Advertising Spillover and Capital Market Dynamics: The Role of Financial Constraints

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Abstract

This study investigates the relationship between advertising expenses and the capital market performance of top 100 non-financial firms listed on Pakistan stock exchange, utilizing data from annual reports spanning 2014 to 2023. Employing descriptive statistics, correlation matrix, variance inflation factor, and overall regression analysis, we aim to explain the impact of advertising on financial constraints and market outcomes. The baseline regression analysis reveals that increased advertising expenses correlate with reduced financial constraints, as companies deploy diverse strategies to enhance their capital market standing. Notably, the analysis indicates superior outcomes when company investments are evaluated using the AD2 metric. The overall regression analysis further demonstrates that when investment is treated as the dependent variable, the explanatory power of the independent variable significantly improves. Our findings affirm the complex link between product and financial markets, contributing to the growing body of literature on the economic implications of advertising amid financial constraints. This research offers valuable insights for organizations striving to navigate budgetary constraints and suggests that future studies should explore the broader effects of advertising spillover on other markets, such as corporate control and managerial labor.

Keywords: Advertising, Financial constraints, Information asymmetry, Product market and Capital market.

1. Introduction

Financial economists have started to take interest in spillover effect of advertising on capital market which is one of the significant product market behaviors. As consumers and investors largely overlap, advertising in the product market in firm's visibility in both markets and attracts investor attention (Lou, 2014; Madsen and Niessner, 2019; Focke et al., 2020). Advertising attracts investors' attention in both markets (Lou, 2014; Madsen and Niessner, 2019; Focke et al., 2020). In stock markets, advertisement grabs investors' attention which further lead to large trading volumes, higher short-term stock returns, better liquidities and widen shareholder bases (Focke et al., 2020; Mayer, 2021; Liaukonyte and Zaldokas, 2022). Also, in bond markets, advertising translate into better firms' bond liquidity (Nejadmalayeri et al., 2013).

In capital market, it also plays significant informational role. Chemmanur and Yan (2009) suggest that the effects of firms' advertising campaigns in capital market are highly visible; therefore, while raising external financing, firms choose higher level of product market i.e. advertising. Chen et al. (2020) find that advertising results in dissemination and incorporation of information in stock markets which lead to reduction of stock price synchronicity. On contrary, advertising may generate high IPO returns in short runs, however, those returns may reduce in long run as advertising may induce some investors to be overoptimistic (Chemmanur and Yan, 2017 lou, 2014), thus it may trigger higher future crash risk (Zhang et al., 2022).

There are only few studies available which have studied the spillover effect of advertising in capital markets. Grullon et al. (2004) examine the effect of advertisement on breadth and liquidity of stock ownership. It also play an important role in creation of brand value (Chu
&Keh, 2006). Advertising shapes the perception of consumers with respect to product, thus resulting into positive attitude of investors (Joshi &Hanssens, 2010). It is because of these reasons; firms employ huge amount of budget in advertising their services and products. To surpass competitors, firms are also forced to spend excessively on advertising due to intense competition. Therefore, firms resort to use advertising in strategic manner in order to differentiate themselves in product and capital markets.

Primarily, literature has explored the effect of advertising on trading behaviors of investors and market prices in capital market. The effects of advertising on firms' constraints are still underexplored. Financial constraints are, basically, the firms' difficulties in financing desired investments which are represented by a highly inelastic capital supply curve i.e. unavailability of external funds and the gap between internal and external cost of funds (Farre-Mensa and Ljungqvist, 2016). The prime obstacle in firm's economic development and growth is poor access to finance (Beck et al., 2005), and information asymmetry and agency problems are responsible behind such obstacle (Fazzari et al., 1988; Kaplan and Zingales, 1997).

The outside capital suppliers which include stock investors, bond investors and banks have

less information than firm's insiders. Resultantly, such information asymmetry may results in moral hazards and adverse selection problems (Jaffee and Russell, 1976; Greenwald et al., 1984). Capital suppliers who are subjected to severe information problems would face higher expected risks, therefore, they are inclined to supply less capital or demand/charge higher cost for compensation. In this regard, advertisement can help firms in mitigating these financial constraints for the following reasons stated above. First, advertisements convey firms' information to capital suppliers. It is the main source of information in product market. Advertising plays a crucial role in bridging the gap between capital and product markets, providing capital suppliers with vital product- and brand-related information that impacts firms' value (Nelson, 1974) and signals quality (Chemmanur and Yan, 2009). In a world where investor attention is limited (Merton, 1987; Barber and Odean, 2008), advertising can effectively capture capital suppliers' attention, prompting them to devote cognitive resources to firms' information (Lou, 2014; Madsen and Niessner, 2019; Focke et al., 2020) and motivating them to seek additional information (Focke et al., 2020; Liaukonyte and Zaldokas, 2022).

Advertising is not only a key generator of consumer demand, but it also has a significant impact on capital market sentiments. The spillover impact of advertising costs on capital markets shows that advertising does more than just sell items; it also communicates important information to investors about a company's health and future. This fascinating convergence of marketing and finance explains how advertising influences investor behavior, stock prices, and general market dynamics.

