Advertising, product market competition and stock returns

Abstract

This paper studies the joint effect of advertising intensity and product market competition on stock returns. Using a sample of the US market over the period from 1977 to 2018, we provide evidence that past advertising is negatively associated with stock returns and this relationship exists only for firms in competitive industries. Also, firms in competitive markets earn higher expected stock returns than firms in concentrated industries, especially among low advertising intensity groups. Our results are robust across alternative subsamples and product market competition measures. Our empirical estimates support the positive causal effect of concentration on advertising.

JEL Classification: G12, M37

Keywords: Advertising intensity, Product market competition, Stock returns

1. Introduction

Advertising plays a crucial role in increasing differentiation and awareness of a firm in a competitive business environment. It is also important from the perspective of investment as it can improve firms' competitiveness and market performance. There are divided opinions on the role of advertising in financial markets. Jose et al. (1986) suggest some possible benefits of increasing advertising such as impeding the entry of new firms, differentiating products, declining price elasticity of demand and increasing shareholder value. As a result, a majority of the empirical research investigates the relationship between advertising expenditures and financial metrics, such as sales (Hanssens, Parsons, and Schultz, 2001; Yiannaka et al., 2002; Bagwell, 2007; Joshi and Hanssens, 2010; Sridhar et al., 2013), firm's market value (Hirschey and Weygandt,1985; Chauvin and Hirschey, 1993; Graham and Frankenberger, 2000; Sridhar et al., 2013; Kurt et al., 2021); stock price (Han and Manry, 2004) and stock price crash risk (Zhang et al., 2022). A comprehensive review of the literature on value relevance of advertising expenditure is provided by Shah and Akbar (2008).

Billions of dollars are invested in advertising every year. An advertising effectiveness can lead to a rise in current sale revenue and firm value (McAlister et al., 2016). There are some reasons explaining for the using of advertising or marketing in general of firms. First, advertising creates brand equity for a firm' product due to differentiating this product from those of other firm's competitors in the market (Aaker 1991). This equity can spill over into investment behaviour of investors by increasing the demand for firm's stock. Signalling effect can be another motivation for firms to spend money in advertising. Investors believe that high advertising expense may be a signal of financial well-being or competitive viability of a firm (Joshi and Hanssens, 2010). Several studies have shown supporting evidence for signalling effects of advertising such as Chauvin and Hirschey (1993), Mathur and Mathur (2000). Due to these effects, advertising may be a way for listed firms to attract the attention of investors in

the stock market and thus increase the stock price. Supporting for attention effect, Chemmanur and Yan (2019) suggest that advertising expenditures may catch more investors' attention in the contemporary advertising year, thus boost the stock return in the short term. The wearing off overtime of the attention causes a decline in stock price, resulting in a negative impact on stock return in the long run.

Although the influence of advertising on different financial metrics, especially sales have attracted considerable attention from researchers, there is controversial evidence in the relationship between advertising and stock return. For example, Lou (2014) show evidence that advertising is positively associated with the short term stock return, but negatively affects future stock return. Supporting this point of view, a recent empirical study on advertising and stock return by Chemmanur and Yan (2019), shows that a higher level of advertising growth is positively correlated to a larger contemporaneous stock return in the advertising year. Meanwhile, a negative relationship is witnessed between advertising growth and stock return in the year subsequent to the advertising year. This result is not driven by product market sales, profitability and the selection of the advertising sample. Heiens et al. (2016) show opposite evidence when suggesting that there is no positive and significant effects of advertising on stock return. Therefore, the primary motivation of this study is to examine the link between advertising and stock return.

Specifically, we do not consider the above relationship independently. Previous studies do not account for the effect of competition in the given product market and the influence of advertising on industry concentration and returns. For example, Chan et al. (2001) investigate the relationship between research and development (R&D), advertising expenditures and stock return using the portfolio approach. They find no association between R&D, advertising expenditures and future stock returns of companies. A structural model is proposed by Victorino (2014) to investigate the link between advertising and firm market value. He

indicates that by interpreting advertising as an investment in brand capital, brand equity is measured by a novel way and its impact on firm value varies substantially across industries.

Unlike prior research, we examine the interaction effect of product market competition and advertising on stock returns. Our paper studies the joint impact of product market competition and advertising intensity on future stock returns using portfolio sorts, the Capital Asset Pricing Model (CAPM) by Sharpe and Lintner (1964), the Fama-French (1993) three factor model, the Carhart (1997) four factor model and the Fama-French (2015) five factor model technique. Particularly, a conventional double-sorting approach is used to test the interaction effect between advertising and the competitive degree of industries on expected stock returns. Firms are divided into different groups based on two different breakpoints of the ranked value of advertising intensity including the New York stock exchange (NYSE) breakpoints and all but micro breakpoints. Details of this approach are discussed in Section 3.

Following previous research, we focus on advertising intensity expressed as the ratio of advertising expenditures on sales revenue rather than the level of spending on advertising[1]. We find evidence that higher advertising intensity is associated with lower expected stock returns and this negative relation exists only for firms in more competitive industries. The tests show that the negative relationship between advertising and stock returns exists only in competitive industries. Indeed, the value-weighted, equal-weighted and abnormal returns of sorted portfolios decline monotonically with advertising intensity in less concentrated industries. However, this result is not true for firms in more concentrated industries. Our findings hold across all asset pricing models including the CAPM, the Fama-French (1993) three factor model, the Carhart (1997) four factor model, and the Fama-French (2015) five factor model as well as for both NYSE breakpoints and all but micro breakpoints. For instance, using NYSE breakpoint, the spreads in equal weighted and value weighted returns between low and high

[1] See for example, Lou (2014) and Vitorino (2014).

advertising intensity in high competitive industries are 0.76% and 0.70%, respectively and they are statistically significant at the 5% level. Meanwhile, these numbers for concentrated industries are 0.52% and 0.40% and they are not statistically significant. This result is consistent with Chemmanur and Yan (2019), that a larger advertising growth leads to a smaller stock return in the year subsequent to the advertising year. Nevertheless, this finding is not consistent with Chandra and Weiberg (2018), who suggest that concentrated industries engage in more advertising. One explanation is that firms in competitive industries are in a different equilibrium, where some of them advertise more and others advertise less. The firms in the competitive industries that are advertising are valued more as they are forecast to have more predictable sales (higher market values today suggest lower expected returns in the future). Similarly, the firms in the competitive industries that are under-advertising are valued less. They may be pursuing other competitive strategies that are riskier than advertising, which exposes them to a greater expected default risk, leading to higher expected returns.

We also report that there is a positive relationship between existing condition in product market competitiveness and future stock returns and this association exists only among low advertising intensity firms. The portfolio raw returns and abnormal returns increase monotonically with competitive degree in firms with low ratio of advertising to sales revenue. These results are robust when using different breakpoints and asset pricing models. For example, when using all but micro breakpoints, the abnormal returns (alpha values) increase with the level of competition in low advertising intensity firms and the high minus low completion alphas are all statistically significant at the 1% level. Further robustness tests are executed on the joint effect of advertising intensity and product market competition on stock returns.

For robustness, we run our main regressions using two subsamples over the period from 1977-1993 and 1996-2018. The reason for choosing these samples is that there is a regulatory

change in reporting advertising costs in 1994. Statement of Position (SOP) 93-7- Reporting on Advertising Costs was issued on June 1994 by the Accounting Standards Executive Committee (Lou, 2014). We show that the relation between advertising, competition degree and stock returns are not driven by sample selection.

Following Plyakha, Uppal, and Vilkov (2014), the choice of weighting scheme in test portfolios may influence the inference drawn from empirical tests of asset pricing. Hence, we compute both equal weighted and value weighted portfolio return when examining the joint effect between advertising, product market competition and stock return. Our results are robust with both weighting schemes. In addition, four asset pricing models including CAPM, Fama and French 3 factor, Carhart four factor, and Fama and French five factor are used to take account for the difference in risk between portfolios. Alpha is monthly risk adjusted abnormal return in percent. Our results have shown the difference in explanatory power of four asset pricing models. Moving from CAPM, Fama and French 3 factor, Carhart four factor, to Fama and French five factor alpha, we can see that there is a decline in the magnitude of the alpha, except for Carhart alpha. This finding suggests that Fama and French five factor model captures more variation in the cross section of returns compared to other pricing models.

