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THE EFFECT OF ADVERTISING EXPENSES ON STOCK RETURNS: EVIDENCE FROM EUROPEAN FIRMS

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Abstract

According to the Behavioural Finance literature, investors have limited attention which can affect their financial decisions and, therefore, financial markets. Advertising is one of the phenomena that can impact the investors' attention having a spillover effect on financial markets, namely, on stock prices and returns. Furthermore, managers that are aware of this effect can opportunistically take advantage of it to manipulate investors.

Although there is a growing literature about the impacts of advertising on stock returns for the US, Japanese and Chinese markets, there are no empirical studies that address this relationship for the European market. This dissertation fills this gap by studying the relationship between the advertising expenses and stock returns, in the European Market.

For this purpose, we conducted a series of portfolio sorts and panel regressions, controlling by the factors that can drive the firms' advertising policy, to isolate the relationship between the two variables. The results obtained suggest that the advertising expenses do not have a statistically significant impact on stock returns. We conjecture that the differences between our results and those obtained in other markets, namely in the US market, can be explained by the differences regarding the treatment and disclosure of advertising expenses, between the US and European companies, and its impact on the sample selection and in the variability of advertising expenses.

Once this research did not found evidence of a connection between the advertising expenses and stock returns for the European markets, managers should be aware when using these expenses opportunistically to affect stock returns. Nevertheless, future research is needed to identify if the connection found remains the same when using a sample without differences regarding the treatment and disclosure of advertising expenses.

Keywords: Advertising Expenses; Stock Returns; Advertising Spillover Effect; Financial Markets; Investors' Attention

JEL-Codes: G12, G14

Resumo

De acordo com as Finanças Comportamentais, os investidores têm atenção limitada o que afeta as suas decisões financeiras e, portanto, os mercados financeiros. A publicidade é um dos fenómenos que afeta a atenção dos investidores tendo um *spillover effect* nos mercados financeiros, nomeadamente, no preço e na rendibilidade das ações. Para além disso, os gestores que têm conhecimento deste efeito tendem a aproveitar-se do mesmo para manipular os investidores.

Apesar de existir uma crescente literatura referente ao impacto da publicidade na rendibilidade das ações para os mercados americanos, japoneses e chineses, não há estudos empíricos para o mercado europeu. Esta dissertação preenche esta lacuna ao estudar a relação entre as despesas de publicidade e a rendibilidade das ações neste mercado.

Para este propósito, e controlando os fatores que podem afetar a política de publicidade das empresas, recorreu-se à construção de portfolios e a regressões em painel para isolar a relação entre as duas variáveis. Os resultados obtidos sugerem que as despesas de publicidade não têm um impacto estatisticamente significativo na rendibilidade das ações. As diferenças encontradas entre as evidências europeias e de outros mercados, nomeadamente do mercado americano, podem ser explicadas pelas diferenças relativamente ao tratamento e à divulgação das despesas de publicidade, entre as empresas europeias e americanas, e o seu impacto na seleção da amostra e na variação das despesas de publicidade.

Uma vez que, para o mercado europeu, este estudo não encontrou uma relação entre as despesas de publicidade e a rendibilidade das ações, os gestores devem ter atenção quanto ao uso oportunístico destas despesas para afetar a rendibilidade das ações. Não obstante, é necessário estudar esta relação futuramente de modo a identificar se a conexão encontrada permanece a mesma ao usar uma amostra sem diferenças à cerca do tratamento e da divulgação das despesas de publicidade.

Palavras-chave: Despesas de Publicidade; Rendibilidade das Ações; *Spillover Effect*; Mercados Financeiros; Atenção dos Investidores

JEL – Codes: G12, G14

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1. Introduction

Nowadays, advertising is common in everyone's life as it is used by companies to communicate their products, brands and to attract consumers' attention to make them faithful clients. In this way, it is crucial to understand the impact of advertising on the company's value since it can indirectly impact the business through sales and profits (Joshi & Hanssens, 2010).

However, as recently advanced by some behavioural financial authors, advertising may not only influence consumers but also financial investors and their decisions, having a spillover effect on financial markets (Grullon, Kanatas & Weston, 2004). Investors are also exposed to advertisements every day that, due to their bounded rationality, can have an attention-grabbing effect that will impact their financial decisions, such as their trading activities (Wu, Yu & Dong, 2020).

Furthermore, the managers that are aware of this spillover effect and its financial impacts can opportunistically use advertising to manipulate investors. For example, some studies suggest that managers use advertising around insider sales (Lou, 2014), before Mergers and Acquisitions (Fich, Starks & Tran, 2015), and following shareholders complaints (Wies, Hoffmann, Aspara & Pennings, 2019).

As perceived, the advertising spillover effect can impact the financial markets in multiple ways. One important financial impact of advertising is its effect on the firms' stock returns. Theoretically, when a firm increases its advertising expenses, increasing its mediatic presence, it will attract the attention of investors that suffer from attention constraints. These investors, in turn, will increase their demand for these stocks which can lead to a temporary increase in stock returns (Chemmanur & Yan, 2019; Lou, 2014). Hence, it is important to understand, empirically, the effects of advertising on financial markets, namely on stock returns, and the link of those effects to the investors' attention and to the opportunistic managerial behaviours.

The literature regarding this subject is mostly focused on the US (e.g. Chemmanur & Yan, 2019; Lou, 2014), the Japanese (e.g. Aman, Kasuga & Moriyasu, 2017) and the Chinese market (e.g. Hsu & Chen, 2019). Moreover, the relationship found between the advertising expenditures and stock returns is not always consistent, since some authors found positive connections (e.g. Chemmanur & Yan, 2019; Lou, 2014), others asymmetric ones (e.g. Hsu &

Chen, 2019), and others insignificant ones (e.g. Aman et al., 2017; Focke, Ruenzi & Ungeheuer, 2020).

Considering the inconsistencies regarding the effect of advertising on stock returns and the lack of empirical studies that address this question for the European market, we aim to fill this gap by conducting the first empirical study that, to the best of our knowledge, focuses on this effect for this market.

In this way, the objective of this dissertation is to answer the question: "What is the impact of the change of advertising expenses in the European companies' stock returns?". Answering this question allows us to fill an important literature gap regarding the advertising spillover effect on financial markets since, as advanced by Chemmanur & Yan (2019, p. 2):

"While this and other similar anecdotes suggest that advertising could affect investors' attention and stock prices, the research on this advertising effect is still in its infancy."

Additionally, this development may lead other authors to study the attention effects and the managers' opportunistic behaviour that are related to the advertising spillover effect, in the European market, contributing to the enlargement of this literature.

The empirical study was conducted by using a sample of European listed and active companies that belong to the Eurozone market. Moreover, and due to availability concerns, was used annual data. In this way, it was adopted as a guideline the rationale of two US studies that also use this type of data – Chemmanur & Yan (2019) and Lou (2014). Thereby, the methodology approach chosen to address this question is based on two econometric methods – the portfolio sorts and the panel regressions.

In the first case, it was constructed a series of portfolios, sorted by the factors that may affect the firms' advertising policy and their returns, to isolate the effect of advertising expenses on stock returns. Furthermore, it was analysed the statistical significance of the returns of the zero-investment portfolios constructed to understand the relationship between the two variables. In the second case, was conducted a series of panel regressions, having in consideration the same factors as above. In this case, to address the impact of advertising on stock returns, we analysed the coefficients of the regressions conducted and their statistical significance.

The empirical evidence described in this study suggests that the change in advertising expenses does not have a statistically significant impact on stock returns, both in the short- and long-term period. The results do not appear to be driven by the determinants of

advertising, by the price predictors or by the price anomalies once these factors were controlled in the empirical study. However, the robustness tests conducted suggest that the results found could be influenced by the differences regarding the treatment and disclosure of advertising expenses, in Europe, and their impact on the sample selection and variability of advertising expenses.

The dissertation is organized as follow: in Chapter 2, it is presented the theoretical framework and the empirical studies related to the advertising spillover effect on the financial markets. In Chapter 3, it is described the methodology used. In Chapter 4, it is presented the information regarding the data collection and treatment. In Chapter 5, are described the results of the empirical study conducted. Finally, in Chapter 6 are presented the conclusions, discussed the limitations, and suggested future research lines related to this empirical study.

2. Literature Review

In this chapter, it is presented the literature review concerning the advertising spillover effect. First, it is presented the theoretical framework of this effect – subchapter 2.1. Next, are presented the behavioural studies that address this effect and, finally, the literature that addresses the connection between this effect and the managers' opportunistic behaviour – subchapters 2.2. and 2.3.

2.1. Theoretical Framework

Rational Finance defines investors as rational economic men. This rational economic man is described as a man that has perfect rationality, perfect information, and perfect self-interest, as well as stable preferences that allow him to choose the option that maximizes his welfare (Simon, 1955).

However, this rational economic man does not appear to describe the real-world investors since humans are affected by emotions in their decisions, have limited capabilities and, normally, do not have access to all information. Concerning this, emerged a more realistic economic approach of investors used by Behavioural Finance – the bounded rationality investors. These investors, although being rational, present some cognitive and information limitations that are important and can affect their financial decisions (Simon, 1990).

Particularly, humans, and therefore individual investors, are characterized to have a limited capacity to perform mental work and limited attention (Kahneman, 1973) which can affect their information processing, namely regarding financial assets. For instance, as explained by Merton (1987), an investor will only consider including a stock in his portfolio if he is aware of that stock. Furthermore, according to Frieder & Subrahmanyam (2005), individual investors prefer to invest in companies with visible brand names and recognizable products. Barber and Odean (2008) go further, and state that retail investors are net buyers of attention-grabbing stocks such as stocks that appeared on the news and that experienced abnormal trading volumes or extreme one-day returns. The authors explain that, due to their bounded rationality, individual investors are not able to consider all the available options when doing a buying decision and, therefore, will be more likely to consider the stocks that grab their attention, ignoring the others.

Considering the findings already described, it is important to understand the effects that may attract the investors' attention to certain financial assets and their impacts on financial

markets. One effect that is being recently studied is the effect of advertising, namely, the product market advertising since it attracts not only the attention of consumers but also investors to a certain product or firm (Branikas & Buchbinder, 2020). Therefore, advertising can create a spillover effect on financial markets, affecting the investors' trading activities (Wu et al., 2020) and impacting the stock prices and trading volumes.

Advertising may influence the firm's market value permanently, temporarily or not have an impact at all (Aman et al., 2017). In the cases that advertisements contain relevant fundamental information, the institutional investors will review their beliefs keeping into account this information, which can lead to a permanent increase in stock prices. However, most of the time, advertisements do not contain relevant information and, therefore, will not impact the beliefs of institutional investors, but will grab the attention and impact the beliefs of more attention-constrained investors (i.e., retail investors). In the last case, the stock price can suffer a temporary increase or not be altered, depending on the short sale constraints that the institutional investors face. As explained by Miller (1977), in the cases that pessimistic investors (i.e., institutional investors) face short sale constraints, the optimistic investors (i.e., individual investors) will start buying these shares without arbitrageurs being able to correct their actions, which will lead to temporary mispricing. In the cases that there are no short sale constraints, the institutional investors will be able to correct the actions of individual investors, avoiding the mispricing. Nevertheless, in the three possible cases, it is expected an increase in the shares' trading volume.

2.2. The Advertising Spillover Effect on Financial Markets

As previously described, advertising may have a spillover effect on financial markets, attracting the investors' attention and influencing their financial decisions. In this chapter, it is presented some of the most important literature that allows us to understand its impacts on financial markets, namely on stock prices and returns. The presented literature is organized according to its findings and publishing date.

Grullon et al. (2004) studied the impacts of the advertising spillover effect on the US market. The authors used as a proxy of the firm's visibility among its investors the product market advertising since this type of advertising should make, at least, the investors aware of the firm's name and its products. The findings suggest that the product market advertising has a spillover effect on financial markets affecting both the ownership structure and the common stocks' liquidity, as hypothesized by the authors. Regarding the ownership structure, the

authors found that firms with higher advertising expenses have, *ceterius paribus*, more investors (both individual and institutional ones). Particularly, the results suggest that the impact of advertising is stronger for the individual ones, which is consistent with the idea that retail investors are more attention-constrained and, therefore, will be more affected by advertisements. Regarding the common stocks' liquidity, the findings suggest that companies with higher advertising expenses experience lower bid ask-spreads, smaller relative price impacts when considering the spreads before and after the trading activities, and greater depths.

A few years later, Fehle, Tsyplakov & Zdorovtsov (2005) tried to understand if companies can influence the investors' behaviour by creating mood and attention effects through advertising. To test the hypothesis that companies use mass media to exploit the bounded rationality of investors, Fehle et al. (2005) conducted a natural experiment using firms that aired TV commercials in the Super Bowl broadcasts between 1969-2001. The findings suggest that companies that are easily recognizable from the content of the ads experienced positive abnormal returns. In addition, the authors found that the trading volumes of these companies increased significantly on Monday post-game and that retail investors are net buyers of these shares.

These findings are consistent with the hypothesis of advertising creating mood and attention effects that may influence the investors' behaviour, namely the retail investors' trading behaviour, and the short-term stock returns of advertising firms.

Lou (2014), in an article called "Attracting Investors Attention through Advertising", tried to understand the relationship between the product market advertising and the stock returns, for the US companies. The author predicted that an increase in the advertising expenses would lead to an increase in the contemporaneous stock returns and to future lower returns. After conducting a calendar-time portfolio analysis and the Fama-MacBeth regressions, the author found evidence of the predicted pattern, even after controlling for common risk factors. The author's analysis also suggests that the observed pattern can only be explained by the attention-grabbing effect of advertising and its impact on retail/institutional investors. Particularly, the results suggest that retail investors are net buyers of stocks with increasing advertising expenses, which is consistent with the idea that these investors are more attention constrained than the institutional ones.

These findings, besides being consistent with the results obtained by Grullon et al. (2004) and Fehle et al. (2005), are important for the growing literature about the advertising spillover effect since they support its existence.

In a similar research for the US companies, Chemmanur & Yan (2019), also tried to understand the short- and long-term impact of advertising expenditures on the stock returns. The authors found, consistently with Lou's (2014) findings, that an increase in the advertising expenditures, in the contemporaneous year, leads to a temporary increase in stock price and to future lower returns. Furthermore, the authors found that the negative effect of advertising in the future stock returns is stronger for shares that have a higher idiosyncratic risk/liquidity ratio (i.e., that are harder to short sell due to the short sale constraints). These findings are consistent with the idea that retail investors are net buyers of attention-grabbing stocks, while institutional investors will try to short sell them to correct prices.

Chemmanur & Yan (2019) also linked this effect to the investors' attention once their findings suggest that an increase in advertising leads to higher firm's visibility, in the advertising year. This finding supports the belief that advertising has an attention-grabbing effect on investors, that will lead them to buy this firm's shares which, in turn, may affect its turnover and stock price.

In the same year, Hsu & Chen (2019) conducted a pivotal study, for the Chinese market, where it was also found a connection between the advertising expenses and the contemporaneous abnormal stock returns, in the low-volatility periods of stock returns. However, when considering the high-volatility periods, the authors found no evidence that supports the idea that an increase in the advertising expenses would lead to a significant and abnormal increase in stock returns. This asymmetric pattern can be explained by the theory that, in the high-volatility periods, the investors will process the information that contradicts their initial beliefs more slowly. Besides supporting the evidence that there is a connection between the advertising expenses and the contemporaneous stock returns, this study extends this finding by explaining what is expectable to happen in low- and high-volatility periods. Additionally, it raises the idea that, in certain situations, may not exist a significant connection between the two variables.

In alignment with the idea raised by Hsu & Chen (2019) in their study, there is other Behavioural Finance literature that did not found a significant relationship between the advertising expenses and stock returns. For instance, Aman et al. (2017) tried to understand how the corporate advertisements relate to the investors' trading activities using daily data

from Japanese TV commercials. The authors found that a high frequency of TV commercials is positively and significantly correlated with the shares' turnover, which is consistent with the advertising spillover effect on financial markets. Nevertheless, the authors did not find a significant relationship between the advertising levels and the daily stock returns. These findings are consistent with Miller's heterogeneous expectations model once they can be explained by the hypothesis of retail and institutional investors having different beliefs. As explained in this study, an increase in advertising may lead the retail investors to buy the stocks and the institutional ones to selling them, causing an impact in the shares' turnover, but not in their prices due to the absence of short sale constraints.

In the following years, were published two similar studies for the US market (Madsen & Niessner, 2019; Focke et al., 2020), that used high-frequency advertising data to study the effects of advertising on financial markets, avoiding the heterogeneity problems associated with the use of annual data.

Madsen & Niessner (2019) used print ads in business publications to understand the impacts of advertising on the stocks' trading volume, liquidity, and returns, through the investors' attention channel. The authors found that the investigated ads trigger, temporarily, the investors' attention and lead to an increase of the trading volumes and quoted depths on the publication days, which is consistent with the idea that advertisements can impact investors' financial decisions. However, the authors did not find a significant relationship between the advertising expenses and stock prices.

Focke et al. (2020), analysed the short-term impact of advertising, namely of newspaper and TV advertisements, on financial markets. Consistently with the findings of Madsen & Niesser (2019), their study suggests that companies can significantly influence the investors' attention and their trading activities through product market advertising, but not the contemporaneous and subsequent daily stock returns.

The findings of these two articles, similarly to the findings of Aman et al. (2017), can also be theoretically explained by Miller's heterogeneous beliefs theory and the absence of short sale constraints. This explanation allows us to understand why other studies, for the US market, found a positive correlation between advertising and the contemporaneous stock returns (Chemmanur & Yan, 2019; Lou, 2014) and these did not. However, Focke et al. (2020) presented a different explanation for their findings. The authors argued that the contemporaneous connection found in the other articles can be caused by heterogeneity problems and explained by the reverse causality between stock prices and advertising

expenditures. In the authors' view, the high stock returns will lead companies to increase their advertising expenditures, and not the other way around, which raises the idea that the previous findings cannot correctly explain the connection between the advertising expenditures and stock prices, in the US market.

Mayer (2021), due to the inconsistencies of the previous studies, recurred to corporate sponsorships of college football to study the connection between the advertising expenses and stock prices, through an investors' attention channel, without facing heterogeneity problems. The evidence presented, in this US study, suggests that sponsoring firms experience abnormally high turnover and that retail investors are net buyers of these stocks. Furthermore, there is evidence that sponsorships cause a temporary increase in prices, leading to cumulative abnormal returns in the five days after the game, that are reversed in the following five days. This reversal in stock prices can be explained by the fact that institutional investors, after the price increase, start to issue selling orders forcing the price to converge to its fundamental value. These findings are consistent with the attention-grabbing effect of advertising and its impact on financial markets, namely on retail investors, already presented by other studies (e.g., Fehle et al. (2005) and Lou (2014)).

This pivotal study, besides providing support to previous US studies, also contributes to the discussion on why the more recent studies, for the same market, did not found a connection between the advertising expenditures and stock prices. Mayer (2021) argues that the studies conducted by Focke et al. (2020) and Madsen & Niessner (2019) are based on small fluctuation data that might not be sufficient to attract enough attention to impact stock prices and, therefore, conducted to insignificant findings.

In this way, and considering the presented studies, it is possible to speculate that an increase in the advertising expenditures can cause an attention effect that can influence, at least temporarily, the stock returns, among other financial variables. Particularly, this change in advertising expenses can lead to – (1) an insignificant impact on stock returns, when there are no short sale constraints or – (2) a temporary increase of stock returns if there are short sale constraints – assuming in both cases that advertisements do not contain new and relevant information that will impact the firm's fundamentals[1].

[1] In appendix 7.1., it is provided a table with the methodological considerations regarding the articles presented in this subsection.

2.3. The Advertising Spillover Effect and the Managers' Opportunistic Behaviour

Understanding the advertising spillover effect, and its impact on financial markets, is also important because managers that are aware of this effect may opportunistically take advantage of it for their benefit (Wu et al., 2020). In this chapter, is presented the recent literature that allows us to understand how managers can opportunistically use advertising to manipulate bounded rationality investors.

Chemmanur & Yan (2009) studied the use of product market advertising, by companies, around Initial Public Offerings (IPO) and Seasoned Equity Offerings (SEO) and found evidence suggesting that managers use this type of advertising as a signalling alternative to underpricing. The findings suggest that firms tend to increase their level of product market advertising around their IPO/SEO years when compared with the years where no equity issue takes place, and with non-IPO and non-SEO matching companies. This behaviour can be explained by the fact that an increase in the product market advertising expenditures will attract the investors' attention, facilitating the trading process.

