



IFMA and IFDA present

PRESIDENTS
CONFERENCE
2007

PRESIDENTS CONFERENCE SPECIAL REPORT

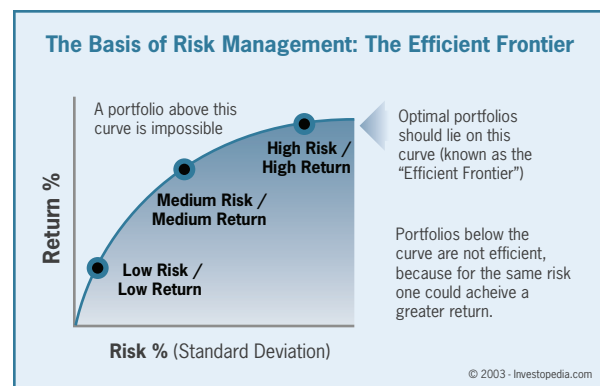
RISK MANAGEMENT FOR FOOD MANUFACTURERS AND PROCESSORS

With commodity price fluctuations at an all-time high and future demand more difficult than ever to predict, food manufacturers and processors need a better approach to managing business risk. These organizations can now benefit from recent advances in Risk Management strategies traditionally associated with other industries.

What is Risk Management?

Risk Management is an investment problem. The ultimate goal is to develop a product and pricing portfolio that balances exposure to risk, just as you would with a diversified portfolio of investments. However, in this case, the volatility doesn't come from stock prices rising or falling; it comes from fluctuations in revenue and cost. For food manufacturers, the net opportunity for Risk Management through better supply and demand decisions is large because improvements grow as sales grow, not margin. Relative margin improvements can be significant, typically resulting in improved gross margins in the vicinity of 1 to 4 percent of sales.¹ Note that there are two terms we will use in this white paper that should be defined: "Demand Optimization" means changing prices, discounts, and/or product mix to shift demand into more profitable products,

channels, geographies or customers. "Supply Optimization" refers to changing product mix, quantities made, and quantities stored to best meet demand at minimal cost given an acceptable service level.



To date, mathematical techniques such as optimization have been applied, if at all, to spot sales rather than to longer term commitments such as formula and contract sales. A good Risk Management approach adds two elements to this foundation: it incorporates the supply (and supply costs) of products and their inputs, and it is applied to the entire mix of a company's sales types and products to truly allow the creation of a balanced portfolio.

¹ Experience at SignalDemand as well as in previous organizations.

What Risk Management lessons can manufacturers learn from other industries?

The securities industry has struggled with Risk Management for decades. Deep mathematics has been developed to quantify, simulate, and explore the uncertainties of financial securities. Billions of dollars and thousands of person-years have been devoted to building software to help the securities industry manage and profit from the inherent risks in their business.

Some of the key lessons from securities Risk Management are based on Markowitz portfolio theory. The theory acknowledges that each security has an intrinsic rate of return and degree of volatility. The challenge addressed by this theory is to choose a portfolio that maximizes the expected return for a given acceptable level of risk.

Food manufacturers and processors face the same uncertainties as securities markets. This is particularly true with the recent and unprecedented volatility in commodities.² As food manufacturers become acquainted with mathematical

approaches to margin optimization and forecasting, now is the time to lay out a plan for moving to the next frontier in business optimization: Risk Management.

What does Risk Management really mean for food manufacturers?

For food manufacturers to effectively manage business risk, they must apply these concepts more broadly in their organizations. Food manufacturers have historically thought of Risk Management as a tool to manage raw procurement costs. Risk Management departments traditionally hedge contract exposure on a commodity futures exchange. However, this hedging fails to adequately capture true cost risk, as futures markets only exist for certain commodities, available instruments lack flexibility, and market liquidity is limited. Moreover, the influx of hedge fund money into commodities markets further muddies the correlation of futures' values to those of the underlying assets.

Even if supply hedging were to become 100% comprehensive, it is still only half the equation. To effectively mitigate risk,

Applying Risk Management can result in improved gross margins of 1–4% of sales.