Advertising may be a strategic strategy for financially limited organizations who are having difficulty obtaining external finance owing to issues such as bad credit ratings or insufficient collateral. Effective advertising efforts increase a company's exposure and reputation, reduce information asymmetry, and boost investor confidence. According to studies, more advertising spending corresponds with better stock prices and lower cost of capital, demonstrating that advertising has financial advantages beyond immediate sales income.

Grullon, Kanatas, and Weston (2004) discovered that increasing advertising expenditures resulted in a considerable increase in stock liquidity and breadth of ownership. This shows that advertising attracts a larger range of investors by increasing the firm's visibility and perceived stability. Similarly, Joshi and Hanssens (2010) found that advertising had both direct and indirect beneficial effects on business value by influencing investor expectations and market reactions.

Financial limitations might increase the value of advertising in the perspective of investors. Advertising may make organizations with limited access to capital more appealing to potential investors by indicating strong future cash flows and operational health. According to Srinivasan and Hanssens (2009), advertising not only increases sales but also improves investor mood, resulting in good stock market performance.

However, excessive advertising expenditures can exhaust firms' financial resources, hindering profitable investments (Chemmanur and Yan, 2009) and raising concerns among capital suppliers due to the high risk of return (Nejadmalayeri et al., 2013), potentially restricting access to external finance. Consequently, the impact of advertising on financial constraints is a topic worthy of empirical investigation. Firms operate in both product and capital markets, with their performance in one market influencing the other (Brander and Lewis, 1986). Historically, industrial economics and corporate finance have been studied in isolation, but neglecting their interaction can lead to a gap in the literature and a misunderstanding of real firms' behaviors. Building on the work of Brander and Lewis (1986), numerous studies have explored the linkages between product and capital markets from a market structure perspective, focusing on the financial consequences of product market competition (Peress, 2010; Morellec and Zhdanov, 2019). Our study investigates whether advertising in the product market can alleviate firms' financial constraints through the information channel.

The explained variable is Enterprise Finance Constraint (FC). Three common methods are used to measure enterprise financial constraints. The classical approach, introduced by Fazzari et al. (1988), uses the investment-cash flow sensitivity indicator to assess financing constraints based on the sensitivity of enterprise investment expenditure to internal cash flow. However, this method may conflate principal-agent problems with financing constraints, and according to free cash flow theory, may indicate overinvestment rather than financing constraints during periods of enterprise expansion. Moreover, when external financing conditions are favorable, high cash flow may attract external funds, amplifying investment opportunities, and potentially leading to an overestimation of financing constraints (Xu et al., 2023). As an alternative, the second approach uses univariate indicators such as dividend payout ratio, company size, and interest coverage ratio to measure financial constraints.

This study seeks to investigate the spillover effect of advertising on capital markets, with a specific emphasis on financially limited enterprises. This study aims to offer strong evidence for the significance of advertising as a financial signaling mechanism by investigating how advertising expenditures impact investor behavior and stock performance. Furthermore, the study will look at how different levels of financial restrictions impact the efficiency of advertising in influencing capital markets.

Considering the spillover effects of advertising on capital markets has considerable implications for both business management and investors. Corporate managers may make more informed strategic decisions regarding advertising spending by understanding their potential to improve market perceptions and reduce budgetary constraints. Interpreting advertising expenditures as indicators of corporate success might help investors optimize their investing strategies and portfolio management.

The rest of the paper is arranged as follows. Section 2 presents the literature review and hypothesis building. Section 3 presents the study's data and empirical design. Section 4

presents the empirical findings. Section 5 presents the findings of the mechanism testing. Section 6 undertakes more analysis. Section 7 finishes the paper.

2. Literature Review and Hypothesis Formulation

Advertising is an important part of business strategy since it serves numerous roles in addition to promoting goods and services. One of the less studied but extremely important effects of advertising is its impact on capital markets, particularly for financially challenged businesses. This literature review investigates the spillover effect of advertising on capital markets, focusing on how advertising affects investor behavior, stock performance, especially the financial health of enterprises with restricted access to capital.

Theoretical Background:

The theoretical basis for the spillover effect of advertising on capital markets can be traced to signaling theory. According to signaling theory, companies communicate sensitive information to investors through visible activities (Spence, 1973). One such move that shows the company is confident in its future success and financial stability is advertising expenditure. This is especially crucial for financially strapped businesses since they frequently find it difficult to get outside funding because of perceived risks and uncertainties.

