Advertising, Investor Recognition, and Stock Returns

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Abstract

In this paper, we test the implications of Merton's (1987) investor recognition theory in a new context, namely, the effect of advertising on stock returns. We extend Merton's (1987) theory by assuming that advertising affects stock returns by attracting investor recognition to the firm's stock. The increased degree of investor recognition attracted by advertising leads to an increase in stock returns in the contemporaneous advertising year but a decrease in stock returns in the future (subsequent to the advertising year). Our empirical findings support these predictions. We find that a higher level of advertising growth is associated with higher contemporaneous stock returns and lower ex-post long run stock returns. The effect of advertising growth on future stock returns exists even after we control for other price predictors, such as size, book-to-market, and momentum, and product market considerations, such as sales and profitability, as well as sample selection concerns. To further investigate the effect of advertising on stock returns under the investor recognition theory, we derive five hypotheses and document consistent findings. First, advertising increases a firm's visibility among investors in the contemporaneous advertising year. Second, the effect of advertising growth on future stock returns is more pronounced if a firm's advertising helps the firm attract more investor recognition in the advertising year. Third, the effect of advertising growth on future stock returns is stronger if the stock experiences higher idiosyncratic volatility in the advertising year. Fourth, the effect of advertising growth on future stock returns is stronger for smaller firms, value firms, and firms with poorer ex-ante operating performance. Finally, we also find that the effect of advertising growth on future stock returns is stronger in the case when advertising increases compared to the case when advertising decreases.

1 Introduction

Recently, there has been considerable interest among financial economists on the implications of increased investor recognition of a firm's equity on its stock returns: see Merton's (1987) seminal theoretical analysis of this issue. In his model of capital market equilibrium under incomplete information, Merton assumes that investors consider only a subset of available securities in forming their optimal portfolios and that these subsets differ across investors. He refers to the number of investors who know about a security as the degree of "investor recognition" for the security and models the resulting capital market equilibrium. He shows that, in equilibrium, if relatively few investors know about a particular security, the only way for the market of the security to clear is for these investors to take large undiversified positions in the security. These investors would then require a higher expected return to compensate them for the increased risk associated with their large undiversified positions. There are two key predictions arising from Merton's model. First, a security's value is increasing in the degree of investor recognition of the security. Second, the equilibrium expected return on a security is decreasing in its degree of investor recognition.

In this paper, we test the implication of Merton's (1987) investor recognition theory in a new context, namely, the effect of advertising on stock returns. To develop testable hypotheses for our study of the effects of advertising on stock returns, we extend Merton's incomplete information framework by introducing an additional assumption. We assume that an increase in the level of a firm's advertising expenditures can help the firm to improve its visibility among investors, thereby increasing the degree of investor recognition for its equity. Now consider a setting where a firm increases the amount of advertising expenditures in year t. The increase in advertising expenditures would increase the number of investors who become aware of the firm's stock (in the sense of Merton (1987)), and thus attract more investors to hold the stock. In this setting, when a new equilibrium is reached, a larger number of investors will hold the firm's stock, with each investor holding a smaller undiversified position in the stock compared to the equilibrium in year $t-1$ (prior to the increase in the firm's advertising expenditures). At the new equilibrium, investors require only a smaller premium to compensate them for their (smaller) undiversified positions in the stock, thereby reducing the firm's cost of capital as well. Two key predictions emerge from the above extension. First, if a higher level of advertising can increase the number of investors who recognize the firm, this will lead to an immediate increase in the firm's market value, yielding a higher contemporaneous stock return in year t (i.e., the year the firm increases its advertising expenditures). Second, since a large number of investors recognizing the firm's equity will yield a lower equilibrium expected return on its equity, the long-run stock return on the firm's equity will be lower subsequent to year t. In short, the above setting predicts that a growth in advertising expenditures is associated with a short-run contemporaneous increase and a long-run ex-post decrease in stock returns.

There is some recent anecdotal evidence indicating that a firm's product market advertising may have important effects on its stock returns. For example, consider the following quote from a *Business Week* article ("What Price Reputation?" July 9, 2007) on the recent advertising campaign by United Technologies Corp. (UTC): "The color schematic of UTC's Sikorsky S-92 copter is embedded with messages aimed at Wall Street..... The underlying theme: UTC is a great investment because it is a leader in innovation and eco-friendly technologies that help the bottom line.....UTC thinks this (ad campaign) may have contributed to the 16% rise in UTC's stock, far outpacing the Standard & Poor's 500-stock index and rival General Electric Corp."[1] However, there has been no study so far in the literature that focuses on the effect of advertising on stock returns. The objective of this paper is to fill this gap in the literature by conducting the first study on the effect of advertising on the cross section of stock returns for all publicly listed firms.

[1] Also consider an early survey conducted by *Barron's* in 1970's which collected questionnaire answers from institutional investors about the impact of corporate advertising. For the question: "Has so called corporate image or institutional advertising ever served to call your attention ....," 82% of the respondents answered "Yes." For the question: "In your opinion, does such corporate image advertising favorably affect the company's security values," 87% answered "Yes."

To test our predictions on the relation between advertising and stock returns, we use advertising growth from the previous year to the current year. We work with advertising growth rather than the level of advertising to purge firm fixed effects. First, the effect of advertising on investor recognition varies among various firms. For example, a well-known firm with a low level of advertising could still enjoy a higher degree of investor recognition compared to a young firm with a high level of advertising expenditures. Second, the level of advertising is also effectively a permanent firm characteristic, with a yearly autocorrelation of 0.985. Thus, we focus on advertising growth in the paper to exclude the fixed effects that affecting a firm's advertising policy.

We study the relation between advertising growth and stock returns, using portfolio sorts, Fama-French's (1993) three factor model, Carhart's (1997) four-factor model, and the Fama-MacBeth's (1973) technique. We find that a higher level of advertising growth is associated with a larger contemporaneous stock return in the advertising year. Further, a larger growth in advertising is followed by a smaller stock return in the year subsequent to the advertising year. For example, the results from the Fama-MacBeth regressions show that a one-standard-deviation increase in advertising growth is followed by a decrease in stock return by 3.43% in the subsequent year. The effect of advertising growth on future long-run stock returns exists even after we control for the common return predictors, such as size, book-to-market, and momentum.

We further run various robustness tests on both the relation between advertising growth and contemporaneous stock returns and the relation between advertising and future long-run stock returns. We show that both relations are unlikely to be driven by product market considerations. It is possible that a firm advertises to introduce a new product or to heavily promote the existing products, both of which simultaneously increase stock prices. It is also possible that a firm's advertising budget may increase in a profitable year, which is accompanied by an increase in stock price. However, we show that the relations between advertising growth and stock returns exist even after we control for product market sales and profitability (both the levels as well as the changes of these variables). This finding rules out the possibility that the relations between advertising growth and stock returns are solely driven by product market considerations. We also show that the relation between advertising growth and future long-run stock returns is unlikely to be driven by the asset growth effect (Cooper, Gullen, and Schill, 2008) and other well-know effects such as the accounting accrual effect and the post-announcement earnings drift.

Finally, we show that our results on the relation between advertising growth and stock returns are unlikely to be driven by the selection of our advertising sample. Our advertising sample is only a subset of the universe of Compustat since many firms do not report advertising to Compustat. We run two robustness checks to address this sample selection concern. First, we select for each firm in our advertising sample (i.e., the reporting firm) a matching firm that is similar to the reporting firm but do not report advertising to the Compustat database (i.e., the non-reporting firm). We perform the matching based on industry, size, and book-to-market or on industry, sales, and profitability, the firm characteristics that we identify to be the key determinants on whether a firm reports advertising or not.[2] We then separate the non-reporting firms into two groups: the non-reporting firms matching the firms reporting high advertising growth and the non-reporting firms matching the firm reporting low advertising growth. We find that these two groups of non-reporting firms experience a similar pattern of contemporaneous stock returns and future long-run stock returns. Second, we also run Heckman's (1979) selection model and find results consistent with our predictions. These two robustness checks demonstrate that our findings regarding the relations between advertising growth and stock returns are robust to the selection of our advertising sample.

To further investigate the effect of advertising on stock returns under the investor recognition theory, we derive five additional testable predictions on how advertising affects ex-post stock returns

[2] We establish these determinants by running a probit regression of reporting versus non-reporting firms based on all Compustat firms. We find that small firms, growth firms, firms with smaller sales growth but higher profitability are less likely to report advertising to Compustat.

by affecting investor recognition.[3] First, if the effect of advertising on stock returns is indeed an investor recognition effect, an increase in a firm's advertising expenditures should attract greater investor recognition to the firm in the contemporaneous advertising year. Second, the negative effect of advertising on the future long-run stock returns will be stronger if advertising helps the stock attract more investor recognition in the contemporaneous advertising year. Third, as shown by Merton (1987), the expected return required by investors to compensate for their undiversified positions in equilibrium will be larger if the security's idiosyncratic risk is higher. Thus, our third hypothesis is that the negative effect of advertising on future stock returns will be stronger for firms with higher idiosyncratic risk. Fourth, it is possible that small firms, value firms, and poorly performing firms are more likely to be affected by advertising since it is harder for these types of firms to gain visibility in the equity markets without advertising. Thus, our fourth hypothesis is that the negative effect of advertising on future stock returns will be stronger for small firms, value firms, and firms with poorer *ex-ante* operating performance. Finally, it is possible that investor recognition is sticky in the sense that investors could be unlikely to lose recognition of a firm in a short time even with a decrease in advertising. If it is true, the effect of advertising on investor recognition and further future stock returns could be non-linear. Thus, our last hypothesis is that the effect of advertising on future stock returns is stronger in the case when advertising increases than in the case when advertising decreases. We discuss these hypotheses in more detail in Section 2.

To test these additional hypotheses, we use share trading turnover and the number of financial analysts covering the firm to proxy for the degree of investor recognition. As postulated by Merton (1987), investors trade in the stock market only in the stocks that they recognize. Financial ana-

[3] We will not test these hypotheses based on the relation between advertising and contemporaneous stock returns. While high advertising and high investor recogntion increase contemporaneous stock returns, contemporaneous stock returns could also have a feedback effect on investor recognition and the firm's capacity to advertise in the contemporaneous year (e.g., by affecting the firm's ability to fund advertising through equity issues). In consideration of the difficulty to disentangle these two effects, we choose to stay away from contemporaneous stock returns in our test on the investor recognition theory. We instead focus on ex-post stock returns since there exists a clear causality from advertising in the advertising year to ex-post stock returns subsequent to the advertising year.

lysts' coverage brings more visibility to the firm since investors follow closely analysts' forecasts or recommendations (see, e.g., Womack (1996) and Barber, et. al. (2001)). Thus, a higher share trading turnover or a larger number of financial analysts covering a firm's stock indicates an enhanced level of investor recognition associated with the stock.[4] Using these proxies, we find evidence supporting our hypotheses related to the investor recognition theory. First, we find that a higher level of advertising growth is associated with a higher level of share trading turnover and a higher level of analyst coverage of a firm's equity. Second, for a firm with a higher level of advertising growth, its stock return in the year subsequent to the advertising year decreases to a larger degree if the firm experiences a larger share trading turnover or attracts more analyst coverage in the contemporaneous advertising year. Third, we further find that the negative effect of advertising growth on future stock returns is stronger if the idiosyncratic volatility of the stock is higher. Fourth, we find that the negative effect of advertising growth on future stock returns is stronger for smaller firms, value firms, and firms that had poorer operating performance in the prior year. Finally, we also find that the negative effect of advertising growth on ex-post stock returns is stronger when advertising increases compared to the case when advertising decreases. All these findings support the investor recognition theory to explain the effect of advertising on future stock returns.

As discussed earlier, our paper is related to the large literature on investor recognition and investor attention.[5] Barber and Odean (2008) find evidence suggesting that investors purchase only stocks

[4] The number of analyst covering is a firm characteristic, with a yearly autocorrelation of 0.91. To purge the firm fixed effects determining the number of analysts, we use the change in the number of analysts from the previous year to the current year rather than the level of number of analysts in our study. To maintain consistency, we also use the change in trading turnover as another proxy for investor recognition. However, the results of our (unreported) analyses making use of the level of analyst coverage and the level of trading turnover as the proxies for investor recognition are broadly similar.

[5] While we focus here on the implications of Merton's (1987) investor recognition hypotheses, our study on the effect of advertising on stock returns can also be motivated using Barber and Odean's (2008) attention model. Barber and Odean argue that individual investors face a search problem when they buy stock since they have to choose from a large set of available alternatives. This search problem has little impact on selling, since individual investors only have to choose from a small set of their limited portfolio holdings when they are selling. As a result, an increased level of attention would increase the buy-sell imbalance and further increase stock prices. According to Barber and Odean (2008), attention-grabbing advertising could increase the contemporaneous stock price in the short run (because more attention increases the magnitude of buy orders relative to sell orders). As the attention attracted by advertising wears off over time, stock price may decrease, resulting in negative future stock returns.

that have caught their attention (see also Barber, Odean, and Zhu (2009)). Grinblatt and Keloharju (2001) show that investors prefer to invest in companies with which they are familiar.[6] Peng and Xiong (2006) study theoretically the effect of limited investor attention on asset-price dynamics.[7] Using a database of Swedish investors' equity holdings, Bodnaruk and Ostberg (2009) find cross-sectional support for the investor recognition hypothesis. Our paper contributes to this literature by using an extension of Merton's (1987) investor recognition theory to explain the effect of advertising on stock returns.

Our paper is also related to the literature on the role of advertising in the financial markets. Recently, Chemmanur and Yan (2009) have studied the effect of advertising in the IPO market. They suggest that the levels of advertising expenditures and IPO underpricing function as substitutes for IPO firms to signal their true value to uninformed investors in the equity market.[8] Grullon, Kanatas, and Weston (2004) have studied the impact of advertising on breadth of ownership and stock liquidity in the secondary market. They find that firms with a greater level of advertising have a significantly larger number of both individual and institutional investors investing in their equity, lower bid-ask spreads, smaller price impacts, and greater market depth. They interpret this as supporting the idea that advertising affects stock liquidity. They, however, do not study the relation between advertising and stock returns. Further, it is also not all clear how stock liquidity affects the cross section of stock returns. In the literature on liquidity and stock returns, some researchers view

[6] See also Huberman (2001), who find that investors prefer to invest in local companies and Frieder and Subrahmanyam (2005). Gervais, Kaniel, and Mingelgrin (2001) show that stocks experiencing a high trading volume tend to appreciate in the following month due to the increased visibility of the stock associated with high trading volume. Amihud, Mendelson, and Uno (1999) find that a reduction in the minimum trading unit of a stock increases the firm's shareholder base, and increases the stock price.

[7] In addition to the literature on the relation between investor attention and investor trading behavior, many studies further suggest that investor attention could affect firm behavior. For example, Iliev and Welch (2008) suggest that the limited attention of firm management could affect firm investment policy. Corwin and Coughenour (2008) show that the limited attention of NYSE specialists affects execution quality in securities that they are making a market for.

[8] Chemmanur and Yan (2007) further study the role of advertising around a firm's IPO, and show that a greater extent of advertising by the firm leads to a higher IPO valuation and a lower subsequent stock return. See also the subsequent study of Lou (2010), who demonstrate, similar to Chemmanur and Yan (2009), that there is a significant increase in firm advertising expenditures prior to seasoned equity offerings. Unlike Chemmanur and Yan (2009), who demonstrate this effect for IPOs and SEOs, Lou (2010) shows that there is such an increase in advertising expenditures prior to insiders sales as well.

liquidity as a characteristic that influences stock returns beyond trading costs: Investing in illiquid stocks is compensated by higher stock returns (see, e.g., Datar, Naik, and Radcliffe, 1998). Others view liquidity as a market-wide risk factor: stocks with higher sensitivity to innovations in aggregate liquidity have higher expected returns (see Pastor and Stambaugh, 2003). If the first view is true, it is not clear how improved liquidity driven by advertising can cause both the short-run increase and the long-run decrease in stock returns. If the second view is true, it would be an empirical question on whether or not the increase in liquidity driven by the firm-specific advertising is related to aggregate liquidity. In contrast, our extension of Merton's (1987) capital market equilibrium with incomplete information provides an unifying explanation for all our findings.

