Commentaries and Rejoinder to "Balancing Risk and Return in a Customer Portfolio"

A Comment on "Balancing Risk and Return in a Customer Portfolio"

Fred Selnes

Tarasi et al.'s (2011) article titled "Balancing Risk and Return in a Customer Portfolio" makes a noteworthy contribution to customer portfolio management theory, an important subject that has yet to receive a great deal of research attention. This brief comment emphasizes a few issues regarding the application of modern financial portfolio theory to customer portfolio management. The reason for developing financial portfolio theory was to help financial investors make decisions regarding their securities market portfolios. As Devinney, Stewart, and Shocker (1985) argue in their comments on Cardozo and Smith's (1983) work, applying financial portfolio theory to a marketing context requires substantive modifications to the theory because this context does not meet some of the critical assumptions in financial portfolio theory. In accordance with that perspective, I highlight some key issues with Tarasi et al.'s approach (2011) that require attention for the work to be truly useful.

Critical Assumptions in Modern Financial Portfolio Theory

The essence of financial portfolio theory relates to reducing risk by diversifying investments. It is well known that simple diversification with different types of customers serves to reduce overall customer portfolio risk; the marketing field has also widely applied this logic. For example, companies tend to reduce their dependence on a single (large) customer to avoid "putting all their eggs in one basket." However, the point of modern financial portfolio theory is to move beyond simple diversification and reduce overall risk by constructing a portfolio of assets that have low correlation of returns. Assets A and B have a low correlation of returns if the return of A is high when the return of B is low, and vice versa.

Markowitz (1952) proves mathematically that the variance of returns in a portfolio of securities depends on the correlation of returns among the securities in the portfolio. It is possible to express the variance of a portfolio p with two assets as follows:

$$\sigma_p = x_A^2\sigma_A^2 + x_B^2\sigma_B^2 + 2x_Ax_B\rho_{AB}\sigma_A\sigma_B, \quad (1)$$

where x_A and x_B are the relative shares in assets A and B, σ_A^2 and σ_B^2 are the variances of return in assets A and B, and ρAB is the correlation of return from assets A and B. As Equation 1 shows, variance of the portfolio decreases when the size of the correlation between return from asset A and asset B is lower. Because the expected value of the investment in a portfolio increases with reduced portfolio variance, investors diversify their portfolios by minimizing Equation 1—in other words, by minimizing the risk of their portfolio.

Possible portfolios can be plotted in a diagram with the expected return on one axis and the risk on a second axis. The definition of the efficient frontier is portfolios that have (1) greater expected return than any other portfolio in their risk class (i.e., any other portfolio with the same variability of returns) and (2) less risk than any other portfolio with the same level of expected return. A financial investor can improve the value of a portfolio by changing the relative share of the various assets in the portfolio either to reduce risk at a given level of expected return or to increase the expected return at a given level of risk.

As Tarasi et al. suggest, it is possible to apply the approach to a customer portfolio context in which the efficient frontier of customer portfolios is the set of portfolios with the lowest risk at a given level of return or the highest expected return at a given level of risk. A marketing manager can optimize the value of a customer portfolio by reducing the number of customers of a certain type and increasing the number of customers of another type such that no other combinations of customer types provide a better expected return at a given level of risk or lower risk at a given level of return. The validity of this theory, when applied in a marketing context, rests on several important assumptions.

One of Tarasi et al.'s assumptions is that customer portfolio value has the same meaning for the marketing manager as financial portfolio value has for the financial investor. In reference to Srivastava, Shervani, and Fahey (1998), Tarasi et al. argue that it is possible to conceptualize customers as financial assets, which assumes the option of applying the value concept in financial theory to marketing and customer portfolio value. Although this is a legitimate argument, marketing managers tend to take a broader view of customer portfolio value than they do with financial assets. For example, Blattberg and Deighton (1996) suggest that the value of a customer portfolio is a consequence of the level of the retention costs needed to develop committed

Fred Selnes is Professor of Marketing, BI Norwegian School of Management (e-mail: fred.selnes@bi.no). The author extends special thanks to Dag Michalsen, Professor of Finance, BI Norwegian School of Management, for his helpful comments in crafting the article.

