

EVENT STUDIES FOR ANTITRUST ANALYSIS CAN BE COST EFFECTIVE

Financial market investors bet their dollars on whether a merger will raise or lower prices. A merger that raises market prices will benefit both the merging parties and their rivals and thus raise the prices for all their shares. Conversely, suppose the financial community expects the efficiencies from a merger to be so large that the merged firm will drive down market prices. In this case, the share values of the merging firms' rivals would fall when the probability of the merger goes up. Thus, evidence from financial markets can be used to predict market price effects when significant merger-related efficiencies are alleged.

A working paper implies that as an analytic tool, event studies can be cost-effective.¹ John Kwoka and Chengyan Gu analyze 40 mergers. They provide the breakdown represented in Tables 1-A and 1-B below.

Table 1-A: Breakdown of 40 merger cases analyzed by an antitrust agency

Agency Decision	True outcome			
	Anticompetitive	Procompetitive	Total	Percent
Anticompetitive	14	2	16	40%
Procompetitive	17	7	24	60%
Total	31	9	40	
Percent	77.5%	22.5%		
	Error type:			
	False negative	False positive		
Error magnitude:	17/31 = 54.84%	2/9 = 22.22%		

Source: Kwoka and Gu (2013)

¹ John Kwoka and Chengyan Gu (2013) “Predicting Merger Outcomes: How Accurate are Event Studies, Market Structure Determinants and Agency Decisions” Northeastern Univ. working paper, December.

Table 1-B: Breakdown of 40 merger cases analyzed by an event study

Event study finding:	True outcome			
	<u>Anticompetitive</u>	<u>Procompetitive</u>	Total	Percent
Anticompetitive	7	2	9	22.5%
Procompetitive	24	7	31	77.5%
Total	31	9	40	
Percent	77.5%	22.5%		
	Error type:			
	False negative	False positive		
Error magnitude:	24/31 = 77.42%	2/9 = 22.22%		

Source: Kwoka and Gu (2013)

The lower portion of Tables 1-A and 1-B each displays the percentage of false negative and the false positive errors based on the case breakdown provided on the upper portion of the table. For example, the upper part of Table 1-A indicates that in 17 of 31 anticompetitive mergers the relevant agency had erroneously concluded the merger to be procompetitive; therefore incidence of false negative error for agency decisions is 17/31 or approximately 55%. Table 1-A also indicates that in 2 of 9 procompetitive mergers the relevant agency had erroneously concluded the merger to be anticompetitive, therefore the incidence of false positive error is 2/9 or approximately 22%. For event studies the incidence of a false negative is approximately 77% and the incidence of a false positive is approximately 22% as Table 1-B displays.

When comparing analysis tools one criterion can be the “truth content,” measured as the conditional probability $P[\text{truth} = x \mid \text{signal} = x]$. Tables 2-A and 2-B display the conditional probabilities corresponding to Tables 1-A and 1-B respectively. On each table, $P(\text{truth}|\text{signal})$ is calculated as $P(\text{signal}|\text{truth})P(\text{truth})/P(\text{signal})$.

Table 2-A: Truth content of Agency Decisions

<u>Truth</u>	<u>Signal</u>	<u>P(signal truth)</u>	<u>P(truth)</u>	<u>P(signal)</u>	<u>P(truth signal)*</u>
Anticompetitive	Anticompetitive	100 – 54.84 = 45.16%	77.50%	40.00%	87.50%
Procompetitive	Procompetitive	100 – 22.22 = 77.78%	22.50%	60.00%	29.17%
Average		61.47%	50.00%	50.00%	58.33%

* $P(\text{truth}|\text{signal}) = P(\text{signal}|\text{truth})P(\text{truth})/P(\text{signal})$

Table 2-B: Truth content of Event Studies

<u>Truth</u>	<u>Signal</u>	<u>P(signal truth)</u>	<u>P(truth)</u>	<u>P(signal)</u>	<u>P(truth signal)*</u>
Anticompetitive	Anticompetitive	100 – 77.42 = 22.58%	77.50%	22.50%	77.78%
Procompetitive	Procompetitive	100 – 22.22 = 77.78%	22.50%	77.50%	22.58%
Average		50.18%	50.00%	50.00%	50.18%

* $P(\text{truth}|\text{signal}) = P(\text{signal}|\text{truth})P(\text{truth})/P(\text{signal})$

Based on Tables 2-A and 2-B, the truth content of event studies relative to that of agency decisions is calculated in Table 3.

Table 3: Truth content of event studies relative to agency decisions

<u>Truth</u>	<u>Truth content of:</u>		<u>Truth content of event studies relative to agency decisions*</u>
	<u>Agency Decisions</u>	<u>Event Studies</u>	
Anticompetitive	87.50%	77.78%	0.89
Procompetitive	29.17%	22.58%	0.77
Average	58.33%	50.18%	0.83

*Truth content of event studies/truth content of agency decisions

Based on Table 3, the average event study underperforms structural analysis by 11% for anticompetitive mergers. The average event study also underperforms structural analysis by 23% for procompetitive mergers. The average event study underperforms structural analysis by 17%. We conclude that as long as the average event study costs less than 83% of the cost of the average structural analysis, the event study methodology is cost effective as an analysis tool.