Advertising, Attention, and Stock Returns

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Abstract

This paper studies the effect of advertising on stock returns both in the short run and in the long run. We find that a greater amount of advertising is associated with a larger stock return in the advertising year but a smaller stock return in the year subsequent to the advertising year, even after we control for other price predictors, such as size, book-to-market, and momentum. We conjecture that this advertising effect on stock returns is due to the effect of advertising on investor attention. Advertising could help a firm attract investors' attention. Stock price increases in the adverting year due to the attracted attention, but decreases in the subsequent year as the attracted attention wears out over time in the long run. We test this "investor attention hypothesis" using trading volume and the number of financial analysts covering to proxy for investors' attention on the firm's stock. We document five consistent findings. First, advertising increases a firm's visibility among investors in the advertising year. Second, an increased level of investor attention is associated with a larger contemporary stock return and a smaller future stock return. Third, the effect of advertising on stock returns is stronger in firms with more visibility in the advertising year. In particular, when a high advertising firm attracts more investor attention in the stock market, the stock return of the high advertising firm increases to a larger degree in the contemporary adverting year and decreases to a larger degree in the subsequent years. However, the stock return of such a high advertising firm decreases to a smaller degree if the attention attracted in the advertising year persists subsequent to the advertising year. Fourth, the effect of advertising on future stock returns is stronger if investors face a larger cost of arbitrage. Finally, we also find that the advertising effect is stronger for small firms, value firms, and firms with poor ex-ante stock performance or poor ex-ante operating performance.

1 Introduction

Investors have limited attention. How limited attention affects investors' trading behavior has been the subject of an increasing amount of research in recent years. Many studies suggest that limited time and resources preclude individual investors from considering all possible investments and restrict the amount of information they can analyze. For example, Gervais, Kaniel, and Mingelgrin (2001) show that stocks experiencing a high trading volume tend to appreciate in the following month. They argue that this pattern could be explained by the increased visibility of a stock associated with the high trading volume. Recently, Barber and Odean (2008) find more evidence suggesting that investors purchase only stocks that have caught their attention.[1] In this paper, we extend this literature by studying the role of advertising in affecting investors' attention and stock returns.

Several pieces of anecdotal evidence indicates that advertising can help catch the attention of investors in the equity market and boost stock prices. 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 Silorsky 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."[2] While this and

[1] Similarly, Grinblatt and Keloharju (2001) and Huberman (2001) find that investors prefer to invest in local and familar compaines. See also Foerster and Karolyi (1998) etc., for empirical support on the investor attention effect. Corwin and Coughenour (2008) further show that the limited attention of NYSE specialists affects execution quality in securities that they are making market for.

[2] 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."

other similar anecdotal evidence seem to suggest that advertising could affect investors' attention and stock prices, the research on this advertising effect is still in its infancy. In a recent paper, Chemmanur and Yan (2007) study the role of advertising around a firm's IPO, and show that a greater extent of advertising by the firm leads to higher IPO valuations and lower subsequent stock returns. In contrast to the above paper, which focuses only on IPOs (an event which is clearly unique in the lige of a firm), our focus in the current paper is on the effect of advertising on the cross section of stock returns of all publicly listed firms. Specifically, we study how firms' advertising activities affect their stock returns both in the short run and in the long run. We then link the advertising effect on stock returns to the investor attention argument. To our knowledge, our paper is the first to study the effect of advertising on stock returns.

We first study the impact of advertising on stock returns using both the Fama-French (1993) factor models and stock returns adjusted by various benchmark returns. We find that a greater amount of advertising is associated with a larger stock return in the advertising year but a smaller stock return in the year subsequent to the advertising year. The long-run stock underperformance of the high advertising firm is especially significant in the second half of the year subsequent to the advertising year and it starts to diminish after the first year. This result holds even after we control for the size effect, the book-to-market effect, and the momentum effect. For example, the results from the Fama-MacBeth regressions show that a one-standard-deviation increase in advertising increases stock return in the advertising year by 3.35%. Subsequent to the year with the increased advertising, stock return decreases in the second half of the (subsequent) year by 2.92%.

Next, we study the investor attention argument to explain the effect of advertising on stock returns. There are two ways in which investors' attention could affect stock prices. First, Barber and Odean (2008) argue that individual investors face a search problem when they are buying since they have to choose from a large set of available alternatives. The 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, increased attention attracted by advertising would increase the buy-sell imbalance and further increase stock prices. Second, it is also possible that more investor attention increases the heterogeneity of investors' beliefs about a stock's value (Gervais, Kaniel, and Mingelgrin (2001)). As Miller (1977) argues (see also Morris (1996) and Mayshar (1983)), when investors with heterogeneous beliefs are subject to short-sale constraints, pessimistic investors are prevented from selling short and stock prices reflect the beliefs of optimistic investors. When investors' beliefs become more heterogeneous about a stock's value, the stock would be purchased by investors with more optimistic sentiment and is more overpriced. In this paper, we conjecture that advertising can help firms attract investors' attention. The attracted attention could increase the contemporaneous stock price in the advertising year either because more attention increases the magnitude of buy orders relative to sell orders or because more attention increases the heterogeneity in investor beliefs. In both cases, we expect that attention-grabbing advertising increases stock price in the contemporary advertising year. The investor attention argument can also explain our findings on long run stock returns. As the attracted attention wears off over time, stock price decreases in the future, resulting in a negative future stock return.

This attention explanation yields six testable hypotheses. First, if the advertising effect on stock returns is indeed an attention effect, an increase in a firm's advertising expenditures should attract more attention on the firm in the contemporary advertising year. Second, more investor attention attracted by the firm is associated with a larger contemporary stock return and a smaller future stock return. Third, the positive advertising effect on stock return in the contemporary advertising year should be stronger if the stock catches more attention in that year. Fourth, advertising should have a stronger effect on long run stock returns as well if the stock catches more attention in the advertising year and the attracted attention wears off more quickly in the long run. In particular, we hypothesize that the long-run stock price reversal of the high advertising firms is greater if their advertising helps them draw more attention from investors in the advertising year. However, the long-run stock price reversal will be weaker if these firms maintain high visibility in the year subsequent to the advertising year. Fifth, we also hypothesize that the advertising effect is stronger in those stocks that are more costly to sell short. This is because short-sale constraints are a key reason that attention-grabbing advertising can cause stock mispricing, either due to the buy-sell imbalance argument of Barber and Odean (2008) or due to the heterogeneous beliefs argument of Miller (1977). Finally, it is also possible that small stocks, value stocks, and poorly performing stocks do not catch investors' attention without advertising, thereby are more likely to be affected by advertising. Thus, our sixth hypothesis is that the effect of advertising on stock returns is stronger in small stocks, value stocks, and stocks with poor ex-ante stock performance or poor ex-ante operating performance.

To test these hypotheses, we use trading volume and the number of financial analysts covering the firm to proxy for the extent of investors' attention. Investors are more likely to trade when they pay more attention to a stock. Financial analysts' 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 trading volume or a larger number of financial analysts covering a firm's stock indicates an enhanced level of investor attention caught by the stock. We proxy the cost of arbitrage using a firm's idiosyncratic risk and Amihud's (2002) illiquidity ratio. Shleifer and Vishny (1997) argue that higher idiosyncratic risk increases the cost of arbitrage since arbitrageurs have access to only a small number of projects and they are not fully diversified. Illiquidity also increases the cost of arbitrage either because arbitrageurs find it difficult to obtain shares of the illiquid stock to sell short or because the transaction cost of trading is high for an illiquid stock.[3]

Using these proxies, we find evidence supporting all our investor attention hypotheses. In particular, we find that advertising increases the levels of trading turnover and analyst coverage. The increased levels of trading turnover and analyst coverage increases contemporary stock returns but are followed by lower future stock returns. We also find that for a firm with a large amount of advertising expenditures, its stock return in the contemporary advertising year increases to a larger degree if the firm experiences a larger trading turnover or attracts more financial analyst coverage in the advertising year. However, such a high advertising firm that attracts more trading and more analyst coverage in the advertising year experiences a greater degree of stock price reversal subsequent to the advertising year, though the reversal would be reduced if investor trading and analyst coverage continue to be strong in the subsequent year. We further find that the long-run reversal in stock return is stronger if investors face a larger arbitrage cost. Finally, we show that the advertising effect on long-run stock returns is also stronger for small stocks, value stocks, and stocks that had either poor operating performance or stock performance in the prior year.

As we discussed earlier, there is a large literature on the relation between investor attention and asset-pricing anormalies. For example, investor attention has been studied to explain abnormally high levels of individual investor share purchases around the time of earnings announcements (Lee, 1992, and Barber and Odean, 2008). Our paper contributes to this literature by using the investor attention argument 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 (2008) have studied the effect of advertising for the market of new

[3] However, illiquidity ratio could be related to investor attention as well. A stock with less recognition from investors could be less liquid. Thus, on the one hand, illiquidity increases the cost of arbitrage and causes the stock to be overvalued. On the other hand, illiquidity could be an outcome of the lack of investor attention, which could cause stock to be undervalued. The latter possibility potentially could reduce the power of illiquidity ratio in our study as the proxy for the arbitrage cost and bias towards rejecting our fourth hypothesis. However, as we show later, we still find supporting evidence for our fourth hypothesis.

equity issues. They focus on the dynamics between product market advertising and the amount of the money left on table ("underpricing") during the going public process. They suggest that the levels of advertising expenditures and IPO underpricing could function as substitutes for IPO firms to signal their true value to uninformed investors in the equity market. 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. Their findings suggest that advertising helps attract investors' attention. In contrast to both the above papers, our paper focuses on how advertising affects the contemporary stock returns in the advertising year and long-run stock returns in the year subsequent to the advertising year. Finally, our paper is also indirectly related to the literature on the relationship between media mentions and asset prices (see, e.g., Klibanoff, Lamont, Wizman (1998), Chan (2003), and Tetlock (2007)). 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 may not, in general, be under the control of the firm.

The rest of this paper is organized as follows. Section 2 discusses the sample selection and variable construction. Section 3 studies the relation between advertising and stock returns. Section 4 studies the investor attention argument to explain the advertising effect on stock returns. Section 5 concludes.

2 Data and Descriptive Statistics

2.1 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., those that are identified by CRSP share type codes of 10 and 11, and those with stock prices more than five dollar at the end of the prior fiscal year. 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. Thus, our final sample consists of 6,660 firms. In the following sections, we may be constrained to use only part of the sample in some empirical tests, 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 fiscal 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. The SOP was issued by Accounting Standards Executive Committee (AcSEC). It changes the practice that companies use to expense the cost of advertising.[4] Table 1 reports the annual breakdown for our sample, as well as the firms covered by Compustat and CRSP 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 expenditures 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. The percentage

[4] Prior to SOP 93-7, there was no authoritative accounting literature for advertising. The practice on expensing advertising expenditures was diverse, including the four alternatives considered by AcSEC, as well as expensing advertising at other points over the continuum covered by those alternatives. 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 costs of all advertising either at the first time when the advertising takes place or within the period in which the advertising costs are incurred.

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 our analysis to years after 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.

