The Effect of Financial Press Advertising on Stock Prices

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Introduction

In 1974, U.S. firms spent approximately $6.5 billion for corporate communications: annual reports, analyst meetings, corporate advertising in media, publicity, etc. Of this total, about $800 million was spent on media advertising, much of it in the financial press such as *Fortune, The Wall Street Journal,* etc. [18]. Both from the choice of media and from message content, it is clear that the investment community is the target audience for a high proportion of financial press advertising. Discussions with corporate advertising officers and media representatives suggest that a primary objective of such advertising is to influence security prices. The SEC clearly recognizes the possibility, for it constrains such advertising efforts when a firm is in registration. However, a fundamental question remains largely unstudied and certainly unanswered. Can financial press advertising exert a systematic and measurable effect on investor decisions?

The purpose of the research reported here is to determine whether financial press advertising has any significant effect on equity values, once the traditional explanatory measures of risk, return and growth have been taken into account. Further, it seeks to explore the conditions under which such advertising might be effective. The answer to the above question bears directly on information issues such as the sources and cost of information used by investors. It is also of practical consequence since the existence of the financial press, on which investors rely, depends upon a continuous supply of advertising revenues [19, 25, 27].

Publishers of magazines reaching investors and the business community have conducted surveys to explore the impact of financial press advertising on the

stock market. *Barron's* surveyed institutional money managers about the impact of corporate advertising [2]. Of 218 respondents, 82% replied "Yes" to the question: "Has so called 'corporate image' or 'institutional' advertising ever served to call your attention to or led you to look into a company as an investment potential?" Of these 179 respondents, 79% claimed that "such an investigation led to the purchase of securities." Moreover, 87% of the institutional investors surveyed answered "Yes" to the question: "In your opinion, does such 'corporate image' advertising favorably affect the company's security values?" Surveys such as the one carried out by *Barron's* suggest that such advertising *could* conceivably influence investors' decisions and thus security values. To our knowledge, however, financial press advertising has never been explicitly treated in an empirical analysis of equity prices.

Theoretical Justification for the Inclusion of Advertising

The basic stock price valuation models used in this study are similar to equations used by other researchers and include measures of earnings, expected earnings growth, and risk. The only substantive difference is that we introduce financial press advertising expenditures as an additional explanatory variable.

There are strong *a priori* reasons to believe that financial press advertising could have an impact on stock prices. The financial press carries to millions of investors advertising messages that are controlled by management and are presumably "biased." Much effort is spent developing creative strategies and executions. The persuasive effects of communication are well recognized and the arguments for the attention-getting effects of advertising are well documented in the literature on product markets [12, 13, 17, 20]. Moreover, the buying process is a general one and the purchase of products and securities is similar in many ways [12]. There is little reason to believe that an individual who is responsive to advertising messages in a product context could not be influenced by advertising messages in a financial context.

The research presented here does not attempt to explain the precise mechanism by which financial press advertising might affect investors' buy and sell decisions, and thus security prices. It seems to us, however, that there are four possible ways in which financial press advertising could theoretically affect investor decisions. First, if advertising has no direct impact on investors, it represents a withdrawal from earnings and consequently, advertisers may have depressed earnings *vis-à-vis* nonadvertisers. In that case, financial press advertising could be expected to have a negative relationship with share price. Second, advertising may change information search costs and/or search behavior. Third, advertising may change investor preference orderings or "tastes." Fourth, advertising may be a source of new information.

Advertising is a general component of the information contained in the financial press. To an investor-reader, its marginal cost may be close to zero which compares favorably to the cost of many other information sources. In particular, advertising may reduce the cost of passive search while its catalytic role may cause agenda shifts and stimulate extensive search [1, 15].

Also, an investor's preferences for holding a given stock, or even the criteria used in his decision-making might be modified by financial press advertising. Such a notion is at odds with standard financial theory, particularly the mean-variance model, or for that matter any paradigm that takes preference orderings as given. However, this possibility has been widely studied and a major view within the field of marketing is that consumer preferences are stochastic [4].