The same authors, in 2017, tried to understand the impact of product market advertising on the long-term valuation of IPO firms (Chemmanur & Yan, 2017). The authors conjecture that firms used advertising not only to impact consumers but also financial investors, especially, around an IPO. The findings support this idea since they show that a firm's overvaluation, both in the IPO and in the immediate aftermarket, increases as its product market advertising also increases.

Considering these findings, it is possible to speculate that managers aware of these effects use the firm's product market advertising expenditures to increase the IPO's offer price, manipulating the investors, and gathering, more equity for the firm. However, as shown in Chemmanur & Yan's (2017) study, after the IPO these firms will experience more negative long-run stock returns due to the higher overvaluation triggered by the advertising expenditures.

Lou (2014), besides providing evidence of the advertising spillover effect on financial markets, studied the managers' opportunistic behaviour around insider sales. The author hypothesized that, before insider sales, it should be observed an increase in advertising expenditures and, in the next years, a subsequent decrease – a pattern that the author denoted as an inverted V-shaped pattern. The evidence presented in this study supports the existence

of this pattern which indicates that managers opportunistically increase advertising expenditures around insider sales, to pressure the stock price upwards and, therefore, profit more in their insider sales. Although the pattern was also found in other financial events, such as SEO and stock-financed acquisitions, it was not found for debt issues and cash-financed acquisitions, which suggests that managers use advertising to increase stock returns in beneficial situations.

In a related vein, Fich et al. (2015) studied the paper of advertising in takeover deals. The authors tested the hypothesis of target firms using advertising to increase their takeover premiums since it can attract more investors' attention and increase the managers' negotiation power. The empirical evidence found corroborates this hypothesis and is consistent with Lou's (2014) findings since Lou also found that managers tend to increase advertising spending before stock-financed acquisitions.

Managers can also use advertising to mitigate some events' negative effects on financial markets. For example, Wies et al. (2019), in a study conduct for the S&P 1500 firms, found that companies tend to increase their advertising expenditures to mitigate the negative effect of shareholders' complaints in the firm value. Particularly, managers tend to recur to this strategy when the claims are filled by institutional investors, related to non-financial problems, or covered by the media.

Concerning the presented literature, it is possible to infer that understanding the impact of advertising on financial markets, especially on stock returns, is crucial since managers, in different situations, may take advantage of it to manipulate this financial measure.

3. Methodological Considerations

In this chapter, it is explained the methodology used to answer the defined research question. This chapter is organized as follow: in the first subchapter – subchapter 3.1. – it is explained the research question. Next, are explained the methods and robustness tests used – subchapters 3.2. and 3.3. Lastly, are explained the test statistics and the variable construction adopted – subchapters 3.4. and 3.5.

3.1. Advertising Expenditures and Stock Returns

Analysing the literature review, it is possible to conclude that the relationship between the advertising expenditures and stock returns is well studied for the US market (e.g. Chemmanur & Yan, 2019; Focke et al., 2020; Lou, 2014; Mayer, 2021) and it is being studied for other markets, such as the Japanese (e.g. Aman et al., 2017) and the Chinese market (e.g. Hsu & Chen, 2019). Nevertheless, the findings presented in these papers are inconsistent and there are no empirical studies that analyse this relationship for the European market.

In this way, the objective of this dissertation is to answer the following question: "What is the impact of the change of advertising expenses in the European companies' stock returns?". To empirically study this relationship was necessary to recur to econometric methods since they allow to answer this question quantitively (Stock & Watson, 2015).

Once this empirical study is based on annual advertising data, it was adopted a methodology similar to the one used in the papers that address the same question using the same type of data – the Lou (2014) and Chemmanur & Yan's (2019) US papers. Particularly, this relationship was studied both in the short and long-term, i.e., in the contemporaneous advertising year and the subsequent years by recurring to portfolio sorts and panel regressions, as will be explained in the next subsections.

Furthermore, to isolate the effect of advertising expenses on stock returns, besides the principal variables – the change in advertising expenses and the raw returns – we used other variables to control the factors that may influence the advertising growth and, therefore, the obtained results. These factors, as presented in the Chemmanur & Yan's (2019) study, are the size effect, the profitability effect, the book-to-market value effect and – consistently with the industrial organization literature – the sales effect (Bagwell, 2007). Nevertheless, we controlled other effects that may also affect the results – such as the price predictors and the price anomalies effects – by introducing the momentum, the discretionary accrual and the

asset growth's variables as dependent variables (Chemmanur & Yan, 2019).

In particular, regarding the advertising expenses variable, it was used the change in advertising expenses rather than the advertising expenses itself to remove the firm fixed effects. As advanced in other studies, it is preferable to use the change variable rather than the level variable, when studying the predictability of stock returns, to purge the firm fixed effects from the found results (Chemmanur & Yan, 2019; Chen, Hong & Stein, 2002; Lakonishok, Shleifer & Vishny, 1994). Additionally, it was used the log change of advertising expenses, instead of the absolute change, to keep into attention the marginal effects and avoid the misleading that can be created by the use of absolute changes (Chemmanur & Yan, 2019; Lou, 2014).

3.2. Portfolio Sorts

The portfolio sorts are a key procedure, to empirical finance, that allow the identification of cross-sectional relationships between assets returns and assets characteristics. This procedure was used to track the stock returns in the advertising contemporaneous year t and the subsequent periods using *ex-post* long-run event windows (Chemmanur & Yan, 2019).

Similarly, to Chemmanur & Yan (2019), the sorted portfolios' performance was tracked in four *ex-post* event windows: two windows of six months – one following the contemporaneous advertising year [1, 6] and other following this six-month event window [7, 12] – and two windows of one-year – one following the advertising year [1, 12] and the other starting in the seventh month following the advertising year [7, 18].

The portfolio sorts, following Chemmanur & Yan (2019), were constructed both to stock raw returns and stock adjusted returns, to control for the price predictors that may affect the results – such as the momentum, the book-to-market ratio, and the size. Furthermore, the portfolios were sorted by the factors that can impact the firms' advertising policy and, therefore, the studied relationship – the firm size, the book-to-market ratio, and the sales revenue.

3.2.1. Adjusted Returns

To construct a portfolio sort based on adjusted returns, it is necessary to decide by which factors the raw returns will be adjusted and how they will be determined. The raw returns, in this case, were adjusted by size and book-to-market ratio or by size, book-to-market ratio and momentum (Chemmanur & Yan, 2019).

Mathematically, the adjusted stock return is the difference between the holding period stock return and its benchmark portfolio's return sorted by the respective factors. In this way, to calculate the adjusted return, it was necessary to build the benchmark portfolios according to the factors that we want to control.

These portfolios were created following Chemmanur & Yan's (2019) methodology, i.e., using a procedure similar to Loughran & Ritter (1997) (Chemmanur & Yan, 2019). For instance, to calculate the adjusted return by size ($Size_t$) and book-to-market ratio (BM_t), it was necessary to create benchmark portfolios keeping into account these two factors. First, at the end of each year, the stocks were classified into five quintiles according to the firm's size. Next, the stocks in each one of these quintiles were grouped into five sub quintiles according to the book-to-market ratio of each firm, performing a total of 25 benchmark portfolios. For each one of these portfolios, we calculated its mean return.

The procedure to calculate the size, book-to-market ratio and momentum adjusted return is similar. Having the 25 benchmark portfolios according to size and book-to-market ratio, the stocks of each one of these portfolios are grouped in sub quintiles according to the momentum, i.e., according to their returns in the advertising year t, leading to a total of 125 benchmark portfolios. Then, for each one of these portfolios, it is calculated its mean return.

3.2.2. Construction of Portfolios

Having the raw returns and the adjusted returns for each stock, it is necessary to construct the portfolio sorts. The portfolio sorts, as already mentioned, were controlled by the determinants of advertising to ensure that the relationship between the advertising expenses and stock returns is not driven by these factors.

Following Chemmanur & Yan (2019), we created two types of portfolio sorts: one that was triple-sorted by size ($Size_t$), book-to-market ratio (BM_t) and the change in advertising expenditures (ΔAdv_t), and other that was triple-sorted by sales ($Sales_t$), book-to-market ratio (BM_t) and the change in advertising expenditures (ΔAdv_t).

The portfolio triple-sorted by size, book-to-market ratio and advertising change was created by conducting the following procedure: for each year, the stocks were classified into five size quintiles according to their firm's size in the advertising year t. Then, the stocks of each quintile were further ranked into five sub quintiles according to the book-to-market ratio, being created 25 portfolios. Next, the stocks of each portfolio were ranked into more five quintiles according to their firm's advertising growth, performing a total of 125 portfolios.

Keeping into account these 125 portfolios, the quintiles with similar advertising changes – but different size and book-to-market ratio – were grouped, conducting to 25 equal-weighted portfolios. Finally, these portfolios were distributed among 5 quintiles (P1 to P5) based on the advertising changes. In particular, the portfolios with higher advertising changes were assigned to quintile five (P5) and the portfolios with the lowest advertising changes were assigned to quintile one (P1).

Having the five portfolios constructed for each year, the corresponding yearly portfolios were merged, originating five final portfolios that were evaluated. The performance of each one of these portfolios was tracked keeping into account the stocks raw returns and adjusted returns, in each event window. Furthermore, it was also tracked the performance of a zero-investment portfolio (P5 – P1).

After tracking the portfolios' performance, both to the raw and adjusted returns, it was performed a significance test to address the statistical significance of the obtained returns, as will be explained in subsection 3.4.

The procedure to create and evaluate the portfolio sorted by sales, book-to-market ratio and advertising change is similar. This triple-sort procedure guarantees that the results are not driven by the determinants of advertising – such as size, sales, and book-to-market ratio – or by the price predictors – momentum, size, and book-to-market ratio.

3.2.3. Robustness Test

To validate the results of the previous tests, it was necessary to conduct a series of robustness tests. In the case of the portfolio sorts, were addressed two problems that may arise and influence the results: the sample selectivity problem and the problem associated with the lower variability of advertising expenses in our sample.

3.2.3.1. Matching Sample

The previously described test was conducted on firms that report their advertising expenditures to the database. However, some firms are less likely to report these expenses, such as smaller firms, firms with higher profitability, growth firms (i.e. with smaller book-to-market ratios) and firms with smaller sales growth (Chemmanur & Yan, 2019). In this way, and once more following Chemmanur & Yan (2019), were conducted the same portfolio sorts' tests for a matching sample of non-reporting firms, to address if the sample selection interferes with the results found.

The matching sample was constructed considering the three main characteristics that lead a company to not report its advertising expenditures – the industry, size and book-to-market ratio (Chemmanur & Yan, 2019) – and following the next steps. First, the non-reporting firms were classified into 48 industries according to their SIC codes[2] and the Fama & French (1997) industry classification. Then, the firms in each industry were ranked into 3x3 or 2x2 portfolios – depending on the number of firms in each industry – based on their size and book-to-market ratio.

In the cases that were possible to have nine portfolios with, at least, four firms each the distribution was done based on 3x3 portfolios. This is, the companies were distributed into three groups according to their size and, each one of those groups was divided into more three groups according to the book-to-market ratio, performing a total of nine portfolios. In the cases where it was not possible to have at least four firms in each of the nine portfolios, the distribution was done according to 2x2 portfolios. The firms in which the SIC Codes are not included in the Fama & French (1997) industry classification were not included in the construction of the portfolios.

After having the above portfolios constructed, for each advertising reporting firm in the principal sample was selected the corresponding portfolio and matching non-reporting firm. Particularly, the matching non-reporting firm was the firm with the closest market capitalization. To perform the construction of the matching sample was considered the data regarding the last sample year once this is the year that includes data regarding all the companies considered.

Having the matching sample constructed, were calculated the adjusted returns, and conducted a portfolio sort analysis like the one described previously. Particularly, to distribute the companies regarding the change in advertising and, keeping into account that the matching sample's companies do not report their advertising expenses to the database, it was used the advertising expenses' values of the corresponding reporting firm.

3.2.3.2. Variability of Advertising Expenses

As previously explained, the sorting procedure adopted lead to five final portfolios (P1 to P5) where the companies were distributed according to their log change in advertising

[2] A company can have until eight SIC codes depending on the number of businesses it operates. In this way, it was used the SIC code corresponding to the business that provides more revenue for the company.

expenses. However, since there are companies that do not report their advertising expenses to the database, the principal sample used might be biased by presenting a lower variation of these expenses. Particularly, in the cases that the change in advertising is not pronounced, this is, in the cases that the variation in advertising expenses of portfolio one (P1) is close to the variation of portfolio five (P5), it is expectable that the returns will also be close and, therefore, the returns of the zero-investment portfolio (P5 – P1) may not be significant.

To control for this effect, it was conducted a robustness test where, instead of five final portfolios, were obtained ten final portfolios, similarly to the article of Lou (2014). Having the five final portfolios for each year – obtained following the procedure explained in subchapter 3.2.2. – each one of the portfolios was divided in two, according to the log change in advertising expenses (ΔAdv_t). Particularly, the firms with the smallest ΔAdv_t were attributed to portfolio one (P1).

After the construction of the ten portfolios for each year, each yearly corresponding portfolio was merged, leading to ten final portfolios (P1 to P10). Finally, the portfolios were evaluated recurring to a similar procedure to the one applicable to the five final portfolios obtained in subchapter 3.2.2.

3.3. Panel Regressions

In addition to the portfolio sorts, we conducted a series of regressions to identify the impact of advertising growth on the contemporaneous year and in the *ex-post* event windows. The regressions conducted are similar to the Fama-MacBeth regressions used by Chemmanur & Yan (2019).

$$Raw\ Return_t = \alpha_0 g + \alpha_1 \Delta Adv_t + \alpha_2 Size_{t-1} + \alpha_3 BM_{t-1} + \varepsilon_t \quad (3.1.)$$

$$Raw\ Return_{t+1} = \beta_0 g + \beta_1 \Delta Adv_t + \beta_2 Size_t + \beta_3 BM_t + \beta_4 Raw\ Return_t + \varepsilon_{t+1} \quad (3.2.)$$

These Fama-MacBeth regressions allow us to understand the impact of advertising growth in the contemporaneous stock return (regression 3.1.) or the *ex-post* stock returns (regression 3.2.), by controlling the factors that can influence the firm's advertising decision – the size and book-to-market ratio. Moreover, in the case of regression 3.2., it was also controlled the predictability of momentum, by introducing the returns as a dependent variable, to ensure that the results are not driven by this price predictor (Chemmanur & Yan, 2019).

Regression 3.1. was run for the contemporaneous advertising year t, while the regression 3.2. was run in the following *ex-post* event windows - [1, 6], [7, 12], [1, 12] and [1, 18] months following the advertising year. Furthermore, the regressions were also run by adding two additional factors – the sales growth ($\Delta Sales_t$) and the profitability growth ($\Delta Prft_t$) – that can also influence the firm's advertising decision and the obtained results.

In the reference articles, the coefficients were obtained following the Fama & MacBeth's (1973) rationale. In this case, the coefficients were obtained by running a panel regression with fixed effects and clustered standard errors, using the Least-Squares approach[3]. Furthermore, the statistical significance of each coefficient was addressed recuring to the t-statistic and the p-value associated, as it is explained in section 3.4.

Although the estimation process used is different from the one adopted in the reference articles (Chemmanur & Yan, 2019; Lou, 2014), the two procedures are similar and conduct to equally reliable t-statistics and inferences of similar quality (Skoulakis, 2008). However, due to the differences regarding the estimation procedure, the regressions used in this empirical study are nominated panel regressions instead of Fama-MacBeth regressions.

3.3.1. Robustness Tests

Similarly to the portfolio sorts' case, we conducted a series of robustness tests to validate the regressions' main results. The robustness tests were conducted following the rationale of Chemmanur & Yan's (2019) paper and address two problems that may arise – the sample selection problem and the price anomalies problem.

First, it was addressed the sample selection problem. To identify if the sample selection interferes with the results, the regression 3.2. was estimated using the matching sample of non-reporting advertising firms constructed in subchapter 3.2.3.1.

Then, to address the price anomaly concern, it was introduced in regression 3.2. two additional variables: the asset growth and the discretionary accruals. These two variables were used to control the possible price anomalies – the asset growth and accounting accrual anomaly – that may influence the main results found.

[3] To run the panel regressions, we fixed the cross-section and period effects, i.e., we fixed the firms and year. The clustered standard errors were obtained by applying the White Period correction to the standard errors.

3.4. Test Statistics

To address the statistical significance of the results, at the conventional significance levels (1%, 5%, and 10%), it was conducted a statistical test – the T-test (Lou, 2014).

In the case of the portfolio sorts, was tested the statistical significance of the returns of the zero-investment portfolios (Chemmanur & Yan, 2019). We tested the following hypotheses:

H0: the returns are not statistically different from zero

H1: the returns are statistically different from zero

It was applied a mean comparison test for independent samples, considering the heteroskedasticity presented in the used sample. This heteroskedasticity arises due to the differences in the standard errors and it was also addressed in the reference articles (Chemmanur & Yan, 2019; Lou, 2014) recurring to similar procedures.

In the case of the panel regressions, was addressed the statistical significance of the regressions' coefficients. The hypotheses are:

H0: $Bi = 0$

H1: $Bi \neq 0$

In this case, the t-statistic was calculated based on the clustered standard errors adopted, that help to mitigate the heteroskedasticity problems present in the sample used.

In both cases, the null hypothesis (H0) is rejected when the p-value is lower than the corresponding significance level. Rejecting the null hypothesis allows us to conclude that the portfolios' returns or the regressions' coefficients evaluated are statistically significant.

3.5. Construction of Variables

To perform the empirical tests previously explained, it was necessary to construct the variables used. The rationale adopted is similar to the one presented by Chemmanur & Yan (2019). First, it was necessary to define the temporal windows adopted since the variables refer to different periods. In this way, t was considered the advertising year, (t – 1) the year before the advertising year, and (t + 1) the year following the advertising year. Then, it was performed the construction of variables[4].

[4] The mathematical formulas adopted for the construction of variables can be consulted in table 9, in appendix 7.2.

Regarding the construction of variables, the Adv_t variable was constructed by doing the log value of advertising expenditures. In turn, the advertising growth variable (ΔAdv_t) represents the change in the log values between year (t – 1) and year t. This variable was coded as 0 if the advertising expenditures reported in two subsequent years were null.

Similarly, the $Sales_t$ variable is the log value of sales revenue in year t and the $\Delta Sales_t$ variable the log change from year (t – 1) to year t. The $Prft_t$ variable was obtained by doing the ratio between the EBITDA and the book value of assets for year t, and the $\Delta Prft_t$ corresponds to the change from year (t – 1) to year t. The book value of assets was calculated as the difference between the total assets and the accumulated depreciation, in year t.

The $Size_t$ variable is the log value of the market capitalization in year t and the BM_t is the book-to-market value of equity ratio calculated as the inverse of the price-to-book value ratio in year t.

Furthermore, to construct the variables Raw $Return_t$ and Raw $Return_{t+1,}$ it was used the monthly total returns. The variable Raw $Return_t$ was constructed for each year of the sample. The variable Raw $Return_{t+1}$ was constructed for the windows [1, 6], [7, 12], [1, 12] and [7, 18] months following each contemporaneous advertising year t.

Finally, to control the price anomalies were necessary two variables: the asset growth variable (Asset $Growth_t$) and the discretionary accruals variable (Discretionary $Accrual_t$). The Asset $Growth_t$ variable is the change, in percentage, of the book value of assets between year (t – 1) and year t. The Discretionary $Accrual_t$ variable (DA_t) was estimated following the DeAngelo (1986) Model (Bartov, Gul & Tsui, 2000).

Following the model's logic, the discretionary accruals for period t (DA_t) are the difference between the total accruals in year t (TA_t) scaled by the last period assets ($Assets_{t-1}$) and the non-discretionary accruals for the same period t (NDA_t). In this way, to calculate the discretionary accruals for period t, it was necessary to calculate the non-discretionary accruals and total accruals for the same period.

The NDA_t are the ratio between the last period total accruals (TA_{t-1}) and the total assets' value in the last two periods ($Assets_{t-2}$). The total accruals for period t, TA_t, are calculated following the balance sheet approach (Bartov et al., 2000; Jones, 1991). The TA_t are the difference between the change in the current assets in period t (ΔCA_t), the cash and cash equivalents ($\Delta Cash_t$), and the current liabilities (ΔCL_t), plus the change in the debt included in these current liabilities (ΔDCL_t) less the depreciation and amortization in the same period (DEP_t).

4. Data

In this chapter, it is presented the information regarding the data necessary to conduct the empirical study. In subchapter 4.1., it is explained the data collection and treatment procedure. In the following chapters – subchapter 4.2. and 4.3. – are presented the summary statistics for the principal and matching samples, respectively.

4.1. Data Collection

To conduct the empirical study explained in the prior chapter, it was necessary to collect the corresponding data. In this way, it was necessary to define the frequency of data used, the temporal dimension of the study and the markets included.

