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Loss Aversion, Overconfidence of Investors and their Impact on Market Performance: Evidence from the London Stock Exchange (FTSE100)

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ABSTRACT

The Capital Asset Pricing Model (CAPM) has traditionally explained the relationship between risk and expected return, assuming efficient markets and rational investors. However, empirical evidence has increasingly challenged these assumptions, leading to the emergence of behavioural finance, which examines how psychological factors impact investor behaviour and market outcomes. This study explores the effects of two key behavioural biases—loss aversion and overconfidence—on the performance of FTSE100-listed companies.

Using panel data models on a sample of six companies from industrial and service sectors between January 2004 and December 2022, our research finds that investor sentiment significantly influences market performance. Specifically, overconfidence correlates positively with the stock performance of industrial firms but does not affect service sector firms. Loss aversion, however, does not show a significant impact on performance in the UK market.

These findings suggest that overconfidence may have a more pronounced effect on market performance compared to loss aversion. This has implications for portfolio managers and financial regulators, as understanding these psychological biases can enhance market predictions and stability. By incorporating investor sentiment into market analysis, stakeholders can better anticipate market fluctuations and mitigate potential risk.

Keyword: Behavioral finance, Investment decision, Loss aversion, Overconfidence

1. Introduction

The Capital Asset Pricing Model (CAPM) traditionally explains the relationship between risk and expected returns, assuming rational investors and efficient markets. CAPM posits that an asset's expected return is proportional to its systemic risk (beta). However, empirical evidence

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

has challenged these assumptions, revealing market anomalies that CAPM cannot account for. This has led to the development of behavioral finance, which examines how psychological factors like loss aversion and overconfidence influence investor behavior and market outcomes.

Behavioral finance posits that investors are not always perfectly rational and that market inefficiencies often persist despite rational attempts to exploit them. Daniel Kahneman's prospect theory and Richard Thaler's research on overconfidence highlight how biases such as loss aversion (intense fear of losses) and overconfidence (overestimation of one's abilities) impact trading behavior and market stability.

The London Stock Market (FTSE100) provides a relevant context for studying these biases. Loss aversion may lead to overly conservative investment strategies, while overconfidence can cause excessive trading and market instability. Robert Shiller's research indicates that cognitive biases contribute to market anomalies like bubbles and crashes, challenging CAPM's predictions.

This study aims to explore how loss aversion and overconfidence affect the performance of FTSE100- listed companies. It investigates these biases' impact using data from 2004 to 2022, focusing on both industrial and service sectors. The research reveals that investor sentiment, particularly overconfidence, significantly influences market performance, especially in industrial firms. In contrast, loss aversion does not show a substantial impact on economic performance.

2. Literature review

2.1. Loss aversion

A fundamental idea in behavioural economics, loss aversion refers to people's propensity to experience losses more keenly than comparable gains. First introduced by Amos Tversky and Daniel Kahneman in their Prospect Theory (1979), loss aversion has significant ramifications for comprehending human decision-making in various contexts. Under this bias, the investor uses gain to make a decision rather than loss because he tries to avoid the risk linked to loss. Loss aversion is a phenomenon that affects investors who believe that if they hold securities in the stock market and do not realise a loss, they will instead realise a gain. Since prices move quickly, they want to sell their securities and pocket the difference between the purchase price and the market value. One specific instance of regret aversion is loss aversion. People naturally want to avoid experiencing regret after making mistakes, no matter how minor. Studies support the theory of ambiguity aversion, which explains and validates the existence of all behavioural biases that can affect an investor.

According to Aftalion (2002), investors susceptible to this bias tend to be pessimistic because they believe that the psychological impact of loss will have a more significant influence on their behaviour than gains. Researchers like Chau et al. (2011) and Rephael et al. (2012) have used

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

prospect theory to understand investor decisions. They relied on normative models in which investors maximise the utility function based on specific criteria. Barberis et al. (2001) studied loss aversion in a consumption-based model to evaluate financial assets, as illustrated by the prospect theory. Asset prices are analysed in an economy where investors receive immediate benefits from consumption and fluctuations in their wealth's monetary value. The authors conclude that investors are risk-averse, with the extent of this aversion depending on past investment performance. Amonlirdviman and Carvalho (2010) analysed the portfolio problem of an investor who has to choose between home and foreign equities in the face of unequal return co-movement. Surprisingly, based on the home bias puzzle, the authors argue that loss-averse investors act similarly to individuals with expected-utility preferences and reasonable risk aversion.

The theory of ambiguity aversion, which explains and rationalises the existence of all behavioural biases that can affect an investor, is supported by additional research. Gebhardt (2011) study an exchange economy in which investors are loss-averse over the relative. Consumption: they suffer from utility loss if they consume less than their reference group members. Consequently, there is an incentive to hold the same portfolio of risky assets as the reference group. Thus, risk premia can be supported in equilibrium that diverges from the risk premia obtained without loss aversion over relative consumption. Leung and Tsang (2013), using a data set containing most real estate transactions in Hong Kong from 1992 to 2006, find anchoring and loss aversion necessary, and the results are robust to the type of housing and sample period. The results align with the strong associations between house price, price dispersion, and volume. Their findings imply that loss aversion and anchoring play a vital role in the housing market’s cyclicality. Yang and Zhang (2013) present a dynamic asset pricing model with diverse attitudes and demonstrate that the equilibrium stock price is the wealth share-weighted average of the stock prices that would prevail in an economy with one sentiment investor only. Moreover, heterogeneous sentiments induce fluctuations in wealth distribution, which raises the volatility of stock returns and causes mean reversion in stock returns.

When it comes to gain and loss, Thaler and Johnson (1990) showed that the degree of loss aversion is mainly based on past performance. An investor, for instance, becomes slightly averse to loss when past results indicate gains but extremely averse to loss when past results indicate a loss.

The first part of this literature survey based on the prospect theory showed that the loss aversion bias greatly influences an investor’s decision-making and investment strategies, hence our first hypothesis:

H1: Loss-aversion bias, which reflects investors' pessimism, adversely affects the performance of English companies, as well as their investment decision-making and strategies.

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

2.2. Overconfidence:

Overconfidence stems from findings in cognitive psychology research, indicating that individuals tend to overestimate their knowledge, skills, and the accuracy of their information. Research suggests that overconfident investors tend to overrate their ability to gather and interpret data, believing they can accurately forecast market trends. They often prioritise their insights over publicly available information, presuming their intuition and personal judgments to be superior. Such investors adhere to self-derived strategies, even if unsupported by rational analysis, finding contentment in their decision- making processes. They take full responsibility for managing their investment portfolios and engage in frequent buying and selling activities on the stock exchange.

