Leveraging Customer-level Information for Product-level Decisions

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December, 2001

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Profits. No other measurement drives more management decisions. Indeed, profits are synonymous with success. Almost by definition, successful products generate profits for their owners. It is this kind of product-oriented profitability that drives many of the tactical and even larger strategic decisions made by companies.

Product profitability is generally measured through common accounting procedures. Looking through the lens of accounting profit, the profit of any particular product is simply the sum, across all customers, of the profit made on each individual customer’s purchase of that product. If one hundred people purchase the product, and the company makes $5 in profit per sale, conventional accounting profit sets the profitability of the product at $500. This measure of profitability treats all customers the same. It is concerned exclusively with measuring the profitability of a single product.

Managers can make marketing decisions at the level of the product or the level of the customer. In general, mass marketers such as brick-and-mortar retailers make product-level marketing decisions while direct marketers have begun to use the information gleaned from large transactional databases to make customer-level marketing decisions. There is now a great deal of literature that explores how direct marketers might use customer-level data to increase the effectiveness of their marketing activities.

However, mass marketers face greater challenges in effectively utilizing this kind of information. While large retailers, and even manufacturers in some cases, have access to a rich set of customer-level data it is not clear how to leverage this new found information to make better product-level decisions. For example, how can Wal-Mart best use marketing intelligence on the purchase patterns of individual customers to make better pricing decisions for laundry detergent? How can a bank make better marketing decisions for its checking account offerings by observing the purchase behavior of individual bank customers? This is the question we seek to explore in our paper.

The dilemma that mass merchandisers often face today is that they must make product-level decisions to please increasingly fragmented customers on whom they have abundant information. One way to leverage such information is to “go direct”. This approach has produced some well-documented successes, such as Dell Computers, where direct marketing has provided a way to deliver customized service with efficiency. But this approach also has some clear limitations.
These include the challenges of providing top-notch customer service in an environment where the customer may never have face-to-face contact with anyone in the organization. Also on the limitations side of the ledger are the privacy concerns of potential customers and the costs associated with setting up and maintaining a logistics infrastructure. One need to look no further than the recent flurry of failed e-tailers to understand that “going direct” is not a panacea.

Alternatively, mass merchandisers can seek a profit metric that better incorporates customer-level information and better reflects a product’s true profitability than traditional measures of accounting profit. This will allow them to institutionalize a customer-focused marketing plan and make more effective product-level decisions that leverage their increasing access to customer information. With such profit metric, mass merchandisers can follow the lead of direct marketers and step into age of customer-level information. Figure 1 shows how customer-level data has transformed direct marketing and how we believe it can transform mass marketing.

**Figure 1: Marketing Orientation: Decision-Profit Matrix**

<table>
<thead>
<tr>
<th>Profit Measurement</th>
<th>Product-level</th>
<th>Customer-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product-level</td>
<td>* Mass Marketing</td>
<td>* Marketing Profits Approach</td>
</tr>
<tr>
<td>Marketing Decision</td>
<td>* Direct Marketing</td>
<td>* One-to-one Marketing</td>
</tr>
</tbody>
</table>

The central message of our article is that standard accounting methods for measuring product profit do not leverage observed consumer purchase patterns and hence lead managers to make poor product-level marketing decisions. We propose a new metric, called “marketing profits,” that incorporates these purchase patterns and show that it leads to better marketing decisions.
### Marketing Profits

To fix the central idea of this problem we offer the following example. Consider a grocery retailer who must allocate advertising space in a weekly feature advertising insert in a local newspaper. This retailer is trying to make a decision on how much advertising space to allocate to produce and how much to allocate to meat. Some customers come to the store because of the fresh produce but also purchase meat while others come to the store because of the quality and selection of meat but also purchase produce. In short, some customers make their store choice based on produce alone while others only consider the retailer’s merchandising decisions for meat. Suppose the retailer only has enough additional advertising space to feature one of these two categories. Which should it be? Of course, the retailer would like to feature the category that will result in the greatest profits. To make this example concrete, Table 1 lists the hypothetical purchase patterns by the two types of consumers, produce-focused and meat-focused.

