
straightforward test for price effects of the acquisitions.

The next section provides background information concerning the firms and products involved. Following that we describe the data and methodology used to estimate the price effects of the acquisitions and present results which indicate significant price increases traceable to the acquisitions. We then offer estimates of the incremental profits attributable to those price increases. A final section provides a summary.

II. Background

The Federal Trade Commission brought an antitrust suit against Xidex Corporation in 1981 for its earlier acquisition of two competitors. The acquisitions in 1976 and 1979, had eliminated a major rival of Xidex in each of its two main product lines: two types of "non-silver" duplicating microfilm known as "diaz" and "vesicular". These two types of microfilm employ photo-imaging processes that can only be used for making duplicate copies from "silver" (halide) originals. / They have a significant cost advantage compared to the alternative of using silver duplicating film (an advantage estimated at one-fourth to one-half the cost of using silver film) and are much simpler to handle and process.³ / Diaz and vesicular are used to make about 90% of all duplicate microfilm copies and an even larger percentage of microfilm copies of active business files. / Diaz and vesicular are closely competing alternatives for making duplicate copies but not perfect substitutes.⁴

In 1976 Xidex acquired the diazo business of Scott Graphics Inc. increasing its U.S. market share in diazo microfilm from

40% to 66%. In 1979 it acquired the assets of Kalvar Corporation, increasing its U.S. market share in vesicular microfilm from 67% to 93%. Combining the two products, the 1976 acquisition increased Xidex's share of U.S. "non-silver microfilm" sales from 46% to 66%, and the 1979 acquisition raised it from 61% to 70%. Judging from market-share statistics, these acquisitions would appear to have had a significant impact on market structure. The issue we examine next is whether there were discernible effects on the prices of diazo and vesicular duplicating microfilm as a result of Xidex's extension of "market power" in the two product lines.

Our study uses data covering a ten year period. In order to identify and measure price effects due to the acquisitions, we have to control for the influence during that period of general inflation and changes in the costs of inputs specific to the production of diazo and vesicular microfilm. For example, the cost of plastic film base increased due to the increase in petroleum prices, which also affected the cost of coatings since the coatings for both films use petroleum based resins. For both types of film, the cost of the film base and chemicals used for the coatings are estimated to account for 60% to 70% of price. Offsetting increases in materials cost and the effect of inflation on non-microfilm specific costs were gains in productivity as the result of increased coating line speeds and quality control improvements which improved factors

absolute prices and thereby isolate price effects of the acquisitions, we use price ratios of vesicular and diazo microfilm in given product "configurations." A product configuration is defined by physical dimensions of the film (width, thickness and length) and whether or not it has a special edge stripe for marking. Because of the similarity in materials and processes, the vesicular-to-diazo price ratio for a given configuration should not be much affected by changes in petroleum prices, productivity, or general inflation. In making diazo or vesicular microfilm a coating is applied to a roll of plastic film base, which is the same for both types of microfilm. The coated film base is then cut into strips of various widths and lengths in the case of rolls. The film is then cut into strips of various widths and lengths in the case of rolls.

prices, this term serving as shorthand for "the prices that would have obtained in the absence of the acquisitions." (As discussed later these benchmark prices may have been above true competitive prices.) For each configuration, we use the time series data on GSA contract prices to calculate the average price ratio for three subperiods.

R_i - the average value of V_i/D_i (the competitive benchmark price ratio). The average price ratio prior to either acquisition, computed using prices for contract years 1972-73 through 1976-77.

R_{si} - the average value of V_i/D_i - The average price ratio following the Scott acquisition, but before the Kalvar acquisition, computed using prices for contract years 1977-78 and 1978-79.