This paper has two main contributions to the previous literature. First, we supplement past research studying the relation between advertising and stock returns (see e.g., Bublitz and Ettredge, 1989; Eng and Keh, 2007; Chan et al., 2001 and Chemmanur and Yan, 2019). Prior studies show that negative premiums are associated with advertising intensity measures. For instance, Lou (2014) provides evidence that advertising spending leads to a higher abnormal return and then is followed by lower future return. He establishes that the low minus high decile ranked by year to year changes in advertising expenditures is 6.96% and 9.84% in the following two years. This return pattern holds after controlling for size, value, momentum and liquidity

factors. We contribute to this literature by showing how the competitive degree of firms in a given industry can affect the association between advertising and stock returns.

Second, our study contributes to the association between product market competition and stock returns. Hou and Robinson (2006) empirically demonstrate that firms in more competitive industries earn higher returns even after controlling for size, book to market and momentum. Meanwhile, Aguerrevere (2009) argues that the degree of competition and firms' expected returns vary with product market demand. He suggests that competitive industries outperform concentrated industries when demand is low, whereas when demand is high firms in more concentrated industries earn higher returns. Recently, Gu (2016) studies the connection between industry competition and returns by taking into account the effect of firms' R&D intensity. She shows a strong positive interaction effect between R&D investment and product market competition on stock returns. We study the relationship between competition degree and stock returns under the effect of advertising activities.

The rest of the paper is organized as follows. Section 2 describes our hypothesis development. Section 3 documents the data and presents summary statistics. Empirical results and robustness tests are reported in Sections 4 and 5. Finally, Section 6 concludes.

2. Hypothesis development

H1. There is a negative relationship between past advertising and stock return in competitive industries.

In this study, we provide a more thorough analysis of the relationship between advertising and stock returns under the effect of product market competition. The influence of advertising on financial markets, especially stock returns attracts significant attention in the academic literature. For example, Chemmanur and Yan (2019) study this relation under the investor attention theory. They examine the relation between advertising and stock returns in both the short and long run. They show that advertising is positively correlated to stock returns in the

advertising year but negatively to stock returns in the subsequent year. They argue that advertising could enhance investor attention, leading to increasing the contemporaneous sales revenue and stock price in the advertising year. However, this attention wears off over time, resulting in stock prices and expected stock returns declining.

Moreover, the causal effect of market structure on advertising is also being considered. The variation in industry structure will alter the incentive of firms on investing in advertising (Chandra and Weinberg, 2018). In addition, Becker and Murphy (1993) predict that firms with market power (high concentration) will undersupply advertising. Hence, we hypothesize that the effect of advertising on stock returns will be strong for firms in competitive industries.

H2: Firms in more competitive industries earn higher stock returns than firms in concentrated industries. This relationship is strong for firms with low advertising intensity.

In order to examine the interaction effect between advertising intensity and product market competition on stock returns, we empirically test the second hypothesis that there is a positive relationship between competitive degree of industries and stock returns and this relation is strong and significant among low advertising intensity firms.

Prior studies have given potential reasons about the negative effect of product market concentration and stock returns. For instance, Hou and Robinson (2006) explain this relation following a risk-based interpretation, i.e. innovation risk. They argue that firms in more competitive industries are riskier as they engage in more innovation, thus demanding higher expected stock returns. Indeed, they find that annual returns of firms in the most competitive industries is approximately 4% higher than those in the most concentrated industries. Similarly, Aguerrevere (2009) suggests that firms in competitive industries are riskier when demand is low as a consequence of competition on the value of grow options, and from the association between level of demand and the relative riskiness of assets. Recently, Hashem and Su (2015)

find that industry concentration is negatively correlated to stock returns in the UK market. In order to explain this result, they suggest that competitive industries have greater distress risks which lead to larger premiums required by investors.

Meanwhile, the relationship between advertising and product market structure has also been studied extensively, see e.g., Mueller and Rogers (1980), Buxton et al. (1984), Matraves (1999) and Chandra and Weinberg (2018). Bagwell (2007) argues that in order to enhance monopoly power, firms invest more in advertising to lead through greater concentration. Therefore, we expect that the positive relation between less concentrated industries and stock returns is strong and significant for firms with low advertising intensity.

3. Data and summary statistics

3.1 Sample selection

Our sample contains all common stocks with share code 10 and 11 in the NYSE/AMEX and NASDAQ stock exchanges. Accounting data such as advertising expenditure, total assets and sales are collected from COMPUSTAT. Monthly securities data are downloaded from the Centre for Research in Security Prices (CRSP), over the time period of 1975 to 2018. To be included in the sample, a firm must have matching data in both datasets. We also exclude firm-year observation with missing advertising spending. Following Fama and French (1992), we match all accounting variables at fiscal year-end in calendar year t-1 with CRSP monthly return data from July of year t to June of year t+1. The minimum six-month gap between fiscal year end and stock return allows the accounting information to be impounded into firm's stock returns. Firms in the financial industry with Standard Industrial Classification (SIC) between 6000 and 6999; and regulated industry with SIC between 4900 and 4999 are excluded from the sample. We also delete observations with negative or zero total assets or sales. Following Lou (2014) and Chemmanur and Yan (2019), only firms with stock prices greater than $5 are

included in the sample. We remove firms with less than 24-month observations. Finally, our sample covers the period from 1977 to 2018.

Advertising intensity is measured by advertising expenditure scaled by sales (AD/sale). This ratio is widely used in previous studies such as Lou (2014) and Vitorino (2014). We use three-digit SIC codes from CRSP in order to classify industries. Following Hou and Robinson (2006) and Chandra and Weiberg (2018), we measure product market competition by the Herfindahl-Hirschman Index (HHI), which is defined as the sum of squared market shares in equation 1:

$$HHI_{jt} = \sum_{i=1}^{N_j} s_{ijt}^2 \quad (1)$$

Where HHI_{jt} is the Herfindahl-Hirschman Index of industry *j* in year *t*. s_{ijt} is the market share of firm *i* in industry *j* in year *t*. The market share of each firm is computed as the ratio of firm's sale to total sale value of the entire industry. In order to limit the effect of potential data errors, we calculate HHI index for each industry each year and then average the values over the past three years. HHI index is regularly used by researchers for market structure[2]. Small value of HHI implies that many competing firms share the market, thus the industry is competitive. Meanwhile, large value of HHI means that the market shares belong to a few large firms and the industry is concentrated.

In order to investigate the interaction effect between product market competition and advertising on stock returns, we follow Gu (2016) by implementing the double sorting portfolio approach. In particular, in June of each year t, we group all stocks into three portfolios including the bottom 30% (low), middle 40% (medium), and top 30% (high) based on the ranked value of HHI index in year t-1. Meanwhile, independently, firms with non-missing advertising expenditures are divided into three portfolios based on the breakpoints for the bottom 30%,

[2] See, among others, Hou and Robinson (2006), Giroud and Mueller (2011), Gu (2016), and Chandra and Weiberg (2018).

middle 40%, and top 30% of the ranked value of advertising intensity (ratio advertising/ sale) in calendar year t-1. The interaction of HHI and AD/sale portfolios results in nine portfolios with different characteristics in competition degree and advertising intensity. Following Hou et al. (2014, 2017) and Gu (2016), we apply two difference methods to construct breakpoints for advertising intensity. First, firms traded on the NYSE are used to allocate breakpoints for AD/sale and then these breakpoints are applied to all stocks in the sample. Second, to minimize the effect of microcap firms, we exclude all firms with market capitalization below the 20th NYSE percent. The remaining stocks of the sample are used to calculate breakpoints.