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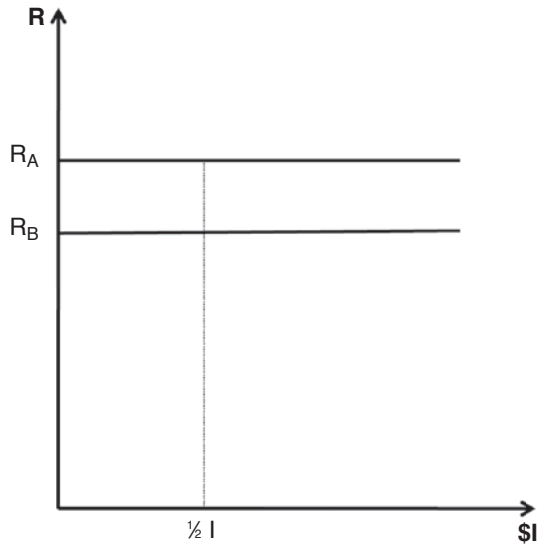
and loyal customers, rather than simply a consequence of the level of acquisition costs. Johnson and Selnes (2004) argue that there is a connection between the value of a customer portfolio and how it improves the companies' production functions (i.e., economies of scale and economies of scope). Others have argued that the value of a customer portfolio depends on how well it is connected to other marketing assets, such as the companies' brand portfolios (Rust et al. 2004). Customers can also be valuable because they drive market orientation and innovation (Selnes and Sallis 2003). Accordingly, the maximum value from a marketing perspective, and therefore the composition of a customer portfolio, is not always equivalent to the maximum value derived from a financial investor perspective. For example, if two segments with equal return ratios differ in terms of the variability of return (and therefore risk), the financial investor perspective states that the company should increase its share in the low-variability segment and reduce its share in the high-variability segment. However, the segment with the higher return variability may have stronger effects on positive word of mouth, brand building, or relationship learning. Consequently, the high-variability segment may have a nonfinancial advantage that makes it more valuable from a marketing management perspective. Thus, applying the efficient frontier rule to a customer portfolio has the potential to lead to suboptimal solutions.

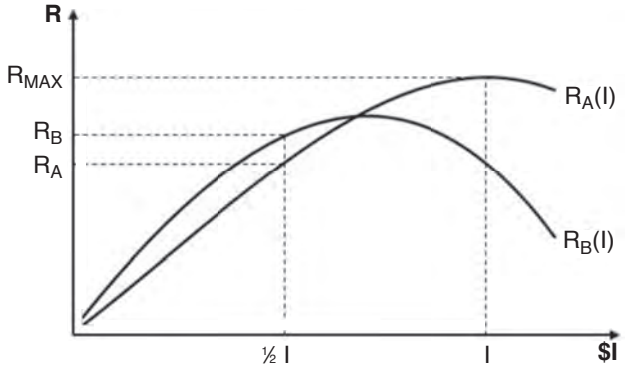
A second important assumption in financial portfolio theory is that return increases linearly with the invested amount. As Devinney, Stewart, and Shocker (1985) note, marketing investments are more likely to follow a concave than linear shape, thus achieving a maximum at some specific level of investment. Figure 1, Panel A, illustrates a linear relationship between investment and return, and Figure 1, Panel B, shows a concave relationship between investment and return. With a linear relationship, reallocating the share invested in asset A to asset B does not affect the level of return on either asset. With a concave relationship, reallocating the share invested in asset A to asset B affects the level of return for both assets. The example in Figure 1, Panel B, shows that the rate of return from the investment reaches its maximum when the investor allocates all resources to asset B. The consequence is that, instead of customer segments' investment positions being fixed in a return–risk space, they depend on the amount invested in each customer segment. Therefore, reallocating the fraction invested in different customer segments within the portfolio changes the expected return and risk from each individual customer segment. Accordingly, even if the financial portfolio analysis indicates that the optimal solution is to reduce the relative amount invested in customer segment A and increase the relative amount invested in customer segment B, this may not be true, because changing the level of investment in these customer segments would change the expected return and risk, which would mean that the portfolio is no longer efficient. Although Tarasi et al. address this concern, the consequence of not meeting this assumption might be more serious and could challenge the validity of an efficient frontier in a customer portfolio. For example, employing the efficient frontier approach might lead managers to split their investments into two customer segments, whereas the actual maximum of expected return would be to allocate all the resources in one of the customer segments, as exemplified in Figure 1, Panel B.

FIGURE 1
Investment–Return Relationships

A: Investment–Return Relationship for a Portfolio of Assets with a Linear Return Rate



B: Investment–Return Relationship for a Portfolio of Assets with a Concave Return Rate



Source: Devinney, Stewart, and Shocker (1985).