As already referred, regarding the frequency of advertising data, the empirical study was conducted by recuring to annual data. This decision lays in two major reasons – the lack of availability of daily data and the controversy about the daily data's capacity of attracting investors' attention and generating significant results (Mayer, 2021). Regarding the temporal dimension, the study was conducted for ten years – from 2009 to 2019 – once the most similar study adopts a temporal dimension of nine years (Chemmanur & Yan, 2019).

Regarding the markets considered, and since this empirical study is focused on Europe, were included the European markets. Therefore, it was used as a sample the active listed companies of the eurozone markets since, according to the WorldBank indicators of 2018, the market capitalization of these companies accounted for 54.6% of GDP in this year.

To collect the data regarding these companies, it was used the DataStream/EIKON database. There are 5904 equities, present in the database, that belong to the eurozone market. From these 5904 firms, 1820 are present in only one stock exchange, while the remaining equities are present in more than one. Regarding the companies present in more than one stock exchange, these were only considered once, in the stock exchange of their countries of origin. In this way, were considered 3448 firms – 1820 present in one stock exchange and 1628 present in the stock exchange of their countries of origin.

After analysing the data regarding these companies, we eliminated the companies for which there are no data in the database or that do not present financial interim data. Additionally, recurring to the SIC Codes, we identified and eliminated financial companies – such as banks, insurance, and trading companies – and companies that do not present their SIC Code.

Therefore, the sample is constituted by 1998 firms, from which 599 report their advertising expenses to the database.

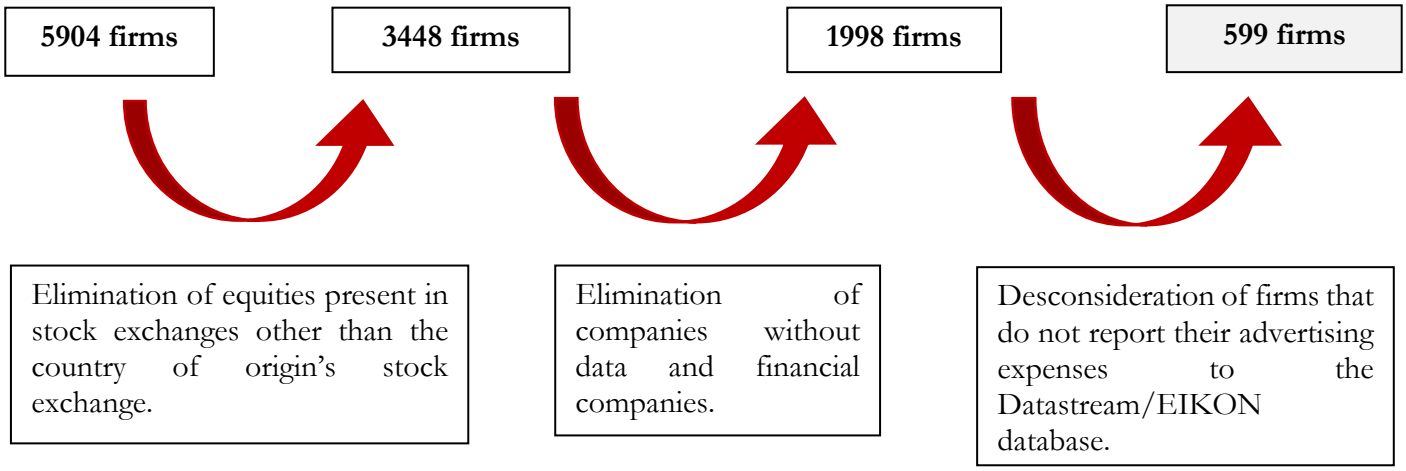

Figure 1: Sample's Treatment

Souce: Own Elaboration

Subsequently, the 599 firms that report their advertising expenses to the database were analysed to identify possible outliers that may affect the empirical results. In this way, 18 firms were considered severe outliers due to their excessive values on variables such as profit, discretionary accruals, and asset growth. These 18 companies were eliminated from the sample that is, now, constituted by 581 firms[5].

Figure 2: Treatment of Principal Sample

Source: Own elaboration

Although the final number of firms is considerably smaller than the number of firms used in the reference studies, it is consistent with the number of firms used in other studies, such as Aman et al. (2017) and Madsen & Niesser (2019) that resorted to samples of 311 and 637 companies, respectively. Furthermore, as already explained in previous subchapter 3., it was

[5] A list of the excluded companies is provided in Annex B.

addressed in the robustness tests the sample selection concern regarding the companies that report their advertising expenses or not.

4.2. Summary statistics: Principal Sample

In this subsection, it is presented the descriptive statistics and correlations analyses regarding the principal sample variables. All the data used to construct these variables was collected in thousands and used in these units in the construction.

Analysing the descriptive statistics (Table 1), it is possible to observe that ΔAdv_t and Raw $Returns_t$ variables present lower mean values when comparing it with Chemmanur & Yan's (2019) reference values – 0.012 against 0.110 and 0.076 compared to 0.101, respectively. Furthermore, there is a significant difference regarding $\Delta Sales_t$ variable, when comparing with the previously referred study, once this variable presents a mean value of 0.015 comparing to the value of 0.159 presented in the study. The same pattern is observed for the $\Delta Prft_t$ variable. Regarding the other variables, such as the $Size_t$ and the BM_t, the values are similar to the ones presented in the reference articles.

Table 1: Descriptive Statistics - Principal Sample

	Observations	Mean	Median
Adv_t	3662	3.4807	3.4602
ΔAdv_t	2958	0.0122	0.0120
$Sales_t$	6144	5.2537	5.2065
$\Delta Sales_t$	5549	0.0146	0.0156
$Prft_t$	5234	0.1091	0.1196
$\Delta Prft_t$	4513	0.0058	0.0013
$Size_t$	5746	5.1292	5.0278
BM_t	5679	0.8193	0.6250
Raw $Return_t$	5223	0.0756	0.0105
Asset $growth_t$	4623	0.0594	0.0167
Discretionary $accruals_t$	5111	-0.0017	-0.0017

Notes: This table reports the mean and medians of the variables used in this study. The t stands for the advertising year, (t – 1) for the year before the advertising year and (t+1) for the year following the advertising year. The variable Adv_t is the log value of the advertising expenses on the advertising year t. The ΔAdv_t is the change of the variable Adv_t from year (t – 1) to year t. The variable $Sales_t$ is the log value of the sales revenue, and the variable $\Delta Sales_t$ the respective change from (t – 1) to t. The variable $Prft_t$ is calculated as the ratio between the EBITDA and the book value of assets, and $\Delta Prft_t$ stands for its change between (t – 1) and t. The variable $Size_t$ corresponds to the log value of the market capitalization, and the variable BM_t is the book-to-market ratio calculated as the inverse of the price-to-book value ratio. The Asset $Growth_t$ variable is the change, in percentage, of the book value of assets between (t – 1) and t. Finally, the Discretionary $Acrruals_t$ variable represents the discretionary accruals, calculated following the DeAngelo Model (1986).
Source: Own elaboration

Furthermore, by analysing the correlations between the variables (Table 2), it is possible to identify the strength and the direction of the linear correlation between the chosen variables. Particularly, it is possible to observe that the Adv_t variable, consistently with the Chemmanur

& Yan's (2019) reference article, is highly and positively correlated with the variables $Sales_t$ and $Size_t$, with a correlation of 0.762 and 0.673, respectively. However, inconsistently with the article, this variable appears to be only slightly positively correlated to the $Prft_t$ variable. These results suggest that larger firms may advertise more which can lead to an increase in sales. Additionally, the correlations suggest that the variable Adv_t is positively and moderately correlated with the variable Raw $Return_t$, presenting a correlation of 0.336. Therefore, due to the strong correlations between these variables, it is preferable to use the advertising growth variable, rather than the level of advertising, to purge the firm fixed effects, as previously referred to.

Table 2: Correlations - Principal Sample

	Adv_t	**BM_t**	**$Prft_t$**	**Raw $Return_t$**	**$Sales_t$**	**$Size_t$**
Adv_t	1.0000	-0.0831	0.0669	0.3358	0.6753	0.7620
BM_t	-0.0831	1.0000	0.0051	-0.0268	-0.0322	-0.0984
$Prft_t$	0.0669	0.0051	1.0000	0.0299	0.0959	0.1118
Raw $Return_t$	0.3358	-0.0268	0.0299	1.0000	0.2471	0.3730
$Sales_t$	0.6753	-0.0322	0.0959	0.2471	1.0000	0.7410
$Size_t$	0.7620	-0.0984	0.1118	0.3730	0.7410	1.0000

Notes: This table reports the correlations between the variables used in this study. The t stands for the advertising year. The variable Adv_t is the log value of the advertising expenses on the advertising year t. The variable $Sales_t$ is the log value of the sales revenue. The variable $Prft_t$ is calculated as the ratio between the EBITDA and the book value of assets. The variable $Size_t$ corresponds to the log value of the market capitalization. The variable BM_t is the book-to-market ratio calculated as the inverse of the price-to-book value ratio. The correlations were calculated recurring to the ordinary method, this is, to the Pearson's correlation coefficient.
Source: Own elaboration

4.3. Summary Statistics: Matching Sample

As previously explained, to conduct the robustness tests, it was constructed a matching sample using the companies that do not report their advertising expenses to the database. This sample was constructed based on the industry, size and book-to-market ratio of each firm and, as indicated by Chemmanur & Yan (2019), it is more likely to present higher profitability and smaller sales growth, size and book-to-market ratio, when compared to the companies that report their advertising expenses to the database.

This sample was constructed keeping into account the 1399 firms that do not report their advertising expenses to the database. After following the steps described in subchapter 3.2.3.1., the matching sample obtained was constituted by 412 firms comparing with the 581 firms of the principal sample. The difference regarding the sizes of the two samples can be

explained by the fact that some of the companies SIC Codes were not included in the Fama & French (1997) classification and, therefore, these companies were not included in the construction of the matching sample. Furthermore, in some cases, it was not possible to select a matching company for the reporting firm once the market capitalizations were not close or it would implicate the selection of the same matching company more than once, which would lead to a biased matching sample. After analysing the 412 companies, we excluded the outliers, namely regarding the variables profit and asset growth, leading to a matching sample constituted by 410 firms[6].

Considering the descriptive statistics, presented in Table 3, and comparing them with the main sample's descriptive statistics, it is possible to observe that the matching sample presents higher profitability – 0.146 comparing with 0.109 – and smaller sales growth – 0.012 compared to 0.015, as expected. However, it presents a higher size – 5.162 comparing with 5.129 – and book-to-market ratio – 0.838 compared to 0.819. Nevertheless, the two samples are very similar and do not present significant differences.

Table 3: Descriptive Statistics - Matching Sample

	Observations	Mean	Median
$Sales_t$	4413	5.1993	5.1929
Δ $Sales_t$	3997	0.0124	0.0139
$Prft_t$	3871	0.1464	0.1212
Δ $Prft_t$	3366	0.0033	0.0000
$Size_t$	4283	5.1624	5.1070
BM_t	4234	0.8382	0.6369
Raw $Return_t$	3889	0.0946	0.0143
Asset $growth_t$	3467	0.0996	0.0226
Discretionary $accruals_t$	3711	-0.0064	-0.0024

Notes: This table reports the mean and medians of the matching sample's variables, used in this study. The matching sample was constructed based on the industry, size and book-to-market ratio of the non-reporting firms. The t stands for the advertising year, (t – 1) for the year before the advertising year and (t – 1) for the year following the advertising year. The variable Adv_t is the log value of the advertising expenses on the advertising year t. The ΔAdv_t is the change of the variable Adv_t from year (t – 1) to year t. The variable $Sales_t$ is the log value of the sales revenue, and the variable $\Delta Sales_t$ the respective change from (t – 1) to t. The variable $Prft_t$ is calculated as the ratio between the EBITDA and the book value of assets, and Δ $Prft_t$ stands for its change between (t – 1) and t. The variable $Size_t$ corresponds to the log value of the market capitalization, and the variable BM_t is the book-to-market ratio calculated as the inverse of the price-to-book value ratio. The Asset $Growth_t$ variable is the change, in percentage, of the book value of assets between (t – 1) and t. Finally, the Discretionary $Acrruals_t$ variable represents the discretionary accruals, calculated following the DeAngelo Model (1986).
Source: Own elaboration

[6] A list of the excluded companies is provided in Annex B.

5. Empirical Evidence

In this chapter, it is presented the empirical evidence, regarding the methodologic tests conducted, that allow us to assess if the change in advertising expenses can affect the stock returns, in the European market. In this way, in subchapters 5.1. and 5.2. are presented the results regarding the portfolio sorts and the panel regressions conducted.

5.1. Portfolio Sorts

As already explained, to address the statistical relationship between the change of advertising expenditures and stock returns, for the European markets, we constructed a series of portfolios and evaluated their performance regarding the raw and adjusted returns. In this subsection, are presented the results regarding these empirical tests and the robustness tests associated.

5.1.1. Main Results

First, we constructed the portfolios for the principal sample, this is, considering the firms that report their advertising expenses to the database. We constructed, as already explained in the methodology chapter, two panels of portfolios: one triple-sorted by size, the book-to-market ratio, and the log change in advertising expenses (ΔAdv_t) – Panel A – and the other triple-sorted by sales, the book-to-market ratio and the ΔAdv_t – Panel B. The results obtained can be consulted in Table 4.

Analysing the results, it is possible to observe that in general the mean returns of the portfolios composed by companies that present a higher ΔAdv_t, this is, that belong to portfolio five (P5), are higher than the mean returns of the companies that present a lower ΔAdv_t, this is, that belong to portfolio one (P1). However, when analysing the performance of the zero-investment portfolio (P5 – P1) in both panels – Panel A and Panel B – most of the results are not statistically significant at the conventional significance levels (1%, 5% and 10%). This finding suggests that there is not a statistically significant relationship between the log change in advertising expenses and stock returns.

Even so, when analysing each panel individually, it is possible to observe that in the case of Panel A some of the returns presented are statistically significant. Particularly, focusing on the mean returns adjusted by size and the book-to-market ratio of the zero-investment

Table 4: Portfolio Sorts - Main Results

	Raw Returns					Adjusted Returns: Size and BM					Adjusted Returns: Size, BM and Momentum				
Panel A: Portfolios are triple-sorted by size, book-to-market ratio and change in advertising expenditures (ΔAdv_t)															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0713	0.0757	0.0787	0.0778	0.0699	-0.0167	-0.0176	-0.0158	-0.0174	-0.0225	-0.0050	-0.0004	0.0010	0.0002	-0.0077
P2	0.0957	0.1096	0.1118	0.1131	0.1105	0.0054	0.0141	0.0155	0.0149	0.0133	-0.0059	-0.0011	0.0005	0.0001	0.0048
P3	0.1335	0.1380	0.1408	0.1405	0.1582	0.0241	0.0266	0.0289	0.0262	0.0456	0.0105	0.0082	0.0098	0.0094	0.0167
P4	0.0994	0.0892	0.0923	0.0930	0.0844	0.0054	-0.0078	-0.0059	-0.0044	-0.0161	0.0104	0.0013	0.0027	0.0025	0.0018
P5	0.0999	0.1079	0.1086	0.1110	0.1147	0.0128	0.0215	0.0214	0.0225	0.0251	0.0073	0.0029	0.0024	0.0028	0.0015
P5-P1	0.0286	0.0322	0.0299	0.0332	0.0448	0.0295	0.0391	0.0372	0.0399	0.0475	0.0123	0.0033	0.0014	0.0026	0.0092
P-value	0.1401	0.1695	0.2173	0.1694	0.0720*****	0.1098	0.0737*****	0.1017	0.0777*****	0.0385******	0.3414	0.8326	0.9319	0.8702	0.5669
Panel B: Portfolios are triple-sorted by sales, book-to-market ratio and ΔAdv_t															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0693	0.0732	0.0744	0.0748	0.0662	-0.0064	-0.0065	-0.0063	-0.0067	-0.0129	-0.0019	0.0033	0.0039	0.0034	-0.0034
P2	0.0788	0.0844	0.0863	0.0861	0.0881	-0.0161	-0.0131	-0.0125	-0.0135	-0.0061	-0.0156	-0.0148	-0.0146	-0.0145	-0.0092
P3	0.1703	0.1755	0.1819	0.1818	0.1887	0.0627	0.0621	0.0686	0.0660	0.0692	0.0279	0.0262	0.0306	0.0296	0.0366
P4	0.0905	0.0843	0.0857	0.0872	0.0959	-0.0180	-0.0246	-0.0239	-0.0233	-0.0160	0.0066	-0.0028	-0.0018	-0.0019	0.0012
P5	0.0885	0.1011	0.1018	0.1034	0.0970	0.0072	0.0176	0.0167	0.0183	0.0108	-0.0009	-0.0019	-0.0030	-0.0023	-0.0092
P5-P1	0.0192	0.0280	0.0274	0.0286	0.0308	0.0137	0.0240	0.0230	0.0250	0.0237	0.0011	-0.0052	-0.0069	-0.0058	-0.0058
P-value	0.3086	0.2371	0.2629	0.2416	0.1370	0.4419	0.2783	0.3160	0.2749	0.2200	0.9312	0.7313	0.6660	0.7157	0.6735

Notes: The sample period covers 2009-2019. To create the adjusted returns, the stocks are classified in 5x5 or 5x5x5 portfolios according to their size and book-to-market or their size, BM and momentum, respectively. The adjusted return corresponds to the difference between the stock return and the mean return of the corresponding portfolio. Both raw returns and adjusted returns are constructed for five event windows: t stands for the advertising year; month 1 to the first month following the advertising year and following. In Panel A the portfolios are created according to the size, book-to-market ratio and the log change of advertising expenses (ΔAdv_t). The stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided into 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided into more 5 sub quintiles according to the log change in advertising. Finally, the 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but different size and BM quintiles. Panel B is constructed following the same procedure, but considering the variables sales, book-to-market ratio and the log change of advertising expenses. In the table are reported the mean portfolio returns and the difference between the returns of portfolios P1 and P5 (P5 – P1). The p-value presented is calculated based on the t-statistic for heteroscedastic standard errors. *, **, and *** provide the statistical significance of the results at 10%, 5% and 1% significance level, respectively.
Source: Own Elaboration

portfolio, it is possible to observe that the mean returns are statistically significant in the *ex-post* periods – [1, 6], [1, 12] and [1, 18] months – once they are superior to zero and significant at a 10% significance level. For example, when considering the adjusted returns by size and book-to-market ratio, in the twelve months following the contemporaneous advertising year, the results suggest that the zero-investment portfolio will experience an annual adjusted mean return of 3.99%.

This pattern is not consistent with the pattern found in previous articles for the US market (e.g. Chemmanur & Yan, 2019; Lou, 2014). As explained in the reference articles, it is expectable that an increase in the advertising expenses will lead to an increase in stock prices, in the contemporaneous advertising year, but to future lower returns. This is supported by the fact that the zero-investment portfolios, analysed in these articles, registered statistically significant positive returns in year t and consistently negative returns in the following periods. On the contrary, the results found in this empirical study suggest that the increase in stock prices, in the contemporaneous advertising year t, will not be reversed in the following periods, but will continue throughout time. This pattern, observed in the European market, can be interpreted as a light sub reaction of prices in the periods following the contemporaneous advertising year.

Nevertheless, it is important to keep in attention that the pattern found is very tenuous and only marginally significant due to various reasons. Focusing on Panel A, the pattern is not significant when considering the mean raw returns, the mean returns adjusted by size, the book-to-market ratio and momentum or lower significance levels such as 5% and 1%. Moreover, the pattern is also not verified when considering the portfolios in Panel B, which supports its light significance.

In this way, the results suggest that the change in advertising expenses, by European firms, will not have a statistically significant impact on their stock returns, both in the contemporaneous advertising year and in the *ex-post* event windows. These results, although not consistent with the results presented by Chemmanur & Yan (2019) and Lou (2014), are consistent with the results of other authors. Particularly, are consistent with the findings of Madsen & Niessner (2019), Focke et al. (2020) and Aman et al. (2017) for the US and Japanese markets, respectively, once these authors also did not find a significant relationship between the advertising expenses and stock prices.

The findings presented in these US and Japanese articles can be explained by three major reasons. First, and recurring to the theoretical framework, the lack of connection can be

explained by the absence of short sale constraints that allow institutional investors to correct the actions of retail investors, avoiding the stocks mispricing (Aman et al., 2017). Secondly, the findings can be explained by the nature of the data used in these studies. The studies are based on daily advertising data which allows the elimination of the endogeneity problems associated with the use of annual data. Therefore, one can argue that the advertising expenses do not affect the contemporaneous stock returns but, instead, that the increase in stock returns leads to an increase in advertising expenses (Focke et al., 2020). This framework, explains both the lack of connection found in these articles and the findings of the previous annual studies for the US market (e.g. Chemmanur & Yan, 2019; Lou, 2014). Furthermore, the use of daily data by these articles might not be enough to attract the investors' attention and to disclose a significant relationship between the two variables (Mayer, 2021).