We then compute monthly equal and value weighted returns on nine portfolios for the period from July of year t to June of year t+1, and rebalance portfolios in June of each year. In order to conduct a thorough comprehensive econometric analysis, we examine the portfolio abnormal performance using four asset pricing models. They are the single factor CAPM, Fama and French three factor model, Carhart four-factor model, and the Fama and French five factor model. According to the single factor CAPM, the expected excess return of a security is a linear function of systematic or market risk.

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \varepsilon_{it} \quad (2)$$

Where R_{it} is the return of portfolio i in month t, R_{ft} is the risk-free rate return in month t, and MKT_t is the market excess return that is obtained by subtracting the risk free rate from market portfolio return in month t. The next model is the Fama-French three-factor model by Fama and French (1993). It captures the market, value and size factors.

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \varepsilon_{it} \quad (3)$$

Where SMB_t represents the size factor and HML_t denotes the value risk factor. Other variables are defined as in equation (1). We also estimate the four-factor asset pricing model (Carhart, 1997), by computing the following equation:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,MOM} MOM_t + \varepsilon_{it} \quad (4)$$

Where MOM_t signifies the past performance factor (momentum). The final model we implement is the Fama and French five factor model, introduced by Fama and French (2015).

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,RMW} RMW_t + \beta_{i,CMA} CMA_t + \varepsilon_{it} \quad (5)$$

Where RMW_t and CMA_t stand for profitability and investments, respectively.

3.2 Summary Statistics

The summary statistics of our sample are reported in Table 1. Panel A shows the characteristics of the subsamples of firms in low competitive and high competitive industries. It can be seen that concentrated industries have larger advertising expenditures. The average advertising spending of firms in concentrated industries is $103.360 million and it is nearly double the figure of competitive industries. For most variables, low competitive firms have greater mean value than high competitive firms, except for the AD/sale ratio and return. The statistics of non-missing and missing advertising subsamples are presented in Panel B. Firms with advertising spending witness a larger average sales revenue being $3,075.200 million, whereas this figure for firms with missing advertising expenditure is $1,983.900 million. Similar patterns are witnessed for other variables such as total assets, market equity and share price. These results are consistent with Lou (2014).

[INSERT TABLE 1 HERE]

4. Results

This section presents our main empirical findings on the interaction effects of advertising intensity and product market competition on expected stock returns.

4.1 Effect of industry competition on advertising-stock return relation

In order to investigate the influence of industry competition degree on the relationship between advertising intensity and stock return, we apply a double sorting approach. As discussed previously, this procedure results in nine difference portfolio sorts on advertising intensity in combination with HHI index. Table 2 reports monthly equal weighted and value weighted returns advertising intensity portfolios on low competition and high competition industries, when using two breakpoints for advertising intensity. In Panel A, we use NYSE breakpoints to sort portfolios based on the ranking of advertising intensity. There is a monotonic decrease in portfolio returns with AD/sale in the high competition group. The equal weighted return declines from 2.11% for the portfolio with low AD/sale to 1.35% for the portfolio with high AD/sale. It leads to a premium of 0.76% for the return on low-minus-high advertising intensity portfolio and it is statistically significant at the 1% level. Similar positive and significant relationship is witnessed for the spread value weighted return between low and high advertising intensity portfolios in high competitive industries. Meanwhile, return on the low-minus-high AD/sale portfolios in low competitive industries is negative and insignificant for both equal weighted and value weighted returns. Comparable patterns are seen when we use all but micro breakpoints in Panel B.

[INSERT TABLE 2 HERE]

For completeness, we conduct additional tests on the relationship between advertising and profitability, market capitalization, and research and development (R&D) expenditures. Using a similar approach as above, in June of each year, we sort firms into three portfolios based on the Profitability, Market Capitalization and R&D value, respectively. We report the advertising intensity for each portfolio. Our empirical results suggest that there is a negative relationship between advertising and profitability and R&D expenditure. However, we observe a positive

association between advertising and market capitalization. Our findings can be seen in the appendix.[3]

The results of asset pricing tests of advertising-return relation in competitive and concentrated industries are presented in Table 3 and Table 4. Table 3 reports the abnormal returns (alpha values) of advertising intensity portfolios with equal-weighted return, whereas the results with value-weighted returns of portfolios are shown in Table 4. NYSE breakpoints for advertising intensity are used in Panel A and we utilize all-but-micro breakpoints in Panel B for both tables.

[INSERT TABLE 3 HERE]

As displayed in both tables, the abnormal returns on advertising intensity portfolios for firms in high competitive industries declines monotonically with past advertising intensity. The alphas on low minus high advertising intensity portfolios are positive and statistically significant for firms in more competitive industries (low HHI), whereas the equivalents for firms in more concentrated industries (high HHI) are negative and insignificant. Our results hold for the two breakpoints and different asset pricing models, except for the five factor model alpha in Panel A of Table 3. For instance, as shown in Panel A, Table 3, the monthly equal weighted CAPM alphas on the low, medium and high advertising intensity portfolios in high competition industries are 0.91%, 0.80% and 0.36%, respectively. The monthly CAPM alpha on the low-minus-high advertising intensity portfolio is 0.55% with a t-statistic of 3.19 in high competition industries, which translates to an annual premium of almost 6.6%. Meanwhile, the corresponding values in low competition industries are 0.54%, 0.66%, and 0.66%, respectively. The alpha on the low-minus high advertising intensity portfolios is negative (-0.12%) and insignificant. Panel B shows the results when using all-but micro breakpoints for advertising intensity portfolios. The alpha values of low minus high advertising intensity portfolio in high

[3] We would like to thank an anonymous referee for making this excellent suggestion.

competition industries of single factor CAPM, Fama and French three factor model, Carhart four factor model and the Fama and French five factor model are 0.63%, 0.68%, 0.75%, and 0.84% respectively. All values are significant at the 1% level.

[INSERT TABLE 4 HERE]

Table 4 shows similar findings concerning the abnormal return of advertising intensity portfolios in low and high competition industries. The value weighted CAPM alpha value of low, medium and high advertising/sale portfolio in high competition industries, when using NYSE breakpoints are 0.88%, 0.75%, and 0.40% with statistical significance at the 1% level. The spread of low minus high advertising intensity portfolio is 0.48% and statistically significant at the 1% level. The highest spread is seen in the five factor model (0.69%). In contrast, the single factor CAPM alpha value on low minus high advertising intensity portfolio is negative at -0.20% and insignificant for low competition industries. Similar return patterns are seen in Panel B when using all but micro breakpoints, but with smaller returns' magnitudes.

In summary, the empirical results in Tables 2, 3 and 4 support the hypothesis that the negative advertising intensity and return relation is strong and significant in competitive industries. Furthermore, our findings also suggest that future abnormal returns of advertising intensity portfolios become negative for firms in high concentrated industries. The effect of advertising on firms' returns can be significantly different for two firms with the same advertising intensity, who operate in two industries with different market structures. This finding can be explained using the investors' attention impact of advertising. In particular, in the advertising year, firms may have higher return because of attracting a large attention from investors but this attention wears out over time, thus stock return declines in a year after the advertising campaign. Moreover, firms with high concentration tend to invest less in advertising (Becker and Murphy, 1993). As a result, the negative relationship between advertising and stock return exists only in competitive industries.

4.2 Effect of advertising intensity on industry competition-return relation

This subsection presents results of the second hypothesis, which states that the positive association between industry competition and stock returns is strong and significant among low advertising intensity firms. Table 5 displays monthly equal weighted and value weighted returns of competition portfolios among low advertising intensity (bottom 30% of the advertising distribution) and high advertising intensity firms (top 30% of the advertising distribution). Panel A shows the results when using NYSE breakpoints for advertising intensity and the results of all, but micro breakpoints are shown in Panel B. Industry with low HHI means that it is a competitive industry, while high HHI suggests that the industry is more concentrated. First, when NYSE breakpoints are used for analysis, the monthly equal weighted returns of high, medium, and low HHI index in advertising-weak group are 1.44%, 2.10% and 2.11%, respectively. The return on low minus high HHI portfolio is positive at 0.67% and statistically significant at the 5% level. The monthly value weighted return shows a familiar pattern but with higher magnitude for the low advertising intensity group. Meanwhile, the spread of low minus high HHI portfolio's returns become negative and insignificant for companies in the advertising-intensive group. These findings remain intact when using all but micro breakpoints for advertising intensity as shown in Panel B.

