Competition and Wealth Effects of Mergers

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"No one can believe that we have established a precise relationship between concentration and market power... We need to be humble in a day when the greatest function of the antitrust laws appears to be to arm the defenses of corporate officials who, when a takeover proposal is made, seek to maintain the avarice of their stockholders."
Nobel Laureate George J. Stigler (1982, pp. 7-8).

1 Introduction

In February of 1983, General Motors (GM) and Toyota, the world's largest and third largest automakers, agreed to jointly produce cars to be sold in the United States. The agreement triggered a vigorous campaign by GM's competitors to stop the joint venture.[1] Both Chrysler and Ford charged that the venture would result in price-fixing and generally reduce competition. They also argued that the deal violated U.S. Department of Justice (DOJ) standards for industry concentration. In sum, GM's competitors were of the opinion that the venture constituted a clear violation of antitrust laws, and they were counting on the Federal Trade Commission (FTC) to stop the agreement. More than a year later, on April 11, 1984, the FTC finally

[1]"A joint venture ignites a feud", *Maclean's Magazine*, May 16, 1983.

gave approval to a consent agreement which limited GM and Toyota's joint venture to build subcompact cars in Freemont, California.

Apart from bringing to mind Posner's (1969) "porkbarrel" model of antitrust enforcement,[2] this case also points to a fundamental problem in antitrust enforcement: Because the anticompetitve significance of corporate combinations does *not* represent an observable characteristic, policy makers are forced to rely on largely untested theories in order to justify their decisions. The fundamental inability of the enforcement agencies to systematically separate efficient from anticompetitive mergers invites opportunistic charges of anticompetitive effects. The temptation to prod the FTC into challenging the GM-Toyota venture may have been irresistable precisely because the industry rivals feared the venture would *increase* competition by realizing economic efficiencies, placing Chrysler and Ford at a competitive disadvantage.

As noted by George Stigler (above quote), the economics profession has provided little –if any– *tested* knowledge to support the market share and concentration criteria which form the basis for U.S. antitrust policy,[3] and which basically underlies the recent move in Canada towards a more activist policy towards horizontal mergers. Perhaps due to a certain intuitive appeal (the cost of enforcing a tacit collusive agreement is inversely related to the number of producers in the industry), the Market Concentration Doctrine continues to play a dominant role in antimerger enforcement policy. This Doctrine, which is an implication of oligopoly models in the tradition of Cournot ([1838] 1927) and Nash (1950), holds that the degree to which the output of an industry is concentrated in a few firms gives a *reliable* index of the industry's market power.[4]

The Market Concentration Doctrine has been heavily criticized on both theoretical and empirical grounds. For example, the oligopoly framework behind the Doctrine explicitly rules out competition from *potential* (not yet established) producers,[5] as well as important dynamic aspects of changes

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[2]Posner asserts that antitrust investigations by the FTC are initiated "at the behest of corporations, trade associations, and trade unions whose motivation is at best to shift the costs of their private litigation to the taxpayer and at worst to harass competitors." (1969, p.88).

[3]Section 3 of this paper contains a brief description of the merger guidelines issued by the U.S. Department of Justice.

[4]See, for example, Demsetz (1973).

[5]See, e.g., Demsetz (1968). Accounting for the role of potential competition, Demsetz concludes that "We have no theory that allows us to deduce from the observable degree of concentration in a particular market whether or not price and output are competitive"

in market structure. Markets are inherently dynamic as resources are re-allocated in response to new investment opportunities. Competitive pressures cause firms to specialize their productive skills and resources, which in turn leads to increased concentration whenever the resulting cost-advantage increases optimal firm size.[6] In this view, the process of industry concentration is driven by "healthy" competition, with some of the efficiency gains passed on to consumers. Thus, one can view the degree of inductry concentration as an index of *competition* (through resource specialization) as well as of monopoly power, in which case a deconcentration policy forces a costly, suboptimal duplication of otherwise efficiently allocated corporate resources.

These two conflicting views of the causal links between competition and concentration can only be resolved through systematic empirical evidence. The central empirical implication of the Market Concentration Doctrine is that relatively high levels of industry concentration will be associated with relatively large industry-wide monopoly rents.[7] Following Bain (1951), numerous studies have attempted to test this proposition by estimating the cross-sectional correlation between accounting measures of industry profits and the level of industry concentration.[8] However, although this correlation is indeed typically found to be positive, the same studies have generally failed to show that this evidence discriminates between the Market Concentration Doctrine and alternative proposition that the positive correlation is simply driven by inter-industry differences in risk or average costs of production.[9] Thus, this type of evidence does little to resolve the basic issue concerning the true causal link between competition and concentration.

Furthermore, with the level of aggregation involved in the empirical mea-

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(pp. 59-60).

[6]See, e.g., McGee (1971), Peltzman (1977) and Lustgarten and Thomadakis (1980) for a further elaboration of this point.

[7]A closely related but somewhat less general prediction is that high levels of concentration will be associated with relatively high, supracompetitive *product prices*. Although evidence of supracompetitive pricing is sufficient to conclude that market power is present, it is clearly not necessary: monopoly rents can also be generated by means of collusion on non-price variables, by monopsonizing inputs, or by sophisticated price discrimination schemes that need not be evident through the observed product price.

[8]For a survey of the literature on the "structure-conduct-performace" paradigm, see, e.g., Scherer (1970) and Weiss (1974).

[9]Brozen (1970), Demsetz (1973), Peltzman (1977), and Carter (1978) present evidence supporting the theory that industry concentration is predominantly a result of the expansion of relatively cost-efficient producers. The issue of cross-industry variation in risk is not explicitly addressed in this literature.

sures of profitability, and since merger is only *one* particular route to increased concentration, the empirical estimates of the correlation between industry concentration and profits provide little –if any– basis for determining an optimal public policy towards mergers. A merger policy ought to be based on systematic evidence on the relationship between changes in industry concentration and firm profitability, based directly on the history of merger activity. Some first evidence of this type is reported in Eckbo (1985) and is reviewed in this paper. I also review in some detail the principle, originally developed in Eckbo (1983) and Stillman (1983), of using stock prices to analyze *market expectations* as to the anticompetitive significance of horizontal mergers. This approach has a theoretical foundation lacking in the traditional structuralist approach to diagnose market power effects of mergers. Stated simply, merger-induced changes in industry members' stock prices provide direct evidence on the existence of monopolistic wealth transfers, which is the central necessary *result* of increased market power. This contrasts with the traditional, indirect approach, which is to infer the *opportunity* for such wealth transfers by referring to some abstract monopoly model.

For example, in the context of the GM-Toyota venture, rather than speculating that the venture might reduce competition because the venture resembles a collusive arrangement (the traditional approach), the Eckbo-Stillman approach involves (i) estimating the wealth impact of the joint venture using stock market data, and (ii) analysing whether it is reasonable to interpret the estimated wealth effect as (discounted) monopoly profits rather than gains/losses expected to follow from economically efficient corporate combinations. Interestingly, over the ten days surrounding the first public announcement of the joint venture in 1983, the stock price of GM *rose* by a significant 10 percent in excess of the market, while the prices of Crysler and Ford *fell* a significant 9 and 2 percent, respectively. Is this price fall consistent with the charge that the *market* expected the venture to limit competition in the auto industry? The discussion in this paper provides a basis for analysing questions of this type. Indeed, this methodology was used by the FTC itself during the inquiry which eventually led the agency to the final consent agreement with GM and Toyota in 1984.[10]

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[10]The U.S. Department of Justice have also shown an interest in using the Eckbo-Stillman methodology to diagnose anticompetitive mergers: "[One] tool that might be considered [for detecting price fixing], an Antitrust Division lawyer said, would be a study of stock prices of companies involved in a merger and their competitors", *Wall Street Journal*, January 10, 1984, p. 3.