In the European market case, similarly, the findings can be explained both recurring to the theoretical framework or to market factors that may influence them. Focusing on the theoretical framework, the absence of a statistically significant relationship between the advertising expenses and stock returns can be explained by the lack of short sale constraints, in the European market, and its effects on institutional investors. In this scenario, the institutional investors will be able to correct the actions of retail investors immediately and the stock price will not be affected, similarly to what happens in the Japanese market (Aman et al., 2017). However, this framework is only theoretical since, to the best of our knowledge, there is no empirical evidence regarding the absence of short sale constraints, in the European market.

Furthermore, the results found can also be explained by the quality of the data used. One major difference between the European and the US market, regarding the advertising expenses, is the accounting policy existent. In the case of the US market, there is a policy – SOP 93-7 – that obligates companies to register their advertising expenses within the period they occur, which allows the authors to have a sample that follows the same accounting rules (Chemmanur & Yan, 2019). In the case of the European markets, to the best of our knowledge, there is not a standard accounting policy that must be followed. Following the accounting rules, the advertising expenses must be included in the Selling, General and Administrative (SG&A) expenses, but no information obligates the companies to register them in a given period, which can lead to a sample composed by companies that follow different accounting rules regarding these expenses.

Therefore, some differences may arise in the results. Once the companies do not follow a standard policy for the treatment of these expenses, the results may be biased by some noise. As explained by Chemmanur & Yan (2019) in their article, when they considered the years prior to the introduction of the SOP 93-7 policy in the US market, the results became weaker due to the noise introduced by the different accounting policies used.

Additionally, the results can be explained by the issue of the disclosure of advertising expenses. Both in the US and the European markets, the companies are not obligated to disclose their advertising expenses to the database, which can lead to a biased sample that may affect the results found. To address this question, it was conducted a robustness test that considers the sample selectivity question.

Furthermore, and in alignment with the previous issue, the results can also be explained by the differences regarding the number of companies that report their advertising expenses to the database and its impact on the variability of advertising expenses. Analysing the sample of Chemmanur & Yan (2019), and comparing it to the European sample used, it is possible to observe that more US companies tend to report their advertising expenses separately to the database. In the European case, since fewer companies report their advertising expenses, the sample and the variation in advertising might be smaller than the one observed in the reference article, which can affect the results. If the variations in advertising expenses between portfolios are smaller, they may not be sufficient to reveal an existing relationship between the two variables. However, this problem was addressed using a robustness test that allows us to corroborate this hypothesis or not.

5.1.2. Robustness Tests

In this subsection, are presented the results regarding the robustness tests conducted. As previously explained, we conducted two robustness tests: one regarding the sample selectivity problem and the other regarding the variability of advertising expenses problem.

5.1.2.1. Matching Sample

The results presented in the prior section are achieved considering only the companies that report their advertising expenses to the database. However, most of the European companies do not report these expenses and, therefore, were not considered in the previous tests. In this way, it is necessary to address the sample selectivity concern, i.e., if the results found are caused by the sample used or not.

To address this concern, as explained in section 3.2.3.1., was constructed a matching sample and performed the same tests applied to the principal sample. The results for the portfolios triple sorted by size, book-to-market ratio and the log change in advertising expenses are reported in Table 5 – Panel A. The full results can be found in Table 13 in annex D and are consistent with the ones reported in this section.

To interpret the results found, it is necessary to understand the logic behind this test. As already referred, the objective of this robustness test is to verify if the principal results may be driven by the sample selectivity or not. Once the matching sample is composed by non-reporting companies that are similar to the reporting ones, to identify if the principal results are driven by the sample selectivity, it is necessary to compare both results – the results of the principal sample and the matching sample. Particularly, if the results of the principal tests are driven by the sample selection, the matching sample results should present the same pattern found in the main results (Chemmanur & Yan, 2019).

Analysing the obtained results, it is possible to observe that, in general, the mean returns of the zero-investment portfolio are not statistically significant when considering the usual significance levels. In particular, only the mean return adjusted by size, book-to-market ratio and momentum, in the contemporaneous advertising year, is significant at a 5% significance level. Nevertheless, this return is only marginal significant once its significance does not hold when considering a 1% significance level or when considering the raw returns and the returns adjusted by size and book-to-market ratio.

In this way, it is possible to conclude that the matching sample and the principal sample lead to the same conclusion that there is not a significant relationship between the change in advertising expenses and stock returns. Therefore, the results of this robustness test suggest that the pattern found in the main results (section 5.1.1.) may be driven by the sample selection, supporting one of the reasons that might explain why the main results found, in this empirical study, are different from the ones presented in the reference articles.

5.1.2.2. Variability of Advertising Expenses

In subchapter 5.1.1. are presented the main results regarding the portfolio sorts tests. As already explained, these results might be influenced by the sample used and its impacts on the variability of advertising expenses. As previously referred, in the methodological considerations, if the variation of advertising expenses between the portfolios is too close, it

Table 5: Portfolios Sorts - Robustness Tests' Results

	Raw Returns					Adjusted Returns: Size and BM					Adjusted Returns: Size, BM and Momentum				
Panel A: Matching Sample – Portfolios are triple-sorted by size, book-to-market ratio and ΔAdv_t															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0750	0.0797	0.0794	0.0813	0.0829	-0.0305	-0.0283	-0.0295	-0.0276	-0.0234	0.0045	-0.0001	0.0000	-0.0004	0.0022
P5	0.0701	0.0728	0.0752	0.0754	0.0770	-0.0438	-0.0456	-0.0450	-0.0418	-0.0455	-0.0336	-0.0303	-0.0299	-0.0300	-0.0187
P5-P1	-0.0050	-0.0069	-0.0041	-0.0059	-0.0059	-0.0133	-0.0172	-0.0154	-0.0142	-0.0221	-0.0381	-0.0302	-0.0299	-0.0296	-0.0208
P-value	0.7934	0.7727	0.8712	0.8155	0.8286	0.4810	0.4662	0.5373	0.5705	0.4085	0.0155*****	0.1184	0.1230	0.1374	0.3382
Panel B: Variability of Advertising Expenses – Portfolios are triple-sorted by size, book-to-market ratio and ΔAdv_t															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0369	0.0325	0.0330	0.0333	0.0298	-0.0141	-0.0228	-0.0234	-0.0227	-0.0253	-0.0159	-0.0176	-0.0171	-0.0175	-0.0187
P10	0.0509	0.0584	0.0589	0.0597	0.0640	-0.0070	0.0020	-0.0015	0.0016	-0.0016	0.0025	0.0047	0.0041	0.0054	0.0033
P10-P1	0.0140	0.0258	0.0259	0.0264	0.0342	0.0071	0.0249	0.0218	0.0243	0.0237	0.0184	0.0224	0.0212	0.0230	0.0219
P-value	0.2613	0.0972*****	0.0979*****	0.0974*****	0.0660*****	0.5704	0.0967*****	0.1567	0.1147	0.1895	0.0898*****	0.0897*****	0.1090	0.0858*****	0.1773

Notes: The sample period covers 2009-2019. To create the adjusted returns, the stocks are classified in 5x5 or 5x5x5 portfolios according to their size and book-to-market or their size, BM and momentum, respectively. The adjusted return corresponds to the difference between the stock return and the mean return of the corresponding portfolio. Both raw returns and adjusted returns are constructed for five event windows: t stands for the advertising year; month 1 to the first month following the advertising year and following.

In Panel A are reported the results for the matching sample and the portfolios are created according to the size, book-to-market ratio (BM) and the log change of advertising expenses (ΔAdv_t). The matching sample is constructed keeping into account the industry, the size and the book-to-market ratio of each company in 2019. Having the matching sample, to create the portfolios, the stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided in 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided in more 5 sub quintiles according to the log change in advertising. The 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but to different size and BM quintiles. In the table are reported the mean portfolio returns and the difference between the returns of portfolios P1 and P5 (P5 – P1).

In Panel B are reported the results for the firms that report their advertising expenses to the database. The companies are distributed in 10 portfolios according to their size, book-to-market ratio (BM) and the log change of advertising expenses (ΔAdv_t). The stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided in 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided in more 5 sub quintiles according to the log change in advertising. The 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but to different size and BM quintiles. Then, each one of the 5 portfolios is separated in two according to the ΔAdv_t. In the table are reported the mean portfolio returns and the difference between the returns of portfolios P1 and P10 (P10 – P1). For each panel is calculated the p-value. The p-value presented is calculated based on the t-statistic for heteroscedastic standard errors. *, **, and *** provide the statistical significance of the results at 10%, 5% and 1% significance level, respectively.

Source: Own Elaboration

may not be enough to disclose a significant relationship between the advertising expenses and stock returns, when tracking the zero-investment portfolio's performance.

In this way, it was conducted a robustness test where instead of considering five final portfolios (P1 to P5), in each scenario, we considered ten final portfolios (P1 to P10) to highlight the differences regarding the change of advertising expenses between the extreme portfolios. The results for the portfolios triple sorted by size, book-to-market ratio and the log change in advertising expenses are reported in Table 5 – Panel B. The full results can be consulted in Table 14 in annex D and are consistent with the ones presented.

The logic behind this robustness test is to analyse if the dimension of the variation of advertising expenses may influence the main results found or not. On one hand, if the variability of advertising expenses affects the relationship found, i.e., if higher variations lead to more significant results, it is expectable to obtain more statistically significant results when considering the ten portfolios. On the other hand, if the dimension of the variation does not affect the results, it is expectable to obtain similar results to the ones described in subsection 5.1.1.

Analysing the results obtained, in general, it is possible to observe that the majority of the mean returns of the zero-investment portfolio (P10 – P1) are still not significant when considering the conventional significance levels. This finding indicates that, in general, there is not a significant relationship between the change in advertising expenses and stock returns, in the European market. However, there are more cases where the difference between the returns of the extreme portfolios is statistically significant when considering a significance level of 10%. Particularly, when considering the raw returns, these returns are positive and statistically significant in all *ex-post* event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months – at a 10% significance level.

These results show that the consideration of ten portfolios conducted to more statistically significant results, which suggests that the variation of advertising expenses may affect the results obtained. In a more detailed way, the results indicate that to obtain more statistically significant returns, for the European market, it is necessary to compare the stocks that present the highest advertising variation (P10) with the ones that present the lowest (P1).

Therefore, it is possible to conclude that higher variations in the advertising expenses may conduct to more pronounced differences in the mean returns of the zero-investment portfolios and to more statistically significant relationships between these returns and the advertising expenses. In this way, these results support one of the possible reasons that may

cause the differences found between the main results and the reference articles – Chemmanur & Yan (2019) and Lou (2014).

As already referred, one of the reasons that may explain this dissimilarity between the results is the difference regarding the variation of advertising expenses, between the European and the US market. When comparing the mean log change of advertising expenses throughout the years it is possible to observe that, in the European market, this variation is notably less pronounced when compared with Chemmanur & Yan's (2019) US market study – 0.012 against 0.110[7] – which may affect the results obtained, by not being enough to disclose an existing relationship between the two variables.

This idea is consistent with the explanation provided by Mayer (2021) on why the studies of Focke et al. (2020) and Madsen & Niesser (2019) did not found a significant relationship between the advertising expenses and the stock returns. According to the author, the data used in these two studies, due to its small fluctuation, was not enough to disclose a significant relationship between the two variables. Similarly, and as suggested by this robustness test, the sample and data used in this study, due to the low variation associated with the advertising expenses variable, may also not be enough to disclose a significant connection between the two variables.

5.2. Panel Regressions

In addition to the portfolio sorts, to identify if the change in advertising expenses can influence the stock returns, in the European market, we conducted a series of panel regressions, as explained in subchapter 3.3. of the methodological considerations. The results obtained, both for the main and robustness tests conducted, are addressed in this subsection.

5.2.1. Main results

As previously explained, we conducted the panel regressions for two different periods. First, we access the impact of the change of advertising expenses in the returns for the contemporaneous advertising year t – by recuring to regression 3.1. Then, we accessed the impact of this variable in the *ex-post* event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months following the advertising year – by recurring to regression 3.2.

[7] The variation of the advertising expenses, for the European market, is a mean of the 2958 registered observations from 2009 – 2019. In the case of the US market, the variation presented in the Chemmanur & Yan's (2019) study is a mean of the 6527 registered observations from 1996 – 2005.

Table 6: Panel Regressions - Main Results

Variables	Raw Return$_t$		Raw Return [1, 6] months		Raw Return [7, 12] months		Raw Return [1, 12] months		Raw Return [7, 18] months	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-0.4298 [0.0013]***	-0.4795 [0.0028]***	-0.0874 [0.0116]**	-0.1139 [0.0108]**	-0.0098 [0.7888]	-0.0259 [0.5854]	-0.0552 [0.1094]	-0.0817 [0.0713]*	-0.0235 [0.6704]	-0.0391 [0.5622]
ΔAdv$_t$	-0.0119 [0.2178]	-0.0192 [0.1172]	-0.0121 [0.3002]	-0.0181 [0.2409]	-0.0157 [0.3674]	-0.0228 [0.3221]	-0.0137 [0.3459]	-0.0203 [0.2937]	-0.0258 [0.2970]	-0.0368 [0.2660]
Size$_{t-1}$	0.1000 [0.0001]***	0.1097 [0.0002]***								
BM$_{t-1}$	0.0040 [0.3644]	0.0055 [0.3282]								
Size$_t$			0.0177 [0.0066]***	0.0225 [0.0062]***	0.0021 [0.7631]	0.0051 [0.5649]	0.0109 [0.0991]*	0.0157 [0.0588]*	0.0079 [0.4747]	0.0110 [0.4024]
BM$_t$			0.0048 [0.0998]*	0.0057 [0.1447]	0.0071 [0.0513]*	0.0083 [0.0901]*	0.0067 [0.0604]*	0.0079 [0.1040]	0.0067 [0.1173]	0.0076 [0.1555]
Raw Return$_t$			1.0003 [0.0000]***	0.9984 [0.0000]***	1.0763 [0.0000]***	1.0760 [0.0000]***	1.0437 [0.0000]***	1.0421 [0.0000]***	0.9641 [0.0000]***	0.9586 [0.0000]***
ΔSale$_t$		-0.0198 [0.3061]		-0.0128 [0.0502]		-0.0038 [0.7574]		-0.0097 [0.2684]		-0.0070 [0.4787]
ΔPrft$_t$		0.0016 [0.3729]		-0.0004 [0.6032]		-0.0005 [0.5610]		-0.0005 [0.4856]		-0.0007 [0.5622]
Observations	2621	2349	2311	2063	2311	2063	2267	2024	1964	1749

Notes: The sample covers the period 2009-2019 and is composed by companies that report their advertising expenses to the database. The dependent variable is the Raw Return. This variable was measured in five different periods – the contemporaneous advertising year t and four ex-post event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months following the contemporaneous advertising year. The ΔAdv$_t$ corresponds to the log change of advertising expenses from year (t – 1) to year t. The Size variable corresponds to the log value of the market capitalization and the BM variable to the book-to-market value of equity ratio. The ΔSale$_t$ variable corresponds to the change of sales' log value from year (t – 1) to year t and the ΔPrft$_t$ to the change in the ratio EBITDA/book value of assets in the same period. The coefficients are obtained by running a panel regression with fixed effects and clustered standard errors. The p-values associated with the correspondents t-statistics are provided in brackets. *, **, *** indicate the significance of the coefficients at 10%, 5% and 1% significance levels by using a t-test.
Source: Own Elaboration

The results are reported in Table 6. Columns (1) and (2) report the results referring to the contemporaneous year (regression 3.1.) and the remaining columns report the results referring to the *ex-post* event windows (regression 3.2.).

Analysing the obtained results, it is possible to observe that the coefficient associated with the log change in advertising expenses (ΔAdv_t) is not significant, in all scenarios, when considering the conventional significance levels. Furthermore, this coefficient remains insignificant when introducing the variables sales growth ($\Delta Sales_t$) and profit growth ($\Delta Prft_t$). These results, consistently with the results presented in section 5.1.1., suggest that there is not a significant relationship between the change in advertising expenses and stock returns, in the European market. Although not consistent with the results presented by Chemmanur & Yan (2019) and Lou (2014), these results are, once more, consistent with the findings of Aman et al. (2017), Madsen & Niesser (2019) and Focke et al. (2020).

5.2.2. Robustness Tests

In addition to the principal tests, we conducted a set of robustness tests to validate the results. In these tests, we addressed two major concerns – the sample selectivity concern and the price anomaly concern – recurring to regression 3.2.

The results are reported in Table 7. Columns (1) to (4) address the sample selectivity concern – reporting the results for the matching sample – and columns (5) to (10) address the price anomaly concern – reporting the results considering the price anomalies variables. The results refer to the six-month and twelve-month windows following the contemporaneous advertising year t – [1, 6] and [1, 12] months. The full results can be consulted in Tables 16 and 17 in annex E and are consistent with the ones reported in this section.

Focusing on the matching sample results, it is possible to observe that the coefficient ΔAdv_t is insignificant in all *ex-post* event windows, except in the six-month event window following the contemporaneous advertising year. Particularly, in this event window, the coefficient is positive and statistically significant at a 10% significance level, which can be interpreted as a light sub reaction of prices to an increase in advertising expenses. Nevertheless, since the coefficient is close to zero and is not significant when considering lower significance levels – such as 5% and 1% - it is not possible to conclude that the change in advertising expenses will significantly affect the stock returns, in this period.

In this way, the matching sample results and the main results conduct to the same conclusion that the change in advertising expenses does not have a statistically significant impact on

Table 7: Panel Regressions - Robustness Tests' Results

Variables	Raw Return [1, 6] months		Raw Return [1, 12] months		Raw Return [1, 6] months			Raw Return [1, 12] months		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-0.1817 [0.0050]***	-0.2364 [0.0168]**	-0.1689 [0.0307]**	-0.2361 [0.0541]*	-0.1101 [0.0104]**	-0.0990 [0.0080]***	-0.0964 [0.0082]***	-0.0767 [0.0757]*	-0.0605 [0.0599]*	-0.0569 [0.0668]*
ΔAdv_t	0.0037 [0.0781]*	0.0054 [0.0963]*	0.0030 [0.2000]	0.0043 [0.2207]	-0.0184 [0.2389]	-0.0027 [0.4506]	-0.0028 [0.4253]	-0.0206 [0.2895]	-0.0005 [0.8976]	-0.0007 [0.8623]
$Size_t$	0.0417 [0.0014]***	0.0506 [0.0079]***	0.0417 [0.0104]**	0.0535 [0.0277]**	0.0218 [0.0058]***	0.0199 [0.0044]***	0.0194 [0.0044]***	0.0148 [0.0620]*	0.0120 [0.0517]*	0.0113 [0.0564]*
BM_t	0.0035 [0.0469]**	0.0071 [0.0613]*	0.0033 [0.0707]*	0.0079 [0.0865]*	0.0057 [0.1440]	0.0045 [0.1059]	0.0045 [0.1058]	0.0079 [0.1035]	0.0063 [0.0622]*	0.0063 [0.0620]*
Raw $Return_t$	0.7145 [0.0000]***	0.7218 [0.0000]***	0.6076 [0.0000]***	0.6099 [0.0000]***	0.9986 [0.0000]***	0.9986 [0.0000]***	0.9988 [0.0000]***	1.0423 [0.0000]***	1.0424 [0.0000]***	1.0426 [0.0000]***
$\Delta Sale_t$		0.0063 [0.4127]		0.0101 [0.2659]	-0.0134 [0.0433]**	-0.0130 [0.0232]**	-0.0131 [0.0217]**	-0.0105 [0.2307]	-0.0084 [0.3280]	-0.0087 [0.3128]
$\Delta Prft_t$		0.0000 [0.9642]		0.0001 [0.8709]	-0.0001 [0.9381]	-0.0001 [0.8897]	0.0001 [0.8570]	-0.0001 [0.8879]	-0.0002 [0.7924]	0.0001 [0.8772]
Asset $Growth_t$					0.0020 [0.2422]		0.0014 [0.2315]	0.0027 [0.1671]		0.0019 [0.1864]
Discretionary $Accrual_t$						-0.0122 [0.3978]	-0.0125 [0.3889]		-0.0142 [0.4420]	-0.0146 [0.4345]
Observations	1593	1295	1570	1273	2063	2020	2020	2024	1982	1982
Sample	Matching Sample				Advertising firms					

Notes: The sample period covers 2009 – 2019. The dependent variable is the Raw Return. The results presented consider this variable in two ex-post event windows – [1, 6] and [1, 12] months– following the contemporaneous advertising year. Columns (1) to (4) present the results for the matching sample constructed based on the industry, size and book-to-market ratio of companies that do not report their advertising expenses to the database. Columns (5) to (10) present the results for companies that report their advertising expenses to the database. The ΔAdv_t corresponds to the log change of advertising expenses from year (t – 1) to year t. The Size variable corresponds to the log value of the market capitalization and the BM variable to the book-to-market value of equity ratio. The $\Delta Sale_t$ variable corresponds to the change of sales' log value from year (t – 1) to year t and the $\Delta Prft_t$ to the change in the ratio EBITDA/book value of assets in the same period. The Asset Growth variable is the change, in percentage, of the book value of assets between year (t – 1) and year t. The Discretionary Accrual variable is calculated following the DeAngelo (1986) Model. The coefficients are obtained by running a panel regression with fixed effects and clustered standard errors. The p-values associated with the correspondents t-statistics are provided in brackets. *, **, *** indicate the significance of the coefficients at 10%, 5% and 1% significance levels by using a two-tailed t-test.
Source: Own Elaboration

stock returns. Since both samples present the same conclusions, the results suggest that the sample selection may have interfered with the main results found. These results are consistent with the ones reported in subchapter 5.1.2.1.

