Merger Retrospective: Examining the Kimberly-Clark and Scott Paper Company Merger

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ABSTRACT

This study conducts a post-merger retrospective of the Kimberly-Clark and Scott Paper merger in 1995 to examine the impact on store prices and consumer welfare. Kimberly-Clark was a premium brand with strong market power in the United States. Scott Paper had the largest market share of tissues in Europe and was positioned as a value-oriented brand. This merger created the second largest personal care company in the United States. While the federal government conducts many simulations ex-ante, few analyses are run ex-post the merger. These are crucial to calibrate economic models and deliver accurate regulation. This study examined data from University of Chicago’s Booth School of Business using Dominick’s database, which surveyed over 100 of its chain stores in the Chicago area over a nine year period using weekly sales data of over 3,500 products. Regressions showed that despite the strong individual positions of the two companies, there were no anti-trust issues. After the merger, industry market prices rose by $0.49 or 2.8% in the Chicago area. This is within the 5% benchmark used by the Department of Justice to allow mergers to proceed.
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Table of Contents

ABSTRACT ............................................................................................................................................................................ 2
AKNOWLEDGEMENTS ........................................................................................................................................................... 3
I. Introduction ..................................................................................................................................................................... 5
II. Literature Review ............................................................................................................................................................ 8
III. Description of Data ......................................................................................................................................................... 10
    Table 1: Summary of Experimental Variables ................................................................................................................ 11
    Graph 1: General Relationship between Week and Price .................................................................................................. 12
IV. Empirical Results ........................................................................................................................................................... 13
    Graphs 2-3: Change in Price Overtime for Same Location and Product ............................................................................. 13
    Figure 1: Reg postmerger on price ..................................................................................................................................... 14
    Figure 2: Reg postmerger StoreDum* on price .................................................................................................................. 15
    Figure 3: Reg postmerger StoreDum* UPCDum* on price .................................................................................................. 15
    Figure 4: Reg postmerger StoreDum* UPCDum* qtyDum* on price .................................................................................. 15
    Figure 5: Reg postmerger StoreDum* UPCDum* qtyDum* SaleDum* on price ................................................................. 16
    a. Accounting for the Interaction Effect ........................................................................................................................... 16
       Table 2: The Effect of the Interaction Term While Considering All Variables. .............................................................. 17
       Figure 6: Average Price of Merged Firm Products Prior to Merger ............................................................................... 18
       Table 3: Final Results ..................................................................................................................................................... 18
V. Future Work .................................................................................................................................................................... 19
Vi. Bibliography .................................................................................................................................................................. 21
I. Introduction

United States anti-trust laws facilitate competitive pricing schemes to prevent market monopolies. The government’s decision to approve a merger is based on pre-merger models that simulate the effects on consumer welfare and market share. The ex-ante analysis considers market structure, pricing mechanisms, number of competitors, consumer demand, inflation, welfare trends, and regional power, among other inputs. The federal government performs a sensitivity analysis, testing a range of values for the parameters, to verify consistent results. After a merger is approved, the models are seldom revisited to determine if the initial projections were accurate. The reviewing process is constrained by high administration costs and significant time intensity. The system lacks a checking process to verify the accuracy of existing models.

Generally, company mergers help reduce transaction costs and increase company efficiency. Firms seek to increase their financial position via economies of scale, economies of scope, vertical integration, diversification, and taxation laws. Economies of scale refer to the decrease in the average cost per unit as output increases. The fixed cost is spread over the entire output. Similarly, economies of scope means as the number of differentiated goods increases, the average total production cost decreases. By sharing production and distribution channels, the firm is able to sell the two goods at a lower cost than if sold individually. Vertical integration occurs when up-stream and down-stream firms combine to streamline costs. Previously, the two firms individually serviced two parts of the good. Now, the whole good is created within one firm. This internalizes the costs by lowering transaction, bargaining costs, and product uncertainty. It frees up resources to devote to research and expansion. By diversifying product offerings, the firm can access a larger array of consumers. This lowers the firm’s exposure to possible market shocks by balancing its products. The
larger audience helps strengthen the firm’s brand and market standing. Finally, companies can purchase financially unstable firms to lower their tax payments to the federal government. The decrease in tax liability strengthens the firm’s short-term financial performance. The Department of Justice will block a potential merger that causes industry market prices to increase more than 5 percent.