R_{ki} - the average value of V_i/D_i - The average price ratio following the Kalvar acquisition, computed using prices for contract years 1979-80 through 1981-82. \bar{V} / \bar{D}

Suppose we expect the Scott acquisition to result in an increase in diazo prices above their competitive benchmark level. Our hypothesis then can be stated as

$$(1) \quad D'_i = D_i (1 + d), \quad d < 0,$$

where d denotes proportional increase in diazo prices above their competitive benchmark levels. Divide (1) through by V_i and take the reciprocal to get an expression in terms of the V/D price

ratios,

$$(2) \quad V_i/D'_i = V_i/D_i(1 + d).$$

Thus, if $d < 0$ the V/D price ratio following the Scott acquisition will fall relative to the competitive benchmark price ratio. On substitution of the observed average price ratios, we have

$$(2') \quad R_{Si} = R_{Ci} / (1 - d).$$

Our estimate of d is calculated by solving for d in (2') as $d = R_{Ci} / R_{Si} - 1$

In the case of the Kalvar acquisition, we are concerned about the effects on vesicular prices. The analogue to equation (2) is

$$(3) \quad V'_i/D_i = (V_i/D_i)(1 + v),$$

where v is the proportional increase in vesicular prices above their competitive benchmark level. In this case, however, we do not have a corresponding price ratio appearing on the left-hand side since the Kalvar (vesicular) acquisition occurred after the Scott (diaz) acquisition. We have two alternatives.

The first is to use R_{Si} and R_{Ki} to estimate v . If we divide through (3) by (1 - d) and use (1), we have

$$(4) \quad (V'/D')_i = (V/D)_i (1 - d - v),$$

an equation containing price ratios corresponding to average price ratios, R_{Ki} and R_{Si} . There are one method of estimating v would use by

A picture is useful in conveying the circumstances behind the statistical results. In Figure 1 we have plotted the value of the average price ratio across all configurations for each contract year. The solid lines give the average values of R_{si} and R_{ki} from Table 1.6 / The hypothesis that the changes in market structure had a positive impact on prices implies that the average price ratio, measured as V/D , would fall following the Scott (di azo) acquisition and then rise following the Kalvar (vesicular) acquisition. This pattern is clearly evident in Figure 1. In addition, since the Kalvar acquisition gave Xidex a near monopoly in vesicular, one would expect the price effect of this acquisition to be greater than that of the Scott acquisition, as it appears to be. Note also that the average value of V/D has a rising trend following the Kalvar acquisition. This is consistent with (but, of course, does not confirm) the possibility that the price impact of the Scott acquisition was being dissipated, since a decline in d from its initial value would be reflected in a rising value for the V/D price ratio.

IV. Estimates of the Short-run Effects on Profits

We now turn to estimating the impact of the acquisitions on Xidex's profits. The acquisitions may have increased profits through economies of scale in production and distribution or from Xidex's superior management skill. / Our interest, however, is with the increase in profits due to the elevation of prices above their competitive benchmark levels. We denote these "supra π

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In order to get a feel for the magnitude of the bias assume of

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(8) A

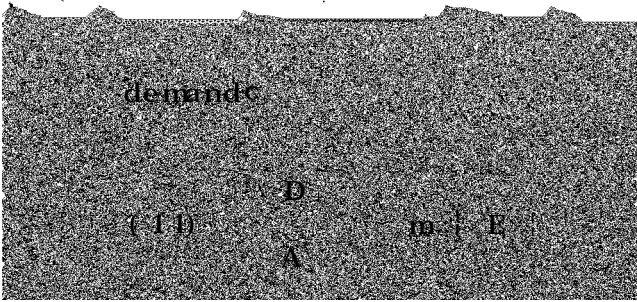
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Thus, as long as demand is not very elastic over the interval P'P and m is quite small, area $\triangle ABC$ is a good estimate of the gain in profits due to the price effects of the acquisition.

The net bias from our procedure for estimating the gain in profits is likely to be small (and may be negative) because of three instances in which we took the conservative option in estimating $\triangle ABC$.