Advertising may also contain information that was previously unavailable or poorly disseminated among investors. There is an extensive body of research suggesting that buyers selectively expose themselves to different information sources [24]. Information source preferences are due, in part, to different costs of using various sources and differences in the quality of information available. The point, of course, is not that information is costly. This is undisputable. What matters is that information is not equally distributed to all investors and that some investors could, quite rationally, use advertising as a source of information. Stigler's seminal work, "The Economics of Information," and a considerable literature that has followed adopt this view of advertising as an information source [23, 26]. Unfortunately, this important body of economic theory has had little impact on the finance literature, which typically assumes that all relevant information is universally available without cost. Alternatively, it is assumed that search costs and other imperfections can be ignored without doing damage to the analysis [10, p. 277, pp. 335–346].

In summary, we feel that there is sufficient theoretical justification for the position that advertising

could influence the decisions of investors, just as it may influence buying behavior in product markets. The analysis next turns to empirical testing.

Sample Design and Data Base

All firms on the *Compustat* tapes with sales over $200 million in 1972 or 1973 were chosen for inclusion in the study. A total sample of 721 firms resulted, although missing data caused this number to be reduced somewhat for most of the analyses. By limiting the sample to large firms, it was felt that advertising data gathering would be made easier. However, it was not necessary that a firm be an advertiser to be included. In fact, most sample firms did no financial press advertising during the period studied. Of 721 firms, 269 firms advertised in the media vehicles studied during 1971, accounting for $26,001,783 in financial press revenues. In 1972, 262 of the sample firms advertised for a total of $22,215,645, and in 1973, 292 sample firms accounted for $26,515,454 in such spending.

Annual advertising data were collected on the number of insertions, national page equivalents, and dollar expenditures for each firm's non-divisional advertising by year for 1971, 1972 and 1973 for each of the eleven publications shown in Exhibit 2. The advertising data were obtained from *The Rome Reports* and *Leading National Advertisers*, media auditing services. In a few cases, information was collected from back issues of the magazines.

Media rates were obtained from Standard Rate and Data Service. Black and white one-time rates for one page were multiplied by the national page equivalents to derive the expenditure for each advertiser in media not audited by *The Rome Reports*. Total spending for each firm for each year was the sum of the expenditures thus derived for the individual publications.

The years 1971, 1972 and 1973 were selected for two reasons: first, to keep the results reasonably current; and second, to include different stock market conditions. In broad terms, 1971 represented a volatile year during which the stock market indices were first up and then down, ending the year somewhat higher than they began. 1972 was a period of almost consistent stock market gains, and 1973 was a true bear market.

The gathering of the advertising data ignored creative content and thus, there is some product advertising in the data. For example, IBM and Xerox ran campaigns in the financial press on specific computer and copier products because these publications reached product prospects. It might be theoretically desirable to exclude such ads since the objective is to measure the *direct* effect, if any, of advertising on share prices. It could be argued that the inclusion of some product advertising biases the results because such advertising can be expected to stimulate sales and earnings, which may increase share prices. However, this problem is mitigated by two facts. First, product advertising may influence investors as well as potential product buyers [2]. Second, earnings enter the model as an independent explanatory variable, providing explicit control for this possibility.

The Basic Model Without Advertising

Many previous empirical studies of stock prices have used price to earnings, earnings to price, or a similar ratio as the dependent variable. One frequently cited reason is to transform the dependent term into a measure of the rate of return on equity. Another reason is to scale the data, allowing comparisons across firms of different size. However, when price to earnings is used as the dependent variable, and earnings does not enter on the right side of the equation, it is implicitly assumed that price is a linear function of earnings with zero intercept. Moreover, it is assumed that the elasticity of price with respect to earnings is constant and equal to one. Both these assumptions *may* be correct, but they are unnecessary for purposes of empirical testing and restrict the generality of the model.[1] More importantly, price per share of common stock is a pure market measure while price to earnings is not. Stock prices are determined in the marketplace as a function of a number of variables, including earnings. Earnings per share may be correlated with some of the other explanatory variables, and when it is used to deflate price, spurious correlations may result. Based on these arguments, price per share

[1]That is, define P' = price per share, E = earnings per share and M = the price-earnings multiple, which is a function of expected growth, risk and perhaps advertising. Then $P'/E = M$, $\partial P'/\partial E = M$, and $\partial^2 P'/\partial E^2 = 0$, and $(\partial P'/\partial E)^* (E/P') = 1$.