Kimberly-Clark was founded in 1872 as a paper making factory. It has since expanded and its products include Cottonelle, Kleenex Facial Towels, Huggies, Kotex, Depends, and Good Nites. The product line is considered premium purchases and is generally priced higher than their competitors. Kimberly-Clark, which is currently based in Texas, has a strong market presence in the United States.

Scott Paper Company was established in Philadelphia in 1874 via a limited partnership. In 1879, Scott Paper became the first company to manufacture toilet paper on a roll, transforming the industry. By the time of the merger, it was number one tissue company in Europe by market share. Scott’s is marketed as a value-orientated brand, catering to the lower demand consumers.

Kimberly-Clark and Scott Paper announced plans to merge in July 1995 and finalized the deal, worth $9.4 billion, by December 12 of the same year. The new company operated under the Kimberly-Clark brand name and Scott shareholders received 0.78 of common stock of the new company per share of Scott. As a result of the merger, Kimberly-Clark cemented its position as the number two company in the paper goods market, behind market leading Proctor & Gamble. It gained a strong international presence, specifically in Europe, and diversified its product offering combining premium names and value-orientated goods. To thwart anti-trust concerns, Kimberly-Clark sold four brands to Proctor & Gamble: Scotties facial tissue, Baby Fresh, Wash-a-bye Baby, and Kid Fresh. It also sold two of its four U.S. manufacturing plants. This alleviated concern that Kimberly-Clark and Scott’s would potentially control 58 percent of the moist-toilette market.
The merger created a corporate giant worth $11 billion in annual sales—Kimberly-Clark had $7.4 billion in sales the prior year and Scott’s had $3.6 billion. By comparison, Proctor & Gamble held annual sales of $30 billion. The new company gained the dominant share of the facial tissue market, which is counter-balanced by Proctor & Gamble’s majority claim to the paper towel and toilet paper businesses. The new company featured manufacturing plants in 33 countries, sales forces in 150 countries, and 56,000 employees.

A merger retrospective is a case study of how one merger affects a specific market at a particular point in time. Although it may be difficult to extrapolate conclusions, but these reviews justify government regulation decisions. In a short time frame and with limited resources, the federal government must forecast how a change in the market would impact competition. Without these post merger calibrations, agencies would not know if they were too aggressive or lenient with regulation. Few studies have been conducted examining the accuracy and effectiveness of the initial simulations and subsequent post-merger effects. This paper examines the impact of the merger on consumer welfare and store prices in Chicago during the years 1989 to 1997.

A benchmark is needed to compare post merger prices. The simplest estimate is to use the pre-merger price, but measure is unstable. Pre-merger will accurately estimate merger impact only if the demand and cost factors do not vary significantly over time. Data showed that these inputs were stable over the time period, setting the pre-merger prices as the comparison benchmark.
II. Literature Review

Previous research that examined had similar questions and was used as a foundation for this study. It explained the basic steps of the simulation and the required criterion. Majority of studies proposed demand models to capture consumer behavior and utility preferences.

Oliver Bidzinski and Isabel Ruhmer (2009) in their study “Merger Simulation in Competition Policy: A Survey” created an extensive overview to run simulations. Merger retrospective is still a nascent tool used by policy-makers to understand anti-trust. These instruments have potential to further expand by becoming more technical to impact policy decisions. However, at this point they should not be used as a singular resource to evaluate government regulation. Instead, they should be combined with other strategies to achieve the full benefit.