2.2 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. We code ΔAdv_t as zero if a firm reports zero advertising expenditures in both year $t-1$ and year t.[5] In Section 3.1.3, we also study the percentage change of advertising expenditures to check the robustness of our results.[6]

We 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 $\Delta Sale_t$ as the log change in sales revenue from year $t-1$ to year t and $Sale_{t-1}$ as the log value of sales revenue in year $t-1$. We also calculate $Size_{t-1}$ as the log of market capitalization in year $t-1$ and $Prft_{t-1}$ as the operating income before interest, tax, depreciation, and amortization (EBITDA) scaled by the book value of assets in year $t-1$. $\Delta Prft_t$ is the change in EBITDA/Assets from year $t-1$ to year t. BM_{t-1} is the ratio of 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

[5] 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.

[6] 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.

value or, if the redemption value is missing, the liquidating value.

We measure a firm's trading activities by exchange-adjusted trading turnover. Trading turnover is trading volume in shares scaled by shares outstanding. Adjusted trading turnover is the log ratio of a firm's trading turnover to the average trading turnover in the stock exchange where the firm's stock is trading. We measure adjusted trading turnover both in the advertising year ($Turnover_t$) and in the year subsequent to the advertising year ($Turnover_{t+1}$). We also calculate the log of the number of financial analysts' earnings forecasts reported in I/B/E/S. This variable is measured either in the last month of the advertising year ($Numest_t$) or in the last month of the subsequent year ($Numest_{t+1}$). Both trading turnover and the number of financial analysts' earnings forecasts can proxy for the degree of investors' attention on a stock. A higher number of analyst forecasts or a larger adjusted trading turnover indicates a greater degree of attention attracted by the stock among investors in the equity market.

We also follow Amihud (2002) and define illiquidity ratio as a stock's absolute daily stock return divided by its daily trading volume (scaled by 10^6). We measure illiquidity ratio in the advertising year ($Illiquid_t$). Illiquidity ratio captures the price impact of trades, i.e., the price change per dollar of trading volume. A larger price impact indicates that a stock is more illiquid and more difficult to arbitrage. Finally, we measure idiosyncratic volatility as the standard deviation of market-adjusted daily abnormal stock returns in the advertising year $Risk_t$. We estimate daily abnormal stock return as the difference between raw stock return and the value-weighted market return in the same day. Idiosyncratic risk is costly to arbitrageurs since arbitrageurs only have access to a small number of projects and are often not well diversified (Shleifer and Vishny, 1997). Table 2 reports the sample statistics of the above variables.

2.3 Determinants of Change in Advertising

We study the determinants of 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 table 3. Table 3 also shows the results from the ordinary least square regressions. 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. Columns (5) and (6) further show that large firms and value firms spend more advertising expenditures than smaller 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 (2) and (3)). Finally, columns (7) to (10) shows 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. Considering that ΔAdv_t is related to $Size_t$, BM_t $\Delta Sale_t$, and $\Delta Prft_t$, 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.

3 Advertising and Stock Returns

In this section, we study the relation between advertising and stock returns, both in the contemporary year of advertising and in the long run. We first study the relation with portfolio sorts, followed by a series of regressions based on the Fama-French (1993) three factor model, the Carhart (1997) four-factor model, and the Fama-MacBeth (1973) technique.

3.1 Portfolio Sorts

We first study stock returns with portfolio sorts. We rank stocks into ten deciles every year based on ΔAdv_t. We then form an equal-weighted portfolio for stocks in each decile class of ΔAdv_t. The stocks with the highest ΔAdv_t are assigned to the portfolio in decile 10 and the stocks with the lowest ΔAdv_t are assigned to the portfolio in decile 1. We also form a zero-investment portfolio that longs the stocks in decile 10 (high advertising stocks) and shorts the stocks in decile 1 (low advertising stocks).

For all decile portfolios and zero-investment portfolios, we track the performances for the advertising year t and four other long-run event windows. The four 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 accrue beyond the 18-month mark, the effects are relatively weak and increasingly clouded by the statistical noise that accompanies longer horizons.

3.1.1 Raw Stock Returns

In table 4, we present the results based on raw stock returns. In the five left-hand columns of the table, we use the unconditional ranking on the change in advertising (ΔAdv_t). In the next five columns, we control for the size effect by sorting based on both ΔAdv_t and market capitalization ($Size_t$). The double sort is implemented as follows. For each year, we first rank stocks into five quintiles based on $Size_t$. We further rank stocks into ten deciles based on ΔAdv_t, relative to the other stocks in their size quintile. We then combine the deciles of ΔAdv_t across size quintiles. In particular, for the stocks in the same decile of ΔAdv_t (but in different size quintiles), we form an equal-weighted portfolio across the five size quintiles and track the performance of the portfolio over time. One advantage of this double-sort procedure is that it ensures the stocks in each ΔAdv_t decile to roughly have the same firm size. As we discussed in Section 2.3, large firms tend to advertise more than small firms. Thus, this procedure is useful since otherwise the high ΔAdv_t deciles could be dominated by large stocks.

In the five right-hand columns of the table, we further control for the value stock effect by performing the portfolio sorts based on ΔAdv_t, $Size_t$, and the book-to-market ratio (BM_t). In this triple-sort procedure, we first assign stocks into size quintiles as discussed above. We then rank stocks in each size quintiles into five BM_t 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 ten deciles relative to the other stocks in the same size and book-to-market portfolio. Finally, we combine the deciles of ΔAdv_t across the 25 size and book-to-market portfolios and calculate the equal-weighted return for stocks in the similar decile of ΔAdv_t across the 25 size and book-to-market portfolios. This triple-sort procedure ensures that our results on the advertising effect are not driven by both firm size and the book-to-market ratio, two well-known return predictors in the literature.

Table 4 shows that the results for raw returns are not much affected by whether or not we sort on $Size_t$ and BM_t. In general, the firms with more advertising expenditures in the advertising year t experience a larger stock return during the same year. However, the stock performance reverses for these high advertising firms after the advertising year as they experience a smaller stock return in the long run compared to the firms spending less in advertising in year t. The inferior performance of the high advertising firms subsequent to the advertising year is especially significant in the second half of the subsequent year and starts to diminish after one year subsequent to the advertising year. For example, consider raw returns sorted by ΔAdv_t and $Size_t$. In the advertising year, the stocks in the top decile outperform the stocks in the bottom decile by 13.5%, which is statistically significant. Further, consider the (P10-P1) portfolio that is long the top-decile stocks and short the bottom-decile stocks at the end of the advertising year. Half year after the advertising year, the (P10-P1) portfolio earns -6.2%, which translates into an annualized rate of return of -12.8%. In the second half of the year after portfolio formation, the portfolio is down by additional 8.3% (-17.3% on an annualized basis). The return of the (P10-P1) portfolio in the 12-month window [7, 18] is similar to that in the six-month window [7, 12], but smaller than that in the 12-month window [1, 12]. This result suggests that the long-run stock price reversal of the high advertising firms starts to diminish one year after the advertising year.

3.1.2 Adjusted Stock Returns

In table 5, we present the results based on adjusted stock returns. In the five left-hand columns of the table, we use returns adjusted for industry and firm size ($Size_t$). To implement this adjustment, we create benchmark portfolios using a characteristic-based procedure similar to Loughran and Ritter (1997). We group all stocks in our sample into 48 industries using the industry classification in Fama and French (1997). At the end of each year, stocks in each industry are assigned to five size quintiles. The industry and size adjusted return for a stock over any holding period is the holding-period return for that stock in excess of the holding-period return on the industry and size benchmark portfolio to which the firm belongs.

In the next five columns, we use returns adjusted for firm size ($Size_t$) and market-to-book ratio (BM_t). The procedure is as follows. At the end of each year, we assign stocks to five size quintiles. Within each size quintile, we further group stocks into subquintiles, based on their book-to-market ratios. 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 for a stock is the stock's holding period return in excess of its benchmark portfolio return.

In the five right-hand columns of table 5, we further adjusted for momentum. This adjustment is a three-dimensional extension of the above size and book-to-market adjustment. Based on 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. The 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 on one of the 125 benchmark portfolios to which the stock belongs.

The size control somewhat reduces the magnitude of the (P10-P1) return. Table 4 shows that the (P10-P1) unconditional raw return is 16.8% in the advertising year, -9.2% in event window [1, 6], and –9.4% in window [7, 12]. With the industry and size adjustment, the (P10-P1) return in table 5 changes to 9.0% in the advertising year, -6.1% in window [1, 6], and –7.2% in window [7, 12]. The fact that the size adjustment partially reduces the magnitude of the advertising effect is not surprising in light of our results in Section 2.3: advertising and firm size is positively related. Further, the additional adjustments for book-to-market and momentum do not quantitatively change the long run stock returns of the (P10-P1) portfolio. Thus, the advertising effect on stock returns does not seem to be affected by the predictability powers of both momentum and the difference between value and glamour stocks.

Overall, our results in table 5 show that the adjustment for firm size, book-to-market ratio, and momentum does not make any qualitative difference on the relation between advertising and stock returns compared to the results based on unconditional raw returns. The adjusted return of the (P10-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. Thus, our results in both table 4 and table 5 show that a firm's advertising helps boost the stock performance of the firm in the contemporary advertising year. However, investors could over-react to the firm's advertising campaign, causing the firm with a higher level of advertising activities to experience a poorer stock return after the advertising year.

3.1.3 Robustness Checks

In the following, we conduct a range of additional tests to verify the robustness of our results reported in tables 4 and 5. As we discussed in Section 2.1, there was a change in the accounting practice on expensing the advertising 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 interesting to know whether the advertising effect on 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. We also study separately the sample period of years 1980-1993 prior to the accounting change. We present the results from this first robustness check in table 6, with panel A focused on the sample period of 1980-2005 and panel B focused on the sample period of 1980-1993. To save space, we report only the results on raw return, the size and book-to-market adjusted return, and the size, book-to-market, and momentum adjusted return. In general, both panels A and B show that the advertising effect documented earlier holds in the different sample periods as well. However, the advertising effect seems to be weaker in the early sample period of 1980-1993. 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 based on the early years.

In the second robustness check, we use the percentage change rather than the log change to measure the change in advertising. We present the results in panel C, table 6. As it turns out, our results on the advertising effect remain virtually unchanged, demonstrating the robustness of our results to the different measures of the change in advertising.

In the third robustness check, we control for profitability growths. As shown in table 3, advertising is negatively related to the change in profitability $\Delta Prft_t$. Thus, one may concern whether a firm's future stock return is affected by the increase in advertising in response to the negative profitability growth or by the negative profitability growth itself. To address this concern, we control for profitability growths. We sort raw returns by the change in profitability $\Delta Prft_t$. We assign stocks into decile classes of ΔAdv_t, with the decile breakpoints determined separately within each $\Delta Prft_t$ quintile. We then recombine the deciles across the $\Delta Prft_t$ quintiles and study the raw returns of the portfolios formed in those ΔAdv_t deciles. We also study the stock returns adjusted by industry and $\Delta Prft_t$. In this study, we create benchmark portfolios by assigning stocks to $\Delta Prft_t$ quintiles within each year and each industry. The adjusted return of a stock is the stock's raw return in excess of the equal-weighted return of the benchmark portfolio to which the stock belongs. We present the results on these two types of returns in panel D, table 6. As can be seen, our results on the advertising effect remain almost the same even with the control for $\Delta Prft_t$: advertising is still positively related to the contemporary stock returns but negatively related to the future stock returns. This robustness check suggests that none of our early results are driven by the profitability effect.