Regarding the price anomalies concern, and analysing the results, it is possible to observe that the ΔAdv_t coefficient remains insignificant when introducing the asset growth and discretionary accrual variables in the main regressions – both individually or together. In this way, these results suggest that the main results are unlikely to be driven by price anomalies, such as the asset growth anomaly and the accounting accrual anomaly, consistently with the results of Chemmanur & Yan (2019).

Overall, the results found suggest that the change of advertising expenses, by European firms, will not significantly impact their stock returns, in the short- or long-term periods. These results do not appear to be driven by the determinants of advertising, by the price predictors or by the price anomalies, since these factors were addressed in the empirical study conducted[8]. However, the results suggest that the pattern found may be driven by the sample selection and by the low variation associated with the change in advertising expenses.

[8] As already referred the determinants of advertising are the sales, the size, the book-to-market ratio and the profitability effect. The price predictors controlled are the momentum, size and the book-to-market ratio. The price anomalies controlled are the asset growth and the accounting accrual annomally.

6. Conclusion

This dissertation addressed the relationship between the change in advertising expenses and stock returns, for the European market, by recurring to portfolio sorts and panel regressions with fixed effects.

The results obtained, in both methodologies, suggest that the change in advertising expenses does not have a statistically significant impact on stock returns, both in the contemporaneous advertising year and in the *ex-post* event windows. Furthermore, the robustness tests conducted suggest that the results may be affected by the sample selection and by the variability of advertising expenses.

These results, although consistent with some studies for the US and the Japanese market (e.g. Aman et al., 2017; Focke et al., 2020; Madsen & Niessner, 2019), are not consistent with the reference articles (Chemmanur & Yan, 2019; Lou, 2014). Two lines of thought allow us to explain these results – the theoretical framework and the quality of data.

Regarding the first one, the lack of connection between the two variables can be explained by the absence of short sale constraints, in the European market, which will allow the institutional investors to immediately correct the actions of retail investors affected by the increase of advertising expenditures. In this way, the advertising spillover effect on the financial market will be controlled and the stock prices and, consequently, the stock returns will not be affected. However, it is necessary to empirically confirm if this theory is verified in the European market.

Regarding the quality of data, there are three possible explanations for the results found. Primarily, since the European companies do not follow a standard accounting advertising policy, the sample might be biased by some noise which can lead to less significant results (Chemmanur & Yan, 2019). Secondly, since these companies are not obligated to disclose their advertising expenses to the database, the sample selection might also be influenced. In this way, and as suggested by the robustness tests conducted, the lack of connection found between the two variables can also be explained by the sample selectivity issues and their impacts on the main results.

Furthermore, since fewer companies disclose their advertising expenses to the database, the sample might be biased by presenting a smaller variation of advertising. As suggested by the robustness tests conducted, the lower variability associated with the advertising expenses can lead to less significant statistically results. This is consistent with the reason presented by

Mayer (2021) on why other US studies – such as Focke et al. (2020) – did not found a significant relationship as well. According to the author, these studies used small fluctuation data that did not allow to disclose a significant relationship between the change in advertising expenses and stock returns.

Nevertheless, this study contributes to the growing literature concerning the impact of advertising expenses on stock returns since, to the best of our knowledge, it is the first study to address this relationship for the European market. Furthermore, and due to the nature of the relationship found, it can have European managerial implications.

As advanced by several studies, managers in the US market, tend to take advantage of the contemporaneous relationship between the increase of advertising expenses and stock returns around financial events (e.g. Chemmanur & Yan, 2017; Fich et al., 2015; Lou, 2014). Once, there is no clear evidence of this relationship for the European market, this behaviour has no empirical support in this context. In this way, managers need to be cautious when using advertising expenses as a tool, around financial events.

Nonetheless, the findings and conclusions presented in this study should be interpreted with caution since it presents some limitations. First, and considering that the study was conducted recurring to annual data, some endogeneity problems may arise when studying the relationship for the contemporaneous advertising year (Focke et al., 2020). Particularly, we should bear in mind that the sense of causality between the two variables can be opposite to the one studied in this dissertation. Additionally, once companies are not obligated to disclose their advertising expenses and the sample used does not follow a standard accounting policy regarding the treatment of its advertising expenses, it is possible that the results found could be biased by these differences.

In this way, it is interesting to address these questions in future research. One interesting line of work, although challenging, is to study this relationship, for the European market, by recurring to daily data and using only companies that follow the same treatment regarding their advertising expenses. Moreover, it would be interesting to extend the work of Hsu & Chen (2019) by studying the impact of advertising expenses on stock returns when considering the stock returns' volatility, in the European markets. Lastly, it is also relevant to study the attention effects and the managers' opportunistic behaviours related to the advertising expenses, in the European market. These possible lines of work would contribute to the extension of the contemporary literature regarding the advertising spillover effect on financial markets, namely in the European market.

7. Appendix

7.1. Methodological Considerations: The Advertising Spillover Effect on Financial Markets

Table 8: Methodological Considerations of the articles regarding the advertising spillover effect on financial markets

Study	Country	Sample Size	Period of analysis	Data collection	Advertising Data	Unit of analysis	Methodology	Statistical analysis	Findings
Grullon et al. (2004)	US	5776 firms	1993–1998	Compustat CRSP TAQ	Annual	The breadth of ownership and liquidity	Univariate analysis, Regression with fixed effects (period or/and firms)	T-statistic	Advertising impacts the ownership structure and the common stocks' liquidity.
Fehle et al. (2005)	US	894 Super Bowl commercials	1969–2001	USA Today Ad-Meter CRSP Compustast TAQ	Super Bowl Commercials	Returns and buying activity	Univariate analysis, Cross-section analysis	T-statistic	Advertising companies experience positive abnormal returns and an increase in trading volume. Small investors are net buyers of attention-grabbing stocks.

Lou (2014)	US	66 113 firms	1974–2010	Compustast CRSP TAQ ISSM	Annual	Returns	Portfolio sorts, Fama-MacBeth Regressions	T-statistic	An increase in advertising leads to an increase in the contemporaneous stock returns and to future lower returns.
Chemmanur & Yan (2019)	US	6745 firms	1996–2005	Compustast CRSP IBES	Annual	Returns	Portfolio sorts, Fama-MacBeth Regressions, Factor models	T-statistic	Found evidence of a similar pattern described by Lou (2014).
Hsu & Chen (2019)	China	Not mentioned	2008-2016	CSMAR REESET	Annual	Weekly returns	Markov-switching model	T-statistic	In low-volatility periods, an increase in advertising leads to contemporaneous abnormal stock returns. In high-volatility periods this pattern is not verified.
Aman et al. (2017)	Japan	311 firms	2010–2011	M-data Corporation NFQ database	Daily	Daily returns and trading volume	Regression with fixed effects (period)	T-statistic	Advertising will positively and significantly impact the trading volume, but not stock returns.
Madsen & Niesser (2019)	US	637 firms	2003–2008	Media Radar Compustast CRSP	Daily	Daily returns and trading volume	OLS and 2SLS Regressions (with period and firm fixed effects)	T-statistic	Advertising can impact the trading volume and liquidity, but the stock price.

Focke et al. (2020)	US	998 firms for TV advertisements 1098 firms for newspaper advertisements	1995–2012	Compustat CRSP TAQ IBES Kantar	Daily	Daily returns and turnover	Regression with fixed effects (period and firms)	T-statistic	Advertising has an impact on the trading volume, but not on the contemporaneous and subsequent daily stock returns.
Mayer (2021)	US	275 college football bowl games	1991–2014	Sports Reference LLC CRSP	Corporate sponsorships of college football bowl games	Daily returns and trading volume	Event Study, Regressions with fixed effects (period or/and firms)	T-statistic	Sponsor companies will register an increase in turnover and a temporary increase in stock price.

Notes: In this table are reported the methodological considerations regarding the articles that address the advertising spillover effect on financial markets. The articles are presented in the same order that are addressed in the literature review (section 2.2.) – according to findings and publishing date. CRSP is the Center for Research in Securities Prices, a US database. TAQ is the Trades and Quotes database, for the US market. ISSM is the Institute for the Study of Security Markets database, that provides data regarding the US markets. IBES stands for the Institutional Brokers Estimate System, in the US market. CSMAR is the China Stock Market and Accounting Research database. NFQ stands for the Nikkei Financial Quest, a Japanese database. Kantar corresponds to a media database that tracks advertising data from public and private US companies. The fixed effects, in the regressions with fixed effects, refer to period, firms or both. All authors recurred to a two-tailed test (t-statistic) to address the statistical significance of the obtained results.

7.2. Construction of Variables: Formulas Adopted

Table 9: Mathematical Formulas

Name	Variables used	Formula
Adv_t	Advertising Expenditures	$Log_{10}(\text{Advertising Expenditures}_t)$
ΔAdv_t	Adv	$Adv_t - Adv_{t-1}$
$Sales_t$	Net sales or Revenues	$Log_{10}(\text{Net sales or Revenues}_t)$
$\Delta Sales_t$	Sales	$Sales_t - Sales_{t-1}$
Book value of $Assets_t$	Total Assets and Accumulated Depreciation	$\text{Total Assets}_t - \text{Accumulated Depreciation}_t$
$Prft_t$	EBITDA Book value of assets	$\frac{EBITDA_t}{Book\ value\ of\ assets_t}$
$\Delta Prft_t$	Prft	$Prft_t - Prft_{t-1}$
$Size_t$	Market Capitalization	$Log_{10}(\text{Market Capitalization}_t)$
BM_t	Price-to-Book value ratio	$\frac{1}{Price - to - Book\ value\ ratio_t}$
Asset $Growth_t$	Book value of Assets	$\frac{Book\ value\ of\ assets_t - Book\ value\ of\ assets_{t-1}}{Book\ value\ of\ assets_{t-1}}$
TA_t	Total Current Assets (CA) Cash and Cash generic (Cash) Total Current Liabilities (CL) Short Term Debt and Current Portion of Debt (DCL) Depreciation, Depletion and Amortization (DEP)	$TA_t = \Delta CA_t - \Delta Cash_t - \Delta CL_t + \Delta DCL_t - DEP_t$

NDA_t	TA Total Assets (Assets)	$NDA_t = \frac{TA_{t-1}}{Assets_{t-2}}$
DA_t	TA NDA Total Assets (Assets)	$DA_t = \frac{TA_t}{Assets_{t-1}} - NDA_t$

Notes: The year t corresponds to the advertising year. The years (t – 1) and (t + 1) correspond to the year before and after the advertising year, respectively. The Adv_t variable corresponds to the log value of advertising expenditures in the advertising year t. The ΔAdv_t is the change of the log value from year (t – 1) to year t. The $Sales_t$ variable corresponds to the log value of the sales revenue in the advertising year t, and the variable $\Delta Sales_t$ is its change from (t – 1) to t. The $Prft_t$ variable corresponds to the profit calculated as the ratio between the EBITDA and the book value of assets. The $\Delta Prft_t$ variable is the profit's change from (t – 1) to t. The $Size_t$ variable corresponds to the log value of the market capitalization in the advertising year t. The BM_t variable corresponds to the inverse of the price-to-book value ratio in year t. The Asset $Growth_t$ is the change, in percentage, of the book value of assets between (t – 1) and t. The DA_t variable corresponds to the discretionary accruals in the advertising year t and is calculated following the DeAngelo Model (1986).
Source: Own Elaboration

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Annexes

Annex A: Extracted Variables

Advertising Expenses (TI)

Market Capitalization (XC08001)

Net Sales or Revenues (WC01001)

EBIT and Depreciation (WC18198)

Cash and Cash Generic (WC02005)

Depreciation, Depletion and Amortization (WC01151)

Accumulated Depreciation (WC02401)

Total Assets (WC02999)

Total Current Assets (WC02201)

Total Current Liabilities (WC03101)

Short Term Debt and Current Portion of Debt (WC03051)

SIC Code I (WC07021)

Price-to-Book Value (PTBV)

Total Return Index (RI)

Annex B: Outliers of Principal Sample and Matching Sample

The following companies were considered outliers and, therefore, removed from the principal sample:

1. Adler Modemaerkte AG
2. Amoeba
3. Bastogi SPA
4. Cyprus Limni Resorts and Golfcourses PLC
5. Dong Co.
6. Ercros SA
7. FNG N.V
8. Hoffmann Green Cement Technologiesgut AG
9. Hskcan Corporation
10. Just Eat Takeway
11. Norddeutsche Steingut AG
12. Proximus
13. Service Point Solutions S.A.
14. Sogefi S.P.A
15. Telecom Italia SPA
16. Telekom Austria AG
17. VEF Radiotehnika RRR AS
18. Wolford AG

The following companies were considered outliers and, therefore, removed from the matching sample:

1. Musse Grevin SA
2. Lotto24 AG

Annex C: Yearly Descriptive Statistics

Table 10: Yearly Descriptive Statistics - Principal Sample

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Adv_t	Mean	3.9322	3.5499	3.4952	3.3820	3.4068	3.4732	3.5653	3.5332	3.4943	3.4173	3.4149
	Median	3.8339	3.5398	3.4169	3.3833	3.4241	3.4393	3.5438	3.5056	3.4954	3.3994	3.4205
	Std. Dev	1.1178	1.0739	1.1041	1.1248	1.1323	1.0854	1.0559	1.0271	1.0382	1.0401	1.0382
	Obs	32	184	259	376	385	380	371	375	381	424	443
ΔAdv_t	Mean	-0.0327	-0.0029	0.0386	-0.0095	-0.0298	0.0251	0.0516	0.0252	0.0114	-0.0055	0.0146
	Median	-0.0092	0.0176	0.0249	-0.0008	-0.0100	0.0137	0.0233	0.0164	0.0205	0.0006	0.0167
	Std. Dev	0.1580	0.1173	0.1750	0.2176	0.2715	0.3359	0.2856	0.2172	0.2379	0.3394	0.2158
	Obs	24	32	180	239	339	347	337	339	344	371	406
$Sales_t$	Mean	5.2635	5.2737	5.2812	5.2662	5.2629	5.2322	5.2303	5.2207	5.2238	5.2421	5.2570
	Median	5.1833	5.2383	5.2008	5.1997	5.1942	5.1859	5.2002	5.1855	5.2050	5.2306	5.2462
	Std. Dev	1.0043	1.0449	1.0387	1.0648	1.0402	1.0503	1.0604	1.0407	1.0535	1.0598	1.0888
	Obs	456	462	476	495	506	524	537	556	565	566	555
$\Delta Sales_t$	Mean	-0.0342	0.0322	0.0246	0.0214	0.0025	0.0120	0.0185	0.0231	0.0333	0.0192	0.0036
	Median	-0.0324	0.0305	0.0282	0.0141	0.0030	0.0101	0.0205	0.0165	0.0270	0.0224	0.0168
	Std. Dev	0.1568	0.1539	0.1666	0.1345	0.1591	0.1781	0.2799	0.1314	0.2873	0.1445	0.1593
	Obs	445	453	461	473	494	501	519	532	555	563	553
$Prft_t$	Mean	0.1253	0.1141	0.1360	0.0882	0.1082	0.1173	0.0999	0.1317	0.1204	0.0814	0.0987
	Median	0.1018	0.1219	0.1174	0.1147	0.1141	0.1170	0.1196	0.1282	0.1316	0.1199	0.1312
	Std. Dev	0.4089	0.7045	0.5787	0.3669	0.9990	0.6505	0.4518	0.5995	0.4267	0.5892	0.3881

	Obs	418	430	438	434	435	432	409	422	438	474	491
$\Delta Prft_t$	Mean	0.0373	-0.0030	0.0251	-0.0313	0.0022	0.0238	-0.0058	0.0382	0.0004	-0.0333	0.0124
	Median	-0.0125	0.0119	-0.0008	-0.0020	0.0017	0.0021	0.0008	0.0048	0.0042	-0.0014	0.0023
	Std. Dev	0.4921	0.8353	0.7770	0.6442	1.0180	0.7288	0.3630	0.4749	0.6520	0.6081	0.6088
	Obs	404	413	421	409	400	403	386	390	407	426	454
$Size_t$	Mean	5.0569	5.1014	4.9942	5.0114	5.0989	5.1141	5.1485	5.1891	5.2872	5.1994	5.2565
	Median	4.9363	4.9662	4.8855	4.8573	4.9627	5.0062	5.0929	5.1484	5.2456	5.1652	5.1893
	Std. Dev	0.9623	0.9489	0.9466	0.9580	0.9927	0.9762	0.9695	0.9495	0.9357	0.9330	0.9390
	Obs	427	433	444	445	462	473	500	514	526	548	550
BM_t	Mean	1.0734	0.9042	0.8713	1.1275	1.0839	0.6431	0.7862	0.7121	0.8301	0.3579	0.9574
	Median	0.8850	0.7042	0.6757	0.8475	0.7407	0.6061	0.6645	0.6098	0.5464	0.4651	0.5618
	Std. Dev	1.3162	1.1106	1.0939	3.7168	5.3082	3.1852	2.6562	5.1231	2.7765	7.0448	9.2739
	Obs	426	428	435	448	453	467	476	506	519	539	563
Asset $Growth_t$	Mean	-0.0975	0.0554	0.0960	-0.0089	-0.0102	0.0856	0.1251	0.0890	0.0649	0.0812	0.1665
	Median	-0.0485	0.0441	0.0257	-0.0126	-0.0190	0.0167	0.0235	0.0182	0.0248	0.0301	0.0698
	Std. Dev	1.2120	0.4321	0.6339	0.6401	0.4424	0.6820	0.8118	0.5549	1.1129	0.6299	0.6715
	Obs	415	423	429	426	417	417	396	398	412	432	458
DA_t	Mean	-0.0070	0.0120	0.0096	-0.0243	-0.0020	0.0157	-0.0174	0.0151	0.0020	0.0088	-0.0294
	Median	-0.0205	0.0135	0.0059	-0.0050	-0.0015	0.0037	-0.0048	0.0042	0.0017	0.0005	-0.0169
	Std. Dev	0.2573	0.1984	0.1747	0.1670	0.1866	0.2729	0.2358	0.2258	0.1867	0.1828	0.1408
	Obs	416	425	428	429	437	454	470	486	502	528	536
Raw $Return_t$	Mean	0.0496	0.0597	0.0575	0.0534	0.0663	0.0739	0.0782	0.0792	0.0964	0.1007	0.0996
	Median	0.0075	0.0092	0.0091	0.0083	0.0099	0.0153	0.0113	0.0107	0.0130	0.0130	0.0111
	Std. Dev	0.1736	0.2076	0.1902	0.1912	0.2385	0.2281	0.2953	0.3097	0.3620	0.3961	0.4420

	Obs	430	433	441	450	454	400	478	508	523	541	565

Notes: The year t corresponds to the advertising year. The year (t – 1) corresponds to the year prior to the advertising year. The year (t+1) corresponds to the year following the advertising year. The Adv_t variable corresponds to the log value of advertising expenditures in the advertising year t. The ΔAdv_t is the change of the log value from year (t – 1) to year t. The $Sales_t$ variable corresponds to the log value of the sales revenue in the advertising year t and the variable $\Delta Sales_t$ is its change from (t – 1) to t. The $Prft_t$ variable corresponds to the profit calculated as the ratio between the EBITDA and the book value of assets. The $\Delta Prft_t$ variable is the profit's change from (t – 1) to t. The $Size_t$ variable corresponds to the log value of the market capitalization in the advertising year t. The BM_t variable corresponds to the inverse of the price-to-book value ratio. The Asset $Growth_t$ is the change, in percentage, of the book value of assets between (t – 1) and t. The DA_t variable corresponds to the discretionary accruals in the advertising year t and is calculated following the DeAngelo Model (1986).
Source: Own Elaboration

