

Optimising marketing spend: return maximization and risk minimization in the marketing portfolio

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Optimising marketing spend: return maximization and risk minimization in the marketing portfolio

In a world of limited resources, marketing managers tasked to deliver shareholder value face decisions about how to maximize the returns on their marketing portfolio. Risk is less often considered. In finance the picture is very different; financial portfolio management is concerned with both risk and returns. The central innovation in this paper is the application of modern portfolio theory (MPT) to the management of marketing portfolios in food retailing and in drinks manufacturing. The authors develop a model that calculates an efficient frontier of marketing portfolios that maximize overall return within certain risk constraints, first for a simple two-segment marketing world and then for a more realistic multi-segment portfolio. However, marketing portfolios differ from financial ones in the sense that the allocation of marketing spend affects the returns from the portfolio. Therefore, a second innovation, an extension of MPT to take account of marketing spend allocation decisions, has been developed. Using this model, marketers can determine the risk and the returns of marketing investments, helping them select an optimal portfolio. This would go some way to ensuring that marketing contributes to shareholder value creation, currently one of its major challenges.

Introduction

Marketing has a problem: it is not sufficiently accountable (Rust, Lemon, and Zeithaml 2001). There is not enough focus on the returns on marketing spend (Sheth and Sharma 2001); nor, in the main, are marketers able to demonstrate where and how their marketing activities create shareholder value (Doyle 2000). Yet spending on marketing assets, including brands and customer relationships, should be considered as an investment supporting shareholder value creation and long-term growth (Lukas, Whitwell and Doyle 2005). This is a very different task for the marketer than maximizing market share or customer satisfaction, neither of which activities necessarily lead to increased shareholder value (Lukas, Whitwell and Doyle 2005). Dobbs (2005) argues that, in efficiently-regulated markets, the maximization of shareholder value is the objective that best serves all the firm's stakeholders.

The notion of risk is intrinsic to the concept of shareholder value (Doyle 2000). Shareholder value is created only if the return on capital made by the company exceeds its cost of capital, which is driven by risk (Cornelius and Davies 1997). Companies can be profitable in an accounting sense and yet still destroy shareholder value, because risk has not been adequately taken into account.

Financial portfolios use Modern Portfolio Theory (MPT), which deals with problems of risk and return, to make investment allocation decisions. The impact of MPT on business decision-making has been substantial; major capital spending projects, for example, are now routinely assessed for risk as well as return. This message has not yet been taken up by marketing. If marketing calculations take no account of risk, decisions about resources and how to prioritize marketing spending may be sub-optimal (Dhar and Glazer 2003).

So, can MPT be applied to marketing? Marketing spend allocation decisions can be viewed as portfolio investment decisions (Anderson 1981), whether the portfolio is considered in terms of customers or customer segments (Rust, Lemon and Zeithaml 2001; Libai, Narayandas and Humby 2002; Dhar and Glazer 2003), products (Bordley 2003) or brands (Petromilli, Morrison, and Million 2002). However, as Devinney, Stewart and Shocker (1985) point out, unlike financial portfolios, investment in marketing assets is expected to affect the returns from those assets. Thus, MPT would need modification before it could be applied to marketing (Cardozo and Smith 1985).

Despite ongoing interest in the notion of marketing portfolios and the emergence of portfolio management tools such as the Boston Matrix, Directional Policy Matrix, and StratPort, risk and return has received relatively little consideration in the marketing literature. Previous discussion of the management of marketing portfolios has tended to focus either on profit maximization (Larréché and Srinivasan 1981, 1982) or on customer lifetime value maximization (Lemon, Rust and Zeithaml 2001). An early exception is Kotler (1971), who uses variance of returns as a proxy for risk. However, MPT views risk as depending in large measure on the covariance of its component investments (Anderson 1981); in other words, diversification reduces portfolio risk. More recently, Srivastava and Reibstein (2004) consider risk in terms of volatility of cash flows, and Dhar and Glazer (2003) have revived the argument for using financial portfolio theory to address marketing portfolios, stressing the importance of understanding risk.

In this paper, the application of MPT to marketing through a model that takes into account risk and return is demonstrated. First, MPT is applied to a marketing portfolio made up of customer segments. However, MPT does not apply literally to marketing portfolios since returns on financial portfolios are generally considered to be determined by the market and therefore independent of spend allocation, which is not the case in marketing. Therefore, we

adapt MPT to apply to the particular conditions in marketing, in which returns are affected by the allocation of marketing spend. The goal in developing the model is to locate a set of marketing portfolios that optimize risk and returns.

Optimization of marketing portfolios

The definition of portfolio optimization given under MPT is rather different to other marketing paradigms, in which marketing spend optimization is an issue of reducing wastefulness or inefficiency (Feder 1974), such as reaching marketing segments that were not targeted (McCarthy 1971; Heskett 1976) or avoiding the diminishing returns to advertising spend (Schaffir and Orr 1984). Applying MPT to marketing suggests that optimal marketing portfolios are those marketing portfolios for which:

1. No other combination of customer segments will yield higher returns with the same level of risk; or
2. No other combination of customer segments will yield the same returns with lower risk.

Realistically, many combinations of customer segments (portfolios) are possible and their risk/return positions can be plotted. Those that satisfy the conditions of optimality will lie on what is known as the efficient frontier (Sharpe 1981).