In the fourth robustness check, we also control for sales growth. Advertising could affect stock returns either by affecting customers in the product markets or by affecting investors in the financial markets. On the one hand, a firm's advertising could draw attention from investors in the financial markets and consequently affect the firm's stock return. On the other hand, a firm's advertising could also boost the firm's sales revenue and consequently affect its future stock returns. As shown in Table 3, advertising is positively related to the change in sales ($\Delta Sale_t$). Such a sales growth induced by advertising could be followed by a positive future stock return (see, e.g., Lakonishok, Shleifer, and Vishny, 1994). Thus, to study the advertising effect on investors in the financial markets, we need to control for the sales effect.

To control for the sales effect, we first study the raw returns sorted by sales growth $\Delta Sale_t$. We also study the returns adjusted by industry and $\Delta Sale_t$. The algorithm of these two studies is similar to that in the study when we control for profitability growth. We present the results from this robustness check in Panel D in table 6. According to these results, the advertising effect on stock returns as we documented earlier remains significant after the control for $\Delta Sale_t$. Thus, the advertising effect on stock returns is unlikely to be driven by the sales effect alone.

Finally, we also control for both $\Delta Sale_t$ and $\Delta Prft_t$ by studying the raw returns sorted by both variables. In this double-sort, we first group stocks into 25 classes based on $\Delta Sale_t$ and $\Delta Prft_t$. We create ΔAdv_t deciles separately within each class. We then combine the ΔAdv_t deciles across the 25 classes grouped by $\Delta Sale_t$ and $\Delta Prft_t$ and calculate the equally weighted stock returns for each ΔAdv_t decile. We present the above results in the right-hand columns in Panel D of Table 6. Again, the advertising effect on stock returns remains significant (though at a weaker statistical significance level) after we control for both $\Delta Sale_t$ and $\Delta Prft_t$.

3.2 Fama-MacBeth Regressions

Next, we run a series of Fama-MacBeth (1973) regressions as an alternative approach to study the forecasting power of ΔAdv_t.

$$\begin{gathered} Raw\ Return_t = \alpha_0 + \alpha_1 \Delta Adv_t + \alpha_2 Size_{t-1} + \alpha_3 BM_{t-1}, \text{ and} \\ Raw\ Return_{t+1} = \beta_0 + \beta_1 \Delta Adv_t + \beta_2 Size_t + \beta_3 BM_t + \beta_4 Raw\ Return_t. \end{gathered} \tag{1}$$

We implement the Fama-MacBeth technique in much the same way as discussed in Section 2.3.

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 (1) is raw return in either year t or year $t+1$. 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 consist of firm size, the book-to-market ratio, momentum. As we discussed in Section 3.1.3, 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 $\Delta Prft_t$. In this way, we can exclude the sales effect and the profitability effect so that and α_1 and β_1 in regression (1) would reflect the impact of advertising on investors in the financial markets.

To start with, we run regressions on raw return in the contemporary year t. The results are reported in the first two columns in table 7. The coefficient of ΔAdv_t is 0.088 in column (1) without controlling for the sales and profitability variables and 0.064 in column (2) with such these controls. The latter coefficient implies that a one-standard-deviation increase in ΔAdv_t increases stock return by 3.21% in the contemporary year.

We then run regressions on raw return in year $t+1$. We report the results in columns (3) to (10) in table 7, with raw return measured in one of the four event windows [1, 6], [7, 12], [1, 12], and [7, 18]. The results in columns (3) and (4) show that advertising is negatively linked to the stock return in the first six months after portfolio formation, though this relation is insignificant. One possibility for this insignificance is that the reversal of stock prices in window [1, 6] is offset by the lingering positive effect of advertising on stock prices.

In contrast, the coefficients of ΔAdv_t reported in columns (5) to (8) are all significant. In particular, the coefficient of ΔAdv_t is -0.048 in column (6) where raw return is measured in window

[7, 12] and –0.063 in column (8) where raw return is measured in window [1, 12]. Both coefficients are significant at the 5% level. To get a sense of magnitude, the coefficient of -0.048 implies that a one-standard-deviation increase in ΔAdv_t decreases the half-year return in window [7, 12] by 2.61%, which is -5.3% on an annualized basis. Thus, in the second half of the year after the advertising year, the positive advertising effect on stock returns starts to wear out. As stock prices start to revert to fundamentals, the stock of the high advertising firms experiences a negative stock return in this time period. Finally, we also present the results based on raw return in window [7, 18] in columns (9) and (10). As can be seen, the coefficients of ΔAdv_t is negative and significant at the 5% level in column (9) but insignificant in column (10). These results suggest the reversal of future stock price subsequent to the year of high advertising starts to diminish one year after the advertising year. Overall, our results in table 7 confirm our earlier results that high advertising increases contemporary stock returns but is followed by a decrease in future stock returns.

3.2.1 Robustness Checks

In the first robustness check, we run regression (1) based on the extended sample covering years 1980-2005 but without the transition years 1994 and 1995. We present the results in the first four columns in table 8. As can be seen, extending the sample period reduces, but does not completely eliminate, the effect of ΔAdv_t on future stock returns. The coefficient of ΔAdv_t is still positive and significant at the 1% level when the dependent variable is stock return in year t. However, when stock return is measured in window [7, 12], the coefficient of ΔAdv_t is -0.030 in column (3) (compared to -0.063 in column (5) in table 7) and it is insignificant in column (4). 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 second robustness check, we run regression (1) using the size and book to market adjusted returns as the dependent variable. We report the regression results in column (5) to (8) in table

8. The adjustment of stock returns by size and book to market ratio seems to be redundant once we control for size and the book to market ratio in the regression. As it turns out, the coefficients of ΔAdv_t in columns (7) and (8) in table 8 are similar to the corresponding coefficients in columns (5) and (6) 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.

Finally, we also measure ΔAdv_t as the percentage change in advertising expenditures rather than the log change in advertising expenditures as we used in all previous regressions. The results based on this new measure are presented in columns (9) to (12). It is evident that our results are robust to the alternative measure of ΔAdv_t. The coefficient of the percentage change in advertising is positive and significant in the regression on raw return in the contemporary year t and it is negative and significant in the regression on raw return in window [7, 12].

3.3 Fama-French Factor Models

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

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_{pt}. \quad (2)$$

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 large firms minus the return on small 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. R_{pt} is the equally weighted monthly return on the portfolio of each ΔAdv_t decile or the (P10-P1) portfolio.[7] Specifically,

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

we assign each firm to a portfolio at the end of each June based on its ΔAdv_t rank in the fiscal year prior to the time of portfolio formation. Each firm will be held in the portfolio in a holding period of either half a year or a year. At the end of each holding period, the firm drops out of the portfolio. We choose not to present the results based on stock returns in the advertising year since our portfolios are formed at a time subsequent to the advertising year. In the above factor model (2), 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 9. They show that the portfolio of the high advertising firms earns a lower stock return in the year subsequent to the advertising year, both in a holding period of six months and one year. Specifically, the (P10-P1) portfolio earns -8.4% in a six-month window (-1.40% monthly return) and -11.3% in a one-year window (-0.94% monthly return). Both stock returns are statistically significant.

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

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + u_p UMD_t + \varepsilon_{pt}. \tag{3}$$

Model (3) is similar to model (2), except 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 9. In general, adding the momentum factor marginally reduces the magnitude of abnormal returns both in the six-month window and in the one-year window. In panel B, the (P10-P1) portfolio earns a return of -6.78% in the six-month window. However, α_p of the (P10-P1) portfolio is insignificant in the one-year window, though it is still negative.

To demonstrate the robustness of our results, we also run the three factor model (2) based on the extended sample covering years 1980-2005 but without the transition years 1994 and 1995. The results are presented in panel C, table 9. Compared to the results in panel A, the magnitude of the negative future stock return earned by the (P10-P1) portfolio becomes smaller but the statistical significance improves in panel C. These results in panel C demonstrate the robustness of our results to the different sample periods.

Overall, our results in table 9 suggest that a large amount of advertising expenditures can predict a negative future stock return. It is worth noting that the ex-post stock returns based on the Fama-French factor model in this subsection is slightly less significant than those in Sections 3.1 and 3.2, where we focus on portfolio sorts and Fama-MacBeth regressions. This difference could arise from the different ways that we construct our portfolios and calculate ex-post stock returns. In Sections 3.1 and 3.2, we intend to study the impact of advertising on the dynamics of stock returns surrounding the advertising year. Thus, we calculate stock returns based on event time windows relative to the end of the fiscal year, at which point we compute the change in advertising in that fiscal year. In contrast, we rely on calendar time windows in this subsection by following the methodology in Fama and French (1993). The calendar time windows here are created at the end of each June. Thus, they could start at any time from one month to twelve months after the change in advertising expenditures occurs. This difference between calendar time windows and event time windows could potentially explain our weaker results based on the calendar time windows.

4 Does Investor Attention Drawn by Advertising Explain the Advertising Effect on Stock Returns?

In the previous section, we find that a larger amount of advertising expenditures is linked to a larger stock return in the contemporary year, but a smaller stock return in the long run. We conjecture that the advertising effect occurs because a firm's advertising can help attract investors' attention on the firm's stock. In the following, we first develop testable hypotheses for this investor attention argument in Section 4.1, followed by the empirical tests of these hypotheses in Sections 4.2 to 4.6.

4.1 Hypothesis Development

Investors' attention could affect contemporary stock prices and future stock returns in two ways. First, Barber and Odean (2008) argue that attention-grabbing events affect buying and selling differently. Individual investors face a search problem when they are buying since they have to buy from a large set of choices. Thus, individual investors are more likely to limit their search to stocks that have recently caught their attention. On the other hand, attention-grabbing events do not affect selling as much as they do to buying: individual investors only have to choose from a small set of their limited portfolio holdings when they are selling. As a result, an increased attention would increase the buy-sell imbalance. The increased imbalance further increases stock prices when the demand curve for the stock is downward-sloping and when the stock faces short-sale constraints. As the stock gradually falls out of attention in the long run, it would experience a negative future stock return.

Second, it is also possible that an increased level of recognition increases the heterogeneity of investors' beliefs about a stock's value. As Miller (1977) argues, when investors with heterogeneous beliefs are subject to short-sale constraints, pessimistic investors are prevented from selling short and stock prices reflect the beliefs of optimistic investors. When the heterogeneity of investor beliefs on the stock's value increases (because of the increased recognition on the stock), the stock would be purchased by the investors with more optimistic valuation, thereby being priced at a higher price level. As the recognition effect wears off over time and the information about the operating performance of the firm becomes available to investors, the heterogeneity of investor beliefs will be reduced, causing the firm's stock price to converge to its fundamental value.

In the paper, we argue that advertising can help a firm attract investors' attention. The attracted attention results in an increase in the contemporaneous stock price according to the above discussions. As the attention attracted by advertising fades out over time, stock price decreases in the future, resulting in a negative future stock return. To test this investor attention explanation, we develop the following hypotheses.

If the advertising effect on stock returns is indeed an investor attention effect, we expect that an increase in a firm's advertising expenditures attracts more investor attention on the firm's stock in the advertising year. This is the first hypothesis (H1) we test. We also expect that an increased level of investor attention is associated with a larger contemporary stock return, but followed by a smaller future stock return. This is the second hypothesis (H2) to test. Note that both hypotheses (H1) and (H2) are not the direct tests of the investor attention argument since both hypotheses does not involve the effect of advertising on stock returns. However, both the relation between advertising and attention (as hypothesized in H1) and the relation between attention and stock returns (as hypothesized in H2) are necessary conditions for the investor attention argument. According to the investor attention argument, advertising attracts investor attention and the attracted attention affects stock returns.