[INSERT TABLE 5 HERE]

Tables 6 and 7 display the abnormal returns on competition portfolios of two groups including advertising-intensive and advertising-weak firms. Table 6 presents the results of asset pricing tests with equal-weighted portfolio returns. As illustrated in both panels, for the low advertising intensity group, firms in competitive industries outperform concentrated industries by earning higher abnormal returns over the sample period. The low minus high HHI portfolio's return is positive and statistically significant. These results are robust for all four asset pricing models and two different breakpoints for advertising intensity. For instance, the

equal-weighted five factor model alpha values of high, medium and low HHI portfolios for the advertising-weak group are 0.26%, 0.59%, 0.85%, respectively and are all significant at the 5% level. The spread between low and high HHI portfolios' alpha is as large as 0.59% and significant at the 1% level. The corresponding values in the high advertising intensity group are 0.65%, 0.58%, and 0.21% with significance at the 1% and 5% level in all cases. Interestingly, the three factor and five factor model alphas of low minus high HHI portfolios are negative at -0.32% and -0.44%, with significance at the 5% level. Moreover, the single factor CAPM alpha, three factor model alpha, and four factor model alpha for low minus high HHI portfolios of the advertising-weak group are 0.37%, 0.48%, and 0.45%, with significance at the 5% level. In contrast, the corresponding values for the advertising intensive group become negative at -0.29%, -0.32%, respectively and are insignificant.

Panel B reports a comparable pattern but with stronger results. For instance, the equal weighted five factor model alphas of high, medium, low HHI portfolios for low advertising/sale group are 0.21%, 0.60%, and 1.01%, respectively. The spread alpha is positive at 0.80% and statistically significant at the 1% level. The estimates of CAPM, three factor model and four factor model alphas are 0.49%, 0.57%, and 0.65% respectively, and statistically significant at the 1% level. The abnormal returns of competition portfolios in high advertising intensity group are negative and insignificant in all cases except for the five factor model.

[INSERT TABLE 6 HERE]

Table 7 repeats the same analysis with value weighted returns of portfolios among high and low advertising intensity firms. As illustrated in Panel A, the abnormal returns of portfolios in the advertising-weak group increase monotonically with the degree of product market competition, whereas the opposite trend is seen for firms in the advertising –intensive group. For instance, the three factor model alpha values of high, medium, and low HHI portfolios of the low advertising intensity group are 0.34%, 0.61%, and 0.94%, respectively and significant

at a minimum of 5% for all cases. The alpha of low minus high HHI portfolio is 0.60% and statistically significant at the 1% level. The five factor model raises the highest low minus high abnormal return at 0.69%, while the lowest value belongs to the CAPM alpha. The corresponding figures of the high advertising intensity group are 0.56%, 0.64% and 0.43%, respectively. The low minus high spread is -0.13% and insignificant. Panel B shows similar return patterns when using all but micro breakpoints for the advertising intensity portfolios.

[INSERT TABLE 7 HERE]

Overall, the results of raw and abnormal returns displayed in Tables 5, 6 and 7 overwhelmingly support the second hypothesis that there is a positive relationship between industry competition and future stock returns, which is consistent with the findings of Hou and Robinson (2006) and Gu (2016). Furthermore, this positive relation exists only for firms with low advertising intensity. This finding supports for the argument that high competitive industries have greater distress risks which require large risk premiums by investors. As a result of competition, firms in competitive industries are also riskier. Meanwhile, Bagwell (2007) suggests that firms in concentration industries have incentive to pour more money in advertising to enhance the monopoly power. Therefore, the positive relationship between product market competition and stock return is strong at low advertising intensity firms.

5. Robustness

5.1 Subsample tests

As a robustness check, following Lou (2014) the whole sample is divided into two sub-periods, which are 1977-1993 and 1996-2018. The reason is that there is a regulatory change in reporting advertising costs in 1994. In particular, the American Institute of Certified Public Accountants issued Statement of Position (SOP) 93-7- Reporting on Advertising Costs in 1993, which requires firms expense advertising expenditures in the incurred period or the first time the advertising takes place (Shah and Akbar, 2008). The SOP 93-7 is effective for fiscal year

ending after 15 June 1994. Tables 8 and 9 presents the robust results of the advertising-return and competition-return relation for subsamples, respectively. For both tables, we use NYSE breakpoints for advertising intensity and report the monthly value weighted portfolio returns.

The monthly returns and alpha value patterns in the two subsamples are similar to the full sample reported in Tables 4 and 7, in terms of economic magnitude and statistical significance. For instance, the results of the period from 1977 to 1993 are reported in Panel A, Table 8 and the four factor model alphas on low, medium and high advertising intensity for low competition industries are 0.51%, 0.77%, 0.75% respectively, and significant at the 5% level. The low minus high abnormal return is –0.24% and insignificant. Meanwhile, the corresponding numbers for the high competition group are 1.22%, 0.80%, 0.40% respectively, and statistically significant at the 5% level. The spread of low advertising intensity and high advertising intensity portfolios is positive and significant at the 1% level. Interestingly, the period from 1996 to 2018 experiences a stronger result with respect to significance levels, compared with the period between 1977-1993. Similarly, when considering the competition-return relation, Table 9 presents results consistent with the whole sample outcomes in Table 7. Our empirical analysis shows that hypothesis 2 is robust across all subsamples.

[INSERT TABLES 8 AND 9 HERE]

5.2 Alternative HHI index

In this subsection, we use an alternative index to measure market share concentration as a robustness check. According to Hay and Morris (1991) and Ali et al. (2009), the HHI index only considers public firms, which leads to a problem of missing private companies in calculating industry concentration. As a result, Hoberg and Phillips (2010) construct an alternative Herfindahl Index using both private and public companies. The results of using this alternative concentration measure are displayed in Tables 10 and 11. For both tables, Panel A shows the results using NYSE breakpoints with equal-weighted portfolio returns and Panel B

reports the value-weighted portfolio returns with all but micro breakpoints. Table 10 (11) show the results of the advertising-return (competition-return) association using the alternative product market competition measure, which is introduced by Hoberg and Phillips (2010).

The empirical estimates from Tables 10 and 11 are comparable to the results when we use the HHI index of Hou and Robinson (2006). This implies that our findings are not driven by product market competition measures.

[INSERT TABLES 10 AND 11 HERE]

For further robustness, we also follow Lou (2014) and Chemmanur and Yan (2019) by conducting a Fama and MacBeth regression in order to test the relationship between stock return and past advertising. We find that the negative relationship between future stock return and advertising exists only in competitive industries[4].

6. Conclusion

In this paper, we have empirically examined the interaction effect of product market competition and advertising intensity on stock returns. Using a sample of all public firms from 1977 to 2018 in the US market, we test how market structure affects the advertising-return relation and whether advertising intensity influences the relationship between market competition and stock returns. Product market competition is measured by the Herfindahl-Hirschman Index (HHI) of Hou and Robinson (2006) and advertising intensity is defined as the ratio of advertising expenditure on sales.

We discover that advertising is negatively related to stock return and this association exists only for firms in high competitive industries. In addition, consistent with Hou and Robinson (2006) and Hashem and Su (2015) we show evidence that there is a positive relationship between industry competition and stock returns. This impact is more pronounced for firms with

[4] Results of the Fama and MacBeth regression are available from the authors upon request.

low advertising intensity, compared to companies in the high advertising intensity group. Our results are robust when we use two subsample data periods, 1977 to 1993 and 1996 to 2018. Furthermore, as a robustness check, an alternative index introduced by Hoberg and Phillips (2010) is used to measure product market competition. Our original findings remain intact once we implement all robustness tests.