Furthermore, they harbour a deep-seated belief in their inherent luckiness. Moreover, some studies have asserted that overconfidence and optimism can lead to excessive business entry. For instance, Camerer and Lovallo (1999) discovered that individuals who are overconfident and optimistic about their skills tend to enter new businesses in more significant numbers, only to exit later due to business failures. Similarly, Barber and Odean (2000) observed that overconfident investors tend to overestimate the accuracy of their information and, consequently, the anticipated gains from trading. They also noted that individuals typically turnover their joint stock investments at about 70% annually.

A notable experimental study by Russo and Schoemaker (1992) underscored the prevalence of overconfidence through a questionnaire-based assessment. Their findings revealed that while a mere 1% of individuals answered nine out of ten questions correctly, most respondents inaccurately estimated their knowledge, with the majority providing incorrect answers. This highlights a tendency among individuals to exhibit disproportionate confidence relative to their actual knowledge base.

Additionally, Chuang and Susmel (2011) present evidence indicating that individual investors exhibit higher levels of overconfident trading than institutional investors. In the context of Taiwan, they illustrate that personal and institutional investors engage in more aggressive trading following market gains, particularly in bullish markets, upward momentum market conditions, and periods of low volatility. However, individual investors demonstrate even more aggressive trading behaviours, particularly in riskier securities and during high-volatility market states.

Furthermore, Gervais and Odean (2001) suggest that the degree of overconfidence tends to decrease with investor experience. They propose that successful but inexperienced traders tend to be more overconfident than their experienced counterparts. Similarly, Menkhoff, Schmeling, and Schmidt (2013) found that both investment experience and age significantly influence the level of overconfidence, with overconfidence decreasing as individuals gain more knowledge and age.

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Gloede and Menkhoff (2011) conducted experiments demonstrating that professional expertise is associated with lower levels of overconfidence.

Numerous theoretical models substantiate the correlation between overconfidence, heightened trading activity, and diminished profitability. These models draw upon insights from an extensive body of psychological research, often termed the "calibration literature," exemplified by studies such as those by Lichtenstein et al. (1982). However, overconfidence models integrate a broader spectrum of psychological findings underpinning the concept of overconfidence. They predict that overconfident investors are inclined to engage in more frequent trading than rational investors. Moreover, similar to a practical study conducted by Deaves et al. (2009), which evaluated traders' performance on a task designed to elicit overconfidence and determine the accuracy of signals they receive regarding asset value, this experiment also links signal accuracy to task performance aimed at eliciting overconfidence. The experiment unfolds as follows: Initially, participants undertake a counting task designed to evoke overestimation or over-placement. Subsequently, participants trade an asset, valued at either 0 or 100 tokens, through a computerised double auction organised in groups of five. Participants are randomly assigned to either the control group or one of two treatment groups. All participants receive a signal, the accuracy of which is contingent upon their performance on a task identical to the one completed in the initial part of the experiment. In the control group, participants are presented with their signal but must be made aware of its accuracy. Consequently, overconfident participants may overestimate and overplace the accuracy of their signal, presuming it to be more precise than it is or superior to signals received by others in the group, even if this is different. Hence, in the control group, overestimation and over placement can influence trading behaviour.

Some studies also suggest that investigating potential gender effects can shed light on overconfidence. Research indicates that men are more prone to overconfidence (Lundeberg et al., 1994), possibly due to factors such as self-attribution bias, where success is attributed to personal effort and failure to external factors, which tends to be less pronounced among women (Miller & Ross, 1975; Beyer, 1990). Disparities in overconfidence between genders appear to be more prominent in tasks perceived to be in traditionally masculine domains (e.g., Beyer and Bowden, 1997). Indeed, Barber and Odean (2001) discovered that men trade 45% more frequently than women, resulting in lower risk-adjusted portfolio returns. In this experiment, we examine gender-based disparities in trading activity and consider whether overconfidence is the sole driving factor. Other influences may be at play. For instance, research suggests that women in mixed-gender groups tend to be less assertive than men (Carli, 2001). Additionally, the observation that men typically exhibit less risk aversion (e.g., Agnew et al., 2003) may make them more inclined to engage in transactions even when they are aware of incomplete information. Conversely, Bashir et al. (2013) assert no notable distinction in decision-making responses regarding overconfidence bias between male and female individuals in Pakistan.

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

In the behaviour of trading on the stock market exchange, the investor's reaction to overconfidence when exhibiting high trading volumes leads to changes in demand and increasing prices, which allows investors to perceive higher returns in the eventual case of selling their shares. This is in line with the disposition effect, meaning that investors tend to sell winners, and perceiving the appreciation of their investments will boost their overconfidence. Overconfident investors tend to disregard the risks associated with their investment portfolios, particularly those exhibiting prediction overconfidence. Conversely, investors displaying certainty and confidence tend to engage in excessive trading, ultimately leading to an undiversified portfolio (Awan et al., 2006). The influence of overconfidence prompts investors to overestimate their ability to control events and understand market dynamics, consequently underestimating the vulnerability inherent in their decisions (Baker & Nofsinger, 2002).

This bias has been notably detrimental, as evidenced by the negative impact witnessed during the technological bubble of the 1990s. Many investors concentrated heavily on technological stocks, driven by overconfidence in anticipating superlative returns. However, substantial losses ensued when the bubble inevitably burst (Pompian, 2006). Therefore, drawing from these hypotheses and supporting evidence, we aim to explore the impact of overconfidence on the stock market performance of English companies listed in the FTSE100. Through empirical analysis, we seek to elucidate its influencing factors and characteristics.

H2: The overconfidence bias, reflecting investors' optimism, positively influences the stock market performance of English companies and, subsequently, the economic performance of Britain.

3. Methodology

Our study focuses on the influence of loss aversion and investor overconfidence on market performance within the London Stock Market (FTSE100). We examine a sample comprising six companies indicated in both categories of industry and service sector as well that are listed on FTSE100. Our dataset encompasses yearly observations from January 1, 2004, to December 31, 2022. Annual data from Reuters encompass all English financial firms in the database. Control and independent variables retained in the dataset include market capitalisation, net earnings, company turnover (as measures of firm size), return on assets (ROA), and Tobin's Q ratio (as indicators of economic and stock market performance, respectively). To test our hypotheses, we introduce a loss-aversion variable derived from the fast variation of trading volume, supported by prior literature (e.g., Kahneman and Tversky, 1992; Genesove & Mayer, 20x`01; O'Connell & Teo, 2009; Gomes, 2005). Additionally, we define an overconfidence variable, proxied by the percentage change of shareholders' capital, aligning with previous studies (Malmendier & Tate, 2005; Heaton, 2002; Michailova, 2010). Table I provides a summary of variable definitions and sources.