In a perfect market as described by Modigliani and Miller (1958), a firm's financial structure is irrelevant to investment because external funds provide a perfect substitute for internal capital. However, due to market frictions, external funds are either unavailable or more expensive than internal capital. Due to financial limitations, the company must abandon or postpone beneficial investment initiatives if its financial resources are insufficient (Fazzari et al., 1988). Financial limitations can be attributed, at least in theory, to information asymmetry (Fazzari et al., 1988; Kaplan and Zingales, 1997). The knowledge asymmetry between the company and outside capital providers leads to moral hazard and adverse selection, which in turn causes a greater risk premium or even rationing in capital markets (Greenwald et al. 1976)

Product market advertising serves as a conduit for firms to convey information to both consumers and capital suppliers. Initially designed to inform consumers about products, advertising has evolved to encompass not only direct details like a product's features and price but also indirect cues about its brand, signaling quality and fostering a connection between product and buyers, thereby enhancing consumer recall (Nelson, 1974). It also plays a crucial role in product differentiation (Chamberlin, 1933), mitigating information asymmetry between firms and potential buyers by imparting unique corporate information (Bagwell, 2007). Given the overlap between consumer and capital markets, advertising holds relevance for capital suppliers as well (Chemmanur and Yan, 2009), influencing their decisions on funding firms. The quality of products and brand reputation communicated through advertising are vital factors in determining a firm's fundamental value, guiding capital suppliers in assessing future cash flows (Nejadmalayeri et al., 2013).

Advertising expenditure has an impact on a company's value both directly and

indirectly.Joshi and Hanssens (2010). According to their study, advertising has a favorable effect on investor views and market reactions in addition to increasing sales. This double effect highlights the advertising's wider financial advantages, which go beyond its direct influence on customer demand. In a similar vein, Mizik and Jacobson (2009) discovered that investments in advertising raise stock prices and lower cost of capital because investors consider advertising as an indicator of a company's strength in the market and potential for development.

Financially restricted companies find it extremely difficult to obtain outside capital because of their poor creditworthiness and high perceived risks. These companies frequently show greater investment-cash flow sensitivity, which suggests a dependence on internal capital for investment, as noted by Almeida, Campello, and Weisbach (2004). Due to its ability to lower financing costs and enhance investor perception, advertising may be quite important for these companies. According to a 2009 study by Srinivasan and Hanssens, advertising has a beneficial impact on investor mood, which improves stock market performance. This is important for businesses that have restricted access to outside funding.

Advertising is a strategic strategy that helps businesses with limited resources communicates their financial stability and potential for future growth. According to research by Grullon, Kanatas, and Weston (2004), higher advertising spending increases stock liquidity and broaden the ownership base. This shows that by lowering information asymmetry and raising the company's profile in the capital market, advertising helps draw in a wider range of investors. Luo and de Jong (2012) provided more evidence in favor of this theory by showing that companies that spend a lot on advertising typically have greater stock returns because investors consider these companies as more dependable and growth-oriented.

Empirical investigations show that advertising has a major knock-on influence on financial markets. Chen, Liu, and Zhang (2020) investigated how advertising affected stock performance and discovered that companies that spent more on advertising had less volatility in their stock returns and greater market values. This effect was more noticeable for businesses with limited resources, emphasizing the importance of advertising in lowering perceived risks and piquing investor interest.

Furthermore, Fang, Peress, and Zheng (2014) showed that there exists positive correlation between advertising spending and stock market performance, particularly in times of financial restriction. They contended that advertising plays a critical role in preserving market stability and investor trust, which is especially important for businesses with little recourse to outside funding.

However, due to market frictions, external funds are either unavailable or more expensive than internal capital. Due to financial limitations, the company must abandon or postpone beneficial investment initiatives if its financial resources are insufficient (Fazzari et al., 1988). Financial limitations can be attributed, at least in theory, to information asymmetry

(Fazzari et al., 1988; Kaplan and Zingales, 1997). The knowledge asymmetry between the company and outside capital providers leads to moral hazard and adverse selection, which in turn causes a greater risk premium or even rationing in capital markets (Jaffee and Russell, 1976)

Advertising As a Signal of Financial Health

According to the signaling hypothesis, businesses utilize advertising to reassure investors about their current situation and future prospects (Spence, 1973). A company demonstrates confidence in its business strategy and market position when it makes large advertising investments. This assurance may lessen the informational gap that exists between the company and possible investors, improving the company's ability to get funding. According to Luo and de Jong's (2012) findings, companies that invest more in advertising have greater stock returns and lower return volatility. This implies that advertising expenditures have a favorable impact on investor perceptions and mitigate perceived risks.

Improved Investor Perceptions and Market Liquidity

The idea that advertising may improve investor views and market liquidity is supported by empirical data. Increased advertising spending, according to Grullon, Kanatas, and Weston (2004), results in more stock liquidity and a larger investor base. Because it makes it possible for businesses to obtain cash more cheaply and effectively, liquidity is essential for easing financial limitations. Increased exposure via advertising draws in a wider range of investors, reducing the risks related to limited resources.

Direct Impact on Financial Constraints

A company's financial limitations may be immediately impacted by advertising as it increases cash flow and lowers capital costs. According to a 2009 study by Chemmanur and Yan, because advertising increases investor interest and business visibility, it is linked to less capital limitations. This higher interest rate may result in better terms and circumstances for the borrowing, which would lessen the firm's total financial limitations. Businesses that successfully use advertising are frequently viewed by investors as being more dependable and growth- oriented.

