

An Optimal Approach To Forward Buying

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10/8/09

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There is much discussion in industry publications and academic journals about trade promotions.¹ Various theories are offered to explain why they help or hurt manufacturers, retailers, or consumers. Off-invoice trade promotions are particularly controversial. These trade promotions permit retailers to buy an unlimited amount of a product at a lower than normal price for a limited amount of time. Such promotions encourage retailers to buy more than their current needs, i.e., to forward buy.

Regardless of whether or not these trade promotions are beneficial to the distribution process, a large number of them continue to be offered to retailers.² Moreover, when retailers are faced with price increases, they are in exactly the same situation as when they are offered an off-invoice trade promotion. While there is much research and discussion focused on when and how manufacturers should offer trade promotions, there is no research or discussion on how retailers should respond to these offers.

I believe that this lack of interest is based on the misconception that the forward buying decision is trivial, and that a table, spreadsheet, or a policy of buying deal to deal will suffice. In fact determining the optimal quantity to purchase for a given trade promotion is quite complex, and involves the consideration of the following factors:

- 1) the amount of inventory already on hand and on order;
- 2) payment terms;
- 3) delivery lead-time;
- 4) whether additional transportation and handling costs will be required;
- 5) the size (or weight) of a case;
- 6) the manner that storage costs will be applied;
- 7) the interest cost to the firm (and the availability of funds to invest);
- 8) sales forecast;

¹ See for example references 1 and 10

² Cannondale Associates has estimated that 35% of the \$80 billion of trade promotions in 2003 were of the off-invoice variety

9) whether there is a future deal and if so its value.

It is possible to ignore some of these factors, or make simplifying assumptions and settle for a rough approximation of potential profit when analyzing deals. However, for many retailers the forward buying operation involves a large investment, and the cumulative effect of inaccurate deal analyses can have a significant negative impact on overall profitability.

Make An Investment Decision

While on the surface, forward buying decisions seem similar to the process of setting inventory reordering policies, these two activities are actually quite different. Inventory reordering policies typically attempt to find an optimal balance among ordering, holding, and shortage costs. They assume that there will be repeated orders placed over an extended period of time under the same conditions. Such policies are complex to derive, and even with simplifications, such as assuming that holding costs follow a simple pattern, approximations are often needed. These policies seek to provide a simple solution to finding a low cost means of reordering inventory.

In forward buying situations there is no presumption of repeated buys over a long period of time under the same conditions. The objective is to buy the quantity which maximizes profit for a particular deal under a specific set of circumstances. Shortage costs and order costs are typically not important since forward bought inventory is frequently placed at a separate storage location and transferred to normal inventory when needed. The main similarity between forward buying decisions and determining inventory reordering policies is that holding costs must be calculated in both cases.

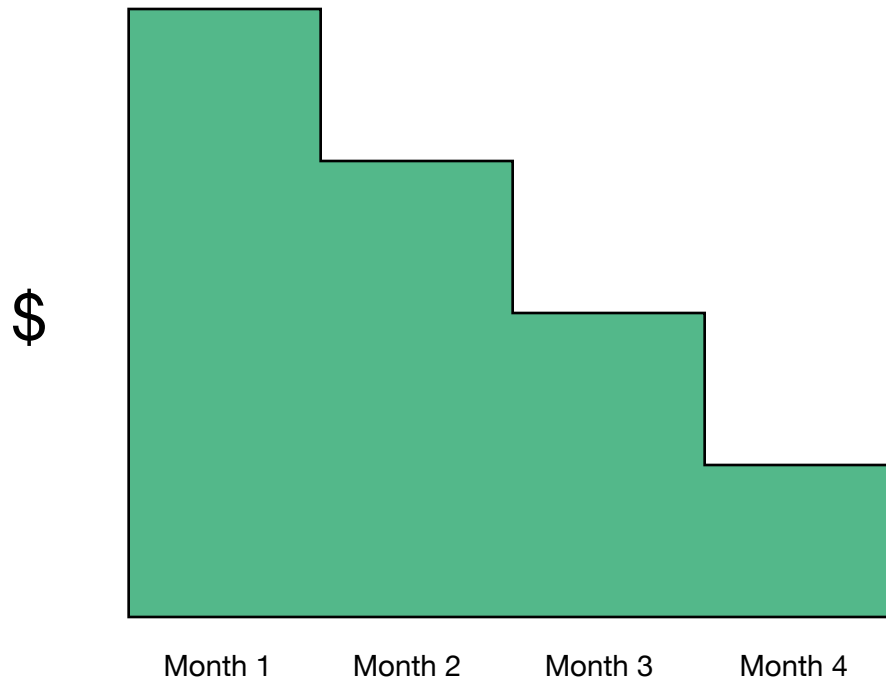
Frequently, when calculating holding costs, the assumption is made that they can be represented by a single constant percent of the value of the inventory per unit of time. While this approach is reasonable, and necessary in the case of computing inventory reorder points, it is only a crude estimate of the true costs of holding inventory. This approach is inaccurate for several reasons:

- 1) holding costs are actually made up of several different components, such as storage costs, interest costs, and insurance costs;
- 2) the costs are not all based on the value of the inventory, e.g., storage costs are based on case volume (or case weight);
- 3) It may not be correct to represent costs as a smooth function, e.g., storage costs may be charged once a month, leading to a step function (see Figure 1).

Since the profitability of the forward buying decision will depend on how accurately you can represent costs, an ideal forward buying analysis would individually represent all the factors that contribute to the cost of holding inventory. Such a detailed analysis may not be practical for inventory reordering decisions, but is possible for forward buying decisions, since they are less complex, higher in value, and fewer in number. Decisions involving a significant investment in forward bought inventory should be treated like any other major investment: they should be based on a rigorous analysis of costs and profits.

Figure 1.

Storage Costs



The Use Of Public Warehouses

The magnitude of the forward buying activities of many retailers necessitates the use of public warehouses.³ Storing forward bought goods in this way provides retailers with the flexibility to expand or contract forward buying operations, and eliminates the need to make large capital investments in warehouse space. The use of public warehouses affects the costs of forward buying in the following ways:⁴

- 1) there will be extra handling costs for each pallet stored;
- 2) there will be an extra transportation charge for each pallet stored;
- 3) storage charges will be assessed on entry to the public warehouse (one full months charge if the merchandise is received between the 1st and 15th of the month, one half months charge if it is received between the 16th and 31st of the month);
- 4) storage charges will be assessed on all remaining pallets in storage on the first of each succeeding month.

³ Professor David Bell of the Wharton Business School has stated that these activities are so great that at least one company offering public storage has based its business plan on providing facilities for retailers for forward buying and diverting, i.e., buying on deal and reselling to other retailers.

⁴ There may be other miscellaneous costs, but those listed are the most important.

When storage costs accrue as outlined above, all costs in the analysis become variable. As a result, calculating storage costs becomes concrete, rather than being an exercise in cost accounting. While there may be complexities to deal with, such as the storage cost step function (see Figure 1), all costs in the analysis can in principal be calculated exactly.

Accuracy Is Money

It is often said that time is money. In the case of forward buying, however, accuracy is money. In a typical forward buying situation, the function which represents the profit of buying any given quantity, will look something like Figure 2. To maximize profit, you need to be able to do two things:

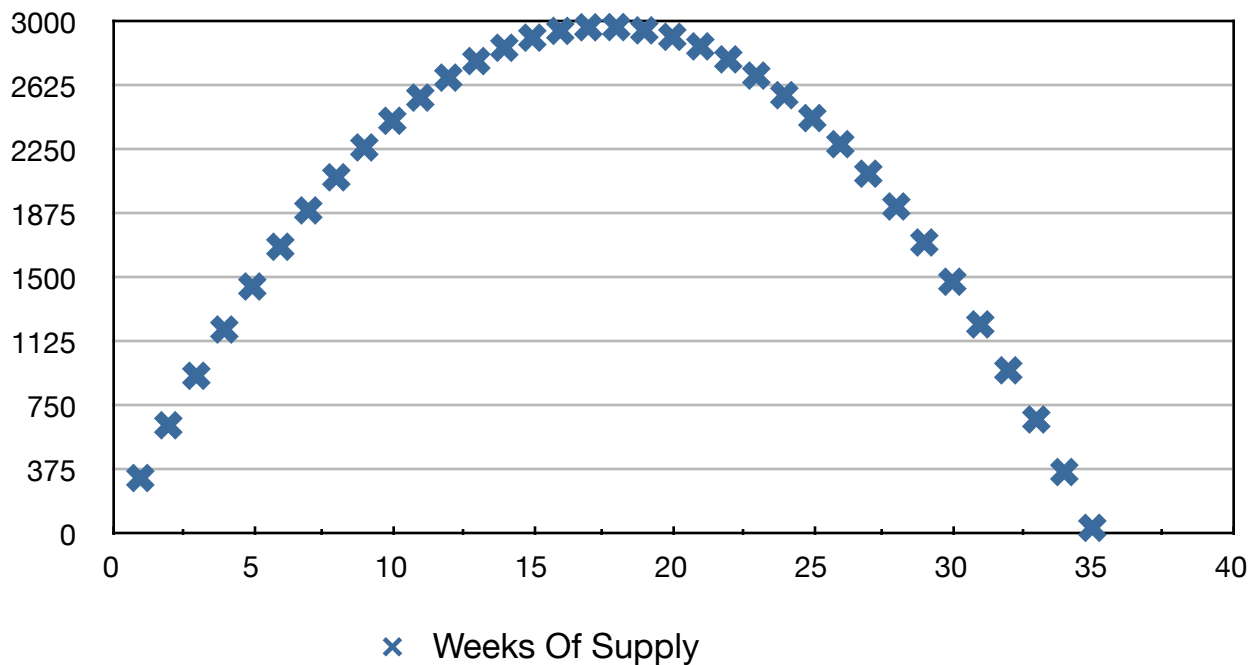
- 1) accurately represent the profit function;
- 2) find the highest point along the curve.

As can be seen, the curve contains a single optimal point. The precision of the method used to find this point, and the accuracy achieved in representing the profit function, are the key factors that will determine the profitability of the forward buying operation.

It should also be noted, that in addition to being able to find the maximum point, the ability to calculate the value of *any* point along the curve is important for what-if analysis and rounding off to full pallets or full truckloads.

Figure 2.

Profit Function



Don't Make Mistakes

It is one thing to analyze a deal in a less than exact manner and as a result earn a 15 percent smaller profit than you could have earned. It is something else to actually lose money on the deal. This can easily occur if you fail to include important factors, or simply use incorrect data in your analysis. For example, if you fail to account for the fact that you have 20 weeks of supply on hand, or that there will be another deal in the near future for the item being analyzed, you could make an unprofitable purchase. To avoid these kind of mistakes it is necessary to have a systematic process in place to make forward buying decisions. This process should have a means of assuring that proper data is used for every deal analysis.

It is also necessary to include the buyers judgement in the process. No quantitative analysis can exactly represent all possible eventualities. Things like seasonality, potential obsolescence, future salability, future product availability or uncertainty about future sales levels, are difficult to include directly in the analysis. Ignoring these 'soft' factors can be costly, e.g., If you buy four months supply of a product, and it becomes unsalable after two months, you will lose money on the deal. Experienced buyers should review every analysis for reasonability and sign off on the purchase.

Final Thoughts

When forward buying, keep the following points in mind:

- 1) you are making an significant investment;
- 2) the more accurate your analysis, the more money you will make;
- 3) it is crucial to include all relevant factors in the analysis;
- 4) costs change, so cost factors used in the analysis should be updated frequently;
- 5) quantitative analysis provides a basis for the decision, it should not replace judgement.

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