Conceptualizations and Operationalizations of Return and Risk

Financial portfolio theory defines the return for an asset as follows:

$$r = [(p_1 - p_0) + d_1]/p_0, \quad (2)$$

where p_0 is the price for the asset at the beginning of a certain period, d_1 is the dividend the investor receives in the period, p_1 is the price at the end of the period, and r is rate of return for that period. In a marketing context, it is possible to conceptualize return as the accumulated earnings that an investor derives from a customer segment divided by the accumulated investments in the customer segment. The

investment analogy is the allocation of marketing resources to the various customer segments.

Tarasi et al. conceptualize return as profit margin or net earnings and use earnings before interest and taxes per customer segment divided by the total revenue per customer segment as the measure of return. This variable is different than earnings relative to investments, which financial portfolio theory uses. Customer segments with the highest return (on investment) do not necessarily have the highest profit margin, just as customer segments with the lowest return do not necessarily have the lowest profit margin. The problem is that there is not a perfect correlation between profit margin and return on investment; therefore, the chosen operationalization violates the assumptions of financial portfolio theory. Tarasi et al. do not explain the correlation between net earnings and return in their portfolio. However, it is reasonable to expect that the segment with larger customers (Cluster 1) will have a higher return rate, even though the profit margin is below average, because the marketing investments necessary to get one incremental dollar sales from larger customers is often relatively smaller than the marketing investment needed to get one incremental dollar sales from smaller customers. Furthermore, to obtain incremental revenues from a larger customer segment, a marketing manager might be willing to accept a lower price and, therefore, a lower level of net earnings. However, despite a lower level of profit margin, the relative difference in investments might mean that the return on investment from the larger customer segment is actually higher than the return from the smaller customer segment. If this is the case, the inference of the efficient frontier is incorrect, and the company should not reduce its share in Cluster 1, as Table 1 in Tarasi et al.'s article suggests.

The risk of a financial portfolio is the variability of its return under the assumption that a stationary distribution generates the return. Tarasi et al. conceptualize risk as variability in cash flow (operationalized as sales revenues). In other words, customer segments with higher variability in sales revenues over time are considered more risky. This implies that a customer segment that systematically purchases one unit in one month and three units in the next month will have higher revenue variability and, therefore, a higher level of risk than one that purchases two units every month. In addition, a customer segment that increases its purchases every period will have higher variability, and therefore risk, than one with stable purchases over time. Consequently, the classification of a growth segment is more risky even if its revenue increase is stable and predictable. The implication of the analysis is that the efficient portfolio will have less variance in revenues and will therefore consist of customer segments with more stable revenues. Because it is easy to manage variability in revenues from a customer segment as long as it is systematic and predictable, variability in revenue is not likely to be a valid measure of risk. Thus, the derived efficient portfolio frontier has the potential to be misleading and even detrimental to profitability.

Concluding Remarks and Further Research

Although questions can be raised about the validity of Tarasi et al.'s approach, the authors nonetheless make an important contribution. Their decision to select customer segments rather than individual customers as the unit of analysis is significant. Marketing managers allocate resources and specialize in both customer segments (e.g., product development, brand building, customer relationship management systems) and individual customers (e.g., sales, market communication, promotions); the joint effect determines the return of the investments.

I also believe that the analysis of purchase patterns is important and is a promising avenue for further research. Constructing the portfolio of customer segments with the right mix of purchase patterns probably has a close relation to value creation. Anecdotal evidence from business practice suggests that companies that can combine customer segments with complementary purchase patterns have greater fixed capacity utilization. For example, it is well known that a resort hotel can improve its room utilization by combining business convention customers with consumer holiday customers. Furthermore, complementary purchase patterns might be even more important than negative covariance of returns (on which financial portfolio theory relies).

Customer portfolio theory can be further advanced by employing mathematical modeling and statistical tools (as financial portfolio theory has done). However, I believe customer portfolio theory would be advanced to a greater degree by incorporating customer purchase behaviors and marketing managers' multifaceted objectives, rather than employing more sophisticated financial portfolio theory instruments. I commend Tarasi et al. for their contribution and hope it inspires scholars to develop the area further.