The rest of the paper is organized as follows. Section 2 gives a non-technical description of methodological issues and outlines the nature of the empirical tests. A survey of the U.S.-based evidence is found in Section 3. This section also presents some first results for Canadian horizontal mergers. Concluding remarks are found in Section 4.

2 Diagnosing Anticompetitive Mergers

2.1 The Basic Methodological Framework

2.1.1 A Simple Illustration

A principle advantage of using security price data to measure economic effects is their high quality. North-American stock exchanges are among the world's most efficient capital markets.[11] The textbook assumptions are all there for a competitive, informed market, such as relatively low transaction costs, frequent trading, unimpeded entry on both sides of the market, and rapid, low-cost information dissemination. Stock prices set in an efficient market reflect all publicly available information about the future prospects for the respective stock issues, and prices change quickly to incorporate the economic consequences of new information. Thus, if one knows *a priori* at what point in time a certain type of information became publicly available, one can use the price changes at that point in time to "read" how the market interpreted the information. In the context of this paper, stock price changes, conditional on events where information concerning mergers and acquisitions became publicly available, are used to derive the market's expectation about the microeconomic consequences of these investments.

The advantage of stock price data in drawing inferences about the valuation changes induced by events like mergers and tender offers is illustrated by the following example. Suppose the objective is to judge whether a given merger has produced market power, and that the only available information is the history of the price of the merging firms' product before and after the merger took place. One would then run into the following types of problems. (1) Since firms can extract monopoly rents without changing the observed product price (e.g., by lowering product quality) we would certainly fail to

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[11]For a discussion of the concept of market efficiency, and much of the related empirical work, see, e.g., Fama (1970, 1976). Fama's (1970, p. 383) definition of an efficient market as one 'in which prices "fully reflect" available information' is the definition used in this paper.

recognize monopolistic mergers unless we do in fact observe a change in the product price around the time of the merger. (2) If we are looking for product price changes due to the merger, we need to predict what the product prices would have been in the absence of the merger. There is currently no generally accepted theory which gives such a prediction on product prices. (3) In order to identify product price changes caused by the merger, we need to predict at what point in time the merger actually starts to have an impact on these prices (is it half a year, one year, or five years after the merger date?).

The theory behind the use of security price data presents a solution to all of these three problems: Security prices represent the net impact of the merger on the firms' future cash flows (regardless of whether the impact comes through prices, quality, costs, etc.); there is a well developed equilibrium model describing expected (or "normal") security price behavior; and we know security prices will on average adjust correctly to the merger in formation at the time when this information becomes publicly available. Thus, the relatively small, difficult to measure yearly accounting profit change induces a relatively easily measured, discounted adjustment in the stock price of the merging firm.

The following framework helps illustrate this principle further. The firm's current total market value, V, equals the discounted future expected net cash flows to the firm. These periodic expected cash flows are generated by producing Q_t units of the firm's product, each costing c_t (dollars per unit) in purchased inputs, and selling them at the unit price p_t. The cost per unit, c_t, depends directly on the unit cost of purchased inputs, and inversely on the level of technological efficiency or "skill" with which the firm assembles the input to produce its final product. Let R_t denote the economic rents (or profits) earned by the firm in period t. By definition, in any period t,

$$R_t \equiv (p_t - c_t)Q_t. \tag{1}$$

V is the present value of all future expected R_t's:

$$V = \sum_{t=0}^{\infty} E(R_t)/(1 + r_t)^t, \tag{2}$$

where r_t is the appropriate discount rate in period t, given the perceived riskiness of R_t, and E denotes expected value. Now, suppose the market receives news that our firm is about to merge with another firm, and that

(i) the market accurately estimates the effect of the merger on the future values of p_t, and c_t, and this information is instantaneously incorporated into the new value of the firm, V';

(ii) prior to the merger news, the market's estimated probability that this company would merge was zero, and the merger news changed this probability to one; and

(iii) the market assesses the only effect of the merger to be a $k\%$ permanent increase in all future periods' R_t, and that the firm's optimal rate of output will remain unchanged.

Since, in this example, $R'_t = (1+k)R_t$ for all future periods, it follows that:

$$V' - V = \sum_{t=0}^{\infty}[(1+k)E(R_t) - E(R_t)]/(1+r_t)^t = kV, \qquad (3)$$

or, equivalently,

$$(V' - V)/V = k. \qquad (4)$$

In other words, the percent change in the market value of the firm due to the merger announcement equals the percent change in all future periods' rents.

2.1.2 Generalizations

As discussed below, although one or more of assumptions (i)–(iii) may be violated in any particular case, the basic interpretation of the observed change in the value of the merging firms remains essentially intact:

(i) Accurate and Instantaneous Reflection of New Information: One of the most thoroughly tested propositions in the field of financial economics is the efficient markets (or rational expectations) hypothesis. In our context, this hypothesis holds that the average investor cannot expect to make profits by designing a trading strategy where he is buying or selling the securities of the merging firms based on the information produced as a consequence of the merger announcement. For this to hold, the market must *on average* correctly interpret the consequences of a merger for the value of the merging firm, and this information must be swiftly incorporated into security prices.

For example, if the market systematically overvalues a merging firm due to misreading the information in the merger announcement, one can expect to earn positive profits by purchasing the shares of the merging firm once

the announcement is made. Competition among investors to capitalize on this profit opportunity would drive the share price of the merging firm to the point where the expected arbitrage profit is zero. Furthermore, this would happen sufficiently fast that only "first movers" (such as "insiders") would have a chance to profit from the merger information. The numerous empirical studies of mergers and tender offers support this efficient markets argument. As a result, we can interpret the *average* impact of a set of merger announcements, where the average is taken across a sample of independent mergers, as an *unbiased* –or rational– estimate of the true economic consequences of the merger for the value of the firms involved.

(ii) Partly Anticipated "News": In the stylized example above we assumed that the market's estimate of the probability that the merger will take place is zero before the announcement and one afterwards. Realistically, this probability –which I denote as π– exceeds zero prior to the announcement, because some earlier news leaks have led the market to partly anticipate the merger. Furthermore, few announcements drive π to one. There may remain several sources of uncertainty concerning whether the merger will actually take place (and how soon) even after stockholders have approved a merger. For example, minority stockholder lawsuits can delay or prevent a merger which has been approved by both firms' boards. Antitrust law enforcement agencies can block an announced acquisition, or order divestiture even after the merger has taken place.

Let $\Delta\pi$ denote the change in π caused by a particular merger announcement. Without loss of generality, equation (3) can be rewritten as

$$(V' - V)/V = \Delta\pi k. \tag{5}$$

That is, the percent change in the market value of the merging firms as a result of the merger announcement equals the percent change in the net earnings multiplied by the change in the market's estimated probability that the earnings changes will actually materialize (through the merger). Equation (5) indicates that to obtain the most powerful statistical tests of the impact of a merger announcement, one should use an event (or series of events) which maximizes $\Delta\pi$. The literature on mergers indicates that the first public announcement of the merger *proposal* is such an event.[12]

(iii) A Non-Constant Increase in R_t: The methodology does in no way depend on assumption (iii) in the above illustration. Generally speaking, the merger will change future cash flows in a complex manner, and not with

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[12]See Jensen and Ruback (1983) and Eckbo (1988) for reviews of the literature.

a k% increase in all future periods' R_t. If we relax this k% assumption, the observed value of $(V' - V)/V$ still represents the present value of the change in all future periods' R_t. Thus, the sign and magnitude of $(V' - V)/V$ continue to measure the wealth effect of the merger announcement.