Next, we expect that the advertising effect on stock returns is stronger both in the advertising year and in the long run if the stock draws more attention in the advertising year. However, we expect that the advertising effect on the long-run stock returns is weaker when the attention drawn by advertising in the advertising year persists subsequent to the advertising year. Thus, our third hypothesis (H3) is that advertising increases stock returns in the contemporary year to a larger degree if the stock catches more attention in that year. Our fourth hypothesis (H4) is that the negative relation between advertising and future stock returns is stronger if the stock catches more attention in the advertising year and weaker if the stock maintains its high visibility in the year subsequent to the advertising year.

In addition, both our discussions earlier on the search problem and the heterogeneous beliefs argument suggest that short-sale constraint is a key reason that advertising-driven attention can cause stock overpricing. Thus, our fifth hypothesis (H5) is that the advertising effect is stronger in those stocks that are more costly to sell short. In other words, for those stocks with higher arbitrage costs, an increase in the level of advertising would be associated with a larger contemporary stock return and a smaller long-run stock return.

Finally, it is possible that small stocks, value stocks, and stocks with poor performances are relatively unappealing to investors, thereby more likely to be affected by advertising. Thus, our sixth hypothesis (H6) is that the advertising effect on stock returns is stronger in the small, value, and poorly performing stocks.

4.2 Attention and Advertising

We first study whether advertising can affect investors' attention by testing hypothesis (H1). We use two variables to proxy for the degree of attention that investors are paying to a stock: the stock's trading volume and the number of financial analysts covering the stock. Investors are more likely to trade when they pay more attention to a stock (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 trading volume or a larger number of financial analysts covering indicates a enhanced level of attention attracted by the stock.

We run the following regression to test hypothesis H1:

$$Attention_t = \gamma_0 + \gamma_1 \Delta Adv_t + \gamma_2 Size_{t-1} + \gamma_3 BM_{t-1} + \gamma_4 \Delta Sale_t + \gamma_5 \Delta Prft_t. \tag{4}$$

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 correlation using a Newey-West correction. We expect γ_1 to be positive to be consistent with hypothesis H1.

We present the results from regression (4) in table 10. In columns (1) to (3), we use exchange-adjusted trading turnover in year t to proxy for $Attention_t$. We first run a regression of trading turnover against ΔAdv_t without including any control variables. According to column (1), γ_1, the coefficient of ΔAdv_t, is positive and significant at the 1% level. In column (2), we control for $Size_{t-1}$ and BM_{t-1}. The coefficient of ΔAdv_t changes little with these controls. In column (3), 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 trading turnover is not driven by sales growth or profitability growth. The coefficient of ΔAdv_t in column (3) remains statistically significant at the 1% level after the controls, though controlling for sales growth and profitability growth reduces the economic magnitude of the advertising effect on trading turnover. In general, the above results suggest that a higher amount of advertising expenditures increases trading volume in the stock market.

In columns (4) to (6), we re-run regression (4) with $Attention_t$ proxied by the number of financial analysts in year t. The results from these regressions are similar to those in the three left-hand columns. The coefficient of ΔAdv_t is positive and significant at the 1% level. These results suggest that advertising helps a firm attract more financial analysts to cover the firm.

Overall, our results here are consistent with hypothesis H1. They suggest that an increase in advertising helps a firm increase its visibility and draw more attention from investors in the stock market.

4.3 Attention and Stock Returns

Next, we study whether investors' attention affects stock returns by testing hypothesis H2. We run the following regression:

$$\begin{gathered} Raw\ Return_t = \delta_0 + \delta_1 Attention_t + \delta_2 Size_{t-1} + \delta_3 BM_{t-1}, \text{ and} \\ Raw\ Return_{t+1} = \lambda_0 + \lambda_1 Attention_t + \lambda_2 Size_t + \lambda_3 BM_t + \lambda_4 Raw\ Return_t. \end{gathered} \tag{5}$$

We proxy for the degree of investor attention using trading volume and the number of analysts following the firm. We expect that the attention variables are positively related to the stock return in year t but negatively related to the long run stock return in year $t+1$. Thus, we expect δ_1 to be positive and λ_1 to be negative.

We present the results in table 11. In the first two columns, we run a regression of raw stock return in year t against $Turnover_t$ or $Numest_t$, the attention proxy in the same year, controlling for $Size_{t-1}$ and BM_{t-1}. We find that both the coefficient of $Turnover_t$ and the coefficient of $Numest_t$ are positive and significant. These results are consistent with hypothesis H2: a stock experiences a larger stock return in the year when the stock attracts more attention from investors in the stock market.

In columns (3) to (8), we run regressions of long-run raw stock return in year $t+1$ against the attention proxy measured in both year t and year $t+1$. We control for $Size_t$, BM_t, and momentum in these regressions, where momentum is measured by raw stock return in year t. In these regressions, the coefficients of the attention proxy in year t, $Turnover_t$ and $Numest_t$, capture the effect of investor attention on the future stock return. The coefficients of the attention proxy in year $t+1$, $Turnover_{t+1}$ and $Numest_{t+1}$, capture the effect of attention on the contemporary stock return, since the dependent variable (future raw return) is measured in year $t+1$ as well. Our results show two important findings. First, both the coefficients of $Turnover_t$ and $Numest_t$ are negative and significant at the 1% level, regardless of whether future raw stock return is measured in event window [1, 6], [7, 12], or [1, 12]. Second, both the coefficients of $Turnover_{t+1}$ and $Numest_{t+1}$ are positive and significant at the 1% level. Both findings are consistent with hypothesis H2. The first finding suggests that a larger amount of advertising is followed by a smaller stock return in the subsequent year. The second finding suggests that a larger amount of advertising increases the stock return in the contemporary year (which is year $t + 1$ in this finding).

Thus, our results in table 11 suggest that attention affects stock returns in both the contemporary year and the subsequent year. They are consistent with the investor attention argument: An increased visibility is associated with an increase in the contemporary stock return; it is also associated with a decrease in the future stock return as the visibility wears out over time. However, this relation between attention and stock returns could be driven by factors other than advertising. Thus, to link investor attention to the impact of advertising on stock returns, we test the third and the fourth hypotheses.

4.4 Attention and the Effect of Advertising on Stock Returns

In the test of hypothesis H3, we run a regression of stock return in year t against the interaction term between advertising and the attention variable, measured in year t as well. In particular, we construct a dummy variable capturing the firms with a large amount of advertising expenditures. This dummy variable of high ΔAdv_t equals one if a firm's ΔAdv_t is above the sample average and zero otherwise. Similarly, we construct the dummy of large trading turnover in year t, equal to one if a firm's $Turnover_t$ is above the sample average. We then interact the dummy of high ΔAdv_t with the dummy of high $Turnover_t$. We also interact the dummy of high ΔAdv_t with another attention proxy $Numest_t$. These two interaction terms capture the situation where a firm spends a large amount of advertising in year t and catches high attention among investors in the same year. According to hypothesis H3, we expect the coefficients of both interaction terms to be positive in the regressions on contemporary stock returns.

We present the results from the above test in the first two columns in table 12. The coefficient of the interaction term between the ΔAdv_t dummy and the $Turnover_t$ dummy is positive and significant. Similarly, the coefficient of the ΔAdv_t dummy interacted with $Numest_t$ is positive and significant as well. Both results are consistent with hypothesis H3. They suggest that the positive impact of advertising on the contemporary stock return is stronger for the high attention stocks, such as the high volume stocks and the stocks with high analyst coverage. Thus, investors' attention does play a role in the relation between advertising and stock return in the contemporary advertising year.

Next, we test hypothesis H4 to study whether the investor attention argument can explain the advertising effect on future stock returns. We run a regression of stock return in year $t + 1$ against the interaction term between advertising and attention. Again, we use both trading turnover and the number of analyst forecasts to proxy for the degree of investor attention. In particular, we interact the dummy of high ΔAdv_t with not only the dummy of high $Turnover_t$ but also the dummy of high $Turnover_{t+1}$, where the dummy of high $Turnover_{t+1}$ equals one if a firm's trading turnover in the subsequent year $t+1$ is above the sample average. Similarly, we interact the dummy of high ΔAdv_t with both $Numest_t$ and $Numest_{t+1}$. The interaction term between the advertising dummy and the investor attention variable in year t (i.e., the high $Turnover_t$ dummy or $Numest_t$) captures the situation where a firm spends a large amount of advertising expenditures and attracts investors' attention in the same year. The interaction term between the advertising dummy and the attention variables in year $t+1$ (i.e., the high $Turnover_{t+1}$ dummy or $Numest_{t+1}$) captures the situation where the attention attracted by a firm's advertising in year t persists in the subsequent year $t + 1$. According to hypothesis H4, we expect the coefficient of the former interaction term to be negative and the coefficient of the latter interaction term to be positive in the regressions on future stock returns.

We present the results from the above test in columns (3) to (8), table 12, with the dependent variable, long-run raw return, measured in various future event windows. Three findings from these columns are as follows. First, the coefficient of the dummy of high ΔAdv_t is negative and mostly significant. This results is consistent with our earlier results, showing that higher advertising in year t is followed with smaller future stock returns in year $t+1$. Second, the coefficient of the interaction term between the dummy of high ΔAdv_t and the dummy of high $Turnover_t$ is negative and significant at the 1% level. Specifically, consider the high volume stock (with the $Turnover_t$ dummy equal to one) and the low volume stock (with the $Turnover_t$ dummy equal to zero) in the case when both types of stocks advertise heavily in year t (with the ΔAdv_t dummy equal to one). According to column (7), the long-run stock return of the high volume stock is 17% worse in event window [1, 12] than the long-run return of the low volume stock. Similarly, the coefficient of the ΔAdv_t dummy interacted with $Numest_t$ is negative and significant as well. These results support our hypothesis H4. They suggest that the negative relation between advertising and future stock returns is more significant for those firms catching more investor attention such as those high volume firms and those firms with more analyst coverage.

Third, once we interact the dummy of high ΔAdv_t with either the $Turnover_{t+1}$ dummy or $Numest_{t+1}$ (i.e., the proxy of investor attention in the subsequent year $t+1$ rather than in the contemporary year t), the coefficient of the interaction term becomes positive and significant. These results show that a high advertising firm would experience a larger (or less negative) return in the subsequent year if investors still trade heavily on the firm's stock and if the firm is still heavily covered by financial analysts in the subsequent year. These results confirm our earlier findings that investors' attention has a positive impact on the stock return in the same year (i.e., year $t+1$ in these results). They also support hypothesis H4, showing that the high advertising firm experiences a less degree of stock price reversal in the long run if its stock can maintain a high degree of investor attention in the long run.

In sum, our results from table 12 directly link the advertising effect to the investor attention argument. They suggest that the long-run stock price reversal following a high advertising year is more significant for a firm that catches more attention in the high advertising year. However, such a price reversal could be smaller if the attention does not fade out over time so that the firm maintains its high visibility among investors subsequent to the high advertising year.