Measuring The Optimality Of Marketing Portfolios

This section defines the optimality of a marketing portfolio by its position in relation to the efficient frontier. Modern portfolio theory holds that the aim of the investor is to

maximize return and minimize risk (Sharpe 1981; Brealey 1983); there is empirical evidence that investors behave in the way predicted by MPT (Ferguson 1987).

The Efficient Frontier

The efficient frontier determines the set of the best possible returns for a given investment (Sharpe 1981). It consists of a series of investment combinations (portfolios) that are higher risk, higher return and other portfolios that are lower risk, lower return. A central assumption of MPT applies to the model, namely:

Assumption 1: When making marketing spend allocation decisions, a marketer would choose from a set of optimal marketing portfolios along the efficient frontier and would reject marketing portfolios that lie below the frontier.

Marketing portfolios that lie below the efficient frontier are suboptimal because alternative portfolios are available that offer either higher returns for a given level of risk, or a given level of return at lower risk. Marketing portfolios that lie above the efficient frontier are unattainable at current levels of marketing spend.

Locating a Marketing Portfolio in relation to the Efficient Frontier: the Sharpe Ratio

The original tool with which users of MPT located a portfolio in relation to the efficient frontier was the Sharpe ratio (Sharpe 1966, 1981), a measure of risk-adjusted

returns (Sharpe 1994; Robertson 2001). Assets are modeled as having excess returns (compared to a benchmark) and risk (defined as the standard deviation of returns). The investor chooses his or her desired level of risk then selects the portfolio with that level of risk and the highest Sharpe ratio (Sharpe 1994). Calculation of the Sharpe ratio is relatively straightforward, although ideally 36 data points (3 years' worth of data on excess returns compared to a benchmark portfolio) are needed (Robertson 2001) and the Sharpe ratio can only be used to compare investments in similar portfolios over the same period of time (Robertson 2001). Thus, short-term tactical decisions should in principle be considered separately from long-term strategic ones. The calculation of the Sharpe ratio for a marketing portfolio is demonstrated below.

Although the Sharpe ratio "...continues to be today's world standard for risk-adjusted performance...it is not immune to criticism" (Cantaluppi 2000, p.19). Some reservations have been expressed about the Sharpe ratio, even by its originator (Sharpe 1994). Certain of these reservations apply to its use with a marketing portfolio:

1. The use of historic data as a predictor of future performance (Sharpe 1994; Dowd 2000; Lux 2002).
2. The Sharpe ratio does not take into account correlations with other assets in the investor's portfolio (Sharpe 1994; Cantaluppi 2000; Dowd 2000; Lo 2002).
3. The use of standard deviation as the measure of risk (Sharpe 1994; Cai, Teo, Yang and Zhou 2000). Several commentators have noted that standard deviation assigns the same level of risk to upside as to downside fluctuations (Zebrowski 1999; Trachtenberg and Lappen 2001; Israelsen 2003). Thus, a

consistently loss-making portfolio could have a standard deviation of zero, making it appear low risk (Trachtenberg and Lappen 2001).

Solutions to the problems with the Sharpe ratio include: taking into account absolute values (Israelsen 2003); measuring the direction as well as the magnitude of divergence (Lashgari 2001); measuring downside deviation and upside potential (Trachtenberg and Lappen 2001; Leggio and Lien 2003); and incorporating a standard error calculation for the Sharpe ratio where returns are not independent of other assets in the portfolio (Dowd 2000; Lo 2002). Alternative models have been proposed (e.g. Fama and French 1993) but have not gained the same degree of recognition.

The Optimisation Model

For reasons of parsimony, the widely understood and utilized Sharpe ratio is used in the model but incorporating adjustments to address some of the known weaknesses:

1. Returns are defined as expected returns, and
2. The correlation between different segments in the portfolio is taken into account.

The model does not correct for the problem that defining risk in terms of the standard deviation does not discriminate between positive and negative deviation. The rationale for this is twofold:

1. Simplicity: Standard deviation is widely understood and easy to calculate; and,
2. Pragmatism: Positive deviation may cause bottlenecks and other business problems. Unless customer/ segment profitability calculations are exceptionally accurate, the full cost of doing additional unexpected business with customers may not be captured (Howell and Soucy 1990; Lemon, Rust, and Zeithaml 2001).

The Sharpe Ratio of a Single Segment Marketing Portfolio

The Sharpe ratio offers a quick and easy-to-calculate risk-adjusted performance comparison of marketing spends. The simplest case is one in which the decision is to invest 100% of marketing spend in one of two market assets, either in segment A or in segment B.

Definition (segment's average excess returns): Excess returns are defined as the returns over and above the risk-free interest rate.

A high Sharpe ratio means that the segment delivers a lot of return for its level of risk; a low Sharpe ratio means that the segment delivers low returns for its level of risk:

Definition (risk): Risk is defined as the standard deviation of returns of a segment.
Standard Deviation measures a segment's volatility of returns.

The Sharpe ratio of the single-segment marketing portfolio is then:

$$\text{Sharpe Ratio} = \frac{\text{Segment's average excess returns}}{\text{Standard deviation of segment's returns}}$$

To optimize their marketing portfolio, marketing managers would target high Sharpe ratio segments in preference to low Sharpe ratio segments, as this would maximize the risk adjusted returns on the marketing spend.