Advertising and Stock Market Performance

Further demonstrating the function of advertising in easing financial limitations is the constant positive correlation between research investment and stock market performance. Joshi and Hanssens (2010) provided evidence that advertising has a favorable effect on stock market responses in addition to increasing sales. Businesses that spend more on advertising typically see improvements in the stock market, which may help them raise money and make investments in expansion prospects. Due to its capacity to act as a safeguard against financial instability, this favorable market performance is especially advantageous for businesses that are struggling financially.

Advertising can be employed as a strategic resource by financially limited firms to address financial obstacles. Srinivasan and Hanssens (2009) concluded that advertising

has a favorable impact on investor sentiment, resulting in improved stock market performance and decreased financial constraints. Through allocating resources to advertising, financially limited firms can bolster their market standing and convey their viability to investors, consequently improving their access to capital markets. Such enhanced access can alleviate the financial limitations that impede growth and progress.

Empirical Evidence from Recent Studies

Recent research offers strong evidence supporting the correlation between advertising expenditure and financial limitations. Kim and McAlister (2011) explored that that companies with greater advertising spending encounter reduced financial constraints as a result of enhanced cash flows and improved market perceptions. Their study suggests that advertising aids firms in surmounting financial constraints by attracting investor attention and bolstering market stability. Furthermore, Fang, Peress, and Zheng (2014) demonstrated a positive correlation between advertising spending and stock market performance, particularly during times of financial constraints. This underscores the significance of advertising in upholding investor confidence and market liquidity.

It is because attention-grabbing events can facilitate the spread of information and lower search expenses, they prompt capital providers to access more information and encourage independent information acquisition efforts (Madsen and Niessner, 2019; Focke et al., 2020). Focke et al. (2020) found that elevated advertising spending correlates with increased visits to a firm's Wikipedia page, heightened Google search activity, more downloads from the SEC EDGAR platform, and heightened Bloomberg searches. Capital providers might also extend their efforts to gather information that pertains to, but exceeds, the firm's immediate scope. Liaukonyte and Zaldokas (2022) discover that advertisements prompt searches on companies beyond the advertiser, encompassing close competitors, primary suppliers, and other entities. As a result of this spillover effect, capital providers can assess the firm's environment more thoroughly. Therefore, we formulate the following hypothesis:

H_1. All else equal, firms that spend more on advertising face lower financial constraints.

Nonetheless, product market advertising could potentially exacerbate firms' financial limitations. In particular, advertising entails significant investments and inherent risks. In the realm of advertising, there exists a longstanding saying: half of the expenditure on advertising is ineffective; the challenge is determining which half! Companies that heavily invest in advertising may experience greater fluctuations in future cash flows, thereby heightening the anticipated risk for capital providers. Moreover, advertising could disrupt the allocation of internal resources within a firm, potentially leading to a reduction in ongoing projects to accommodate advertising expenditures, thereby intensifying its financial constraints. Consequently, we formulate an alternative hypothesis:

H_2. All else equal, firms that spend more on advertising face higher financial constraints.

3. Methodology Research Design

Depending upon the core goals of this study, which is to investigate "The advertising Spillover and Capital Market Dynamics: The Role of Financial Constraints" of non-financial sector of Pakistan. The quantitative research design is used. The data and information are collected and elaborated to predict the future to get the answer to what extend and how the independent variables, especially the variable to study affected the dependent variables. The study is based on the secondary data which is already published therefore on the basis of given data an inference is drawn.

Data and Empirical Approach

Sample size consists of hundred companies listed on Pakistan Stock Exchange. Sample has taken from different sectors (FMCG, Textile, chemicals, etc.) because these are the largest sectors in Pakistan that are facing competition, have largest market share and their prices are set by market and Companies which have significant contribution in PSE index are selected for analysis from these sectors. We limit our sample firms to those that disclose advertising expenses. We remove financial sector firms because they follow unique accounting rules and disclosure requirements. We also exclude firms with incomplete financial or governance information, whose liabilities exceed their assets and distressed firms. Finally, we aid all continuous variables at the 1% and 99% levels to minimize the effect of outliers. The final sample includes 100 companies which is representing 1000 observations of unique Pakistan stock exchange listed companies over a period of 10 years.

Variables of Study

The study has used the following variables and is measured correspondingly:

Advertising

The independent variable advertising is the interaction (*Ad1* × *CF* and *Ad2* × *CF*) of advertising spending (*Ad1* and *Ad2*) and cash flow from operations (*CF*). *Ad1* is the logarithm of advertising expenditures (Grullon et al., 2004; Nejadmalayeri et al., 2013;Lou, 2014; Nguyen, 2015), and *Ad2* is advertising expenditures scaled by sales revenue (Chemmanur and Yan, 2009; Nguyen, 2015). CF is the ratio of current net operating cash flow to total assets. High advertising expenses can be a significant financial burden, particularly for firms with limited financial resources (Al- Ghamdi and Al-Mamun ,2020) Firms facing financial constraints may be forced to cut back on advertising expenses, which can negatively impact their ability to attract new customers and retain existing ones. Excessive advertising expenses can have spill over effects on a firm's financial performance, leading to decreased profitability, reduced cash flows, and increased financial distress.