4.5 Advertising and Short-Sale Constraints

Stock would be overpriced when short-selling is prohibitively costly in the equity market. In the following, we study how the cost of arbitrage factors into the advertising effect by testing hypothesis H5. Our first proxy for the cost of arbitrage is Amihud's (2002) illiquidity ratio $Illiquid_t$. Illiquidity increases the cost of short-selling either because arbitrageurs find it difficult to locate an illiquid stock to sell short or because the transaction cost of trading is high for an illiquid stock. However, illiquidity ratio could be related to investors' attention as well. A stock with less recognition from investors could be less liquid. Thus, on the one hand, illiquidity increases the cost of arbitrage and causes the stock to be overvalued. On the other hand, illiquidity could be an outcome of the lack of investor attention, which could cause stock to be undervalued. These two conflicting effects of illiquidity on stock prices could reduce the power of $Illiquid_t$ as the proxy for the cost of arbitrage. In consideration of this, we also use idiosyncratic risk $Risk_t$ as the second proxy. A higher level of $Illiquid_t$ or $Risk_t$ indicates a higher cost of arbitrage.

Using these two proxies, we run a regression of future stock returns against the interaction term between advertising and the cost of arbitrage. The specification is similar to that reported in table 12. In particular, we interact the dummy of high ΔAdv_t with the dummy of high $Illiquid_t$. We also interact the dummy of high ΔAdv_t with the dummy of high $Risk_t$. Hypothesis H5 predicts that the advertising effect on future stock returns is stronger for stocks with high arbitrage costs.

Thus, we expect the coefficient of the interaction terms to be negative.

We present the results from this test in table 13, with stock return measured either in event window [7, 12] or [1, 12]. In the first four columns, we use $Illiquid_t$ to proxy for the arbitrage cost. In columns (5) to (8), we use $Risk_t$ to proxy for the arbitrage cost. As expected, the coefficient of the ΔAdv_t dummy interacted with the high $Illiquid_t$ dummy is negative and significant. Similarly, the coefficient of the ΔAdv_t dummy interacted with the $Risk_t$ dummy is negative and significant as well. Both coefficients are statistically significant. These results are consistent with hypothesis H5. They show that the advertising effect on future stock returns is stronger for illiquid stocks or stocks with high idiosyncratic volatilities, those stocks that typically face large arbitrage costs.

We also run a regression of future stock return against the dummy of high stock price, equal to one if a firm's stock price at the end of year t is above the sample median and zero otherwise. The results are presented in the last two columns in table 13. They show that the coefficient of the ΔAdv_t dummy interacted the high price dummy is positive and significant at the 5% level. These results suggest that the advertising effect on future stock returns is stronger for highly priced stocks. It is possible that stocks priced at a higher price level are less liquid. Thus, the above results on the price dummy are consistent with hypothesis H5 as well.

4.6 Advertising and Firm Characteristics

In the following, we test hypothesis H6. We first study the advertising effect in firms with different sizes. We run a regression of future stock return against the interaction term between the dummy of high ΔAdv_t and the dummy of large firm size. The size dummy equals one if a firm's $Size_t$ is above the sample median and zero otherwise. Hypothesis H6 predicts the coefficient of the interaction term to be positive. The results from this regression are presented in the first two columns in table 14. As expected, the coefficient of the interaction term between the ΔAdv_t dummy and the $Size_t$ dummy is positive and significant. For example, according to the results in column (2), if both a large firm and a small firm spend a large amount on advertising in year t, the small firm's stock return in year $t+1$ is smaller than that of the large firm by 6%.

Second, we compare the advertising effect between value firms and glamour firms. We run a regression of future stock return against the interaction term between the dummy of high ΔAdv_t and the book-to-market dummy. The book-to-market dummy equals one if a firm's BM_t is above the sample median and zero otherwise. Hypothesis H6 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 the ΔAdv_t dummy and the BM_t dummy is negative and significant. For example, column (4) shows that the long-run stock return of a value firm with large advertising expenditures is smaller by 10.6% compared to a value firm with similar advertising expenditures.[8]

Finally, we study the advertising effect for firms with different stock performances and operating performances. We measure stock performance by raw stock return in year t. We run a regression of future stock return against the interaction term between the ΔAdv_t dummy and the return dummy. The return dummy equals one if a firm's raw stock return in year t is above the sample median and zero otherwise. We also run a regression of future stock return against the interaction term between the ΔAdv_t dummy and the $Prft_t$ dummy, where we use $Prft_t$ to measure firms' operating performances. The $Prft_t$ dummy equals one if a firm's $Prft_t$ is above the sample median and zero otherwise. Hypothesis H6 predicts the coefficient of the interaction term in both of the above regressions to be positive.

We present the results from the above regressions in columns (5) to (8) in table 14. As expected, the coefficient of the ΔAdv_t dummy interacted with the performance dummy is positive and significant, regardless of whether we study stock performances or operating performances. In

[8] Our results on firm size and book-to-market ratio are consistent with the size effect and the glamour/value stock effect documented in the other asset-pricing anomalies.

sum, our results in table 14 are consistent with hypothesis H6, suggesting that the reversal of future stock prices for the high advertising firms is stronger in small firms, value firms, and firms with poor stock performances or operating performances.

5 Conclusion

This paper studies the effect of advertising on stock returns and relates this advertising effect to the investor attention argument. We find that a greater amount of advertising 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 link the advertising effect on stock returns to the investor attention argument. We show that advertising increases a firm's visibility among investors in the advertising year. The increased level of investor attention is associated with a larger contemporary stock return and a smaller future stock return. We further show that the advertising effect is stronger in firms with more visibility in the advertising year. In particular, for a firm with a large amount of advertising expenditures, its stock return in the contemporary advertising year increases to a larger degree if the firm catches more attention from investors in the advertising year. Such a high advertising firm with more attracted attention in the advertising year later experiences a greater reversal of stock returns in the future year, though the reversal would be reduced if the attracted attention persists in the long run. We also show that the advertising effect is stronger if investors face a larger arbitrage cost. Finally, we show that the advertising effect on future stock returns is stronger for small, value, and poorly performing stocks. Overall, our results suggest that advertising helps a firm attract investors' attention in the advertising year. The attracted attention increases stock price in the advertising year. However, as the attracted attention wears out over time, stock price starts to decline subsequent to the advertising year.

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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	988	429	24.029	0.979	0.129	0.135	0.167	0.129
1981	1,060	517	24.978	0.364	0.126	0.126	0.132	0.121
1982	1,026	492	28.110	0.561	0.076	0.081	0.100	0.075
1983	1,037	465	30.613	1.110	0.112	0.116	0.140	0.119
1984	1,249	537	29.419	0.835	0.175	0.151	0.258	0.158
1985	1,233	541	29.695	0.619	0.082	0.088	0.122	0.084
1986	1,256	525	30.659	0.820	0.131	0.106	0.243	0.104
1987	1,308	537	30.945	0.877	0.133	0.115	0.258	0.112
1988	1,182	516	35.630	0.722	0.133	0.120	0.210	0.112
1989	1,153	529	37.754	0.474	0.099	0.084	0.193	0.076
1990	1,107	519	42.604	0.411	0.091	0.080	0.433	0.078
1991	1,032	505	47.422	0.154	0.058	0.052	0.079	0.044
1992	1,228	581	45.091	0.318	0.115	0.086	0.176	0.082
1993	1,421	653	40.850	0.293	0.084	0.082	0.169	0.076
1994	577	171	77.106	2.600	0.207	0.147	0.421	0.140
1995	354	25	136.140	9.510	0.178	0.133	0.351	0.142
1996	460	21	133.867	8.820	0.170	0.109	0.335	0.115
1997	572	16	117.243	7.505	0.209	0.127	0.740	0.135
1998	607	19	114.566	9.389	0.163	0.117	0.392	0.117
1999	583	15	129.664	13.323	0.202	0.107	3.502	0.113
2000	741	15	101.748	9.368	0.237	0.126	0.962	0.134
2001	669	17	114.160	9.379	-0.119	-0.025	0.080	-0.024
2002	721	18	117.058	9.984	-0.079	0.000	0.115	0.000
2003	690	18	136.739	12.200	0.099	0.073	0.408	0.075
2004	897	24	120.649	8.129	0.141	0.100	0.581	0.105
2005	997	28	113.983	8.000	0.123	0.083	0.371	0.086
1980-2005	24,148	7,733	61.171	2.482	0.115	0.096	0.411	0.096
1996-2005	6,937	191	122.706	10.203	0.111	0.082	0.704	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. Illiquidity ratio is the absolute stock return divided by the value of trading volume. Numest is the number of analysts following the firm in the last month of the fiscal year. Turnover is the log ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. 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*.

Variables	**# of Obs.**	**Mean**	**Median**
Log change in advertising (ΔAdv_t)	6,715	0.111	0.082
Log advertising in the year prior to the advertising year (Adv_{t-1})	6,731	2.209	2.219
Percentage change in advertising in the advertising year	6,731	0.704	0.085
Raw $return_t$ in the advertising year	6,731	0.101	0.025
Log of market capitalization in the advertising year ($Size_t$)	6,731	6.351	6.207
Log of market capitalization in the year prior to the advertising year ($Size_{t-1}$)	6,731	6.500	6.286
Book-to-market ratio in the advertising year (BM_t)	6,731	0.688	0.483
Book-to-market ratio in the year prior to the advertising year (BM_t)	6,731	0.522	0.394
Log change in sales ($\Delta Sale_t$)	6,731	0.159	0.103
Log sales in the year prior to the advertising year ($Sale_{t-1}$)	6,731	6.294	6.175
Change in operating income ($\Delta Prft_t$)	6,731	-0.016	-0.001
Operating income in the year prior to the advertising year ($Prft_{t-1}$)	6,731	0.116	0.134
Idiosyncratic Risk ($Risk_t$)	6,731	0.033	0.029
Illiquidity Ratio ($Illiquid_t$)	6,731	0.357	0.009
Trading turnover in advertising year ($Turnover_t$)	6,731	1.330	0.950
Trading turnover in the year after the advertising year ($Turnover_{t+1}$)	6,706	1.291	0.952
Number of financial analysts following in advertising year ($Numest_t$)	5,360	8.706	6
Number of financial analysts following in the year after advertising year ($Numest_{t+1}$)	5,212	8.655	6

Table 3: Determinants of Advertising: OLS and Fama-MacBeth 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 advertising year *t*. Size is the log of market capitalization. BM is the ratio of the book value to the market value of equity. 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	-0.293***	-0.284***	-0.338***	-0.323***	-0.258***	-0.193***	-0.314***	-0.297***	-0.369***	-0.349***
	[0.001]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
Adv_{t-1}	-0.079***	-0.076***	-0.081***	-0.078***	-0.089***	-0.078***	-0.074***	-0.074***	-0.077***	-0.076***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
$\Delta Sale_t$	0.496***	0.519***	0.494***	0.511***			0.607***	0.587***	0.602***	0.577***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*			*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
$Sale_{t-1}$	0.080***	0.076***	0.065***	0.067***			0.074***	0.067***	0.056***	0.050***
	[0.000]	*[0.000]*	*[0.001]*	*[0.000]*			*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
$Size_t$			0.02	0.014**	0.084***	0.069***			0.024	0.022***
			[0.205]	*[0.038]*	*[0.000]*	*[0.000]*			*[0.105]*	*[0.001]*
BM_t			0.028**	0.022***	0.071***	0.056***			0.031***	0.030***
			[0.017]	*[0.007]*	*[0.000]*	*[0.000]*			*[0.005]*	*[0.000]*
$\Delta Prft_t$							-0.881***	-0.434***	-0.881***	-0.430***
							[0.000]	*[0.000]*	*[0.000]*	*[0.000]*
$Prft_{t-1}$							0.245**	0.446***	0.259**	0.471***
							[0.026]	*[0.000]*	*[0.019]*	*[0.000]*
Reg. Method	Fama-MacBeth	OLS	Fama-MacBeth	OLS	Fama-MacBeth	OLS	Fama-MacBeth	OLS	Fama-MacBeth	OLS
Observations	6,715	6,715	6,715	6,715	6,715	6,715	6,715	6,715	6,715	6,715