Evaluating Tradeoffs between Alternative Deals

A DO THE DEAL NOW = \$10 You can have a certain payment of \$10 today → \$10

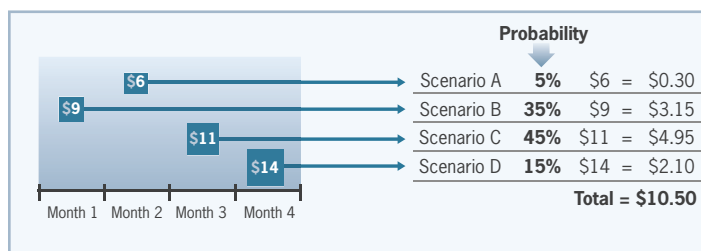
B DO THE DEAL LATER = \$10.50 Or you can take the chance on an uncertain \$10.50 in the future.

We know there are various ways price could move in the future, with each scenario having a different probability of occurring.

The expected probability of a scenario occurring, times what you'd receive if it did occur, equals the expected value of that scenario. The sum of the expected values of all scenarios is the expected payment if we wait, and do NOT do the deal today.

$$(\$6 \times .05) + (\$9 \times .35) + (\$11 \times .45) + (\$14 \times .15) = \$10.50$$

However...since there is uncertainty around the \$10.50 later, it raises the question: "is the \$.50 premium enough to compensate me for the risk of waiting?"



² This increase in volatility in commodity markets can be traced to three primary sources: (1) dramatic increases in the price of oil, (2) the related run-up in the price of corn, which stems from increases in the value of ethanol, and (3) the growth of hedge funds, which come in and out of commodity markets with enormous investments to balance even larger financial portfolios, but have no direct connection to the commodity they invest in.

food manufacturers must also address the demand-side. This means quantifying the risk in pricing decisions.

Manufacturers who incorporate Risk Management techniques that include both the buy- and sell-side have the opportunity to reduce total business risk, especially when making commitments to suppliers and customers that are effective over longer timeframes – measured in months or even years.

How can Risk Management be applied by a food manufacturer?

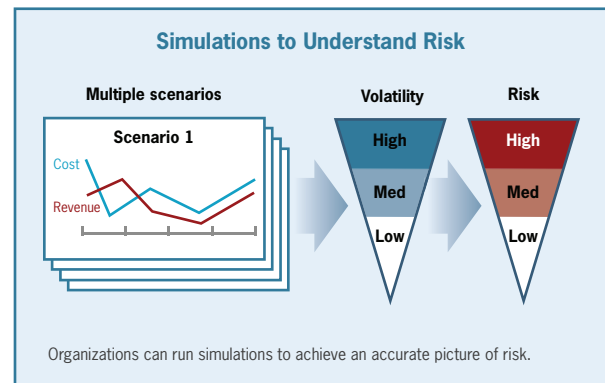
There are three primary components that must be incorporated to adequately address the Risk Management problem for manufacturers:

1) Quantify tradeoffs between alternative deals. When faced with contract decisions, food manufacturers need a means of quantifying the expected revenue generated if the product were to be held for future sale instead of sold today. This requires an accurate projection of demand and knowledge of inventory and available capacity over time. In the example to the left (Evaluating Tradeoffs between Alternative Deals), we show how the comparison between a transaction today and one in the future can be done.

Result: Manufacturers are able to make better contracting decisions because they better understand tradeoffs associated with alternative contracts.

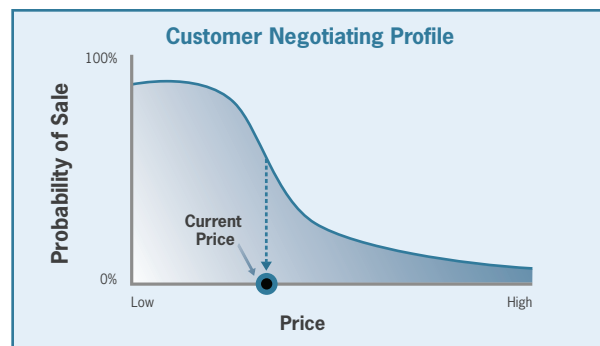
2) Estimate and incorporate the *risk premium* into decision making: As food processors quote forward prices, they introduce margin risk because of the fluctuation of future commodities prices. Finding some way of quantifying the amount of fluctuation that can be expected is important; the greater the risk, the higher the expected payoff would need to be to compensate you for the additional risk. At the most basic level, simply calculating the standard deviation of prices for a product in a channel, and comparing this number between