#### Table 1 Profit Contributions

<table>
<thead>
<tr>
<th></th>
<th>Produce</th>
<th>Meat</th>
<th>Marketing Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce-focused Consumers</td>
<td>$25</td>
<td>$35</td>
<td>$60</td>
</tr>
<tr>
<td>Meat-focused Consumers</td>
<td>$5</td>
<td>$35</td>
<td>$40</td>
</tr>
<tr>
<td>Accounting Profits</td>
<td>$30</td>
<td>$70</td>
<td></td>
</tr>
</tbody>
</table>

The uppercase letters ($P$ and $M$) in Table 1 indicate the items that determine the consumers’ store choices, while the lowercase letters ($p$ and $m$) indicate purchases that do not effect store choice. In our example, the produce-focused consumer buys fresh produce that contributes $P = $25 but also purchases meat that adds $m = $35 to profits, while the meat-focused consumer buys meat that contributes $M = $35 but also purchases fresh produce, which adds $p = $5 to profit. The accounting profits for a category are traditionally computed by aggregating over both consumer types in proportion to their representation in the population. In Table 1 the accounting profits are summed vertically: for produce it equals $P + p = $30 and for meat it equals $M + m = $70.

It appears that, by standard accounting measures of profit, meat would be the best choice for this retailer’s feature advertisement. This is wrong! It fails to recognize that a substantial part of meat sales, $m = $35, is made to produce-focused consumers. The manager would arrive at a better understanding of category profitability by summing up profits horizontally in Table 1. We refer to
the total profitability of each category-level consumer segment as the *marketing profits* of the category. Through the lens of marketing profits a manager now learns that meat-focused consumers make a contribution of only $40 (M + p) because these individuals do not by much in the produce category. However, produce-focused customers bring $60 (P + m) in profits to the store. Even though produce in and of itself produces less accounting profit than meat, these produce-focused consumers contribute more by way of their additional purchases of meat. Thus, it would be more profitable for the retailer in our example to feature produce rather than meat. For this reason, a profit measure that aggregates across different product categories for each type of consumer is a better measurement for making informed merchandising decisions.

While the above example is couched in terms of grocery products, there are many other business settings in which purchases are typically bundled and hence the marketing profits principle applies. Take consumer banking as another example. Many people have their checking accounts, savings accounts, brokerage services, car loans, and even home loans from the same bank. Especially because of recent deregulation in the financial services industry, banks have begun to compete with other financial service providers on a wide range of products and services. They now must consider this new reality when developing their marketing plans. In this context, how does a bank manager determine the profitability of checking accounts? Certainly focusing only on the profits that arise directly from checking accounts and ignoring the profits that are generated indirectly through the sales of other related products provides an imperfect picture to managers. The bank managers need a clear understanding of the profitability and profit potential of each of the products and services the bank sells in order to develop a sound and effective marketing plan. They need a profitability metric that accounts for the fact that individual customers, with different amounts of potential profitability, focus on different products or subsets of products when choosing a service provider. Specific to this example, they need a metric that can reveal the importance of the checking account as a driving force in the consumer’s choice of banks.

In business-to-business enterprises multiple product purchases also comprise an increasing proportion of business transactions. Particularly in the area of service providers, companies often look for turnkey solutions to complex service requirements. The service provider is not just expected to provide a single service, but rather a set of services that provides a solution to a problem or resource constraint the company is facing. This movement towards solving problems rather than selling a single service has forced managers of these companies to rethink the role particular products and services play in their overall strategy.
Facilitating Better Management Decisions

There are many circumstances in which an accurate assessment of category profitability is vital for making important tactical decisions. First, there are the obvious sorts of decisions, like pricing, which depend directly on a correct measure of product or category profitability. Without accurate profitability information, managers are literally left guessing when it comes to pricing decisions. Other critical merchandising decisions include allocating shelf space among the many products a retailer often carries and determining the money and space devoted to feature advertising particular categories. Both depend on accurate assessments of category profitability.

