

December 31, 1998

STAPLES AND OFFICE DEPOT: AN EVENT-PROBABILITY CASE STUDY

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Abstract

Investors in financial markets bet their dollars on whether a merger will raise or lower prices. Below, we apply an event-probability methodology to the proposed merger between Staples and Office Depot, which was challenged by the FTC and eventually withdrawn. In addition to a time-series regression, we also look at the effect of the merger in specific event windows. We find highly significant returns to the only rival firm in the relevant market. We estimate the price effect of the merger and find it highly consistent with independent estimates.

Keywords: Stock market, event study, horizontal merger, antitrust, price effect, unilateral effects.

It boils down to whether you trust the agencies or the stock market. I'll take the stock market any day. --*Bruce Kobayashi, former economist at the FTC and the Department of Justice's Antitrust Division*¹

I. Introduction

Investors in financial markets 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, the financial community may expect the efficiencies from the merger to be sufficiently large to drive down prices. In this case, the share values of the merging firms' rivals fall as the probability of the merger goes up. Thus, evidence from financial markets can be used to predict market price effects when significant merger-related events have taken place.

MacKinlay (1997) is a recent source for a general discussion of event studies. Brown and Warner (1984) discuss the special case of daily returns. Recent applications on merger cases include Cox and Portes (1998) and Simpson and Hosken (1998). Werden and Williams (1988) provide a critical perspective.

McGuckin, Warren-Boulton, and Waldstein (1992) developed an event-probability methodology to analyze the effect of merger announcements on the stock returns of the firms in the same line of business using continuous time-series regression; they found relatively small effects for the rival firms. In particular, the premiums for the rival firms were smaller than those on the selling firms. Taken as a whole, the merger effect on rivals was not highly significant in an economical or statistical sense.

Below, we apply the same event-probability methodology to the proposed merger between

Staples and Office Depot, which was challenged by the FTC and eventually withdrawn. In addition to a time-series regression, we also look at the effect of the merger in specific event windows. We find highly significant returns to the only rival firm in the relevant market. Based on these returns, we are able to estimate the price effect of the merger in the product market which is highly consistent with the estimates of the likely price increase from other, independent, sources.²

II. Background

Office Depot and Staples are, respectively, the first and the second-largest office superstore (OSS) chains in the United States. Staples pioneered the office superstore concept in 1986. In 1997, Staples operated approximately 550 stores in 28 states. It had 1996 revenues of some \$4 billion, and a stock market valuation of approximately \$3 billion at the end of 1996. Office Depot, which adopted the concept of superstores within months after Staples invented it, operated more than 500 stores in 38 states, had 1996 sales of approximately \$6.1 billion and a stock market value of about \$2.2 billion at the end of 1996. The rationale for the superstore concept was simple: While large businesses were able to purchase office supplies through high-volume contract stationers, small businesses and individuals had no comparably convenient, low-cost source of office supplies and other business related products. The office superstore was to do for office supplies what the supermarket had done for home groceries.

The typical superstore is approximately 23,000-30,000 sq. ft. in area, stocks about 5,000-6,000 items, is located in an urban business area, and looks like a warehouse. Approximately half of Staples and Office Depot revenues are derived from sales of office supplies, with the rest

coming from the sale of computers, office furniture, and other business-related items. Both chains purchase virtually all of their inventory directly from manufacturers in large quantities, enabling them to receive volume discounts that are unavailable to small and medium-size retailers. These lower costs have led to dramatically lower prices: office supplies are typically sold by superstores at discounts of 30% to 70% below manufacturer-suggested retail prices.

At one time, 23 competing OSS chains were present in the market. By the time of the proposed merger, however, OfficeMax was the only remaining close rival to Staples and Office Depot. Spun off from K-Mart in 1994, OfficeMax operated 575 superstores and 17 delivery centers in over 220 areas in 48 states. Like Staples and Office Depot, each OfficeMax superstore offered an extensive selection of over 7,000 items at discount prices, selling primarily to small and medium-sized businesses, home office customers, and individuals. OfficeMax's total revenues for fiscal year 1997 were \$3.2 billion dollars, with office supplies making up about 40% of total revenues.