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

This study uses Return on Assets (ROA) and Tobin's Q as performance metrics. ROA indicates company and management performance, reflecting its ability to generate earnings from its assets. It is widely employed in financial literature as a proxy for firm performance (Karaca & Eksi, 2012; Chari et al., 2012; Miranty & Sisnuhadi, 2011; Valenti et al., 2011). Similarly, Tobin's Q ratio is a commonly accepted measure for market performance in academic research (Tobin & Brainard, 1968; Tobin, 1969; Chung & Pruitt, 1994; Lei & Song, 2011). The fundamental model employed to assess the influence of loss aversion on economic performance (H1) is depicted as follows:

$$ROA_{i,t} = \alpha 0 + \beta 1 SIZE_{i,t} + \beta 2 MCAP_{i,t} + \beta 3 LA_{i,t} + \varepsilon_{i,t} \quad (1)$$

Hypothesis H1 anticipates that the coefficient of the loss-aversion variable, LA, will be significant, indicating that investors' loss aversion affects the Return on Assets (ROA) of English companies in the FTSE100 stock market. The model incorporates other variables from previous studies to elucidate firms' economic performance.

An examination of the impact of investor overconfidence on market performance (H2) is articulated through the subsequent regression model:

$$Tobin's\ Q_{i,t} = \alpha 0 + \beta 1 SIZE_{i,t} + \beta 2 NE_{i,t} + \beta 3 OC_{i,t} + \varepsilon_{i,t} \quad (2)$$

Hypothesis H2 posits that the coefficient on the overconfidence variable OC will demonstrate significance. We aim to ascertain whether investors operating within the England stock markets (FTSE100) manifest overconfidence in their conduct, thereby exerting an empirical influence on stock market performance. The model integrates several other variables to discern further discernible effects on company market performance.

Table I: Variable's Description

Variable	Definition	Measurement	Formula	Reference	Source
Dependent Variable					Database Thomson Reuters
ROA	Return on Asset	The ratio between net income and total assets	Net income/Total assets	*Karaca & Eksi, (2012); Chari et al., (2012) and Valenti et al., (2011)*	

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

TQ	Tobin's Q ratio	The ratio between a firm's stock market value and its fixed capital replacement value	Total market value/Total assets	*Tobin & Brainard, (1968)* *Tobin, (1969) and Lei & Song, (2011)*
Independent Variable				
LA	Loss Aversion	Percentage of transaction volume	Previous yearly transaction volume/ Present annual transaction volume	*Loewenstein, George; Weber, Elke U. (2002)*
OC	Overconfidence	Percentage change of shares held by shareholders	Previous yearly number of shares held by shareholders/ Present year number of shares held by shareholders	*Barber, B., & Odean, T. (1999)*
MCAP	Market capitalisation	The total market value of a firm's outstanding shares	Total shares outstanding X current stock price	*Al Mubarak, M., & Hamdan, A. (2016)*
SIZE	Firm Size	Turnover ratio: the amount of assets that a firm replaces about its sales	Log of total assets	*Rao, C. M., & Rao, K. P. (2009)*

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

NE	Net earnings	Difference between a firm's revenues and costs	Total revenue – Total expense – Preferred stock dividend	*Pan, X., Sha, J., Zhang, H., & Ke, W. (2014)*	

4. Results

4.1. Analysis of Loss Aversion and Overconfidence Effects on Market Performance: Yearly Estimates

The results are delineated in three stages. Initially, we examine the impacts of loss aversion and overconfidence separately, which is the cornerstone of our analysis. Subsequently, we assess the normality of the distributions of the research variables. Finally, we provide evidence of bias dominance among investors in UK markets.

To accurately gauge the influence of behavioural biases, we employ the robust panel fixed-effect model to estimate investors' sentiment regarding loss aversion and the panel random-effect model, a widely accepted approach, to evaluate investors' sentiment of overconfidence through Tobin's Q, as detailed in the methodology. Table IV succinctly presents the results of these estimated regression models.

Table 2 presents the estimation outcomes of the panel data for H1, which rigorously tests the impact of loss aversion on the economic performance of UK companies. The regression spans the entire analysis period (2004-2022) and encompasses industry and service sectors. While most of the variables regressed on asset returns are statistically significant, the independent variable of Loss Aversion is not. This finding suggests the absence of a loss-aversion bias effect on the economic performance of companies listed on the UK Stock Exchange, a significant insight for investors. Consequently, H1 is unsupported, indicating a need for further exploration in this area. Table IV indicates that the model is highly significant (Wald-chi2 = 98.67, p-value = 0.000) with an R2 value of 11.18 per cent. This signifies that the independent variables in the market performance model collectively account for only 11.18 per cent of the variation in ROA. The estimates show that the loss aversion variable (LA), represented by changes in trading volume, negatively impacts asset returns (ROA).

However, this effect is not statistically significant at the 95% confidence level in the UK market with (P-value > 5%). Notably, this negative impact affects the industry and service sectors. The other variables in our model, SIZE and MCAP, are statistically significant for both sectors at the

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

1, 5, and 10 per cent levels. Specifically, in the industry sector, LA negatively affects ROA with a coefficient of -0.00836, while in the service sector, the impact is less severe, with a coefficient of -0.00535. The SIZE and MCAP variables exhibit different effects across sectors: in the industry sector, SIZE has a negative coefficient of -0.0513 and MCAP a positive coefficient of 0.000735, whereas in the service sector, SIZE is positive at 0.00017 and MCAP is negative at -0.00035.

Table 2. Impact of loss aversion of investors on the economic performance of UK companies

H1 Result			
Panel Model (1): $ROA_{i,t} = \alpha 0 + \beta 1 SIZE_{i,t} + \beta 2 MCAP_{i,t} + \beta 3 LA_{i,t} + \varepsilon_{i,t}$			
Variables	Industry Sector (N=285)	Service Sector (N=323)	Both Sector (N=608)
Intercept	0.231***	0.136***	0.159***
p-value	(0.000)	(0.000)	(0.000)
Size	-0.0513***	-0.0241***	-0.0298***
p-value	(0.000)	(0.000)	(0.000)
MCAP	0.000735***	0.000573***	0.000516***
p-value	(0.000)	(0.001)	(0.000)
LA	-0.00836	-0.00535	-0.00689
p-value	(0.337)	(0.766)	0.470
R2 (%)	20.47	21.86	11.18
Wald-chi2	68.03***	89.23***	98.67***
p-value	(0.000)	(0.000)	(0.000)

Note: *, ** and *** indicate statistical significance at the 1%, 5% and 10% confidence levels, respectively..