The Impact of Diversification on the Marketing Portfolio

Whilst the Sharpe ratio can be used to assess relative performance, it does not offer insights into the benefits of diversification, defined here in marketing terms as the allocation of investment across several market segments in a marketing portfolio. For this, the efficient frontier is needed. The efficient frontier maps the most efficient combinations of risk and return for a given marketing spend (Sharpe 1994; Bajoux-Besnainou and Portrait 1998). To calculate the efficient frontier, we assume that marketers face decisions about investment in marketing portfolios under conditions of resource constraint:

Assumption 2: Marketers face resource allocation decisions between different market segments. The existence of multiple segments means that marketers face choices between investing different amounts in different segments.

This assumption means that a series of marketing portfolios is available to the marketer, between which he or she must decide. Investing 100% of marketing

resources into a single segment would, under most circumstances, not be an optimal strategy. In fact, diversification (allocating marketing resources across more than one marketing asset) can increase the risk-adjusted returns from marketing spend (Dhar and Glazer 2003). The portfolio expected return is defined as:

Definition (portfolio expected return): For a marketing portfolio containing n segments, the expected return on the portfolio ($E(R_p)$) is a function of the proportion of the total investment in each segment (w_i) and the expected return of that segment (μ_i).

The portfolio expected return is defined by:

$$E(R_p) = \sum_{i=1}^n w_i \mu_i$$

Portfolio theory demonstrates that, as the correlation coefficient between asset returns decreases, the variance (i.e. risk) of portfolio returns also decreases; however, portfolio returns are unaffected (Sharpe 1981). By diversifying marketing spend across customer segments, overall portfolio risk can be reduced for a given level of returns. In other words, diversification can improve the risk-adjusted return of the marketing portfolio (see Devinney, Stewart and Shocker 1985 for a discussion of the issues here).

Definition (portfolio risk): The risk of the portfolio (σ_p^2) is a function of the variance of

portfolio returns. This variance will depend on the variance of segment returns for individual segments i and j (σ_i^2 , σ_j^2); the proportion of total investment in segments i and j (w_i , w_j); and the correlation between the returns of segments i and j (r_{ij}).

The risk of the marketing portfolio is given by:

$$\sigma_p^2 = \sum_{i=1}^n w_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{j=1, j \neq i}^n w_i w_j \sigma_i \sigma_j r_{ij}$$

Diversification and a Simple Two-Segment Portfolio

The principle of diversification in the marketing portfolio is demonstrated in Figure 1 (see Table 1 for the data used to construct Figure 1). In a simple marketing portfolio consisting of two segments, if the returns from each segment are perfectly correlated (i.e. correlation coefficient = +1), the risk-return trade off is as shown by the lower line. In practice, however, this will rarely be the case. As the correlation of returns between segments decreases, more favorable risk-return trade offs can be achieved, as shown by the upper line.

Bring in Figure 1

The risk-return combinations along the upper line are more favorable from the marketer's point of view because they yield higher returns for all levels of risk. As the correlation of returns between segments A and B decreases, the upper line stretches further towards the top left corner, and portfolios that yield higher returns for given

levels of risk can be found. The upper (concave) line is the efficient frontier. It represents the highest portfolio return achievable for a given level of risk for segments A and B when they are not perfectly correlated.

Empirical Testing A: The Food Retailer

Simple case: the two-segment marketing portfolio

Table 1 shows a simple world in which only two customer segments, A and B, are available to the marketing manager. The data are based on realistic examples from the storecard database of a large food retailer. The properties of A, in terms of risk and returns, are very different to the properties of B. Segment A has returns of 8% and risk (standard deviation) of 3%. This segment is representative of customers buying an average range of goods on a predictable basis and is typical of lower income families. Segment B enjoys higher returns (14%) but also has greater associated risk (7%). This segment typifies customers buying higher mark-up goods on an occasional basis, such as affluent singles or young professional couples.

Using assumption 2 (concerning the proportion of marketing spend), a set of portfolios comprising different proportions of A and B is available to the marketing manager (Table 1, columns 1 and 2). Two scenarios are demonstrated: A and B are perfectly correlated (columns 3 to 5); and A and B are not perfectly correlated (columns 6 to 8). The latter situation describes the actual case for the data we are using; the former scenario has been constructed using the same data to illustrate the principal of diversification. We assume a risk-free rate of 4% to calculate the Sharpe

ratios (columns 5 and 8) for 11 different marketing portfolios and to demonstrate the impact of diversification on risk-adjusted returns (Table 1).

Bring in Table 1

As expected, the risk-adjusted returns are higher for portfolios where the correlation of returns between the two segments is lower. The highest Sharpe ratio where the two segments are perfectly correlated is 1.429 (column 5); if the two segments have a correlation of 0.6 the Sharpe ratio could be as high as 1.546 (column 8). Where the segments are perfectly correlated, the highest Sharpe ratio is where 100% of marketing spend is concentrated on Segment B. In the case where the segment returns have a correlation of 0.6, the highest risk-adjusted returns are obtained by investing 60% of marketing spend in Segment A and 40% in Segment B.

Extension to the Multi-Asset Marketing Portfolio

Next, we extend the application of the model to a realistic real-world example where the marketer can select a variety of portfolios comprising investment in multiple market segments. The efficient frontier is straightforward to compute for two segments. However, where there are many segments, the calculation is more complex and involves finding the solution to a constrained minimization problem. To model the real-world marketing portfolio, the following is defined:

Definition (the efficient frontier for a real-world marketing portfolio) The efficient frontier for a marketing portfolio containing n segments is calculated as for the two-segment example but subject to the constraint $E(R_p)$ that the returns should be attainable by the portfolio (R_p^*) .