The success of the OSS concept had redefined the retailing of office supplies in the United States, driving thousands of independent stationers out of business, just as the growth of supermarkets had driven out thousands of small, Mom and Pop grocery stores. The competitive rivalry between the superstores had, however, benefited consumers substantially. Each OSS chain slashed prices, drove down costs, developed innovative approaches to marketing, distribution and store layout, and expanded rapidly, bringing to increasing numbers of consumers the convenience of one-stop shopping at low prices. Office Depot had, at least in recent years, been the most aggressive and lowest-price competitor.

On September 4, 1996, Staples and Office Depot announced an agreement under which Staples would acquire Office Depot by exchanging 1.14 Staples share for each outstanding Office Depot share, a roughly \$4 billion deal. After a seven-month investigation, the FTC decided to challenge the merger.

III. Probability of the Merger and Abnormal Returns

Figure 1 shows the cumulative abnormal returns to Staples and Office Depot and the probability of the merger over the period (approximately ten months) between the announcement of the merger and the court decision.³ Figure 2 shows the abnormal returns to OfficeMax, the abnormal returns to Office Depot and Staples combined, and the probability of the merger over the same period.

One can see in Figure 1 that the abnormal returns to Staples were generally moving in the opposite direction as the probability of the merger, whereas the abnormal returns to Office Depot were generally moving together with the probability. From Figure 2 it can be seen that the abnormal returns to both OfficeMax and to the combined Staples and Office Depot were generally moving together with the probability.

1. Specific Event Windows

Tables 1 and 2 show the results of the event-window approach. In Table 1, each row shows a different event window corresponding to each of the six “events.” The column labeled “Probability” shows the probability of the merger during each event window. The next column shows the change in the probability of the merger during each event window. The rest of the columns display the percentage abnormal returns to the stocks of different firms during each event

window.

Table 2 shows the ratio of the “percentage abnormal return” to the “change in probability” from the corresponding row and column of Table 1. The resulting figure is the stock market's estimate of the effect of the merger on the value of the firm over the given event window.

For example, for Event I (the announcement period), the abnormal return to Office Depot were 29.9686%, and the change in probability was 0.8411 – calculated as a movement in the probability of the merger from (presumably) zero to the 0.8411 on September 17, 1996. These figures⁴ are displayed on Row I of Table 1. For the same event, Table 2, Row I, shows that the abnormal returns to Office Depot from a 100% increase in the probability would be 35.63% = $(29.9686\%)/0.8411$. Likewise, Table 1, Row II shows that during Event II, the value of Office Depot fell 4.8352%, and the probability of the merger fell 0.0783. This in turn implies that a 100% increase in the probability would result in a 61.76% = $(-4.8352\%)/(-0.0783)$ increase in the value of Office Depot shares, as shown in Table 2, Row II.

Next, we describe each of the merger-related events.

Event I is the announcement of the merger. In calculating the abnormal return for the announcement event, we have included the abnormal return to each of the merging parties over the month prior to the announcement date. This is the standard procedure used to incorporate the effects of information leaking out to the market before the formal announcement. It is not uncommon to observe a substantial share of the price effect of a merger -- perhaps one third on average -- to occur before the merger is announced. In this case, there was a substantial abnormal return to Staples (14.43 %) over the month preceding the announcement. Indeed, Staples' price

actually had negative abnormal returns on the announcement day, implying that the market's view of the effect of the merger on the Staples shareholders, including the terms of the merger, was less favorable than anticipated. Second, in order to allow enough time for the market to fully evaluate the effect of the merger on the companies' profitability (a task that has taken us, for example, some considerable time), "merger announcement" includes the two weeks following the announcement.

Event II is the expiration of the FTC second request period, an event associated with an 8 percentage point fall in the market's estimate of the probability of the merger.

Event III is the end of the waiting period for the FTC second request, an event associated with an 18 percentage point fall in the market's estimate of the probability of the merger.