Finally, as discussed earlier, our paper is related to the literature on the relation between media mentions and asset prices. For example, Tetlock (2007) shows that the level and the direction of median mentions of a firm's stock predict subsequent stock returns (See also Tetlock et. al., 2008, Klibanoff, Lamont, and Wizman, 1998, Chan 2003, and Fang and Peress, 2009). However, an important difference between media mentions and advertising is that advertising represents an action under the control of a firm which can impact its stock returns, whereas media mentions are not, in general, under the control of the firm.

The rest of this paper is organized as follows. Section 2 discusses the investor recognition model and develops hypotheses. Section 3 discusses sample selection and variable construction. Section 4 empirically studies the relation between advertising and stock returns. Section 5 empirically tests the investor recognition hypotheses to explain the effect of advertising on stock returns. In Section 6, we discuss the corporate finance implications of the effect of advertising on stock returns. Section 7 concludes.

2 An Investor Recognition Model

The literature on investor recognition originates in the work of Merton (1987), who considers a reality in the capital markets: investors have incomplete information. Merton (1987) assumes that, because of the incomplete information, investors consider only the securities that they recognize (or "are aware of") when they form their portfolios. The set of securities recognized by each investor is only a subset of the publicly traded securities available in the capital markets. This set also differs across investors. Merton refers to the number of investors who know about a security as the degree of "investor recognition" for the security and models the resulting capital market equilibrium. In this incomplete information framework, in order for the market to clear for a security with limited investor recognition, the limited number of investors who know about the security have to take large undiversified positions in the security. These investors would then require a higher expected return to compensate them for the increased risk associated with their large undiversified positions.

In particular, Merton (1987) shows that the expected return of a security k, $E(R_k)$, satisfies:

$$E(R_k) - R_f = \beta_k(E(R_M) - R_f) + \lambda_k - \beta_k \lambda_M. \tag{1}$$

R_f is the risk-free rate of return; β_k is beta of security k; λ_k is the equilibrium shadow cost of incomplete information for security k; and λ_M is the weighted-average shadow cost of incomplete information over all securities. Merton (1987) further denotes α_k as the difference between security k's equilibrium expected return and the Security Market Line; $\alpha_k = \lambda_k - \beta_k \lambda_M$. He shows in equation (31.c) of his article that

$$\frac{\partial \alpha_k}{\partial q_k} = -\frac{\delta x_k \sigma_k^2}{q_k^2}, \tag{2}$$

where q_k is the size of the investor base who knows about security k, relative to the total number of investors in the market; $q_k < 1$. q_k can also be viewed as the degree of investor recognition. In additional, δ is the coefficient of aggregate risk aversion; x_k is the market value of security k relative to aggregate market value; σ_k^2 is the the idiosyncratic risk of security k.

It can be shown that $\frac{\partial \alpha_k}{\partial q_k} < 0$. Thus, the alpha of security k decreases with an increase in the degree of investor recognition q_k, the fraction of investors who know about the stock's existence. This is because the undiversified position held by each investor would be reduced when more investors recognize a firm's stock. Consequently, investors would require a lower expected return to compensate them for the reduced risk that is associated with their reduced undiversified positions in the firm's stock.

In this paper, we extend Merton's incomplete information framework by introducing an additional assumption. We assume that advertising can help a firm improve its visibility among investors, thereby increasing the degree of investor recognition for the equity of the firm. In other words, we assume that $\frac{\partial q_k}{\partial A_k} > 0$, where A_k is the amount of advertising expenditures spent by firm k. Following equation (2), we can show that

$$\frac{\partial \alpha_k}{\partial A_k} = -\frac{\partial q_k}{\partial A_k}\frac{\delta x_k \sigma_k^2}{q_k^2} < 0. \tag{3}$$

The above equation shows that the alpha of security k decreases with an increase in advertising A_k. Intuitively, consider a firm that increases the amount of advertising expenditures in year t. The increased advertising activities would increase the number of investors who recognize the firm's stock, and thus attract more investors to hold the stock. In this case, when a new equilibrium is reached, a larger number of investors will hold the firm's stock, with each investor holding a smaller undiversified position in the stock compared to the equilibrium in year $t-1$ (prior to the increase in the firm's advertising expenditures). At the new equilibrium, investors require only a smaller premium to compensate for their (smaller) undiversified positions in the stock, thereby reducing the firm's alpha as wll as the cost of capital.

If we further assume that $\frac{\partial q_k}{\partial A_k}$ is independent from idiosyncratic risk σ_k^2, we have:

$$\frac{\partial \alpha_k}{\partial A_k \partial \sigma_k^2} = -\frac{\partial q_k}{\partial A_k}\frac{\delta x_k}{q_k^2} < 0. \tag{4}$$

The above equation shows that the cross derivative of α_k with respect to A_k and σ_k^2 is negative. This result suggests that the negative effect of advertising A_k on the alpha of security k is more pronounced when security k's idiosyncratic risk σ_k^2 is larger. As we discussed earlier, when an increase in advertising increases the degree of investor recognition, the undiversified position held by each investor would be reduced so that the extra return required to compensate for the undiversified position would be reduced as well. Also as discussed in Merton (1987), in the presence of limited investor recognition, the extra return required by investors to compensate for their undiversified positions arises from the exposure to idiosyncratic risk. Thus, an increase in advertising would reduce the extra return (i.e., the alpha) to a larger degree if idiosyncratic risk is larger.[9]

2.1 Hypotheses on Investor Recognition and the Effect of Advertising on Stock Returns

Two key predictions emerge from the above setting. First, the contemporaneous stock price in the year of high advertising will increase, and, second, the expected long-run stock return subsequent to the year of high advertising will decrease. These two predictions follow from equation (3). The increase in the contemporaneous stock price is because investors revise upward their valuation of the higher advertising firm due to its decreased cost of capital. Subsequent to the contemporaneous price increase, the expected long-run stock return will decrease due to a decrease in the required risk premium on the firm's stock as discussed above. In short, the above predictions state that an increase in advertising is associated with a contemporaneous increase and a future ex-post decrease in stock returns.

To further study the relation between advertising and stock returns under th investor recognition theory, we develop five hypotheses in the following. In these five hypothesis, we study the causality that advertising affects stock returns by affecting investor recognition, as suggested by our extended

[9] It is worth noting that our prediction here is different from Merton (1987). Merton (1987) suggests that $\frac{\partial \alpha_k}{\partial \sigma_k^2} < 0$. This is because the risk associated with the large undiversified positions that these investors hold would be larger if the idiosyncratic risk of the security is larger. As a result, the premium required by investors to compensate for the risk associated with their undiversified large positions is increasing in the idiosyncratic risk of the security. In comparison, our prediction here focuses on the cross derivative of α_k with respect to idiosyncratic risk σ_k^2 and advertising A_k.

model in the previous subsection. For this purpose, we will focus on how advertising affects ex-post stock returns, rather than on the relation between advertising and contemporaneous stock returns. While high advertising and high investor recognition increase contemporaneous stock returns, contemporaneous stock returns could also have a feedback effect on investor recognition and the firm's capacity to advertise in the contemporaneous year (e.g., by affecting the firm's ability to fund advertising through equity offerings). In consideration of the difficulty to disentangle the above two effects and to establish the causality between advertising and contemporaneous stock returns, we choose to stay away from contemporaneous stock return in our test of the investor recognition theory. We instead focus on ex-post stock returns since there exists a clear causality from advertising and investor recognition in the advertising year to ex-post stock returns subsequent to the advertising year (and there is no feedback effect from ex-post stock returns to advertising in the contemporaneous year).

First, if the effect of advertising on stock returns is indeed an investor recognition effect as suggested in our extended model, we expect that $\frac{\partial q_k}{\partial A_k} > 0$. In other words, we expect that an increase in a firm's advertising in year t attracts more visibility among investors toward the firm's stock in the same advertising year t. This is the first hypothesis (**H1**) we test. Second, we also expect that the effect of advertising on stock returns is more pronounced when advertising attracts more investor recognition. Thus, our second hypothesis (**H2**) is that the negative effect of the advertising in year t on the long-run stock returns subsequent to year t is stronger if the stock attracts greater investor recognition in year t. Third, according to equation (4), an increased level of advertising reduces the required risk premium to a larger degree when idiosyncratic risk σ_k^2 is larger. Thus, our third hypothesis (**H3**) is that the negative effect of the advertising in year t on the long-run stock returns subsequent to year t is stronger if the stock has a higher idiosyncratic risk.

Fourth, according to equation (3), $\frac{\partial \alpha_k}{\partial A_k}$ is more negative if $\frac{\partial q_k}{\partial A_k}$ is larger. In other words, a firm's increased level of advertising reduces the required risk premium more effectively if the firm's advertising is more effective in attracting investor recognition. It is possible that small firms, value firms, and firms with poor ex ante operating performance are more likely to be affected by advertising since these types of firms are relatively unknown and unappealing to investors without any advertising by these firms. Thus, $\frac{\partial q_k}{\partial A_k}$ could be larger for small firms, value firms, and firms with poor ex ante operating performance. If this conjecture is true, we expect that the negative effect of the advertising in year t on the long-run stock return subsequent to year t is stronger for smaller firms, value firms, and firms with poorer ex-ante operating performance. This is the fourth hypothesis (**H4**) we test.

Finally, it is possible that investor recognition could be sticky in the sense that investors are unlikely to lose recognition of a firm in a short time when advertising decreases. Thus, the effect of advertising on investor recognition could be non-linear; i.e., $\frac{\partial q_k}{\partial A_k} \mid_{A_k < A_{k-1}} < \frac{\partial q_k}{\partial A_k} \mid_{A_k \geq A_{k-1}}$. In other words, the effect of advertising on investor recognition in the case when advertising decreases could be weaker compared to the case when advertising increases. If the above conjecture is true, we expect that the negative effect of advertising on ex-post stock returns is weaker in the case when advertising decreases than in the case when advertising increases. This is the last hypothesis (**H5**) we test.

3 Data and Descriptive Statistics

3.1 Sample Selection

Our sample covers the period from year 1996 to 2005. We extract financial statement information from Standard & Poor's Compustat files, stock prices from the Center for Research in Securities Prices (CRSP), and analyst coverage data from the Institutional Brokers Estimate System (IBES). We follow the standard convention and limit our analysis to the firms incorporated in the U.S. and those that are identified by CRSP share type codes of 10 and 11. We also exclude from our sample those firms that are not covered by Compustat and CRSP, and especially those firms with missing data on advertising expenditures, where advertising expenditures are the cost of advertising, media, and promotional expenses from Compustat item #45. Finally, we exclude those firms with market capitalization less than $20 million in the prior year and with stock price less than $5 per share at the end of the prior year. Thus, our final sample consists of 6,745 firms. As discussed earlier, we focus on advertising growth in our empirical studies. Our sample with data available on advertising growth consists of 6,527 firms. In some empirical studies, we may be constrained to use only part of the sample, either due to incomplete information on lagged values or due to incomplete information in IBES to construct certain variables.

In the paper, we choose to focus on the sample starting from year 1996 since a new statement of position, SOP 93-7, Reporting on Advertising Costs, was effective only for years beginning on or after June 15, 1994. SOP 93-7 was issued by Accounting Standards Executive Committee (AcSEC). It changes the practice that companies use to expense the cost of advertising.[10] Table 1 reports the annual breakdown for our sample, as well as for the extended sample from 1980 to 1995. It shows that a substantially large number of firms choose not to report any advertising expenditures after 1994, which results in a decrease in sample size after 1994. The number of firms reporting zero advertising expenditure also declined substantially and the average and the median advertising expenditures increased substantially around 1994. For example, prior to 1994, more than 40% of firms reported zero cost of advertising.[11] The percentage of zero advertising firms changed to around 30% in 1994 and 7% in 1995. It becomes stabilized at around 2%-4% after 1995. Considering this change in accounting practice for advertising, we limit most of our analysis to the sample after year 1995. In a robustness analysis, we will extend our sample to cover the period from 1980 to 2005, but excluding the interim years 1994 and 1995.

Table 1 also shows that advertising data is available for only a subset of firms in the universe of Compustat. The number of firms with advertising data available ranges from 450 in 1996 to 975 in

[10] Prior to SOP 93-7, there was no authoritative accounting literature for advertising. The practice on expensing advertising expenditures was diverse, including various alternatives considered by AcSEC, as well as expensing advertising at various time points. SOP 93-7 severely limits the methods available for companies to allocate the cost of advertising to expense. For example, under the SOP, all entities must expense the cost of advertising either at the first time when the advertising takes place or within the period in which the advertising cost is incurred.

[11] Majority of these firms report their advertising expenditures as insignificant, in which cases we code as zero cost of advertising.

2005. We will discuss and address the representativeness of our advertising sample in the sections later.

3.2 Construction of Variables

In the paper, we define year t as the advertising year, year $t-1$ as the year prior to the advertising year, and year $t+1$ as the year subsequent to the advertising year. We measure the change in advertising in year t (ΔAdv_t) as the change in the log values of advertising expenditures from year $t-1$ to year t. ΔAdv_t can also be viewed as advertising growth.[12] We code ΔAdv_t as zero if a firm reports zero advertising expenditures in both year $t-1$ and year t.[13] In unreported results, we also study the percentage change of advertising expenditures to check the robustness of our results.

We use two variables to proxy for the degree of investor recognition ($Recogntion$): the stock's exchange-adjusted share turnover and the number of financial analysts covering the stock. Investors trade for a stock when they know about the stock (Merton, 1987, and Barber and Odean, 2008). Financial analysts' coverage could bring more visibility to the firm as investors follow analysts' forecasts or recommendations (see e.g., Womack, 1996, Barber, Lehavy, McNichols, and Trueman, 2001). Thus, a higher share turnover or a larger number of financial analysts covering the stock indicates an enhanced level of investor recognition about the stock. We measure exchange-adjusted share turnover as the log ratio of a firm's share turnover to the average share turnover in the stock exchange in which the firm's stock is trading, where share turnover is trading volume in shares scaled by shares outstanding. To capture the degree of investor recognition in the advertising year, we calculate adjusted share turnover in the advertising year ($Turnover_t$) and the log of the number of financial analysts' earnings forecasts reported in I/B/E/S in the last month of the advertising year ($Numest_t$). $\Delta Turnover_t$ is the change

[12] Following Grullon, Kanatas, and Weston (2004), we do not use a scaled measure of advertising intensity such as the ratio of advertising to sales or assets. This is because the purpose of the paper is to measure the impact of a firm's advertising on investors in the stock market, rather than the relative intensity of the firm's advertising to sales.

[13] This treatment has only a marginal effect on the size of our sample in 1996-2005 since few firms in this sample period report zero advertising. However, it helps us to maintain a reasonable sample size for the extended sample that covers the years prior to 1994. We will study the extended sample to check the robustness of our results.

in adjusted share turnover from year $t-1$ to advertising year t. $\Delta Numest_t$ is the change in the log number of analysts from the last month in year $t-1$ to the last month in advertising year t.

We also construct the following product market variables to capture the factors that may affect a firm's advertising decision. The industrial organization (IO) literature suggests that sales is the most important consideration in corporate advertising decisions. We calculate $Sale_t$ as the log value of sales revenue in year t and $\Delta Sale_t$ as the log change in sales revenue from year $t-1$ to year t. $Size_t$ is the log of market capitalization in year t. $Prft_t$ is operating income before interest, tax, depreciation, and amortization ($EBITDA$) in year t scaled by the book value of assets in the same year ($Asset_t$). $\Delta Prft_t$ is the change in $EBITDA/Asset$ from year $t-1$ to year t. BM_{t-1} is the ratio of the book value to the market value of equity. The book value of equity is the book value of common equity plus the value of deferred tax and investment tax credit minus the value of preferred equity, where the value of preferred equity is calculated as either the redemption value or, if the redemption value is missing, the liquidating value.

In addition, we measure idiosyncratic volatility ($Risk_t$) as the standard deviation of market-adjusted daily abnormal stock returns in the advertising year. We estimate daily abnormal stock return as the difference between raw stock return and the value-weighted market return in the same day. Asset growth is the percentage change in the book value of asset ($Asset$) from year $t-1$ to year t. Standardized unexpected earnings (SUE_t) is calculated as $(E_q - E_{q-4} - c_q)/s_q$, where q indexes for quarters. E_q and E_{q-4} are earnings in quarter q, the last quarter in the fiscal year, and quarter $q-4$, the last quarter in the prior year, respectively; and c_q and s_q are the mean and the standard deviation, respectively, of $(E_q - E_{q-4})$ over the preceding eight quarters. Discretionary accruals is calculated following the modified Jones model in the accounting literature:

$$\frac{TAC_q}{Asset_{q-1}} = \delta_0 + \delta_1 \frac{\Delta Sls_q - \Delta Rec_q}{Asset_{q-1}} + \delta_2 \frac{PPE_q}{Asset_{q-1}} + \epsilon_q. \tag{5}$$

TAC_q is total accruals in the last quarter of the current fiscal year, i.e., quarter q. It is calculated as income before extraordinary items less operating cash flow. ΔSls_q is the change in sales from the current quarter q to the prior quarter $q-1$; ΔRec_q is the change in accounts receivables from quarter q to quarter $q-1$; PPE_q is gross property, plant and equipment in quarter q. We run regression (5) for each industry-quarter with at least 10 observations, where the industry is defined by two-digit SIC codes. We calculate discretionary accruals as the residual ϵ_q from regression (5).