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"Balancing Risk and Return in a Customer Portfolio": A Comment

Matthew T. Billett

Research on the interface of marketing and finance continues to be a source of important new insights in both the marketing and finance literature streams. Tarasi et al. (2011; hereinafter TBHW) contribute to this research stream a novel application of modern portfolio theory (MPT), widely used in finance to optimize financial portfolios, to a firm's customer portfolio. Applying MPT to a financial portfolio amounts to trading off the expected return (mean) of a particular asset class against the influence that asset class will have on overall portfolio risk (variance). The authors apply the mean-variance optimization that underpins MPT by replacing financial asset classes (e.g., stocks, bonds, real estate, commodities) with customer asset classes (e.g., segmented by customer industry). Although this application provides new insights for marketing, as researchers, it is crucial to assess their findings in light of the assumptions and limitations underlying the MPT methodology.

Modern portfolio theory makes numerous assumptions, and its empirical application in finance commonly raises necessary caveats and concerns among finance researchers. These assumptions and concerns garner much attention in the finance literature, which has identified conditions and circumstances in which MPT is more or less useful. Although TBHW consider these issues throughout their article, the primary purpose of this comment is to flesh out in more detail some of the common issues and concerns with MPT among finance researchers, with the aim of facilitating a dialogue on the usefulness of MPT in the customer portfolio setting and potentially other related market-based asset settings. I divide the comment into two sections: one on the underlying reason investors value MPT and the other on the practical implementation issues of using MPT. In each section, I summarize some of the findings in the finance literature and then turn to the application of MPT to market-based assets to raise potential questions and avenues for further research.

The Value Proposition of MPT

When MPT is applied to financial portfolios, it shows that investors can diversify some types of risk away at little or no cost. Risk-averse investors create portfolios of financial assets and judge each investment according to the investment's covariance with other assets rather than the total risk (variance) of that investment alone. Modern portfolio theory analysis determines what these portfolios should look like and indicates the set of efficient portfolios that dominate inefficient allocations.[1] Given the relatively low transaction costs of creating efficient portfolios through mutual funds, exchange-traded funds, and so on, investing in efficient portfolios is economically feasible for most investors.

Although the concept of efficient portfolios is important for investors, it is equally important in shaping decision making in firms and determining value-maximizing capital budgeting practices. If investors own efficient portfolios, they do not benefit from corporate decisions that eliminate risks the investors have already diversified away. For example, this investor view of risk has been used to illustrate why conglomerate mergers can be value destructive. Levy and Sarnat (1970) show that although merging two firms might reduce cash flow variability, investors can more efficiently accomplish this themselves by owning shares of both companies. Unless the merger creates synergistic gains, investors will view the cost of the merger as outweighing the benefits. Put simply, investors will not value the decrease in firm risk because it was already present in their efficient portfolios. The finance literature makes this point prominently, not only on mergers and acquisitions but also on risk management and corporate finance decision making. From this perspective, simply eliminating unsystematic risk does not benefit investors, unless it also contemporaneously increases mean returns.

The marketing equivalent question then becomes, What exactly are the cost–benefit trade-offs for a firm regarding its customer portfolio? Research aimed at understanding how investors value more efficient customer portfolios is merited; if more efficient portfolios simply reduce unsystematic risk—like conglomerate mergers of the 1960s—the benefits may not outweigh the costs.

Moreover, much research in finance suggests ways in which reducing unsystematic risk can also benefit investors (by improving expected returns). For example, if a firm has significant financial distress costs, reducing the likelihood of becoming distressed can improve firm value (see Stulz 1999).[2] However, this link connecting total risk and firm value is by no means universal to all firms. Moreover, the degree to which the total risk matters varies from firm to firm and spans situations in which unsystematic risk is irrelevant to highly relevant.[3] Additional research focusing on how

Matthew T. Billett is Professor of Finance, Henry B. Tippie College of Business, University of Iowa (e-mail: matt-billett@uiowa.edu). The author thanks Neil Morgan, Lopo Rego, and Ashish Tiwari for helpful discussions, comments and suggestions.

[1]Efficient portfolios are defined as having the highest expected return feasible for the given level of the portfolio's risk; alternatively, they have the lowest risk for a given expected return.

[2]Some of the channels Stulz (1999) points out include links between total risk and financial distress costs, underinvestment problems, and asymmetric information, which make unsystematic risk value relevant.