Table 11: Yearly Descriptive Statistics - Matching Sample

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
$Sales_t$	Mean	5.1824	5.2368	5.2127	5.2071	5.1757	5.1795	5.1818	5.1629	5.1806	5.2231	5.2531
	Median	5.1269	5.1824	5.1720	5.1759	5.1739	5.1739	5.1755	5.2041	5.2046	5.2386	5.2702
	Std. Dev	0.9668	0.9445	1.0228	1.0308	1.0590	1.0314	1.0593	1.0847	1.0837	1.0322	1.0425
	Obs	329	332	351	363	370	378	385	395	397	395	392
$\Delta Sales_t$	Mean	-0.0438	0.0289	0.0377	0.0221	-0.0085	0.0149	0.0071	-0.0092	0.0357	0.0241	0.0235
	Median	-0.0284	0.0274	0.0250	0.0165	-0.0008	0.0088	0.0201	0.0128	0.0238	0.0176	0.0183
	Std. Dev	0.2374	0.1218	0.1284	0.1583	0.1456	0.1853	0.1758	0.3320	0.2685	0.1644	0.1602
	Obs	324	326	332	352	362	368	377	384	391	391	390
$Prft_t$	Mean	0.1581	0.1607	0.0737	0.1520	0.2386	0.1288	0.1275	0.0871	0.0898	0.2856	0.1016
	Median	0.1092	0.1132	0.1135	0.1177	0.1269	0.1290	0.1301	0.1230	0.1312	0.1220	0.1148
	Std. Dev	0.7639	1.0595	0.8679	0.7628	2.0549	0.8916	0.6387	0.4976	0.9909	2.1056	0.8394
	Obs	318	328	335	335	321	319	302	303	308	335	349
$\Delta Prft_t$	Mean	0.0105	-0.0071	-0.0300	0.0894	0.0878	-0.1240	-0.0180	-0.0277	-0.0151	0.2394	-0.1603
	Median	-0.0155	0.0079	0.0014	0.0028	0.0030	-0.0008	0.0045	-0.0020	0.0018	-0.0040	-0.0024
	Std. Dev	0.6085	1.1977	0.7012	1.3867	2.3463	1.7871	1.1005	0.6363	1.0494	2.3627	2.0072
	Obs	309	311	322	314	305	301	289	294	289	303	329
$Size_t$	Mean	5.0875	5.1286	5.0437	5.0737	5.1429	5.1522	5.2159	5.2271	5.3268	5.2202	5.2504
	Median	5.0219	5.0743	4.9822	5.0346	5.1001	5.1166	5.1430	5.1551	5.2952	5.1591	5.1673
	Std. Dev	0.9144	0.9342	0.9328	0.9594	0.9801	0.9696	0.9705	0.9709	0.9465	0.9362	0.9496
	Obs	324	331	335	332	339	356	369	378	392	399	406
BM_t	Mean	1.0851	0.8961	0.9212	1.1215	0.9992	0.9189	0.8678	0.8542	0.5145	0.6020	0.6704
	Median	0.9524	0.7299	0.6494	0.8403	0.6944	0.6309	0.6579	0.6061	0.5291	0.4785	0.6098

	Std. Dev	1.0715	0.9149	1.3380	1.4505	1.6666	1.7074	0.9586	1.3229	5.2303	0.9970	1.8920
	Obs	323	327	334	336	339	344	357	375	384	398	401
Asset Growth$_t$	Mean	0.0183	0.1676	0.0759	0.1225	-0.0037	0.1190	0.0721	0.1407	0.1159	0.0592	0.2027
	Median	-0.0553	0.0412	0.0152	-0.0023	-0.0137	0.0304	0.0450	0.0425	0.0365	0.0289	0.0683
	Std. Dev	0.5384	1.0817	0.7665	1.2994	0.5631	0.7100	0.8404	0.8873	0.6173	0.6370	1.3174
	Obs	320	319	331	323	316	313	297	302	298	312	336
DA$_t$	Mean	-0.0130	0.0121	-0.0084	0.0120	-0.0723	0.0729	0.0023	-0.0081	0.0012	-0.0436	-0.0207
	Median	-0.0140	0.0052	0.0028	0.0003	-0.0055	0.0036	-0.0059	0.0011	0.0019	-0.0020	-0.0145
	Std. Dev	0.1330	0.1536	0.1646	0.1401	1.1416	1.1256	0.2294	0.1787	0.1395	0.8613	0.2358
	Obs	312	313	315	316	322	334	344	350	358	369	378
Raw Return$_t$	Mean	0.0514	0.0614	0.0654	0.0668	0.0835	0.0885	0.1044	0.1090	0.1294	0.1309	0.1270
	Median	0.0106	0.0120	0.0133	0.0122	0.0131	0.0193	0.0163	0.0159	0.0181	0.0171	0.0144
	Std. Dev	0.1902	0.2211	0.2346	0.2500	0.3219	0.2593	0.3845	0.4331	0.5047	0.5439	0.5501
	Obs	325	329	336	339	341	298	358	376	385	399	403

Notes: The year t corresponds to the advertising year. The year (t – 1) corresponds to the year prior to the advertising year. The year (t+1) corresponds to the year following the advertising year. The $Sales_t$ variable corresponds to the log value of the sales revenue in the advertising year t and the variable $\Delta Sales_t$ is its change from (t – 1) to t. The $Prft_t$ variable corresponds to the profit calculated as the ratio between the EBITDA and the book value of assets. The $\Delta Prft_t$ variable is the profit's change from (t – 1) to t. The $Size_t$ variable corresponds to the log value of the market capitalization in the advertising year t. The BM_t variable corresponds to the inverse of the price-to-market value ratio. The Asset $Growth_t$ is the change, in percentage, of the book value of assets between (t – 1) and t. The DA_t variable corresponds to the discretionary accruals in the advertising year t and is calculated following the DeAngelo Model (1986).
Source: Own Elaboration

Annex D: Portfolio Sorts – Full Results

Table 12: Portfolio Sorts - Main Results (principal sample)

	Raw Returns					Adjusted Returns: Size and BM					Adjusted Returns: Size, BM and Momentum				
Panel A: Portfolios are triple-sorted by size, book-to-market ratio and ΔAdvt															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0713	0.0757	0.0787	0.0778	0.0699	-0.0167	-0.0176	-0.0158	-0.0174	-0.0225	-0.0050	-0.0004	0.0010	0.0002	-0.0077
P2	0.0957	0.1096	0.1118	0.1131	0.1105	0.0054	0.0141	0.0155	0.0149	0.0133	-0.0059	-0.0011	0.0005	0.0001	0.0048
P3	0.1335	0.1380	0.1408	0.1405	0.1582	0.0241	0.0266	0.0289	0.0262	0.0456	0.0105	0.0082	0.0098	0.0094	0.0167
P4	0.0994	0.0892	0.0923	0.0930	0.0844	0.0054	-0.0078	-0.0059	-0.0044	-0.0161	0.0104	0.0013	0.0027	0.0025	0.0018
P5	0.0999	0.1079	0.1086	0.1110	0.1147	0.0128	0.0215	0.0214	0.0225	0.0251	0.0073	0.0029	0.0024	0.0028	0.0015
P5-P1	0.0286	0.0322	0.0299	0.0332	0.0448	0.0295	0.0391	0.0372	0.0399	0.0475	0.0123	0.0033	0.0014	0.0026	0.0092
P-value	0.1401	0.1695	0.2173	0.1694	0.0720*	0.1098	0.0737	0.1017	0.0777*	0.0385**	0.3414	0.8326	0.9319	0.8702	0.5669
Panel B: Portfolios are triple-sorted by sales, book-to-market ratio and ΔAdvt															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0693	0.0732	0.0744	0.0748	0.0662	-0.0064	-0.0065	-0.0063	-0.0067	-0.0129	-0.0019	0.0033	0.0039	0.0034	-0.0034
P2	0.0788	0.0844	0.0863	0.0861	0.0881	-0.0161	-0.0131	-0.0125	-0.0135	-0.0061	-0.0156	-0.0148	-0.0146	-0.0145	-0.0092
P3	0.1703	0.1755	0.1819	0.1818	0.1887	0.0627	0.0621	0.0686	0.0660	0.0692	0.0279	0.0262	0.0306	0.0296	0.0366
P4	0.0905	0.0843	0.0857	0.0872	0.0959	-0.0180	-0.0246	-0.0239	-0.0233	-0.0160	0.0066	-0.0028	-0.0018	-0.0019	0.0012
P5	0.0885	0.1011	0.1018	0.1034	0.0970	0.0072	0.0176	0.0167	0.0183	0.0108	-0.0009	-0.0019	-0.0030	-0.0023	-0.0092
P5-P1	0.0192	0.0280	0.0274	0.0286	0.0308	0.0137	0.0240	0.0230	0.0250	0.0237	0.0011	-0.0052	-0.0069	-0.0058	-0.0058
P-value	0.3086	0.2371	0.2629	0.2416	0.1370	0.4419	0.2783	0.3160	0.2749	0.2200	0.9312	0.7313	0.6660	0.7157	0.6735

Notes: The sample period covers 2009-2019. To create the adjusted returns, the stocks are classified in 5x5 or 5x5x5 portfolios according to their size and book-to-market ratio or their size, BM and momentum, respectively. The adjusted return corresponds to the difference between the stock return and the mean return of the corresponding portfolio. Both returns and adjusted returns are constructed for five event windows: t stands for the advertising year; month 1 to the first month following the advertising year and following. In Panel A, the portfolios are created according to the size, book-to-market ratio and the log change of advertising expenses (ΔAdv_t). The stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided into 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided into more 5 sub quintiles according to the log change in advertising. Finally, the 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but to different size and BM quintiles. In the table are reported the mean portfolio returns and the difference between the returns of the extreme portfolios (P5 – P1). The p-value presented is calculated based on the t-statistic for heteroscedastic standard errors. *, **, and *** provide the statistical significance of the results at 10%, 5% and 1% significance level, respectively. Panel B is constructed following the same procedure, but considering the variables sales, book-to-market ratio and the log change of advertising expenses.

Source: Own Elaboration

Table 13: Portfolio Sorts - Matching Sample Results

	Raw Returns					Adjusted Returns: Size and BM					Adjusted Returns: Size, BM and Momentum				
Panel A: Portfolios are triple-sorted by size, book-to-market ratio and ΔAdvt															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.0750	0.0797	0.0794	0.0813	0.0829	-0.0305	-0.0283	-0.0295	-0.0276	-0.0234	0.0045	-0.0001	0.0000	-0.0004	0.0022
P2	0.1595	0.1646	0.1647	0.1668	0.1703	0.0305	0.0277	0.0286	0.0287	0.0285	0.0257	0.0298	0.0268	0.0289	0.0378
P3	0.1566	0.1589	0.1655	0.1637	0.1679	0.0277	0.0264	0.0316	0.0278	0.0318	-0.0023	-0.0142	-0.0068	-0.0102	-0.0277
P4	0.1105	0.1205	0.1167	0.1186	0.1190	-0.0169	-0.0055	-0.0121	-0.0088	-0.0175	0.0027	0.0077	0.0027	0.0095	0.0026
P5	0.0701	0.0728	0.0752	0.0754	0.0770	-0.0438	-0.0456	-0.0450	-0.0418	-0.0455	-0.0336	-0.0303	-0.0299	-0.0300	-0.0187
P5-P1	-0.0050	-0.0069	-0.0041	-0.0059	-0.0059	-0.0133	-0.0172	-0.0154	-0.0142	-0.0221	-0.0381	-0.0302	-0.0299	-0.0296	-0.0208
P-value	0.7934	0.7727	0.8712	0.8155	0.8286	0.4810	0.4662	0.5373	0.5705	0.4085	0.0155*****	0.1184	0.1230	0.1374	0.3382
Panel B: Portfolios are triple-sorted by sales, book-to-market ratio and ΔAdvt															
	Year t	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**	**Year t**	**[1, 6]**	**[7, 12]**	**[1, 12]**	**[7, 18]**
P1	0.1049	0.1029	0.1057	0.1066	0.1117	-0.0044	-0.0115	-0.0098	-0.0087	-0.0030	0.0144	0.0014	0.0024	0.0019	0.0008
P2	0.1290	0.1403	0.1369	0.1414	0.1402	0.0139	0.0172	0.0139	0.0154	0.0141	0.0162	0.0224	0.0200	0.0218	0.0360
P3	0.1124	0.1309	0.1376	0.1348	0.1395	-0.0252	-0.0105	-0.0052	-0.0077	-0.0091	-0.0216	-0.0226	-0.0187	-0.0163	-0.0269
P4	0.1588	0.1514	0.1519	0.1532	0.1543	0.0150	0.0217	0.0205	0.0232	0.0186	0.0043	0.0004	-0.0007	0.0005	-0.0112
P5	0.0708	0.0730	0.0720	0.0726	0.0742	-0.0343	-0.0393	-0.0427	-0.0407	-0.0433	-0.0139	-0.0078	-0.0095	-0.0087	-0.0027
P5-P1	-0.0341	-0.0299	-0.0337	-0.0341	-0.0375	-0.0299	-0.0277	-0.0329	-0.0320	-0.0402	-0.0283	-0.0092	-0.0119	-0.0106	-0.0035
P-value	0.1704	0.2752	0.2312	0.2242	0.2110	0.1828	0.2884	0.2216	0.2303	0.1600	0.0591*****	0.5725	0.4566	0.5185	0.8466

Notes: The sample period covers 2009-2019 and includes the matching companies that do not report their advertising expenses to the database. The matching sample is constructed keeping into account the industry, the size and the book-to-market ratio of each company in 2019. To create the adjusted returns, the stocks are classified in 5x5 or 5x5x5 portfolios according to their size and book-to-market or their size, BM and momentum, respectively. The adjusted return corresponds to the difference between the stock return and the mean return of the corresponding portfolio. Both returns and adjusted returns are constructed for five event windows: t stands for the advertising year; month 1 to the first month following the advertising year and following. In Panel A, the portfolios are created according to the size, book-to-market ratio and the log change of advertising expenses (ΔAdv_t). The stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided into 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided into more 5 sub quintiles according to the log change in advertising. Finally, the 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but to different size and BM quintiles. In the table are reported the mean portfolio returns and the difference between the returns of the extreme portfolios (P5 – P1). The p-value presented is calculated based on the t-statistic for heteroscedastic standard errors. *, **, and *** provide the statistical significance of the results at 10%, 5% and 1% significance level, respectively. Panel B is constructed following the same procedure, but considering the variables sales, book-to-market ratio and the log change of advertising expenses.
Source: Own Elaboration

Table 14: Portfolio Sorts - Variability of Advertising Expenses' Results

	Raw Returns					Adjusted Returns: Size and BM					Adjusted Returns: Size, BM and Momentum				
Panel A: Portfolios are triple-sorted by size, book-to-market ratio and ΔAdvt															
	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]
P1	0.0369	0.0325	0.0330	0.0333	0.0298	-0.0141	-0.0228	-0.0234	-0.0227	-0.0253	-0.0159	-0.0176	-0.0171	-0.0175	-0.0187
P2	0.1073	0.1202	0.1264	0.1243	0.1130	-0.0152	-0.0074	-0.0032	-0.0068	-0.0127	0.0060	0.0169	0.0194	0.0183	0.0042
P3	0.0603	0.0589	0.0560	0.0580	0.0571	-0.0036	-0.0085	-0.0115	-0.0106	-0.0146	-0.0127	-0.0085	-0.0112	-0.0091	-0.0115
P4	0.1294	0.1556	0.1625	0.1627	0.1576	0.0141	0.0321	0.0368	0.0348	0.0335	-0.0030	0.0002	0.0041	0.0016	0.0106
P5	0.1338	0.1344	0.1379	0.1375	0.1540	0.0364	0.0369	0.0412	0.0372	0.0574	0.0115	0.0077	0.0109	0.0093	0.0227
P6	0.1252	0.1377	0.1409	0.1398	0.1584	0.0033	0.0088	0.0105	0.0085	0.0257	0.0120	0.0133	0.0145	0.0151	0.0166
P7	0.2019	0.1823	0.1891	0.1889	0.1697	0.0946	0.0753	0.0836	0.0798	0.0635	0.0481	0.0336	0.0393	0.0371	0.0352
P8	0.0692	0.0842	0.0862	0.0870	0.0983	-0.0263	-0.0191	-0.0205	-0.0152	-0.0168	-0.0153	-0.0192	-0.0190	-0.0187	-0.0206
P9	0.0731	0.0685	0.0670	0.0715	0.0662	-0.0268	-0.0273	-0.0275	-0.0266	-0.0229	-0.0010	-0.0105	-0.0138	-0.0127	-0.0101
P10	0.0509	0.0584	0.0589	0.0597	0.0640	-0.0070	0.0020	-0.0015	0.0016	-0.0016	0.0025	0.0047	0.0041	0.0054	0.0033
P10-P1	0.0140	0.0258	0.0259	0.0264	0.0342	0.0071	0.0249	0.0218	0.0243	0.0237	0.0184	0.0224	0.0212	0.0230	0.0219
P-value	0.2613	0.0972*****	0.0979*****	0.0974*****	0.0660*****	0.5704	0.0967*****	0.1567	0.1147	0.1895	0.0898*****	0.0897*****	0.1090	0.0858*****	0.1773
Panel B: Portfolios are triple-sorted by sales, book-to-market ratio and ΔAdvt															
	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]	Year t	[1, 6]	[7, 12]	[1, 12]	[7, 18]
P1	0.0386	0.0297	0.0304	0.0309	0.0275	-0.0124	-0.0224	-0.0232	-0.0228	-0.0242	-0.0137	-0.0161	-0.0153	-0.0160	-0.0155
P2	0.0948	0.1082	0.1098	0.1109	0.0944	-0.0022	0.0047	0.0056	0.0050	-0.0076	0.0139	0.0261	0.0265	0.0267	0.0131
P3	0.0661	0.0681	0.0692	0.0686	0.0725	-0.0173	-0.0192	-0.0183	-0.0204	-0.0174	-0.0202	-0.0161	-0.0160	-0.0165	-0.0222
P4	0.0934	0.1096	0.1130	0.1123	0.1154	-0.0115	-0.0014	-0.0005	-0.0009	0.0130	-0.0195	-0.0201	-0.0198	-0.0193	-0.0042
P5	0.1711	0.1820	0.1883	0.1887	0.1983	0.0576	0.0658	0.0728	0.0683	0.0764	0.0237	0.0248	0.0300	0.0280	0.0371
P6	0.1649	0.1587	0.1642	0.1640	0.1650	0.0609	0.0495	0.0540	0.0531	0.0489	0.0352	0.0282	0.0317	0.0318	0.0370
P7	0.1329	0.1247	0.1275	0.1273	0.1458	0.0124	0.0023	0.0059	0.0018	0.0282	0.0201	0.0098	0.0115	0.0101	0.0190
P8	0.0750	0.0777	0.0797	0.0813	0.0916	-0.0224	-0.0204	-0.0215	-0.0164	-0.0188	-0.0060	-0.0158	-0.0161	-0.0157	-0.0178
P9	0.0935	0.1052	0.1059	0.1092	0.0826	-0.0059	0.0018	0.0037	0.0042	-0.0161	-0.0061	-0.0087	-0.0098	-0.0090	-0.0219

P10	0.0510	0.0587	0.0594	0.0601	0.0640	-0.0070	0.0019	-0.0015	0.0016	-0.0016	0.0025	0.0048	0.0042	0.0055	0.0033
P10-P1	0.0124	0.0290	0.0290	0.0292	0.0365	0.0053	0.0243	0.0217	0.0244	0.0226	0.0163	0.0208	0.0195	0.0215	0.0188
P-value	0.3998	0.0812*****	0.0796*****	0.0847*****	0.0626*****	0.6825	0.1010	0.1534	0.1081	0.2034	0.1362	0.1159	0.1431	0.1102	0.2509