3.3 Summary Statistics

Table 2 reports the sample statistics of the above variables. It can be seen that the level of advertising expenditures Adv_t is effectively a permanent firm characteristic, with a yearly autocorrelation of 0.985. Adv_t is highly correlated with firm size $Size_t$, with a contemporaneous correlation of 0.756. It is also highly correlated with firm sales $Sale_t$ and firm profitability $Prft_t$, with contemporaneous correlations of 0.856 and 0.230, respectively. These correlations suggest that large firms and firms with high profitability advertise heavily and that high advertising can help boost firm sales. In an effort to purge the above firm fixed effects, we focus on advertising growth ΔAdv_t rather than the level of advertising Adv_t in the paper.[14] Another reason to use ΔAdv_t rather than Adv_t is that the level Adv_t is at best a noisy measure of the degree of investor recognition. For example, a well-known firm with a low level of advertising could still have a higher degree of investor recognition compared to a young firm with a high level of advertising.

Similarly, the number of analysts following the firm, $Numest_t$, is also a firm characteristic, with a yearly autocorrelation of 0.909. $Numest_t$ is highly correlated with firm size (with a contemporaneous correlation = 0.732), firm sales (with correlation = 0.627), and firm profitability(with correlation = 0.25). Thus, we also use change in the number of analysts $\Delta Numest_t$ in our study to purge the firm fixed effects. Further, to maintain the consistency between our recognition variables and the advertising

[14] Many empirical studies on the predictability of stock returns have also used the change variable rather than the level to purge the firm fixed effects. For example, Chen, Hong, and Stein (2004) use change in breadth of mutual fund ownership rather than the level of breadth to predict future stock returns. Lakonishok, Shleifer, and Vishny (1994) use past growth in sales, earnings, and cash flow to measure the past performance and to study the predictability of past performance on future stock returns.

variable, we use $\Delta Turnover_t$ as the other investor recognition variable. However, $Turnover_t$ has a yearly autocorrelation of 0.723, which is smaller than the autocorrelations of Adv_t and $Numest_t$. Thus, $Turnover_t$ is less likely a firm characteristic compared to $Numest_t$. In consideration of this, we also run regressions using $Turnover_t$ as a recognition variable, in addition to using $\Delta Turnover_t$ to purge the firm fixed effects.

3.4 Determinants of Whether Firms Report or Non Report Advertising

As we discussed in Section 3.1, our advertising sample represents only a subset of the universe of Compustat firms. Table 3 reports the percentage of Compustat firms that report a positive amount or a zero amount of advertising expenditures in the sample years. As can be seen, in 1996-2005, 24% of Compustat firms report a positive amount of advertising, 1% of Compustat firms report a zero amount, and 75% of Compustat firms do not report any advertising amount to Compustat. In the extended sample from 1980 to 2005, more firms (32%) report a zero amount of advertising but 47% of Compustat firms still choose not to report any advertising amount. In the following, we will discuss the representativeness of our advertising sample and study the determinants on whether a firm reports advertising or not. In this way, we intend to make the concern of sample selectivity more concrete, so that we can address this concern later to show that it does not affect our inference regarding advertising and stock returns.

In panels A and B in table 2, we first compare firm characteristics and stock returns between the reporting firms and the non-reporting firms. As can be seen from column (5), the non-reporting firms have smaller firm sizes than does the reporting firm in both the sample of 1996-2005 and the extended sample of 1980-2005. In the sample of 1996-2005, the non-reporting firms also have larger book-to-market ratios, while in the sample of 1980-2005, the non-reporting firms have larger sales growth and smaller contemporaneous stock returns. It is possible that the non-reporting firms could simply be those firms incurring no advertising expenditures. We study this possibility in column (6) by comparing the non-reporting firms and the firms reporting zero advertising expenditure. We find that the non-reporting firms are significantly different from the firms reporting zero advertising, especially in the sample of 1980-2005 and on their firm sizes.

In panel C in table 2, we further estimate a probit model for the reporting and the non-reporting firms based on our main sample of 1996-2005. Overall, the regression results show that smaller firms, growth firms (with smaller book-to-market ratios), and firms with smaller sales growth but higher profitability are less likely to report advertising to Compustat. In our empirical study later, we will ensure that these determinants on reporting versus non-reporting do not drive our findings on advertising and stock returns.

3.5 Determinants of Advertising

We study the determinants of advertising growth, ΔAdv_t, to see to what extent ΔAdv_t captures the information in other well-known predictors of stock returns. The study is implemented as follows. First, for each year, we run a separate regression on ΔAdv_t against the following variables: Adv_{t-1}, $Size_t$, BM_t, $\Delta Sale_t$, $Sale_{t-1}$, $\Delta Prft_t$, and $Prft_{t-1}$. We then average the regression coefficients across years as in Fama and MacBeth (1973) and estimate the statistical inference based on the Newey-West standard errors. We present the results from the above Fama-MacBeth regressions in the first five columns in table 4. Consistent with the industrial organization literature, our results show that the sales consideration is an important determinant in a firm's advertising decision. Both the coefficient of $\Delta Sale_t$ and the coefficient of $Sale_{t-1}$ are positive and significant at the 1% level in all regressions. Column (1) further shows that large firms and value firms spend more advertising expenditures than small firms and glamour firms, although their economic significance is somewhat reduced once we control for the sales variables in the same regression (as in columns (4) and (5)). Finally, columns (3) and (5) show that profitability is also an important determinant in a firm's advertising decision. A firm tends to advertise more when the firm generates more profits in the prior year or when the firm is experiencing troubles in its operating performance in the contemporary year.

However, if our advertising sample is not a truly random sample, then the determinants estimated above from the Fama-MacBeth model could be biased. To address the sample selection concern, we further estimate the Heckman's (1979) selection model. The Heckman selection model consists of a selection equation and an advertising equation. The specification of the selection equation in the model is the same as that in the probit model discussed in Section 3.4. The sample in the estimation of the selection equation consists of all the firms in 1996-2005 that are covered by Compustat. The specification of the advertising equation is similar to that in the Fama-MacBeth regressions discussed above. The sample in the estimation of the advertising equation is the advertising sample.

We present the results from the Heckman selection model in the last five columns in table 4. Since the results from the first-stage selection equation is similar to those presented in table 3, we present here only the results from the second-stage advertising equation. Overall, the results from the Heckman selection model are mostly similar to those from the Fama-MacBeth model. The effect of sales and profitability on advertising remains the same in both models. However, the effects of firm size on advertising become somewhat more significant, while the effect of the book-to-market ratio on advertising becomes somewhat less significant. Nevertheless, we still find that $Size_t$, BM_t, $\Delta Sale_t$, and $\Delta Prft_t$ are important determinants on a firm's advertising policy. Considering these determinants of advertising, we will ensure below that our results on the advertising effect are not driven by the size effect, the book-to-market effect, the sales effect, and the profitability effect, as well as other return predictors such as momentum.

4 Advertising and Stock Returns

In this section, we study the relation between advertising growth and stock returns, both in the contemporaneous year of advertising and in the long run subsequent to the advertising year. We first study the relation with portfolio sorts, followed by a series of regressions based on the Fama-French's

(1993) three factor model, the Carhart's (1997) four-factor model, and the Fama-MacBeth's (1973) model.

4.1 Portfolio Sorts

We first study stock returns with portfolio sorts. We track the performances of the sorted portfolios in the advertising year t and four ex-post long-run event windows. The four ex-post event windows are [1, 6], a six-month event window right after the advertising year; [7, 12], a six-month event window from month 7 to month 12 subsequent to the advertising year; [1, 12], a one-year window right after the advertising year; and [7, 18], a one-year window starting from the seventh month subsequent to the advertising year. We have also tracked the performance of each portfolio beyond month 18. Although it appears that excess returns continue to exist beyond the 18^{th}-month mark, the effects are relatively weak due to the statistical noise that accompanies longer horizons.

In the paper, we study both raw stock returns and stock returns adjusted either by size and book-to-market ratio or by size, book-to-market, and momentum. We construct the adjusted stock returns as follows. For the size and book-to-market adjusted return, we first create benchmark portfolios using a procedure similar to Loughran and Ritter (1997). At the end of each year, we assign stocks to five size quintiles based on their firm sizes ($Size_t$). Within each size quintile, we further group stocks into subquintiles, based on their book-to-market ratios (BM_t). This grouping yields a total of 25 benchmark portfolios. For each benchmark portfolio, we calculate the benchmark portfolio return as the equal-weighted holding period return. The size and book-to-market adjusted return of a stock is the stock's holding period return in excess of its benchmark portfolio return.

The procedure to construct the size, book-to-market, and momentum adjusted return is a three-dimensional extension of the above size and book-to-market adjustment. Within each of the 25 size and book-to-market groupings discussed above, we further group stocks into momentum quintiles each year, based on their raw returns in the advertising year. This grouping results in a total of

125 benchmark portfolios. Stock return adjusted by size, book-to-market, and momentum is defined as a stock's holding period return less the equal-weighted holding period return of one of the 125 benchmark portfolios to which the stock belongs.

4.1.1 Raw and Adjusted Stock Returns

We present the results based on portfolio sorts in table 5. In Section 3.5, we show that firm size, book-to-market, sales, and profitability could affect a firm's advertising policy. To ensure that the relation between advertising and stock returns is not driven by these determinants, we first control for the size effect and the book-to-market effect in panel A by triple-sorting the portfolios by size ($Size_t$), book-to-market ratio (BM_t), and advertising growth (ΔAdv_t). The triple sort is implemented as follows. For each year, we first rank stocks into five size quintiles based on $Size_t$. We then rank stocks in each size quintile into five book-to-market quintiles. Thus, we have 25 size and book-to-market portfolios in each year based on the five by five classification. Next, on the basis of ΔAdv_t, we rank stocks in each of the 25 size and book-to-market portfolios into five quintiles relative to the other stocks in the same size and book-to-market portfolio. Finally, we combine the quintiles of ΔAdv_t across the 25 size and book-to-market portfolios. In particular, for the stocks in the same quintile of ΔAdv_t (but in different size and book-to-market portfolios), we form an equal-weighted portfolio across the 25 size and book-to-market portfolios and track the performance of the portfolio over time. The stocks with the highest ΔAdv_t are assigned to the portfolio in quintile 5 and the stocks with the lowest ΔAdv_t are assigned to the portfolio in quintile 1. We also form a zero-investment portfolio (P5-P1) that longs the stocks in quintile 5 (high advertising stocks) and shorts the stocks in quintile 1 (low advertising stocks). One advantage of this triple-sort procedure is that it ensures the stocks in each ΔAdv_t quintile to on average have the similar firm size and book-to-market ratio. As we discussed in Section 3.5, large firms and value firms tend to advertise more than small firms and glamour firms. Thus, this procedure is useful since otherwise the high ΔAdv_t quintiles could be dominated by large and value stocks.

In panel B of table 5, we triple-sort portfolios based on $Sale_t$, BM_t, and ΔAdv_t. The triple-sort procedure here is similar to the procedure discussed above when we sort portfolios based on $Size_t$, BM_t, and ΔAdv_t. In Section 3.5, we find that firm size becomes less significant in determining a firm's advertising policy once we introduce the sales variables as additional independent variables. Thus, in panel B here, we choose to control for the sales effect rather than controlling for the size effect as in panel A. This triple-sort procedure ensures that our results on the advertising effect are not driven by the sales effect and the book-to-market effect.

Table 5 shows that the results for both raw returns and adjusted returns are not much affected by the different portfolio sorts. In general, the firms with a higher level of advertising growth in the advertising year t experience a larger stock return during the same year t. However, the firms with higher advertising growth in year t experience a smaller stock return in the long run subseqent to year t. The difference in the long-run ex-post stock returns between the high advertising and the low advertising firms is significant in all four ex-post event windows. For example, consider raw returns sorted by $Sale_t$, BM_t, and ΔAdv_t as shown in panel B. In the advertising year, the stocks in the top quintile (P5) outperform the stocks in the bottom quintile (P1) by 9.2%, which is statistically significant. Further, consider the (P5-P1) portfolio that is long the top-quintile stocks and short the bottom-quintile stocks at the end of the advertising year. Half year after the advertising year, the (P5-P1) portfolio earns -5.2%, which translates into an annualized rate of return of -10.7%. In the second half of the year after portfolio formation, the (P5-P1) portfolio is down by an additional 4.6% (-9.4% on an annualized basis). These results indicate an pattern of long-run ex-post stock price decrease for the firms with high advertising growth subsequent to the year of high advertising growth (i.e., year t).

The adjustments for firm size, book-to-market ratio, and momentum do not make any qualitative difference on the relation between advertising growth and stock returns. As shown in table 5, the adjusted return of the (P5-P1) portfolio is still positive and significant in the advertising year and it is negative and significant in the event windows subsequent to the advertising year. However, the size control somewhat reduces the magnitude of the (P5-P1) return in the advertising year. For example, according to panel B, the unconditional raw return of the (P5-P1) portfolio is 9.2% in the advertising year. With the size, book-to-market, and momentum adjustment, the (P5-P1) return changes to 6.3% in the advertising year. In contrast, the adjustments do not change the magnitude of the (P5-P1) return in the long-run ex-post event windows. Panel B shows that the size, book-to-market ratio, and momentum adjusted return is -5.7% in event window [1, 6] and –4.0% in window [7, 12], similar to the raw stock returns in the corresponding windows.

Overall, our results in panels A and B of table 5 show that a firm's advertising activities in year t are positively correlated with the stock performance of the firm in the contemporaneous advertising year t. Our results also show that the firm with a higher level of advertising growth in year t experiences a poorer stock return subsequent to the advertising year t. This relation between advertising growth and stock returns does not seem to be driven by the determinants of a firm's advertising policy, such as sales and profitability. Neither does it seem to be driven by the predictability powers of momentum, the difference between large and small stocks, and the difference between value and glamour stocks.[15]

4.1.2 Robustness Checks

In the following, we conduct a range of additional tests to verify the robustness of our results reported in Section 4.1.1. First, we check the robustness of our results to the alternative sample. As we discussed in Section 3.1, there was a change in the accounting practice on expensing the advertising

[15] Our result on the relation between advertising growth and contemporaneous stock returns should be interpreted with caution. While our results show a positive relation between advertising growth and contemporaneous stock returns, they do not imply any causality between advertising and contemporaneous stock returns. As we discussed in Section 2.1, while advertising could affect contemporaneous stock returns by affecting contemporaneous investor recognition, contemporaneous stock returns could also have a feedback effect on advertising and investor recognition as well. In contrast, our result on the relation between advertising growth and ex-post stock returns implies a clear causality from advertising growth in year t to ex-post stock returns subsequent to year t.

cost in 1994. Thus, the main sample in our paper does not cover years 1980-1995 due to the substantial difference in the advertising accounting between the periods of 1980-1995 and 1996-2005. However, it is still interesting to know whether the relation between advertising and stock returns holds in the period of 1980-1995 as well. In the first robustness check, we expand our sample period to cover years 1980-2005 but without years 1994 and 1995. We exclude these two years since firms were in transition of the accounting change in both years.[16] We present the results from this first robustness check in panel A, table 6. To save space, we report only the results on portfolios sorted by $Size_t$, BM_t, and ΔAdv_t. In general, panel A shows that the advertising effect documented earlier holds in the extended sample periods as well, especially for the adjusted stock returns. However, the relation between advertising growth and stock returns seems to be weaker in the sample period of 1980-2005, both economically and statistically. This is not surprising given that there was no universal standard to expense advertising prior to 1994. The diverse practices of the advertising accounting prior to 1994 could add noise to the reported advertising expenditures and contribute to the weaker results in our extended sample (with the early years included).