Table 4: Raw Returns to Portfolios Ranked by Log Change in Advertising Expenditures. The sample period covers 1996 to 2005. Raw returns are calculated for four event windows: advertising year; [1,6], a six-month window right after advertising year; [7,12], a six-month window from month 7 to 12 subsequent to advertising year; and [7,18], a 12-month window from month 7 to 18 subsequent to advertising year. Raw returns controlled by size are calculated as follows. For each month, all stocks in the sample are sorted into quintiles based on their sizes. Then stocks are ranked into deciles relative to other stocks in their size quintile on the basis of the log change in advertising expenditures. For stocks in similar deciles of advertising change, an equally weighted portfolio is formed and the performance is tracked in the relevant event window. The table reports the average return of the portfolios in each deciles, along with the difference in the returns of portfolios in deciles 10 and 1, P10-P1. Raw returns controlled by size and book to-market are calculated in the similar manner, with all stocks first sorted based on both size and book-to-market ratio, rather than only on size. Standard errors are calculated using a Newey-West correction for serial dependence.

	Raw return					Raw return sorted by size					Raw return sorted by size and book-to-market ratio				
Rank	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
1	-0.007	0.095	0.097	0.185	0.172	0.055	0.080	0.094	0.170	0.167	0.096	0.087	0.081	0.163	0.162
2	0.083	0.082	0.043	0.137	0.133	0.069	0.087	0.049	0.139	0.151	0.023	0.079	0.065	0.155	0.147
3	0.070	0.099	0.087	0.207	0.218	0.067	0.092	0.076	0.185	0.171	0.074	0.096	0.084	0.200	0.203
4	0.151	0.096	0.076	0.180	0.167	0.098	0.100	0.083	0.203	0.178	0.116	0.101	0.061	0.172	0.149
5	0.114	0.086	0.059	0.162	0.125	0.088	0.086	0.057	0.163	0.147	0.104	0.084	0.056	0.156	0.127
6	0.081	0.093	0.049	0.159	0.145	0.102	0.091	0.047	0.155	0.142	0.120	0.100	0.060	0.179	0.155
7	0.151	0.118	0.045	0.172	0.114	0.105	0.134	0.048	0.193	0.119	0.120	0.117	0.059	0.188	0.146
8	0.215	0.084	0.026	0.124	0.109	0.205	0.085	0.034	0.125	0.101	0.177	0.085	0.037	0.126	0.121
9	0.116	0.054	0.043	0.102	0.119	0.153	0.037	0.030	0.076	0.113	0.136	0.046	0.033	0.098	0.112
10	0.160	0.003	0.002	0.045	0.077	0.190	0.018	0.011	0.067	0.091	0.157	0.029	0.007	0.060	0.078
P10-P1	0.168	-0.092	-0.094	-0.140	-0.095	0.135	-0.062	-0.083	-0.102	-0.077	0.061	-0.058	-0.074	-0.103	-0.084
std. err.	0.052	0.029	0.032	0.053	0.052	0.051	0.028	0.030	0.051	0.049	0.049	0.027	0.029	0.047	0.044
p-value	0.001	0.002	0.003	0.008	0.067	0.008	0.029	0.006	0.046	0.121	0.208	0.035	0.012	0.028	0.057

Table 5: Adjusted Returns to Portfolios Ranked by Log Change in Advertising Expenditures. The sample period covers 1996 to 2005. Adjusted return for each stock is computed as the difference between the stock's raw return and the mean of its matching portfolio. Matching portfolios are created based on industry and size, or on size and book to market ratio, or on size, book-to-market, and momentum. All stocks are ranked into deciles on the basis of the log change in advertising expenditures. The table reports the average return of the portfolios in each deciles, along with the difference in the returns of portfolios in deciles 10 and 1, P10-P1. Four event windows are reported in the table: advertising year; [1,6], a six-month window right after advertising year; [7,12], a six-month window from month 7 to 12 subsequent to advertising year; and [7,18], a 12-month window from month 7 to 18 subsequent to advertising year. Standard errors are calculated using a Newey-West correction for serial dependence.

	Industry and size adjusted return					**Size and book-to-market adjusted return**					**Size, book-to-market, and momentum adjusted return**				
Rank	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
1	-0.107	-0.002	0.028	-0.013	0.009	-0.146	-0.001	0.035	0.004	0.018	-0.028	0.000	0.033	0.007	0.025
2	-0.092	-0.003	-0.001	-0.011	0.012	-0.116	-0.009	-0.010	-0.029	-0.015	-0.028	-0.016	-0.010	-0.032	-0.015
3	-0.104	0.009	0.033	0.042	0.086	-0.130	0.013	0.027	0.043	0.064	-0.016	0.014	0.026	0.049	0.066
4	-0.055	0.015	0.021	0.036	0.029	-0.047	0.016	0.024	0.028	0.025	0.002	0.020	0.024	0.035	0.024
5	-0.088	0.013	0.014	0.030	-0.005	-0.069	0.008	0.004	0.012	-0.019	-0.029	0.012	0.004	0.014	-0.023
6	-0.102	-0.002	-0.014	-0.009	-0.007	-0.119	0.008	-0.011	-0.004	-0.012	-0.016	0.006	-0.015	-0.015	-0.018
7	-0.066	0.034	0.003	0.026	-0.013	-0.060	0.039	-0.010	0.021	-0.031	-0.033	0.044	-0.007	0.030	-0.033
8	-0.006	0.004	-0.018	-0.015	-0.012	0.020	-0.002	-0.028	-0.035	-0.039	-0.007	-0.005	-0.030	-0.044	-0.033
9	-0.051	-0.024	0.004	-0.032	-0.007	-0.078	-0.039	-0.009	-0.068	-0.023	-0.039	-0.042	-0.007	-0.071	-0.019
10	-0.017	-0.063	-0.044	-0.100	-0.074	-0.050	-0.085	-0.053	-0.121	-0.071	0.024	-0.077	-0.053	-0.118	-0.051
P10-P1	0.090	-0.061	-0.072	-0.087	-0.083	0.096	-0.084	-0.089	-0.125	-0.089	0.052	-0.078	-0.086	-0.125	-0.075
std. err.	0.045	0.027	0.029	0.041	0.042	0.043	0.029	0.030	0.050	0.051	0.025	0.028	0.030	0.048	0.049
p-value	0.044	0.024	0.012	0.034	0.048	0.026	0.004	0.004	0.013	0.079	0.035	0.006	0.004	0.010	0.125

Table 6: Robustness Checks on Returns to Portfolios. In panel A, the sample period covers 1980 to 2005 without years 1994 and 1995. In panel B, the sample period covers 1980 to 1993. Stocks in both panels are ranked into deciles on the basis of log change in advertising expenditures. P10-P1 stand for the difference in the returns between portfolios in deciles 10 and 1. Size is the log of market capitalization and BM is the ratio of the book value to the market value of equity in year *t*. In panel C, stocks are ranked into deciles on the basis of percentage change in advertising expenditures from the prior year to the advertising year. In panels D and E, stock returns are either sorted or adjusted by $\Delta Prft_t$ or $\Delta Sale_t$, change in EBITDA/Assets or the log of sales from year *t-1* to the advertising year *t*. Four event windows are reported: advertising year; [1,6], a six-month window right after advertising year; [7,12], a six-month window from month 7 to 12 subsequent to advertising year; and [7,18], a 12-month window from month 7 to 18 subsequent to advertising year. Standard errors are calculated using a Newey-West correction for serial dependence.

Part A: Sample period covers 1980-2005 but without years 1994 and 1995. Portfolios are ranked by the log change in advertising expenditures.

	Raw return					**Size and book-to-market adjusted return**					**Size, BM, and momentum adjusted return**				
Rank	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
1	0.053	0.108	0.062	0.169	0.159	-0.079	0.006	0.024	0.020	0.013	-0.012	0.005	0.023	0.021	0.016
10	0.220	0.058	0.022	0.097	0.109	0.024	-0.036	-0.015	-0.042	-0.029	0.018	-0.033	-0.016	-0.041	-0.023
P10-P1	0.167	-0.050	-0.040	-0.072	-0.049	0.102	-0.042	-0.039	-0.061	-0.042	0.030	-0.038	-0.039	-0.061	-0.039
p-value	0.000	0.000	0.003	0.001	0.019	0.000	0.001	0.002	0.002	0.036	0.001	0.001	0.002	0.001	0.042

Part B: Sample period covers 1980-1993. Portfolios are ranked by the log change in advertising expenditures.

	Raw return					**Size and book-to-market adjusted return**					**Size, BM, and momentum adjusted return**				
Rank	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
1	0.078	0.113	0.048	0.163	0.153	-0.050	0.008	0.019	0.026	0.011	-0.005	0.007	0.018	0.027	0.013
10	0.245	0.081	0.031	0.120	0.123	0.055	-0.015	0.001	-0.008	-0.011	0.015	-0.014	0.000	-0.008	-0.011
P10-P1	0.167	-0.032	-0.017	-0.043	-0.030	0.105	-0.024	-0.018	-0.034	-0.022	0.020	-0.022	-0.019	-0.034	-0.024
p-value	0.000	0.014	0.205	0.032	0.140	0.000	0.050	0.164	0.070	0.238	0.014	0.064	0.129	0.061	0.184

Part C: Sample period covers 1996-2005. Portfolios are ranked by the percentage change in advertising expenditures.

	Raw return					**Size and book-to-market adjusted return**					**Size, BM, and momentum adjusted return**				
Rank	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**	**Adv year**	**[1,6]**	**[7,12]**	**[1,12]**	**[7,18]**
1	-0.014	0.095	0.096	0.185	0.173	-0.150	-0.001	0.034	0.003	0.019	-0.031	0.001	0.032	0.007	0.023
10	0.162	0.003	0.004	0.046	0.079	-0.049	-0.085	-0.052	-0.120	-0.069	0.023	-0.077	-0.052	-0.116	-0.049
P10-P1	0.176	-0.092	-0.093	-0.139	-0.094	0.101	-0.083	-0.086	-0.123	-0.088	0.054	-0.078	-0.084	-0.123	-0.072
p-value	0.001	0.002	0.003	0.008	0.068	0.021	0.004	0.004	0.014	0.082	0.025	0.006	0.005	0.010	0.143

Panel D: Sample period covers 1996-2005. Portfolios are ranked by the log change in advertising expenditures.