The simulations depend on the form of competition: Cournot Competition, Bertrand Competition, and Auction model. Cournot Competition (based on quantity) is best if products are homogenous and consumers are not concerned with the supplier. Bertrand Competition (based on price) is used if goods are differentiated and consumers are concerned with the supplier. Consumers will not be distributed equally amongst the producers and will pay a premium for a preferred product. Action models feature low frequency selling of goods, where sellers auction their goods. After purchase, are generally tailored to the consumer’s preferences. Running a simulation is a four step process. First, an appropriate demand function needs to be chosen to simulate consumer behavior. Possible models are linear, log-linear, logit, or multi-step demand. Second, calibrate the demand system for the elasticities to simulate pre-merger prices and market shares. Third model the supply according to the initial model chosen. Finally, run the simulation using pre-merger data adjusted for post-merger market share to determine the new equilibrium. This assumes that firms do not cooperate
and the initial model describing demand and competition remains unchanged. The competition between the two merged firms is internalized.

In Bertrand Competition, consumers are willing to pay a premium for the product. Consumer preferences lead to imperfect substitutes between the brands. If the company raises its price, some customers – but not all— will leave to a competitor. In general, as cross price elasticity increases the merger becomes more anticompetitive. In this case, mergers between two close substitutes are more harmful to consumers than mergers between two distant products. This merger is an example of Bertrand Competition because the there are two different valued products and the merged firm increases its consumer base to gain profits of both markets. Premerger, Scott Paper may have found the price increase unprofitable, but post merger it will be profitable because the company controls more of the alternative products.

Steven Berry (1994) in his article “Estimating Discrete-Choice Models of Product Differentiation” proposed an estimation to calculate the implied mean levels of utility per good using instrumental variables. He examined oligopoly markets with differentiated products that had unobserved product characteristics. This model can be applied to the data extracted from this report.

This study ran statistical regressions to see the change in consumer prices after the merger. Later, the interaction effect between the time period (before or after the merger) and the product choice (a merged firm’s product or a competitor’s product) was included in the model. In the end, we discovered the percentage prices increased after the merger for both market prices and merged firm products.

The United States Federal Trade Commission and the Department of Justice staff released a note in 2011 titled “Roundtable on Impact Evaluations of Merger Decisions”. It states that only a handful of industries have undergone merger reviews including banking, railroads, petroleum, airlines, and
hospitals. These industries were all once regulated by the government and only examined short-run price effects. At the time of this note’s publication, only three papers were published that compared pre-merger simulation estimates to post-merger estimates using the price data.

III. Description of Data

The data used in the report is from University of Chicago Booth School of Business. Kilt's Center for Marketing arranged a partnership with Dominick’s Finer Foods to create the Dominick’s database. The store analyzed data throughout its 100 chain stores in the local area. The bathroom tissues catalogue contains store-level data from 1989 – 1997 of more than 3,500 Unique Product Codes (UPC). There are three categories of data files available: consumer count, UPC file, and price movement. Consumer count examined store traffic and coupon usage by store. The UPC file had information about product name, size, and commodity code. The price movement file contained weekly sales data for each UPC in each store. This report analyzed data on movement files for retail price, units sold, gross margin, coupon sales, date, store number, and number of items bundled together. Three variables were created outside of the initial dataset: post merger, merged firm and PMMF. Post merger is a dummy variable to indicate if the sale occurred before or after the merger. Merged firm is a dummy variable indicating if the product sold is part of the merged firm’s product line. PMMF stands for post merger * merged firm and is the interaction of the two variables. The summary of the variables is seen below in Table 1. The statistical software package STATA was used to run the regressions in this report.
Table 1: Summary of Experimental Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>984,308</td>
<td>1.721169</td>
<td>1.807318</td>
<td>0</td>
<td>11.99</td>
</tr>
<tr>
<td>PMMF</td>
<td>984,308</td>
<td>0.0698166</td>
<td>0.2548377</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Postmerger</td>
<td>984,308</td>
<td>0.2502946</td>
<td>0.4331829</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Mergedfirm</td>
<td>984,308</td>
<td>0.2138182</td>
<td>0.4100002</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Week</td>
<td>984,308</td>
<td>224.2588</td>
<td>113.8154</td>
<td>1</td>
<td>399</td>
</tr>
<tr>
<td>Store</td>
<td>984,308</td>
<td>83.36365</td>
<td>36.7131</td>
<td>1</td>
<td>146</td>
</tr>
<tr>
<td>UPC</td>
<td>984,308</td>
<td>3.80e+09</td>
<td>4.61e+08</td>
<td>1.12e+09</td>
<td>5.40e+09</td>
</tr>
<tr>
<td>Quantity</td>
<td>984,308</td>
<td>1.009185</td>
<td>0.1644888</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