Event IV is the vote by the Commission to block the merger, closely followed by the announcement by the parties that they had reached an agreement with Office Max that, they believed, would satisfy the Commission's concerns. This is a relatively complex event because it appears to be really two events -- a change in the probability of the merger, plus a sale of a substantial number of stores to Office Max by the merging parties at reportedly bargain-basement prices. As Table 1 shows, the combined effect of the increase in the probability of the merger and the transfer of the stores was a very large increase in the value of Office Max shares. If we ignored this second event -- the sale of the stores -- and attributed all of this change to the effect in the probability of the merger, we would have greatly overestimated the effect of the merger on OfficeMax. We do not have an independent estimate of the difference between the fair market value of the stores to be sold to OfficeMax and the price, but based on news reports, it would appear that the sale involved a transfer on the order of \$140-200 million to OfficeMax's

shareholders from the shareholders of Staples and Office Depot.⁵ Netting out this transfer,⁶ we get an estimate for the effect of the merger on OfficeMax, absent the sale, of 16-24%, as shown in Table 2, Rows IV.a and IV.b.

Event V is the FTC's decision to reject the proposed deal (the sale of the stores) and proceed with its challenge of the merger. Just like the previous event, this event also involves two separate effects on the stock prices of Staples, Office Depot, and OfficeMax. Accordingly, we re-adjusted the change in the abnormal returns to the three companies to net out the effect of the news that the anticipated transfer would not take place.⁷ The resulting figures are on rows V.a and V.b of Table 2.

Event VI is the court decision. Since Staples and Office Depot had pre-announced that they would not appeal the decision, the probability of the merger falls to zero.⁸

The estimated effects of each event on each firm's stock price (and on the combined value of Staples and Office Depot) were then averaged over all six events, with each event weighted by its effect on the expected probability of the merger actually occurring. The results of this exercise are reported in Table 3, row A.

Row D in Table 3 presents the estimates for the effect of the merger on the equity values of each firm, averaged over the six events (row A multiplied by row C).

The market's view of the effect of the merger on Office Max, net of the effects of the proposed sale of stores, is quite consistently large. Our "best estimate" is that the merger would be expected to increase the value of Office Max equity by 11.66%, or by \$ 200 million.

2. Continuous Time-Series Regression

As a second approach, we regressed the daily abnormal returns to each company on the daily change in the probability of the merger, using continuous time series. For each of the firms, we estimated a generalized autoregressive conditional heteroscedasticity (GARCH) model with daily abnormal returns as the dependent variable and the change in the probability of the merger (and its lag, if significant) as the independent variable(s).⁹ Specifically, for each of the companies we estimated the equation

$$AR(t) = \alpha + \beta \Delta p(t) + u(t)$$

where Δp is the change in probability¹⁰ and u is the autoregressive heteroscedastic error term.

Table 4 shows the depth of the two GARCH polynomials and the values of the coefficients for the change in the probability of the merger, for each company.

The magnitude of the merger effect on the combined value of Staples and Office Depot, 9.35%, is statistically highly significant. The effect of the merger on the only other office superstore (OSS), OfficeMax, is 12.22%. This is very close to our previous estimate of 11.66% for the effect of the merger on OfficeMax (Row A in Table 3). Moreover, this coefficient estimate is both statistically highly significant, and it is also well within the 9% - 15% range obtained for the effect of the merger on the combined value of Staples and Office Depot. Row B of Table 3 shows the estimates of the merger effect for Staples and Office Depot and each of the potential rivals of the merging parties.

The estimated effect of the merger on most of the companies other than Staples, Office Depot, and OfficeMax is either negative, or virtually zero. The largest positive effect is for Comp

USA (6.06%), which, with a t-statistic of 3.1, is significant at the 1% level. The total of 5.58% effect of 5.58% for US Office Products, significant at the 2% level, possibly suggests a positive effect. However, the contemporaneous effect for US Office Products is small and insignificant, and the estimated merger effects for events I-VI mostly have the wrong sign. Combining the results of the two approaches indicates that the most likely candidate for a non-OSS rival for the merging parties would be Comp USA.

3. Using the Effect of the Merger on the Value of Office Max to Derive the Market's Estimate of the Effect of the Merger on the Price of Office Supplies.