	Raw return sorted by $\Delta Prft_t$			**Industry and $\Delta Prft_t$ adjusted return**			**Raw return sorted by $\Delta Sale_t$**			**Industry and $\Delta Sale_t$ adjusted return**			**Raw return sorted by $\Delta Sale_t$ and $\Delta Prft_t$**		
Rank	**[1,6]**	**[7,12]**	**[1,12]**	**[1,6]**	**[7,12]**	**[1,12]**	**[1,6]**	**[7,12]**	**[1,12]**	**[1,6]**	**[7,12]**	**[1,12]**	**[1,6]**	**[7,12]**	**[1,12]**
1	0.101	0.103	0.203	0.011	0.028	0.006	0.102	0.085	0.188	0.003	0.015	-0.005	0.103	0.083	0.188
10	0.019	0.017	0.067	-0.071	-0.044	-0.101	0.019	0.025	0.072	-0.061	-0.030	-0.084	0.043	0.033	0.101
P10-P1	-0.082	-0.086	-0.136	-0.083	-0.072	-0.107	-0.083	-0.060	-0.116	-0.063	-0.045	-0.079	-0.059	-0.050	-0.087
p-value	0.004	0.005	0.009	0.002	0.012	0.013	0.002	0.043	0.020	0.010	0.068	0.034	0.038	0.085	0.084

Table 7: Fama-MacBeth Regressions of Stock Return 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: 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**
	[0.462]	*[0.465]*	*[0.017]*	*[0.001]*	*[0.589]*	*[0.433]*	*[0.039]*	*[0.073]*	*[0.014]*	*[0.031]*
ΔAdv_t	0.088**	0.064**	-0.039	-0.019	-0.063***	-0.048**	-0.086***	-0.063**	-0.068**	-0.047
	[0.017]	*[0.026]*	*[0.104]*	*[0.223]*	*[0.004]*	*[0.026]*	*[0.006]*	*[0.012]*	*[0.024]*	*[0.108]*
$Size_{t-1}$	0	-0.002								
	[0.997]	*[0.911]*								
BM_{t-1}	0.068**	0.075***								
	[0.020]	*[0.001]*								
$Size_t$			-0.005	-0.007	0.002	0.001	-0.007	-0.01	-0.002	-0.004
			[0.422]	*[0.255]*	*[0.803]*	*[0.944]*	*[0.485]*	*[0.395]*	*[0.798]*	*[0.684]*
BM_t			0.020*	0.018	-0.007	-0.008	0.014	0.01	0.007	0.004
			[0.085]	*[0.119]*	*[0.692]*	*[0.636]*	*[0.573]*	*[0.681]*	*[0.713]*	*[0.851]*
Raw $Return_t$			0.018	0	-0.009	-0.014	0.018	-0.006	0.019	0.01
			[0.513]	*[0.992]*	*[0.658]*	*[0.468]*	*[0.748]*	*[0.906]*	*[0.497]*	*[0.683]*
$\Delta Sale_t$		0.203**		-0.048		-0.044**		-0.061		-0.084**
		[0.010]		*[0.217]*		*[0.026]*		*[0.227]*		*[0.038]*
$\Delta Prft_t$		1.364***		0.354***		0.197*		0.514***		0.315***
		[0.000]		*[0.000]*		*[0.064]*		*[0.001]*		*[0.004]*
Observations	6,527	6,502	6,527	6,502	6,527	6,502	6,527	6,502	6,527	6,502

Table 8: Fama-MacBeth Regressions of Stock Return Against Advertising: Robustness Check on Sample Size. The sample covers either a period of year 1980 to year 2005 without years 1994 and 1995 or a period of year 1996 to year 2005. The dependent variable is raw stock return or size and book-to-market adjusted return. Both raw return and adjusted return are measured in one of the two event windows: advertising year t or [7,12], a six-month window from month 7 to 12 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 in columns (1) to (8) or the percentage change in advertising expenditures from year t-1 to advertising year t in columns (9) to (12). $\Delta Prft_t$ 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 [7, 12]**		**Advertising year adjusted return$_t$**		**Adjusted return in months [7, 12]**		**Advertising year raw return$_t$**		**Raw return in months [7, 12]**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Constant	0.058	0.06	0.028	0.043	0.023	0.02	-0.036**	-0.02	0.077	0.081	0.048	0.064
	[0.368]	*[0.319]*	*[0.352]*	*[0.140]*	*[0.767]*	*[0.828]*	*[0.039]*	*[0.313]*	*[0.439]*	*[0.451]*	*[0.546]*	*[0.409]*
ΔAdv_t or % change in Adv	0.139***	0.072***	-0.030**	-0.018	0.077***	0.055***	-0.060***	-0.047**	0.036**	0.015*	-0.031***	-0.024**
	[0.000]	*[0.000]*	*[0.024]*	*[0.160]*	*[0.009]*	*[0.005]*	*[0.007]*	*[0.033]*	*[0.021]*	*[0.100]*	*[0.001]*	*[0.015]*
$Size_{t-1}$	0.006	0.004			-0.041***	-0.042***			0	-0.002		
	[0.520]	*[0.686]*			*[0.009]*	*[0.009]*			*[0.998]*	*[0.913]*		
BM_{t-1}	0.070***	0.082***			0.287***	0.297***			0.065**	0.073***		
	[0.004]	*[0.001]*			*[0.000]*	*[0.000]*			*[0.028]*	*[0.001]*		
$Size_t$			0.003	0.002			0.007***	0.006***			0.002	0
			[0.253]	*[0.408]*			*[0.001]*	*[0.005]*			*[0.853]*	*[0.979]*
BM_t			0.003	0			-0.013	-0.015*			-0.008	-0.009
			[0.792]	*[0.974]*			*[0.158]*	*[0.097]*			*[0.635]*	*[0.607]*
Raw $Return_t$			0.012	0.006			-0.003	-0.008			-0.011	-0.016
			[0.450]	*[0.753]*			*[0.900]*	*[0.714]*			*[0.600]*	*[0.411]*
$\Delta Sale_t$		0.271***		-0.032*		0.151**		-0.038**		0.223***		-0.042**
		[0.000]		*[0.054]*		*[0.019]*		*[0.029]*		*[0.003]*		*[0.044]*
$\Delta Prft_t$		1.474***		0.222***		1.028***		0.180**		1.328***		0.207*
		[0.000]		*[0.003]*		*[0.000]*		*[0.023]*		*[0.000]*		*[0.054]*
Observations	15,086	15,040	15,086	15,040	6,527	6,502	6,527	6,502	6,527	6,502	6,527	6,502
Sample Period	80-93 and 96-05		80-93 and 96-05		96-05		96-05		96-05		96-05	
Measure of ΔAdv_t	Log change		Log change		Log change		Log change		Percentage change		Percentage change	

Table 9: Fama French Factor Regression. This table reports the results from Fama and French (1993) three-factor or four-factor regressions for portfolios of firms ranked (into deciles) by the log change in advertising expenditures, as well as the results for zero-investment portfolios that long the firms in decile 10 and short the firms in decile 1. Sample period covers year 1996-2005. Event month [1, 6] stands for the six months subsequent to the advertising year; and [1, 12] stands for the 12 months subsequent to the advertising year. The four-factor regression model is given below:

$$r_{pt} - r_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p\, SMB_t + h_p\, HML_t + u_p\, UMD_t + \varepsilon_t .$$

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 UMD_t is the return on high momentum stocks minus the return on low momentum stocks in month t. α_p is the monthly risk-adjusted abnormal return in percent and β_p, s_p, h_p, and u_p are factor loadings.

Part A: Fama-French three factor model. Deciles portfolios are ranked by the log change in advertising expenditures.

	Event Month [1, 6]					Event Month [1, 12]				
Deciles	**α**	**Mkret**	**SMB**	**HML**	**UMD**	**α**	**Mkret**	**SMB**	**HML**	**UMD**
1	0.111	1.210	1.070	0.049		0.170	1.357	0.914	0.292	
2	-0.021	1.218	0.642	0.309		-0.011	1.188	0.588	0.472	
3	0.218	0.980	0.662	0.353		0.123	1.046	0.528	0.471	
4	0.135	0.928	0.521	0.329		0.236	1.000	0.370	0.458	
5	-0.203	1.066	0.497	0.390		0.142	1.062	0.397	0.521	
6	-0.042	1.162	0.568	0.328		0.138	1.159	0.593	0.409	
7	0.072	1.133	0.684	0.304		-0.045	1.212	0.402	0.377	
8	-0.273	1.237	0.799	0.202		0.096	1.192	0.549	0.164	
9	-0.537	1.260	0.825	-0.092		-0.370	1.344	0.526	0.030	
10	-1.284	1.238	0.960	-0.293		-0.768	1.375	0.722	-0.228	
P10-P1	-1.40**	0.03	-0.11	-0.34*		-0.94*	0.02	-0.19	-0.52***	

Part B: Fama-French four factor model. Deciles portfolios are ranked by the log change in advertising expenditures.

1	0.747	1.065	1.064	-0.077	-0.460	0.610	1.181	1.018	0.203	-0.427
2	0.425	1.116	0.638	0.220	-0.322	0.459	1.001	0.699	0.377	-0.456
3	0.582	0.897	0.658	0.280	-0.263	0.384	0.942	0.590	0.419	-0.253
4	0.505	0.843	0.517	0.255	-0.268	0.469	0.907	0.426	0.412	-0.226
5	0.251	0.962	0.493	0.299	-0.329	0.443	0.942	0.468	0.460	-0.292
6	0.474	1.045	0.563	0.225	-0.373	0.465	1.029	0.670	0.343	-0.317
7	0.466	1.043	0.681	0.226	-0.285	0.283	1.081	0.479	0.311	-0.318
8	-0.036	1.183	0.797	0.155	-0.171	0.430	1.059	0.628	0.097	-0.324
9	0.000	1.137	0.820	-0.199	-0.388	0.092	1.160	0.636	-0.063	-0.449
10	-0.386	1.033	0.951	-0.472	-0.650	0.095	1.031	0.927	-0.402	-0.838
P10-P1	-1.13*	-0.03	-0.11	-0.39**	-0.190	-0.51	-0.15	-0.09	-0.61***	-0.41***

Part C: Fama-French four factor model based on extended sample of 1980-2005 which excludes years 1994 and 1995. Deciles portfolios are ranked by the log change in advertising expenditures.

1	-0.067	1.141	0.993	0.039		0.022	1.218	0.930	0.238	
10	-0.803	1.143	0.968	-0.300		-0.549	1.245	0.821	-0.205	
P10-P1	-0.74***	0.00	-0.03	-0.34***		-0.57**	0.03	-0.11	-0.44***	

Table 10: Advertising, Trading Turnover, and Number of Analysts. The sample period covers from year 1996 to year 2005. The dependent variable is trading turnover in advertising year *t* number of analyst forecasts in 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 following the firm in the last month of the fiscal year. Trading turnover is the log ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. 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.