2.1.3 Procedures for Estimating $(V' - V)/V$

The fact that the merger information is incorporated into stock prices literally within minutes of the announcement suggests that one should use transaction-to-transaction prices in the empirical tests. However, available data sources for security price movements records at best the daily (closing to closing) price change of each security.[13] If one measures security price movement over one day, daily security price movements which are "normal", i.e., unrelated to the merger announcement *per se*, must be subtracted in order to arrive at an estimate of $(V' - V)/V$. To arrive at this normal price movement, it is common to assume that stock returns are generated by the following "market model":

$$r_{jt} = \alpha_j + \beta_j r_{mt} + \epsilon_{jt}, \tag{6}$$

where r_{jt} and r_{mt} are the rate of return on the security of company j and the (usually value-weighted) market portfolio over period (day) t, and ϵ_{jt} is a random error term assumed to have an expected value of zero and to be uncorrelated with the market return. This model incorporates the fact that most securities tend to move up or down with the market. Thus, the realized return r_{jt} is adjusted for market-wide movements to isolate the component of the return due to news events related to the merger/acquisition.[14]

The stocks *unexpected* or *abnormal* return over period t, AR_{jt}, is then defined as the difference between the realized return over period t and the return that was expected at the beginning of the period, given model (6).

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[13]Standard data sources are the stock price tapes compiled by the Center for Research in Securities Prices at the University of Chicago, covering firms listed on the New York- and the American Stock Exchange, and the University of Laval, covering firms listed on the Toronto Stock Exchange.

[14]The parameter β_j measures the sensitivity of the j'th firm's return to market movements. The term $\beta_j r_{mt}$ is the portion of the return to security j that isover due to market-wide factors. The parameter α_j measures that part of the average return on the stock which is not due to market movements. Lastly, the term ϵ_{jt} measures that part of the return to the firm which is not due to movements in the market or the security's average return. See, e.g., Fama (176) and Scwert (1981) for a further discussion of the market model and its applications.

Thus, if we define period t as the day when the merger is announced, then the average value of AR_{jt} in a sample of independent mergers represents an unbiased estimate of the impact of the merger announcement on the typical merger in the sample. Readers interested in a detailed description of this estimation procedure in the context of Canadian mergers are referred to Eckbo (1986).

2.1.4 Relating the Abnormal Return (AR) to Alternative Economic Hyoptheses

Once the merger-induced abnormal returns to merging and related firms have been measured, the problem is to interpret the data so as to distinguish between anticompetitive and efficient mergers. Referring to Exhibit 1, let M denote the merging firms; R the horizontal rivals of M; Y the "upstream" firms selling inputs to M and R; and Z the "downstream" firms purchasing outputs from M and R. Table 1 summarizes the implications of "Market Power" hypotheses and "Productive Efficiency" hypotheses in terms of the sign of AR_i, i = M, R, Y, Z, in response to news which increases the market's estimate of the probability that the merger/acquisition will take place (probability-increasing events). The implications of probability-decreasing events (e.g., news that antitrust authorities attempt to block the proposed merger) follows trivially from Table 1, *except*, as discussed in Section 2.3 below, in the case of information dissemination under the efficiency hypothesis.

It is immediately clear from Table 1 that the abnormal stock returns to M-firms cannot be used to empirically discriminate between the market power and productive efficiency arguments. Both classes of theories imply gains to M-firms in response to probability-increasing events (and losses from subsequent probability-decreasing events). Thus, the following discussion focusses on the R-, Y- and Z-firms. The conceptual analysis is then followed by a discussion of empirical evidence, which is currently available for M- and R-firms only.

2.2 Mergers and Market Power

While market power theories take several forms, they all share the assumption that supracompetitive prices following the merger will not attract new entrants into the industry. In the absence of government supported entry

barriers, (such as patents, licenses, tariffs, etc.) this amounts to assuming that the process of transferring resources to the industry where market power is exerted is sufficiently slow to allow supracompetitive pricing for a significant period of time. Of course, as potential entrants have acquired the specialized skills and technology to enter, the additional supply by these new rivals will force prices down again to a competitive level. Meanwhile, however, a substantial wealth transfer from consumers (or sellers of inputs) to the industry of the merging firms is presumed to have taken place.

2.2.1 Enhanced Collusion

The enhanced collusion hypothesis states that the merging firms, after the merger has been consummated, cooperate with one or more of the other firms in the same industry (i.e., the rivals) to extract consumer or producer surplus from Z and Y firms. How can a merger induce price collusion among rival producers in the same industry? The traditional collusion (or cartel) argument presumes the incentive to coordinate the production rates of the individual firms within an industry is a function of the costs of monitoring the cartel agreement.[15] It is hypothesized that a horizontal merger will reduce the monitoring costs (by reducing the number of independent firms in the industry) to the point where a collusive agreement becomes profitable in the short run. The fewer the firms in the industry, the more visible are each producer's actions, and the higher the chance of detecting members who try to "free-ride" (or cheat) on the cartel by secretly increasing output.

2.2.2 Dominant Firm Model

A variant of the collusion model is the dominant firm hypothesis under which a subset of the firms in the industry (or, in the extreme, only the merged "dominant" firm) finds it optimal to produce a marginal output (or input) restriction on their own. The only difference is that in this situation rivals who choose to stay outside the collusive agreement might gain even more than "insiders" since the former group does not bear the costs of the output restriction necessary to support the supracompetitive product price. Of course, the fact that for sufficiently small rivals it may be more profitable to stay outside (and free-ride on the efforts of the cartel) rather than being inside and sharing in the output restriction makes cartel agreements inherently unstable.

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[15]See, e.g., Stigler (1968).

2.2.3   Predatory Pricing Model

The predatory pricing argument differs from both the collusion and dominant firm models in that the merged firm now is assumed to represent a "threat" to its horizontal rivals. Specifically, it is assumed that by acquiring the target firm, the new and bigger acquiring firm gains a cost advantage which allows him to initiate a price war which will drive some or all of the horizontal rivals out of business. Of course, if this was the whole story, consumers and sellers of inputs would welcome mergers leading to predatory pricing. The crucial assumption behind the predation argument is that after the competitors have been driven out, the dominant firm can raise the product price to a level above the level existing prior to the price war. Furthermore, the dominant firm must somehow be able to sustain this supracompetitive price level for a significant period of time without attracting new entrants (or without inducing previous competitors to re-enter).[16]

2.2.4   Empirical Implications

Any market power theory implies that wealth is somehow transferred to the industry exerting market power from downstream firms or consumers (in the case of monopoly power) or from upstream firms (in the case of monopsony power). The existence of such monopolistic wealth transfer would be reflected in $AR_Y < 0$ or $AR_Z < 0$, depending on whether it is over the input market or the output market (or a combination of the two) the monopolizing industry exerts its power. Furthermore, under the collusion or dominant firm arguments, the rival firms share in the wealth transfer, thus the prediction is $AR_R > 0$ for these firms. Conversely, predatory pricing implies that $AR_R < 0$, since the rivals suffer through the price war, exit, or are bought out at depressed prices.