The assumption of unitary elasticity may be valid theoretically. However, it is questionable for empirical testing where current earnings are measured imperfectly and may contain transitory elements that are discounted by the investment community. In recognition of this problem, many researchers have computed a smoothed or "normalized" version of earnings to use in the denominator of P'/E. Experiments with dependent variables of this type demonstrated considerable sensitivity to the number of past periods included, and to a lesser extent, to the smoothing process itself. Since there is no obvious basis for choosing one version of smoothed earnings as superior on *a priori* grounds, this problem may detract from the credibility of results.

is used as a dependent variable in this investigation.

One possible problem in using price per share as the dependent term is that unscaled (dollar) magnitudes enter on both sides of the regression equation, which may result in heteroskedastic errors. This was found to be the case when the equations were estimated in linear form, and a correction for heteroskedasticity was made using the method of weighted least squares. However, a log-linear specification seems to give better results in all three years, both in terms of overall explanatory power and in terms of the significance of individual independent variables. Significant heteroskedasticity is not present in the log form, making the application of weighted squares unnecessary. Of course, heteroskedasticity is a matter of degree. To the extent that it is present in the log equations, the variance of the error term tends to be negatively associated with variance in the explanatory variables. This means that calculated confidence intervals and acceptance regions are wider than the correct ones. In other words, the coefficient estimates may have *greater* precision than is indicated [14, pp. 254–256] and [28, pp. 244–246].

The logarithmic transformation has been used in a number of previous studies of stock prices and should require no further justification. All results presented here are from log-linear regressions. It is worth noting, however, that the results of tests with advertising are not unique to this choice of structural form. For example, advertising elasticities and significance tests are quite similar in simple linear regressions.

For purposes of comparison, the basic regression model without advertising is presented in Exhibit 1, row A. All variables are defined in Exhibit 2. Many of the explanatory terms have been used frequently by other researchers, and the results in Exhibit 1 are generally consistent with the literature [5, 6, 7, 8, 9, 11, 21]. Therefore, discussion of this form of the model will be brief.

The coefficient of the leverage ratio, LEV, is negative in all three periods, and significant at a high confidence level. This variable is believed to measure financial risk so that the sign of its coefficient is consistent with expectations. Firm size, AST, is another risk measure. Its positive coefficient, highly significant in all three years, is consistent with the literature. It is widely held that large firms can diversify more easily than small ones, and that such diversification may be effective at reducing risk of bankruptcy.

Return on sales, defined as net operating income to net sales, is included as a measure of operating efficiency. This may also be interpreted as a risk variable in the sense that high profit margin firms have earnings which are likely to be consistently positive. The sign of ROS is positive and significant in all three years as expected.

EPS, earnings per share, demonstrates a positive and significant effect in all periods. If earnings per share is replaced by dividends per share, results are not greatly affected except that the standard error of the estimate increases slightly.

ED and DD are (0, 1) dummy variables measuring the consistency of growth in earnings and dividends per share. ED is set equal to 0 unless earnings per share have been increasing or at least constant during each of the last five years. DD is similarly defined for dividends per share. Coefficients of both variables are always positive and highly significant in all three years. The dividend dummy variable is included to reflect the widely held belief that investors like stable and predictable dividends, and in particular, do not like to see dividend payments reduced. Lintner has presented important evidence for this phenomenon and it is in the same spirit that the earnings dummy, ED, is included [16]. Some regressions were estimated using more conventional measures of earnings growth, such as the geometric average of historical growth in earnings per share. Another growth measure tested was the slope coefficient obtained by regressing earnings against a non-linear time trend. Both these variables are usually significant but the dummy variable, ED, is almost always able to explain a higher percentage of variance in the dependent variable. Regardless of the growth measure used, advertising results are similar.