This information is also important for managing supplier relationships. As one specific example, trade promotions, temporary price promotions offered by a manufacturer to retailers, have become a common way for manufacturers to influence the final retail price of an item and to garner merchandising support from retailers. It is often the case that retailers have access to more trade promotions than they can accept given the merchandising support requirements imposed by manufacturers upon retailers who accept such a deal. An accurate understanding of category profitability provides important information to retailers in deciding which of these deals they should accept. A category that at first glance looks like a poor candidate for additional merchandising support may appear very attractive through the lens of marketing profits.

A category manager’s compensation is also often tied to measurements of category profits. Using accounting measures of profit, the contribution of managers whose categories generate profit to the retailer not primarily through their own sales but by generating store traffic and hence additional sales of other unrelated categories will be overlooked. Marketing profits allows a better assessment of the performance and overall contribution of these managers.

Finally, manufacturers too can benefit from understanding the marketing profits their product generates for retailers. Particularly in the case of products that are marketed to consumers who typically spend an above average amount of money at a given store, an accurate assessment of a product’s marketing profits can provide the manufacturer with leverage in channel price negotiations. The manufacturer can reasonably argue that his product need not necessarily be profitable in and of itself for it to generate profits for the retailer. This realization can provide room for the manufacturer to raise the wholesale price and provides justification for the retailer to lower retail prices. Both of these movements in price are potentially very beneficial to manufacturers.
The challenge then is to develop a set of tools to integrate the benefits of customer-level information into a measure of product profitability. These new tools will inject traditional accounting measures of profit with information gleaned from customer-level transactional databases and allow businesses to make better product-level marketing decisions.

**Measuring Marketing Profits**

While the concept of marketing profits is in many ways quite transparent, measuring these profits in today’s complex retail environments is not a simple matter. In order to measure marketing profits of a particular category exactly, the retailer would have to know the profitability of the entire store if this category were to in essence disappear from the minds of his customers. For example, consider a category like cosmetics. The only way to perfectly measure marketing profits for cosmetics is to determine what the profitability of the store would be if no customer considered the price or selection of cosmetics when making their store choice decision. As you might expect, this is basically impossible. It requires measuring some abstract decision process occurring in the minds of consumers. This is not the kind of data picked up by a UPC scanner! This difficulty explains why there has been little discussion of this issue in academic publications or in trade journals. The benefits of the approach may be obvious, but the difficulties in implementing it are considerable.

All hope is not lost, however. We now detail four approaches to measuring marketing profits. Some we recommend, others we do not, but each has the capability of transforming customer transaction data into useful information for product-level decisions.

**A Simple Approach Using Point-of-Purchase Data**

There are ways to develop measures that give insight into marketing profits and circumvent the above-mentioned problems. A simple application of marketing profits can be seen clearly in a consulting project we performed for a large women’s fashion retailer. This retailer had collected customer-level purchase information for a period of about six months. Over that time span this retailer experienced over 1.2 million customer purchase incidents in which one or more products were purchased. The marketing information system was able to track about 250 individual products. This retailer wanted to use the information to refine their product pricing, promotion, and store layout decisions but it was unclear to them how to best use this customer-level purchase
information to accomplish that goal. The conventional approach would suggest a detailed examination of each product’s profitability and then appropriate actions with regard to the most profitable products.

We decided to shed some light on their business practices through the lens of marketing profits and used a very basic form of the marketing profits principle to help them with their decisions. First, we calculated the conditional probability that any given category was purchased given that any other category was purchased. Put another way, we calculated the probability that a customer would purchase a product like “wool dress slacks” if she also purchased a “cardigan sweater.” We made these calculations for every possible pair of products that the retailer tracked. We then used these probabilities to compute the average associated accounting profit for each product. For example, the average associated accounting profits for “wool dress slacks” can be computed by

Average Associated Accounting Profits for Wool Dress Slacks =

\[
\text{Dollar Margin for Wool Dress Slacks} + \\
\text{Probability of Product 1 Purchase Given Dress Slacks Purchase} \times \text{Dollar Margin (Category 1)} + \\
\text{Probability of Product 2 Purchase Given Dress Slacks Purchase} \times \text{Dollar Margin (Category 2)} + \\
\cdots \\
\text{Probability of Product 250 Purchase Given Dress Slacks Purchase} \times \text{Dollar Margin (Category 250)}
\]

As is evident from this simple calculation, the Average Associated Accounting Profits for any given product will be a function of the accounting profit (margin) of the product itself, the number of other products a customer is likely to purchase on the same purchase occasion, and the accounting profits of those associated purchases. It represents the maximum expected profit that may be generated by a particular product in that it imputes the profitability of all associated purchases to that product. This directly implies that the true marketing profit of any particular item or category is less than or equal to this figure.