[3]This amounts to each firm having a unique "risk premium" based on its own situation.

market-based assets (e.g., customers) influence firm value and how that value link varies with firm or industry characteristics would be useful.[4]

In addition to more research on the benefits of applying MPT to market-based assets, a better understanding of the costs would also be helpful. What are the transaction (and other) costs associated with shifting toward an efficient portfolio? In finance, researchers have focused on transaction costs. Although for many financial assets (e.g., shares of stocks, mutual funds) transaction costs are relatively small, this is not necessarily true for all financial assets. For example, hedge funds, private equity, and venture capital are available to only the wealthiest of investors. This means that efficient portfolios might be much different from one investor to another according to the investor's cost of accessing those asset classes. Similarly, customer segments may exhibit dramatically different transaction and access costs to different firms. It would be useful to understand which customer segments can be cheaply "bought" and "sold" versus those that might have large associated transaction costs. Without such knowledge and the ability to calibrate such transaction costs, meaningful implementation of MPT becomes tenuous.

Issues in the Practical Application of MPT

A primary benefit of MPT is that it can be implemented. Practitioners have widely adopted MPT to guide investors toward better decision making. However, MPT implementation raises numerous concerns as to its practical value. Efficient portfolios are highly sensitive to the assets' expected returns and covariances between asset classes, which are difficult to estimate. Britten-Jones (2002) finds the sampling error in the estimates of portfolio weights is large, even though there is a relatively long time series of returns available for financial securities. As TBHW discuss, DeMiguel, Garlappi, and Uppal (2007) also question the usefulness of MPT. They compare the performance of 14 portfolio allocation models, including several designed to address estimation errors, with the performance of a simple naive portfolio strategy that gives equal weight (1/N) to each asset in the portfolio. They find that none of the 14 alternative portfolio strategies consistently outperforms the naive portfolio. This suggests the effect of estimation error on portfolio weights is large, and even strategies designed to address estimation risk are only moderately successful.

Thus, what do these findings caution when deploying MPT to optimize customer portfolios? The major concern the finance literature suggests is this: How precise are the mean and covariance return estimates in the customer data? Additional research on the persistence of spending patterns by customer segment would help speak to this issue. As the finance literature indicates, the historical correlations gleaned from decades of data failed to hold true during the recent financial crisis, when correlations between most risky assets converged toward 1. If customer expected returns and covariance estimates are subject to significant error, the weights obtained from MPT might not be useful and could potentially be harmful.

Another concern in the finance literature is whether prices accurately reflect expected returns. If a stock is mispriced, realized outcomes will deviate according to the mispricing of the underlying assets. In financial markets, arbitrage can lead prices of individual assets to reflect the efficient risk–return characteristics, and deviations from this efficient price are quickly arbitraged so that the price returns to its efficient level. The key point for MPT is that investors expect the same risk–return trade-off regardless of the amount they purchase (e.g., they can have a weight of 10% in a security or 30% on the same security). However, this assumption may not always be true; arbitrage typically requires the existence of reasonable substitutes. Wurgler and Zhuravskaya (2002) show that for many stocks that lack close substitutes, arbitrage is costly, and therefore these stocks exhibit greater mispricing. If securities are mispriced, then the underlying fundamental risk–return relationship assumed in the MPT analysis will not be reflected in the prices or realized in the portfolio that purchases them.

In a market-based asset context, the relevant question is whether the fundamental risk–return relationship for customers is independent of quantity. For example, assume 10% of a firm's customers are from a particular segment and its managers expect to earn 9% on those customers (and that these returns have a particular covariance with the other customer segments). Is it reasonable to assume that they will earn the same 9% if they tripled their share of customers from that segment to 30% of their overall customer portfolio? If so, the risk–return profile of a customer segment will be the same regardless of whether the weight is 10% or 30%. However, if the costs of obtaining the additional customers and/or the revenues expected from these additional customers are not identical to the existing customer, the MPT assumption that the underlying risk–return is independent of the weight is violated. The size of customer portfolios might also influence the stability of the risk–return relationship for particular customer segments. It is typically assumed in financial portfolios that a $1 million portfolio and a $50 million portfolio will have the same expected returns and risk profile if they have the same weights on asset classes. In this sense, financial assets are scalable. If customer portfolios are not scalable, meaningful implementation of MPT might be challenging. There might be ways of identifying customer segments that are scalable and those that are not. This would allow for constraints to be put on the weights for particular customer segments and improve MPT's usefulness.