The efficient frontier for a marketing portfolio containing n segments is given by:

Minimize:

$$\sigma_p^2 = \sum_{i=1}^n w_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{j=1, j \neq i}^n w_i w_j \sigma_i \sigma_j r_{ij}$$

subject to the constraint:

$$E(R_p) = R_p^*$$

The model yields a set of solutions that minimize portfolio risk (variance) for attainable rates of return (the real-world efficient frontier); these are the most efficient portfolios from a marketing spend perspective. Calculating the results of the model produces a set of portfolios along the solid line in Figure 2.

Bring in Figure 2

As in the two-segment example, the Sharpe ratio is not constant along the efficient frontier. This is because the efficient frontier consists of attainable portfolios that maximize returns for a given level of risk: the constrained optimization model does not specify solutions that yield equal Sharpe ratios.

Marketers should prefer to hold efficient portfolios; that is, ones that are on the frontier and not those below it. The model does not specify one optimal portfolio - it generates the efficient set of portfolios along the frontier. If risk preferences were not an issue, the marketer would prefer the marketing portfolio on the efficient frontier with the highest Sharpe ratio. In practice, however, the preferred marketing portfolio will depend on the risk preferences of the marketing manager. Moreover, marketing activities such as altering investment levels in marketing assets, may affect portfolio returns. Other researchers have noted that MPT needs to be adjusted to address the real-world context (Anderson 1981; Devinney, Stewart and Shocker 1985; Markowitz 2005).

Allocation of Marketing Spend and the Sales Response

In MPT, returns are set by the market (a 'given') and are not affected by the level of investment (Sharpe, 1994). The situation in marketing is very different; returns on a marketing portfolio are sensitive to the allocation of marketing spend (Devinney, Stewart and Shocker 1985; Mantrala, Sinha and Zoltners 1992). Mantrala, Sinha, and Zoltners find that reallocating marketing spend may pay off better than changing the absolute levels of marketing spend: "...allocation rules are seldom optimal and can lead investors [in the marketing portfolio] to wrong conclusions about optimum investment levels." (Mantrala, Sinha, and Zoltners 1992 p.166).

The relationship between returns and marketing spend is derived using established techniques such as econometrics and/or control testing to estimate the sales

response to marketing and then derive the associated returns. The sales response curve is typically S-shaped for a given segment (Christopher, 1998).

Bring in Figure 3

The reasons for the S-shaped sales response curve shown in Figure 3 are as follows. Low levels of marketing spend do not have the 'cut through' to have a significant impact on sales and therefore the curve is flat (box A). There is a lower threshold above which sales are more responsive to marketing spend. However, an upper threshold also exists beyond which diminishing returns from marketing set in and increasing marketing spend has a progressively lower impact on generating incremental sales (box B).

The returns to these incremental sales can be derived using the simple equation:

$$\text{Returns} = \text{Sales} \times \text{Margin} - \text{Marketing spend.}$$

Empirical Testing B: The Food Retailer

Figure 4 uses a data set based on storecard data from the food retailer to plot incremental sales and returns against marketing spend. Returns are expressed as a percentage of sales.

Bring in Figure 4

Augmenting the Model with the Sales Response and associated Returns curve

Once the sales response and returns curves have been identified (as in Figure 4) for each segment, the model can be modified through an augmentation to the portfolio returns equation to take account of the expected sales response and incremental returns:

Definition (augmented portfolio returns): Augmented portfolio returns ($E(R_p)$) are a function of the segment investment in segment i (m_i) and the expected return of segment i (μ_i), which is a function of the marketing spend in segment i and is derived from the modeling of the sales response and incremental returns curves.

Thus, portfolio returns (as a function of segment investment) are:

$$E(R_p) = \frac{1}{n} \sum_{i=1}^n \mu_i(m_i)$$

The mathematical optimization problem to find the n segment efficient frontier where segment returns are affected by the level of marketing spend is formalized as:

Minimize:

$$\sigma_p^2 = \sum_{i=1}^n w_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{j=1}^n w_i w_j \sigma_i \sigma_j r_{ij}$$

$i \neq j$

Subject to the constraint

$$E(R_p) = \frac{1}{n} \sum_{i=1}^n \mu_i(m_i) = R_p^*$$

The solution to the augmented model is more complex than that to the initial model. Algebraic solutions are often intractable, especially given the non-linear nature of $\mu_i(m_i)$, and the use of programmable search algorithms (such as hill climbing and simplex method) may be necessary.

As this demonstrates, the task of generating the efficient frontier is computationally more complex when the notion of returns varying by level of investment is introduced. However, where marketing managers are to tackle marketing portfolio management issues beyond a short-run time horizon, this approach is consistent with modern portfolio theory. That said, for many practical purposes the Sharpe ratio will in fact provide a useful yardstick of historic risk-adjusted returns by segment, particularly in the short term.

Practically, once practitioners have become acquainted with MPT, a set of historical data is sufficient to calculate returns, standard deviations and correlations of segments within the marketing portfolio. Sales data, profit margins, marketing expenses (direct expenses can be used as a proxy if indirect costs are not readily available) and the current applicable risk free rate are the only data required. All the data can be processed using standard Excel programming functions. The results support marketing decision-making, as demonstrated in our third empirical test.