How large a price increase was implied by this increase in the value of Office Max? Table 5 shows the steps to derive the average price effect from the change in the market value of OfficeMax, in the absence of efficiencies. In Table 5, the column titled "Low Estimate" starts from an estimated \$200.4 million change in the stock market value of OfficeMax (from row D of Table 3). Assuming a discount rate of 8.2%, we estimate the average change in the annual post-tax profits as \$16.4 million ($= 0.082 \times \200m).¹¹ This is equal to an average change of \$27.4 million in annual pre-tax profits, assuming a corporate tax rate of 40% ($\$27.4\text{m} = \$16.4\text{m} / (1 - 0.4)$). This figure is 2.74% of office supply revenues of OfficeMax, estimated to be about \$1 billion. Finally, dividing by the proportion of sales in areas where a price increase is expected, we arrive at an expected price increase of 6.52% for office supplies in markets where Staples, Office Depot, and OfficeMax are all present.¹² The next column, titled "High Estimate," repeats the same calculations starting with a \$210 million change in the stock market value of OfficeMax (from row E of Table 3) to come up with a price increase of 6.83%

IV. Conclusion

Perhaps the most important conclusion to be drawn from these results is qualitative --- that the financial market expected that this merger would lead to a price increase for products in markets where Office Max currently competes with Staples and Office Depot. This is not to say that there would not be any significant efficiencies and associated cost reductions for Staples and Office Depot as a result of the merger, only that the rate at which any such efficiencies would be passed on to consumers would be more than counteracted by the price increase from reduced competition.

Our model's basic insight has been proven by analysts' reports that track the office superstores industry (which were cited in the FTC's opening statement in court). For example, Value Line's advisory on OfficeMax explained that OfficeMax would benefit from the proposed merger because "a more favorable pricing environment," i.e., higher prices, would yield higher revenues.¹³ As another example, Morgan Stanley reported that the proposed merger "eliminates concern over three-player markets. The just-announced merger of Staples and Office Depot permanently eliminates the lingering fear of intensified competition in three-player markets."¹⁴

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Figure 1--Probability of the Merger and Cumulative Abnormal Returns to Staples and Office Depot

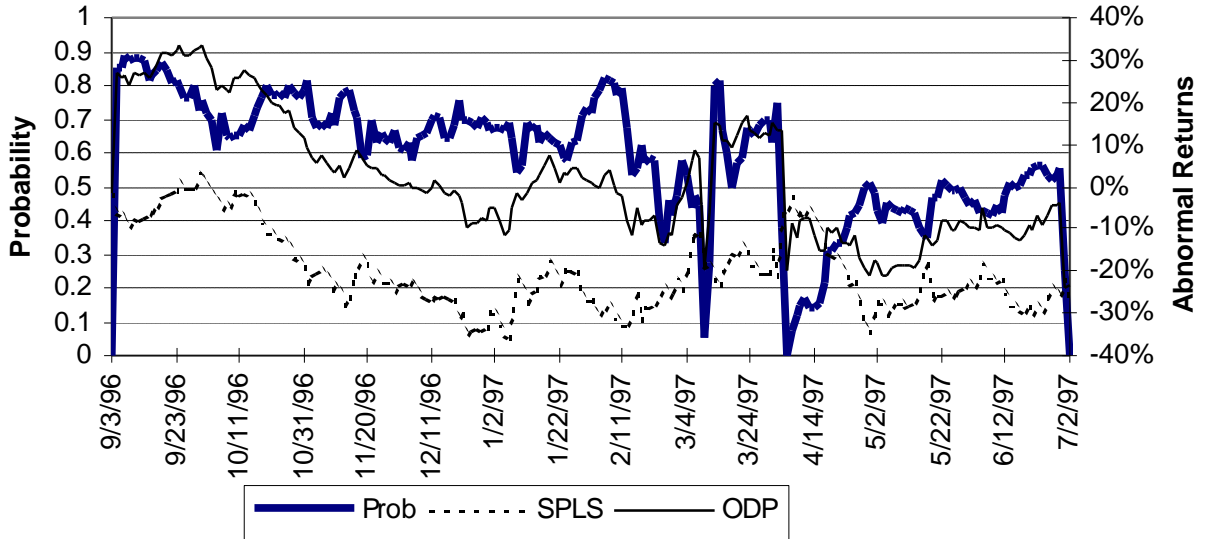


Figure 2--Probability of the Merger and Cumulative Abnormal Returns to OfficeMax and Staples and Office Depot Combined