There are additional differences between financial portfolios and customer portfolios that could influence how MPT might be implemented. It seems likely in practice that the finite supply of customers in a given segment would limit the feasibility of some weighting schemes. Perhaps some segments have unrestricted weights (i.e., many customers with similar risk–return profiles), while others do

[4]This issue needs to be in the forefront of decision makers' minds. Absent MPT, the decision maker would presumably pursue the most profitable (highest mean) customers first. Switching to an MPT view of customers indicates that a smaller mean return from a customer may be warranted if their spending patterns are relatively less correlated with the other customers of the firm. The commensurate reduction in the risk profile of the customer portfolio must be traded off against the lower mean.

not. Financial assets are almost infinitely divisible, allowing investors to choose precise weights (e.g., 20% or 21% stocks). This also speaks to the question of whether having one large customer in a given segment has the same risk–return profile as having many small customers in that segment. These sorts of issues might be tantamount to putting constraints on the weights of some customer segments. Further research could explore the factors that lead to constraints on feasible portfolio weights for various customer segments and how constrained optimization could lead to improved weighting schemes. The constraints could depend on things such as the loyalty and satisfaction of potential customers currently served by competitors, which would affect the costs of attracting them.

It is also worthwhile to examine how managers might implement customer portfolio optimization on the basis of the findings of an MPT analysis. According to TBHW's Table 1, the optimal portfolios' customer makeups are different from one another and would cause the firm to change its customer makeup dramatically. For example, the firm's current customer makeup has 36% coming from segment X_1. In all the efficient portfolios, that customer segment is reduced to anywhere from 20% to 0%, with offsetting rises in other customer segments. Such shifts likely involve significant costs, and these deserve considerable attention. Moreover, the increased profitability of moving to the efficient portfolios is negligible relative to the risk reduction, again emphasizing the need to understand how this risk reduction is valuable to the firm's investors/owners.

Conclusion

In summary, TBHW do a thorough job applying MPT to a firm's customer portfolio. The insights and implications they generate have the potential to dramatically change the way managers view and manage market-based assets, such as customers. They are also careful to point out the potential pitfalls of MPT in this setting. The finance literature has wrestled with many of the theoretical and implementation underpinnings of MPT in the context of financial assets. The insights gleaned in finance research with regard to these issues should be useful in formulating the next steps for research into applications of MPT to market-based assets.

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"Balancing Risk and Return in a Customer Portfolio": A Reply

Crina O. Tarasi, Ruth N. Bolton, Michael D. Hutt, & Beth A. Walker

A financial portfolio perspective presents important implications for the way in which market segmentation and customer portfolio management are conceptualized, practiced, and taught. We begin by addressing each of the issues Selnes (2011) and Billett (2011) identify. Then, we describe the market context in which we believe the approach can be effectively applied and the way managers at the sponsor firm implemented our study's findings.

Comments by Selnes (2011)

Selnes (2011) provides a careful assessment of the article and centers on two assumptions from financial portfolio theory that might not extend to customer portfolio management. First, he argues that marketing managers take a broader view of customer portfolio value than an individual investor does with financial assets. In support of this position, he suggests that the value of a customer portfolio is related to the retention costs needed to develop loyal customers or how the customer portfolio improves the firm's production function (e.g., economies of scale). We concur that there are many ways to value customers and market segments on dimensions such as brand-building appeal, word-of-mouth influence, and relational learning, which are beyond the scope of our study. Our work is consistent with the customer lifetime value research stream, which has advanced knowledge involving customer value measurement (e.g., Blattberg and Deighton 1996; Kumar 2008). However, the goal of our work is to take a step toward advancing this research tradition by incorporating the risk characteristics of customers and testing these ideas in a field context.

Second, Selnes argues that an important assumption in financial portfolio theory is that return increases linearly with the invested amount. Indeed, as we discuss and acknowledge in the article, a distinct difference between a customer portfolio and a financial portfolio is that the returns from investing in customers are likely to be nonlinear. Specifically, the amount of investment has a nonlinear relationship with the "return on customer," which means, for example, that small investments might be insufficient to attract or retain an individual customer or market segment. Similarly, after a certain level of investment in an individual customer or market segment, additional incremental expenditures might not improve returns. Selnes argues that the

nonlinear returns from customer segments may challenge the validity of an efficient frontier in a customer portfolio. As we note in the article, the optimal portfolio can best be viewed as an ideal customer base that managers can evaluate, revise, and assemble over time. Therefore, the optimization process should include a qualitative overlay based on managerial judgment to arrive at recommended resource allocation by segment. The spirit of our article fits the adage attributed to John Maynard Keynes (1883–1946): "It is better to be roughly right than to be precisely wrong." Thus, further research might investigate how to identify the optimal investment in an individual customer or market segment to optimize the customer portfolio.