Empirical Testing C: Drinks Manufacturer

The model was empirically tested on a leading international whisky brand's market portfolio in an exploratory study using historic sales and media spend data. The organization was interested in determining how the results generated by the proposed methodology differed from their traditional allocation of media spend.

A collaborative approach was used with a double aim: to achieve close collaboration between researchers and practitioners due to the unfamiliar nature of MPT in a marketing setting, and to obtain validation of results from the organization in the form of post research interviews.

The results of the study provided evidence that, without increasing the level of the marketing budget, changes in its allocation across segments could provide substantial improvements in returns on investment, as well as a reduction in the volatility (risk) of the portfolio. The model gave the organization confidence that the transfer of media budget out of mature markets where the brand was well established, and into emerging markets where stronger support was required, would result not only in an improvement of the overall profitability of its marketing portfolio, but would actually decrease its risk. It was the latter, somewhat counterintuitive statement, which the organization viewed as a particularly rich insight, giving its strategy of supporting emerging whisky consumption objective support. According to the research director of the firm: "The company has taken this learning and is conducting further research into the feasibility of making changes to the cross

country portfolio. At present the methodology is being explored in further detail alongside the traditional methods of cross country portfolio management”.

Empirical Application of the model: Selecting The Preferred Portfolio From The Efficient Frontier

The model has enabled the calculation of the efficient frontier in a two segment and in a multiple segment world, and extends modern portfolio theory through the addition of a calculation of the effect of marketing spend on portfolio returns. It thus allows marketers to optimize their marketing spend by selecting their preferred portfolio from the set of optimal portfolios along the efficient frontier. Some portfolios lie along the lower left of the efficient frontier; these are low risk, low return portfolios. Others, along the top right of the efficient frontier, have higher risks and higher returns. All of these portfolios are optimal; which portfolio is selected will, therefore, depend on the risk preferences of the marketer.

Approaches to Conceptualizing Risk

There are key differences in the way that risk has been conceptualized in different theoretical approaches. In game theory, risk is modeled as the amount a player will pay for insurance (Mookerjee and Mannino 2000). In MPT, as discussed above, risk is generally measured as the variance in returns against some market benchmark (March and Shapira 1987; Sharpe 1994; Robertson 2001). In decision theory, risk is generally measured in terms of variance and it is assumed that managers have a positive attitude towards returns and a negative attitude towards losses (March and Shapira 1987). Typically, risk is treated as though the consequences and probabilities of a decision are known in advance, although this is rarely the case in

the real world (Skromme Baird and Thomas 1985). Classical decision theory assumes that managers are risk averse. In other words, their risk indifference curve is concave with respect to the origin (Lipsey and Chrystal 1995) so that required returns increase more than proportionally with increasing risk.

Bring in Figure 5

The efficient frontier AB in Figure 5 represents the set of portfolio possibilities for a given temporal perspective, whilst the indifference curves i1, i2, i3 and i4 reflect the marketing manager's risk-return preferences. Curves i1 and i2 are unattainable at the current levels of marketing spend (it may be that increasing the marketing spend might result in a new efficiency frontier above the current line AB, in which case i1 and i2 might become attainable). The highest risk indifference curve that is currently attainable is i3. Curve i4 is attainable, although it is inferior to i3 which offers a higher expected return for the same risk. The marketing manager will prefer the portfolio at the tangent between the concave risk indifference curve and the efficient frontier (Point O in Figure 5).

Prospect theory and the shape of the Risk Indifference Curve

Empirical and experimental data has challenged the classical notions of risk (March and Shapira 1987). Work by Kahneman and Tversky (1979) explores the risk indifference curves of individual decision-makers. Their findings, and subsequent research (Tversky and Kahneman 1987; Whyte 1989; Loewenstein 1998; Mitchell 1996) suggest that the shape of the risk indifference curve is not concave but sigmoidal (Fiegenbaum 1997). People strongly prefer 'certainty' and may misestimate the risk of probable, rather than certain, outcomes so they will show a preference for a small, certain gain over a much larger gain that is merely probable

(risk aversion). However, when a loss is certain, Kahneman and Tversky's subjects exhibit risk seeking; that is, they prefer a larger, but merely probable, loss to a smaller, certain loss (Wiseman and Gomez-Mejia 1998).

Kahneman and Tversky's work also challenges classical notions of risk by demonstrating that attitudes towards risk are affected by context (Kahneman and Tversky 1979). Mood, feelings and framing – the way in which problems or issues are presented or described – all affect risk attitudes (March and Shapira 1987). Other contextual factors, such as compensation structures, current wealth, and previous success at managing risky choices, may influence risk attitudes (Wiseman and Gomez-Mejia 1998; Mittal, Ross and Tsiros 2002).

Risk Attitudes in Organizations

Risk perception is emerging as an issue for marketing (Skromme Baird and Thomas 1985). Much research assumes that risk attitudes are an inherent property of the individual manager (Brockhaus 1980), although it has been argued that, in fact, they are a function of their context or job (March and Shapira 1987). Puto, Patton and King find that industrial buying decisions are mediated by decision framing (Puto, Patton and King 1985). Fiegenbaum and Thomas (1988), Whyte (1989), Bromiley (1991) and Fiegenbaum (1997) show that Prospect theory can be applied to organizational risk attitudes.