The findings suggest that loss aversion negatively impacts the ROA of UK firms, irrespective of the sector. This indicates that a company's economic performance tends to decline as investor loss aversion increases. This relationship highlights that loss-averse investors may engage in behaviours detrimental to the firm's financial health due to risk aversion, potentially leading to

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

riskier economic conditions. Loss aversion is often linked with pessimistic investor outlooks, unfavourable market conditions, or significant events within English society, influencing strategic investment decisions. Random fluctuations in trading volume reflect investor reactions driven by loss aversion, which consistently negatively affects economic performance across all sectors. This bias seems intrinsic to the investor's personality, suggesting that loss-averse investors remain guided by their risk-averse principles even in favourable market conditions, thereby affecting their investment choices.

Table 3. Impact of overconfidence of investors on the market performance of UK companies

H2 Result			
Panel Model (2): Tobin's Qi,t = α0 + β1SIZEi,t + β2NEi,t + β3OCi,t + εi,t			
Variables	Industry Sector (N=285)	Service Sector (N=323)	Both Sector (N=608)
Intercept	5.051***	3.135***	3.515***
p-value	(0.000)	(0.000)	(0.000)
Size	-1.099***	-0.660***	-0.724***
p-value	(0.000)	(0.000)	(0.000)
NE	0.00238	0.0172	0.00526
p-value	(0.624)	(0.334)	(0.402)
OC	0.517***	0.513***	0.498***
p-value	(0.000)	(0.000)	(0.000)
R2 (%)	39.4	30.2	31.3
Adjusted R2 (%)	35.5	25.9	27.2
F-Value	57.87***	43.78***	87.09
p-value	(0.000)	(0.000)	(0.000)

Note: *, ** and *** indicate statistical significance at the 1%, 5% and 10% confidence levels, respectively.

The second set of estimates, conducted on panel data spanning the analysis period from 2004 to

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

2022 for the industry and service sectors, aimed to test H2. This analysis sought to establish whether investor overconfidence biases have a tangible impact on the stock market performance of UK companies. The results, as detailed in Table 3, are significant. The regression coefficients for all variables are statistically significant, reinforcing the previous discussion on the overconfidence effect and providing compelling evidence for accepting H2. The model itself is highly significant (F = 87.09, p-value = 0.000), with an R-squared value of 0.313, indicating that the regression model can account for 31.3 per cent of the variation in the dependent variable (Tobin's Q ratio). The overconfidence variable (OC), represented by the shareholder shares change, is positive and statistically significant for both sectors. The SIZE variable is also statistically significant at the 1, 5, and 10 per cent levels for both sectors, while the NE variable shows the opposite trend. In the industry sector, OC positively impacts Tobin's Q with a coefficient of 0.517, while in the service sector, it has a coefficient of 0.513. When considering both sectors together, the OC coefficient remains positive but is less substantial compared to each sector individually.

Reiterating the key points, the SIZE variable has negative coefficients significantly related to Tobin's Q ratio, with values of -1.099 in the industry sector and -0.66 in the service sector. Conversely, the NE variable has positive coefficients with Tobin's Q, showing values of 0.00238 in the industry sector and 0.0172 in the service sector. This indicates that investor overconfidence positively impacts Tobin's Q for UK firms in both sectors, suggesting that overconfidence can enhance stock market performance. Overconfidence aligns with Tobin's Q, reflecting a positive correlation. These results indicate that investing with overconfidence can enhance stock market performance for industrial companies, whereas, for service companies, such overconfidence might lead to lower performance. Overconfidence often characterises optimistic investors and can be influenced by unfavourable market conditions or significant societal events, affecting strategic investment choices. Changes in shareholders' capital, reflecting investor reactions to overconfidence, have positively influenced market performance in both sectors. This bias may not only stem from investor personality but also from the characteristics of the market or the firm itself. Therefore, the impact of overconfidence depends on the sector, potentially improving performance for some companies while hindering it for others. Thus, H2 is strongly supported.

4.2. Non-Normality in Research Variables:

In this section, we address the non-normality of the research variables, focusing on the non-normality of loss aversion, overconfidence effects, and economic and market performance. The normality of the variables distributions is assessed using a Kernel density estimate graph, which visually represents the normality curve. This analysis is further substantiated by conducting t-tests. The subsequent figures illustrate the test results compared to a normal distribution.

Figures 2, 3, and 4 compare the loss-aversion curve, represented by changes in trading volume, to the normal distribution curve for both sectors. There is a significant gap between these variables.

ISSN: 2455-8834

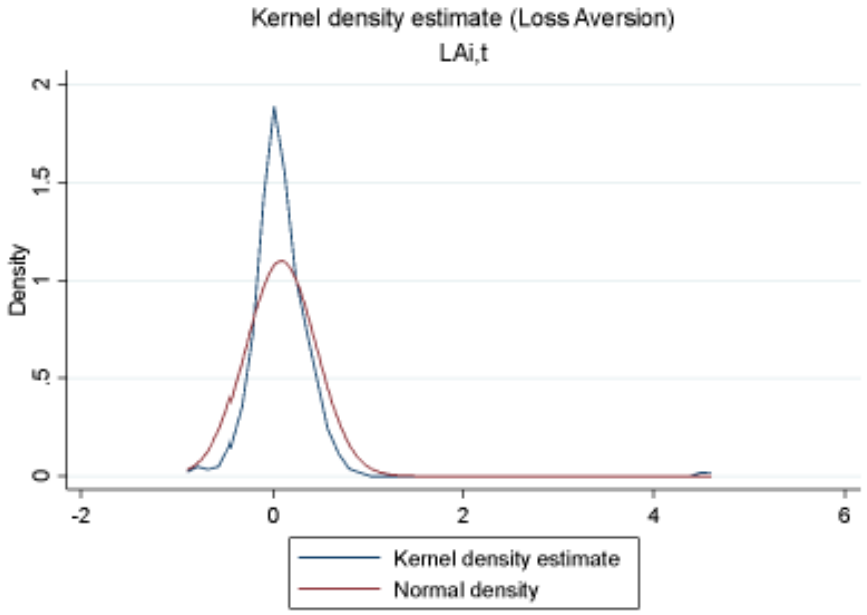
Volume:09, Issue:08 "August 2024"

Previous tests established that the loss-aversion variable negatively impacts the ROA of UK companies across all sectors. Thus, it is crucial for UK companies that investors mitigate loss aversion. These figures illustrate that the loss-aversion effect deviates significantly from the normal distribution for both industry and service firms. Ideally, this effect should be closer to normal, indicating less concern for UK companies about the bias's impact on their economic performance.