Introducing Financial Press Advertising

The (B) equations in Exhibit 1 are the same as the (A) equations, except that they include financial press advertising as an additional explanatory variable. The advertising variable AD is defined as the log of total ad expenditures during the previous twelve months in the publications audited for this study. It has a positive and highly significant coefficient in 1971 and 1972, but not in 1973. The addition of advertising has little effect on the other regression coefficients and t-values. A more refined measure of advertising exposure was also tested to take account of audience sizes, number of advertising insertions, and ad sizes. However, there is little gain in doing so since the more refined measure has a simple correlation of .9 or higher with total advertising expenditure. Therefore, the simpler dollar measure is preferred.

Exhibit 1. Regression Results. Stock Price (Variable P) as a Function of Earnings Per Share, Risk, Growth and Advertising Variables*

	Explanatory Variables										Statistics			
	AST	DD	ED	EPS	LEV	ROS	AD	D72	D73	Constant	R_i^2	R_p^2	Degrees of freedom	f
	.0618	.1167	.2279	.3968	−.1093	.1319				2.997				
1971A	(4.308)	(3.472)	(6.275)	(17.810)	(6.356)	(5.012)					.543	—	678	134.
	.0403	.1198	.2336	.3957	−.1084	.1257	.0159			3.038				
1971B	(2.729)	(3.624)	(6.532)	(18.051)	(6.407)	(4.848)	(4.836)				.558	.498	677	122.
	.0779	.1318	.4052	.4724	−.1855	.1600				2.848				
1972A	(4.956)	(3.832)	(10.203)	(18.271)	(8.889)	(5.926)					.620	—	686	186.
	.0622	.1370	.4030	.4642	−.1899	.1569	.0106			2.894				
1972B	(3.763)	(4.000)	(10.199)	(17.944)	(9.127)	(5.836)	(2.921)				.624	.554	685	163.
	.1305	.0958	.4339	.5446	−.2879	.1994				2.096				
1973A	(6.588)	(2.406)	(8.976)	(18.244)	(10.975)	(5.903)					.647	—	677	207.
	.1327	.0949	.4338	.5446	−.2873	.1999	−.0014			2.090				
1973B	(6.334)	(2.377)	(8.968)	(18.233)	(10.919)	(5.908)	(.322)				.647	.509	676	177.
	.0778	.1182	.3553	.4700	−.1861	.1675	.0079	−.0570	−.5608	2.908				
Pooled	(7.520)	(5.519)	(14.444)	(30.605)	(14.814)	(9.693)	(3.550)	(2.443)	(23.288)		.620	—	2052	372.

*t values in parentheses.

Exhibit 2. Definition of Variables and Statistics

AD = The natural logarithm of total advertising expenditures during the previous twelve months in the following publications: *Banking, Banker's Monthly, Business Week, Dun's Review, Financial World, Fortune, Forbes, Harvard Business Review, Institutional Investor, Nation's Business, The Wall Street Journal.**

AST = The natural logarithm of total assets.

DD = A (O, 1) dummy variable which takes on the value one if dividends per share were not reduced during the past five years, zero otherwise.

D72 = A dummy variable for year. Equal to one in 1972, zero otherwise.

D73 = A dummy variable for year. Equal to one in 1973, zero otherwise.

ED = A (O, 1) dummy variable which takes on the value one if earnings per share did not decrease during the past five years, zero otherwise.

EPS = The natural logarithm of earnings per share of common stock, current year.

LEV = The natural logarithm of leverage, defined as (total assets — common equity)/ common equity.

P = The natural logarithm of price per share of common stock, end of year.

REBOUND = A (O, 1) dummy variable which takes on the value one if, during the previous five year period, EPS declined and then returned to a level equal to or greater than its previous level, zero otherwise.