Our findings have two important implications. First, firms in competitive markets may under-invest in advertising. This is because we report evidence that advertising is negatively correlated to stock returns, and this relation exists only under the effect of market competition. This finding supports the positive causal effect of concentration on advertising of Chandra and Weiberg (2018). Second, our paper is the first to provide empirical evidence about the joint effect of product market competition and advertising on stock returns. It provides a valuable insight into the determinants of stock returns and also opens some avenues for future research. In particular, our empirical evidence shows the failure of asset pricing models in explaining stock returns and suggests a requirement for an asset pricing model that considers features of advertising and product market competition as a determinant of asset returns. A more comprehensive model allows a superior prediction on expected returns of stocks.[5]

[5] The data that supports the findings of this study are available from the corresponding author upon request.

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Table 1: Summary Statistics

This table reports summary statistics of the sample that covers the period 1977 to 2018. Panel A shows the summary of firms in low competitive industries (top 30% of the rank value Herfindahl-Hirschman index -HHI) and firms in high competitive industries (bottom 30% of the rank value of HHI). Panel B reports summary of firms with missing and non missing advertising expenditure data.

Panel A: Summary Statistics of low competitive and high competitive firms

	Low Competitive (High HHI)				High competitive (Low HHI)			
Variables	25%	Mean	Median	75%	25%	Mean	Median	75%
Advertising (million $)	1.300	103.360	6.890	35.270	1.150	54.360	5.640	28.000
Sale (million $)	117.800	4028.700	477.200	1888.700	85.200	1786.600	297.700	1110.500
AD/sale	0.007	0.038	0.016	0.034	0.010	0.050	0.020	0.040
Assets (million $)	97.300	3897.500	376.500	1691.500	85.430	2206.380	278.240	1087.680
Market cap (million $)	105.600	4162.800	402.200	1779.300	106.600	3965.500	374.100	1447.900
Share price ($)	11.430	28.580	20.420	35.750	9.875	26.866	17.800	31.719
Return	-0.050	0.019	0.010	0.072	-0.056	0.020	0.010	0.084

Panel B: Summary Statistics of non-missing and missing advertising firms

	Firms with non-missing advertising expenditure				Firms with missing advertising expenditure			
Variables	25%	Mean	Median	75%	25%	Mean	Median	75%
Advertising (million $)	1.229	86.198	6.210	33.096	-	-	-	-
Sale (million $)	100.500	3075.200	380.300	1523.200	71.700	1983.900	268.300	1042.400
AD/sale	0.008	0.042	0.018	0.037	-	-	-	-
Assets (million $)	89.000	3399.500	321.400	1395.000	78.100	2291.300	265.900	1063.600
Market cap (million $)	101.600	4520.800	383.500	1610.300	83.500	2200.300	275.000	996.100
Share price	10.620	28.100	19.150	34.120	9.820	24.930	17.170	29.880
Return	-0.052	0.019	0.010	0.078	-0.058	0.023	0.009	0.086

Table 2: Advertising-return relation in competitive and concentrated industries

This table reports monthly equal weighted return and value weighted return (in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the equal weighted and value-weighted portfolio returns. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the equal-weighted and value-weighted portfolio returns. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low competition (High HHI)				High competition (Low HHI)			
	AD/sale low	AD/sale Medium	AD/sale High	L-H	AD/sale low	AD/sale Medium	AD/sale High	L-H
Panel A: NYSE breakpoints								
EW return	1.44***	1.81***	1.96***	-0.52	2.11***	1.90***	1.35***	0.76**
	(5.60)	*(6.67)*	*(6.85)*	*(-1.36)*	*(7.68)*	*(7.53)*	*(5.55)*	*(2.05)*
VW return	1.24***	1.52***	1.64***	-0.40	1.98***	1.80***	1.28***	0.70**
	(5.65)	*(5.75)*	*(6.14)*	*(-1.16)*	*(7.44)*	*(7.51)*	*(6.62)*	*(2.14)*
Panel B: All but micro breakpoints								
EW return	1.44***	1.80***	1.64***	-0.20	2.16***	1.83***	1.35***	0.81**
	(5.58)	*(6.88)*	*(6.51)*	*(-0.56)*	*(7.92)*	*(7.56)*	*(6.33)*	*(2.35)*
VW return	1.16***	1.79***	1.70***	-0.54	1.89***	1.78***	1.22***	0.67**
	(4.95)	*(7.17)*	*(6.86)*	*(-1.55)*	*(6.84)*	*(7.54)*	*(6.36)*	*(1.99)*

Table 3: Asset pricing tests with equal weighted returns of portfolios in competitive and concentrated industries

This table reports the monthly abnormal returns (alpha, in percent) of equal - weighted returns of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of equal weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the alpha of equal weighted returns of portfolios. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low competition (High HHI)				High competition (Low HHI)			
	AD/sale low	AD/sale Medium	AD/sale High	L-H	AD/sale low	AD/sale Medium	AD/sale High	L-H
Panel A: NYSE breakpoints								
CAPM alpha	0.54***	0.66***	0.66***	-0.12	0.91***	0.80***	0.36***	0.55***
	(3.81)	*(4.69)*	*(4.83)*	*(-0.61)*	*(7.20)*	*(6.68)*	*(3.05)*	*(3.19)*
3FF alpha	0.41***	0.54***	0.62***	-0.20	0.89***	0.72***	0.30***	0.59***
	(3.26)	*(4.42)*	*(4.98)*	*(1.14)*	*(10.25)*	*(7.86)*	*(3.04)*	*(4.48)*
Carhart alpha	0.50***	0.59***	0.66***	-0.16	0.95***	0.80***	0.40***	0.55***
	(3.97)	*(4.79)*	*(5.25)*	*(0.90)*	*(10.89)*	*(8.83)*	*(4.03)*	*(4.18)*
5FF alpha	0.26**	0.42***	0.65***	-0.39**	0.85***	0.56***	0.21**	0.64***
	(2.09)	*(3.38)*	*(5.08)*	*(2.17)*	*(9.53)*	*(6.21)*	*(2.01)*	*(4.71)*
Panel B: All but micro breakpoints								
CAPM alpha	0.51***	0.71***	0.59***	-0.08	1.00***	0.77***	0.37***	0.63***
	(3.31)	*(5.20)*	*(4.27)*	*(-0.39)*	*(8.13)*	*(6.76)*	*(3.73)*	*(3.99)*
3FF alpha	0.45***	0.63***	0.55***	-0.10	1.02***	0.72***	0.34***	0.68***
	(3.04)	*(4.97)*	*(4.31)*	*(-0.51)*	*(9.58)*	*(6.98)*	*(3.54)*	*(4.72)*
Carhart alpha	0.48***	0.71***	0.62***	-0.14	1.12***	0.83***	0.37***	0.75***
	(3.23)	*(5.61)*	*(4.79)*	*(-0.71)*	*(10.66)*	*(8.06)*	*(3.81)*	*(5.19)*
5FF alpha	0.21	0.50***	0.53***	-0.32	1.00***	0.56***	0.16*	0.84***
	(1.45)	*(3.91)*	*(3.99)*	*(1.63)*	*(9.09)*	*(5.48)*	*(1.71)*	*(5.74)*

Table 4: Asset pricing test with value weighted returns of portfolios in competitive and concentrated industries