Figures 5 and 6 compare the overconfidence curve, shown by changes in shareholders' holdings, to the normal distribution curve. Despite previous results showing a positive influence on Tobin's Q ratio for industrial firms, a notable gap exists between these variables. Consequently, while industrial firms might not need to curb overconfidence, service firms would benefit from addressing it. The figures demonstrate that the overconfidence effect significantly deviates from the normal distribution for all firms. Ideally, this effect should be closer to normal, indicating less concern for UK companies about the bias's impact on their stock market performance.

Figures 7, 8, and 9 show that the ROA of UK companies in both sectors deviates from the normal distribution, reinforcing that loss aversion negatively impacts economic performance. Figures 10, 11, and 12 illustrate that Tobin's Q ratio for UK companies also deviates slightly from normal, confirming that overconfidence is a factor in stock market performance deviations. The non-normality of variables does not introduce biases or incorrect estimates in the model, as linear regressions do not require normal distribution assumptions for large samples; only residuals need to be normally distributed (Diehr & Lumley, 2002).

Figure 1. Non-normality of loss aversion (industry sector)



ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Figure 2. Non-normality of loss aversion (service sector)

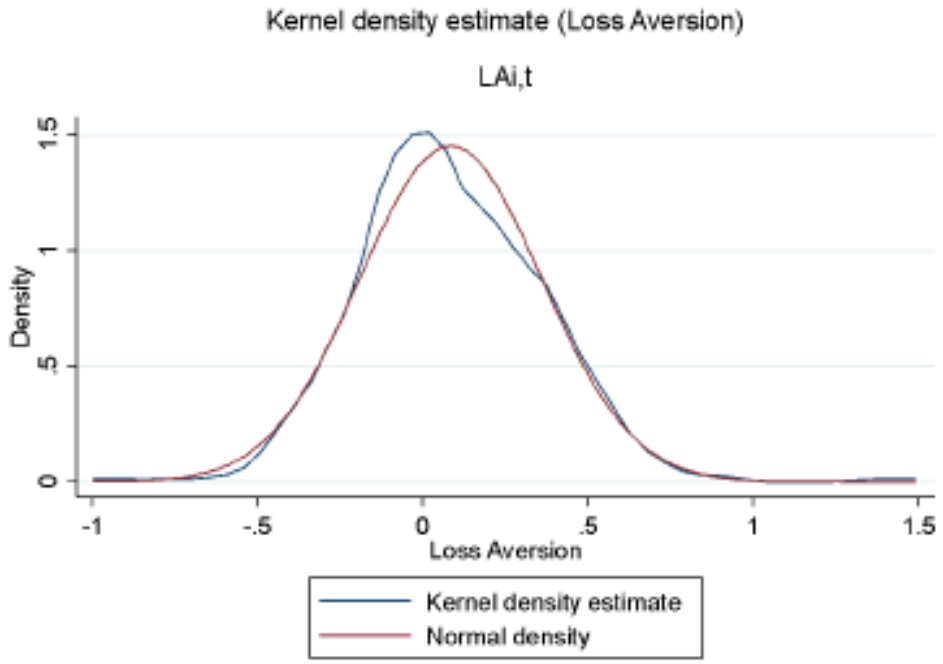
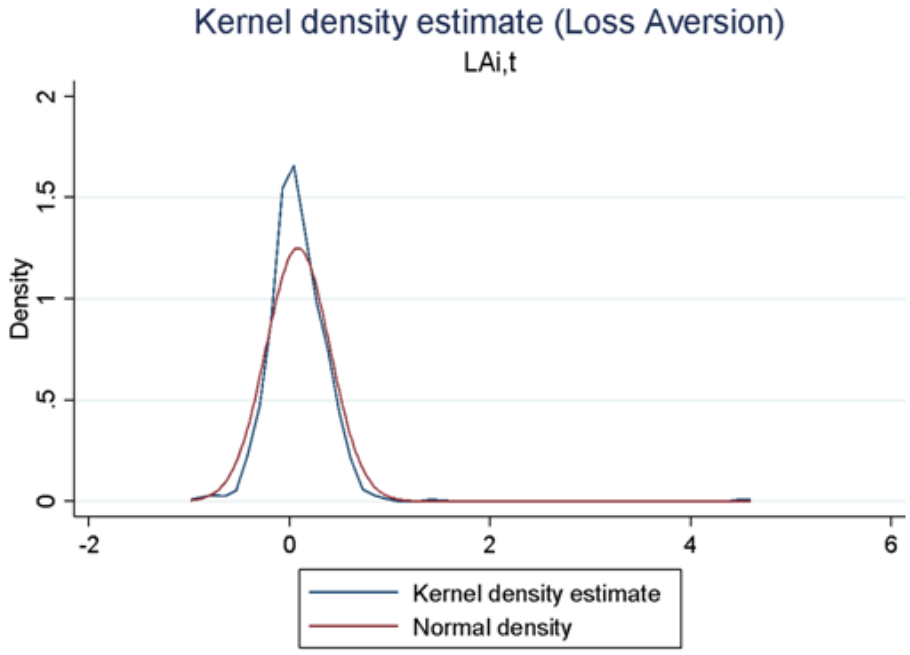


Figure 3. Non-normality of loss aversion (both sectors combined: all companies)



Source: According to the author's statistics and calculations

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Figure 4. Non-normality of overconfidence (Industry sector)

