

## The Return to Advertising Expenditure

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### **Abstract**

Every year companies spend billions of dollars on advertising in an effort to induce consumers to purchase their goods. Yet, unlike almost any other investment that a company makes, management's advertising allocation decision is made with little, if any, substantive information on the return received from that investment. This research presents a methodology for determining the monetary gains from advertising and provides an estimate of the return to advertising investment for a sample of firms. Substantial gains exist for firms from advertising. This effect is seen to vary by type of industry and is strongly related to other positive strategic decisions of the firm.

Every year companies spend billions of dollars on advertising in an effort to induce consumers to either purchase their products for the first time or to continue to purchase them in the future. In 1989 alone, advertising investment in the United States amounted to more than \$123 billion or almost 2.5 percent of gross national product (*Advertising Age* 1990). Yet, unlike any other investment that a company makes, management makes its advertising allocation decision with little, if any, substantive information on the value of that investment to the market value of the firm.

The objective of this paper is to present a methodology for determining the market value of advertising and provide a preliminary estimate of the marginal return to such expenditure for a sample of firms. This research expands on the work of Chaney, Devinney and Winer (1991), Jacobson (1990), Erickson and Jacobson (1991), and Horsky and Swyngedouw (1987). It further develops a marketing research stream aimed at more effectively linking the impact of strategic management decisions with the value of the stockholders' claims as represented by the market value of a firm's equity.

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### 1. Model formulation

Two models are used here. Both models use the generic "response coefficients" methodology developed and widely used in finance and accounting. The logic of this methodology is based on the efficient markets hypothesis. Stated simply, we would expect unanticipated movements in stock returns to be correlated with the unanticipated movements in key structural variables affecting a firm's current and future cash flows. Although the finance and accounting research has focused on measuring the impact of unanticipated changes in income and cash-flow (see, e.g., Bowen, Burgstahler and Daley (1986), Collins and Kothari (1989), or Easton and Zmijewski (1989)), it is logical to suspect that the impact of such changes on the unanticipated returns to stockholders can be further decomposed to discern the sources generating the unanticipated income and cash-flow changes more exactly. For example, unanticipated income changes must be caused by unanticipated changes in either price, quantity, or cost. Decomposing the effect of the determinants of the changes of these components of income should significantly reduce the measured impact of unanticipated income.

For our purposes, we focus on four variables, income, advertising expenditures, research and development expenditures, and new product announcements. We use two model formulations, a single-equation model and a simultaneous equations model. Our base single-equation returns model is

$$UR_{it} = \beta_0 + \beta_1 UInc_{it} + \beta_2 UAdv_{it} + \beta_3 UR\&D_{it} + \beta_4 UNPr_{it} + \epsilon_{it} \quad (1)$$

where,  $Inc_{it}$  = (Income - Adv - R&D)/Assets for firm  $i$  in year  $t$

$$Adv_{it} = \frac{\text{(Advertising expenditure)}}{\text{Sales for firm } i \text{ in year } t}$$

$$R\&D_{it} = \frac{\text{(Research and development expenditure)}}{\text{Sales for firm } i \text{ in year } t}$$

$$NPr_{it} = \frac{\text{(Number of new products announced in year)}}{\text{Assets for firm } i \text{ in year } t^1}$$

$$U^{\dots} = \text{Indicates an unanticipated value,}$$

$$UX_{it} = X_{it} - E\{X_{it}\} \text{ for firm } i \text{ in year } t$$

$$UR_{it} = t - \text{determined by accumulating daily returns throughout the year and determined as:}$$

$$UR_{it} = R_{it} - E\{R_{it}\}$$

$$E\{R_{it}\} = \alpha_i + \beta_i R_{Mt}$$

$$R_{Mt} = \text{Market return in year } t \quad (2a)$$

Our simultaneous equations formulation specifies that income, new products and advertising are endogenous and research and development is exogenous. The model is

$$\mathbf{UR}_{it} = \beta_0 + \beta_1 \mathbf{UInc}_{it} + \beta_2 \mathbf{UAdv}_{it} + \beta_3 \mathbf{UR\&D}_{it} + \beta_4 \mathbf{UNPr}_{it} + \varepsilon_{it} \quad (3a)$$

$$\mathbf{Inc}_{it} = \Omega_0 + \Omega_1 \mathbf{Adv}_{it} + \Omega_2 \mathbf{NPr}_{it} + \Omega_3 \mathbf{R\&D}_{it} + \delta_{it} \quad (3b)$$

$$\mathbf{Adv}_{it} = \tau_0 + \tau_1 \mathbf{NPr}_{it} + \tau_2 \mathbf{NPr}_{it-1} + \mu_{it} \quad (3c)$$

$$\mathbf{NPr}_{it} = \Phi_0 + \Phi_1 \mathbf{R\&D}_{it} + \Phi_2 \mathbf{R\&D}_{it-1} + \phi_{it} \quad (3d)$$

Equations 3d and 3c imply that new products are a function of current and past R&D and advertising is a function of current and past new products. Equation 3b accounts for the fact that income is itself driven by strategic decisions in advertising, R&D, and product development. More complicated formulations were ruled out for both logical and statistical reasons. Logically, there is no reason to posit a relationship between advertising as a determinant of either R&D or new products, nor a reason to suppose that R&D determines advertising. Also, because we are concerned only with capturing the contemporaneous influence associated with these three variables, it is not necessary to formulate equations 3b–3d as fully explanatory models. Lagged values of advertising and new products are not included in equations 3c and 3d since the expected values of the strategic variables include lagged values.<sup>2</sup>

According to this formulation, base levels of income, advertising, and new products exist,  $\Omega_0$ ,  $\Phi_0$  and  $\tau_0$  respectively, but only R&D is exogenous. Equations 1 and 3a specify that unanticipated movements in market-adjusted stock returns are correlated with unanticipated movements in income, advertising, R&D, and new products. A great deal of evidence exists supporting the claim that  $\beta_1 > 0$ , although only in a single-equation context. Therefore, our concern will be exclusively with evaluating the coefficients of the strategic variables ( $\beta_2$ ,  $\beta_3$ , and  $\beta_4$ ). These coefficients should allow us to measure the marginal profit generating capacity of these unanticipated strategic components of a firm's operation.

In developing expectations for advertising, R&D, and income we use an adaptive/rational (A/R) expectations model that says that  $E\{X_{it}\} = w_i + y_i X_{it-1} + z_i X_{it-2} + \dots$ . In estimating this model, we find that almost all the variance is explained by the first lagged variable, that the second is significant, but that longer lags are unimportant. Therefore, two lagged values are used in the expectations formulation. Because new products is a discrete variable (the numerator is a count of new product announcements), a simple naive expectations formulation was used:  $E\{NP_{it}\} = NP_{it-1}$ .<sup>3</sup>

## 2. Data

The data for this analysis comes from three sources, COMPUSTAT, CRSP, and the *Wall Street Journal*. Firm accounting data comes from COMPUSTAT and is