In the second robustness check, we address the concern of sample selectivity. Section 3.4 shows that our advertising sample is only a subset of the universe of Compustat firms. Section 3.4 also shows that smaller firms, growth firms, firms with smaller sales growth, and firms with higher profitability are less likely to report advertising to Compustat. To check whether or not the sample selectivity affects the relation between advertising and stock returns, we study the stock return patterns for the matching firms that are similar to the advertising firms but do not report advertising expenditures to Compustat. If sample selection does contribute to our results that the high advertising firms has lower ex-post stock returns than the low advertising firms, then we would expect the similar stock return pattern for the matching firms: the matching firms selected for the high advertising firms would also

[16] Our results based on the whole sample of 1980-2005 (including years 1994 and 1995) are similar to the results based on the sample excluding years 1994 and 1995.

experience lower ex-post stock returns than the matching firms selected for the low advertising firms. On the other hand, if our results are indeed driven by advertising rather than the selectivity of the advertising sample, we would expect no difference in ex-post stock returns between the high-advertising matching firms and the low-advertising matching firms.

The matching algorithm consists of several steps. First, from all Compustat firms, we select a non-reporting sample of firms that do not report advertising to Compustat. Second, for the non-reporting firms, we obtain four-digit SIC codes from CRSP and group these firms into 48 industries using the industry classification in Fama and French (1997). Third, we classify firms in each industry into five size portfolios based on market capitalization and then each size portfolio into additional five portfolios based on book-to-market ratio. If there are not enough firms in an industry so that the above disaggregation yields a portfolio with less than four firms, we relax either the size classification or the book-to-market classification and construct only two size portfolios or two book-to-market portfolios. Thus, we have a maximum of nine portfolios in each industry based on a 3 by 3 classification and a minimum of four portfolios on a 2 by 2 classification. Fourth, for each firm in our advertising sample, we select an industry-size-BM portfolio to which the advertising firm belongs. Finally, from the industry-size-BM portfolio, we identify a matching firm with the closest market capitalization to the advertising firm. In short, we identify a non-reporting firm to match for each advertising firm based on industry, size, and book-to-market ratio, the three key characteristics determining whether or not a firm reports advertising to Compustat.[17]

We replicate our study in Section 4.1.1 based on the matching non-reporting firms and present the results in panels B and C in table 6. Panel B is based on the main sample of 1996-2005 and panel C is based on the extended sample of 1980-2005. In both panels, the raw return and the adjusted returns of the (P5-P1) portfolio are insignificant in all the ex-post event windows. Thus, the stock return

[17] We have also tried other matching algorithms, for example, based on sales and profitability, the other characteristics that could affect whether or not a firm reports advertising. Our results based on these alternative matching algorithms are similar to those reported in the paper.

patterns that we find in table 5 for the reporting firms do not exist for the non-reporting matching firms here. The relation between advertising and stock returns documented in table 5 is unlikely to be driven by the selectivity of our advertising sample.

4.2 Fama-MacBeth Regressions

Next, we run a series of Fama-MacBeth (1973) regressions as an alternative approach to study the relation between ΔAdv_t and contemporaneous stock returns and to study the forecasting power of ΔAdv_t:

$$Raw\ Return_t = \alpha_0 + \alpha_1 \Delta Adv_t + \alpha_2 Size_{t-1} + \alpha_3 BM_{t-1}, \tag{6}$$

$$Raw\ Return_{t+1} = \beta_0 + \beta_1 \Delta Adv_t + \beta_2 Size_t + \beta_3 BM_t + \beta_4 Raw\ Return_t. \tag{7}$$

We implement the Fama-MacBeth technique in the same way as discussed in Section 3.5. In particular, we run a separate cross-sectional regression for each year and report the mean coefficients across the annual regressions. The standard errors are calculated based on the time-series serial correlation properties of the annual coefficients, as in the usual Fama-MacBeth technique. The dependent variable in regression (6) is the contemporaneous raw return in year t and it is the ex-post raw return in year $t+1$ in regression (7). We do not use benchmark-adjusted return as the dependent variable since controls can be added as the right-hand-side variables. The control variables include firm size, the book-to-market ratio, and momentum. As we discussed in Section 4.1.2, advertising is related to sales growth and profitability growth, which could affect stock returns as well. Thus, in some regressions, we further control for sales growth $\Delta Sale_t$ and profitability growth $\Delta Prft_t$.

We present the results from regression (6) in the first two columns in table 7. The coefficient of ΔAdv_t is positive and significant in both columns, suggesting that ΔAdv_t and stock return in year t are positively related. We then run regression (7) on the ex-post raw return in year $t+1$. We report the results in columns (3) - (10) in table 7, with the ex-post raw return in year $t+1$ measured in one of the four event windows: [1, 6], [7, 12], [1, 12], and [7, 18]. The coefficients of ΔAdv_t are negative in all event windows. They are statistically significant in column (3)-(9) while insignificant in column (10). For example, the coefficient of ΔAdv_t is -0.019 in column (4) where the ex-post raw return is measured in window [1, 6] and –0.063 in column (8) where the ex-post raw return is measured in window [1, 12]. Both coefficients are significant at the 5% level. To get a sense of magnitude, these coefficients imply that a one-standard-deviation increase in advertising growth, ΔAdv_t, decreases the half-year ex-post stock return by 1.14% and the one-year ex-post stock return in window [1, 12] by 3.79%. Overall, our results in table 7 confirm our earlier results based on portfolio sorts. They show that a high level of advertising growth is associated with an increase in the contemporaneous stock return but followed by a decrease in the long-run ex-post stock return.

4.2.1 Robustness Checks

In the following, we conduct additional tests to check the robustness of our regression results reported above. In the first robustness check, we address the concern of sample selection by running Heckman's (1979) selection model. The specification of the first-stage selection equation is similar to that presented in table 3. The specifications of the second-stage stock return equations are similar to those presented in table 7. The results from the second-stage stock return equations are presented in table 8. Overall, the results from the Heckman selection model are similar to those from the Fama-MacBeth model. The coefficient of ΔAdv_t is positive in the regressions on the contemporaneous stock return in year t and it is negative in the regressions on the ex-post stock returns. Thus, it is evident from this robustness check that our results on advertising and stock returns are unlikely to be driven by the factors that cause the selectivity of our advertising sample.

We further address the concern of sample selection by running regression (7) based on the matching sample discussed in Section 4.1.2. As we discussed earlier, we identify the matching firms as those that are similar to the advertising firms but do not report advertising expenditures to Compustat. If our results on the positive relation between advertising and ex-post stock returns are not driven by sample selection, we would expect such a positive relation to disappear for the matching sample. We present the results based on the matching sample in columns (1) to (4) in panel A of table 9. In all four columns, the coefficient of ΔAdv_t is insignificant, regardless whether we measure raw return in the ex-post window [1, 6] or [1, 12]. These results demonstrate that our findings on the relation between advertising and ex-post returns are unlikely to be driven by sample selection.

In the second robustness check, we run regression (7) based on the extended sample covering years 1980-2005 but without the transition years 1994 and 1995. We present the results in columns (5)-(10) in panel A of table 9, with ex-post stock returns measured in event window [1, 6], [1, 12], or [7, 18]. As can be seen, extending the sample period reduces, but does not completely eliminate, the effect of ΔAdv_t on ex-post stock returns. The coefficient of ΔAdv_t is still negative in all columns. It is also significant in most columns except in column (10). As we discussed earlier, the reduced magnitude could be explained by the noisiness of the sample prior to year 1994 when the accounting methods were diverse in expensing advertising.

In the third robustness check, we control for the other well-known price anomaly, such as the asset growth anomaly, the accounting accrual anomaly, and the post earnings announcement price drift. We present the results with these additional controls in columns (1)-(6) in panel B of table 9. We first introduce asset growth, discretionary accrual, and standardized unexpected earnings gradually as the independent variable, followed by the regression with all three variables in the same regression. In all six columns, the coefficient of ΔAdv_t remains negative and significant. Thus, our results on the relation between advertising and ex-post returns are unlikely driven by the asset growth anomaly, the accounting accrual anomaly, and the post earnings announcement price drift.

In the fourth robustness check, we run regression (7) using the size and book to market adjusted returns as the dependent variable. We report the regression results in columns (7) to (10) in panel B of table 9. The adjustment of stock returns by size and the book to market ratio seems to be redundant once we control for both variables in the regression. As it turns out, the coefficients of ΔAdv_t in columns (7) and (8) in table 9 are similar to the corresponding coefficients in columns (3) and (4) in table 7, both statistically and economically. Nevertheless, our results here based on adjusted stock returns help demonstrate the robustness of our results to the different measurement of stock returns.

4.3 Factor Models

In the following, we study whether or not advertising can forecast ex-post stock returns by using Fama-French's (1993) three factor model:

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_{pt}. \tag{8}$$

Here, the first factor, $R_{mt} - R_{ft}$, is the excess return on the market portfolio, calculated as the return on the NYSE/AMEX/NASDAQ value weighted index (R_{mt}) minus the one-month T-bill return (R_{ft}, risk-free return); the second factor, SMB_t, is the return on small firms minus the return on large firms in month t; and the third factor, HML_t, is the return on the high book-to-market stocks minus the return on the low book-to-market stocks in month t.[18] R_{pt} is the equally weighted monthly return on the portfolio of each ΔAdv_t quintile or the (P5-P1) portfolio. We create the ΔAdv_t portfolios in the same way as discussed in Section 4.1. Each firm will be held in a portfolio in a holding period of either half a year or a year subsequent to the advertising year, i.e., window [1, 6] or [1, 12]. At the end of each holding period, the firm drops out of the portfolio. In the above factor model (8), the intercept of the regression α_p is the monthly risk-adjusted abnormal return in percent. The slope coefficients β_p, s_p, and h_p are factor-loading, measuring the sensitivities of the portfolio with respect to various factors.

We present the results from the three factor model in panel A, table 10. Our results show that, subsequent to the advertising year, the portfolio of the high ΔAdv_t firms earns a lower stock return compared to the portfolio of the low ΔAdv_t firms. Specifically, the (P5-P1) portfolio earns -6.01% in the six-month window [1, 6] (-1.001% monthly return) and -8.29% in the one-year window [1, 12]

[18] We thank Kenneth French for providing the data on the above factors in his website.

(-0.691% monthly return). Both stock returns are statistically significant at the 1% level.

We also study the four factor model (Carhart, 1997):

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + u_p UMD_t + \varepsilon_{pt}. \tag{9}$$

Model (9) is similar to model (8), except for an additional factor UMD_t which is the return on the high momentum stocks minus the return on the low momentum stocks in month t. u_p measures the exposure of the portfolio to past momentum.

We present the results from the four factor model in panel B, table 10. In general, adding the momentum factor marginally reduces the magnitude of the ex-post abnormal returns. In panel B, the (P5-P1) portfolio earns a return of -4.77% in the six-month window [1, 6] (-0.795% monthly return) and -7.10% in the one-year window [1, 12] (-0.592% monthly return). Both stock returns are statistically significant as well.

To demonstrate the robustness of our results, we also run the three factor model (8) and the four factor model (9) based on the extended sample covering years 1980-2005 but without the transition years 1994 and 1995. The results are presented in panels C and D in table 10. The (P5-P1) portfolio remain negative and significant. These results demonstrate the robustness of our results to the different sample periods. However, compared to the results in panels A and B, both the magnitude and the statistical significance of the negative future stock return earned by the (P5-P1) portfolio become smaller in the extended sample.

Overall, our results based on the factor models are consistent with our previous results based on portfolio sorts and Fama-MacBeth regressions. They suggest that a high level of advertising growth is followed by a negative future stock return.

5 Does Investor Recognition Explain the Effect of Advertising on Stock Returns?

In the previous section, we find that a higher level of advertising growth is associated with a larger contemporaneous stock return and a smaller ex-post stock return in the long run. We conjecture that such an advertising effect occurs because a firm's advertising can help improve visibility of the firm among investors. In the following, we test the five investor recognition hypotheses developed in Section 2.1. As we discussed earlier, we focus only on the effect of advertising on ex-post stock returns to test these hypotheses.

5.1 Investor Recognition and Advertising

We first test hypothesis (**H1**) by studying whether advertising can affect investor recognition. We run the following regression:

$$\begin{aligned} Recognition_t = \gamma_0 + \gamma_1 \Delta Adv_t + \gamma_2 Size_{t-1} + \gamma_3 BM_{t-1} + \gamma_4 \Delta Sale_t + \\ \gamma_5 \Delta Prft_t + \gamma_6 Adv_{t-1} + \gamma_7 Recognition_{t-1} + \varepsilon \end{aligned} \tag{10}$$

The investor recognition variable, $Recognition_t$, is either the change in adjusted share turnover $\Delta Turnover_t$, or the change in number of financial analysts covering the stock $\Delta Numest_t$. All coefficients are the Fama-MacBeth coefficients, calculated as the time-series means of the coefficients from cross-sectional regressions run every year. The standard errors are adjusted for serial correlations using a Newey-West correction. Hypothesis **H1** predicts that advertising improves investor recognition. We expect γ_1 to be positive to be consistent with hypothesis **H1**.

We present the results from regression (10) in table 11. In columns (1) to (3), we use the change in the number of financial analysts $\Delta Numest_t$ as the dependent variable. We first run a regression of $\Delta Numest_t$ against ΔAdv_t, controlling for $Size_{t-1}$ and BM_{t-1}. As can be seen in column (1), the coefficient of ΔAdv_t, γ_1, is positive and significant at the 1% level. In column (2), we further control for change in sales revenue, $\Delta Sale_t$, and change in profitability, $\Delta Prft_t$, to ensure that the impact of advertising on share turnover is not driven by sales growth or profitability growth. Then in column (3), we also control for the lagged variables Adv_{t-1} and $Numest_{t-1}$. The coefficients of ΔAdv_t in both column (2) and column (3) remain statistically significant at the 1% level after the additional controls. These results suggest that advertising helps a firm attract more financial analysts to cover the firm.

In columns (4) to (6), we re-run regression (10) with the change in share turnover $\Delta Turnover_t$ as the dependent variable. Similarly, the coefficients of ΔAdv_t in all three right-hand columns are positive and significant. These results show that a higher level of advertising growth increases share trading turnover in the stock market. Overall, our results above are consistent with hypothesis **H1**. They suggest that an increase in advertising helps a firm increase its visibility and draw more recognition from investors in the stock market.

5.2 Investor Recognition and the Effect of Advertising on Stock Returns

To link investor recognition to the impact of advertising on ex-post stock returns, we test hypothesis **H2**. In this test, we construct an interaction term between advertising and the recognition variable, both of which are measured in year t. Again, the recognition variable is either $\Delta Turnover_t$ or $\Delta Numest_t$. The interaction term captures the situation where a firm spends a large amount of advertising in year t and draws high visibility among investors in the same year t. Based on these interaction terms, we run a regression on future stock return in year $t+1$ against the interaction term:

$$\begin{aligned} Raw\ Return_{t+1} &= \phi_0 + \phi_1 Recognition_t \times \Delta Adv_t + \phi_2 \Delta Adv_t + \phi_3 Recognition_t \\ &\quad + \phi_4 Size_t + \phi_5 BM_t + \phi_6 Return_t + \phi_7 Control + \varepsilon. \end{aligned} \tag{11}$$

The control variables consist of $\Delta Sale_t$ and $\Delta Prft_t$. Hypothesis **H2** predicts that the negative effect of advertising on future stock returns is more pronounced if advertising helps a firm gain more investor recognition in the contemporaneous advertising year. Thus, we expect ϕ_1 to be negative.

We present the results from regression (11) in table 12. Due to space constraint, we present only the results with $Raw\ Return_{t+1}$ calculated in the ex-post window [1, 6]. In columns (1) and (2), the recognition variable is $\Delta Numest_t$. In column (1), we run a regression without controlling for $\Delta Sale_t$ and $\Delta Prft_t$; in column (2), we run a regression with such controls. In both columns, the coefficients of the interaction term between ΔAdv_t and $\Delta Numest_t$ (i.e., ϕ_1) are negative and they are significant at the 5% level. Thus, the above results with $\Delta Numest_t$ as the recognition variable support hypothesis **H2**.

We also run regression (11) with $\Delta Turnover_t$ as the recognition variable. We present the results in columns (3) and (4) in table 12. In column (3), we do not control for $\Delta Sale_t$ and $\Delta Prft_t$; in column (4), we control for both variables. As expected, the coefficients of the interaction term, ϕ_1, are negative and significant in both columns. In columns (5) and (6), we check the robustness of our results by using $Turnover_t$ as the recognition variable. Again, the coefficients of the interaction term, ϕ_1, are negative and they are significant at the 5% level. Thus, our results based on $\Delta Turnover_t$ as the recognition variable support hypothesis **H2** as well.