In order to gain an understanding of the actual product-level marketing profits we required one more piece of information. We needed to find out how important the product was in determining which retailer the customer would patronize. There are several ways to uncover this kind of information. Consumer surveys, one possible option, will be mentioned further in the upcoming section. However, our client, primarily out of sensitivity for the privacy of their customers, was not interested
in doing additional customer-level marketing research. We instead used the price of the item as a proxy for an item’s importance. What this proxy basically implies is that we assume that a product like a business suit is a more important determinant of where the woman chooses to shop than say a pair of socks. Upon observing a customer who purchased a business suit and a pair of socks we believed it was reasonable to conclude that it was more likely that the woman came to the retailer looking for a suit and then picked up some socks as an add-on purchase rather than a situation in which a woman came looking for a pair of socks and picked up a suit as an add-on purchase. We then extended this logic to all items, assuming that the more expensive an item is the more likely it is the main driver in a decision to patronize a retailer.

Given these two pieces of information, average associate accounting profits and price, we then used the accounting profit principle to examine each of the products. Consider Figure 2. Figure 2 displays some examples of what examining the data through the lens of marketing profits told us. One of the strongest results that came from our analysis is that women who buy petite-sized clothing, on average, buy significantly more products that can be broadly classified as accessories. Because many of the petite-sized products purchased were on the expensive side we were able to conclude that these products were primary drivers of the additional accessories purchases we observed. Also, accessories, while being among the lower priced items carried by the retailer, are often associated with relatively high margins. Therefore, using the marketing profits principle, we were able to tell management that many of the petite-sized items that they were selling were really more profitable than they appeared through standard profit measurement.

This analysis led directly to a reallocation of resources towards more actively merchandising petite-sized clothing. It also led the retailer to make changes to the layouts of some of their stores to encourage this type of naturally occurring cross-purchase behavior. This is just one example of the power of the marketing profits principle to guide important merchandising decisions. If the retailer had been guided solely by the accounting profits of accessories or petite business suits, it would have made different and less profitable merchandizing and layout decisions.
**Figure 2: Marketing Profits Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>* Formal Dresses</td>
<td>* Petite Business Suits</td>
</tr>
<tr>
<td>High</td>
<td>* Accessories</td>
<td>* Socks</td>
</tr>
</tbody>
</table>

**An Approach Using Customer Survey Data**

If it is feasible to conduct some basic marketing research, the marketing profits measurement can be further refined. First, exactly as in the aforementioned approach, retailers can collect data on the groups of products that their customers buy. This kind of information can be gleaned from the point-of-purchase data that most retailers collect through scanner technology or by directly asking customers exiting the store for their purchase receipts. This information can then be paired with data collected from customer surveys. The basic idea behind the survey is to ask customers about the importance of different categories in their decision to patronize a given store. Research in the area of consumer behavior has developed measures for “product involvement,” the importance of a product or category to an individual. We refer readers to *Handbook of Marketing Scales* for a detailed look at the various scales that can be used to measure consumer involvement. The scales presented in this text are straightforward to implement in a pencil-and-paper customer survey. Obtaining this survey data circumvents the need to rely on price as a
proxy for category importance and further refines the ability accurately measure marketing profits.