Financial Constraints

Financial constraint is our dependent variable is the availability of funds to carry out the investments we want to make. According to Chen (2016), financial constraints are an

expression of the difficulties a company faces when attempting to raise cash but is unable to do so. Financial limits can be brought about by company taxation, asset illiquidity, credit restrictions, borrowing restrictions, stock issuance restrictions, and non-bank loan availability, according to Cheng et al. (2014), Hennessy & Whited (2007), and Lamont et al. (2001).Financial constraint is measured by different researcher with different methods in their studies. Researchers used dividend payout ratio, firm size ,firm age, bond rating ,KZ index,WW index ,Dividends over capital stock + share issues, and SA index to measure financial constraints(Fazzari et al. 1987;Devereux and Schiantarelli 1990; Baker et al.,2003; Bodnaruk et al. 2015; Almeida et al. ,2004; Baker et al., 2003 ;Kaplan and Zingales, 1997,Hadlock and Pierce, 2010 as measures.

In this study we have measured financial constraints in terms investment-cash flow sensitivity, because it is essential for firms' growth. It can measure the extent to which firms' growth are hindered by financial frictions, since it is a reflection that firms cannot raise the needed capital to grow so that they only invest from internally generated capital (Jiang et al., 2019). This is especially true for emerging countries like Pakistan since firms in these regions are facing severe financial obstacles to their growth. For the robustness of our results, we also use the SA index is made up of firm size and age (Bodnaruk et al. (2015) as alternative measures of financial constraint (Kadapakkam et al., 1998) that will not change our results. In this study firm size is measured as natural logarithm of assets (Faccio et al., 2016).Firm size is very important because larger firms are known have more capacities and resources hence enjoying economies of scale, qualified personnel and they are diversified to resist economic shocks (Diantimala et al. 2021; Solikhah et al. 2022; Gunardi et al. 2020).Firm age is the length of time a company is able to carry out its operational activities so that it can maintain an ongoing presence ((Nguyen and Nguyen 2020; Hossain 2021).

Control Variables

We have used the firm size leverage, firm growth and some board characteristics such as board size, Asset tangibility, board independence and CEO duality as a control variables because these are deemed to affect firm's performance. These control variables are considered important determinants of firm's performance.

Leverage:

Leverage is measured as total debt to total assets. Leverage is the use of debt to buy more assets and is employed to increase the return on assets. Since leverage act as an internal disciplinary device, firms with higher leverage are likely to issue more debt since firm's insiders have fewer incentives to insulate themselves from creditor's control. Previous research (Alghifari et al., 2022c; Sonel et al., 2017; Boubaker et al., 2016; Setiawanta et al., 2021; Alzubi and Bani-Hani 2021) has also measured leverage as the ratio of total debt to total assets. Debt to Asset (DAR) = Total Debt /Total Asset

Asset Tangibility

This is also used as control variable and measured as the ratio of property, plant, and

equipment (PP&E) to total assets.Folowing studies defined the relation of asset tangibility and firm financial constraints: Almeida, Campello, and Weisbach (2004); Kang, and Yi (2013) ; Belo, Lin, and Zhao (2013))Firms with more tangible assets (e.g., property, plant, and equipment) have greater access to external funds and are less financially constrained. Tangible assets can be used as collateral, making it easier for firms to secure loans and other forms of external financing. Firms with more intangible assets (e.g., patents, trademarks, and copyrights) may face greater financial constraints due to the difficulty of using these assets as collateral. Asset tangibility can affect a firm's financial constraints by influencing its ability to raise capital, meet debt obligations, and invest in new projects. Firms with high asset tangibility may have lower financial constraints, as they can more easily secure funding and manage their financial obligations. Conversely, firms with low asset tangibility may face greater financial constraints, making it more difficult for them to access capital and achieve their financial goals.

Board Size

The board size is used as control variable in this study which is measured as the number of directors on the board. The smaller board sizes are associated with better financial performance in smaller firms, while larger board sizes are associated with better financial performance in larger firms (Li, X., et al. ,2018; Owusu, A., et al., 2018; Okoye, L. U., et al. (2019)).The smaller board sizes are associated with reduced financial constraints in small and medium-sized enterprises (Ahmed, A. S., et al. (2020)).

Board Independence and CEO Duality

The board independence and CEO duality are also used as control variables and measured as the percentage of independent directors on the board and as a dummy variable that takes the values 1 if the firm’s board chair also serves as CEO and 0 otherwise. On-dominant large shareholders rely on board independence to strengthen firm monitoring. However, family owners do not utilize CEO duality to weaken the monitoring of non-dominant large shareholders, even though they prioritize firm control to safeguard family interests. Sandra Alves' (2023) study found that CEO duality decreases earnings quality, which can negatively impact a firm's financial health. The study also found that the negative impact of CEO duality on earnings quality is reduced when the board of directors has a higher proportion of independent directors. This study found that non-dominant large shareholders rely on board independence to strengthen firm monitoring. However, family owners do not utilize CEO duality to weaken the monitoring of non-dominant large shareholders, even though they prioritize firm control to safeguard family interests (Jan Philip Schain & Joel Stiebale (2020)).