items and channels will provide a rough understanding of the relative degrees of risk. A bigger standard deviation translates to greater risk in conducting a transaction in the future instead of today. However, more advanced approaches like computer simulation (such as Monte Carlo simulation) and what-if analysis can be used to determine more precisely the optimal price to charge to offset this incremental risk. This capability allows organizations to run multiple versions of a simulation with various settings for specific operational assumptions or constraints. As the securities industry has already found, running large numbers of simulations enables companies to eventually achieve an accurate estimation of risk.

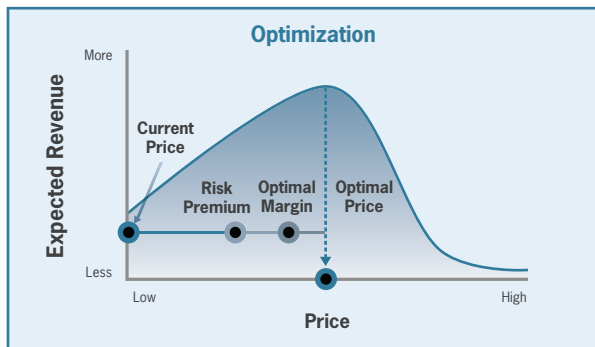


Result: Organizations who can quantify risk are able to more easily contract in the midterm and long-term markets. However, a more comprehensive model would also incorporate information about customer demand to determine the appropriate margin to add to a given contract.

3) Determine optimal price: Now that tradeoffs and risk premium have been incorporated, manufacturers must



decide the optimal price for a transaction. With an analysis that takes into account historical customer behavior and prices, developing the appropriate price to charge customers can be straightforward, depending upon business objectives. When the price is built on accurate models of tradeoffs and risk, the final price will likely be within an acceptable range for the customer.



Next Step: The Efficient Frontier

The above elements—tradeoffs, risk premium, and margin—are core requirements for organizations who would like to utilize pricing as a strategic tool. For companies to more fully realize the benefits of Risk Management, they need to apply these fundamentals to a broader challenge: creating a balanced portfolio of product and pricing decisions.

An analogy to securities portfolio management and the Efficient Frontier proves useful here. For food manufacturers,

each of the three sales methods—negotiated, formula, and long-term—are effectively asset classes with different risk and return profiles where production for all asset classes comes from the same facilities.

With some executive input on the tolerance for risk and the importance of return, a Risk Management-enabled optimization can explore the feasible portfolios of these assets. The resulting recommendation is the risk-optimal strategic balance between negotiated, formula and long-term sales.

Summary

Most food manufacturers fail to effectively manage risk in their business today. Fortunately, advances in computer processing power can be harnessed so that current optimization engines can run models to move manufacturers closer to optimal price and product portfolios. Food manufacturers are now able to apply science previously reserved for Wall Street to address the complex issues of margin and Risk Management in food manufacturing.

Contact

For more information about SignalDemand and our solutions, please contact us:

Phone: 415.356.0800

Email : info@signaldemand.com

Web: www.signaldemand.com



About SignalDemand

SignalDemand delivers margin optimization software that enables process manufacturers to maximize profitability, even as costs and markets change around them. The company's applications rely on the latest econometric models, optimization algorithms and activity-based costing techniques. For more information and details on our foodservice customers, please visit: www.signaldemand.com.

About Robert Pierce, Ph.D.

Chief Scientist, SignalDemand

Dr. Robert Pierce is responsible for managing the creation, implementation and protection of SignalDemand's scientific intellectual property. Prior to working at SignalDemand, Dr. Pierce held senior-level roles at Khimetrics and Concept-Labs, as well as academic posts with the National Academy of Sciences, Penn State University and U.C. Berkeley. He is the author of numerous papers and has a number of patents pending. Dr. Pierce holds a Ph.D. in Theoretical Physics from the University of California at Berkeley.