**An Approach Using Regression Analysis**

A still more precise way to determine marketing profits is to construct system of regression equations in which the demand for each category comprise the dependent variables and the shelf-space allocation for the each category form the independent variables. For example, if a retailer carries 500 categories then this approach would involve estimating 500 regression equations with $500^2 = 250,000$ parameters. Estimating this large system of demand equations would give retailers the ability to gauge the impact of shelf-space allocation, or any other marketing mix variables contained in the model, on overall store sales. In effect, this approach allows the retailer to directly see the impact of any marketing mix decision made in one particular category on the sales and profitability of the entire store. This method does not rely on collecting additional survey data, but rather uses marketing mix and sales data commonly available to retailers.

For the vast majority of retailers, this approach is impractical. The amount of data necessary to estimate such a large number of parameters with any degree of confidence is almost impossible to procure. Even if a sufficiently long time series of data was available to estimate such a model the retailer cannot be sure that the fundamental relationships among the variables of interest have not changed over the period of the data collection. Put simply, this method works well in theory, but poorly in practice. Unless the a retailer has reason to believe that they have or can acquire the very large amount of data necessary to implement this approach, we do not recommend attempting to estimate category-level demand systems to measure marketing profits.

**Recent Advances in Measuring Marketing Profits**

While we believe that the aforementioned simple approaches using point-of-purchase data will yield valuable marketing insights with relatively modest effort there have been recent advances in developing more sophisticated techniques for measuring marketing profit. These new approaches will make it possible for retail managers to correctly gauge the contribution of any category in the store to overall profitability. In so doing, it will allow retailers to circumvent the costly, and often error prone, step of surveying their customers to pin profit measurement on hard data gathered
from the retailer’s current data capture systems. It also does not rely on price as a proxy for category importance, an important limitation of one of the point-of-purchase data approaches we detailed. These methods generally use the following commonly available data

1. Weekly unit sales data for each category
2. Average category margins
3. The cost associated with stocking and maintaining the shelf-space assigned to each category
4. The amount of shelf-space allocated to each category
5. The physical size (in linear feet) of the average SKU sold in each category.

All of this information is generally available to retailers.

The basic concept behind these methods is to infer marketing profits rather than measuring it directly. Recall that marketing profits, by its very nature, is almost impossible to measure perfectly because to do so would require knowing what the sales in all other categories would be if a particular category did not exist in the decision making process of consumers. This kind of counterfactual situation never arises in real retailing environments and makes an error free direct measurement of marketing profits virtually impossible. Inferring marketing profits instead of directly measuring it requires assuming that the retailer is acting in a nearly optimal fashion in the way they allocate their shelf space. This assumption then provides a link between the completely observable accounting profits and the latent marketing profits.

Assuming nearly optimal decision making with respect to shelf-space allocation is not much of a stretch. First, in the face of a deluge of new products and the substantial profit opportunities available through slotting allowances retailers have powerful incentives to make this decision correctly. Second, the conditions under which retailers typically make this decision are considerably more stable than for some of the other necessary merchandising decisions. Neither the total amount of shelf-space nor the basic composition of different categories changes dramatically from week to week. Finally, there is widespread use among retailers of commercially available software packages to help optimize the shelf-space allocation decision.

Figure 4 captures the concept of what this new approach entails. Information on category-level weekly sales data and average category margins allow the retailer to calculate the traditional measure of accounting profits. This information, when paired with data on merchandising costs
and the realistic assumption that shelf-space has been carefully allocated allows us to infer marketing profits.

Figure 3

We have implemented this method for a large Midwestern grocery retailer with interesting results. Table 2 reports some of these results. For simplicity of exposition, we aggregated categories in large “supercategories.” For each supercategory we report the average weekly marketing profit per linear foot of shelf-space allocated as well as average weekly accounting profit per linear foot. The results are striking. For example, while the supercategory “Health and Beauty” appears only marginally profitable using standard accounting metrics ($1.41 per linear foot), including the indirect profitability of Health and Beauty by measuring marketing profits paints an entirely different picture. The Health and Beauty supercategory is indeed very profitable ($10.15 per linear foot). By including the additional sales and hence profits Health and Beauty generates through the sales of other items, the marketing profits measurement has informed management that this supercategory is more than seven times more profitable than standard approaches would suggest. Conversely, the “Dairy” supercategory appears very profitable by
accounting standards ($9.10 per linear foot) but is unprofitable when examined through the lens of marketing profits (-$1.84 per linear foot).