Postmerger is coded as 0 if the sale happened before December 12, 1995 which is equivalent to week 327, and coded as 1 if the sale happened afterward. The original price movement file contained slightly less than 1 million observations. When running regressions, 64,267 observations were dropped from the data because they contained an invalid UPC code. The UPC code was not identified in Dominick’s classification of products and we could not independently verify which product the code represented. Furthermore, an additional 400,000 observations were dropped because they contained a price of 0, meaning that the product was not sold in store during the specified time period. Thus, approximately 500,000 observations were used to run statistical regressions.

Bathroom tissue prices ranged from $0 to $11.99 for 400 weeks of data. The average price of all the products sold in 1989 – 1997 is $1.72 dollars with a high standard deviation. However, this does not
consider the impacts of price in the merged companies, prices of competitors, and inflation. Graph 1 below shows the relationship between week and price. Generally, as the weeks increased, prices increased as well. The merger happened in week 327 of the data, as indicated by the red vertical line.

*Graph 1: General Relationship between Week and Price*
IV. Empirical Results

We were interested to see the visual effects of the merger when considering all the products sold in the market using the initial data. Weeks and price of products were graphed per UPC within the same store, controlling for the same product and location. The result is seen below with the red line representing week 327 when the merger occurred.

*Graphs 2-3: Change in Price Overtime for Same Location and Product*
As evident above, the price increased for the products after the merger. However, we wanted to
determine if this was a result of a general market price increase, inflation increase, or from the
merger.

First, we regressed the variable postmerger on price to see the cross sectional and time series data
for all the firms.

*Figure 1: Reg postmerger on price*

| price    | Coef.    | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|----------|----------|-----------|-------|------|----------------------|
| postmerger | 0.9819384 | 0.0040872 | 240.25 | 0.000 | 0.9739277 – 0.9899492 |
| _cons    | 1.475395  | 0.0020448 | 721.54 | 0.000 | 1.471387 – 1.479403   |

The coefficients on the variables are levels, not percent changes. To find percent changes, we would
take the logarithm of the variable. The data above suggests that prices after the merger increased
by almost one dollar. However, this is subject to the omitted variable bias because important casual
factors such as products, store, sale, and quantity were left out. Since these variables are important
predictors of price, the regression in Figure 1 is the wrong biased model and does not reflect the
true impact on price. The coefficient estimate can either have a positive or negative bias and the
standard errors will be positively biased. The bias decreases when the omitted variables that are not
correlated with price or the other variables. We begin by controlling for the store variable.
This slightly decreases the postmerger effect and indicates that prices increased by $0.92 after the merger. The coefficient decreased because we are building the model and accounting for additional variation. We continue by adding other casual variables and control for UPC.

**Figure 3: Reg postmerger StoreDum* UPCDum* on price**

| price  | Coef. | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|--------|-------|-----------|-------|-----|----------------------|
| postmerger | -.387492 | .003177 | -121.97 | 0.000 | -.393719 - .3812655 |

This suggests a decrease in prices after the merger by approximately $0.39. Figure 3 accounts for the variation in products sold and their impact on price. The predictive ability of the model increases as the number of included relevant variables increases. Next, the quantity of items purchased is added to the equation.