Overall, our results above suggest that the negative relation between advertising and ex-post stock returns is more pronounced for those firms that attract more investor recognition from their advertising campaign in the contemporaneous advertising year, such as the firms with high trading volume or the firms with improved analyst coverage. These results directly link the advertising effect to the investor recognition theory. They show that investor recognition does play a role in the relation between advertising and ex-post stock returns.

5.3 Idiosyncratic Volatility and the Effect of Advertising on Stock Returns

In the following, we test hypothesis **H3** by studying how a firm's idiosyncratic risk affects the relation between advertising and ex-post stock returns. The regression specification in this test is similar to that in regression (11). In particular, we interact adverting growth (ΔAdv_t) with idiosyncratic risk ($Risk_t$) or with the dummy of high idiosyncratic risk. The dummy of high risk equals one if the firm's $Risk_t$ is above the median $Risk_t$ of the whole sample. We run regressions on the future stock returns against this interaction term. Hypothesis **H3** predicts that the effect of high advertising growth on the reduction of ex-post stock returns is stronger for stocks with higher idiosyncratic risk. Thus, we expect the coefficient of the interaction term to be negative.

We present the results from this test in table 13. Due to space constraint, we present only the results with future returns calculated in the ex-post window [1, 6]. In columns (1) and (2), we first run regressions on idiosyncratic risk ($Risk_t$) or the dummy of high idiosyncratic risk, without introducing the interaction term. The coefficients of both risk variables are negative and significant. In columns (3)-(6), we run regressions with the interaction term as an additional independent variable. In columns (3) and (5), we do not control for $\Delta Sale_t$ and $\Delta Prft_t$; in columns (4) and (6), we control for both variables. As expected, the coefficient of the interaction term interacting ΔAdv_t with either $Risk_t$ or the dummy of high $Risk_t$ is negative and significant. These results are consistent with hypothesis **H3**. They suggest that the effect of advertising on ex-post stock returns is stronger for stocks with higher idiosyncratic volatilities.

5.4 Advertising and Firm Characteristics

In the following, we test hypothesis **H4**. We first study the advertising effect in firms with different sizes. We run a regression of future stock returns against the interaction term between advertising growth (ΔAdv_t) and firm size ($Size_t$). Hypothesis **H4** predicts the coefficient of the interaction term to be positive. The results from this regression are presented in columns (1) and (2) in table 14. Again, we present here only the results with future returns measured in the event window [1, 6]. As expected, the coefficient of the interaction term between ΔAdv_t and $Size_t$ is positive and it is significant at the 1% level. These results support hypothesis **H4**. They suggest that the relation between high advertising and low future stock returns is stronger in smaller firms.

Second, we compare the advertising effect between value firms and glamour firms. We run a regression of future stock returns against the interaction term between ΔAdv_t and book-to-market ratio (BM_t). Hypothesis **H4** predicts the coefficient of the interaction term to be negative. We present the results from this regression in columns (3) and (4) in table 14. As can be seen, the coefficient of the interaction term between ΔAdv_t and BM_t is negative and highly significant. These results support hypothesis **H4**. They suggest that the relation between high advertising and low future stock returns is stronger in value firms than in glamour firms.

Finally, we study the advertising effect for firms with different operating performances. We run a regression of future stock return against the interaction term between ΔAdv_t and $\Delta Prft_t$, where $\Delta Prft_t$ is used to measure a firm's operating performance.[19] Hypothesis **H4** predicts the coefficient of the interaction term to be positive. We present the results from the above regression in columns (5) and (6) in table 14. As expected, the coefficient of the interaction term between ΔAdv_t and $\Delta Prft_t$ is positive and significant. These results support support hypothesis **H4**. They suggest that the relation between high advertising and low future stock returns is stronger for firms with poorer prior operating performances.

5.5 Advertising and Stock Return: Positive versus Negative Advertising Growth

In the following, we test hypothesis **H5**. Hypothesis **H5** states that the effect of advertising on ex-post stock returns is stronger when $\Delta Adv_t \geq 0$ than in the case when $\Delta Adv_t < 0$. To test this hypothesis, we first disaggregate our advertising sample to two subsamples: one with $\Delta Adv_t \geq 0$ (4,262 observations) and the other with $\Delta Adv_t < 0$ (2,240 observations). We then study separately the impact of advertising on ex-post stock returns based on these two subsamples. We present in panels A and B in table 15 the results from portfolio sorts. The results in panel A are based on the sample covering from 1996 to 2005 and the results in panel B are based on the sample covering from 1980 to 2005 but without years 1994 and 1995. We triple-sort the portfolios by size ($Size_t$), and book-to-market ratio (BM_t), and advertising growth (ΔAdv_t). Due to space constraints, we present only the

[19] Our results remain qualitatively unchanged if we use $Prft_t$ rather than $\Delta Prft_t$ to measure a firm's operating performance.

raw returns and the size, book-to-market, and momentum adjusted returns for each portfolio in the ex-post event windows [1, 6] and [1, 12]. As can be seen, both the raw return and the adjusted returns of the (P5-P1) portfolio are negative and significant in the subsample with $\Delta Adv_t \geq 0$. In contrast, in the subsample with $\Delta Adv_t < 0$, they are insignificant in panel A while negative and significant in panel B. Thus, the effect of advertising on ex-post stock returns is stronger when $\Delta Adv_t \geq 0$ than when $\Delta Adv_t < 0$.

We also run Fama-MacBeth regression (7) separately for the subsample with $\Delta Adv_t \geq 0$ and the subsample with $\Delta Adv_t < 0$. We present the results from these regressions in panel C in table 15. We find that the coefficients of ΔAdv_t are negative in the regression based on the subsample with $\Delta Adv_t \geq 0$. All these coefficients are significant at the 1% level. In contrast, the coefficients of ΔAdv_t are insignificant in the subsample with $\Delta Adv_t < 0$.

Overall, our results here support hypothesis **H5.** They show that the effect of advertising growth on ex-post stock returns is stronger when advertising increases than in the case when advertising decreases. The similar pattern can also be found for the tests of the other hypotheses. In general, our empirical results are stronger in the subsample with $\Delta Adv_t \geq 0$ than in the subsample with $\Delta Adv_t < 0$. However, to maintain a reasonable sample size and to mitigate the sample selection concerns, we have chosen to present in the earlier sections the results based on the full advertising sample. The results based on the subsample with $\Delta Adv_t \geq 0$ are available upon requests from readers.

6 The Corporate Finance Implications of the Effect of Advertising on Stock Returns

Merton (1987) also predicts that a firm's financing and investing decisions are affected by the degree of investor recognition. This implies that a firm's advertising decision could also be affected by the considerations of its effect on investor recognition. In the following, we further extend the incomplete information framework discussed in Section 2 to analyze how the effect of advertising on investor recognition may affect a firm's choice of advertising expenditures.[20]

Consider a firm deciding on its advertising budget. The managers of the firm have the objective of maximizing the long-run value of its equity. Assume that the effect of advertising on stock returns is common knowledge to managers. Also assume that the marginal effect of advertising on investor recognition is decreasing in the amount of advertising expenditures (i.e., advertising expenditures have decreasing returns to scale with respect to investor recognition). As a result, the marginal effect of advertising on the reduction in the firm's cost of capital is decreasing in the amount of its advertising expenditures.

In this framework, the benefit of advertising to the firm is the decrease in its cost of capital. Since the marginal effect of advertising on investor recognition is decreasing in advertising, this benefit from the reduction in cost of capital would become smaller as the firm increases its level of advertising expenditures. The cost of advertising is the opportunity cost of the capital spent on advertising. Specifically, if a firm funds its advertising expenditures from its internal capital (without accessing the external capital markets), then the firm has to scale back its investment in its growth opportunities. As the firm spends a larger amount of capital on advertising, the effect of its financial constraint becomes more binding, so that it has to forego projects with larger and larger net present values. Thus, the cost of the firm's foregone growth opportunities is increasing in the amount of internal capital it spends on advertising. If, on the other hand, a firm accesses the external capital markets to make up for the funds spent on advertising, it has to incur a significant cost of raising this external capital. The cost of raising external capital is likely to be either constant or increasing in the amount of external capital raised. Thus, in both cases, the opportunity cost of advertising is non-decreasing in the amount of advertising expenditures.

[20] When we discuss advertising expenditures, we consider only the advertising expenditures needed to increase investor recognition. Of course, a firm may undertake a certain amount of advertising driven by product market considerations, and some of this advertising will have effects on investor recognition as well. Thus, the level of advertising expenditures we discuss here can be thought of as the amount over and above the level the firm would undertake purely from a product market point of view.

In equilibrium, the firm trades off the above cost and benefit of increasing its advertising expenditures. It determines its equilibrium advertising amount such that the marginal costs of advertising equals the marginal benefits of advertising. Thus, the equilibrium amount of advertising incurred by various firms will be determined by the magnitude of their opportunity cost of the funds needed for advertising and the effectiveness of advertising in attracting investor recognition (and thus lowering their cost of capital). In summary, a firm will increase its advertising beyond that required by purely product market considerations because of the benefit provided by advertising through increasing investor recognition for its equity and the resulting reduction in its cost of capital.

It is worth noting that the primary focus of this paper is on the effect of advertising on investor recognition and therefore on stock returns. We will not test empirically the predictions we make here on how a firm's advertising decisions are affected by the effect of advertising on investor recognition. Testing such predictions are outside the scope of this paper. Our discussion in this section is only intended to provide a roadmap to future researches on how firms may make use of the results we develop (on the relation between advertising, investor recognition, and stock returns) in their corporate decision making.

7 Conclusion

This paper studies the effect of advertising on stock returns. We find that a higher level of advertising growth is associated with a larger stock return in the advertising year but a smaller stock return in the year subsequent to the advertising year. This advertising effect on stock returns holds after we control for other price predictors, such as size, book-to-market, and momentum.

We further relate the effect of advertising on stock returns to the investor recognition theory. We conjecture that advertising affects stock returns by helping gain recognition to the firm's stock. According to Merton's (1987) investor recognition model, the increased degree of investor recognition attracted by advertising would cause a decrease in stock return in the long run subsequent to the advertising year. We test this investor recognition explanation and document five consistent findings. First, advertising increases a firm's visibility among investors in the advertising year. Second, the effect of advertising growth on future stock returns is more pronounced for a firm if advertising helps the firm gain more investor recognition in the contemporaneous advertising year. Third, the effect of advertising growth on future stock returns is stronger if the firm's idiosyncratic risk is higher. Fourth, the effect of advertising growth on future stock returns is stronger for smaller firms, value firms, and firms with poorer ex-ante operating performance. Finally, we also find that the effect of advertising on future stock returns is stronger when advertising increases than in the case when advertising decreases.

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Table 1: Distribution of Sample across Years. The sample consists of firms with no missing values on advertising expenditures and other variables in both Compustat and CRSP. This table presents the number of firms, the number of firms with zero advertising, and the mean and median amounts of advertising expenditures, log change in advertising expenditures, and the percentage change in advertising expenditures for sample firms.

Year	Number of firms	Number of firms with zero advertising	Advertising expenditures (MM$)		Log change in advertising		Percentage change in advertising	
			Mean	Median	Mean	Median	Mean	Median
1980	970	425	24.121	0.930	0.129	0.135	0.166	0.129
1981	1,046	512	25.111	0.337	0.126	0.125	0.134	0.121
1982	1,012	488	28.192	0.524	0.083	0.082	0.104	0.080
1983	1,022	456	30.947	1.132	0.112	0.116	0.140	0.120
1984	1,226	527	29.791	0.842	0.179	0.156	0.262	0.160
1985	1,209	536	29.359	0.555	0.083	0.088	0.122	0.087
1986	1,226	512	31.617	0.785	0.128	0.106	0.219	0.105
1987	1,266	527	32.004	0.833	0.143	0.115	0.262	0.111
1988	1,151	510	36.899	0.616	0.134	0.120	0.209	0.112
1989	1,132	517	39.918	0.570	0.100	0.085	0.194	0.077
1990	1,103	519	44.892	0.357	0.088	0.080	0.432	0.075
1991	1,033	505	48.723	0.154	0.058	0.052	0.078	0.040
1992	1,224	578	46.089	0.328	0.114	0.086	0.175	0.081
1993	1,411	650	41.553	0.262	0.083	0.082	0.169	0.076
1994	567	167	78.242	2.600	0.207	0.146	0.422	0.137
1995	350	24	137.254	9.510	0.176	0.132	0.351	0.141
1996	450	22	134.690	8.651	0.181	0.110	0.350	0.116
1997	548	17	121.425	7.815	0.204	0.125	0.737	0.132
1998	578	18	118.636	10.000	0.164	0.111	0.390	0.116
1999	565	14	131.445	13.900	0.200	0.105	3.591	0.111
2000	703	15	105.987	9.400	0.246	0.129	0.989	0.138
2001	657	17	115.501	9.700	-0.119	-0.025	0.083	-0.024
2002	714	18	116.719	10.219	-0.085	-0.003	0.106	-0.004
2003	682	18	138.342	12.730	0.092	0.073	0.410	0.074
2004	873	21	120.698	8.218	0.144	0.102	0.593	0.107
2005	975	28	115.564	7.900	0.124	0.083	0.375	0.086
1980-2005	23,693	7,641	61.164	2.482	0.115	0.096	0.411	0.096
1996-2005	6,745	188	119.045	9.384	0.111	0.082	0.703	0.085

Table 2: Sample Statistics. This table provides means and medians of the variables used in the paper. Year *t* stands for the advertising year; year *t-1* stands for the year prior to the advertising year, and year *t+1* stands for the year subsequent to the advertising year. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year *t*. BM is the ratio of the book value to the market value of equity. Idiosyncratic risk is the standard deviation of market-adjusted daily stock returns. Numest is the log of the number of analysts following the firm in the last month of the fiscal year. Turnover is the ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. Change in number of analysts is the change in Numest from year *t-1* to *t*. Change in turnover is the change in trading turnover from year *t-1* to year *t*, scaled by the absolute value of trading turnover in year *t-1*. Prft is the operating income before interest, tax, depreciation, and amortization (EBITDA) scaled by the book value of assets. Sale is the log value of sales revenue. $\Delta Prft_t$ and $\Delta Sale_t$ are the changes from year *t-1* to year *t*. Standardized unexpected earnings (SUE) is $(E_q - E_{q-4} - c_q)/s_q$, where E_q and E_{q-4} are earnings in quarter *q*, the last quarter of the fiscal year, and in the last quarter in the prior year, respectively; and c_q and s_q are the standard deviation and the average, respectively, of $(E_q - E_{q-4})$ over the preceding eight quarters. Discretionary accruals is calculated using the modified Jones model. Asset growth is the percentage change in the book value of assets from year *t-1* to year *t*.

Panel A: Means and Medians

Variables	**# of Obs.**	**Mean**	**Median**
Log change in advertising (ΔAdv_t)	6,527	0.110	0.081
Raw $return_t$ in the advertising year	6,745	0.101	0.026
Log of market capitalization in the advertising year ($Size_t$)	6,745	6.362	6.208
Book-to-market ratio in the advertising year (BM_t)	6,745	0.677	0.484
Log change in sales ($\Delta Sale_t$)	6,745	0.159	0.104
Log sales in the year prior to the advertising year ($Sale_{t-1}$)	6,745	6.286	6.183
Change in operating income ($\Delta Prft_t$)	6,718	-0.013	-0.001
Operating income in the year prior to the advertising year ($Prft_{t-1}$)	6,722	0.116	0.134
Idiosyncratic Risk ($Risk_t$)	6,742	0.033	0.028
Trading turnover in advertising year ($Turnover_t$)	6,742	1.328	0.951
Change in Trading turnover in advertising year ($\Delta Turnover_t$)	5,156	0.826	-0.031
Number of financial analysts following in advertising year ($Numest_t$)	5,385	8.714	6.000
Change in log number of analysts following ($\Delta Numest_t$)	4,224	-0.027	0.000
Standardized unexpected earnings (SUE_t)	4,713	-0.439	0.042
Asset $Growth_t$	6,743	0.131	0.082
Discretionary $accurals_t$	5,203	-0.008	-0.006983

Panel B: Contemporaneous correlations, autocorrelations, and cross-autocorrelation

	Adv_t	$Numest_t$	$Turnover_t$
Adv_{t-1}	0.985	0.562	-0.031
$Size_t$	0.756	0.732	0.060
BM_t	-0.029	-0.184	-0.046
$Sale_t$	0.856	0.627	-0.019
$Prft_t$	0.230	0.250	-0.041
$Return_{t-1}$	0.072	0.108	0.114
$Numest_{t-1}$	0.579	0.909	0.219
$Turnover_{t-1}$	-0.004	0.218	0.723

Table 3: Comparison between Firms Reporting and Not Reporting Advertising to Compustat. This table provides means of the variables for various samples in Panels A and B and the results from probit regressions in panel C. Year *t* stands for the advertising year. ΔAdv_t is the log change in advertising expenditures from year *t-1* to year *t*. BM is the ratio of the book value to the market value of equity. Prft is EBITDA scaled by the book value of assets. $\Delta Prft_t$ is the change in Prf_t from year *t-1* to year *t*. $\Delta Sale_t$ is the log change in sales revenue from year *t-1* to *t*. Raw return [1, 12] is raw stock return in the one-year window subsequent to the advertising year *t*.