Notes: The sample period covers 2009-2019. To create the adjusted returns, the stocks are classified in 5x5 or 5x5x5 portfolios according to their size and book-to-market or their size, BM and momentum, respectively. The adjusted return corresponds to the difference between the stock return and the mean return of the corresponding portfolio. Both returns and adjusted returns are constructed for five event windows: t stands for the advertising year; month 1 to the first month following the advertising year and following. In Panel A, the portfolios are created according to the size, book-to-market ratio (BM) and the log change of advertising expenses (ΔAdv_t). The stocks are first classified into 5 quintiles according to their size. Next, each quintile is further divided into 5 sub quintiles according to the book-to-market ratio. The 25 quintiles obtained are divided into more 5 sub quintiles according to the log change in advertising. The 125 portfolios are grouped into 5 portfolios by grouping the portfolios that belong to the same ΔAdv_t quintile but to different size and BM quintiles. Then, each one of the 5 portfolios is separated in two according to the ΔAdv_t. In the table are reported the mean portfolio returns and the difference between the returns of portfolios P1 and P10 (P10 – P1). The p-value presented is calculated based on the t-statistic for heteroscedastic standard errors. *, **, and *** provide the statistical significance of the results at 10%, 5% and 1% significance level, respectively. Panel B is constructed following the same procedure, but considering the variables sales, book-to-market ratio and the log change of advertising expenses.
Source: Own Elaboration

Annex E: Panel Regressions – Full Results

Table 15: Panel Regressions - Main Results (principal sample)

Variables	Raw Return$_t$		Raw Return [1, 6] months		Raw Return [7, 12] months		Raw Return [1,12] months		Raw Return [7, 18] months	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-0.4298 [0.0013]***	-0.4795 [0.0028]***	-0.0874 [0.0116]**	-0.1139 [0.0108]**	-0.0098 [0.7888]	-0.0259 [0.5854]	-0.0552 [0.1094]	-0.0817 [0.0713]*	-0.0235 [0.6704]	-0.0391 [0.5622]
ΔAdv$_t$	-0.0119 [0.2178]	-0.0192 [0.1172]	-0.0121 [0.3002]	-0.0181 [0.2409]	-0.0157 [0.3674]	-0.0228 [0.3221]	-0.0137 [0.3459]	-0.0203 [0.2937]	-0.0258 [0.2970]	-0.0368 [0.2660]
Size$_{t-1}$	0.1000 [0.0001]***	0.1097 [0.0002]***								
BM$_{t-1}$	0.0040 [0.3644]	0.0055 [0.3282]								
Size$_t$			0.0177 [0.0066]***	0.0225 [0.0062]***	0.0021 [0.7631]	0.0051 [0.5649]	0.0109 [0.0991]*	0.0157 [0.0588]*	0.0079 [0.4747]	0.0110 [0.4024]
BM$_t$			0.0048 [0.0998]*	0.0057 [0.1447]	0.0071 [0.0513]*	0.0083 [0.0901]*	0.0067 [0.0604]*	0.0079 [0.1040]	0.0067 [0.1173]	0.0076 [0.1555]
Raw Return$_t$			1.0003 [0.0000]***	0.9984 [0.0000]***	1.0763 [0.0000]***	1.0760 [0.0000]***	1.0437 [0.0000]***	1.0421 [0.0000]***	0.9641 [0.0000]***	0.9586 [0.0000]***
ΔSale$_t$		-0.0198 [0.3061]		-0.0128 [0.0502]		-0.0038 [0.7574]		-0.0097 [0.2684]		-0.0070 [0.4787]
ΔPrft$_t$		0.0016 [0.3729]		-0.0004 [0.6032]		-0.0005 [0.5610]		-0.0005 [0.4856]		-0.0007 [0.5622]
Observations	2621	2349	2311	2063	2311	2063	2267	2024	1964	1749

Notes: The sample covers the period 2009-2019 and is composed by companies that report their advertising expenses to the database. The dependent variable is the Raw Return. This variable was measured in five different periods – the contemporaneous advertising year (t) and four ex-post event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months following the contemporaneous advertising year. The ΔAdv$_t$ corresponds to log change of advertising expenses from year (t – 1) to year t. The Size variable corresponds to the log value of the market capitalization. The BM variable corresponds to the inverse of the price-to-book value ratio. The ΔSale$_t$ variable corresponds to the change of sales' log value from year (t – 1) to year t and the ΔPrft$_t$ to the change in the ratio EBITDA/book value of assets in the same period. The coefficients are obtained by running a panel regression with fixed effects and clustered standard errors. The p-value correspondents are provided in brackets. *, **, *** indicate the significance of the coefficients at 10%, 5% and 1% significance levels by using a t-test.
Source: Own Elaboration

Table 16: Panel Regressions - Matching Sample

Variables	Raw Return [1, 6] months		Raw Return [7, 12] months		Raw Return [1,12] months		Raw Return [7, 18] months	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.1817 [0.0050]***	-0.2364 [0.0168]**	-0.1765 [0.0565]*	-0.2485 [0.0861]*	-0.1689 [0.0307]*	-0.2361 [0.0541]*	-0.1828 [0.0636]*	-0.2676 [0.0741]*
ΔAdv_t	0.0037 [0.0781]*	0.0054 [0.0963]*	0.0026 [0.2976]	0.0037 [0.3023]	0.0030 [0.2000]	0.0043 [0.2207]	-0.0009 [0.7117]	-0.0038 [0.2862]
$Size_t$	0.0417 [0.0014]***	0.0506 [0.0079]***	0.0455 [0.0230]**	0.0581 [0.0497]**	0.0417 [0.0104]**	0.0535 [0.0277]**	0.0529 [0.0116]**	0.0688 [0.0250]**
BM_t	0.0035 [0.0469]**	0.0071 [0.0613]*	0.0038 [0.0965]*	0.0099 [0.0952]*	0.0033 [0.0707]*	0.0079 [0.0865]*	0.0025 [0.2753]	0.0059 [0.3883]
Raw $Return_t$	0.7145 [0.0000]***	0.7218 [0.0000]***	0.5071 [0.0016]***	0.5108 [0.0023]***	0.6076 [0.0000]***	0.6099 [0.0000]***	0.2563 [0.2116]	0.2588 [0.2269]
$\Delta Sale_t$		0.0063 [0.4127]		0.0168 [0.2344]		0.0101 [0.2659]		0.0094 [0.5313]
$\Delta Prft_t$		0.0000 [0.9642]		0.0003 [0.6180]		0.0001 [0.8709]		0.0018 [0.3653]
Observations	1593	1295	1594	1296	1570	1273	1336	1094

Notes: The sample covers the matching sample in the period 2009-2019. The matching sample was constructed based on the companies that do not report their advertising expenses to the database and according to their industry, size and book-to-market ratio. The dependent variable is the Raw Return. This variable was measured in four ex-post event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months following the contemporaneous advertising year. The ΔAdv_t corresponds to log change of the advertising expenses from year (t – 1) to year t. The Size variable corresponds to the log value of the market capitalization. The BM variable corresponds to the inverse of the price-to-book value ratio. The $\Delta Sale_t$ variable corresponds to the change of sales' log value from year (t – 1) to year t and the $\Delta Prft_t$ to the change in the ratio EBITDA/book value of assets in the same period. The coefficients are obtained by running a panel regression with fixed effects and clustered standard errors. The p-value correspondents are provided in brackets. *, **, *** indicate the significance of the coefficients at 10%, 5% and 1% significance levels by using a t-test.
Source: Own Elaboration

Table 17: Panel Regressions - Other variables results (principal sample)

Variables	Raw Return [1, 6] months			Raw Return [7, 12] months			Raw Return [1,12] months			Raw Return [7, 18] months		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.1101	-0.0990	-0.0964	-0.0202	0.0002	0.0045	-0.0767	-0.0605	-0.0569	-0.0344	-0.0081	-0.0053
	[0.0104]**	[0.0080]***	[0.0082]***	[0.6576]	[0.9941]	[0.8852]	[0.0757]*	[0.0599]*	[0.0668]*	[0.6009]	[0.8780]	[0.9185]
ΔAdv_t	-0.0184	-0.0027	-0.0028	-0.0232	0.0011	0.0009	-0.0206	-0.0005	-0.0007	-0.0374	-0.0005	-0.0008
	[0.2389]	[0.4506]	[0.4253]	[0.3169]	[0.8207]	[0.8586]	[0.2895]	[0.8976]	[0.8623]	[0.2618]	[0.9527]	[0.9283]
$Size_t$	0.0218	0.0199	0.0194	0.0040	0.0005	-0.0003	0.0148	0.0120	0.0113	0.0101	0.0054	0.0048
	[0.0058]***	[0.0044]***	[0.0044]***	[0.6354]	[0.9359]	[0.9631]	[0.0620]**	[0.0517]**	[0.0564]**	[0.4299]	[0.6148]	[0.6435]
BM_t	0.0057	0.0045	0.0045	0.0082	0.0065	0.0064	0.0079	0.0063	0.0063	0.0075	0.0057	0.0056
	[0.1440]	[0.1059]	[0.1058]	[0.0894]*	[0.0485]**	[0.0481]**	[0.1035]	[0.0622]*	[0.0620]*	[0.1550]	[0.0958]*	[0.0960]*
Raw $Return_t$	0.9986	0.9986	0.9988	1.0763	1.0764	1.0766	1.0423	1.0424	1.0426	0.9589	0.9714	0.9716
	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***	[0.0000]***
$VarSale_t$	-0.0134	-0.0130	-0.0131	-0.0048	-0.0013	-0.0016	-0.0105	-0.0084	-0.0087	-0.0080	-0.0033	-0.0034
	[0.0433]**	[0.0232]**	[0.0217]**	[0.6973]	[0.9205]	[0.9025]	[0.2307]	[0.3280]	[0.3128]	[0.4150]	[0.7309]	[0.7178]
$VarPrft_t$	-0.0001	-0.0001	0.0001	0.0000	0.0000	0.0004	-0.0001	-0.0002	0.0001	-0.0001	-0.0001	0.0003
	[0.9381]	[0.8897]	[0.8570]	[0.9983]	[0.9988]	[0.6772]	[0.8879]	[0.7924]	[0.8772]	[0.9324]	[0.9215]	[0.8077]
Asset $Growth_t$	0.0020		0.0014	0.0030		0.0022	0.0027		0.0019	0.0034		0.0020
	[0.2422]		[0.2315]	[0.1444]		[0.2092]	[0.1671]		[0.1864]	[0.1532]		[0.2803]
Discretionary $Accrual_t$		-0.0122	-0.0125		-0.0200	-0.0205		-0.0142	-0.0146		-0.0172	-0.0179
		[0.3978]	[0.3889]		[0.2932]	[0.2887]		[0.4420]	[0.4345]		[0.3720]	[0.3647]
Observations	2063	2020	2020	2063	2020	2020	2024	1982	1982	1749	1712	1712

Notes: The sample covers the period 2009-2019 and is composed by companies that report their advertising expenses to the database. The dependent variable is the Raw Return. This variable was measured in four ex-post event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months – following the contemporaneous advertising year. The ΔAdv_t corresponds to log change of the advertising expenses from year (t – 1) to year t. The Size variable corresponds to the log value of the market capitalization. The BM variable corresponds to the inverse of the price-to-book value ratio. The $\Delta Sale_t$ variable corresponds to the change of sales' log value from year (t – 1) to year t and the $\Delta Prft_t$ to the change in the ratio EBITDA/book value of assets in the same period. The Asset $Growth_t$ variable is the change, in percentage, of the book value of assets between year (t – 1) and year t. The Discretionary $Accrual_t$ variable is calculated following the DeAngelo (1986) Model. The coefficients are obtained by running a panel regression with fixed effects and clustered standard errors. The p-value correspondents are provided in brackets. *, **, *** indicate the significance of the coefficients at 10%, 5% and 1% significance levels by using a two-tailed t-test.
Source: Own Elaboration

Annex F: Output Eviews – Panel Regressions

G.1. Main Results – Principal Sample with dependent variable $Return_t$

Dependent Variable: RETURN
Method: Panel Least Squares
Date: 03/26/21 Time: 09:40
Sample: 2009 2019
Periods included: 11
Cross-sections included: 483
Total panel (unbalanced) observations: 2621
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.429794	0.133207	-3.226511	0.0013
VARADV	-0.011925	0.009673	-1.232889	0.2178
SIZE	0.100021	0.024947	4.009274	0.0001
BM	0.003986	0.004394	0.907195	0.3644

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.854676	Mean dependent var	0.103381
Adjusted R-squared	0.820824	S.D. dependent var	0.375100
S.E. of regression	0.158777	Akaike info criterion	-0.673940
Sum squared resid	53.57125	Schwarz criterion	0.437151
Log likelihood	1379.198	Hannan-Quinn criter.	-0.271529
F-statistic	25.24751	Durbin-Watson stat	0.365909
Prob(F-statistic)	0.000000		

Dependent Variable: RETURN
Method: Panel Least Squares
Date: 03/26/21 Time: 09:41
Sample: 2009 2019
Periods included: 11
Cross-sections included: 465
Total panel (unbalanced) observations: 2349
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.479516	0.160100	-2.995103	0.0028
VARADV	-0.019166	0.012227	-1.567519	0.1172
SIZE	0.109677	0.029668	3.696758	0.0002
BM	0.005490	0.005614	0.977989	0.3282
VARSALES	-0.019775	0.019319	-1.023635	0.3061
VARPRFT	0.001593	0.001787	0.891180	0.3729

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.857149	Mean dependent var	0.110828
Adjusted R-squared	0.820538	S.D. dependent var	0.394364
S.E. of regression	0.167064	Akaike info criterion	-0.560780
Sum squared resid	52.16458	Schwarz criterion	0.616588
Log likelihood	1138.636	Hannan-Quinn criter.	-0.131985
F-statistic	23.41247	Durbin-Watson stat	0.381383
Prob(F-statistic)	0.000000		

G.2. Main Results – Principal Sample with dependent variable $Return_{t+1}$

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/26/21 Time: 09:45
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 468
Total panel (unbalanced) observations: 2311
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.087412	0.034596	-2.526622	0.0116
VARADV	-0.012143	0.011718	-1.036285	0.3002
SIZE	0.017658	0.006497	2.717965	0.0066
BM	0.004773	0.002899	1.646515	0.0998
RETURN	1.000326	0.024304	41.15957	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.981797	Mean dependent var	0.108437
Adjusted R-squared	0.977023	S.D. dependent var	0.389041
S.E. of regression	0.058972	Akaike info criterion	-2.640617
Sum squared resid	6.364092	Schwarz criterion	-1.444791
Log likelihood	3532.233	Hannan-Quinn criter.	-2.204739
F-statistic	205.6352	Durbin-Watson stat	3.043019
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/26/21 Time: 09:47
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 445
Total panel (unbalanced) observations: 2063
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.113861	0.044631	-2.551160	0.0108
VARADV	-0.018130	0.015452	-1.173284	0.2409
SIZE	0.022493	0.008202	2.742197	0.0062
BM	0.005689	0.003899	1.459181	0.1447
RETURN	0.998408	0.025339	39.40223	0.0000
VARSALES	-0.012778	0.006520	-1.959662	0.0502
VARPRFT	-0.000394	0.000759	-0.519952	0.6032

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.981987	Mean dependent var	0.116130
Adjusted R-squared	0.976829	S.D. dependent var	0.409370
S.E. of regression	0.062314	Akaike info criterion	-2.519592
Sum squared resid	6.224513	Schwarz criterion	-1.263808
Log likelihood	3058.959	Hannan-Quinn criter.	-2.059218
F-statistic	190.3894	Durbin-Watson stat	3.108017
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/26/21 Time: 09:49
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 468
Total panel (unbalanced) observations: 2311
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.009780	0.036498	-0.267966	0.7888
VARADV	-0.015737	0.017382	-0.905356	0.3654
SIZE	0.002146	0.007119	0.301399	0.7631
BM	0.007100	0.003640	1.950404	0.0513
RETURN	1.076335	0.062363	17.25930	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976003	Mean dependent var	0.112807
Adjusted R-squared	0.969709	S.D. dependent var	0.413820
S.E. of regression	0.072023	Akaike info criterion	-2.240763
Sum squared resid	9.492723	Schwarz criterion	-1.044937
Log likelihood	3070.202	Hannan-Quinn criter.	-1.804885
F-statistic	155.0615	Durbin-Watson stat	2.388672
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/26/21 Time: 09:50
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 445
Total panel (unbalanced) observations: 2063
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.025887	0.047447	-0.545600	0.5854
VARADV	-0.022807	0.023025	-0.990528	0.3221
SIZE	0.005088	0.008837	0.575764	0.5649
BM	0.008251	0.004865	1.695990	0.0901
RETURN	1.076022	0.064107	16.78487	0.0000
VARSALES	-0.003790	0.012269	-0.308922	0.7574
VARPRFT	-0.000495	0.000852	-0.581492	0.5610

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976397	Mean dependent var	0.120889
Adjusted R-squared	0.969638	S.D. dependent var	0.435636
S.E. of regression	0.075908	Akaike info criterion	-2.124932
Sum squared resid	9.236422	Schwarz criterion	-0.869149
Log likelihood	2651.868	Hannan-Quinn criter.	-1.664558
F-statistic	144.4705	Durbin-Watson stat	2.432433
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/26/21 Time: 09:52
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 466
Total panel (unbalanced) observations: 2267
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.055186	0.034454	-1.601714	0.1094
VARADV	-0.013709	0.014541	-0.942763	0.3459
SIZE	0.010871	0.006588	1.650080	0.0991
BM	0.006725	0.003579	1.879247	0.0604
RETURN	1.043714	0.044654	23.37322	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976679	Mean dependent var	0.111671
Adjusted R-squared	0.970445	S.D. dependent var	0.401441
S.E. of regression	0.069014	Akaike info criterion	-2.323781
Sum squared resid	8.516191	Schwarz criterion	-1.113876
Log likelihood	3113.006	Hannan-Quinn criter.	-1.882341
F-statistic	156.6572	Durbin-Watson stat	2.887767
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/26/21 Time: 09:57
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 442
Total panel (unbalanced) observations: 2024
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.081680	0.045253	-1.804951	0.0713
VARADV	-0.020266	0.019295	-1.050316	0.2937
SIZE	0.015696	0.008301	1.890893	0.0588
BM	0.007908	0.004862	1.626583	0.1040
RETURN	1.042053	0.046394	22.46081	0.0000
VARSALES	-0.009690	0.008753	-1.107065	0.2684
VARPRFT	-0.000534	0.000766	-0.697532	0.4856

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976920	Mean dependent var	0.119588
Adjusted R-squared	0.970203	S.D. dependent var	0.422544
S.E. of regression	0.072938	Akaike info criterion	-2.202743
Sum squared resid	8.336383	Schwarz criterion	-0.935419
Log likelihood	2686.176	Hannan-Quinn criter.	-1.737689
F-statistic	145.4536	Durbin-Watson stat	2.945630
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/26/21 Time: 09:59
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 445
Total panel (unbalanced) observations: 1964
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.023543	0.055306	-0.425694	0.6704
VARADV	-0.025764	0.024694	-1.043318	0.2970
SIZE	0.007912	0.011067	0.714974	0.4747
BM	0.006673	0.004258	1.567260	0.1173
RETURN	0.964095	0.074424	12.95414	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.974051	Mean dependent var	0.114571
Adjusted R-squared	0.966199	S.D. dependent var	0.402739
S.E. of regression	0.074043	Akaike info criterion	-2.167819
Sum squared resid	8.261989	Schwarz criterion	-0.868781
Log likelihood	2585.799	Hannan-Quinn criter.	-1.690401
F-statistic	124.0544	Durbin-Watson stat	2.054482
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/26/21 Time: 10:01
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 421
Total panel (unbalanced) observations: 1749
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.039133	0.067504	-0.579709	0.5622
VARADV	-0.036782	0.033056	-1.112747	0.2660
SIZE	0.011041	0.013181	0.837643	0.4024
BM	0.007615	0.005358	1.421254	0.1555
RETURN	0.958617	0.078200	12.25857	0.0000
VARSALES	-0.006954	0.009814	-0.708610	0.4787
VARPRFT	-0.000671	0.001157	-0.579774	0.5622

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.974675	Mean dependent var	0.122351
Adjusted R-squared	0.966311	S.D. dependent var	0.424007
S.E. of regression	0.077825	Akaike info criterion	-2.057244
Sum squared resid	7.958588	Schwarz criterion	-0.697577
Log likelihood	2234.060	Hannan-Quinn criter.	-1.554610
F-statistic	116.5245	Durbin-Watson stat	2.080355
Prob(F-statistic)	0.000000		

G.3. Robustness Tests results – Matching Sample with dependent variable $Return_{t+1}$