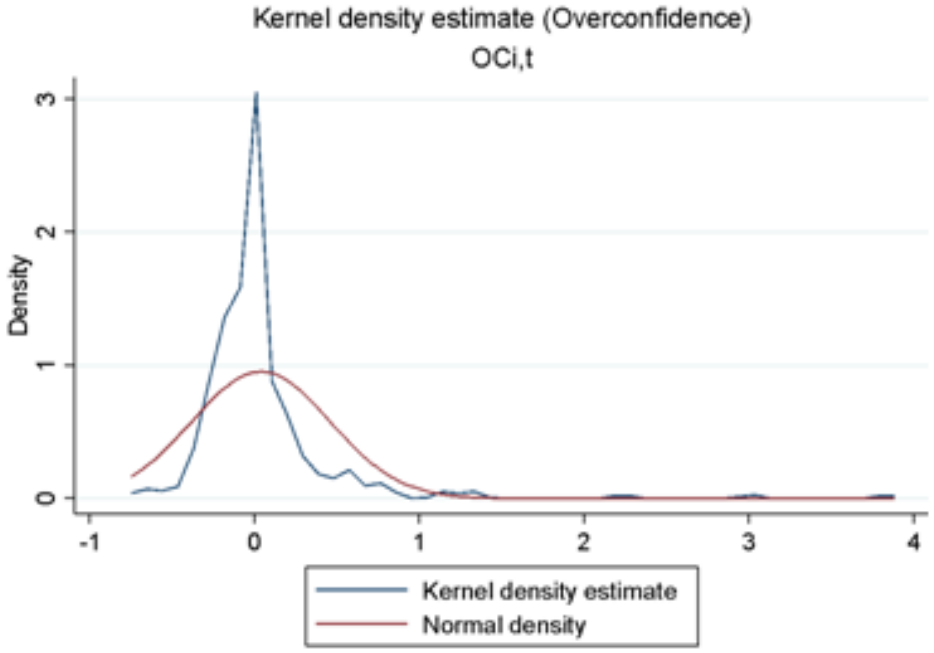
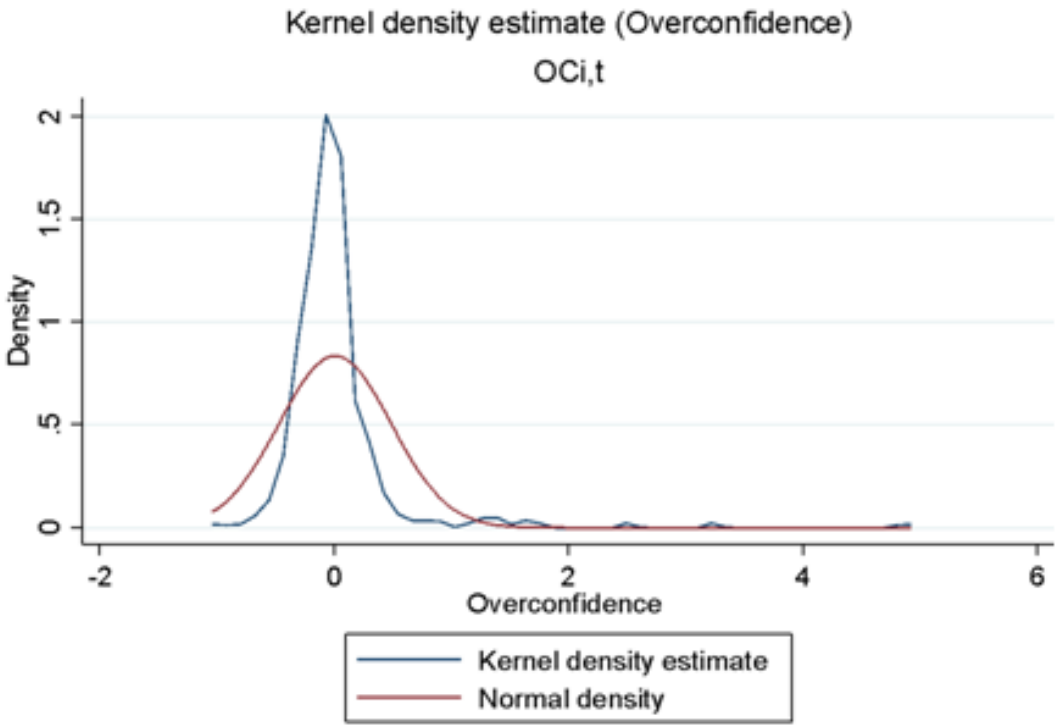


Figure 5. Non-normality of overconfidence (service sector)



ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Figure 6. Non-normality of economic performance (industry sector)

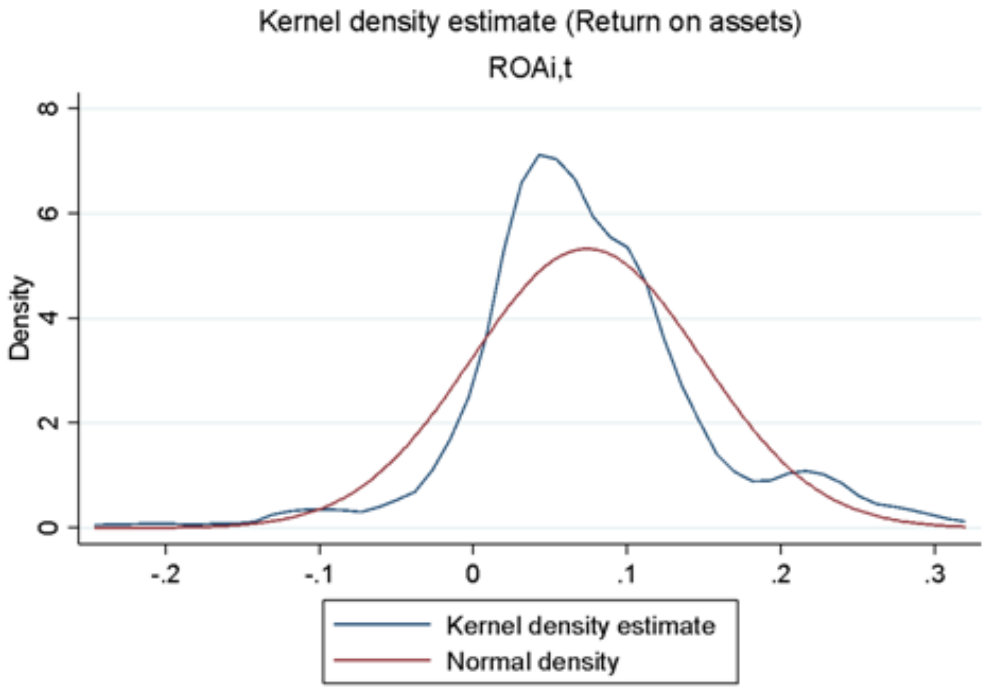
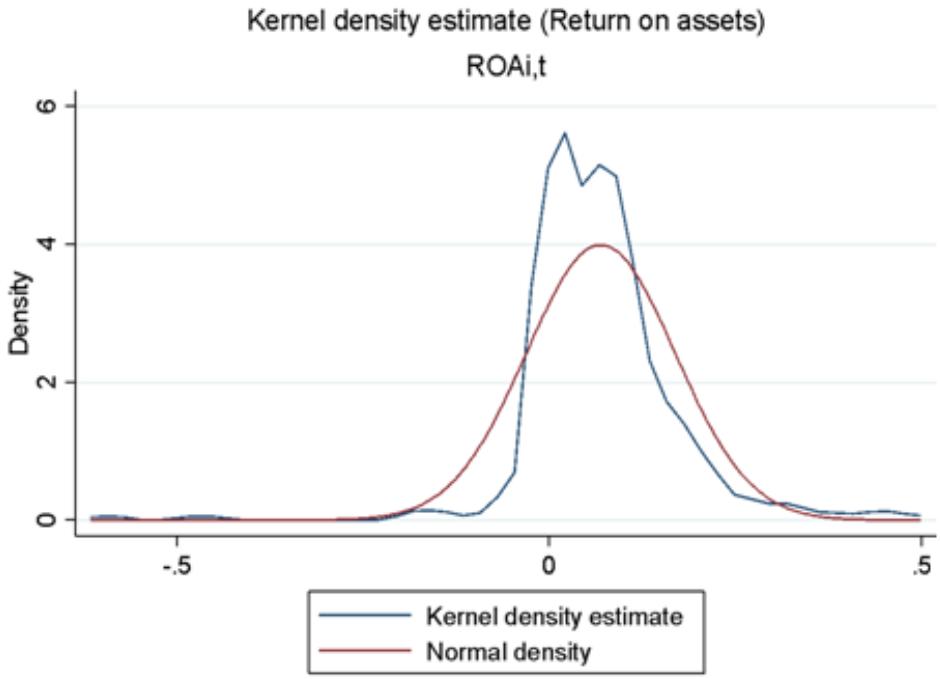