ROS = The natural log of the ratio of current net operating income to net sales.

RS = The coefficient of determination which is obtained by regressing earnings per share on a six year time trend. RS varies between zero and one with high values associated with stable (historical) rates of growth in earnings per share.

SALES = The natural log of net sales for the current year.

SLP = The slope coefficient obtained by regressing earnings per share on a six year historical time trend.

R_i^2, R_p^2 = Two R-squared statistics reported for each equation. R_i^2 is the coefficient of determination calculated directly from the log regression. As such, it tells what proportion of variation in the *transformed* dependent variable can be attributed to variations in the *transformed* explanatory variables. It is best interpreted as a measure of goodness of fit. R_p^2 is a measure of the ability of the log equation to explain variations in the *untransformed* dependent variable, *i.e.* price per share. It is defined as:

$$1 - \left[\sum_{i=1}^{n} (P_i' - \hat{P}_i')^2 \Big/ \sum_{i=1}^{n} (P_i' - \bar{P}')^2 \right],$$

where P_i' = price per share, $\bar{P}'$ = the mean value of price per share, and $\hat{P}_i'$ = predicted price per share from the log equation.

*As explained, the advertising variable frequently takes on the value zero. So that natural logs could be taken, these observations were shifted and set equal to e or 2.718. This transform produces minimal distortion because firms that *do* advertise spend thousands of dollars. Thus there are no non-zero observations on advertising close to 2.718. All are much larger.

Two of the explanatory variables could take on zero or negative values: earnings per share and the rate of return on sales. When this occurred these observations were removed from the sample so that logarithms could be taken. This resulted in the removal of 32 firms in 1971, 21 in 1972 and 15 in 1973.

Exhibit 1 also contains an equation fit on the pooled data for all three years. As expected the regression coefficients are consistent with the (A) and (B) equations, and advertising demonstrates a positive and highly significant relationship with price. D72 and D73 are dummy variables included to represent different market conditions during the three years. The negative and highly significant coefficient of D73 reflects the bear market of 1973.

The regressions indicate that financial press advertising had no significant effect on stock price in the down market year 1973. We are not sure why this is so, but the result held true for different subsets of the sample and for different structural forms of the regression model. It may be that investors are more susceptible to advertising's influence during bull markets. However, with only three years of data, this conclusion is highly speculative.

The log-linear regressions presented in Exhibit 1 assume a constant elasticity of stock price with respect to advertising, but a derivative of stock price with respect to advertising that depends on all the variables in the equation.

$$\partial P'/\partial AD' = P' * \beta/AD', \qquad (1)$$

where β is the coefficient of advertising from the regression, and a prime indicates that a variable is not in logs. (That is, $P' = e^{P}$, $AD' = e^{AD}$.) Since P' is a function of all the explanatory variables, the same must be true for $\partial P'/\partial AD'$. This structural form could represent increasing, decreasing or constant returns to advertising as:

$\beta > 1$ indicates increasing returns,
$\beta < 1$ indicates decreasing returns,
$\beta = 1$ indicates constant returns.

Since most marketing theory suggests decreasing returns to advertising after some point, it is reassuring to find that when the advertising coefficient is significantly different than zero, it is always significantly less than one.[2]

[2]If $\beta > 0$, $\partial P'/\partial AD' \geq 0$ from equation (1).

$$\partial^2 P'/\partial AD'^2 = \left[\frac{\left(\frac{\partial P'}{\partial AD'}\right)}{AD'} - \frac{P'}{AD'^2}\right]\beta = \frac{P'}{AD'^2} * \Delta(\beta - 1),$$

and thus the sign of the second derivative depends on $(\beta - 1)$.

Omitted Variables

One possible explanation for the significant relationship between AD and stock price is that advertising may be serving as a substitute or surrogate measure for some other variable which is a significant determinant of equity values. The inclusion of AST, DD, ED, EPS, LEV and ROS in the same equation with AD obviates the possibility that advertising is a surrogate for one of these variables. In other words, AD cannot be a better measure of earnings per share than EPS itself. Moreover, as shown by the product moment correlation coefficients in Exhibit 3, AD is not highly correlated with any of these variables.