Regarding the conceptualization and operationalization of return and risk, Selnes raises three points. First, he correctly observes that the earnings relative to investments are different from returns received from customers. In financial terms, the focus is on return on investment, in which the investment is the price paid for the asset. In marketing, the price of a customer asset includes multiple facets: the acquisition costs, the cost to serve, and the retention cost. In our study, we center on managing the variability of revenue while maximizing the return on that revenue and show that it is possible to minimize the variability of revenue for a certain level of return. Although measuring the return on customer investment as Selnes suggests would add more depth to our analysis, it imposes data requirements that few studies in marketing have met. We felt fortunate indeed to secure access to seven years of revenue and profit data by customer for a business-to-business firm's entire customer base.

Second, Selnes posits that the segment with large customers (Cluster 1 in our study) will have a higher return rate even though the profit margin is below average. "However, despite a lower level of profit margin, the relative difference in investments might mean that the return on investment from the larger customer segment is actually higher than the return from the smaller customer segment. If this is the case, the inference of the efficient frontier is incorrect, and the company should not reduce its share in Cluster 1." However, because some of these customers are characterized by a high cost to serve, they may well provide a low return on investment. Kaplan and Narayanan (2001) argue that large customers tend to be either the most profitable or the least profitable in the entire customer base. This was true in our study.

Third, Selnes questions the conceptualization of risk as variability in cash flow (operationalized as sales revenues). As we acknowledge in the "Limitations and Further Research" section, the customer portfolio measures used in our study center on the variability of cash flow and profitability but are insensitive to the direction of movement. Therefore, managerial judgment, informed by established customer management approaches, is needed to discern the root cause of the variability (i.e., growth or decline of cash flow). Further research might explore customer resource allocation from a downside-risk perspective.

Comments by Billett (2011)

Billett contributes perspectives from the finance literature to the dialogue related to our article. Regarding the value proposition of modern portfolio theory (MPT), he raises two key points. First, we concur with his position that research is needed to better understand how investors value more efficient customer portfolios. The literature on market-based assets suggests that low vulnerability and volatility reduce the risk associated with cash flows, which results in a lower cost of capital and higher shareholder value (Rao and Bharadwaj 2008; Srivastava, Shervani, and Fahey 1998). Further research might determine whether firms with more efficient portfolios are more accurate in providing earnings guidance to the investment community or are rewarded by investors who display more confidence in the earnings projections from firms with more efficient portfolios.

Second, Billett highlights the importance of carefully determining the transaction and access costs associated with a shift toward an efficient portfolio. He notes that some customer segments can be more readily entered or expanded than others when the associated transaction costs are considered. As we detail in the article, we concur and assert that customer portfolio adjustments ultimately hinge on managerial judgment and represent an important strategic decision. Reorganizing the customer portfolio may require a realignment of the sales force and a different marketing communications strategy, highlighting the higher transaction costs associated with customer versus financial portfolios.

Billett also details four issues related to the practical application of MPT. First, he observes that the historical correlations gleaned from decades of data failed to hold during the recent financial crisis, when the correlation between most risky asset classes converged toward 1. Likewise, we cautioned that during periods of severe economic stress, market segments that were previously uncorrelated can suddenly move in tandem, limiting the benefits of diversification. Although stock prices are more vulnerable to violent swings than customer purchases, we agree that further research is needed to examine the persistence of customer segments' spending patterns. We acknowledge that the weights obtained from MPT may not be useful if customer expected returns and covariance estimates are subject to significant error.

Second, he questions whether the fundamental risk–return relationship for customers is independent of the proportion of customers served (e.g., 10% versus 30% within a segment). As we discuss in the article and our response to Selnes, when an investor selects an optimal weight for a particular asset class and makes the associated purchase, there is no impact for the risk and return for that asset class. In contrast, managers can exert a significant degree of control over the risk–return characteristics of the customer portfolio. Because of increasing or decreasing returns to scale, the weight assigned to a market segment may affect the performance of that segment within the customer portfolio. We endorse his call for further research that explores methods for identifying customer segments that are scalable and those that are not.

Third, Billett observes that investors can choose precise portfolio weights, but the finite supply of customers in a given segment might limit the feasibility of some weighting schemes in the customer portfolio. We agree that a promising line of further research could explore the factors that

lead to constraints on feasible portfolio weights for various customer segments and how constrained optimization might lead to more refined weighting schemes.

