only way to capture the synergy in innovation of complementary products? The answer depends on the research technology that leads to the innovation. One type of research

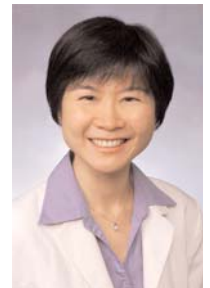
technology involves a one-time, fixed amount of investment that yields a given increase in product quality; additional investment will not yield additional improvements in product quality. A firm simply decides whether to invest the specified amount. When both producers of complementary products face this type of investment, a contractual solution involving profit sharing may be sufficient to yield the necessary investment.

The second type of research technology is distinctly different from the first. With this type, each increase in expenditure results in an improvement in product quality or an increase in the chance of inventing a new product. Thus, a firm must decide on the optimal size of its investment, so that the expected marginal benefit equals the marginal cost. When one of the two producers of complementary products faces this type of innovation, a contractual solution that produces sufficient investment is still possible, but it is more complicated. Under these circumstances, to get sufficient investment, the firm with the second type of innovation could claim all of the profit from both products and compensate the other firm for its investment. This arrangement would give the firm with the second type of innovation incentive to invest a sufficient amount, since it would effectively be an owner of the joint investment project.

When both firms face the second type of innovation, current economic literature suggests that a contractual solution cannot yield an efficient amount of investment by each firm, and merger becomes the primary vehicle for achieving the investment. In reality, most innovations involve this type of investment. The quality of a new product is often a function of the amount of research and development spending. Additionally, innovations often have uncertain outcomes, and larger research and development expenditures can improve the chance of success. In these situations, a merger is likely to be the best means to ensure sufficient amounts of investment.

In modern economies, innovation and technological advances are important sources of economic growth. Moreover, innovation is also often the source of a firm's competitive advantage. In many circumstances involving producers of complementary products, mergers are the most effective way to achieve adequate innovation.

Senior Economist Tessie Su has conducted research into the economics of mergers and innovation synergies. She is based in EI's San Francisco Bay Area office.



Measuring the Competitive Effects of International Airline Code Sharing

By Stuart D. Gurrea

Strategic alliances involving international airline code sharing have shaped the international airline industry over the past decade in a manner similar to the transformation of domestic airline operations into hub-and-spoke networks after deregulation. Airline code sharing is a form of cooperation by which an airline sells tickets with its identifier on another airline's flight. In essence, code sharing amounts to an operational merger on the affected routes. These alliances can produce significant economic efficiency gains, but also may raise concerns of competitive harm.

Since 1987, airline code sharing agreements have required approval from the Department of Transportation (DOT) after a competition review by the Department of Justice. DOT can approve agreements between domestic and foreign carriers if the agreements are not contrary to the public interest and do not substantially reduce or eliminate competition. In the event that there is a reduction in competition, DOT may still grant antitrust immunity if the alliance is necessary to meet an important transportation need or it is considered to be the most pro-competitive alternative to secure public benefits. Typically, approval of the antitrust authorities depends on the likelihood of new entry in response to the potential anticompetitive effects of a particular code-sharing agreement. In this context, the evaluation of the effects of code sharing on competition becomes an essential element for its approval.

Airline code-sharing proposals have received favorable antitrust consideration when they involve routes connecting two

separate networks (complementary alliances). Complementary alliances generally do not undermine competition and can yield large efficiency gains. A more critical perspective has been adopted towards alliances among competitors over the same routes (parallel alliances). Parallel alliances raise competitive concerns that (1) they result in a direct reduction in the number of competitors, which is likely to reduce capacity and result in higher fares, and (2) the alliance's greater airport presence might foreclose rivals from entering the market. The concern



International airline code sharing alliances can produce significant economic efficiency gains, but also may raise concerns of competitive harm.



about foreclosing entry is based on the premise that an alliance's large airport presence imposes structural and strategic barriers to rival airlines' entry decisions. Offsetting the possible competitive harm, however, is considerable potential for efficiency gains. In most regulated international markets, code sharing allows an alliance to operate like a hub-and-spoke network with a large presence at

both ends of the market. This network structure yields economies of scope from lower entry costs into new markets and economies of scale from increased route density producing lower incremental costs of carrying additional passengers.

DOT's approach to international code sharing has been to grant immunity except for those city pairs carved out because "the proposed alliance partners are two of very few or likely competitors." For example, DOT's final order granted antitrust immunity to the alliance between *Lufthansa* and *United Airlines* for all routes, except Chicago-Frankfurt and Washington-Frankfurt on which both airlines were rivals before the alliance. Yet despite DOT policies to sustain the number of rivals, some transatlantic routes on which major international alliances have taken place have nevertheless lost competitors.