2.3   Mergers and Productive Efficiency

Productive efficiency –or "synergy"– theories hold that the merger is a way of implementing new and more efficient production/investment strategies. It is hypothesized that the market values of the merging firms increase because of an increase the skill-level or technology with which the firm combines inputs to produce outputs, which causes a reduction in production costs and an increase in profits. Realization of technological complementarities;

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[16]See, e.g., McGee (1980) for a review of the predatory pricing argument.

replacement of inefficient management teams and organizations; taking advantage of unused corporate tax credits; reducing bankruptcy costs; etc., are frequently cited examples of this class of theories. The impact on the R, Y, and Z firms depends on (a) whether the merger affects the product price; and (b) whether the merger provides information about efficiency gains that are available to *non-merging* firms as well. I treat these two possibilities separately.

2.3.1   Product Price Changes

Clearly, if the efficiency gains are large, and if they lead to an increase in the joint output of the two merging firms, the result will be downward pressure on the product price. With a downward sloping industry demand curve, the additional output from the merged firm can only be sold at a price that is lower than the pre-merger product price. In a competitive industry this will lower the product price facing all producers in the industry. The implications of this price fall is clear: *Ceteris paribus*, it will reduce the market value of the rivals ($AR_R < 0$) and increase the market value of downstream consumers ($AR_Z > 0$). Essentially, the efficiency savings benefit consumers through a lower product price (per unit of quality), in part at the expense of the horizontal rivals of the merging firms. Suppliers of inputs will also benefit ($AR_Y > 0$) if the increased production by the merging firm raises input prices (i.e., if the supply curve in the input market is upward sloping).

A cost reduction realized within the merging firms may not necessarily lead to an expansion of their output and subsequent reduction in the product price. If the scale of the two firms is not changed, the benefit from the cost reduction is completely internalized by the acquiring and acquired firms. With zero product price effect (since there is zero change in industry supply) the merger will, *ceterus paribus*, tend to have a zero wealth impact on the R, Y, and Z firms. Thus, the productive efficiency hypothesis, when focusing exclusively on the consequences of changes in industry output and in the product price, predicts a non-positive impact on the rivals, and a non-negative impact on consumers and sellers of inputs in response to probability-increasing events.

2.3.2   The Effect of Dissemination of Valuable Information

Focusing exclusively on the effect of a possible product price decrease ignores an essential aspect of the interdependency between the merging firms and their close competitors. Since the production technologies or skills of firms in the same industries are closely related, news of a proposed efficient merger can signal opportunities for the rivals to increase *their* productivity as well. That is, a change in economic efficiency for the merging firms can –through dissemination of information concerning the merger– also cause an expected change in the efficiency level of the rivals. This "spillover" effect arises if the innovation which caused the efficiency change is not perfectly and costlessly patentable, and if the resources needed to implement the change are not completely specialized to the two merging firms. In this case, there is likely to be some positive information effect on the rivals, since the merger essentially signals reductions in future costs of production for these closely related firms as well. Since the value of AR reflects the *net* impact of this positive information effect of the negative product price effect, the implication of the productive efficiency hypothesis for the sign of AR_R depends on the relative magnitudes of these two opposing effects. Thus, for events increasing the probability of merger, we have that the sign of AR_R is indeterminate under the efficiency argument.

Finally, an interesting implication arises for mergers that are unexpectedly challenged after announcing a proposal to merge. If the merger is anticompetitive, then a (correct) decision to block the merger simply reverses the valuation effects predicted in Table 1 for all firms involved. However, if the merger is motivated by efficiency, and if the announcement signals significantly reduced future costs for rivals, then a (mistaken) decision to block the merger may not reverse the market value increase experienced by rivals. Prohibiting the output-increasing merger reduces the degree to which the product price falls, but the prohibition does not inhibit the spread of the technological improvements to the rivals. Therefore, the prediction is that the announcement to challenge efficiency-induced mergers will reduce the market value of the merging firms, but will not reverse the gains to the rivals.[17] Thus, observing $AR_R > 0$ for rival firms *both* in response to the merger proposal announcement and in response to the subsequent anitrust complaint announcement is consistent with the efficiency argument. At the

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[17]An exception to this arises when the antitrust challenge inhibits the speed or efficiency with which the rivals utilize the improved production techniques, perhaps by discouraging future efficiency-induced mergers between these rivals and similar bidders.

same time, this type of evidence would be inconsistent with all of the market power arguments discussed above. As shown in Section 3, below, Eckbo (1983) and Eckbo and Wier (1985) use this distinction to test whether mergers in the U.S. that were challenged by the antitrust authorities typically would have been anticompetitive.

2.4   Some Further Implications for Public Policy

Government agencies responsible for deciding whether or not to allow a proposed merger to go through generally have access to probability-increasing information events (such as the merger proposal announcement) only. From the above, the agencies can in principle always use the abnormal stock performance of upstream firms (AR_Y) or downstream firms (AR_Z) in response to a probability-increasing event to separate anticompetitive from efficient mergers. However, if the stock returns of these firms are not available, the agencies must rely on the abnormal returns to the horizontal rivals of the merging firms. As summarized below, while the inferences that one can make from the performance of the rival firms based on a probability-increasing event are less clear-cut, the information is still useful for the purpose of avoiding the mistake of challenging efficient mergers.

2.4.1   Policy Implications of the Rival Firm Performance in Response to the Initial Merger Announcement

		$AR_R > 0$	$AR_R < 0$
	Block	1) Collusion	4) Predation
Antitrust Response			
	Don't Block	3) General Efficiency	2) Specific Efficiency

(1) *Collusion*: If the merger creates a dominant firm with a significant increase in market power, or if it increases the chances of successful collusion, then the resulting increased product price will induce positive abnormal returns to rival firms on the announcement date.

(2) *Specific Efficiency:* If the merger lowers the production costs of the merging firms relative to their competitors, it will result in a shift in profits from these rival firms to the more efficient merged entity. This will induce negative abnormal returns to rival firms on the announcement date.

(3) *General Efficiency:* If the merger produces gains because of improved efficiency that is also experienced (or will soon be experienced) by similar rival firms, then the merger announcement will signal chances for beneficial changes for rival firms. This will induce positive abnormal returns to rival firms on the announcement date.

(4) *Predation:* If the merger is expected to lead to predatory tactics, then the rival firms should lose profit after the merger. This will induce negative abnormal returns to rival firms on the announcement date.

Thus, positive fringe firm effects are consistent with either efficiency (information argument) or collusion (increased product price), while negative fringe firm effects indicate either efficiency or predation (in both cases, through a decline in the product price). A further discrimination requires other types of data. Note, however, that given the extremely weak *theoretical* foundation of the predation argument, the presumption is that negative fringe firm effects is the sign of an efficient merger unless other evidence strongly suggests otherwise. What about positive fringe firm effects? In order to judge whether the positive performance is driven by expectations of a product price increase (market power), it is important to know something about the *likelihood* that an *efficient* merger will in fact generate positive abnormal returns to rival firms. The large-sample empirical evidence discussed in Section 3, below, sheds light on this important question.