Figure 7. Non-normality of economic performance (service sector)



ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Figure 8. Non-normality of economic performance (both sectors combined: all companies)

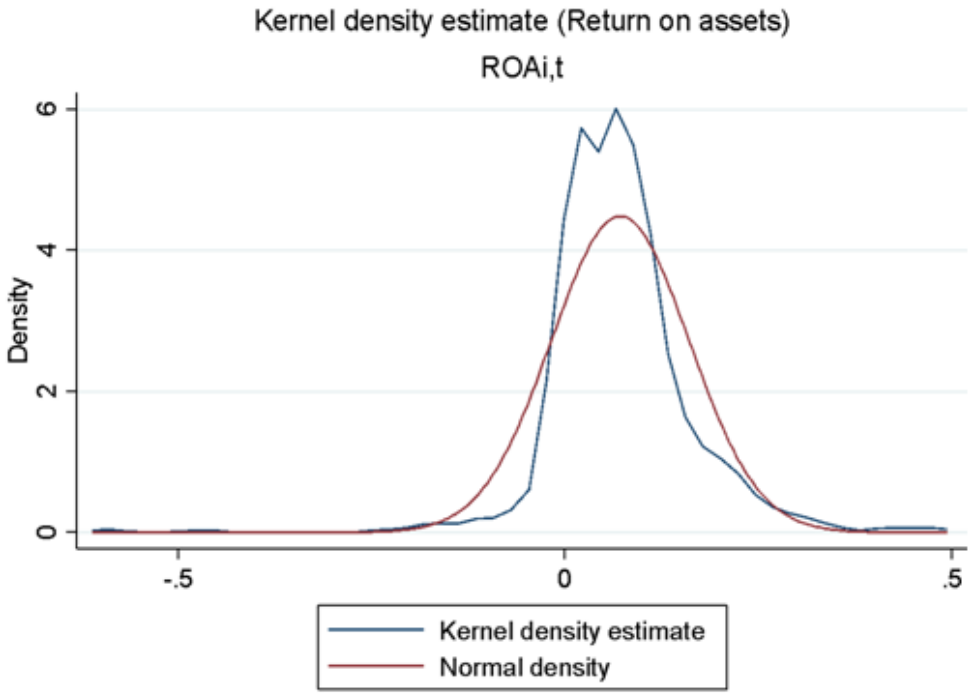
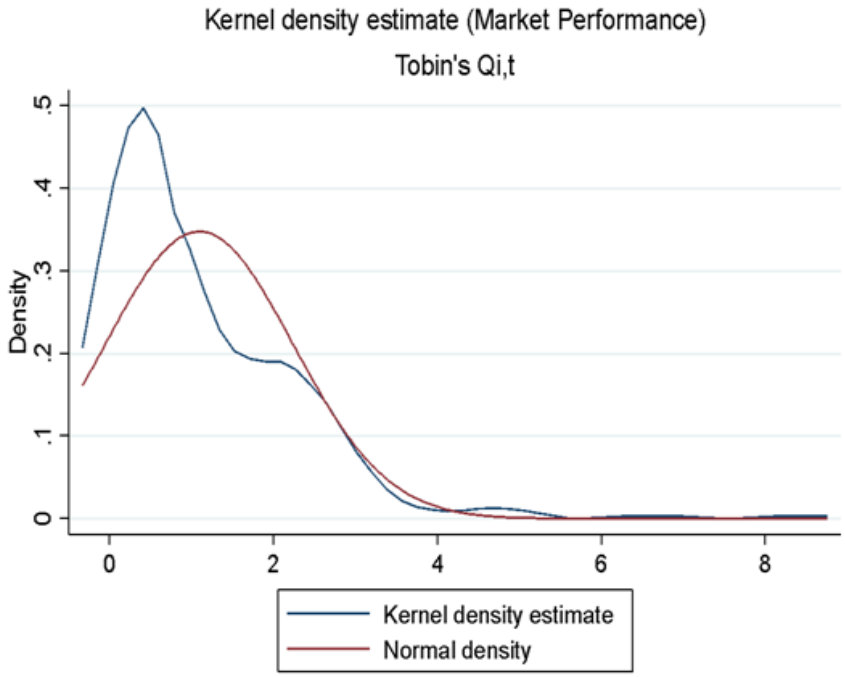


Figure 9. Non-normality of market performance (industry sector



ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Figure 10. Non-normality of market performance (service sector)