Risk attitudes of decision makers have been assessed using outcome measures (Bromiley 1991; Panzano and Billings 1997); questionnaires (Singh 1986; Panzano and Billings 1997); choice dilemma questionnaires (e.g. Brockhaus 1980; Puto,

Patton and King 1985); or simulated using risk algorithms (e.g. Mookerje and Mannino 2000). More research would be needed to explore the real-world risk indifference curves of marketing managers; the methodologies adopted by Kahneman and Tversky (1979) and others could be applied in interviews and focus groups within organizations in order to explore the acceptable degrees of risk for that manager or within that organization. This acceptable level could then be located on the efficient frontier to identify the preferred portfolio.

Implications of Prospect theory for locating the Preferred Portfolio on the Efficient Frontier

Prospect theory suggests that marketers may exhibit different risk preferences at different times and that some changes in the riskiness of marketing decision making may occur if, for example, market conditions or compensation systems change. Thus, the preferred portfolio will depend on the context and the gain or loss expectations of the marketing manager and of the organization (Whyte 1989).

A highly risk-averse marketer will hold a portfolio in the lower left hand area of Figure 2, where both risk and returns are lower; Prospect theory suggests that this might be the preferred marketing portfolio of a marketing manager when times are good and gains are expected. When things are going badly, managers take more risk (March and Shapira 1987) relative to some reference point (Fiegenbaum 1997; Leggio and Lien 2003). Managers in poorly performing organizations, where decisions are more likely to have negative framing, also take more risks (Singh 1986). This may lead to them preferring marketing portfolios in the upper right area of the efficient frontier. Failure to recognize a shift towards greater risk-taking and to locate an optimal portfolio may lead to reduced organizational performance through investment in what Bromiley calls 'bad gambles' (Bromiley 1991). Risk-seeking

behavior in tough times might be the opposite of organization intent and lead to inferior choices (Bromiley 1991); our model could play a useful role in helping to flag up shifts towards riskier choices.

Prospect theory can also help explain why marketing managers may select suboptimal portfolios. For example, users of SWOT analysis should be sensitive to framing, since marketing managers are more likely to spend resource on positively framed rather than negatively framed options (Mittal, Ross and Tsiros 2002). Framing is of particular concern in areas of low performance, where managers may fail to address the underlying issues and instead invest effort in positively-framed situations; such as the underperforming sales person who focuses on small, friendly clients rather than large, difficult ones, with suboptimal results for the organization (Mittal, Ross and Tsiros 2002).

Discussion

Most companies recognize that their market divides into customer segments. These segments vary according to profitability and risk (Hulbert, Capon and Piercy 2003). How to allocate resources between these segments to maximize returns and minimize risk is a key question for marketers. However, the selection of marketing portfolios is not currently based on portfolio investment criteria and there is a need for consideration of risk as well as returns in the selection process (Ryals 2002a, 2002b; Dhar and Glazer 2003). Moreover, the impact of marketing spend allocation decisions is not well-understood (Mantrala, Sinha and Zoltners 1992). This suggests that marketing portfolio decisions are essentially arbitrary. The model presented in this paper introduces new procedures for locating the optimal marketing

portfolio, based on established tools from MPT modified to take account of marketing spend and the sales response. It enables marketing managers to maximize the efficiency of their marketing operations at any level of spend, provided that the efficient frontier is calculated and risk preferences are understood.

Implications for managers

The model presented in this paper has some intriguing implications for marketing management. One is that marketing managers could consider their investment choices in terms of portfolio management. Certain portfolios are suboptimal and should be rejected. Moreover, marketing managers could find it useful to measure the returns, standard deviations and correlations of segments within their marketing portfolios and to factor in the impact of marketing spend allocation decisions to the portfolio selection decision.

Although not tested in this research, the application of MPT to marketing also suggests that the risk preferences of the marketing manager and of the organization should be understood. Prospect theory indicates that the risk preferences of a single manager might not reflect the risk profile of the organization if there are special pressures on that individual. Worse, the entire organization's risk attitudes may change in difficult times, possibly resulting in catastrophic decisions (Whyte 1989).

Application to Other Areas of Marketing

The first empirical application of the model given in this paper is based on a food retailer with a marketing portfolio of multiple customer segments. Data were drawn from observed purchasing behavior based on storecard information. Further

empirical testing showed that the model could be applied to a portfolio of brands. The applications to brand management decision-making were to maximize a series of investment opportunities between developing new brands, funding brand extensions and managing existing brands. Potentially, the model could also be used in key account management, to help key account managers decide whether and to what extent they should pursue new customers as opposed to managing their relationships with existing key customers. More research would be needed to examine the implications of extending the model in this way.

Process Issues and Limitations

A limitation of this paper is the use of standard deviation to measure risk. As discussed above, alternative approaches to the Sharpe ratio for calculating risk-adjusted returns have recently been suggested (Leggio and Lien 2003). Future research could usefully explore how these alternatives might affect the approach presented in this paper.

A second limitation concerns the practical measurement of risk preferences, as discussed in the paper, and the problem that risk preferences may differ between individual marketing managers and between marketing managers and their organization. Further testing would be needed to establish how major a limitation this would be on the model that we propose.

A third limitation is the behavioral consequences of the model. The model may recommend zero investment in certain marketing assets (products, brands or customer segments) as optimal, but there may be organizational constraints that

would make this conclusion unacceptable. This was raised as a theoretical consequence by Anderson (1981) and, indeed, Ryals (2005) identifies “selective customer divestment” as a valid strategic option in two case studies of customer portfolio management.