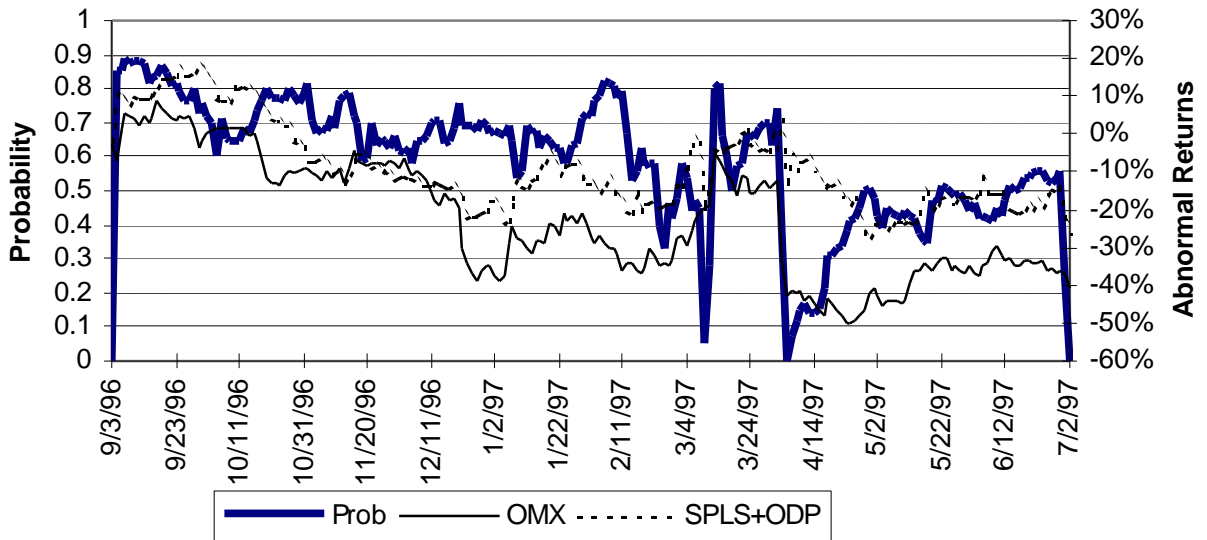


Table 1: Probability of the Merger and the Effect of the Merger on Share Prices.

| Event | Period | | End-of-period | | Percent Abnormal Returns | | | | | | | | | |
|---|-------------|----------|---------------|------------------------|--------------------------|--------------|------------|---------|----------|----------|----------|--------|---------------|--------------------|
| | Begin Date | End Date | Prob-ability | Change in Prob-ability | Staples | Office Depot | Office Max | Cost Co | Wal Mart | Best Buy | Comp USA | Viking | Corp. Express | US Office Products |
| | <u>1996</u> | | | | | | | | | | | | | |
| <i>Preannouncement period</i> | 8/5 | 9/3 | -- | -- | 14.43 | 5.73 | 1.68 | -1.32 | 8.82 | 9.03 | -4.12 | -6.95 | -2.62 | -23.68 |
| I <i>First two weeks</i> | 9/4 | 9/17 | 0.84 | 0.84 | -2.83 | 29.97 | 10.63 | -4.76 | -0.15 | 4.32 | 26.81 | 10.11 | -9.99 | 21.19 |
| II <i>FTC Second Request plus the next day</i> | 11/1 | 11/4 | 0.70 | -0.08 | -1.59 | -4.84 | -1.10 | 1.10 | -1.07 | -5.94 | -1.48 | -1.46 | 0.46 | 0.48 |
| | <u>1997</u> | | | | | | | | | | | | | |
| III <i>End of the waiting period for the FTC Second Request</i> | 2/24 | | 0.40 | -0.18 | 2.33 | -6.14 | -3.05 | -2.75 | 1.96 | -3.06 | -0.69 | 1.76 | 3.03 | -1.79 |
| IV <i>FTC vote plus "the deal"</i> | 3/10 | 3/12 | 0.80 | 0.35 | -10.58 | 8.31 | 15.20 | 9.46 | 5.48 | -1.20 | 0.75 | 7.54 | 11.22 | -5.10 |
| V <i>FTC challenge</i> | 4/3 | 4/4 | 0.00 | -0.75 | 9.40 | -39.42 | -10.49 | 7.94 | -0.18 | -0.41 | -1.38 | 7.44 | -1.05 | 4.93 |
| VI <i>Court Decision</i> | 6/30 | 7/2 | 0.00 | -0.56 | -2.88 | -19.83 | -4.83 | -6.03 | 2.52 | -1.49 | -3.41 | 4.90 | -5.60 | -1.05 |