**Figure 4: Reg postmerger StoreDum* UPCDum* qtyDum* on price**

| price  | Coef. | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|--------|-------|-----------|-------|-----|----------------------|
| postmerger | -.3812503 | .0031671 | -120.38 | 0.000 | -.3874577 - .3750429 |
Quantity does not have a large impact on the postmerger variable. According to the description of data, quantity has a low standard deviation and remains relatively consistent of 1 unit purchased.

The last control variable is sale, to determine the impact of any promotions at the store. This includes if items were sold as a bonus buy (buy one get one free), through the use of a coupon, or a simple price reduction within the store. Additional promotions would spike demand for the products, especially for consumers looking to purchase the cheapest good without concern for the producer.

*Figure 5: Reg postmerger StoreDum* UPCDum* qtyDum* SaleDum* on price*

| price     | Coef.   | Std. Err. | t    | P>|t|  | [95% Conf. Interval] |
|-----------|---------|-----------|------|------|----------------------|
| postmerger| 0.0058834| 0.0020521 | 2.87 | 0.004 | 0.0018613 - 0.0099055 |

This final model suggests that industry prices increased on average by barely one cent after the merger. Given that the average price of the products was $1.72, this represents a 0.58% increase in price after the merger. However, this model is inaccurate because it does not account for the interaction effect between postmerger and merged firm, which is accounted for by the PMMF variable. We now include it in the next model.

a. **Accounting for the Interaction Effect**

After controlling for all the variables, this suggests that post merger, prices for all firms merged and non-merged increased by less than one cent. Given that the average price of the products was $1.72, this represents a 0.58% increase in price after the merger. However, this model is inaccurate because it does not account for the interaction effect between postmerger and merged firm, which
is accounted for by the PMMF variable. The variable PMMF examines the post merger change in price for products within the merged firm. We now include it in the next model. A summary of the data coefficients is seen in table 2 below. The methodology to compute these values is similar to the procedure above except the interaction term PMMF was included. Adding the interaction coefficient and the post merger coefficient together will give the total effect on prices. This also separates out the effect for the merged and non-merged products, allowing us to compare merged firm prices to non-merged firm prices.

**Table 2: The Effect of the Interaction Term While Considering All Variables.**

<table>
<thead>
<tr>
<th>Variables Regressed on price adjusted</th>
<th>Impact</th>
<th>PMMF Coefficient</th>
<th>Post Merger Coefficient</th>
<th>Total Effect</th>
<th>Percentage Change from PMMF</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postmerger, mergedfirm</td>
<td>Effect on price only within the merged firm products</td>
<td>.6714939</td>
<td>1.188451</td>
<td>1.859945</td>
<td>56.50%</td>
<td>Merged products increased $1.86</td>
</tr>
<tr>
<td>PMMF postmergerupcDum* storeDum* saleDum* qtyDum*</td>
<td>Control for all the variables</td>
<td>.0672461</td>
<td>-.0178001</td>
<td><strong>0.049446</strong></td>
<td>-377.79%</td>
<td>Price increased by $0.05 after the merge for merged products</td>
</tr>
<tr>
<td>Remove qty</td>
<td>Remove 1 variable at a time</td>
<td>.0141628</td>
<td>-.0282476</td>
<td>-0.01408</td>
<td>-50.138%</td>
<td></td>
</tr>
<tr>
<td>Remove sale</td>
<td>Remove 1 variable at a time</td>
<td>.0695665</td>
<td>.0352905</td>
<td>0.104857</td>
<td>197.13%</td>
<td></td>
</tr>
<tr>
<td>Remove store</td>
<td>Remove 1 variable at a time</td>
<td>.0676752</td>
<td>-.0171885</td>
<td>0.050487</td>
<td>-393.72%</td>
<td></td>
</tr>
<tr>
<td>Remove UPC</td>
<td>Remove 1 variable at a time</td>
<td>.8089038</td>
<td>.3633386</td>
<td><strong>1.172242</strong></td>
<td>222.63%</td>
<td></td>
</tr>
</tbody>
</table>