Conclusion

A key issue in marketing is the development of sustainable competitive advantage and the creation of shareholder value. Dynamic efficient strategies in the management of financial portfolios depend on continuous rebalancing of the assets within the portfolio (Bajeux-Besnainou and Portrait 1998), which is equivalent to the impact of targeted marketing strategies on customer acquisition and retention. The difference from stock market portfolios, of course, is that movement of customers into and out of a marketing portfolio is not always within the control of the portfolio manager. A further difference is that the availability of certain marketing portfolios may be affected by organizational competencies and policies.

The model provides a practical solution to the problem identified by Anderson (1981) of how MPT could be applied to marketing portfolios. It demonstrates how marketers can identify the set of optimal portfolios, defined as maximizing returns for a given risk level and given marketing spend decisions. This information could be combined with an understanding of organizational and individual risk preferences drawn from Prospect theory to locate the preferred marketing portfolio. However, it should be noted that the preferred portfolio derived using the model may involve zero

investment in certain customer segments and there may be other organizational constraints that would prevent such a marketing decision ever being taken.

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Table 1: The Impact Of Diversification On Risk-Adjusted Returns

| Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 | Column 7 | Column 8 |
|---------------------------|-------------------------|---|---------------------------------------|-----------------------------------|---|---|-------------------------------------|
| % Investment in Segment A | % Investment in Brand B | Correlation =1 Portfolio Risk (Stdev) | Correlation =1 Portfolio Return | Correlation =1 Sharpe Ratio | Correlation =0.6 Portfolio Risk (Stdev) | Correlation =0.6 Portfolio Return | Correlation =0.6 Sharpe Ratio |
| 100% | 0% | 3.0% | 8.0% | 1.333 | 3.0% | 8.0% | 1.333 |
| 90% | 10% | 3.4% | 8.6% | 1.353 | 3.2% | 8.6% | 1.451 |
| 80% | 20% | 3.8% | 9.2% | 1.368 | 3.4% | 9.2% | 1.517 |
| 70% | 30% | 4.2% | 9.8% | 1.381 | 3.8% | 9.8% | 1.544 |
| 60% | 40% | 4.6% | 10.4% | 1.391 | 4.1% | 10.4% | 1.546 |
| 50% | 50% | 5.0% | 11.0% | 1.400 | 4.6% | 11.0% | 1.535 |
| 40% | 60% | 5.4% | 11.6% | 1.407 | 5.0% | 11.6% | 1.516 |
| 30% | 70% | 5.8% | 12.2% | 1.414 | 5.5% | 12.2% | 1.494 |
| 20% | 80% | 6.2% | 12.8% | 1.419 | 6.0% | 12.8% | 1.472 |
| 10% | 90% | 6.6% | 13.4% | 1.424 | 6.5% | 13.4% | 1.450 |
| 0% | 100% | 7.0% | 14.0% | 1.429 | 7.0% | 14.0% | 1.429 |

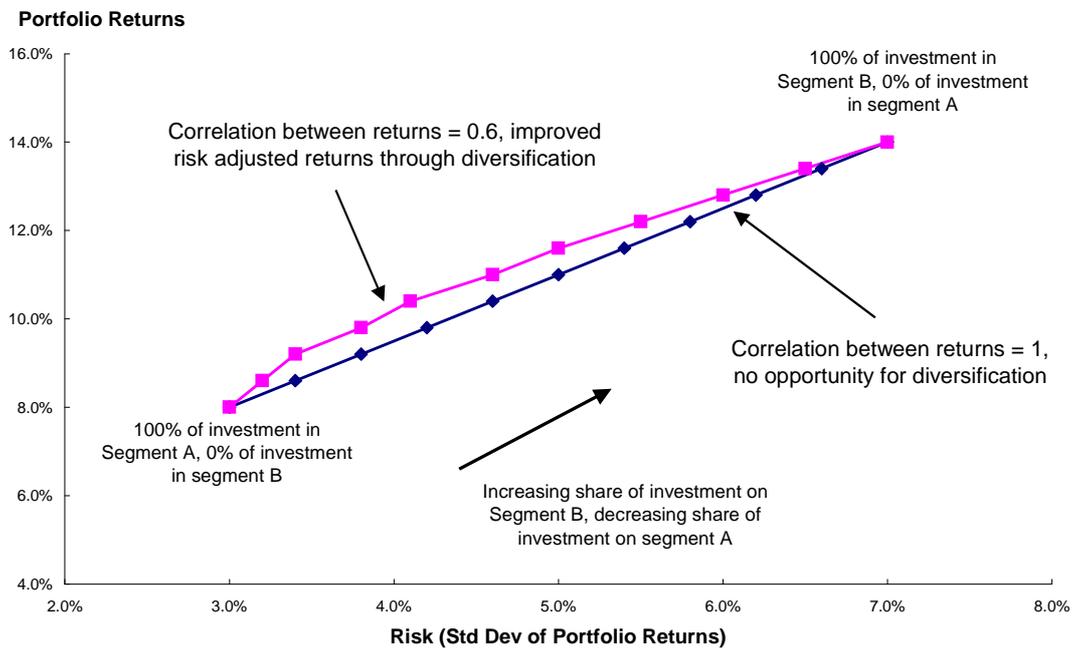
Figure 1: Diversification And The Efficient Frontier

Figure 2: The Efficient Frontier For A Complex Marketing Portfolio With Multiple Segments