Table 2: Effect of the Change in the Probability on Abnormal Returns.

| <i>Event</i> | Percent Abnormal Returns Divided by Change in Probability | | | | | | | | | | | |
|---|---|--------------|--------------------------|------------|---------|----------|----------|----------|--------|---------------|--------------------|--|
| | Staples | Office Depot | Staples and Office Depot | Office Max | Cost Co | Wal Mart | Best Buy | Comp USA | Viking | Corp. Express | US Office Products | |
| I <i>First two weeks</i> | -3.36 | 35.63 | 16.68 | 12.64 | -5.65 | -0.17 | 5.14 | 31.87 | 12.02 | -11.88 | 25.19 | |
| II <i>FTC Second Request plus the next day</i> | 20.35 | 61.76 | 41.15 | 14.08 | -14.09 | 13.70 | 75.90 | 18.94 | 18.64 | -5.92 | -6.14 | |
| III <i>End of the waiting period for the FTC Second Request</i> | -12.88 | 33.88 | 8.48 | 16.84 | 15.18 | -10.80 | 16.87 | 3.81 | -9.70 | -16.73 | 9.86 | |
| IV <i>FTC vote plus "the deal"</i> | -30.05 | 23.60 | -6.08 | 43.16 | 26.87 | 15.56 | -3.40 | 2.13 | 21.41 | 31.87 | -14.47 | |
| | <i>Adjusted for Transfer to OfficeMax</i> | | | | | | | | | | | |
| IV.a <i>\$200m transfer</i> | -26.97 | 26.68 | -0.73 | 15.79 | | | | | | | | |
| IV.b <i>\$140m transfer</i> | -27.90 | 25.75 | -2.82 | 24.00 | | | | | | | | |
| V <i>FTC challenge</i> | -12.60 | 52.82 | 14.77 | 14.05 | -10.64 | 0.25 | 0.56 | 1.85 | -9.97 | 1.41 | -6.61 | |
| | <i>Adjusted for Transfer to OfficeMax</i> | | | | | | | | | | | |
| V.a <i>\$200m transfer</i> | -26.97 | 26.68 | 20.87 | 1.74 | | | | | | | | |
| V.b <i>\$140m transfer</i> | -27.90 | 25.75 | 19.94 | 5.44 | | | | | | | | |
| VI <i>Court Decision</i> | 5.17 | 35.63 | 17.22 | 8.68 | 10.84 | -4.52 | 2.68 | 6.12 | -8.80 | 10.06 | 1.88 | |

Table 3: Average Merger Effect and Change in the Market Value.

| | Staples | Office Staples and Depot | Office Depot | Office Max | Cost Co | Wal Mart | Best Buy | Comp USA | Viking | Corp. Express | US Office Products |
|--|---------|--------------------------|--------------|------------|---------|----------|----------|----------|--------|---------------|--------------------|
| Average merger effect (Percent Abnormal Returns) | | | | | | | | | | | |
| A From events I-VI* | -6.64 | 40.24 | 15.34 | 11.66 | 1.61 | 0.77 | 5.09 | 12.53 | 1.82 | 1.59 | 4.90 |
| B From regression | -8.91 | 33.00 | 9.35 | 12.22 | -0.73 | 1.55 | 1.62 | 6.06 | -4.10 | 0.66 | 5.58 |
| Market value** (Billions of Dollars) | | | | | | | | | | | |
| C | 3.18 | 2.51 | 5.69 | 1.72 | 4.58 | 60.79 | 0.95 | 0.95 | 1.30 | 1.20 | 1.50 |
| Change in market value*** (Millions of Dollars) | | | | | | | | | | | |
| D From events I-VI | -211 | 1,009 | 872 | 200 | | | | 119 | | | |
| E From regression | -283 | 828 | 532 | 210 | | | | 57 | | | |

*Weighted by the absolute value of the change in probability for each event.