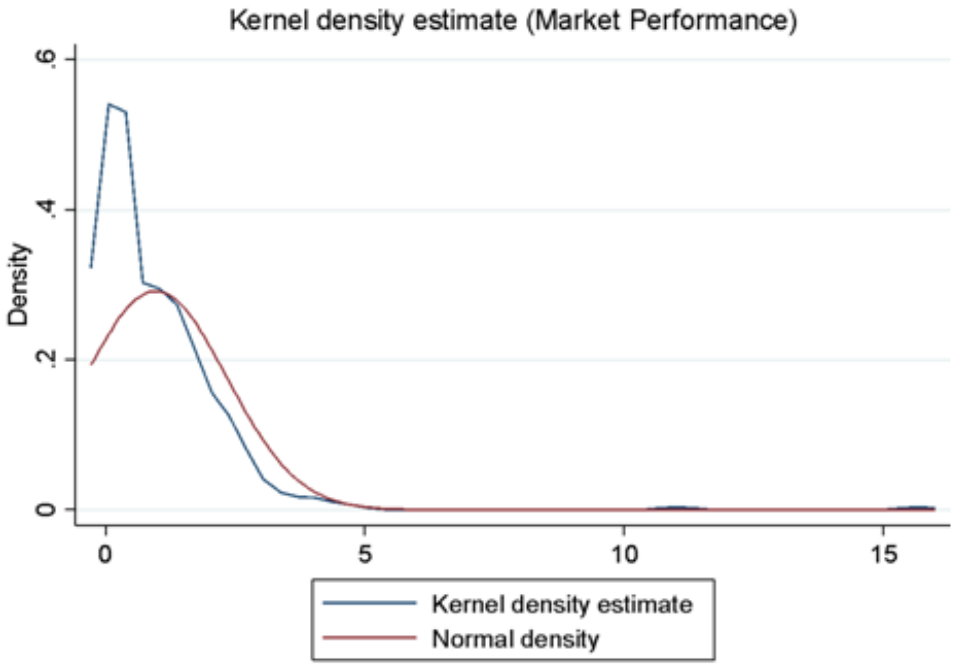
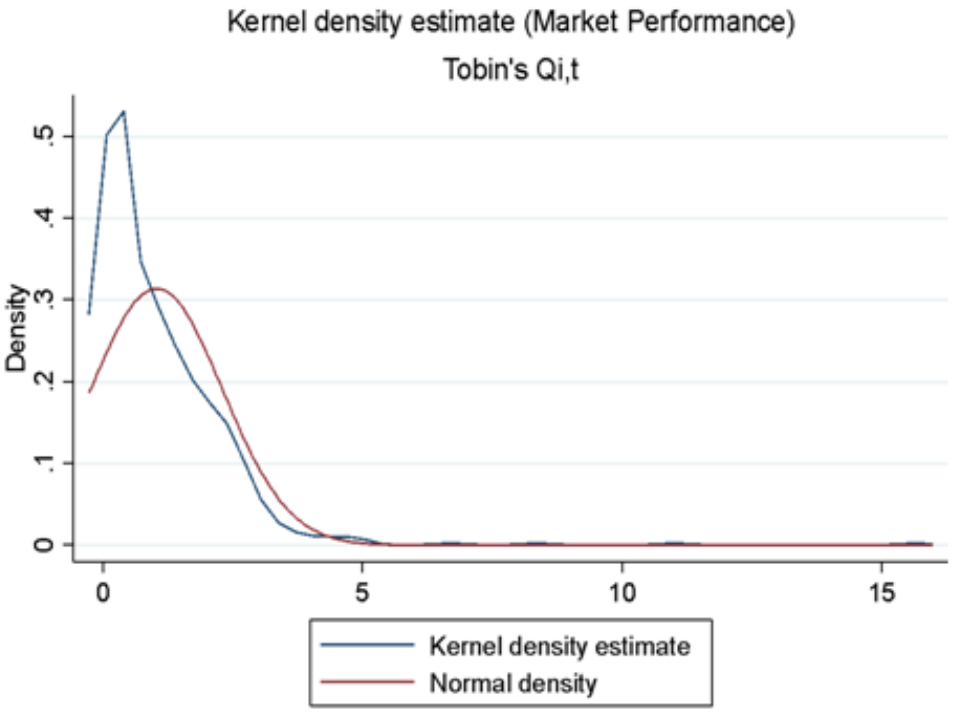


Figure 11. Non-normality of market performance (both sectors combined: all companies)



ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Table 4. Dominance of investor overconfidence on loss aversion

Difference: LOi,t – Oci,t			
Variables	Industry Sector (N=285)	Service Sector (N=323)	Both Sector (N=608)
t-Statistic	1.3011	2.5451***	2.7164***
H1: ≠0 (p-value)	0.1943	0.0114	0.0114
H1: >0 (p-value)	0.0971	0.0057	0.0034
H1: <0 (p-value)	0.9029	0.9943	0.9966

Note: *, ** and *** indicate statistical significance at the 1%, 5% and 10% confidence levels, respectively.

We aim to empirically answer whether an investor tends to be loss-averse or overconfident? Loss aversion reflects pessimism, while overconfidence indicates optimism. Theoretically, an investor cannot exhibit both biases simultaneously. Table 4 presents the results of a paired-sample t-test comparing the percentage variation of transaction volume (measuring loss aversion) with the percentage variation of shares held by shareholders (measuring overconfidence). The test hypothesis is that the difference between these two percentages equals 0. The empirical results for both sectors suggest that the difference between the variables is greater than 0. However, our findings show that this difference is less than 0 and not statistically significant, with a p-value greater than 5%.

This indicates that loss aversion dominates overconfidence, meaning investors tend to be more loss-averse than overconfident. The predominance of loss aversion over overconfidence suggests that investors in UK companies are generally pessimistic. However, this pessimism can negatively impact a company's stock market performance. As highlighted earlier in Table IV, loss aversion negatively affects market performance (ROA) overall. Despite not being statistically significant with a p-value greater than 5%, the influence of loss aversion on market performance underscores its detrimental effect on economic outcomes.

5. Conclusion

The analysis presented in this study provides insightful contributions to understanding behavioural biases—specifically loss aversion and overconfidence—and their impacts on the economic and market performance of companies listed on the UK Stock Exchange. Our research focused on a sample of industry and service sector firms, examining data from 2004 to 2022.

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Firstly, the investigation into loss aversion revealed that this behavioural bias does not significantly impact UK companies' economic performance. Despite the intuitive expectation that loss aversion might influence investor behaviour and company performance, our findings do not support this hypothesis. The results suggest that other factors may play a more critical role in driving the economic outcomes of these firms.

In contrast, our analysis of overconfidence provided robust evidence supporting its positive influence on market performance. The results showed a significant relationship between investor overconfidence and stock market metrics, such as Tobin's Q ratio. This finding aligns with the hypothesis that overconfident investors tend to drive up stock prices due to their optimistic outlook, which reflects positively on market performance.

The implications of these findings are multifaceted. Understanding that overconfidence can lead to inflated market valuations is crucial for investors and financial analysts. It highlights the importance of exercising caution and seeking objective data to counteract the potential distortions caused by overconfident behaviour. For policymakers and regulatory bodies, the evidence suggests a need to consider behavioural factors when designing interventions to stabilise financial markets. Furthermore, our study underscores the complexity of investor behaviour and its varied impacts on different performance metrics. While loss aversion may not significantly affect economic performance, its role in other aspects of investor decision-making cannot be entirely dismissed and warrants further investigation. Future research could explore the conditions under which loss aversion manifests more prominently, offering a more nuanced understanding of this bias.

In conclusion, the dichotomy observed between the effects of loss aversion and overconfidence provides a deeper insight into behavioural finance. Overconfidence emerges as a more influential bias in the context of market performance, suggesting that investor sentiment and psychology play a critical role in shaping financial markets. These findings contribute to the broader discourse on behavioural finance, emphasising the need for ongoing research to unravel the complexities of investor behaviour and its implications for market dynamics.

By integrating behavioural insights with traditional financial analysis, stakeholders can develop more comprehensive strategies to navigate the intricacies of financial markets. The lessons drawn from this study serve as a valuable resource for enhancing the effectiveness of investment decisions and policy formulations in the ever-evolving landscape of finance.

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