This table reports the monthly abnormal returns (alpha, in percent) of value- weighted returns (in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of value- weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the alpha of value- weighted returns of portfolios. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low competition (High HHI)				High competition (Low HHI)			
	AD/sale low	AD/sale Medium	AD/sale High	L-H	AD/sale low	AD/sale Medium	AD/sale High	L-H
Panel A: NYSE breakpoints								
CAPM alpha	0.41**	0.48***	0.61***	-0.20	0.88***	0.75***	0.40***	0.48***
	(2.43)	*(2.90)*	*(3.53)*	*(-0.83)*	*(6.21)*	*(6.71)*	*(3.55)*	*(2.65)*
3FF alpha	0.34**	0.45***	0.56***	-0.22	0.94***	0.83***	0.44***	0.50***
	(2.04)	*(2.66)*	*(3.24)*	*(-0.91)*	*(6.83)*	*(7.72)*	*(3.99)*	*(2.84)*
Carhart alpha	0.47**	0.59***	0.60***	-0.13	0.93***	0.89***	0.40***	0.53***
	(2.82)	*(3.53)*	*(3.40)*	*(-0.53)*	*(6.65)*	*(8.13)*	*(3.57)*	*(2.96)*
5FF alpha	0.22	0.34**	0.39**	-0.17	0.91***	0.83***	0.22**	0.69***
	(1.25)	*(1.98)*	*(2.20)*	*(-0.69)*	*(6.35)*	*(7.44)*	*(2.01)*	*(3.85)*
Panel B: All but micro breakpoints								
CAPM alpha	0.33*	0.79***	0.60***	-0.27	0.77***	0.74***	0.35***	0.42**
	(1.83)	*(5.01)*	*(3.77)*	*(-1.11)*	*(5.12)*	*(6.75)*	*(3.09)*	*(2.22)*
3FF alpha	0.31*	0.76***	0.61***	-0.30	0.85***	0.82***	0.40***	0.45**
	(1.69)	*(4.75)*	*(3.80)*	*(-1.23)*	*(5.71)*	*(7.78)*	*(3.79)*	*(2.46)*
Carhart alpha	0.25	0.75***	0.61***	-0.36	0.88***	0.90***	0.41***	0.47**
	(1.33)	*(4.60)*	*(3.71)*	*(-1.45)*	*(5.79)*	*(8.45)*	*(3.75)*	*(2.52)*
5FF alpha	0.05	0.51***	0.45***	-0.40	0.83***	0.84***	0.21**	0.62***
	(0.28)	*(3.19)*	*(2.73)*	*(-1.62)*	*(5.39)*	*(7.59)*	*(2.01)*	*(3.32)*

Table 5: Competition-return among high and low advertising intensity firms

This table reports the monthly equal weighted return and value weighted return (in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the equal weighted and value-weighted portfolio returns. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the monthly equal-weighted and value-weighted portfolio returns. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low AD/sale				High AD/sale			
	HHI High	HHI Medium	HHI Low	L-H	HHI High	HHI Medium	HHI Low	L-H
Panel A: NYSE breakpoints								
EW return	1.44***	2.10***	2.11***	0.67**	1.96***	1.85***	1.36***	-0.60
	(5.60)	*(7.681)*	*(7.68)*	*(2.36)*	*(6.85)*	*(6.45)*	*(5.56)*	*(1.59)*
VW return	1.24***	1.57***	1.98***	0.74**	1.64***	1.46***	1.28***	-0.36
	(5.65)	*(5.89)*	*(7.44)*	*(2.14)*	*(6.14)*	*(6.28)*	*(6.62)*	*(1.10)*
Panel B: All but micro breakpoints								
EW return	1.44***	1.72***	2.15***	0.71*	1.64***	1.52***	1.35***	-0.29
	(5.58)	*(6.86)*	*(7.79)*	*(1.91)*	*(6.51)*	*(6.07)*	*(6.33)*	*(-0.90)*
VW return	1.17***	1.64***	1.89***	0.72**	1.70***	1.36***	1.22***	-0.48
	(4.95)	*(6.80)*	*(6.84)*	*(1.99)*	*(6.86)*	*(6.05)*	*(6.36)*	*(1.53)*

Table 6: Asset pricing test with equal weighted returns of portfolios among high and low advertising intensity firms

This table reports the monthly abnormal returns (alpha, in percent) of equal - weighted returns (in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of equal weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the alpha of equal weighted returns of portfolios. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low AD/sale				High AD/sale			
	HHI High	HHI Medium	HHI Low	L-H	HHI High	HHI Medium	HHI Low	L-H
Panel A: NYSE breakpoints								
CAPM alpha	0.54***	0.56***	0.91***	0.37**	0.65***	0.56***	0.36***	-0.29
	(3.81)	*(4.39)*	*(7.20)*	*(1.96)*	*(4.83)*	*(4.26)*	*(3.05)*	*(-1.62)*
3FF alpha	0.41***	0.51***	0.89***	0.48***	0.62***	0.54***	0.30***	-0.32**
	(3.26)	*(5.66)*	*(10.25)*	*(3.17)*	*(4.98)*	*(5.22)*	*(3.04)*	*(-2.01)*
Carhart alpha	0.50***	0.61***	0.95***	0.45***	0.66***	0.62***	0.40***	-0.26
	(3.97)	*(6.99)*	*(10.89)*	*(2.96)*	*(5.25)*	*(6.04)*	*(4.03)*	*(-1.62)*
5FF alpha	0.26**	0.59***	0.85***	0.59***	0.65***	0.58***	0.21**	-0.44***
	(2.09)	*(6.38)*	*(9.53)*	*(3.83)*	*(5.08)*	*(5.48)*	*(2.01)*	*(2.69)*
Panel B: All but micro breakpoints								
CAPM alpha	0.51***	0.64***	1.00***	0.49***	0.59***	0.45***	0.37***	-0.22
	(3.31)	*(5.41)*	*(8.13)*	*(2.47)*	*(4.27)*	*(3.57)*	*(3.73)*	*(-1.30)*
3FF alpha	0.45***	0.61***	1.02***	0.57***	0.55***	0.45***	0.34***	-0.21
	(3.04)	*(6.17)*	*(9.58)*	*(3.14)*	*(4.31)*	*(3.88)*	*(3.54)*	*(-1.31)*
Carhart alpha	0.48***	0.72***	1.13***	0.65***	0.62***	0.60***	0.37***	-0.25
	(3.23)	*(7.51)*	*(10.66)*	*(3.55)*	*(4.79)*	*(5.31)*	*(3.81)*	*(-1.54)*
5FF alpha	0.21	0.60***	1.01***	0.80***	0.53***	0.51***	0.16*	-0.37**
	(1.45)	*(5.93)*	*(9.09)*	*(4.39)*	*(3.99)*	*(4.31)*	*(1.71)*	*(-2.27)*

Table 7: Asset pricing test with value weighted returns of portfolios among high and low advertising intensity firms

This table reports the monthly abnormal returns of value- weighted returns (alpha, in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of value- weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. We then report the alpha of value- weighted returns of portfolios. The sample period is from July 1977 to December 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low AD/sale				High AD/sale			
	HHI High	HHI Medium	HHI Low	L-H	HHI High	HHI Medium	HHI Low	L-H
Panel A: NYSE breakpoints								
CAPM alpha	0.41**	0.54***	0.88***	0.47**	0.61***	0.53***	0.40***	-0.21
	(2.43)	*(3.14)*	*(6.21)*	*(2.13)*	*(3.53)*	*(3.42)*	*(3.55)*	*(-1.02)*
3FF alpha	0.34**	0.61***	0.94***	0.60***	0.56***	0.64***	0.43***	-0.13
	(2.04)	*(3.59)*	*(6.83)*	*(2.76)*	*(3.24)*	*(4.29)*	*(3.99)*	*(-0.73)*
Carhart alpha	0.47***	0.67***	0.93***	0.46**	0.60***	0.69***	0.40***	-0.20
	(2.82)	*(3.88)*	*(6.65)*	*(2.10)*	*(3.40)*	*(4.54)*	*(3.57)*	*(-0.96)*
5FF alpha	0.22	0.66***	0.91***	0.69***	0.39**	0.59***	0.22**	-0.17
	(1.25)	*(3.78)*	*(6.35)*	*(3.09)*	*(2.20)*	*(3.79)*	*(2.01)*	*(-0.82)*
Panel B: All but micro breakpoints								
CAPM alpha	0.33*	0.67***	0.77***	0.44*	0.60***	0.43***	0.35***	-0.25
	(1.83)	*(4.32)*	*(5.12)*	*(1.85)*	*(3.77)*	*(3.00)*	*(3.09)*	*(-1.28)*
3FF alpha	0.31*	0.72***	0.85***	0.54**	0.61***	0.55***	0.40***	-0.21
	(1.69)	*(4.61)*	*(5.71)*	*(2.28)*	*(3.80)*	*(4.02)*	*(3.79)*	*(-1.09)*
Carhart alpha	0.25	0.73***	0.88***	0.63***	0.61***	0.62***	0.41***	-0.20
	(1.33)	*(4.58)*	*(5.79)*	*(2.62)*	*(3.71)*	*(4.48)*	*(3.75)*	*(-1.02)*
5FF alpha	0.05	0.72***	0.83***	0.78***	0.45***	0.53***	0.22**	-0.23
	(0.28)	*(4.45)*	*(5.39)*	*(3.24)*	*(2.73)*	*(3.76)*	*(2.01)*	*(-1.18)*