2.4.2 Some General Limitations of the Tests

When drawing normative implications for merger regulation based on the predictions in Table 1, the following limitations should be emphasized:

The Hypotheses are Not Mutually Exclusive: This means that the observed security value changes (AR) resulting from a given merger announcement can represent the sum of simultaneous positive and negative effects due to market power and efficiency. In principle, the dollar value of efficiency gains realized within the merging firms can outweigh the social loss if the

merger also creates market power.[18] Therefore, a pattern of abnormal returns, which, according to Table 1 is truly consistent with the market power hypothesis does not represent sufficient evidence to conclude that blocking the merger will increase *social* welfare, although blocking it will increase the welfare of consumers of the merging firms' product.

Monopolistic Wealth Transfer does Not Necessarily Entail a Social Cost: Under a policy of maximizing social welfare one is concerned with the total quantity of output, not with wealth transfers *per se*. If the monopolist is able to capture additional consumer surplus without restricting his sales of the product, e.g., by a perfect price discrimination scheme, total social welfare does not necessarily change (although the welfare of the consumer of the product is reduced). Unless one is concerned with the welfare of special groups (such as consumers in this example) it is difficult to justify blocking mergers which belong in this category. Since the procedure described here measures wealth transfers and not changes in output, additional information on the latter variable (or some proxy) is necessary before one can conclude that a challenge of the merger enhances social welfare.

The Deterrent Effect of Antitrust Policy: Although the predictions in Table 1 are helpful in determining whether a particular merger is causing monopolistic wealth transfers, the methodology is insufficient to fully address the more ambitious task of determining the overall social welfare implications of an active antimerger policy. Such a discussion, which goes beyond the purpose of this paper, would necessarily involve weighing the cost of challenging potentially efficient mergers by "mistake" (since anticompetitive mergers are difficult to identify) against the potential benefit from deterring a number of inefficient mergers from even entering the state of a merger proposal. Although the methodology presented here represents an important step forward in our understanding of anticompetitive mergers, a satisfactory formal analysis of the deterrent effect as applied to antitrust policy has yet to reach fruition.

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[18]This general point is also emphasized by Williamson (1968).

3   Empirical Evidence

3.1   Mergers in the U.S.

3.1.1   Aspects of U.S. Antimerger Policy

With the Celler-Kefauver amendment in 1950, Section 7 of the Clayton Act
of 1914 replaced Section 2 of the Sherman Act of 1890 as the principal
federal antitrust law regulating corporate mergers and acquisitions. Under
Section 7, a *potential* threat to competition constitutes a (civil) offense, and
it is not necessary to prove a horizontal relationship between the bidder
and target firms. Furthermore, anticipated economic efficiencies are not
a defense against the illegality of a merger that may "substantially lessen
competition".[19] Prior to the Celler-Kefauver amendment, Section 7 applied
to the transfer of corporate stock only and was applied exclusively to hori-
zontal mergers. Since 1950, the DOJ and the FTC have filed more than 500
antitrust complaints against firms involved in mergers, on the grounds that
these mergers would violate Section 7 of the Clayton Act. Approximately
85 percent of the complaints were filed against horizontal combinations, and
most resulted in divestiture or cancellation of the merger. Stigler (1966)
perceives another consequence of these prosecutions: He attributes the de-
cline in the relative frequency of horizontal mergers in the United States to
the deterrent effect of vigorous Section 7 enforcement.

   The U.S. government selects Section 7 cases against horizontal mergers
largely on the basis of market share and industry concentration. The DOJ's
Merger Guidelines of 1968 state market shares that were likely to trigger an
antitrust complaint. The critical aggregate market shares varied according
to the four-firm market concentration ratios. For example, a merger bewteen
two firms each having 4 percent of the sales in a market with a four-firm
concentration ratio of 75 percent or more was likely to be challenged. The
DOJ'S 1982 *Merger Guidelines* use the Herfindahl Index of concentration
and are somewhat less restrictive than the old guidelines, but their focus
is also on market structure.[20] Note that the government does not strictly
adhere to its own guidelines: Rogowsky (1982) finds that 20 percent of
the mergers challenged under the 1968 guidelines actually fell *below* the
guidelines, and one-third of these were found in violation of Section 7 of the
Clayton Act.

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[19] *United States v. Procter and Gamble*, 386 U.S. 568, 580 (1967)).

[20] For a perspective on the 1982 *Merger Guidelines*, see Tollison (1983).

In September 1978, The Hart-Scott-Rodino (HSR) Antitrust Improve-
ments Act took effect, significantly increasing the legal powers of the law
enforcement agencies to obtain private information needed for judging a
merger's anticompetitive impact *before* filing a complaint.[21] The HSR Act
addressed two perceived handicaps borne by the agencies charged with en-
forcing Section 7 of the Clayton Act: First, under the 1962 Antitrust Civil
Process Act the DOJ could not require third parties, such as competitors
and trade associations to provide information about corporate acquisitions
until after a Section 7 complaint had been filed. This frequently caused the
DOJ to drop an investigation altogether for lack of information or to file a
"skeleton" complaint based on scanty data. The HSR Act established the
right of the DOJ to issue Civil Investigative Demands to the merging firms
and to other parties not directly involved in the merger prior to filing a
complaint.

Second, until the HSR Act, the government could not require postpone-
ment of proposed acquisitions pending investigation. The agencies regard
prevention of mergers as the most efficient way to cure anticompetitive prob-
lems. The agencies can always request a court to enjoin a proposed acqui-
sition, but they must provide the court with evidence that the acquisition
is likely to be anticompetitive. Such evidence is difficult to accumulate on
a few days' notice. The HSR Act required firms planning "large" mergers[22]
to notify the FTC and the DOJ before completing the transaction. Such
a merger cannot be completed until thirty days after the notification has
taken place, and a request for further information by the agencies trigger a
further time delay.

According to the FTC, the notification requirements and delay have
largely eliminated the "midnight merger". They assure that "virtually
all significant mergers or acquisitions occurring in the United States will
be reviewed by the antitrust agencies prior to the consummation of the
transaction."[23] The information provided by the parties "usually is suffi-
cient for the enforcement agencies to make a prompt determination of the

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[21]Eckbo and Wier (1985) analyse the impact of the Hart-Scott-Rodino Act.

[22]See Eckbo and Wier (1985, p.122-123) for the definition of "large" in this context.

[23]6 FTC Ann. Rep. to Cong. concerning HSR ACT 11 (1983). During the period
September 1978 through December 1982 the DOJ and the FTC observed 4,274 reported
transactions and received 7,761 notifications (more than one filing may be recived for a
single transaction where there are multiple parties and where the transaction is completed
through several steps).

existence of any antitrust problems raised by the transaction."[24]

The empirical tests discussed below examine both to what extent the DOJ and the FTC has succeeded in selecting truly anticompetitive mergers for prosecution, and whether there is any evidence that the HSR Act has indeed, as claimed by the FTC, increased the precision with which defendants are chosen.