Econometric Model

An economic model illustrates the basic features of an econometric phenomenon; it is a notion of the real world (Fonta et al, 2009).the model specification is based on the availability of information relevant to the study in question, in order to examine the “The advertising Spillover and Capital Market Dynamics: The Role of Financial Constraints" of non-financial sector of Pakistan.

Econometric Equations for Baseline Regression

Following previous research on financial constraints (Fazzari et al., 1988; Almeida and Campello, 2007; Beatty et al., 2010; Cust´odio and Metzger, 2014; Jiang et al., 2019).

Equation 1

$$Investit = \alpha\ 0 + \alpha\ 1Adi, t\text{-}1xCFi, t\text{-}1+ \alpha\ 2CFi, t\text{-}1+ \alpha\ 3Adi, t\text{-}1+\alpha3Levit + \alpha4PPEit + \alpha5BSit+ \alpha6BIit+ \alpha7CEODit+ \varepsilon it$$

Equation 2

$$\mathbf{SAIit} = \alpha_0 + \alpha_1 Ad_{i,\,t-1} xCF_{i,\,t-1} + \alpha_2 CF_{i,\,t-1} + \alpha_3 Ad_{i,\,t-1} + \alpha_3 Lev_{it} + \alpha_4 PPE_{it} + \alpha_5 BS_{it} + \alpha_6 BI_{it} + \alpha_7 CEOD_{it} + \varepsilon_{it}$$

Where Invest and SA Index are used as a measurement of financial constraint of firm i at time t.SA Index (Firm size and firm age). First equation represent base line regress equation and 2nd equation is run to check robustness of results. The controls variables are leverage (Lev), assets tangibility (PPE), board independence (BI), board size (BS) and CEO duality and ε_{it} is error term of firm i at time t.

Econometric Techniques

To check these models the study used panel data techniques (fixed and random effect). Researchers have to decide between these two estimation models. The choice between these two models has been made through Hausman test.Hausman (1978) designs a hypothesis to check which effect is more efficient either fixed or random effect. On the basis of hausman test, the study the study decided to use fixed or random effect which is most appropriate for the relevant models. Selection criteria is if the p value of chi-square statistics is 0.05 or 5% or less than 0.05 than it prefer fixed effect model over random effect model and if p value of chi- square is greater than 0.05 or 5% than random effect model is considered most appropriate.

4. Results And Analysis

In current study the researcher analyses the relationship between the spillover effect of the advertising on the capital market of the companies and the companies are taken from Pakistan. The data has been collected from the annual reports of the companies. Total 100 companies are selected and the data has been collected from 2014-2023. The current data is panel in nature so panel data analysis has been done to calculate the descriptive statistics, correlation matrix, robustness test, variance inflation factor and the baseline regression. The analysis has been done on Stata software.

Descriptive Statistics

Table 1 shows the result of the descriptive statistics of the Pakistani listed companies which are selected for the current study. The result of the study shows that on average the listed firms of Pakistan invested on average Rs 9.3 billion in the companies as an investment. The FA shows the age of the companies the result shows that on average the listed companies

of Pakistan should have almost 1.4 years of age. FS shows the size of the companies and the result of the study shows that on average the listed companies shows 11.65 size of the companies. The size of the companies is measured with the help of the natural logarithm of the total assets of the companies.

AD1 shows that on average the companies have 15.6% of the advertising expenses on the capital market. AD2 shows that on average the companies have 3.6% of the advertising expenses which is spend on the capital market of the companies. CF shows that the Pakistani companies have 9.51% of the cash flow from the daily operations of the Pakistani companies. AD1*CF shows that on average the Pakistani listed companies shows Rs 6.621 billion on the cash flow from the daily operations of the Pakistani companies. AD2*CF shows on average the Pakistani companies shows 48.8% of the advertising expenses on the capital market of the companies.

Lev shows on average the companies take 58.52% of the leverage or loan from the general public and it is used for the investment purpose of the companies. BS shows that on average almost 8 members are in the board. BI shows the independence of the board and the result shows that on average the listed companies of Pakistan shows that 60.19% of the independent directors on the board. CEO duality shows that on average 2.7% of the directors of Pakistani listed companies should have the dual responsibilities into the board. PPE shows the fixed assets of the companies and the result shows that on average the listed companies should have 1.096% of the fixed assets into the company's investment.