Exhibit 3 also gives correlation coefficients for some additional variables that are not included in the regressions in Exhibit 1, and which might be represented by advertising in the surrogate sense. None of the variables is strongly correlated with AD. Indeed, an analysis of many financial variables on *Compustat* suggested that AD is not highly correlated with anything save leading or lagging values of itself. Otherwise, the strongest correlations seem to be with measures of scale such as AST and SALES as might be expected [3, 22]. If SALES is included in the three equations, the coefficients for advertising are .0161, .0103, and −.0020 for 1971, 1972 and 1973 respectively, with t-statistics of 4.905, 2.844 and .481. These estimates are slightly different than those presented in Exhibit 1. Exhibit 4 gives results from equations that include SLP, REBOUND and RS; and again, the coefficients and t-values for AD are not greatly affected.

These tests are necessarily inconclusive, for there are virtually an infinite number of variables that *could* be correlated with AD and, at the same time, significant determinants of stock price. However, it seems unlikely that advertising's significant effect can be explained in this manner. AD is not operating as a surrogate for conventional measures of earnings, expected return, and risk, which are widely believed to be the primary determinants of equity prices.

Interaction Effects With Advertising

If advertising really has a significant effect on stock prices, it seems likely that the effect would not operate equally for all firms. That is, companies which can point out good performance might receive greater benefits from stimulating investor interest. To test the existence of this "good story effect," interactions between advertising and measures of historical perfor-

Exhibit 3. Product Moment Correlation Coefficients

	Correlation of Advertising (AD) With:										
	AST	DD	ED	EPS	LEV	P	REBOUND	ROS	RS	SALES	SLP
1971	.361	−.016	−.031	.105	.016	.241	−.016	.187	−.032	.278	−.055
1972	.426	−.024	.006	.200	.099	.234	.021	.214	.005	.357	.082
1973	.406	−.047	−.007	.135	.117	.123	.095	.194	−.036	.348	.072

mance were tested. In the log-linear model, such interaction effects may be taken into account by allowing for an advertising elasticity which is variable, and which is a function of historical performance measures.

Writing the regression model in its full form:

$$P' = e^{(\alpha_1 + \alpha_2 DD + \alpha_3 ED)}\ ROS'^{\alpha_4}\ EPS'^{\alpha_5}\ AST'^{\alpha_6}\ LEV'^{\alpha_7}\ AD'^{\beta}, \quad (2)$$

where the α_i are coefficients of non-advertising variables. The first term, e to a power, represents the effect of the constant plus the dummy variables which are not transformed into logs. To estimate an interactive model in which the advertising elasticity of stock price depends on some performance measure, PER, equation (2) may be rewritten:

$$P' = e^{(\alpha_1 + \alpha_2 DD + \alpha_3 ED)}\ ROS'^{\alpha_4}\ EPS'^{\alpha_5}\ AST'^{\alpha_6}\ LEV'^{\alpha_7}\ (AD)'^{(\beta_1 + \beta_2 PER)}, \quad (3)$$

where β_1 and β_2 are parameters. Recalling that $P = \log_e P'$, $AD = \log_e AD'$, etc., equation (3) may be written in linear form for classical least squares estimation.