Fourth, Billett wonders how managers might implement customer portfolio optimization on the basis of the findings of an MPT analysis. He suggests that the increased profitability of moving to efficient portfolios is negligible relative to the risk reduction. However, importantly, the results reveal that the firm's efficient portfolio has constantly lower variability than the firm's existing portfolio and the profit maximization portfolio; furthermore, the profit performance is superior in the long run. Moreover, from our discussions with managers at the sponsor firm and at a Marketing Science Institute conference on effective marketing spending, we find that practitioners embrace the idea of taking a fresh look at the structure of the overall customer base and identifying a combination of customers that stabilizes cash flow and advances profit performance. We address issues Billett identifies related to the implementation of our portfolio approach further in the next section.

Implementing the Customer Portfolio Approach

Appropriate market contexts. Our approach especially applies to situations in which there are meaningful differences in variability across the market segments that constitute a firm's customer portfolio. Therefore, we expect that the portfolio approach will have immediate application for business-to-business firms that serve diverse sectors of the economy. Such firms tend to allocate a greater portion of their sales and marketing resources at the level of individual customers, have direct contact with customers, and can more readily access customer purchase histories. In contrast, the approach is less suitable and more difficult to implement for consumer packaged goods firms, which rely on a host of channel partners to reach diverse customer segments. The approach may be suitable in those business-to-consumer industries in which a firm has direct contact with its customers, such as online retailing, telecommunications, and financial services. However, we want to reiterate that the portfolio approach will be less appropriate and of limited managerial value in these or other contexts if market segments tend to be highly correlated.

Customer portfolio adjustments. Through managerial control and specific knowledge (Devinney and Stewart 1988), marketing managers, particularly in the long run, can exercise a significant degree of control over the risk–return properties of the customer portfolio. Therefore, the optimal or efficient portfolio that is identified by the analysis represents an ideal customer base that managers can scrutinize, revise, and assemble over time. As we acknowledge in the article, some portfolio adjustments can be implemented by resetting the customer contact priorities of the sales force. However, others might require a more fundamental realignment of sales and marketing communication strategies.

To apply the approach, a marketing manager might first explore the array of portfolio options along the efficient frontier and examine the cluster weights (customer representation) in each portfolio. For example, some of the options include portfolio weights that more closely approximate the composition of the current portfolio than others. Next, using the current portfolio as a benchmark, the manager can evaluate the strategic actions that might be taken to achieve a target portfolio along the efficient frontier.

This is the process that managers followed at the firm we studied—they examined the composition of the current portfolio and considered incremental portfolio adjustments that would move the customer mix toward the efficient frontier. To support customer selection, the managers drew on cost to serve and profit data by individual customer and industry sector. Moreover, to inform decision making, the managers also used a top-down macro forecast for the economy and selected industries provided by a forecasting unit within the firm.

Applying customer risk metrics. To identify a target portfolio, managers at the cooperating firm first examined the customer betas and reward ratios for each of the 29 industries that the firm serves. Provided here is a preliminary view of the relative attractiveness of customer groups on the basis of betas (correlation to the overall portfolio) and reward on variability. Next, they wanted to examine the customers with the highest customer reward ratios (i.e., the top ten) in each of six clusters defined in the study as well as those for each major product line.

In evaluating particular customers, managers also (1) examined customer ratings (e.g., relationship strength, potential) provided by the sales management function and (2) used the customer risk measures as an overlay in the assessment. To move toward the efficient portfolio, the firm placed a special priority on increasing the proportion of small and medium-sized customers in the portfolio and redirected sales resources to increase sales call contacts on carefully chosen accounts in the small and medium-sized business sector. Likewise, managers used the customer reward ratio as a further guide for gauging the relative attractiveness of key customer accounts, particularly those involving a contractual relationship, for which a significant level of dedicated assets are deployed.

A Concluding Note

Our study answers the call of Gupta et al. (2006, p. 150) for research to guide marketing managers in taking "actions that maximize the value of the portfolio rather than the value of the next-acquired customer." Customer lifetime value provides a valuable framework for advancing firm performance by identifying the right customers and allocating resources accordingly, whereas our approach seeks to increase firm value by identifying the right customer mix or portfolio for the firm. Our study raises implications for research in the areas of (1) marketing strategy development (e.g., diversified vs. focused strategies), (2) market segmentation, and (3) customer relationship management. Further research is needed to develop approaches that more fully integrate customer risk into customer lifetime value models. We hope that our study, along with the incisive commentaries that Selnes and Billett provide, help spawn such research efforts.

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