	Turnover$_t$			**Number of Analysts (Numest$_t$)**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	1.260***	0.898***	0.678***	-0.277***	1.979***	-0.328***
	[0.000]	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*	*[0.000]*
ΔAdv_t	0.459***	0.443***	0.252***	0.109***	0.091***	0.055***
	[0.000]	*[0.000]*	*[0.000]*	*[0.003]*	*[0.001]*	*[0.006]*
$Size_{t-1}$		0.075***	0.087***	0.337***		0.340***
		[0.000]	*[0.000]*	*[0.000]*		*[0.000]*
BM_{t-1}		-0.261***	-0.187***	-0.005		0.016
		[0.000]	*[0.004]*	*[0.889]*		*[0.667]*
$\Delta Sale_t$			0.822***			0.234***
			[0.000]			*[0.000]*
$\Delta Prft_t$			-0.802**			0.320***
			[0.012]			*[0.005]*
Observations	6,524	6,524	6,499	5,214	5,214	5,193

Table 11: Stock Returns, Trading Turnover, and Number of Analysts. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in four event windows: 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; and [1,12], a 12-month window subsequent to the advertising year. Size is the log of market capitalization. BM is the ratio of the book value to the market value of equity. Numest is the log of the number of analysts following the firm in the last month of the fiscal year. Trading turnover is the log ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. The coefficients are time-series means of the coefficients from cross-sectional regressions run every year (i.e., Fama-MacBeth (1973) coefficients). *p* -value calculated with Newey-West standard errors, are provided in brackets. *, **, and *** indicate significant difference from zero at the 10%, 5%, and 1% level respectively.

	Raw Return in Advertising Year		**Raw Return [1, 6]**		**Raw Return [7, 12]**		**Raw Return [1, 12]**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Constant	0.014	0.184**	0.067	0.146***	0.002	0.075	0.108	0.269*
	[0.897]	*[0.030]*	*[0.187]*	*[0.002]*	*[0.985]*	*[0.326]*	*[0.395]*	*[0.057]*
$Size_{t-1}$	-0.003	-0.086***						
	[0.816]	*[0.000]*						
BM_{t-1}	0.087***	0.04						
	[0.000]	*[0.203]*						
$Size_t$			-0.003	-0.023***	0.003	-0.011	-0.005	-0.039**
			[0.667]	*[0.000]*	*[0.742]*	*[0.298]*	*[0.696]*	*[0.035]*
BM_t			0.028***	0.021	-0.003	-0.016	0.025	0.005
			[0.007]	*[0.190]*	*[0.863]*	*[0.370]*	*[0.252]*	*[0.745]*
Raw $Return_t$			-0.009	-0.01	-0.025	-0.028*	-0.026	-0.035
			[0.684]	*[0.700]*	*[0.205]*	*[0.065]*	*[0.548]*	*[0.384]*
$Turnover_t$	0.062***		-0.064***		-0.031***		-0.101***	
	[0.010]		*[0.000]*		*[0.000]*		*[0.000]*	
$Turnover_{t+1}$			0.072***		0.055***		0.142***	
			[0.000]		*[0.000]*		*[0.000]*	
$Numest_t$		0.245***		-0.211***		-0.065***		-0.291***
		[0.000]		*[0.000]*		*[0.001]*		*[0.000]*
$Numest_{t+1}$				0.253***		0.096***		0.367***
				[0.000]		*[0.000]*		*[0.000]*
Observations	6,524	5,214	6,524	5,089	6,399	5,089	6,524	5,089

Table 12: Advertising Effect on Cross-Section Stock Returns, Trading Turnover, and Number of Analyst Forecasts. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in four event windows: 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; and [1,12], a 12-month window subsequent to 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. Numest is the log of the number of analysts following the firm in the last month of the fiscal year. Turnover is the log ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. All dummy variables equal one if the value of the relevant variable is above the annual sample average and zero otherwise. 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.

	Raw Return in Advertising Year		**Raw Return [1, 6]**		**Raw Return [7, 12]**		**Raw Return [1, 12]**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Constant	0.03	0.197*	0.111***	0.152***	0.058	0.119*	0.222***	0.322***
	[0.792]	*[0.060]*	*[0.003]*	*[0.000]*	*[0.485]*	*[0.093]*	*[0.008]*	*[0.000]*
$Size_{t-1}$	-0.003	-0.083***						
	[0.848]	*[0.000]*						
BM_{t-1}	0.078***	0.043**						
	[0.003]	*[0.050]*						
$Size_t$			-0.005	-0.016***	0.001	-0.01	-0.01	-0.031**
			[0.391]	*[0.003]*	*[0.904]*	*[0.318]*	*[0.369]*	*[0.011]*
BM_t			0.019*	0.015	-0.005	-0.02	0.013	-0.004
			[0.097]	*[0.413]*	*[0.776]*	*[0.240]*	*[0.613]*	*[0.821]*
Raw $Return_t$			0.012	0	-0.017	-0.02	0.004	-0.016
			[0.654]	*[0.991]*	*[0.407]*	*[0.220]*	*[0.945]*	*[0.726]*
Dummy of high ΔAdv_t	0.027	-0.054	-0.037**	-0.02	-0.055***	-0.083***	-0.098***	-0.110***
	[0.450]	*[0.339]*	*[0.012]*	*[0.582]*	*[0.000]*	*[0.006]*	*[0.000]*	*[0.002]*
Dummy of high $Turnover_t$	0.071*		-0.018		0.004		-0.018	
	[0.095]		*[0.487]*		*[0.825]*		*[0.667]*	
ΔAdv_t dummy × $Turnover_t$ dummy	0.062*		-0.081***		-0.071***		-0.166***	
	[0.083]		*[0.004]*		*[0.002]*		*[0.005]*	
ΔAdv_t dummy × $Turnover_{t+1}$ dummy			0.104***		0.094***		0.233***	
			[0.000]		*[0.000]*		*[0.000]*	
$Numest_t$		0.218***		0.014		0.012		0.025
		[0.000]		*[0.496]*		*[0.497]*		*[0.493]*
ΔAdv_t dummy × $Numest_t$		0.047**		-0.221***		-0.062***		-0.300***
		[0.045]		*[0.000]*		*[0.000]*		*[0.000]*
ΔAdv_t dummy × $Numest_{t+1}$				0.231***		0.088***		0.337***
				[0.000]		*[0.000]*		*[0.000]*
Observations	6,524	5,214	6,524	5,089	6,399	5,089	6,524	5,089

Table 13: Advertising Effect on Cross-Section Returns and Arbitrage Cost. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in adverting year, event window [7,12], or [1,12]. Year *t* stands for 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*. Trading turnover is the log ratio of stock turnover (trading volume/shares outstanding) to the market average turnover. Price is the stock price at the end of the advertising year. Illiquid is the Amihud's (2002) illiquidity ratio calculated as the average ratio of the absolute value of daily return to the value of daily trading volume. Risk is the idiosyncratic volatility calculated as the standard deviation of market-adjusted daily stock returns. All dummy variables are calculated as one if the value of the relevant variable is above the annual sample average. 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)**	**(7)**	**(8)**	**(9)**	**(10)**
Event Window	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**
Constant	0.063***	0.160***	0.062	0.200**	0.061**	0.144***	0.062	0.206**	0.057	0.212***
	[0.005]	*[0.000]*	*[0.174]*	*[0.040]*	*[0.024]*	*[0.000]*	*[0.436]*	*[0.046]*	*[0.453]*	*[0.007]*
Dummy of high ΔAdv_t	-0.013**	-0.030*	-0.013**	-0.031**	-0.023	-0.03	-0.021	-0.038	-0.066***	-0.104**
	[0.045]	*[0.054]*	*[0.049]*	*[0.042]*	*[0.204]*	*[0.326]*	*[0.220]*	*[0.127]*	*[0.003]*	*[0.015]*
Dummy of high $Risk_t$	0.001	0.006	0.008	0.007						
	[0.971]	*[0.937]*	*[0.849]*	*[0.927]*						
ΔAdv_t dummy × $Risk_t$ dummy	-0.051**	-0.047*	-0.050**	-0.047*						
	[0.017]	*[0.082]*	*[0.043]*	*[0.069]*						
Dummy of high $Illiquid_t$					0.006	0.039	0.011	0.014		
					[0.806]	*[0.287]*	*[0.260]*	*[0.531]*		
ΔAdv_t dummy × $Illiquid_t$ dummy					-0.042**	-0.061*	-0.042**	-0.051*		
					[0.019]	*[0.080]*	*[0.029]*	*[0.100]*		
Dummy of high Price									-0.057***	-0.082***
									[0.003]	*[0.004]*
ΔAdv_t dummy × Price dummy									0.053**	0.086**
									[0.037]	*[0.012]*
$Size_t$			0.001	-0.008			0	-0.01	0.006	-0.002
			[0.876]	*[0.475]*			*[0.995]*	*[0.410]*	*[0.378]*	*[0.807]*
BM_t			-0.009	0.012			-0.008	0.012	-0.008	0.012
			[0.528]	*[0.595]*			*[0.660]*	*[0.640]*	*[0.645]*	*[0.625]*
Raw $Return_t$			-0.008	0.015			-0.011	0.018	-0.006	0.026
			[0.683]	*[0.734]*			*[0.597]*	*[0.765]*	*[0.780]*	*[0.641]*
Observations	6,524	6,524	6,524	6,524	6,524	6,524	6,524	6,524	6,527	6,527

Table 14: Advertising Effect on Cross-Section Returns: Grouped by Firm Characteristics. The sample period covers from year 1996 to year 2005. The dependent variable is raw stock return in advertising year, event window [7,12], or [1,12]. Year t stands for 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. All dummy variables are calculated as one if the value of the relevant variable is above the annual sample average. 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)**	**(7)**	**(8)**
Event Window	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**	**[7, 12]**	**[1, 12]**
Constant	0.076	0.193**	0.044	0.139	0.059	0.206**	0.062	0.214**
	[0.304]	*[0.015]*	*[0.630]*	*[0.338]*	*[0.479]*	*[0.018]*	*[0.212]*	*[0.014]*
$Size_t$	0	-0.001	0.002	-0.004	0.001	-0.007	0	-0.014
	[0.960]	*[0.920]*	*[0.820]*	*[0.751]*	*[0.895]*	*[0.496]*	*[1.000]*	*[0.203]*
BM_t	-0.008	0.012	-0.015	-0.01	-0.007	0.015	-0.004	0.021
	[0.670]	*[0.624]*	*[0.122]*	*[0.561]*	*[0.683]*	*[0.512]*	*[0.549]*	*[0.426]*
Raw $Return_t$	-0.012	0.018	-0.013	0.017	-0.014	0.021	-0.012	0.003
	[0.572]	*[0.762]*	*[0.544]*	*[0.736]*	*[0.506]*	*[0.732]*	*[0.558]*	*[0.954]*
Dummy of high ΔAdv_t	-0.065***	-0.089**	-0.021	-0.007	-0.059***	-0.080**	-0.059**	-0.092**
	[0.000]	*[0.018]*	*[0.294]*	*[0.832]*	*[0.005]*	*[0.012]*	*[0.012]*	*[0.022]*
Dummy of large $Size_t$	-0.016	-0.062**						
	[0.488]	*[0.031]*						
ΔAdv_t dummy × $Size_t$ dummy	0.049**	0.056**						
	[0.017]	*[0.047]*						
Dummy of high BM_t			0.03	0.110***				
			[0.270]	*[0.003]*				
ΔAdv_t dummy × BM_t dummy			-0.039**	-0.106***				
			[0.024]	*[0.006]*				
Dummy of high $Return_t$					0.003	-0.01		
					[0.872]	*[0.753]*		
ΔAdv_t dummy × $Return_t$ dummy					0.042*	0.037*		
					[0.063]	*[0.055]*		
Dummy of high $Prft_t$							0.005	0.048
							[0.631]	*[0.252]*
ΔAdv_t dummy × $Prft_t$ dummy							0.042**	0.061**
							[0.044]	*[0.042]*
Observations	6,527	6,527	6,527	6,527	6,527	6,527	6,381	6,381