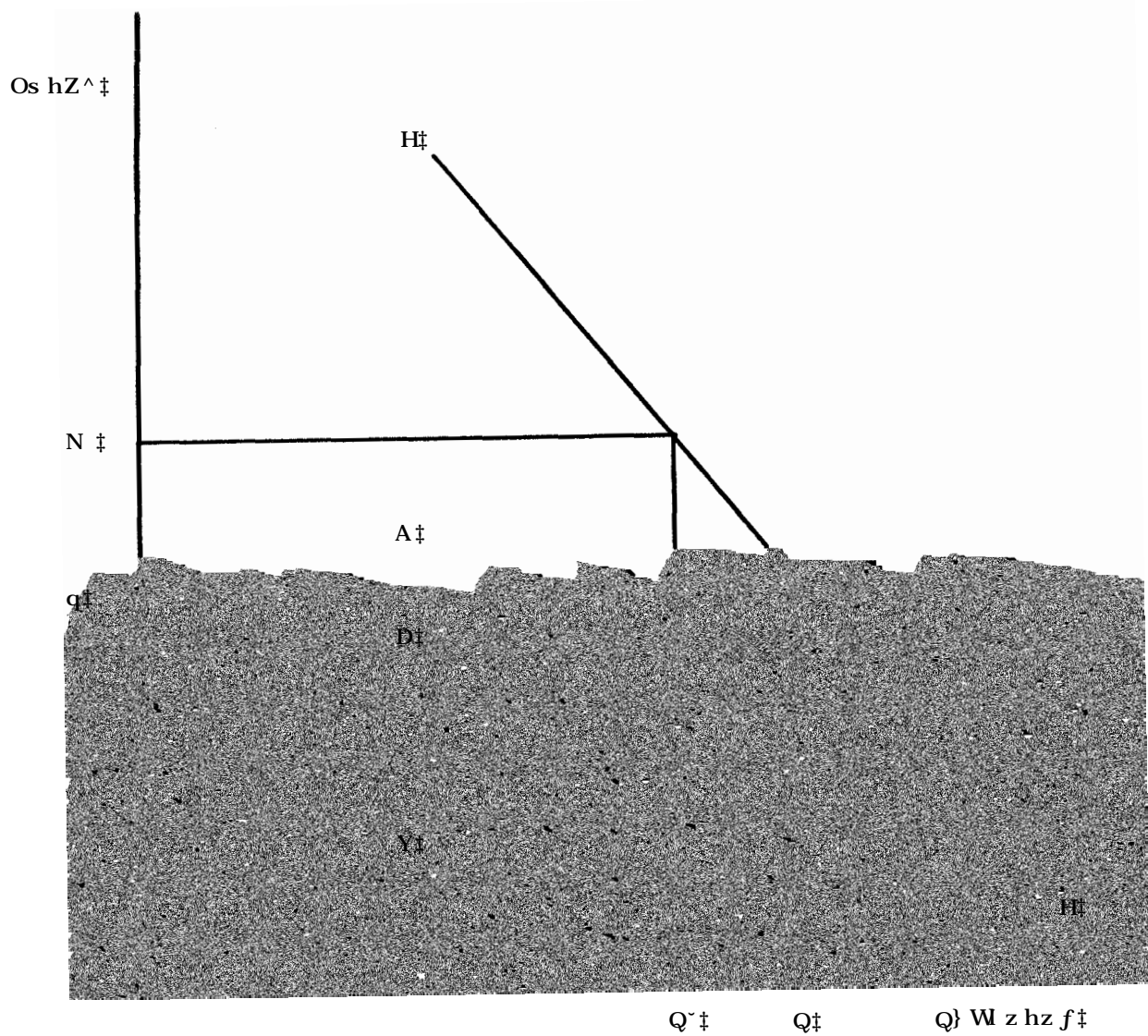
di azo at the time of the bidding for the 1977- 78 co tract year
which took place in early 1977 (the first round of GSA bidding
f{llowing the Scott acquisition). zoweve , it is surely possible
that price increases in di azo were reflected in sales to non- GSA

acquisitions would appear to be handsome investments.