Thus, when accounting for the interaction and controlling the variables of store, quantity, sales, and UPC, prices for products in the merged firm increased by approximately $0.05. Furthermore,
products within the merged firm saw increases of $0.067 or approximately $0.07 per good. Before the merger, the average price of these products was approximately $1.30, as seen in figure 6.

*Figure 6: Average Price of Merged Firm Products Prior to Merger*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>price</td>
<td>141742</td>
<td>1.29891</td>
<td>1.496417</td>
<td>0</td>
<td>7.39</td>
</tr>
</tbody>
</table>

The Department of Justice will reject a prospective merger if market prices increase above the 5% benchmark. This merger caused industry level prices to increase by 2.8%, which is well within the anti-trust boundaries. Thus, the Department of Justice used the appropriately calibrated models to determine the effects of this merger. A 5% price increase would see prices rise by approximately $0.065 dollars.

*Table 3: Final Results*

<table>
<thead>
<tr>
<th></th>
<th>Average Price</th>
<th>Post-Merger Change</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Products</strong></td>
<td>$1.72</td>
<td>$0.049</td>
<td>2.8%</td>
</tr>
<tr>
<td>Merged Firm Products</td>
<td>$1.30</td>
<td>$0.067</td>
<td>5.1%</td>
</tr>
</tbody>
</table>
The equation used to estimate the effect on price is:

\[ P_{sut} = \beta_1 X + \alpha_1 PM + \alpha_2 PM*MF + \beta_{2t} UPC + \beta_{3t} Store + \beta_{4t} Sale + \beta_{2t} Qty + \epsilon \]

In the panel data, price is a function of the store, UPC and time period. This equation accounts for the interaction effect summing across all possible UPC’s and stores. The coefficient \( \beta_{2t} \) captures the UPC effect and \( \beta_{3t} \) explains the store effect. The effect of the post merger dummy variable for a non-merged firm is captured by \( \alpha_2 \) and the effect of post merger for a merged firm is \( \alpha_1 + \alpha_2 \). The coefficient \( \beta_{2t} \) captures the UPC effect and the coefficient \( \beta_{3t} \) captures the store effect.

V. Future Work

There are tremendous opportunities for future research in this field. The initial proposal was to use the data figures found in section IV of the report to estimate the market demand function and subsequently the market supply function using the discrete choice model outlined by Berry (1994). The functions are estimated using the recovered alpha and beta parameters in the equation specified above. Afterward, a simulation is built to determine the accuracy of the initial government report. We modify the supply functions to see the price reactions in the market. Furthermore, the simulation would use pre-merger input estimates to verify if it matched the post-merger results. This portion of the project remains open for future work.

Discrete choice models focus on the demand side via regression analysis and reduces the computation to certain characteristics. They deal with problems that involved choices between two
or more alternatives. A discrete choice model must satisfy three requirements: the options must be exhaustive, mutually exclusive, and the set of options must be finite. The formula used by Berry is written below.

\[ U_{ijt} = \beta X_{jt} + \alpha P_{jt} + \xi_{jt} + \epsilon_{ijt} \]

This formula calculates the utility for person \( i \) and product \( j \) at time period \( t \). \( X \) represents the observed product characteristics, \( P \) is the price, \( \alpha \) is the marginal disutility, and \( \xi \) is the unobserved product characteristics (i.e. advertisements, product placements, store promotions). The model assumes that all individuals are identical in tastes. The error terms follow the type 1 (Gumbel) extreme value distribution.
VI. Bibliography