Panel A: The sample covers 1996-2005.

Variables	(1) whole sample	(2) reporting positive adv.	(3) reporting zero adv.	(4) Non-reporting adv.	(5) non-reporting – reporting	(6) non-reporting - zero adv.
Number of firms	27,034	6,557	188	20,289		
% of whole sample	100%	24%	3%	75%		
$Size_t$	6.031	6.351	5.536	5.933	-0.396***	0.397***
BM_t	0.715	0.688	0.708	0.724	0.035***	0.016
$\Delta Sale_t$	0.153	0.160	0.123	0.151	-0.008	0.028
$\Delta Prft_t$	-0.016	-0.016	-0.019	-0.016	0.001	0.003
Raw $return_t$	0.106	0.099	-0.024	0.109	0.014	0.133***
Raw return [1, 12]	0.134	0.133	0.117	0.135	0.002	0.018

Panel B: The sample covers 1980-2005 excluding years 1994 and 1995.

Variables	(1) whole sample	(2) reporting positive adv.	(3) reporting zero adv.	(4) Non-reporting adv.	(5) non-reporting – reporting	(6) non-reporting - zero adv.
Number of firms	58,632	23,693	7,641	27,298		
% of whole sample	100%	40%	32%	47%		
$Size_t$	5.720	5.917	5.489	5.684	-0.094***	0.195***
BM_t	0.798	0.745	0.916	0.797	-0.004	-0.119***
$\Delta Sale_t$	0.124	0.134	0.083	0.129	0.011***	0.046***
$\Delta Prft_t$	-0.013	-0.014	-0.010	-0.014	-0.001	-0.003***
Raw $return_t$	0.123	0.133	0.125	0.118	-0.013***	-0.008
Raw return [1, 12]	0.132	0.145	0.118	0.130	-0.007	0.012*

Panel C: Probit regressions on the dummy of non-reporting firms; sample covers 1996-2005.

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.999***	3.625***	2.018***	4.102***	4.141***	4.348***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
$Size_t$	-0.333***			-0.188***	-0.372***	-0.171***
	[0.000]			*[0.000]*	*[0.000]*	*[0.000]*
BM_t	-0.121***			-0.058*	-0.125***	-0.028
	[0.000]			*[0.055]*	*[0.000]*	*[0.368]*
Raw $return_t$	0.232***			0.180***	0.220***	0.140***
	[0.000]			*[0.000]*	*[0.000]*	*[0.000]*
$\Delta Sale_t$		-0.158***		-0.061		-0.110**
		[0.002]		*[0.249]*		*[0.044]*
$Sale_{t-1}$		-0.297***		-0.182***		-0.277***
		[0.000]		*[0.000]*		*[0.000]*
$\Delta Prft_t$			0.212		0.578***	0.800***
			[0.152]		*[0.000]*	*[0.000]*
$Prft_{t-1}$			0.436***		1.133***	1.824***
			[0.006]		*[0.000]*	*[0.000]*

Table 4: Determinants of Advertising: Fama-MacBeth Regressions and Heckman Regressions. The sample period covers 1996 to 2005. The dependent variable is ΔAdv_t, the log change in advertising expenditures from year *t-1* to the advertising year *t*. Size is the log of market capitalization. BM is the ratio of the book value to the market value of equity. Raw return is stock return in year *t*. Sale is the log of sales revenue. $\Delta Sale_t$ is the log change in sales revenue from year *t-1* to year *t*. Prft is EBITDA scaled by the book value of assets. $\Delta Prft_t$ is the change in operation income from year *t* to year *t-1*. *p*-values are provided in brackets. *, **, and *** in superscript indicate significant difference from zero at the 10%, 5%, and 1% level respectively, using a two-tailed test.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Constant	-0.086	-0.138	0.206***	-0.169**	-0.196***	1.102***	0.038	1.143***	-2.304**	-4.724
	[0.139]	*[0.157]*	*[0.002]*	*[0.012]*	*[0.000]*	*[0.000]*	*[0.773]*	*[0.000]*	*[0.046]*	*[0.392]*
Adv_{t-1}	-0.085***	-0.064***	-0.041***	-0.072***	-0.067***	-0.096***	-0.063***	-0.080***	-0.062***	-0.062***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
$Size_t$	0.072			0.02	0.038	0.080***			-0.206*	-0.385
	[0.101]			*[0.610]*	*[0.235]*	*[0.002]*			*[0.081]*	*[0.447]*
BM_t	0.215***			0.114***	0.101***	0.087***			-0.006	-0.045
	[0.000]			*[0.000]*	*[0.000]*	*[0.000]*			*[0.839]*	*[0.699]*
$Size_{t-1}$	-0.007			-0.001	-0.017	-0.056**			0.196*	0.361
	[0.892]			*[0.974]*	*[0.599]*	*[0.049]*			*[0.077]*	*[0.433]*
BM_{t-1}	-0.250***			-0.148***	-0.118***	-0.067***			-0.159***	-0.26
	[0.000]			*[0.000]*	*[0.000]*	*[0.001]*			*[0.004]*	*[0.318]*
Raw $return_t$	0.044			-0.019	-0.015	0.043*			0.133**	0.236
	[0.238]			*[0.599]*	*[0.708]*	*[0.059]*			*[0.043]*	*[0.392]*
$\Delta Sale_t$		0.536***		0.504***	0.586***		0.572***		0.708***	0.927**
		[0.000]		*[0.000]*	*[0.000]*		*[0.000]*		*[0.000]*	*[0.019]*
$Sale_{t-1}$		0.053***		0.046**	0.037***		0.045***		0.154***	0.267
		[0.000]		*[0.028]*	*[0.009]*		*[0.000]*		*[0.007]*	*[0.358]*
$\Delta Prft_t$			-0.239*		-0.848***			-0.072		-0.656*
			[0.097]		*[0.000]*			*[0.242]*		*[0.056]*
$Prft_{t-1}$			0.161		0.230**			0.265***		0.199
			[0.267]		*[0.047]*			*[0.000]*		*[0.590]*
Regression Method			Fama MacBeth Model					Heckman Two-Stage Model		
Observations	6,527	6,527	6,502	6,527	6,502	27,948	27,948	27,948	27,948	27,948

Table 5: Raw Returns and Adjusted Returns, Portfolio Sorts. The sample period covers 1996 to 2005. Raw returns are calculated for five event windows: year t stands for advertising year; month 1 stands for the first month subsequent to the advertising year, etc. Adjusted return is computed as the difference between the stock's raw return and the mean of its matching portfolio. Matching portfolios are created based on size and book to market (BM) ratio or on size, BM, and momentum. In panel A, all stocks are first sorted into size quintiles based on their sizes, and then within each size quintile, are ranked into additional quintiles based on BM. We further rank firms into advertising quintiles for each of the 25 size and BM groups based on the log change in advertising expenditures. Equally weighted portfolios are formed for stocks in similar advertising quintiles across the 25 size and BM groups. The table reports the average portfolio returns, along with the difference in the returns of portfolios in quintiles 5 and 1, P5-P1. We sort portfolios in panel B in the similar manner. Standard errors are calculated using a Newey-West correction for serial dependence.

	Raw return					**Size and BM adjusted return**					**Size, BM, and momentum adjusted return**				
Rank	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
Panel A: Portfolios are triple-sorted by size, book-to-market ratio, and change in advertising expenditures (ΔAdv_t).															
1	0.053	0.077	0.058	0.142	0.144	-0.094	0.003	0.006	0.003	0.015	-0.015	0.007	0.009	0.010	0.021
2	0.067	0.089	0.069	0.169	0.158	-0.071	0.011	0.012	0.020	0.028	-0.001	0.010	0.009	0.018	0.022
3	0.120	0.088	0.060	0.161	0.137	-0.036	0.013	0.007	0.022	0.010	-0.001	0.011	0.004	0.016	0.005
4	0.125	0.091	0.042	0.146	0.116	-0.015	0.013	-0.013	-0.002	-0.013	0.005	0.009	-0.012	-0.006	-0.013
5	0.123	0.025	0.006	0.056	0.071	-0.021	-0.051	-0.046	-0.086	-0.058	0.014	-0.049	-0.039	-0.079	-0.048
P5-P1	0.071	-0.052	-0.052	-0.086	-0.073	0.072	-0.054	-0.052	-0.090	-0.073	0.030	-0.056	-0.048	-0.088	-0.069
p-value	0.007	0.001	0.001	0.001	0.002	0.001	0.000	0.001	0.000	0.002	0.001	0.000	0.001	0.000	0.002
Panel B: Portfolios are triple-sorted by sales, book-to-market ratio, and ΔAdv_t.															
1	0.048	0.087	0.060	0.151	0.137	-0.090	0.012	0.006	0.010	0.007	-0.010	0.017	0.007	0.017	0.010
2	0.078	0.086	0.077	0.176	0.174	-0.057	0.007	0.020	0.028	0.043	-0.008	0.004	0.020	0.026	0.044
3	0.110	0.084	0.041	0.144	0.115	-0.051	0.009	-0.010	0.005	-0.011	0.001	0.010	-0.013	0.002	-0.016
4	0.109	0.079	0.043	0.132	0.122	-0.028	0.000	-0.012	-0.016	-0.008	-0.002	-0.003	-0.011	-0.019	-0.006
5	0.140	0.035	0.014	0.070	0.076	-0.012	-0.039	-0.037	-0.069	-0.051	0.021	-0.039	-0.033	-0.066	-0.046
P5-P1	0.092	-0.052	-0.046	-0.081	-0.061	0.078	-0.052	-0.043	-0.080	-0.058	0.031	-0.057	-0.040	-0.083	-0.056
p-value	0.000	0.001	0.004	0.001	0.007	0.000	0.001	0.004	0.001	0.008	0.001	0.000	0.006	0.000	0.008

Table 6: Portfolios Sorts, Robustness Checks. All stocks are first sorted into size quintiles based on their sizes, and then within each size quintile, are ranked into additional quintiles based on BM. We further rank firms into advertising quintiles for each of the 25 size and BM groups based on the log change in advertising expenditures. Equally weighted portfolios are formed for stocks in similar advertising quintiles across the 25 size and BM groups. All returns are calculated for five event windows: 1 stands for the first month subsequent to advertising year, etc. Adjusted return is computed as the difference between the stock's raw return and the mean of its matching portfolio. Matching portfolios are created based on size and book to market (BM) ratio or on size, BM, and momentum. Panel A is based on a sample of firms reporting advertising to Compustat. Panels B and C are based on a sample of matching firms, which are selected on the basis of industry, size, and book-to-market ratio from firms not reporting advertising to Compustat. The table reports the average portfolio returns, along with the difference in the returns of portfolios in quintiles 5 and 1, P5-P1. Standard errors are calculated using a Newey-West correction for serial dependence.

	Raw return					**Size and BM adjusted return**					**Size, BM, and momentum adj. return**				
Rank	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**year t**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
Panel A: Advertising sample covers 1980-2005 without years 1994 and 1995. Portfolios are sorted by size, book-to-market, and ΔAdv_t.															
1	0.094	0.101	0.043	0.150	0.143	-0.058	0.013	0.004	0.017	0.008	-0.009	0.014	0.005	0.020	0.011
2	0.086	0.092	0.060	0.158	0.148	-0.065	0.004	0.010	0.011	0.017	-0.002	0.005	0.008	0.011	0.013
3	0.172	0.078	0.036	0.117	0.123	-0.022	0.002	-0.005	-0.004	-0.005	-0.004	0.003	-0.005	-0.003	-0.005
4	0.129	0.100	0.038	0.141	0.153	-0.012	0.006	-0.004	0.001	0.003	0.000	0.007	-0.003	0.003	0.004
5	0.146	0.090	0.032	0.134	0.129	-0.004	-0.006	-0.012	-0.014	-0.014	0.009	-0.005	-0.009	-0.010	-0.011
P5-P1	0.052	-0.011	-0.011	-0.016	-0.014	0.055	-0.019	-0.016	-0.030	-0.022	0.019	-0.020	-0.014	-0.030	-0.022
p-value	0.000	0.158	0.145	0.164	0.206	0.000	0.007	0.025	0.006	0.040	0.000	0.005	0.040	0.005	0.035
Panel B: Matching sample covers 1996-2005. Portfolios are sorted by size, book-to-market ratio, and ΔAdv_t.															
1	0.128	0.080	0.030	0.140	0.075	-0.003	-0.004	0.001	0.008	-0.030	0.005	-0.006	-0.003	0.002	-0.033
2	0.131	0.063	0.006	0.083	0.071	-0.005	-0.017	-0.020	-0.040	-0.028	-0.005	-0.014	-0.018	-0.036	-0.025
3	0.141	0.073	0.002	0.084	0.064	-0.004	-0.011	-0.028	-0.048	-0.037	-0.007	-0.010	-0.031	-0.050	-0.044
4	0.145	0.084	0.008	0.102	0.067	0.009	0.006	-0.020	-0.019	-0.036	-0.006	0.006	-0.015	-0.015	-0.027
5	0.123	0.076	0.021	0.109	0.089	-0.019	-0.002	-0.005	-0.014	-0.016	0.003	-0.002	-0.005	-0.015	-0.013
P5-P1	-0.005	-0.004	-0.010	-0.032	0.014	-0.016	0.002	-0.005	-0.022	0.014	-0.002	0.004	-0.001	-0.017	0.020
p-value	0.857	0.782	0.572	0.248	0.567	0.464	0.910	0.751	0.395	0.559	0.859	0.804	0.938	0.497	0.397
Panel C: Matching sample covers 1980-2005 without years 1994 and 1995. Portfolios are sorted by size, book-to-market ratio, and ΔAdv_t.															
1	0.128	0.080	0.030	0.140	0.075	-0.003	-0.004	0.001	0.008	-0.030	0.005	-0.006	-0.003	0.002	-0.033
2	0.131	0.063	0.006	0.083	0.071	-0.005	-0.017	-0.020	-0.040	-0.028	-0.005	-0.014	-0.018	-0.036	-0.025
3	0.141	0.073	0.002	0.084	0.064	-0.004	-0.011	-0.028	-0.048	-0.037	-0.007	-0.010	-0.031	-0.050	-0.044
4	0.145	0.084	0.008	0.102	0.067	0.009	0.006	-0.020	-0.019	-0.036	-0.006	0.006	-0.015	-0.015	-0.027
5	0.123	0.076	0.021	0.109	0.089	-0.019	-0.002	-0.005	-0.014	-0.016	0.003	-0.002	-0.005	-0.015	-0.013
P5-P1	-0.005	-0.004	-0.010	-0.032	0.014	-0.016	0.002	-0.005	-0.022	0.014	-0.002	0.004	-0.001	-0.017	0.020
p-value	0.857	0.782	0.572	0.248	0.567	0.464	0.910	0.751	0.395	0.559	0.859	0.804	0.938	0.497	0.397

Table 7: Fama-MacBeth Regressions of Stock Returns Against Advertising. The sample period covers 1996 to 2005. The dependent variable is raw stock return. Raw return is measured in one of the four event windows: the advertising year *t*; [1,6], a six-month window right after the advertising year; [7,12], a six-month window from month 7 to 12 subsequent to the advertising year; [1,12], a 12-month window subsequent to the advertising year; and [7,18], a 12-month window from month 7 to 18 subsequent to the advertising year. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year *t*. $\Delta Prft_t$ or $\Delta Sale_t$, change in EBITDA/Assets or the log of sales from year *t-1* to the advertising year *t*. The coefficients are time-series means of the coefficients from cross-sectional regressions run every year (i.e., Fama-MacBeth (1973) coefficients). *p*-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level respectively, using a two-tailed test.