Table 8: Advertising - return relation and subsamples

This table reports monthly value weighted return and abnormal returns (alpha, in percent) of portfolios sorted on product market competition (HHI) and advertising intensity using NYSE breakpoints for advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, the subsample covers the period from 1977 to 1993. In Panel B, the sample period is from 1996 to 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low competition (High HHI)				High competition (Low HHI)			
	AD/sale low	AD/sale Medium	AD/sale High	L-H	AD/sale low	AD/sale Medium	AD/sale High	L-H
Panel A: The period from 1977 to 1993								
VW return	1.36***	1.87***	2.12***	-0.76	2.36***	2.03***	1.33***	1.03*
	(3.71)	*(4.44)*	*(4.63)*	*(-1.31)*	*(5.52)*	*(5.14)*	*(4.25)*	*(1.95)*
CAPM alpha	0.23	0.52**	0.64***	-0.41	0.85***	0.66***	0.30*	0.55*
	(1.10)	*(2.33)*	*(2.74)*	*(-1.29)*	*(3.31)*	*(4.72)*	*(1.85)*	*(1.81)*
3FF alpha	0.37*	0.58**	0.70***	-0.33	1.06***	0.66***	0.40**	0.67**
	(1.69)	*(2.54)*	*(2.90)*	*(-1.02)*	*(4.09)*	*(4.66)*	*(2.51)*	*(2.20)*
Carhart alpha	0.51**	0.77***	0.75***	-0.24	1.22***	0.80***	0.40**	0.82***
	(2.29)	*(3.32)*	*(3.01)*	*(-0.72)*	*(4.59)*	*(5.62)*	*(2.35)*	*(2.61)*
5FF alpha	0.45*	0.85***	0.57**	-0.12	1.15***	0.66***	0.23	0.92***
	(1.89)	*(3.39)*	*(2.13)*	*(-0.33)*	*(4.02)*	*(4.21)*	*(1.32)*	*(2.73)*
Panel B: The period from 1996 to 2018								
VW return	0.98***	1.22***	1.19***	-0.21	2.01***	1.65***	1.08***	0.93**
	(3.06)	*(3.41)*	*(3.37)*	*(-0.62)*	*(5.52)*	*(5.09)*	*(4.21)*	*(2.08)*
CAPM alpha	0.28	0.45*	0.43*	-0.15	1.18***	0.85***	0.45***	0.73***
	(1.26)	*(1.82)*	*(1.76)*	*(-0.45)*	*(5.24)*	*(4.94)*	*(2.76)*	*(2.62)*
3FF alpha	0.19	0.40	0.39	-0.20	1.20***	0.93***	0.46***	0.74***
	(0.89)	*(1.64)*	*(1.61)*	*(-0.62)*	*(5.48)*	*(5.72)*	*(2.98)*	*(2.75)*
Carhart alpha	0.27	0.53**	0.45*	-0.18	1.18***	0.97***	0.42***	0.76***
	(1.28)	*(2.21)*	*(1.85)*	*(-0.55)*	*(5.33)*	*(5.93)*	*(2.70)*	*(2.80)*
5FF alpha	-0.03	0.25	0.43*	-0.46	1.16***	0.91***	0.20	0.96***
	(-0.16)	*(0.99)*	*-1.71*	*(1.38)*	*(5.05)*	*(5.39)*	*(1.34)*	*(3.49)*

Table 9: Competition-return relation and subsamples

This table reports monthly equal weighted return, value weighted return and abnormal returns (alpha, in percent) of portfolios sorted on product market competition (HHI) and advertising intensity using NYSE breakpoints for advertising intensity. Product market competition is measured by Herfindahl-Hirschman index (HHI). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, the subsample covers the period from 1977 to 1993. In Panel B, the sample period is from 1996 to 2018. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low AD/sale				High AD/sale			
	HHI High	HHI Medium	HHI Low	L-H	HHI High	HHI Medium	HHI Low	L-H
Panel A: The period from 1977 to 1993								
VW return	1.36***	1.41***	2.36***	1.00*	2.12***	1.73***	1.33***	-0.79
	(3.71)	*(3.61)*	*(5.52)*	*(1.78)*	*(4.63)*	*(4.45)*	*(4.25)*	*(-1.43)*
CAPM alpha	0.23	0.07	0.85***	0.62*	0.64***	0.48**	0.30*	-0.34
	(1.10)	*(0.42)*	*(3.31)*	*(1.86)*	*(2.74)*	*(2.02)*	*(1.85)*	*(-1.20)*
3FF alpha	0.37*	0.10	1.06***	0.69**	0.70***	0.66***	0.40**	-0.30
	(1.69)	*(0.59)*	*(4.09)*	*(2.05)*	*(2.90)*	*(2.73)*	*(2.51)*	*(-1.04)*
Carhart alpha	0.51**	0.18	1.22***	0.71**	0.75***	0.69***	0.40**	-0.35
	(2.29)	*(0.99)*	*(4.59)*	*(2.05)*	*(3.01)*	*(2.74)*	*(2.35)*	*(-1.17)*
5FF alpha	0.45*	0.13	1.15***	0.70*	0.57**	0.36	0.23	-0.34
	(1.89)	*(0.66)*	*(4.02)*	*(1.87)*	*(2.13)*	*(1.38)*	*(1.32)*	*(-1.06)*
Panel B: The period from 1996 to 2018								
VW return	0.98***	1.64***	2.01***	1.03**	1.19***	1.18***	1.08***	-0.11
	(3.06)	*(4.25)*	*(5.52)*	*(2.12)*	*(3.37)*	*(3.85)*	*(4.21)*	*(-0.26)*
CAPM alpha	0.29	0.86***	1.18***	0.89***	0.43*	0.50**	0.45***	0.02
	(1.26)	*(3.08)*	*(5.24)*	*(2.78)*	*(1.76)*	*(2.35)*	*(2.76)*	*(0.07)*
3FF alpha	0.19	0.91***	1.20***	1.01***	0.39	0.58***	0.46***	0.07
	(0.89)	*(3.29)*	*(5.48)*	*(3.30)*	*(1.61)*	*(2.81)*	*(2.98)*	*(0.24)*
Carhart alpha	0.27	0.96***	1.18***	0.91***	0.45*	0.64***	0.42***	-0.03
	(1.28)	*(3.46)*	*(5.33)*	*(2.96)*	*(1.85)*	*(3.11)*	*(2.70)*	*(-0.10)*
5FF alpha	-0.03	1.00***	1.16***	1.19***	0.43*	0.60***	0.20	-0.23
	(-0.16)	*(3.49)*	*(5.05)*	*(3.78)*	*(1.71)*	*(2.78)*	*(1.34)*	*(-0.78)*

Table 10: Advertising-return relation with alternative product market competition measure