Exhibit 4. Tests of Interaction with Advertising

Variable Name	Regression Coefficients and t-Values (in parentheses)[1]								
	1971			1972			1973		
	Variable	AD	Interaction[2]	Variable	AD	Interaction[2]	Variable	AD	Interaction[2]
A. DD	.189 (4.079)*	.023 (3.754)*	−.009 (1.289)	.208 (4.149)*	.013 (1.958)*	−.002 (.217)	.141 (2.339)*	−.005 (.767)	.005 (.579)
B. ED	.208 (4.217)*	.015 (3.991)*	.008 (1.008)	.367 (6.624)*	.007 (1.844)*	.014 (1.595)	.453 (6.580)*	−.004 (.740)	.003 (.350)
C. SLP[3]	−.005 (.050)	.016 (4.542)*	—	.147 (2.780)*	.011 (2.640)*	—	.153 (3.448)*	−.003 (.721)	—
D. SLP	−.008 (.065)	.015 (.729)	.001 (.041)	.208 (3.165)*	.019 (2.843)*	−.007 (1.561)	.277 (4.668)*	.013 (1.893)*	−.012 (3.121)*
E. REBOUND[3]	−.003 (.106)	.016 (4.537)*	—	.035 (.996)	.011 (2.655)*	—	−.068 (1.424)	−.004 (.767)	—
F. REBOUND	.017 (.407)	.018 (3.993)*	−.005 (.741)	.037 (.762)	.011 (1.898)*	−.000 (.038)	−.073 (1.136)	−.004 (.512)	.001 (.111)
G. RS[3]	.081 (4.918)*	.016 (4.839)*	—	.045 (4.389)*	.010 (2.600)*	—	.046 (3.278)*	−.003 (.600)	—
H. RS	.043 (2.056)*	−.000 (.068)	.036 (3.084)*	.023 (1.941)*	−.010 (1.416)	.043 (3.505)*	.027 (1.473)	−.013 (1.560)	.023 (1.471)

[1]In addition to the variables shown here, each regression included AST, EPS, LEV, and ROS. Other coefficients and t-values are similar to those reported in Exhibit 1. An asterisk indicates that a coefficient is significant at the 90% confidence level or higher.

[2]The interaction between advertising and the variable shown in column #1, that is, β_2 in equation (5) in the text. Due to the way they are calculated, the interaction variables tend to be correlated with the main effects. For the entire three year period, the overall average simple correlation between AD and the five interaction variables is .654. The overall average simple correlation between the performance terms and their respective interaction measures is .477.

[3]SLP, REBOUND and RS are not included in the results presented in Exhibit 1. Therefore, Exhibit 4 shows test results for these variables with and without an interaction term for purposes of comparison.

$$P = \alpha_1 + \alpha_2 DD + \alpha_3 ED + \alpha_4 ROS + \alpha_5 EPS + \alpha_6 AST + \alpha_7 LEV + \beta_1 AD + \beta_2 AD * PER. \quad (4)$$

In equations (3) and (4) the elasticity of price with respect to advertising is defined as

$$\partial P/\partial AD = (\partial P'/\partial AD')(AD'/P') = \beta_1 + \beta_2 PER, \quad (5)$$

and the size of the interaction effect is measured by β_2.

This form of the basic equation was estimated for all three years, using five different possible performance measures: DD, ED, REBOUND, RS and SLP. Results are summarized in Exhibit 4. Each of these variables, excepting REBOUND, has been discussed previously. REBOUND is designed to capture a recent turnaround in the firm's earnings performance. All these variables are related to earnings or dividends, and thus can change substantially within a one year period. However, choice of these five particular measures is admittedly arbitrary.

In all interaction tests, the main effects, *e.g.*, advertising and the historical performance measure, are included as separate explanatory variables. Although they are not shown in Exhibit 4, all equations also include AST, EPS, LEV and ROS as explanatory terms. Coefficients and significance tests for these variables are quite similar to those presented in Exhibit 1.

As explained, the interaction variable is the product of AD and a performance measure. This definition virtually guarantees that the regression estimates will be troubled by multicollinearity due to the correlation, frequently high, among the three variables. In some equations, especially rows (D) and (H) in Exhibit 4, the coefficient and significance of AD are drastically altered by introduction of the interaction term. This result is not surprising; in fact, it can be directly attributed to the high correlation between these two variables.

Multicollinearity is harmful in that it reduces the precision of the estimates of regression coefficients. However, these estimates still have all the desirable properties, assuming that the other assumptions of the classical normal regression model are met. The t-test on the coefficient of the interaction term indicates its statistical significance, *after* the effects of all other variables are taken into account. Therefore, it is the appropriate test statistic for the existence of an interaction effect [14, pp. 370–371].