3.1.2   Intra-Industry Wealth Effects of Horizontal Mergers

Eckbo (1983) examines intra-industry wealth effects of 191 horizontal mergers in the U.S. between 1963 and 1978, 65 of which were challenged by either the Department of Justice or the Federal Trade Commission with violating Section 7 of the Clayton Act. A sample of 68 vertical mergers, of which 11 were challenged, is also examined. For each merger, a set of horizontal competitors of the merging firms that were listed on the NYSE or the ASE at the time of the merger proposal announcement is identified. The rivals are defined based on overlapping 5-digit Standard Industrial Classification (SIC) codes. For the challenged mergers, the relevant product market is the one identified in court records as being the market 'threatened' by the 'anticompetitive' merger. For unchallenged mergers, the relevant product market is the target's major product line, as defined in the Standard & Poor's *Registry of Corporations*.[25]

Eckbo (1983) reports estimates of the abnormal stock returns to the merging firms and their horizontal rivals (i) relative to the merger proposal announcement and (ii) relative to the subsequent announcement that the DOJ or the FTC has filed a Section 7 complaint against the horizontal merger. The evidence rejects the proposition that the observed sequence of abnormal returns across the two types of announcements follow the pattern predicted by the collusion hypothesis. That is, rivals of the 65 horizontal challenged mergers earn small but significantly positive abnormal return around the merger proposal announcement, followed by *zero or positive* abnormal returns in response to the antitrust complaint announcement. As discussed in Section 2, above, this observation is inconsistent with the collusion hypothesis and consistent with the efficiency argument.

The paper also reports that the average intra-industry wealth effect of

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[24]*Id.* at 11.

[25]As shown by Eckbo and Wier (1985), the empirical results based on the 5-digit SIC rivals are robust: They duplicate the tests using rivals identified by the DOJ or the FTC as being relevant competitors, and they draw precisely the same inferences.

unchallenged horizontal mergers is indistinguishable from the average intra-industry wealth effect of unchallenged vertical mergers. Since vertical mergers are unlikely to have collusive effects, this supports to some extent the view that also the horizontal unchallenged mergers in the sample were not expected to be anticompetitive. Interestingly, there is no evidence that proposed horizontal mergers are expected to *reduce* the value of the competitors of the merging firms:

"Thus, if mergers typically take place to realize efficiency gains, we cannot conclude that the 'synergy' effect is expected to produce a significant expansion of the merging firm's share of the market along with an increase in industry rate of output. If scale economies are involved, then these seem on average to be insufficient to make the rivals worse off. Furthermore, the same evidence contradicts the argument that the merging firms were expected to initiate a (monopolistic) 'predatory' price war after consummation of the merger", Eckbo (1983, pp. 271-272).

3.1.3 Has the Antitrust Improvements Act Improved Antitrust Policy?

How can the government's apparent failure to prosecute truly anticompetitive mergers be explained? One proposition is that case selection criteria based on *ad hoc* measures and levels of market shares and industry concentration are unlikely to be of much use. Empirical tests of this proposition is reported in section 3.1.4, below. A second proposition is that legal constraints in effect during the Eckbo (1983) sample period essentially prevented the agencies from obtaining the information needed for accurately judging a merger's competitive impact before filing a complaint. As described above, the implementation of the HSR Antitrust Improvements Act in September 1978 significantly relaxed those constraints. A major purpose of this Act was to increase the precision with which defendants are chosen by providing the agencies with more information about potential Section 7 violations and more time to analyse the information before they take legal action.

Eckbo and Wier (1985) examine the proposition that the HSR Act has improved the performance of the enforcement agencies by testing the collusion hypothesis on a sample of horizontal mergers challenged after September 1978. Their results are summarized in Table 2. As the table shows, the results for this sample is indistinguishable from the results for the 65 challenged mergers in Eckbo (1983) which took place before 1978: Over the 31 days (-20 through 10) surrounding the merger proposal announce-

ment, the rival firm abnormal performance is on average 2.4 percent in both subperiods (t-values of 2.6 and 1.9, respectively). Furthermore, there is no evidence of a subsequent negative rival firm performance in response to the antitrust complaint announcement, which contradicts the collusion hypothesis. [26] Thus, the evidence does not support the proposition that the Antitrust Improvements Act has in fact improved the agencies ability to select truly anticompetitive mergers for prosecution.

3.1.4 Merger-Induced Changes in Market Shares and Concentration

Suppose the agencies do in fact succeed in challenging some truly anticompetitive mergers while also making 'mistakes' by blocking some efficient ones. In this case, the above tests which are based on sample averages may fail to uncover the evidence of anticompetitive mergers. In part to control for this possibility, Eckbo (1985) performs cross-sectional regressions of the following form:

$$AR_j = \alpha_0 + \alpha_1 CR_j + \alpha_2 dCR_j + e_j, \qquad (7)$$

where CR_j is a measure of the pre-merger level of concentration in the industry where the horizontal merger is taking place, dCR_j is the change in concentration caused by the merger, and AR_j is the abnormal return to an equal-weighted portfolio of the *rivals* of the merging firms around the merger proposal announcement. Under the Market Concentration Doctrine, and assuming there are some anticompetitive mergers in the samples of challenged mergers compiled by Eckbo (1983) and Eckbo and Wier (1985), one should find that $\alpha_2 > 0$. This is because the AR_j of rivals of an anticompetitive merger represents increased monopoly rents, and the Market Concentration Doctrine holds that the increase in monopoly rents will be larger the larger the increase in concentration caused by the merger. Furthermore, under the stronger proposition embedded in antimerger policy, which holds that a merger is more likely to have anticompetitive effects the larger the pre-merger *level* of concentration, one should also find evidence of $\alpha_1 > 0$.

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[26]Notice, in Table 2, that the non-negative rival firm performance in response to the complaint announcement contrasts with the significantly negative abnormal returns to both the bidder and target firms around this event. Thus, one cannot argue that the insignificant abnormal returns to rivals is simply driven by prior anticipation of the complaint; if this was true, no reaction would have been detected in the prices of the bidder and target firms shares either.

While the form of equation (7) is similar in spirit to the regression models typically estimated in the "structure-conduct-performance" literature, there are some notable qualitative differences: For example, while the dependent variable AR_j in eq. (7) measures directly the *market value* of the *increase* in industry profits expected to follow from the *increase* in industry concentration, the tradition has been to regress an *accounting measure* of the *level* of industry profits on the *level* of concentration. The traditional approach has been criticized on the grounds that accounting profits are a poor proxy for economic profits, and that any cross-sectional variation in the level of industry profits can simply reflect differences in risk. This criticism does not apply here, since AR_j is measured using market values and represent a *risk-adjusted* change in the level of industry rents. Equally important is the fact that since equation (7) is specified in the form of changes in the central variables, α_2 can be meaningfully interpreted without specifying a structural model relating the level of industry profits to concentration.

The most important results reported in Eckbo (1985) emerge from regressions of equation (7) using the sample of 80 horizontal challenged mergers compiled by Eckbo (1983) and Eckbo and Wier (1985). The four-firm concentration ratio (CR_4) of the major four-digit SIC industry of the target firm is used to represent CR_j, while the change in the industry's Herfindahl index (dH) measures dCR_j.[27] While data on CR_4 is generally available, the market shares of the bidder and target firms, which yield dH, were collected from case-related court records and publications. In the sample of challenged mergers, the average level of CR_4 is 58 percent (ranging from 6 to 94 percent), while the average value of dH is 3.3 percent (ranging from 0.02 to 24.2 percent).