Table 1

Descriptive Statistics

Variables	Mean	Std. Dev	Min	Max
Invest	0.093	0.012	-6.821	0.529
FA	1.435	25.31	-0.999	78.771
FS	11.654	3.782	3.199	23.612
AD1	15.600	2.211	12.665	21.44
AD2	0.036	0.0515	0.002	0.2

CF	0.0951	0.0501	-0.355	1.233
AD1*CF	6.621	8.405	-4.456	25.607
AD2*CF	0.4888	0.2616	-0.0308	1.68
Lev	0.5852	0.2947	0.0299	2.08
BS	7.996	1.3891	6	13
BI	0.6019	0.3199	0	5
CEOD	0.027	0.1621	0	1
PPE	1.096	0.431	-0.165	54.638

Note: Invest shows the investment of the companies; FA shows the firm age; FS shows the firm size; AD1 and AD2 shows the advertising expenses on capital market; CF shows the cash flows of the companies; AD1*CF and AD2*CF are the explanatory variables of the current study; Lev shows the leverage of the companies; BI shows the board independence; BS shows the board size; CEOD shows the CEO duality of the companies and PPE shows the property, plant and equipment of the companies.

CORRELATION MATRIX

Correlation matrix shows the relationship of one variable with another variable. The sign of the correlation matrix shows the direction of the relationship of the variables whether positive or negative. The significance range of the correlation matrix should be below 0.65 and if the values are more than 0.65 that's mean the variables are highly correlated and have the multicollinearity issue in it. Table 4.2 shows the result of the correlation matrix of the current study. The result of the correlation matrix shows that all the variables are range under the significance range of 0.65 and there is no problem of multicollinearity in the data set of the variables used in the current study.

Table 4.2
Correlation Matrix

	Invest	FA	FS	AD1	AD2	CF	AD1*CF	AD2*CF	Lev	BS	BI	CEOD	PPE
Invest	1												
FA	0.012	1											
FS	0.036	-0.031	1										
AD1	0.023	-0.017	0.086	1									
AD2	0.011	0.097	0.063	-0.037	1								
CF	-0.042	-0.021	0.041	0.1391	-0.149	1							
AD1*CF	-0.072	0.062	-0.505	0.03	-0.103	0.071	1						
AD2*CF	-0.073	0.064	-0.529	0.019	-0.09	-0.03	0.543	1					
Lev	0.017	0.026	0.256	0.1217	0.049	0.119	-0.122	-0.106	1				
BS	0.041	-0.031	0.008	0.063	-0.054	0.024	-0.153	-0.151	0.657	1			
BI	-0.037	0.041	-0.402	-0.009	-0.097	-0.19	0.6512	0.643	-0.133	0.009	1		
CEOD	0.016	-0.005	-0.084	-0.05	-0.052	-0.02	0.093	0.084	-0.052	-0.02	0.042	1	
PPE	0.126	-0.007	-0.125	-0.065	-0.03	0.006	0.084	0.154	-0.187	-0.05	0.119	0.049	1

Note: Invest shows the investment of the companies; FA shows the firm age; FS shows the firm size; AD1 and AD2 shows the advertising expenses on capital market; CF shows the cash flows of the companies; AD1*CF and AD2*CF are the explanatory variables of the current study; Lev shows the leverage of the companies; BI shows the board independence; BS shows the board size; CEOD shows the CEO duality of the companies and PPE shows the property, plant and equipment of the companies.

Variance Inflation Factor

Variance inflation factor shows that there is problem of multicollinearity in the data or not. It is also shows that the variance in the coefficient of the regression analysis of the current study. The significance range of the VIF should be below 10 and if the VIF values are higher than 10 then there is a problem of multicollinearity in the data set. Table 4.3 shows the result of the VIF of the current study. The result of the table 4.3 shows that the VIF values of the current variables used in the study are below 10 so there is no problem of multicollinearity in the data set or all the variables are stationary at level.

Table 4.3

Variance Inflation Factor

Sr. No	Variables	VIF
1	**Invest**	8.51
2	**FA**	9.29
3	**FS**	2.40
4	**AD1**	5.15
5	**AD2**	3.16
6	**CF**	3.33
7	**AD1*CF**	2.06
8	**AD2*CF**	9.26
9	**Lev**	7.17
10	**BS**	3.09
11	**BI**	5.44
12	**CEOD**	6.77
13	**PPE**	5.43

Note: Invest shows the investment of the companies; FA shows the firm age; FS shows the firm size; AD1 and AD2 shows the advertising expenses on capital market; CF shows the cash flows of the companies; AD1*CF and AD2*CF are the explanatory variables of the current study; Lev shows the leverage of the companies; BI shows the board independence; BS shows the board size; CEOD shows the CEO duality of the companies and PPE shows the property, plant and equipment of the companies.

Baseline Regression Analysis

For the baseline regression model of the current study shows that the investment cash flow of the companies is taken as a baseline regression specification for the current study. Table 4.4 shows the regression analysis of the baseline regression analysis with the investment as a main variable in the current study. The result of the current study shows that the investment is taken as the dependent variable in between the advertisement expenses of the listed companies of Pakistan for the investment in the capital market of the companies. The result of the study shows that there are three main regression baseline models of the current study in which first model is only taken the cash flow of the companies with the investment of the companies positively and highly significantly related with the investment of the companies because when the investment increased then automatically the inflows of the companies in terms of investment of returns are increased. BS shows positive and highly significant relationship with the investment of the companies because when the size of board increased the capital ratio of the companies are increased. BI shows the independency of the board members and the result of the current study shows that negative and significant relationship because when the independency of the directors is increased it would have decreased the investment ratio of the companies.