	Advertising year raw return$_t$		Raw return in months [1, 6]		Raw return in months [7, 12]		Raw return in months [1, 12]		Raw return in months [7, 18]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.075	0.08	0.101***	0.127***	0.043	0.06	0.183**	0.221	0.145***	0.173***
	[0.493]	*[0.391]*	*[0.005]*	*[0.000]*	*[0.300]*	*[0.145]*	*[0.015]*	*[0.106]*	*[0.010]*	*[0.005]*
ΔAdv_t	0.088***	0.064**	-0.039**	-0.019**	-0.063**	-0.048**	-0.086***	-0.063**	-0.068**	-0.047
	[0.006]	*[0.020]*	*[0.013]*	*[0.037]*	*[0.014]*	*[0.043]*	*[0.004]*	*[0.033]*	*[0.038]*	*[0.175]*
$Size_{t-1}$	0	-0.002								
	[0.997]	*[0.890]*								
BM_{t-1}	0.068***	0.075***								
	[0.001]	*[0.000]*								
$Size_t$			-0.005	-0.007	0.002	0.001	-0.007	-0.01	-0.002	-0.004
			[0.340]	*[0.157]*	*[0.604]*	*[0.882]*	*[0.401]*	*[0.417]*	*[0.772]*	*[0.549]*
BM_t			0.020**	0.018*	-0.007	-0.008	0.014	0.01	0.007	0.004
			[0.044]	*[0.054]*	*[0.390]*	*[0.295]*	*[0.318]*	*[0.690]*	*[0.494]*	*[0.663]*
Raw Return$_t$			0.018	0	-0.009	-0.014	0.018	-0.006	0.019	0.01
			[0.458]	*[0.990]*	*[0.667]*	*[0.494]*	*[0.739]*	*[0.908]*	*[0.410]*	*[0.599]*
$\Delta Sale_t$		0.203***		-0.048***		-0.044**		-0.061		-0.084*
		[0.003]		*[0.008]*		*[0.012]*		*[0.258]*		*[0.077]*
$\Delta Prft_t$		1.364***		0.354***		0.197***		0.514***		0.315***
		[0.000]		*[0.000]*		*[0.001]*		*[0.008]*		*[0.000]*
Observations	6,527	6,502	6,527	6,502	6,527	6,502	6,527	6,502	6,527	6,502

Table 8: Heckman Two-stage Regressions of Stock Returns Against Advertising. The sample period covers 1996 to 2005. The dependent variable is raw stock return or adjusted return. Raw return is measured in one of the four event windows: the advertising year *t* ; [1,6], a six-month window right after the advertising year; [7,12], a six-month window from month 7 to 12 subsequent to the advertising year; [1,12], a 12-month window subsequent to the advertising year; and [7,18], a 12-month window from month 7 to 18 subsequent to the advertising year. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year *t* . $\Delta Prft_t$ or $\Delta Sale_t$, change in EBITDA/Assets or the log of sales from year *t-1* to the advertising year *t* . The results from the first-stage selection regression are not reported. *p* -values are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level respectively, using a two-tailed test.

	Advertising year raw return$_t$		**Raw return in months [1, 6]**		**Raw return in months [7, 12]**		**Raw return in months [1, 12]**		**Raw return in months [7, 18]**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-2.303***	-1.797***	0.677***	0.935***	0.176**	-0.123	0.376**	0.844***	0.105	0.268*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.022]	[0.225]	[0.016]	[0.000]	[0.472]	[0.067]
ΔAdv_t	0.061***	0.035***	-0.038***	-0.013	-0.049**	-0.030***	-0.079***	-0.043***	-0.071***	-0.039***
	[0.000]	[0.005]	[0.000]	[0.110]	[0.023]	[0.000]	[0.000]	[0.001]	[0.000]	[0.001]
$Size_{t-1}$	0.131***	0.109***								
	[0.000]	[0.000]								
BM_{t-1}	-0.127***	-0.125***								
	[0.000]	[0.000]								
$Size_t$			-0.026***	-0.038***	-0.007	0.009**	-0.012*	-0.032***	0.003	-0.005
			[0.000]	[0.000]	[0.403]	[0.031]	[0.078]	[0.000]	[0.643]	[0.397]
BM_t			0.011*	0.011*	0.013	-0.007	0.007	0.008	-0.004	-0.002
			[0.084]	[0.086]	[0.465]	[0.237]	[0.422]	[0.390]	[0.670]	[0.837]
Raw $Return_t$			0.026***	0.019**	-0.034	-0.054***	-0.013	-0.030**	-0.030**	-0.037***
			[0.001]	[0.018]	[0.140]	[0.000]	[0.325]	[0.020]	[0.011]	[0.002]
$\Delta Sale_t$		0.158***		-0.104***		-0.076***		-0.142***		-0.144***
		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]
$\Delta Prft_t$		0.651***		0.360***		0.328***		0.702***		0.402***
		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]
Mills ratio	1.301***	1.004***	-0.349***	-0.479***	-1.126***	0.108*	-0.128	-0.369***	0.011	-0.056
	[0.000]	[0.000]	[0.000]	[0.000]	[0.005]	[0.072]	[0.176]	[0.000]	[0.900]	[0.516]
Observations	27,034	27,034 #	27,034	27,034 #	27,034	27,034 #	27,034	27,034 #	27,034	27,034

Table 9: Fama-MacBeth Regressions of Stock Returns Against Advertising: Robustness Checks. The sample in columns (1) - (4) consists of matching firms in years 1996 - 2005, selected for the advertising sample on the basis of industry, size, and book-to-market ratio from firms not reporting advertising expenditures. The sample in columns (5) - (10) in panel A consists of firms reporting advertising firms between years 1980 and 2005, excluding years 1994 and 1995. The sample in panel B consists of firms reporting advertising expenditures in years 1996 - 2005. The dependent variable is raw stock return or size and book-to-market adjusted return. Window [1, 6] is a six-month window starting from the first month to the sixth month subsequent to the advertising year, etc. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to the advertising year *t*. $\Delta Prft_t$ and $\Delta Sale_t$ are the changes in EBITDA/Assets and in log sales from year *t-1* to year *t*, respectively. Asset growth is the growth of the book value of asset from year *t-1* to year *t*. Discretionary accruals are calculated following the modified Jones model. Standardized unexpected earnings (SUE) is $(E_q - E_{q-4} - c_q)/s_q$, where E_q and E_{q-4} are earnings in the last quarter in the current year and in the last quarter in the prior year, respectively; and c_q and s_q are the standard deviation and the average, respectively, of $(E_q - E_{q-4})$ over the preceding eight quarters. The coefficients are Fama-MacBeth (1973) coefficients. *p*-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level respectively.

Panel A: Alternative samples

	Raw return in months [1, 6]		**Raw return in months [1, 12]**		**Raw return in months [1, 6]**		**Raw return in months [1, 12]**		**Raw return in months [7, 18]**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Constant	0.093***	0.098***	0.118***	0.124***	0.054	0.074*	0.115*	0.146**	0.101*	0.125**
	[0.003]	*[0.001]*	*[0.000]*	*[0.007]*	*[0.160]*	*[0.075]*	*[0.065]*	*[0.032]*	*[0.061]*	*[0.032]*
ΔAdv_t	0.005	0.001	0.001	-0.005	-0.021*	-0.013*	-0.042*	-0.027	-0.046***	-0.031**
	[0.574]	*[0.891]*	*[0.931]*	*[0.829]*	*[0.051]*	*[0.069]*	*[0.084]*	*[0.146]*	*[0.008]*	*[0.039]*
$Size_t$	-0.004	-0.005**	-0.002	-0.003	0.002	0	0.001	-0.001	0.006	0.004
	[0.111]	*[0.046]*	*[0.371]*	*[0.534]*	*[0.757]*	*[0.945]*	*[0.859]*	*[0.921]*	*[0.452]*	*[0.623]*
BM_t	0.015	0.015	0.006	0.005	0.040***	0.037***	0.042***	0.037**	0.026**	0.022*
	[0.264]	*[0.247]*	*[0.749]*	*[0.782]*	*[0.000]*	*[0.000]*	*[0.007]*	*[0.019]*	*[0.031]*	*[0.074]*
Raw $Return_t$	-0.011***	-0.022***	-0.052***	-0.068***	0.030**	0.011	0.045	0.019	0.030**	0.017
	[0.006]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.045]*	*[0.434]*	*[0.194]*	*[0.591]*	*[0.033]*	*[0.198]*
$\Delta Sale_t$		0.017		0.045*		-0.017		-0.031		-0.043
		[0.135]		*[0.099]*		*[0.388]*		*[0.256]*		*[0.176]*
$\Delta Prft_t$		0.261***		0.385**		0.350***		0.549***		0.371***
		[0.003]		*[0.014]*		*[0.000]*		*[0.003]*		*[0.002]*
Observations	6,527	6,527	6,527	6,527	15,086	15,040	15,086	15,040	15,086	15,040
Sample	matching sample		matching sample		80-93 and 96-05		80-93 and 96-05		80-93 and 96-05	

Panel B: Alternative measures and additional controls

	Raw return in months [1, 6]		**Raw return in months [1, 6]**		**Raw return in months [1, 12]**		**Adjusted return in months [1, 6]**		**Adjusted return in months [1, 12]**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Constant	0.132***	0.146***	0.146***	0.170***	0.264***	0.276***	-0.018	0.056***	-0.066*	0.044**
	[0.001]	*[0.000]*	*[0.005]*	*[0.000]*	*[0.001]*	*[0.001]*	*[0.348]*	*[0.002]*	*[0.081]*	*[0.046]*
ΔAdv_t	-0.017**	-0.026*	-0.029***	-0.018**	-0.082*	-0.044**	-0.037**	-0.017**	-0.081***	-0.046*
	[0.039]	*[0.072]*	*[0.004]*	*[0.030]*	*[0.079]*	*[0.042]*	*[0.022]*	*[0.042]*	*[0.007]*	*[0.063]*
$Size_t$	-0.007	-0.010**	-0.008	-0.011*	-0.016*	-0.015	0.003	-0.003	0.011**	0
	[0.170]	*[0.032]*	*[0.232]*	*[0.063]*	*[0.065]*	*[0.101]*	*[0.250]*	*[0.145]*	*[0.021]*	*[0.956]*
BM_t	0.017*	0.016	0.026***	0.016	0.019	0.034**	-0.011**	-0.018**	-0.024*	-0.007
	[0.071]	*[0.292]*	*[0.003]*	*[0.217]*	*[0.231]*	*[0.049]*	*[0.037]*	*[0.012]*	*[0.076]*	*[0.745]*
Raw $Return_t$	0.004	0.006	-0.018	-0.018	0.018	-0.028	0.029	-0.009	0.036	-0.015
	[0.855]	*[0.862]*	*[0.421]*	*[0.470]*	*[0.809]*	*[0.546]*	*[0.229]*	*[0.679]*	*[0.510]*	*[0.734]*
$\Delta Sale_t$	-0.035**	-0.007	-0.023	-0.031	0.073	-0.070**		-0.022		-0.057**
	[0.033]	*[0.697]*	*[0.223]*	*[0.189]*	*[0.469]*	*[0.011]*		*[0.409]*		*[0.012]*
$\Delta Prft_t$	0.338***	0.286***	0.149*	0.179**	0.356**	0.346**		0.206***		0.336***
	[0.000]	*[0.000]*	*[0.067]*	*[0.026]*	*[0.012]*	*[0.016]*		*[0.003]*		*[0.009]*
Asset $Growth_t$	-0.028**			-0.017	-0.146*	-0.098		-0.013		-0.087
	[0.021]			*[0.355]*	*[0.069]*	*[0.141]*		*[0.427]*		*[0.139]*
Discretionary $Accrual_t$		-0.137*		-0.048	-0.138**	0.039		-0.062		0.051
		[0.083]		*[0.262]*	*[0.028]*	*[0.487]*		*[0.205]*		*[0.354]*
SUE_t			0.000	0.000		0.003**		0.000		0.003**
			[0.906]	*[0.783]*		*[0.022]*		*[0.809]*		*[0.022]*
Observations	6,502	5,094	4,651	3,960	5,094	3,960	6,527	3,960	6,527	3,960
Sample	96-05		96-05		96-05		96-05		96-05	

Table 10: Three-Factor and Four-Factor Models. This table reports the results from Fama and French's (1993) three-factor and Carhart's (1997) four-factor regressions for portfolios of firms ranked (into quintiles) by the log change in advertising expenditures, as well as the results for zero-investment portfolios that long quintile 5 and short quintile 1. Windows [1, 6] and [1, 12] stand for the six-month and the 12-month window, respectively, subsequent to the advertising year. The factor model is given below:

$r_{pt} - r_{ft} = a_p + b_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + u_p UMD_t + e_t$.

r_{pt} is the monthly portfolio returns, r_{ft} is the one-month T-bill return, $(R_{mt} - R_{ft})$ is the monthly market risk premium, SMB_t is the return on small firms minus the return on large firms in month t, HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month t, and UMDt is the return on high momentum stocks minus the return on low momentum stocks in month t. a_p is the monthly risk-adjusted abnormal return in percent and b_p, s_p, h_p, and u_p are factor loadings.

Panel A: Three factor model based on the sample of 1996-2005.

	Months [1, 6]					Months [1, 12]				
Quintiles	**α**	**Mkret**	**SMB**	**HML**	**UMD**	**α**	**Mkret**	**SMB**	**HML**	**UMD**
1	0.451	1.079	0.565	0.213		0.082	1.128	0.661	0.179	
2	0.409	1.012	0.416	0.596		0.166	1.024	0.420	0.519	
3	0.249	1.010	0.420	0.350		-0.135	1.050	0.448	0.429	
4	0.050	1.228	0.496	0.557		-0.169	1.236	0.503	0.452	
5	-0.549	1.411	0.519	-0.125		-0.609	1.346	0.578	-0.088	
P5-P1	-1.001***	0.332***	-0.045	-0.338***		-0.691***	0.219***	0.083	-0.267***	

Panel B: Four factor model based on the sample of 1996-2005.

	Months [1, 6]					Months [1, 12]				
Quintiles	**α**	**Mkret**	**SMB**	**HML**	**UMD**	**α**	**Mkret**	**SMB**	**HML**	**UMD**
1	0.662	1.001	0.611	0.172	-0.195	0.442	1.004	0.737	0.107	-0.325
2	0.670	0.916	0.473	0.545	-0.241	0.369	0.954	0.463	0.479	-0.183
3	0.360	0.969	0.445	0.328	-0.103	0.092	0.973	0.496	0.384	-0.205
4	0.315	1.130	0.554	0.505	-0.245	0.191	1.112	0.578	0.381	-0.325
5	-0.132	1.258	0.610	-0.207	-0.385	-0.151	1.189	0.675	-0.179	-0.413
P5-P1	-0.795**	0.256***	-0.0003	-0.379***	-0.190***	-0.592***	0.185***	-0.062	-0.287**	-0.089**

Panel C: Three factor model based on the extended sample of 1980-2005, excluding years 1994 and 1995.

	Months [1, 6]					Months [7, 12]				
Quintiles	**α**	**Mkret**	**SMB**	**HML**	**UMD**	**α**	**Mkret**	**SMB**	**HML**	**UMD**
1	0.092	1.066	0.649	0.181		-0.104	1.127	0.798	0.132	
2	0.344	1.054	0.479	0.400	4.770	-0.173	1.033	0.535	0.319	
3	0.232	1.038	0.489	0.239	7.104	-0.269	1.053	0.514	0.291	
4	0.313	1.125	0.520	0.259		-0.407	1.125	0.621	0.255	
5	-0.429	1.273	0.669	-0.150		-0.584	1.187	0.760	-0.164	
P5-P1	-0.522**	0.207***	0.021	-0.331***		-0.480**	0.060	-0.038	-0.297***	

Panel D: Four factor model based on the extended sample of 1980-2005, excluding years 1994 and 1995.