Vo Summary

A «ederal Trade Commission suit against Xidex Corporation, challenging its acquisitions of Scott Graphics in 1976 and Kalvar Corporation in 1979, has yielded an unusual opportunity to observe price behavior before and after the acquisitions. Each acquisition involved a substantial gain for Xidex in its share of a well defined microfilm product line. The materials and processes used in producing the two products are so similar that a ratio of prices can be used to control for input price or productivity changes which would affect the level of absolute prices over the time period covered by our study. Prices in each affected product line were found to increase after the acquisition occurred. It was also possible to estimate the profit gain due to the price increases. The price increases yielded substantial profit gains, in each case sufficient to recover the cost of the acquisition in about two years.

Litigation in the «ederal Trade Commission antitrust suit against Xidex began in December 1981 and ended in March 1982 when Xidex agreed to settlement by consent. The consent allows Xidex to retain the acquisitions with the exception of Kalvar's vesicular technology and knowhow which it is required to divest. In addition, the consent requires licensing of Xidex's proprietary vesicular technology at below market rates and royalty-free licensing of diazo technology. After an extended period for public comment, the final order became effective on July 7, 1983.Æ /



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Table 1. Estimates of Proportional Price Increases

7	1.069	.949	1.372	.1270	.2838
8	1.071	.915	1.323	.1705	.2335
	1.079				.1827
10	1.106	.936	1.285	.1817	.1620
				.1061	.1463
			1.117		
		.773			
	.937	.953			
	.999			2873	
	1.037	.789			
		.957			

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5/ Id. at 16. Diazo and vesicular have almost entirely displaced silver duplicating film in uses other than making copies for archival storage. The continuing use of silver film in this application is influenced by official archival certification of silver film.

β" Id. at 18-23. The most important factor limiting short-run substitutability between the two is that duplicating equipment is specialized to accommodate one or the other. In addition to price, the

Corp.,

materials and

have incurred the obligation to fulfill Kalvar's contracts at the prices tendered by Kalvar. (Apparently GSA contract officers were in support of this opinion as there is a series of legal memoranda in GSA files concerning a dispute on this issue, but no record regarding its final disposition.) However, when the 1979-80 supply schedule was published, Xidex was listed as the supplier on all contracts for which Kalvar had been the low bidder, and the final contract prices were those that had been tendered by Xidex.

17/ The average values of R_i , R_{Si} and R_i do not correspond exactly to the unweighted mean of the average annual values of (P/D) in the corresponding subperiod. In some contract years, the price ratio for some configurations could not be calculated because there was no contract for one of the two products.

See O. E. Williamson, "Economies as an Antitrust Defense, The Welfare Tradeoffs," American Economic Review 58 (March 1968) 18-36. At least in the case of the Kalvar acquisition, there is a strong presumption that there was no efficiency gain from the merger. Two months after the acquisition, the plant was closed and the employees were fired. (Trial Brief at 9.)

18/ If P and Q were used the result obtained below in (11) would have to be multiplied by Q'/Q , which would make the estimate of D/A smaller. Using P' and Q' has the opposite effect on D/A .

19/ Xidex acquired the duplicate microfilm business of Scott Graphics (including a production facility) for \$4,225,000 in cash and notes. (Trial Brief at 7.) Xidex paid Kalvar \$1,776,000 in

cash and assumed, or agreed to reimburse Kalvar for, virtually all of its liabilities, totaling \$4,253,892. Xerox received Kalvar's physical assets, accounts receivable, patents and trade secrets, copyrights and trade names, and an agreement not to compete in the duplicate microfilm business for five years. Kalvar retained its corporate identity, cash and tax loss carryforwards. (Trial Brief at 9.)

20/ Federal Trade Commission Decision and Order, Doc. No. 9146