Table 3 summarizes the main regression results based on three alternative measures of abnormal returns to the rival firms and two event periods surrounding the merger proposal announcement. The event periods are the 31-day interval -20 through 20 and the 7-day interval -3 through 3. The first dependent variable, AR_j, is the measure of rival firm abnormal return discussed in Scetion 2.1 above. The second dependent variable is defined as

$$AR'_j \equiv \frac{AR_j}{\pi}, \tag{8}$$

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[27] $CR_4 \equiv \sum_{i=1}^{4} s_i$, and $H \equiv \sum_{i=1}^{n} s_i^2$, where s_i is the market share of firm i, (in CR_4 the sum is over the four firms with the largest market shares), and n is the total number of firms in the industry. The change in the Herfindahl index caused by the merger between firms i and j in the same industry is therefore given by $dH = 2s_i s_j$.

where, as before, π is the probability, given the information available at the time of the merger proposal announcement, that the proposed merger will be successfully consummated (i.e., survive a possible government antitrust challenge). At the time of the merger proposal, while the most anticompetitive mergers may have the largest industry wealth effects, the *measured* abnormal return to the rival firms will be small if the merger has a relatively small chance of surviving government scrutiny. The above probability adjustment is "undoing" this antitrust "overhang", giving the cross-sectional regression a somewhat better chance of revealing evidence (if any) consistent with the Market Concentration Doctrine.[28]

The third form of the dependent variable is given by

$$dP \equiv \frac{X_0}{S_0(1-\tau)} AR'_j, \qquad (9)$$

where X_0 is the current (pre-merger) net earnings available to stockholders, S_0 is the current level of sales, and τ is the (constant) corporate tax rate. As shown by Eckbo (1985, pp. 329-330), under a constant-growth firm valuation model, dP represent a hypothetical expected change in the industry's product price consistent with merger-induced abnormal returns of AR'_j to the representative rival of the merging firms. Thus, the regressions with dP as dependent variable ask the question of whether there is any evidence that the expected merger-induced product price change is correlated with the change in industry concentration. Of course, dP is only *hypothetically* a measure of an underlying product price change: If the mergers are efficient, then AR'_j represents the value of future cost savings, and dP must be interpreted as the percentage expected decrease in the merging firms' average cost of production. Thus, as with the other two dependent variables, evidence of $\alpha_2 > 0$ does not discriminate between the market power and productive efficiency arguments. The important point, however, is that evidence of $\alpha_2 < 0$ is inconsistent with the former argument while being consistent with the latter.

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[28]Eckbo (1985) estimates the probability of a successful government challenge, in our notation $1 - \pi$, using maximum-likelihood techniques with the number of firms in the industry, CR_4, and the market values of the bidder and target firms as explanatory variables, and using the total sample of challenged as well as unchallenged horizontal mergers. As expected, the estimated value of $1 - \pi$ turns out to be significantly positively related to CR_4 and significantly negatively related to the number of firms in the industry. For the challenged mergers $1 - \pi$ ranges from 0.06 to 0.81 with a mean and standard deviation of 0.45 and 0.21, respectively. For the unchallenged mergers $1 - \pi$ ranges from 0.01 to 0.78, with a mean and standard deviation of 0.20 and 0.14.

The regressions in Table 3 are all based on the sample of challenged mergers, which, if anything introduces a bias in favor of the Market Concentration Doctrine (all the mergers were accused by the government of "monopolizing" product markets). Despite this potential bias, the table shows no evidence whatsoever supporting the concentration doctrine. The coefficient multiplying the change in the Herfindahl index is uniformly negative across all the regressions. For example, increasing dH by 1% implies a reduction of 0.42% in the abnormal returns (AR_j) to the average portfolio of rival firms. This coefficient is statistically significant on a 10% level, with a t-value of -1.70. For both AR'_j and dP, the coefficient multiplying dH is negative, although the t-values are too low to conclude that they are statistically different from zero. As reported by Eckbo (1985, Table 6), similar results emerge when one uses the abnormal returns to the *merging* firms as dependent variable. Since the results do not support the market concentration doctrine, it is also inappropriate to continue to refer to dP as a product price change estimator: one consistent interpretation is that AR'_j, and therefore dP, is driven by merger-induced cost-savings.

3.2   Mergers in Canada

While the U.S. has a long history of strict enforcement of antitrust laws regulating merger activity, horizontal mergers in Canada have taken place in a virtually unrestricted legal environment. The lack of an antitrust "overhang" in Canada makes it interesting to compare the wealth effects of horizontal and non-horizontal mergers in this country. For this purpose I focus on the 247 horizontal and 626 non-horizontal mergers and acquisitions in mining and manufacturing industries compiled by Eckbo (1986). In this sample of 873 cases, a 'horizontal' merger is defined as a merger in which the bidder and target firms have at least one overlapping 4-digit SIC code describing the firms' major productive activity. A non-horizontal merger is one where this condition is not satisfied, given that information on the respective firms' SIC codes is available in sources such as Scott's *Industrial Index*, Dun and Bradstreet's *Canadian Key Business Index*, and Standard and Poor's *Register of Corporations*, based on the year prior to the year of the merger announcement.

The sample period in Eckbo (1986) is 1964 through 1983, and the mergers and acquisitions were identified using the *Merger Register* compiled by Consumer and Corporate Affairs Canada.[29] For each merger, the *Register*

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[29]This data source contains a total of 9294 corporate acquisition bids announced be-

records the identity of the bidder and target firms, the newspaper in which the merger is announced, and a short summary of the major activity of the two firms involved. The sampling procedure in Eckbo (1986) requires that the bidder or the target firm is among the firms on the University of Laval monthly stock return data tape (covering Toronto Stock Exchange listed firms). Furthermore, a case is included in the sample only if the month and year of the merger announcement in the press is documented in the *Merger Register*, and if there is sufficient share price information on the Laval tape to perform the regression analysis.

As shown in Eckbo (1986, Table 3), the three industries with the highest representation of cases are oil and gas extraction (SIC 13, 135 bidder firms, 65 target firms, 44 horizontal and 40 nonhorizontal cases), food and kindred products (SIC 20, 157 bidders, 100 targets 63 horizontal and 42 non-horizontal cases), and printing and publishing (SIC 27, 103 bidders, 54 targets, 37 horizontal and 13 non-horizontal cases). The three industries with tha lowest representation of cases are instruments and related products (SIC 38, 7 bidders, 10 targets, 4 horizontal and 1 non-horizontal cases), tobacco manufactures (SIC 21, 9 bidders, 2 targets, 1 horizontal and 7 non-horizontal cases), and non-metallic minerals, except fuels4(SIC 14, 9 bidders, 6 targets, 2 horizontal and 2 non-horizontal cases).

In order to produce a data base of industry rivals, 4-digit SIC codes were allocated to as many TSE-listed (Laval-tape) firms as possible using information in the industry manuals listed above. The rival firm selection procedure is identical to the one used originally in Eckbo (1983): For each of the 873 horizontal and non-horizontal firms, a list was generated containing all firms on the Laval tape whose 4-digit SIC code overlapped with the target's own major 4-digit code.[30] This initial list of rival firms is then reduced to those firms which, according to the product-specific information listed in the industry manuals, have a substantial product overlap with target. In other words, the rivals are essentially selected on a 5-digit SIC level of accu-

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tween January 1945 and December 1983, of which 7559 were announced after January 1964. The *Register* has been maintained by the Department of Consumer and Corporate Affairs since 1960. It attempts to record all reported mergers in industries subject to the Combines Investigation Act. Accordingly, until the 1976 amendment of the Combines Investigation Act, firms in most of the service sectors of the economy were excluded from the *Register*. Furthermore, the *Merger Register* depends on news-coverage of merger by the major financial news media, including daily and financial newspapers, trade journals, business magazines and other publications in Canada, the United States and Britain.