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/29/21 Time: 10:49
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 331
Total panel (unbalanced) observations: 1593
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.183174	0.065143	-2.811871	0.0050
VARADV	0.003670	0.002082	1.763024	0.0781
SIZE	0.041733	0.013027	3.203459	0.0014
BM	0.003475	0.001747	1.989048	0.0469
RETURN	0.714450	0.067422	10.59663	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.982578	Mean dependent var	0.124438
Adjusted R-squared	0.977793	S.D. dependent var	0.481926
S.E. of regression	0.071816	Akaike info criterion	-2.240794
Sum squared resid	6.441834	Schwarz criterion	-1.080442
Log likelihood	2128.793	Hannan-Quinn criter.	-1.809822
F-statistic	205.3668	Durbin-Watson stat	1.954187
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/29/21 Time: 10:50
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 293
Total panel (unbalanced) observations: 1295
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.236367	0.098708	-2.394618	0.0168
VARADV	0.005446	0.003272	1.664607	0.0963
SIZE	0.050623	0.019024	2.661060	0.0079
BM	0.007096	0.003789	1.873127	0.0613
RETURN	0.721837	0.071336	10.11876	0.0000
VARSALES	0.006338	0.007735	0.819475	0.4127
VARPRFT	4.85E-05	0.001082	0.044861	0.9642

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.982998	Mean dependent var	0.140798
Adjusted R-squared	0.977710	S.D. dependent var	0.528120
S.E. of regression	0.078848	Akaike info criterion	-2.038509
Sum squared resid	6.136189	Schwarz criterion	-0.809776
Log likelihood	1627.935	Hannan-Quinn criter.	-1.577397
F-statistic	185.8800	Durbin-Watson stat	2.028627
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/29/21 Time: 10:51
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 331
Total panel (unbalanced) observations: 1594
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.176519	0.092487	-1.908583	0.0565
VARADV	0.002610	0.002505	1.042079	0.2976
SIZE	0.045493	0.019990	2.275854	0.0230
BM	0.003827	0.002301	1.663228	0.0965
RETURN	0.507113	0.160716	3.155337	0.0016

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976435	Mean dependent var	0.127645
Adjusted R-squared	0.969969	S.D. dependent var	0.494880
S.E. of regression	0.085760	Akaike info criterion	-1.886014
Sum squared resid	9.193457	Schwarz criterion	-0.726255
Log likelihood	1847.153	Hannan-Quinn criter.	-1.455276
F-statistic	151.0068	Durbin-Watson stat	1.679655
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/29/21 Time: 10:58
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 293
Total panel (unbalanced) observations: 1296
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.248548	0.144657	-1.718184	0.0861
VARADV	0.003739	0.003623	1.032085	0.3023
SIZE	0.058096	0.029563	1.965135	0.0497
BM	0.009918	0.005939	1.669974	0.0952
RETURN	0.510832	0.166976	3.059321	0.0023
VARSALES	0.016764	0.014089	1.189860	0.2344
VARPRFT	0.000284	0.000570	0.498804	0.6180

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976648	Mean dependent var	0.144516
Adjusted R-squared	0.969391	S.D. dependent var	0.542769
S.E. of regression	0.094959	Akaike info criterion	-1.666788
Sum squared resid	8.909016	Schwarz criterion	-0.438820
Log likelihood	1388.079	Hannan-Quinn criter.	-1.205980
F-statistic	134.5943	Durbin-Watson stat	1.725561
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 04/11/21 Time: 15:42
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 329
Total panel (unbalanced) observations: 1570
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.168899	0.078055	-2.163851	0.0307
VARADV	0.002957	0.002306	1.282141	0.2000
SIZE	0.041664	0.016231	2.566923	0.0104
BM	0.003298	0.001823	1.809003	0.0707
RETURN	0.607595	0.105929	5.735853	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.980241	Mean dependent var	0.126827
Adjusted R-squared	0.974754	S.D. dependent var	0.487920
S.E. of regression	0.077526	Akaike info criterion	-2.086430
Sum squared resid	7.380604	Schwarz criterion	-0.919092
Log likelihood	1979.847	Hannan-Quinn criter.	-1.652546
F-statistic	178.6511	Durbin-Watson stat	1.796042
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/29/21 Time: 10:54
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 291
Total panel (unbalanced) observations: 1273
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.236120	0.122422	-1.928739	0.0541
VARADV	0.004297	0.003506	1.225589	0.2207
SIZE	0.053458	0.024241	2.205312	0.0277
BM	0.007873	0.004589	1.715805	0.0865
RETURN	0.609869	0.110016	5.543457	0.0000
VARSALES	0.010075	0.009050	1.113278	0.2659
VARPRFT	0.000129	0.000795	0.162600	0.8709

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.980368	Mean dependent var	0.144031
Adjusted R-squared	0.974176	S.D. dependent var	0.536127
S.E. of regression	0.086154	Akaike info criterion	-1.859529
Sum squared resid	7.177643	Schwarz criterion	-0.621796
Log likelihood	1489.590	Hannan-Quinn criter.	-1.394645
F-statistic	158.3273	Durbin-Watson stat	1.822883
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/29/21 Time: 10:57
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 312
Total panel (unbalanced) observations: 1336
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.182758	0.098403	-1.857244	0.0636
VARADV	-0.000888	0.002402	-0.369642	0.7117
SIZE	0.052940	0.020933	2.529075	0.0116
BM	0.002488	0.002279	1.091557	0.2753
RETURN	0.256319	0.205049	1.250038	0.2116

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978401	Mean dependent var	0.129696
Adjusted R-squared	0.971508	S.D. dependent var	0.486401
S.E. of regression	0.082103	Akaike info criterion	-1.954415
Sum squared resid	6.821734	Schwarz criterion	-0.693959
Log likelihood	1629.549	Hannan-Quinn criter.	-1.482129
F-statistic	141.9289	Durbin-Watson stat	2.058712
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/29/21 Time: 10:56
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 269
Total panel (unbalanced) observations: 1094
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.267555	0.149590	-1.788584	0.0741
VARADV	-0.003796	0.003557	-1.067132	0.2862
SIZE	0.068762	0.030620	2.245692	0.0250
BM	0.005949	0.006892	0.863166	0.3883
RETURN	0.258778	0.213983	1.209340	0.2269
VARSALES	0.009355	0.014939	0.626223	0.5313
VARPRFT	0.001823	0.002013	0.905905	0.3653

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978606	Mean dependent var	0.145690
Adjusted R-squared	0.971167	S.D. dependent var	0.530504
S.E. of regression	0.090081	Akaike info criterion	-1.758174
Sum squared resid	6.580940	Schwarz criterion	-0.465377
Log likelihood	1244.721	Hannan-Quinn criter.	-1.268968
F-statistic	131.5497	Durbin-Watson stat	2.127461
Prob(F-statistic)	0.000000		

G.4. Robustness Tests results – Principal Sample with other variables and dependent variable $Return_{t+1}$

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/29/21 Time: 11:02
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 445
Total panel (unbalanced) observations: 2063
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.110078	0.042895	-2.566190	0.0104
VARADV	-0.018396	0.015613	-1.178214	0.2389
SIZE	0.021782	0.007881	2.764018	0.0058
BM	0.005653	0.003867	1.461925	0.1440
RETURN	0.998571	0.025241	39.56201	0.0000
VARSALES	-0.013425	0.006638	-2.022333	0.0433
VARPRFT	-6.45E-05	0.000831	-0.077613	0.9381
ASSETGROWTH	0.002033	0.001738	1.169837	0.2422

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.981992	Mean dependent var	0.116130
Adjusted R-squared	0.976821	S.D. dependent var	0.409370
S.E. of regression	0.062325	Akaike info criterion	-2.518906
Sum squared resid	6.222744	Schwarz criterion	-1.260393
Log likelihood	3059.252	Hannan-Quinn criter.	-2.057531
F-statistic	189.9120	Durbin-Watson stat	3.109500
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/29/21 Time: 11:03
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 438
Total panel (unbalanced) observations: 2020
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.099021	0.037301	-2.654618	0.0080
VARADV	-0.002670	0.003538	-0.754544	0.4506
SIZE	0.019913	0.006981	2.852361	0.0044
BM	0.004505	0.002785	1.617645	0.1059
RETURN	0.998632	0.025547	39.08929	0.0000
VARSALES	-0.012950	0.005698	-2.272713	0.0232
VARPRFT	-9.63E-05	0.000694	-0.138720	0.8897
DA	-0.012152	0.014366	-0.845856	0.3978

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.983134	Mean dependent var	0.117648
Adjusted R-squared	0.978256	S.D. dependent var	0.413167
S.E. of regression	0.060926	Akaike info criterion	-2.563395
Sum squared resid	5.812876	Schwarz criterion	-1.302342
Log likelihood	3043.029	Hannan-Quinn criter.	-2.100596
F-statistic	201.5129	Durbin-Watson stat	3.296266
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_6
Method: Panel Least Squares
Date: 03/29/21 Time: 11:03
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 438
Total panel (unbalanced) observations: 2020
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.096396	0.036392	-2.648797	0.0082
VARADV	-0.002813	0.003527	-0.797544	0.4253
SIZE	0.019422	0.006805	2.853845	0.0044
BM	0.004477	0.002767	1.618166	0.1058
RETURN	0.998753	0.025468	39.21654	0.0000
VARSALES	-0.013134	0.005715	-2.298124	0.0217
VARPRFT	0.000134	0.000746	0.180223	0.8570
ASSETGROWTH	0.001393	0.001164	1.196989	0.2315
DA	-0.012483	0.014485	-0.861822	0.3889

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.983137	Mean dependent var	0.117648
Adjusted R-squared	0.978245	S.D. dependent var	0.413167
S.E. of regression	0.060941	Akaike info criterion	-2.562543
Sum squared resid	5.812073	Schwarz criterion	-1.298713
Log likelihood	3043.169	Hannan-Quinn criter.	-2.098725
F-statistic	200.9689	Durbin-Watson stat	3.297086
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/29/21 Time: 14:57
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 445
Total panel (unbalanced) observations: 2063
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.020230	0.045627	-0.443377	0.6576
VARADV	-0.023204	0.023175	-1.001262	0.3169
SIZE	0.004026	0.008490	0.474175	0.6354
BM	0.008197	0.004823	1.699557	0.0894
RETURN	1.076267	0.063961	16.82687	0.0000
VARSALES	-0.004757	0.012231	-0.388981	0.6973
VARPRFT	-2.06E-06	0.000960	-0.002144	0.9983
ASSETGROWTH	0.003041	0.002082	1.460470	0.1444

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976407	Mean dependent var	0.120889
Adjusted R-squared	0.969633	S.D. dependent var	0.435636
S.E. of regression	0.075915	Akaike info criterion	-2.124391
Sum squared resid	9.232469	Schwarz criterion	-0.865877
Log likelihood	2652.309	Hannan-Quinn criter.	-1.663016
F-statistic	144.1297	Durbin-Watson stat	2.434847
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/29/21 Time: 15:10
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 438
Total panel (unbalanced) observations: 2020
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000233	0.031486	0.007405	0.9941
VARADV	0.001100	0.004852	0.226636	0.8207
SIZE	0.000507	0.006309	0.080417	0.9359
BM	0.006485	0.003284	1.974803	0.0485
RETURN	1.076423	0.064478	16.69454	0.0000
VARSALES	-0.001328	0.013302	-0.099827	0.9205
VARPRFT	1.18E-06	0.000760	0.001557	0.9988
DA	-0.019953	0.018976	-1.051471	0.2932

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978850	Mean dependent var	0.122534
Adjusted R-squared	0.972732	S.D. dependent var	0.439779
S.E. of regression	0.072621	Akaike info criterion	-2.212191
Sum squared resid	8.258801	Schwarz criterion	-0.951138
Log likelihood	2688.313	Hannan-Quinn criter.	-1.749392
F-statistic	159.9919	Durbin-Watson stat	2.648017
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_12
Method: Panel Least Squares
Date: 03/29/21 Time: 15:00
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 438
Total panel (unbalanced) observations: 2020
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004464	0.030919	0.144367	0.8852
VARADV	0.000869	0.004875	0.178174	0.8586
SIZE	-0.000285	0.006163	-0.046275	0.9631
BM	0.006441	0.003256	1.978044	0.0481
RETURN	1.076618	0.064339	16.73345	0.0000
VARSALES	-0.001624	0.013261	-0.122492	0.9025
VARPRFT	0.000373	0.000896	0.416357	0.6772
ASSETGROWTH	0.002245	0.001787	1.256363	0.2092
DA	-0.020487	0.019302	-1.061387	0.2887

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978855	Mean dependent var	0.122534
Adjusted R-squared	0.972721	S.D. dependent var	0.439779
S.E. of regression	0.072635	Akaike info criterion	-2.211454
Sum squared resid	8.256715	Schwarz criterion	-0.947623
Log likelihood	2688.568	Hannan-Quinn criter.	-1.747635
F-statistic	159.5788	Durbin-Watson stat	2.649595
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/29/21 Time: 15:02
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 442
Total panel (unbalanced) observations: 2024
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.076658	0.043128	-1.777478	0.0757
VARADV	-0.020609	0.019451	-1.059501	0.2895
SIZE	0.014752	0.007898	1.867939	0.0620
BM	0.007870	0.004830	1.629270	0.1035
RETURN	1.042276	0.046265	22.52819	0.0000
VARSALES	-0.010541	0.008791	-1.199098	0.2307
VARPRFT	-0.000122	0.000864	-0.140952	0.8879
ASSETGROWTH	0.002655	0.001921	1.382234	0.1671

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.976928	Mean dependent var	0.119588
Adjusted R-squared	0.970195	S.D. dependent var	0.422544
S.E. of regression	0.072948	Akaike info criterion	-2.202109
Sum squared resid	8.333435	Schwarz criterion	-0.932012
Log likelihood	2686.534	Hannan-Quinn criter.	-1.736037
F-statistic	145.0952	Durbin-Watson stat	2.947882
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/29/21 Time: 15:03
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 435
Total panel (unbalanced) observations: 1982
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.060452	0.032104	-1.883005	0.0599
VARADV	-0.000540	0.004196	-0.128733	0.8976
SIZE	0.011988	0.006158	1.946811	0.0517
BM	0.006300	0.003376	1.865978	0.0622
RETURN	1.042415	0.046689	22.32699	0.0000
VARSALES	-0.008423	0.008608	-0.978420	0.3280
VARPRFT	-0.000177	0.000673	-0.263179	0.7924
DA	-0.014185	0.018447	-0.768937	0.4420

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978661	Mean dependent var	0.121216
Adjusted R-squared	0.972388	S.D. dependent var	0.426482
S.E. of regression	0.070867	Akaike info criterion	-2.259104
Sum squared resid	7.688954	Schwarz criterion	-0.986687
Log likelihood	2689.772	Hannan-Quinn criter.	-1.791686
F-statistic	156.0320	Durbin-Watson stat	3.148376
Prob(F-statistic)	0.000000		

Dependent Variable: R_1_12
Method: Panel Least Squares
Date: 03/29/21 Time: 15:04
Sample (adjusted): 2009 2018
Periods included: 10
Cross-sections included: 435
Total panel (unbalanced) observations: 1982
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.056855	0.030996	-1.834290	0.0668
VARADV	-0.000728	0.004196	-0.173413	0.8623
SIZE	0.011314	0.005927	1.909022	0.0564
BM	0.006268	0.003356	1.867536	0.0620
RETURN	1.042585	0.046572	22.38664	0.0000
VARSALES	-0.008672	0.008589	-1.009682	0.3128
VARPRFT	0.000120	0.000777	0.154534	0.8772
ASSETGROWTH	0.001874	0.001418	1.321968	0.1864
DA	-0.014594	0.018669	-0.781766	0.4345

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978665	Mean dependent var	0.121216
Adjusted R-squared	0.972376	S.D. dependent var	0.426482
S.E. of regression	0.070884	Akaike info criterion	-2.258280
Sum squared resid	7.687532	Schwarz criterion	-0.983042
Log likelihood	2689.955	Hannan-Quinn criter.	-1.789825
F-statistic	155.6138	Durbin-Watson stat	3.149745
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/29/21 Time: 15:06
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 421
Total panel (unbalanced) observations: 1749
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.034353	0.065652	-0.523257	0.6009
VARADV	-0.037356	0.033277	-1.122599	0.2618
SIZE	0.010149	0.012853	0.789596	0.4299
BM	0.007503	0.005272	1.423030	0.1550
RETURN	0.958855	0.078057	12.28407	0.0000
VARSALES	-0.007983	0.009791	-0.815332	0.4150
VARPRFT	-9.48E-05	0.001118	-0.084844	0.9324
ASSETGROWTH	0.003404	0.002382	1.429024	0.1532

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.974688	Mean dependent var	0.122351
Adjusted R-squared	0.966302	S.D. dependent var	0.424007
S.E. of regression	0.077836	Akaike info criterion	-2.056596
Sum squared resid	7.954640	Schwarz criterion	-0.693804
Log likelihood	2234.494	Hannan-Quinn criter.	-1.552808
F-statistic	116.2273	Durbin-Watson stat	2.081628
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/29/21 Time: 15:08
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 416
Total panel (unbalanced) observations: 1712
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.008070	0.052565	-0.153523	0.8780
VARADV	-0.000496	0.008347	-0.059380	0.9527
SIZE	0.005368	0.010665	0.503339	0.6148
BM	0.005656	0.003393	1.666937	0.0958
RETURN	0.971422	0.073630	13.19331	0.0000
VARSALES	-0.003271	0.009510	-0.343961	0.7309
VARPRFT	-0.000106	0.001074	-0.098575	0.9215
DA	-0.017216	0.019278	-0.893028	0.3720

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978180	Mean dependent var	0.123901
Adjusted R-squared	0.970856	S.D. dependent var	0.428065
S.E. of regression	0.073078	Akaike info criterion	-2.181102
Sum squared resid	6.840999	Schwarz criterion	-0.810205
Log likelihood	2298.023	Hannan-Quinn criter.	-1.673771
F-statistic	133.5516	Durbin-Watson stat	2.320361
Prob(F-statistic)	0.000000		

Dependent Variable: R_7_18
Method: Panel Least Squares
Date: 03/29/21 Time: 15:09
Sample (adjusted): 2009 2017
Periods included: 9
Cross-sections included: 416
Total panel (unbalanced) observations: 1712
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005275	0.051545	-0.102338	0.9185
VARADV	-0.000755	0.008399	-0.089944	0.9283
SIZE	0.004848	0.010471	0.462984	0.6435
BM	0.005588	0.003354	1.666031	0.0960
RETURN	0.971556	0.073541	13.21102	0.0000
VARSALES	-0.003431	0.009493	-0.361440	0.7178
VARPRFT	0.000251	0.001029	0.243494	0.8077
ASSETGROWTH	0.002025	0.001875	1.080050	0.2803
DA	-0.017924	0.019766	-0.906842	0.3647

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.978184	Mean dependent var	0.123901
Adjusted R-squared	0.970839	S.D. dependent var	0.428065
S.E. of regression	0.073099	Akaike info criterion	-2.180129
Sum squared resid	6.839664	Schwarz criterion	-0.806052
Log likelihood	2298.190	Hannan-Quinn criter.	-1.671621
F-statistic	133.1643	Durbin-Watson stat	2.320856
Prob(F-statistic)	0.000000		

Notes: The dominations used in Eviews to run the regressions are slightly different than the ones used in the dissertation. The dependent variable Return corresponds to the variable Raw $Return_t$. The dependent variables R_1_6, R_7_12, R_1_12 and R_7_18 correspond to the variable Raw $Return_{t+1}$ that is measured in four ex-post event windows – [1, 6], [7, 12], [1, 12] and [7, 18] months – following the contemporaneous advertising year t. VarAdv corresponds to the variable ΔAdv_t. Size corresponds to the variable $Size_{t-1}$ when the dependent variable is the Raw $Return_t$ and to the variable $Size_t$ when the dependent variable is the Raw $Return_{t+1}$. BM corresponds to the variable BM_{t-1} when the dependent variable is the Raw $Return_t$ and to the variable BM_t when the dependent variable is the Raw $Return_{t+1}$. The VarSales corresponds to the variable $\Delta Sales_t$ and the VarPrft to the variable $\Delta Prft_t$. Asset Growth corresponds to the variable Asset $Growth_t$ and the DA to the variable Discretionary $Accrual_t$ (DA_t).

The year t corresponds to the advertising year. The Adv_t variable corresponds to the log value of the advertising expenditures in the advertising year t. The Adv_t variable corresponds to the log value of the advertising expenditures in the advertising year t. The ΔAdv_t is the change of the log value from year (t – 1) to year t. The $Sales_t$ variable corresponds to the log value of the sales revenue in the advertising year t and the variable $\Delta Sales_t$ is its change from (t – 1) to t. The $Prft_t$ variable corresponds to the profit calculated as the ratio between the EBITDA and the book value of assets. The $\Delta Prft_t$ variable is the profit's change from (t – 1) to t. The $Size_t$ variable corresponds to the log value of the market capitalization in the advertising year t. The BM variable corresponds to the inverse of the price-to-book value ratio. The Asset $Growth_t$ is the change, in percentage, of the book value of assets between (t – 1) and t. The DA_t variable corresponds to the discretionary accruals in the advertising year t and is calculated following the DeAngelo Model (1986).