**Pre-merger price multiplied by outstanding shares, August 1996.

***Only those with regression estimates significant at 1% are displayed.

Table 4: Regression Coefficients

| Equation | GARCH Poly- nomials | | Variable (Asymptotic <i>t</i> -ratios in parentheses) | | Total Merger Effect (Square root of the <i>F</i> -statistic in parentheses) |
|----------------------------|---------------------------|----------|---|------------------------------------|---|
| | <i>p</i> | <i>q</i> | Change in Probability | Lagged Change in Probability | |
| 1 Staples | 0 | 1 | -0.0891 (-10.58) | | |
| 2 Office Depot | 1 | 1 | 0.3300 (21.82) | | |
| 3 Staples and Office Depot | 1 | 1 | 0.0935 (8.12) | | |
| 4 OfficeMax | 0 | 1 | 0.0716 (5.59) | 0.0506 (4.74) | 0.1222 (8.51) |
| 5 CostCo | 0 | 1 | -0.0074 (-0.62) | | |
| 6 WalMart | 1 | 1 | 0.0155 (1.51) | | |
| 7 Best Buy | 0 | 1 | 0.0148 (0.30) | | |
| 8 Comp USA | 0 | 1 | 0.0606 (3.06) | | |
| 9 Viking | 0 | 1 | -0.0410 (-2.01) | | |
| 10 Corp. Express | 0 | 1 | 0.0067 (0.13) | | |
| 11 US Office Products | 0 | 1 | 0.0101 (0.54) | 0.0457 (3.11) | 0.0558 (2.29) |

Table 5: Effect of the Merger on Office Supply Prices in Overlap Areas.

| | Low Estimate | High Estimate |
|---|--------------|---------------|
| Increase in Market Value | \$ 200.37 | \$ 210.03 |
| Average annual change in profit (post-tax), million dollars | \$ 16.43 | \$ 17.22 |
| Average annual change in profit (pre-tax), million dollars | \$ 27.38 | \$ 28.70 |
| Percent of office supply revenues | 2.74% | 2.87% |
| Average price increase in overlap areas | 6.52% | 6.83% |

NOTES:

¹ Fortune Magazine, April 14, 1997.

² See Dalkir and Warren-Boulton (1998).

³ Presumably because of cumulative error, merger probability on March 3 was negative; we correct this in an *ad hoc* way by re-setting it to zero.

⁴ Figures in Tables 1-3 are rolled to two decimal points.

⁵ The Washington Post (3/13/97) reported that:

Because all three office product chains would benefit from the merger and with pressure from shareholders mounting, analysts said Staples agreed to accept about \$140 million less than it originally wanted from Office Max.

⁶ We added the probability-weighted amount of the transfer to the merger-related (i.e., abnormal) change in the market value of each of Staples and Office Depot, proportional to their relative market values. We subtracted the probability-weighted transfer from the merger-related change in the market value of OfficeMax.

⁷ We subtracted the probability-weighted amount of the transfer from the merger-related change in the market value of each of Staples and Office Depot, proportional to their relative market values. We added the probability-weighted transfer to the merger-related change in the market value of OfficeMax.

⁸ After correcting for the cumulative error in the probability.

⁹ For a discussion of generalized autoregressive conditional heteroscedasticity, see Bollerslev

(1995).

¹⁰ McGuckin, Warren-Boulton, and Waldstein (1988) show that the probability of a merger can be written as

$$p = \frac{a(V_B - \hat{V}_B) - (V_S - \hat{V}_S)}{\hat{V}_S - a\hat{V}_B}$$

where a is the terms of the stock exchange, V is the actual market price, \hat{V} is the hypothetical “but for” market price in the absence of the merger, and subscripts S and B represent the seller and the buyer respectively.

¹¹ The cost of capital for OfficeMax, a company with no debt and a beta of 0.85, is approximately equal to the risk-free rate plus the beta times the equity premium, i.e. $8.2\% = 3\% + 0.85 \times 6.1\%$.

¹² In 14% of all market areas where an OfficeMax is present, Staples and Office Depot are also present. Conservatively, we assume that these areas represent 42% of total OfficeMax sales.

¹³ *Federal Trade Commission v. Staples, Inc.*, Transcript of Trial, May 19, 1997, p. 38.

¹⁴ *Ibid.*