In Exhibit 4, the interaction variables for DD and REBOUND are never statistically significant. In fact, RS is the only variable that seems to interact consistently and significantly with advertising. In row (H) the interaction term is statistically significant at the 99% confidence level in 1971 and 1972, and approximately at the 86% level in 1973.

ED is related to RS in the sense that it is also a measure of earnings growth stability. The interaction effect between ED and AD is never significant at the 90% confidence level, but it follows the same pattern as RS. It is always positive, most significant in 1972, and least significant in 1973. In two of the three years, it has a t-value greater than unity.

The interaction with SLP is negative and highly significant in 1973, negative and significant at the 88% confidence level in 1972. In both these years, the main effect AD is positive and significant at the 90% level. In 1971, however, neither AD nor the interaction term is statistically significant. These results seem counterintuitive — suggesting a *negative* interaction between advertising and historical earnings growth. We offer no simple explanation for this finding, except possibly that during 1972–1973, investors were unfavorably impressed with firms that touted high earnings performance. This interpretation is not inconsistent with the finding that RS, a measure of earnings stability, interacts positively with advertising.

Overall, these results must be considered tentative. Multicollinearity is a nagging problem and the five performance measures were arbitrarily chosen from a practically infinite set of possible candidates. However, our findings suggest that the effectiveness of advertising, as measured by the advertising elasticity of stock price, may systematically depend on financial variables. This could be due to the fact that some measures of financial performance constitute a "good story" which is not automatically known to all investors. For example, it may be the case that a subset of investors, who use financial press advertising as a source of information, have systematic preferences with regard to these measures.

Summary

The coefficient of financial press advertising is found to be significantly greater than zero at the 99% confidence level in the up market years 1971 and 1972. Advertising's influence, however, may depend upon the overall condition of the stock market, for in the bear market of 1973 no significant relationship is revealed. Tests using pooled data for the 1971–1973 period indicate a positive relationship, significant at the 99% confidence level. Whenever the elasticity coef-

ficient of advertising is significantly different than zero, it is positive and significantly less than one, indicating a favorable effect on stock prices and diminishing returns.

Management Implications

Overall, our findings strongly suggest that financial press advertising can exert a favorable influence on common stock prices, at least during some time periods. This conclusion should be reassuring to the many corporations that are already engaged in this type of advertising, with the objective of reaching investors. At the same time, however, many firms that might benefit from financial press advertising apparently are not doing it. Among our sample firms, for example, 320 out of 721 did no advertising in the audited media vehicles during the 1971–1973 period. This probably reflects the fact that many financial managers have been opposed to corporate advertising on the grounds that it is a pure expense with, at best, ephemeral and unmeasurable benefits.

Hopefully, we have provided persuasive evidence that rational assessment of corporate advertising as an investment alternative is possible. The results presented here were obtained from a large sample of firms and thus do not necessarily apply to any single corporation. However, comparable testing procedures could and should be applied at the industry or individual firm level. Specifically, firms that do not advertise currently should consider test programs to determine what role corporate advertising could play in their investor relations and financial planning. Firms that now run corporate advertising should evaluate its financial effect in light of overall stock market conditions. While our evidence is limited, there seems to be a tendency for more firms to engage in business press advertising during a down market, as if to advertise their way out of a bad situation. Our findings suggest that, on average, such a strategy is not effective.

There may be significant message effects for financial press advertising, in terms of the financial characteristics of the firm. One example is the historical stability of growth in earnings, which was found to interact positively with advertising expenditures. On the other hand, rate of earnings growth and dividend continuity, messages which are often featured in corporate advertising, never exhibited a significant positive interaction. These particular tests were beset with statistical problems and must be interpreted cautiously. Nevertheless, they suggest that the optimal corporate advertising strategy for any firm is likely to depend on its financial condition. Formal creative strategy research, if well designed and executed, might indicate the appropriate messages to be conveyed to the investing public.

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