This table reports monthly equal weighted return, value weighted return and abnormal returns (alpha, in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by alternative Herfindahl-Hirschman index (HHI) in Hoberg and Phillips (2010). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of value- weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. T-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low competitive (High HHI)				High competitive (Low HHI)			
	AD/sale low	AD/sale Medium	AD/sale High	L-H	AD/sale low	AD/sale Medium	AD/sale High	L-H
Panel A: NYSE breakpoints and equal weighted return								
EW return	1.23***	1.73***	1.86***	-0.63	2.24***	2.16***	1.20***	1.04**
	(3.99)	*(5.38)*	*(5.74)*	*(-1.38)*	*(5.98)*	*(6.56)*	*(3.63)*	*(2.08)*
CAPM alpha	0.28	0.55***	0.75***	-0.47	0.92***	0.93***	0.28	0.64**
	(1.32)	*(2.90)*	*(3.30)*	*(-1.52)*	*(4.53)*	*(5.33)*	*(1.31)*	*(2.19)*
3FF alpha	0.11	0.15	0.49**	-0.38	0.91***	0.81***	0.29	0.62***
	(0.54)	*(0.92)*	*(2.29)*	*(-1.29)*	*(6.87)*	*(6.79)*	*(1.58)*	*(2.70)*
Carhart alpha	0.23	0.31*	0.62***	-0.39	1.14***	1.03***	0.52***	0.62***
	(1.13)	*(1.93)*	*(2.85)*	*(-1.31)*	*(9.08)*	*(9.26)*	*(2.86)*	*(2.79)*
5FF alpha	-0.02	-0.11	0.34	-0.36	1.03***	0.86***	0.50***	0.53**
	(-0.10)	*(-0.71)*	*(1.59)*	*(1.21)*	*(7.68)*	*(6.99)*	*(2.64)*	*(2.29)*
Panel B: All but micro breakpoints and value weighted return								
VW return	1.11***	1.70***	1.84***	-0.73	2.12***	2.05***	1.15***	0.97**
	(3.95)	*(5.33)*	*(5.35)*	*(-1.64)*	*(5.54)*	*(6.68)*	*(4.55)*	*(2.12)*
CAPM alpha	0.34*	0.53***	0.84***	-0.50	0.79***	0.87***	0.30**	0.49*
	(1.67)	*(2.79)*	*(2.92)*	*(-1.45)*	*(3.68)*	*(5.43)*	*(2.17)*	*(1.90)*
3FF alpha	0.20	0.19	0.65**	-0.45	1.01***	1.02***	0.42***	0.59**
	(0.99)	*(1.04)*	*(2.27)*	*(-1.28)*	*(4.74)*	*(6.36)*	*(2.98)*	*(2.32)*
Carhart alpha	0.23	0.35*	0.69**	-0.46	1.14***	1.21***	0.44***	0.70***
	(1.09)	*(1.95)*	*(2.34)*	*(-1.27)*	*(5.28)*	*(7.62)*	*(3.09)*	*(2.70)*
5FF alpha	0.03	0.07	0.18	-0.15	1.15***	1.10***	0.28**	0.87***
	(0.17)	*(0.36)*	*(0.67)*	*(-0.44)*	*(5.28)*	*(6.65)*	*(1.97)*	*(3.35)*

Table 11: Competition-return relation with alternative product market competition measure

This table reports monthly equal weighted return, value weighted return and abnormal returns (alpha, in percent) of portfolios sorted on product market competition (HHI) and advertising intensity. Product market competition is measured by alternative Herfindahl-Hirschman index (HHI) in Hoberg and Phillips (2010). Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, NYSE, Amex, and Nasdaq stocks are divided into three groups using the breakpoints for the bottom 30% (low), middle 40% (medium), and top 30% (high) of the ranked values of HHI in year t-1. Independently, firms with non-missing advertising are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of AD/sale in year t-1. In Panel A, we use NYSE breakpoints for advertising intensity and report the alpha of value- weighted returns of portfolios. In Panel B, we exclude stocks with market equity below the 20th NYSE percentile, and use the remaining stocks to calculate breakpoints for advertising intensity. T-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

	Low AD/sale				High AD/sale			
	HHI High	HHI Medium	HHI Low	L-H	HHI High	HHI Medium	HHI Low	L-H
Panel A: NYSE breakpoints								
EW return	1.23***	1.90***	2.24***	1.01**	1.86***	1.58***	1.20***	-0.66
	(3.99)	*(6.02)*	*(5.98)*	*(2.06)*	*(5.74)*	*(6.02)*	*(3.63)*	*(-1.43)*
CAPM alpha	0.28	0.70***	0.92***	0.64**	0.75***	0.51***	0.28	-0.47
	(1.32)	*(4.18)*	*(4.53)*	*(2.20)*	*(3.30)*	*(3.53)*	*(1.31)*	*(-1.51)*
3FF alpha	0.11	0.37**	0.91***	0.80***	0.49**	0.34**	0.29	-0.20
	(0.54)	*(2.57)*	*(6.87)*	*(3.33)*	*(2.29)*	*(2.47)*	*(1.58)*	*(-0.70)*
Carhart alpha	0.23	0.47***	1.14***	0.91***	0.62***	0.40***	0.52***	-0.10
	(1.13)	*(3.22)*	*(9.08)*	*(3.82)*	*(2.85)*	*(2.83)*	*(2.86)*	*(-0.35)*
5FF alpha	-0.02	0.14	1.03***	1.05***	0.34	0.09	0.50***	-0.16
	(-0.10)	*(1.08)*	*(7.68)*	*(4.30)*	*(1.59)*	*(0.67)*	*(2.64)*	*(-0.55)*
Panel B: All but micro breakpoints								
VW return	1.11***	1.73***	2.12***	1.01**	1.84***	2.16***	1.15***	-0.69
	(3.95)	*(5.38)*	*(5.54)*	*(2.18)*	*(5.35)*	*(6.56)*	*(4.55)*	*(-1.61)*
CAPM alpha	0.34*	0.68***	0.79***	0.45	0.84***	0.68***	0.30**	-0.54*
	(1.67)	*(4.36)*	*(3.68)*	*(1.52)*	*(2.92)*	*(4.65)*	*(2.17)*	*(-1.69)*
3FF alpha	0.20	0.52***	1.01***	0.81***	0.65**	0.72***	0.42***	-0.23
	(0.99)	*(3.35)*	*(4.74)*	*(2.73)*	*(2.27)*	*(4.97)*	*(2.98)*	*(-0.72)*
Carhart alpha	0.23	0.56***	1.14***	0.91***	0.69**	0.63***	0.44***	-0.25
	(1.09)	*(3.52)*	*(5.28)*	*(3.00)*	*(2.34)*	*(4.24)*	*(3.09)*	*(-0.77)*
5FF alpha	0.03	0.31**	1.15***	1.12***	0.18	0.44***	0.28**	0.10**
	(0.17)	*(2.08)*	*(5.28)*	*(3.76)*	*(0.67)*	*(3.23)*	*(1.97)*	*(-0.32)*

Appendix

Table A.1: Advertising intensity of portfolios sorts based on Profitability, Market Capitalization, and R&D expenditure

This table reports the average advertising intensity ratio of portfolios sorts on Profitability, Market Capitalization, and R&D expenditure. Advertising intensity is defined as advertising expenditure scaled by sale (AD/sale). In June of each year t, firms are grouped into three portfolios based on the breakpoints for the bottom 30%, middle 40%, and top 30% of the ranked values of profitability, market value, and R&D, respectively in year t-1. t-statistics are reported in parentheses. The significance levels 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

Portfolio	Low	Medium	High	Low-High	t-test
Profitability sort	0.109	0.031	0.048	0.061	4.43***
Market cap sort	0.042	0.048	0.094	-0.052	-3.26***
R&D sort	0.125	0.045	0.031	0.094	5.67***

This table presents the relationship between advertising intensity and profitability, market value and R&D expenditure of firms. Profitability is computed using the Novy-max (2013) measure (gross profitability). Market capitalization is calculated as the share price multiplied by the number of shares outstanding.