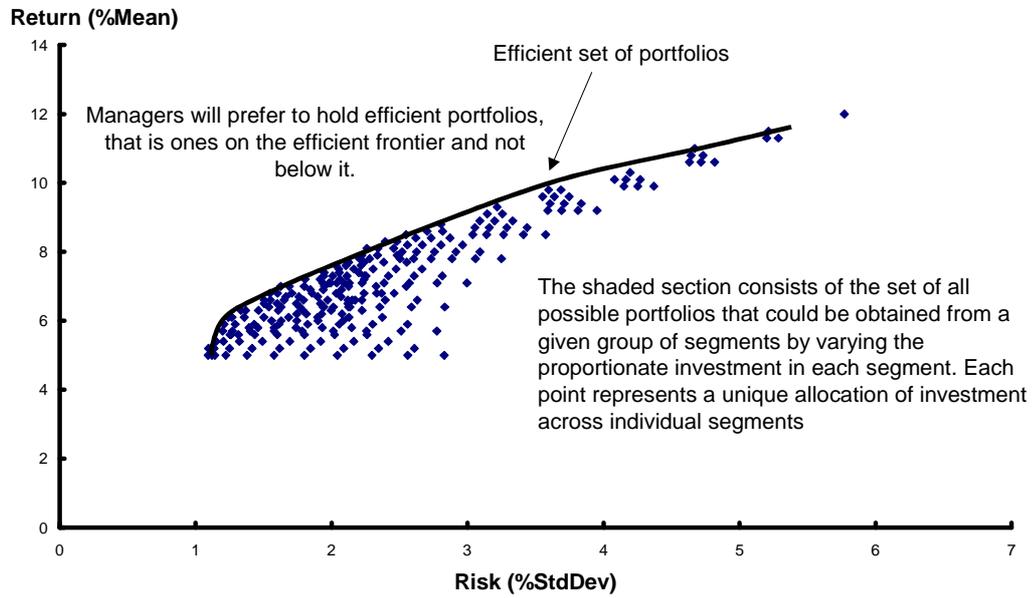


Figure 3: Relationship Between Segment Sales And Marketing Spend On Segment

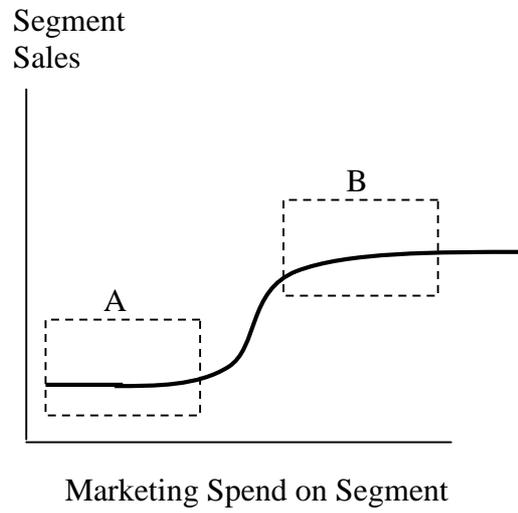


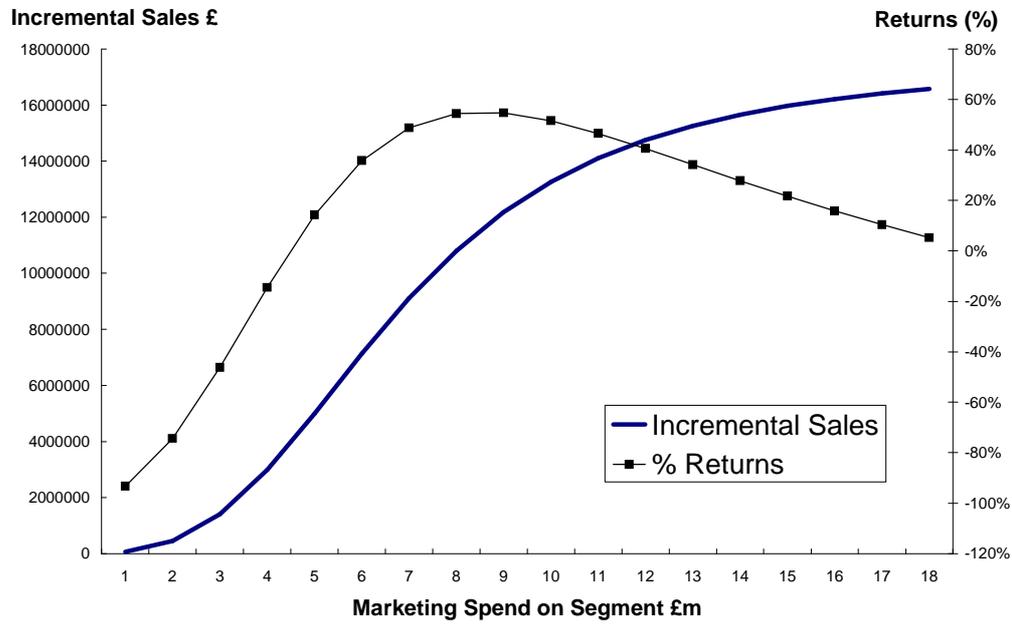
Figure 4: Incremental Sales And Returns Versus Segment Marketing Spend

Figure 5: Locating The Optimal Portfolio On The Efficient Frontier Using Classical Decision Theory

Portfolio expected returns

