

# The Marketing Mix Decision Under Uncertainty

Harsharanjeet S. Jagpal, Ivan E. Brick

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## Abstract

This paper develops a marketing mix model under uncertainty using the Capital Asset Pricing Model (CAPM) valuation framework. The model is general because it treats price, advertising and personal selling simultaneously, and allows for general patterns of uncertainty. Because the manager often lacks precise quantitative information about the sales response function, the analysis focuses on the qualitative properties of the model. The methodology of comparative statics is used to determine how the marketing mix should be modified when market conditions change. Specifically, the comparative statics are shown to depend on how advertising and personal selling influence price-sensitivity, the interaction between advertising and personal selling and the relationship between sales and the return earned in the capital markets. The comparative statics for risk depend, in addition, on the precise mathematical form with which uncertainty enters the random demand function (i.e., additive, multiplicative or generalized). For example, suppose demand uncertainty increases in the additive case and sales covary positively with the return of the market portfolio. Then, if advertising and personal selling are complementary, advertising decreases if increased advertising and increased personal selling decreases price-sensitivity. However, if advertising and personal selling are substitutes, then advertising decreases if increased advertising decreases price-sensitivity but increased personal selling increases price-sensitivity.

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## Institute for Operations Research and the Management Sciences

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