<table>
<thead>
<tr>
<th>Category</th>
<th>MP/Foot</th>
<th>AP/Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce</td>
<td>$17.94</td>
<td>$3.98</td>
</tr>
<tr>
<td>Health and Beauty</td>
<td>$10.15</td>
<td>$1.41</td>
</tr>
<tr>
<td>Frozen Foods</td>
<td>$4.55</td>
<td>$4.11</td>
</tr>
<tr>
<td>General Merchandise</td>
<td>$2.27</td>
<td>$1.34</td>
</tr>
<tr>
<td>Edible Dry Grocery</td>
<td>$1.21</td>
<td>$2.41</td>
</tr>
<tr>
<td>Nonedible Dry Grocery</td>
<td>$.86</td>
<td>$2.12</td>
</tr>
<tr>
<td>Dairy</td>
<td>-$1.84</td>
<td>$9.10</td>
</tr>
<tr>
<td>Meat</td>
<td>-$2.96</td>
<td>$11.85</td>
</tr>
<tr>
<td>Deli</td>
<td>-$4.51</td>
<td>$6.77</td>
</tr>
<tr>
<td>Bakery</td>
<td>-$18.63</td>
<td>-$6.62</td>
</tr>
</tbody>
</table>

Why are the marketing profits of Dairy negative? Several different elements enter into this conclusion. First, the shelf-space allocated to the Dairy supercategory is by necessity refrigerated space. This is expensive. Hence, the merchandising costs associated with these products are among the highest in the store. Second, the Dairy supercategory is dominated by the sales of milk. While milk is purchased on all kinds of shopping occasions, it is also one of the grocery products that is likely to be purchased on shopping occasions when very few other items are purchased. As a prime example, a commonly observed situation is that on the way home from work a person picks up some milk at the store. Because of the relative paucity of associated purchases, milk generates a below average amount of indirect profit. Taken together then, high merchandising costs and low indirect profitability, these lead to negative marketing profits even in the face of positive margins and positive accounting profits.

These, sometimes quite dramatic, shifts in the reported profitability of categories speak directly to the value of the marketing profits approach to retail management. On the surface, dairy products would seem like good candidates for additional merchandising support. However, managing by
marketing profits argues otherwise. Also, while the category manager in charge of health and beauty related products might appear to be doing a poor job of generating profits for the store, marketing profits reveal that this category is generating a significant amount of profits hitherto hidden from management’s eyes. Reasonable and effective compensation plans for category managers should take into account marketing profits.

Conclusion
Marketing profits are a better way to assess product profitability than standard accounting approaches. This article offers four approaches for tackling the problem of measuring marketing profits. The first approach, using only point-of-purchase data, is very straightforward to implement in most retail settings. If marketing research can be conducted, responses from consumer surveys can be substituted for price in determining the importance of different products or categories. We also outlined a traditional regression approach, an approach we do not recommend given the difficult data requirements imposed by that approach. Finally, we sketched a relatively sophisticated approach to measuring marketing profits that relies on the fact that many retailers already spend considerable resources in determining their shelf-space allocation. If retailers are nearly optimal with respect to this decision then sound inferences can be made with respect to category-level marketing profits.

Ultimately, the approach used for uncovering this important management decision metric comes down to a trade-off between the resources a business is willing to invest in this process and the prospects that reasonable inferences into marketing profits will significantly change current product- or category-level marketing decisions. We believe that the value of a clear understanding of marketing profits is often quite high, but that even simple, less resource intensive approaches will provide valuable management insight in the complex world of multiproduct retailing.
The wide ranging competition among financial services providers is likely to expand further given the recent passage of the Financial Services Modernization Act of 1999. This Act eliminates many of the provisions of the 1933 Glass-Steagall Act that prohibited banks from marketing many of the financial services currently available.


For example, the average size of the SKU sold in the category “baby food” is much smaller than that sold in the category “diapers.”


Two examples of these packages are the “Apollo Space Management” program marketed by C/SCAPE and the “Spaceman” package offered by ACNeilsen.