	Months [1, 6]					Months [7, 12]				
Quintiles	**α**	**Mkret**	**SMB**	**HML**	**UMD**	**α**	**Mkret**	**SMB**	**HML**	**UMD**
1	0.258	1.036	0.656	0.131	-0.153	0.283	1.048	0.827	0.029	-0.386
2	0.535	1.020	0.488	0.342	-0.176	-0.056	1.009	0.544	0.287	-0.117
3	0.313	1.024	0.493	0.215	-0.075	-0.097	1.018	0.527	0.245	-0.171
4	0.516	1.089	0.530	0.198	-0.186	-0.159	1.074	0.640	0.189	-0.247
5	-0.080	1.210	0.685	-0.255	-0.321	-0.155	1.099	0.792	-0.280	-0.428
P5-P1	-0.338*	0.174***	0.029	-0.386***	-0.168***	-0.444**	0.051	-0.035	-0.308***	-0.042

Table 11: Advertising, Trading Turnover, and Number of Analysts. The sample period covers from year 1996 to year 2005. The dependent variable is trading turnover in the advertising year t or the change in the log number of analysts following the firm (Numest) from year $t-1$ to the advertising year t. Size is the log of market capitalization. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year $t-1$ to advertising year t. Numest is the log of the number of analysts plus one following the firm in the last month of the fiscal year. Trading turnover is the ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. Change in number of analysts is the change in Numest from year $t-1$ to t. Change in turnover is the change in trading turnover from year $t-1$ to year t, scaled by the absolute value of trading turnover in year $t-1$. Prft is the operating income before interest, tax, depreciation, and amortization (EBITDA) scaled by the book value of assets. $\Delta Prft_t$ is the change in Prft from year $t-1$ to year t. Sale is the log value of sales revenue. $\Delta Sale_t$ is the log change in sales revenue from year $t-1$ to year t. The coefficients are time-series means of the coefficients from cross-sectional regressions run every year (i.e., Fama-MacBeth (1973) coefficients). p-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level respectively.

	Change in Number of Analysts			**Change in Turnover**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	-0.005	-0.076*	-0.443***	0.240***	0.210***	0.256***
	[0.914]	*[0.091]*	*[0.000]*	*[0.005]*	*[0.009]*	*[0.007]*
ΔAdv_t	0.163**	0.094*	0.081**	0.147***	0.084**	0.103**
	[0.029]	*[0.081]*	*[0.024]*	*[0.003]*	*[0.014]*	*[0.033]*
$Size_{t-1}$	0.002	0.002	0.127***	-0.019**	-0.013**	-0.014
	[0.572]	*[0.641]*	*[0.000]*	*[0.040]*	*[0.016]*	*[0.123]*
BM_{t-1}	-0.121***	-0.105**	-0.070***	-0.071***	-0.057*	-0.068***
	[0.009]	*[0.015]*	*[0.001]*	*[0.004]*	*[0.091]*	*[0.008]*
Institutional $Holding_{t-1}$		0.067**	0.246***		-0.094	0.052
		[0.023]	*[0.000]*		*[0.250]*	*[0.496]*
$\Delta Sale_t$		0.319***	0.369***		0.417***	0.503***
		[0.000]	*[0.000]*		*[0.001]*	*[0.000]*
$\Delta Prft_t$		0.435***	0.383***		0.379***	0.205**
		[0.000]	*[0.000]*		*[0.003]*	*[0.039]*
Adv_{t-1}			-0.013**			0.002
			[0.020]			*[0.781]*
$Numest_{t-1}$			-0.305***			
			[0.000]			
$Turnover_{t-1}$						-0.097***
						[0.000]
Observations	3,991	3,980	3,980	5,156	4,601	4,601

Table 12: The Effect of Advertising on Stock Returns, Trading Turnover, and Number of Analyst Forecasts. The sample period covers from year 1996 to year 2005. The dependent variable is raw or size and book-to-market adjusted stock return in window [1,6], a six-month window right after the advertising year. Year *t* stands for the advertising year, year *t+1* stands for the year after the advertising year. ΔAdv_t is the log change in advertising expenditures from year *t-1* to year *t*. BM is the ratio of the book value to the market value of equity. Number of analysts covering (Numest) is the log of the number of analysts following the firm in the last month of the fiscal year. Turnover is the ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. Change in number of analysts is the change in Numest from year *t-1* to *t*. Change in turnover is the change in trading turnover from year *t-1* to year *t*, scaled by the absolute value of trading turnover in year *t-1*. The coefficients are time-series means of the coefficients from cross-sectional regressions run every year (i.e., Fama-MacBeth (1973) coefficients). *p*-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(4)	(5)	(6)	(7)
Constant	0.141***	0.152***	0.120***	0.133***	0.097***	0.120***
	[0.002]	*[0.001]*	*[0.002]*	*[0.002]*	*[0.008]*	*[0.002]*
$Size_t$	-0.008	-0.009	-0.007	-0.008	-0.004	-0.006
	[0.172]	*[0.135]*	*[0.233]*	*[0.198]*	*[0.412]*	*[0.197]*
BM_t	0.020**	0.022**	0.024**	0.025***	0.020**	0.018**
	[0.020]	*[0.014]*	*[0.015]*	*[0.006]*	*[0.033]*	*[0.046]*
Raw $Return_t$	-0.004	-0.019	-0.002	-0.013	0.018	0.000
	[0.830]	*[0.332]*	*[0.923]*	*[0.584]*	*[0.419]*	*[0.995]*
ΔAdv_t	-0.014	-0.007	-0.039***	-0.029**	-0.016**	-0.005
	[0.212]	*[0.379]*	*[0.005]*	*[0.013]*	*[0.048]*	*[0.395]*
$\Delta Sale_t$		0.006		-0.025*		-0.043***
		[0.786]		*[0.069]*		*[0.007]*
$\Delta Prft_t$		0.238***		0.285***		0.334***
		[0.004]		*[0.000]*		*[0.000]*
Change in Number of analysts	-0.015*	-0.016*				
	[0.060]	*[0.068]*				
ΔAdv_t × Change in Number of analysts	-0.029**	-0.025**				
	[0.036]	*[0.037]*				
Change in Turnover			0.020**	0.022**		
			[0.031]	*[0.029]*		
ΔAdv_t × Change in Turnover			-0.031**	-0.036**		
			[0.040]	*[0.031]*		
$Turnover_t$					-0.004	-0.001
					[0.638]	*[0.936]*
ΔAdv_t × $Turnover_t$					-0.013**	-0.010**
					[0.024]	*[0.037]*
Observations	3,991	3,980	5,156	5,141	6,524	6,499

Table 13: The Effect of Advertising on Stock Returns and Idiosyncratic Risk. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in event window [1, 6], a six-month window subsequent to the advertising year. The idiosyncratic volatility $Risk_t$ calculated as the standard deviation of market-adjusted daily stock returns. Dummy of high $Risk_t$ equals one if $Risk_t$ is above the sample median in year t. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year t. Prft is the operating income before interest, tax, depreciation, and amortization (EBITDA) scaled by the book value of assets. $\Delta Prft_t$ is the change in Prft from year *t-1* to year t. $\Delta Sale_t$ is the log change in sales revenue from year *t-1* to year t. The coefficients are Fama-MacBeth (1973) coefficients. p-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	0.207**	0.150***	0.180**	0.171**	0.151***	0.181***
	[0.018]	*[0.003]*	*[0.030]*	*[0.032]*	*[0.003]*	*[0.000]*
$Size_t$	-0.012	-0.010	-0.010	-0.009	-0.010	-0.012*
	[0.192]	*[0.134]*	*[0.250]*	*[0.263]*	*[0.134]*	*[0.075]*
BM_t	0.016**	0.016*	0.016**	0.016**	0.016*	0.014
	[0.018]	*[0.063]*	*[0.021]*	*[0.023]*	*[0.069]*	*[0.250]*
Raw $Return_t$	0.016	0.016	0.017	0.002	0.015	-0.016
	[0.443]	*[0.486]*	*[0.425]*	*[0.896]*	*[0.509]*	*[0.467]*
$Risk_t$	-1.752*		-0.975	-0.518		
	[0.063]		*[0.264]*	*[0.537]*		
Dummy of high $Risk_t$		-0.052**			-0.039**	-0.007
		[0.020]			*[0.042]*	*[0.538]*
ΔAdv_t			-0.004	-0.006	-0.018	0.004
			[0.701]	*[0.501]*	*[0.279]*	*[0.728]*
$\Delta Adv_t \times Risk_t$			-0.753***	-0.441*		
			[0.005]	*[0.089]*		
$\Delta Adv_t \times$ Dummy of High $Risk_t$					-0.024*	-0.039***
					[0.073]	*[0.006]*
$\Delta Sale_t$				-0.032**		-0.026
				[0.038]		*[0.262]*
$\Delta Prft_t$				0.317***		0.161**
				[0.001]		*[0.029]*
Observations	6,524	6,524	6,524	6,499	6,524	6,499

Table 14: The Effect of Advertising on Stock Returns: Grouped by Firm Characteristics. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in event window [1, 6], a six-month window subsequent to the advertising year. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year *t*. Prft is the operating income before interest, tax, depreciation, and amortization (EBITDA) scaled by the book value of assets. $\Delta Prft_t$ is the change in Prft from year *t-1* to year *t*. $\Delta Sale_t$ is the log change in sales revenue from year *t-1* to year *t*. The coefficients are Fama-MacBeth (1973) coefficients. *p*-values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate .significant difference from zero at the 10%, 5%, and 1% level, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	0.104***	0.132***	0.093**	0.117***	0.117***	0.129***
	[0.003]	*[0.000]*	*[0.011]*	*[0.002]*	*[0.001]*	*[0.000]*
ΔAdv_t	-0.083***	-0.065***	-0.01	0.01	-0.031**	-0.017*
	[0.000]	*[0.000]*	*[0.462]*	*[0.272]*	*[0.011]*	*[0.051]*
$Size_t$	-0.006	-0.008	-0.005	-0.006	-0.007	-0.007
	[0.267]	*[0.126]*	*[0.401]*	*[0.238]*	*[0.180]*	*[0.151]*
BM_t	0.020**	0.017*	0.026***	0.025***	0.018**	0.017*
	[0.049]	*[0.074]*	*[0.003]*	*[0.002]*	*[0.048]*	*[0.054]*
Raw $Return_t$	0.019	0.001	0.018	-0.001	0.003	-0.001
	[0.458]	*[0.980]*	*[0.466]*	*[0.981]*	*[0.885]*	*[0.956]*
$\Delta Adv_t \times Size_t$	0.007***	0.008***				
	[0.005]	*[0.006]*				
$\Delta Adv_t \times BM_t$			-0.047***	-0.049***		
			[0.000]	*[0.000]*		
$\Delta Adv_t \times \Delta Prft_t$					0.125**	0.120**
					[0.044]	*[0.044]*
$\Delta Prft_t$		0.354***		0.351***	0.295***	0.340***
		[0.000]		*[0.000]*	*[0.001]*	*[0.000]*
$\Delta Sale_t$		-0.050***		-0.044**		-0.047***
		[0.009]		*[0.014]*		*[0.010]*
Observations	6,527	6,502	6,527	6,502	6,502	6,502

Table 15: The Effect of Advertising on Stock Returns: Grouped by Positive and Negative ΔAdv_t. In panels A and B, all stocks are first sorted into size quintiles based on their sizes, and then within each size quintile, are ranked into additional quintiles based on BM. We further rank firms into advertising quintiles for each of the 25 size and BM groups based on the log change in advertising expenditures. Equally weighted portfolios are formed for stocks in similar advertising quintiles across the 25 size and BM groups. All returns are calculated for two event windows: [1,6] and [1, 12], a six-month and a 12-month window subsequent to the advertising year. Adjusted return is computed as the difference between the stock's raw return and the mean of its matching portfolio. Matching portfolios are created based on size, BM, and momentum. In panel C, the dependent variable is raw stock return. Size is the log of market value of equity. BM is the ratio of the book value to the market value of equity. ΔAdv_t is the log change in advertising expenditures from year *t-1* to advertising year *t* . $\Delta Prft_t$ or $\Delta Sale_t$, change in EBITDA/Assets or the log of sales from year *t-1* to the advertising year *t* . The coefficients are time-series means of the coefficients from cross-sectional regressions run every year (i.e., Fama-MacBeth (1973) coefficients). *p* -values, calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level, respectively.

Panel A: Sample covers from 1996 to 2005. Portfolios are sorted by size, book-to-market ratio, and ΔAdv_t.

	Subsample with $\Delta Adv_t \geq 0$				**Subsample with $\Delta Adv_t < 0$**			
	Raw Return		**Size, BM, and momentum adj. return**		**Raw Return**		**Size, BM, and momentum adj. return**	
Ranks	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**
1	0.088	0.160	0.011	0.018	0.065	0.148	-0.017	-0.014
2	0.086	0.164	0.009	0.020	0.069	0.157	-0.004	0.011
3	0.095	0.127	0.022	-0.011	0.088	0.138	0.014	-0.007
4	0.052	0.111	-0.034	-0.038	0.087	0.192	0.007	0.038
5	0.020	0.041	-0.053	-0.091	0.109	0.174	0.036	0.036
P5-P1	-0.069	-0.119	-0.064	-0.109	0.044	0.026	0.054	0.050
p-value	0.000	0.000	0.000	0.000	0.114	0.554	0.035	0.203

Panel B: Sample covers from 1980 to 2005 without 1994 and 1995. Portfolios are sorted by size, book-to-market ratio, and ΔAdv_t.

	Subsample with $\Delta Adv_t \geq 0$				**Subsample with $\Delta Adv_t < 0$**			
	Raw Return		**Size, BM, and momentum adj. return**		**Raw Return**		**Size, BM, and momentum adj. return**	
Ranks	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**	**[1, 6]**	**[1, 12]**
1	0.110	0.169	0.022	0.031	0.106	0.159	0.011	0.018
2	0.098	0.171	0.012	0.035	0.096	0.143	0.011	0.016
3	0.106	0.147	0.023	0.015	0.084	0.128	0.009	-0.011
4	0.087	0.129	-0.003	-0.007	0.087	0.192	0.007	0.038
5	0.063	0.099	-0.017	-0.028	0.091	0.123	-0.002	-0.013
P5-P1	-0.047	-0.070	-0.039	-0.059	-0.015	-0.036	-0.013	-0.031
p-value	0.000	0.000	0.000	0.000	0.114	0.005	0.100	0.007

Panel C: Fama-MacBeth Regressions.

Sample	**Subsample with $\Delta Adv_t \geq 0$**				**Subsample with $\Delta Adv_t < 0$**			
	96-05		**80-93 and 96-05**		**96-05**		**80-93 and 96-05**	
Dependent variable	**Raw return [1, 6]**	**Raw return [1, 12]**	**Raw return [1, 6]**	**Raw return [1, 12]**	**Raw return [1, 6]**	**Raw return [1, 12]**	**Raw return [1, 6]**	**Raw return [1, 12]**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.169***	0.282***	0.100**	0.186**	0.145***	0.231***	0.096**	0.189**
	[0.001]	*[0.002]*	*[0.046]*	*[0.018]*	*[0.004]*	*[0.002]*	*[0.020]*	*[0.015]*
ΔAdv_t	-0.054***	-0.108***	-0.047***	-0.091***	0.038	-0.006	0.038	0.046
	[0.000]	*[0.001]*	*[0.000]*	*[0.000]*	*[0.178]*	*[0.877]*	*[0.164]*	*[0.418]*
$Size_t$	-0.009	-0.014	-0.001	-0.004	-0.011	-0.014	-0.002	-0.006
	[0.102]	*[0.122]*	*[0.817]*	*[0.685]*	*[0.161]*	*[0.102]*	*[0.739]*	*[0.560]*
BM_t	0.007	-0.009	0.035**	0.032	0.033***	0.030*	0.041***	0.035***
	[0.292]	*[0.516]*	*[0.022]*	*[0.133]*	*[0.008]*	*[0.099]*	*[0.000]*	*[0.003]*
Raw $Return_t$	-0.005	-0.008	0.008	0.02	0.02	0.006	0.017	0.012
	[0.811]	*[0.866]*	*[0.563]*	*[0.541]*	*[0.616]*	*[0.916]*	*[0.450]*	*[0.775]*
$\Delta Sale_t$	-0.072***	-0.079*	-0.022	-0.025	0.015	-0.032	-0.007	-0.046
	[0.001]	*[0.079]*	*[0.435]*	*[0.442]*	*[0.833]*	*[0.430]*	*[0.864]*	*[0.230]*
$\Delta Prft_t$	0.459***	0.650***	0.449***	0.711***	0.161*	0.287***	0.194**	0.317**
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.061]*	*[0.005]*	*[0.026]*	*[0.010]*
Observations	4,262	4,262	10,390	10,390	2,240	2,240	4,650	4,650