[30]In horizontal mergers, this 4-digit SIC code also overlaps with the bidder's major industry code.

racy. Finally, if markets are regional rather than national, then firms having regional sales that do not overlap substantially with the target's sales region are also eliminated.[31]

This procedure yielded one or more rival firms for 116 of the horizontal and 89 of the non-horizontal mergers in Eckbo (1986). The number of rivals per merger ranges from 1 to 34 (mean 9) for horizontal mergers, and from 1 to 33 (mean 7) for non-horizontal mergers. As shown in Table 4, the industries with the largest number of mergers are oil and gas extraction (SIC 13, 24 horizontal and 11 non-horizontal cases), food and kindred products (SIC 20, 22 horizontal and 10 non-horizontal cases), printing and publsihing (SIC 27, 13 horizontal and 13 non-horizontal cases), and lumber and wood products (SIC 24, 9 horizontal and 6 non-horizontal cases). Thus, this subsample is quite representative of the larger sample of 873 in Eckbo (1986).

Figure 1 and Table 5 show the wealth effects of the horizontal and non-horizontal mergers. Figure 1 is a reproduction of Figure 2 in Eckbo (1986), and is included to show that the merger announcement indeed appears to represent a significant news-event, a crucial assumption underlying the methodology described in this paper. Figure 1 plots the monhtly abnormal stock returns to bidder and target firms, cumulated over month -12 through month +12 relative to the month of the merger announcement.[32] The pattern seen in Figure 1 is as expected if the merger news is fully impounded in stock prices by the end of the announcement month (month 0). The curves indicate that the merger announcement itself has a non-negligible impact on stock returns, with prior rumors and speculations most likely accounting for the systematic rise in stock prices in the few months prior to the press announcement of the merger.

Table 5 lists the abnormal returns to bidder, target as well as *rival* firms in month zero. First, the results do not indicate that bidder and firms involved in horizontal mergers perform significantly better than firms in non-horizontal mergers. The 77 target firms in horizontal mergers earn average abnormal returns of 3.7 percent over month 0, while the correspond-

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[31]To re-emphasize, while this selection procedure involves some degree of judgement on the part of the researcher, Eckbo and Wier (1985) show that rival firms selected by this basic procedure produce statistical inferences which are indistinguishable from the inferences based on the more elaborate rival firm selection procedure used by the U.S. DOJ or the FTC when challenging mergers.

[32]Monthly stock returns (from the University of Laval data tape) are used in the absence of a machine-readable data source covering daily stock returns for the firms over the 1964-83 sample period. See Eckbo (1986) for the estimation and test methodology.

ing performance of the 139 targets in non-horizontal mergers is 2.9 percent, both numbers statistically significant. Furthermore, the 215 bidder firms in horizontal mergers earn significantly positive average abnormal returns of 0.9 percent over month 0, while the corresponding performance of non-horizontal bidders is 1.3 percent.

The results in Table 5 for the rival firms are particularly interesting. The announcement-month average abnormal return to the 116 portfolios of rivals of horizontal mergers is *negative* while the corresponding performance of rivals on non-horizontal mergers is *positive*; -1.5 vs. 2.4 percent, respectively. Both numbers are statistically significant on a 5% level of confidence. The negative rival firm performance in the sample of 116 horizontal mergers rules out collusion and dominant-firm market power arguments as explanations for the average gains realized by the merging firms in this category of mergers. The negative rival firm performance is consistent with the hypothesis that the market expects the horizontal merger to place the rival firms at a competitive disadvantage in product markets. This competitive disadvantage possibly is the result of an expected increase in the rate of output by the merged firm, with the associated downward pressure on the industry's product price, lowering the expected profits to rival firms. The expected downward pressure on the product price is consistent with the average horizontal merger being either efficient or anticompetitive of the predatory type. While the evidence does not discriminate further between these two hypotheses, it is important to keep in mind the weak theoretical foundation of the predation argument *per se*. Thus, it is probably safe to conjecture that the negative rival performance signifies efficient, horizontal mergers. A further test of this conjecture, where more detailed informaion on industry characteristics (such as market shares and concentration) is explicitly taken into account, is a potent topic for future research. At this point, the important conclusion emerging from Table 5 is that the data firmly rejects the proposition that the typical horizontal merger in Canada over the 1964-82 period was expected by the market to have collusive anticompetitive effects.

The rival firm performance in the sample of 89 non-horizontal mergers is positive and of a magnitude similar to the average performance of target firms in this merger category. Since non-horizontal mergers do not lead to anticompetitive effects, the positive rival performance most likely reflect dissemination of valuable information caused by the merger announcement. As discussed in Section 2, above, this information possibly includes opportunities for rival firms to improve the efficiency of their own operations, or the merger may signal an increase in the demand for resources commonly

owned by firms throughout the industry of the target firm.

4   Conclusions

Stock prices set in a rational, efficient market contain information which is useful in the process of diagnosing anticompetitive mergers. Few economists would seriously argue that the purpose of the GM-Toyota joint venture was to prepare the two firms for a predatory price war designed to drive Chrysler and Ford out of business. However, as discussed in this paper, if one rules out the predation argument, then the significant decline in Chrysler's and Ford's stock prices upon the announcement of the GM-Toyota venture is evidence that the venture would generate economic efficiencies. This type of evidence, which is conveniently available at the time when antitrust enforcement agencies must decide whether or not to oppose the corporate combination, therefore helps the enforcement agencies avoid the mistake of opposing socially desirable corporate combinations.

As surveyed in this paper, the capital market-based evidence concerning the impact of U.S. antitrust enforcement clearly demonstrates that the market power hypothesis rests on an extremely weak empirical foundation in the context of mergers. Thus, as long as the enforcement agencies continue to insist on rigid structural standards for evaluating the competitive effects of mergers, it is reasonable, given the evidence, to suspect that special interest groups, including those representing relatively inefficient producers and/or a rigid work force, will continue to attempt to take advantage of the regulatory process.

The empirical evidence implies that past antimerger policy has been costly in terms of foregone opportunities to reallocate corporate resources to a higher-valued use.[33] Of course, evidence that antitrust policy is costly does not necessarily rule out the possibility that the same policy is socially optimal: It is possible that the threat of a challenge also deters a sufficient

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[33]There is an additional –and somewhat more subtle– costs implied by prenotification rules such as those in the HSR Antitrust Improvements Act: "If a merger proposal conveys to the market some of the valuable inside information held by the bidder firm, the delay in the execution of the merger transaction required by the pre-merger notification rules can reduce the bidder's expected return from the investment. The evidence indicates that rival firms benefit from the news of a merger proposal, and a delay in execution gives these rival firms additional time to exploit the news, perhaps by competing for the target firm. This potential public-good problem lowers the *ex ante* expected returns to the firm initiating the merger negotiations, whether the merger will have anticompetitive effects or not", Eckbo and Wier (1985, pp. 139-140).

number of collusive mergers from even reaching the state of a merger proposal. The benefit of the previous studies is then to refocus the debate on the perhaps most important remaining issue: What is the likely social value of the deterrent effect? Empirical evidence on this difficult issue is sparse. However, predation arguments aside, this paper presents some first evidence that the typical horizontal merger in Canada was expected by the market to have socially desirable competitive effects. In other words, there is no indication from the Canadian merger experience that anticompetitive mergers are more likely to take place in a corporate control market which –over the 20-year sample period– operated virtually free of antitrust constraints.

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