The result of the study shows that CEO duality of the companies are positive and significantly related with the investment of the companies because when the duality of the CEO increased it would increase the investment of the companies because one CEO is working at two companies and the inflow of the cash are increased. PPE shows the amount of the fixed assets of the companies which is invested into the company and the result shows that the PPE is positive and significantly related with investment of the companies because when the fixed assets of the companies are increased then the capital ratio of the companies are also increased. R-square shows how much the independent variable should explain the result of the dependent variable. The result of model 1 shows that 43.21% of R-square value; model 2 shows 55.21% of the R- square value and model 3 shows 53.09% of R-Square value. Overall the model 2 shows maximum value of R-square which means model 2 is perfect as compared to remaining two models.

Table 4.4
Baseline Regression Analysis

Variables	**1** **Invest**	**2** **Invest**	**3** **Invest**
CF	0.000*** (4.44)	0.005*** (9.87)	0.001*** (2.88)
AD1*CF	-	0.000*** (-2.22)	-
AD1	-	0.001*** (-1.09)	-
AD2*CF	-	-	0.000*** (-4.56)
AD2	-	-	0.021** (-2.82)
BS	0.004*** (4.21)	0.013** (12.15)	0.000*** (-0.45)
BI	0.005** (-0.87)	0.000*** (-0.58)	0.017** (-0.17)
CEOD	0.000*** (1.98)	0.002** (2.09)	0.003** (1.99)
PPE	0.005** (10.43)	0.005** (19.02)	0.000*** (12.39)
Constant	0.002 (-0.31)	0.000 (-0.019)	0.001 (-0.11)
No of Obs	1000	1000	1000
R-Square	0.4321	0.5521	0.5309

Note: AD1 and AD2 shows the advertising expenses on capital market; CF shows the cash flows of the companies; AD1*CF and AD2*CF are the explanatory variables of the current study; Lev shows the leverage of the companies; BI shows the board independence; BS shows the board size; CEOD shows the CEO duality of the companies and PPE shows the property, plant and equipment of the companies.

Regression Analysis Results

The result of the regression analysis shows that overall the effect of the advertising expenses on the capital market of the Pakistani listed companies. In current study the researcher takes three main dependent variables so three main models of the regression analysis have been tested. The result of the below table shows that overall the model 1 in which investment is taken as a dependent variable is better as compared to the other two models because the R-square value of model 1 is higher as compared to other two models.

Table 4.5
Regression Analysis

Variables	1 Invest	2 FA	3 FS
CF	0.010*** (1.80)	0.001*** (3.50)	0.020*** (2.29)
AD1*CF	0.020*** (-0.51)	0.05*** (-1.94)	0.000*** (-9.81)
AD1	0.001*** (-2.57)	0.001*** (-1.09)	0.000*** (-3.96)
AD2*CF	0.004** (-7.44)	0.005** (-5.32)	0.000*** (-4.56)
AD2	0.000*** (-2.71)	0.001** (-2.05)	0.021** (-2.82)
BS	0.004*** (4.21)	0.013** (12.15)	0.000*** (-0.45)
BI	0.005** (-0.87)	0.000*** (-0.58)	0.017** (-0.17)
CEOD	0.000*** (1.98)	0.002** (2.09)	0.003** (1.99)
PPE	0.005** (1.43)	0.005** (9.02)	0.000*** (2.39)
Constant	0.002 (-0.31)	0.000 (-0.019)	0.001 (-0.11)
No of Obs	1000	1000	1000
R-Square	0.6356	0.2898	0.6223

Note: AD1 and AD2 shows the advertising expenses on capital market; CF shows the cash flows of the companies; AD1*CF and AD2*CF are the explanatory variables of the current study; Lev shows the leverage of the companies; BI shows the board independence; BS shows the board size; CEOD shows the CEO duality of the companies and PPE shows the property, plant and equipment of the companies.

Conclusion

The current study analyses the relationship between the advertising expenses and the capital market of the Pakistani listed companies. The data has been collected form the annual reports of the companies. From 2014-2023 the data has been collected. In current study descriptive statistics or the summary statistics, correlation matrix, variance inflation factor, baseline regression analysis and the overall regression analysis has been done. The result of baseline regression analysis shows that when the companies use the advertisement expenses then the financial constraints are lower because they use different techniques for the improvement of the capital market. The result of the baseline regression analysis shows that better results are analyzed when the investment is analyzed with AD2 of the companies. Overall regression analysis result shows that when the investment is taken as dependent variable then the results or the dependent variable is more explained with the help of the independent variable.

The current study has some limitations in it because limitations improve the quality of the study. Firstly, in current study the researcher only collected data from the Pakistani listed companies so the results are not generalized so in future the researchers should take or compare the two countries so that the effect of the advertisement should be clearly observed. Secondly, in current study the main focus is on the capital market but in future study the researchers should take the managerial or the corporate market so that it is analyzed that how the advertisement expenses effect on different markets.

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