Selected EI Cases

Babb v. Geisinger Health System, Centre Community Hospital et al.

Senior Vice President David A. Argue submitted testimony for the defendants in response to a claim that the plaintiff, Terrence E. Babb, M.D., was prevented from joining the staff at the defendant hospital as part of a conspiracy to monopolize OB/GYN services in Centre County, Pennsylvania. Argue testified, among other things, that plaintiff had not properly defined the geographic market and that the defendants had no incentive to engage in the alleged conspiracy. The court granted summary judgment to the defendants who were represented by Lee, Martin, Green & Reiter and Fitzpatrick, Lentz & Bubba.

Furash v. McClave and Towers Perrin

Vice President Henry B. McFarland testified regarding damages on behalf of defendants in a recent trial in U.S. District Court. Plaintiffs alleged that the defendants, Kathleen McClave and Towers Perrin, had caused a consulting firm, Furash and Co., to go out of business. McFarland projected the future profits of the firm absent the defendants' alleged bad acts. He showed that because of the firm's limited earnings potential, it had no going concern value. The jury found in favor of defendants. The defendants were represented by Pepper Hamilton.

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Punitive Damages . . . (Continued from Page 1)

matter, no one can ever fully control others' behavior. Fines that are not necessary to achieve a legitimate social purpose will nevertheless encourage potentially wasteful investments by individuals and companies trying to avoid mistakenly violating the law or being held accountable for someone else's willful violation of the law.

The basic principles of deterrence and corporate behavior apply to all profit-maximizing companies regardless of size, wealth or income. No company has a profit motive to violate the law if, after accounting for the probability and consequences of detection, the expected costs of violating exceed the expected benefits. If the potential punitive award is sufficiently high that there is no profit motive for small companies to violate, then it is also sufficiently high to deter larger or more profitable companies under similar circumstances. To assume otherwise is to assume that large, profitable companies do not maximize profits while smaller less profitable companies do. Not only is

such an assumption counterintuitive and empirically incorrect, but it leaves courts with no deterrence justification whatsoever for punitive fines. If courts assume that companies are not profit maximizers, they have no basis for expecting that fines will affect companies' behavior at all, let alone for assuming that larger fines will have a larger deterrent effect. Rather than achieving the legitimate social goal of deterring unwanted corporate conduct, a policy of higher punitive fines for more profitable corporate defendants may distort the competitive process by disadvantaging more efficient companies and thereby discouraging them from doing business.

Frequently, testifying economists and accountants ignore these basic principles. Their testimony is based on defendants' balance sheets or income statements and the observation that an award would represent only a certain number of days' or weeks' worth of a defendant's revenue, cash flow or net income. Alternatively, the testimony may characterize a particu-

lar award as being only a small fraction of a defendant's net worth, assets or market capitalization. Such analysis is irrelevant to the punitive award appropriate for corporate deterrence. On the other hand, sound economic analysis of punitive awards considers the variables and relationships that are relevant to the issue, e.g., probability of detection, defense costs, reputation costs, risk aversion, and social costs from over-deterrence.

Principal Jonathan L. Walker has testified about punitive awards at trial. Senior Economist Laura A. Malowane and Vice President Matthew B. Wright have analyzed punitive awards in several matters.



Airline Code Sharing . . . (Continued from Page 3)

An economic analysis of market data that accounts for potential entry by rival airlines and how the entry decision may be affected by a code-sharing alliance can be an important part of evaluating code sharing's potential competitive effects. Economic models of entry provide the theoretical and statistical framework to study the determinants of simultaneous entry decisions in markets with few competitors. Among the factors that affect airlines' entry decisions are the nature of market demand and firms' cost structures. In addition, a firm's profits on routes with a limited number of competitors may depend on its rivals' entry decisions. The impact of a rival's entry decision depends on its airport presence—rivals with a large airport presence tend to have a stronger competitive impact—and whether it is part of an efficiency-enhanc-

ing alliance.

A strict enforcement of antitrust restrictions toward parallel alliances should, however, be taken with caution. Some theoretical models predict higher prices from cooperation among rivals on the same routes. But empirical evidence has demonstrated the beneficial effects of code sharing on connecting flights fares. It has failed to provide conclusive evidence supporting the hypothesis that parallel alliances result in higher fares.

Economic analysis of airline market data can offer new insights on the effects of code sharing on competition. A careful analysis of price data and the evaluation of the effects of an alliance on entry decisions can offer valuable information in the approval stage of a code sharing alliance. The application of a general policy without taking into account market and firm characteristics may

prevent the approval of alliances with pro-competitive effects.

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Correction: The summary of Robert Petersen's article on stock option valuation in our previous issue inadvertently stated that standard valuation models can understate employee stock option values.

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