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Investigating the Determinants of Earning Response Coefficient: A Case Study of PSX's KSE-100 Index

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Abstract
The purpose of this study was to determine what factors affect the Earnings Response Coefficient (ERC) for the 30 companies that have been listed on the Karachi Stock Exchange's 100 stock index (KSE-100) during the years 2019-2022. This was achieved by evaluating the company's profitability, its debt percentage, and the extent to which the firm is affected by market-wide movements (i.e., systematic risk), as it relates to investors' responses to earnings announcements. Secondary data were used for the study, which included audited financial statements, annual reports, and other publicly available financial data sources. Descriptive statistical analysis and pooled ordinary least squares (OLS) regression, along with diagnostic tools such as variance inflation factor (VIF) diagnostics, normality tests, and heteroscedasticity corrected estimations, were utilized to ensure the reliability of the findings. The results indicated that the mean ERC value is 0.025. In essence, investors respond to earnings announcements in the Pakistani equity market at a rate much lower than investors in developed countries. Return on assets (ROA), a measure of profitability, has a positive and statistically significant relationship with ERC, indicating that investor responses to earnings announcements are greater when firms exhibit strong operating performance. Leverage (measured using the debt-to-equity ratio), and systematic risk (measured using beta), are both negatively associated with ERC, suggesting that high levels of financial risk and/or market volatility reduce investor confidence in reported earnings. Overall, the explanatory variables explain approximately 36 percent of the variability in ERC. This study adds to the limited body of research examining earnings informativeness in developing capital markets, provides empirical evidence from Pakistan, and highlights the importance of prudent capital structure decisions,

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effective risk management, and improved financial reporting disclosure practices to increase investor responsiveness to earnings announcements.

Keywords: Earnings Response Coefficient, Profitability, Leverage, Systematic Risk, KSE-100 Index, Market Reactions, Financial Reporting.

INTRODUCTION

The Earnings Response Coefficient (ERC) measures the effect of stock prices based on earnings announcements, and high ERC values reflect strong investor reaction, whereas low ERC values reflect lower significance (Hasanzade et al., 2014; Paramita et al., 2020). Financial markets influence the earnings and stock performance of firms, generating price movements that reflect their degree of financial stability. Lower ERC values represent unreliable data, and higher ERC values represent significant market reaction to reliable data (Hasanzade et al., 2014; Zhao, 2019; Paramita et al., 2020). Profitability, as reflected by Return on Equity (ROE) and Return on Assets (ROA), has a positive influence on the ERC, thereby increasing investor confidence (Li & Wang, 2021; Liu et al., 2024; Mashayekhi & Aghel, 2016). Successful firms show robust ERC connections across the globe (Mashayekhi & Aghel, 2016; Li & Wang, 2021). Negative surprise leads to price declines, and positive earnings surprise increases confidence; however, high leverage has negative effects on reactions due to financial risk. Systematic risk, measured by beta, also impacts the corporate responses to earnings reports. The ERC and the systematic risk relationship differ among markets (Hu & Wang, 2021; Xie, 2018). Understanding ERC and its components enhances the reliability of the earnings quality and the confidence of the investors in the accounting information.

This report studies the determinants of ERC in the KSE-100 Index from 2020 through 2022 in order to aid investors and financial decision makers. The profit information contained in the earnings release affects investors' decisions and market responses. Nonetheless, there lack of a full examination of ERC components within Pakistan's economy, as represented by the KSE-100 Index. Discovering ERC components contributes to accurate forecasting of market responses and, therefore, better investment strategies.

The assessment of ERC in Pakistan is more complex than in developed economies because of the unique characteristics of the local economy, such as investor behavior and economic environment. Unlike developed economies, local environments significantly influence how investors react to results. Furthermore, the susceptibility of Pakistan's stock market to changes in the local political, social, and economic environment complicates the ERC analysis. Consequently, the evaluation of traditional ERC components, such as profitability and leverage, is important, since these may function differently in the local market than they do in more stable economies. Analyzing the KSE-100 Index provides both academic and practical benefits for investors, corporate executives, and regulators by enhancing financial communication, portfolio strategy, and regulatory clarity. Additionally, this paper aims to bridge the knowledge gap on ERC drivers in Pakistan with the aim of

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providing additional decision-making capabilities and improved market efficiency. The findings will be used to develop more accurate ERC prediction models, improve financial decision-making, and facilitate the navigation of stakeholders through Pakistan's capital markets.

Research Questions

This research will seek answers to:

How do profitability, capital structure, and systematic risk affect the ERC in Pakistan's stock market?

What is the relationship between profitability, systematic risk, capital structure, and ERC?

Which stakeholders benefit from this study's findings and recommendations regarding ERC in the Pakistani stock market?

Research Gap

The two other studies that are analyzing the factors that may affect ERC in a variety of environments are Awawdeh et al. (2020) in Jordan and Ambarwati and Sudarmaji (2020) in Indonesia. The impact of capital structure, firm risk, and persistent profits on ERC in Indonesia was analyzed by Paramita et al. (2020). Although we know nothing about research on the effects of the above-mentioned variables on ERC in the context of the Pakistani stock market, there is little knowledge as to what degree profitability, capital structure, and systematic risk may be associated with ERC in Pakistan.

LITERATURE REVIEW

Theoretical Background

The efficient market hypothesis (EMH) and signaling theory are the two theories that will be used to explain how financial data impacts the behavior of investors and stock prices in this study. These theories provide a basis for understanding the underlying mechanics of the evolution of ERC, therefore providing an explanation of the dynamic nature of financial markets.

Signaling Theory

Michael Spence created the Signaling Theory in 1973 to address the asymmetry of information in markets. Informed parties, like applicants for a job or firms, signal, as per Spence, their internal value to their less informed counterparts, such as investors or employers. Several types of financial market signals that firms utilize to tell investors about their overall business outlook and well-being include dividend payouts and earnings reports. As stated by Brigham and Houston (2014), company disclosures will decrease the asymmetry of information between investors and management, which influences investors' perception and the price of the firm's shares. Signals do not all have the same impact; context, consistency, and credibility are all important elements. The strength and stability of a firm is signalled to investors by the firm's ability to produce consistently profitable earnings and its consistent payment of

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dividends; however, selective disclosure may create doubt regarding a firm's intentions. Managers recognize the significance of signalling, and provide strategic disclosures of financial data to ensure investor confidence and increase the stature of their firm; therefore, voluntarily disclosing financial data, such as governance reports, can emphasize a firm's strengths and increase investor confidence. Transparency is associated with clear communication and reduced uncertainty in investments, and therefore, transparency is associated with better market performance (Connelly et al., 2011). Signal theory has applications in numerous aspects of corporate finance, including capital structure and earnings management. Firms with quality earnings, as per Seavey et al. (2025), will provide full financial information, which affects the perception and valuation of investors. Additionally, good governance practices influence investors to view firms as lower risk, resulting in a positive reaction from the market, according to Saha (2024). This research demonstrates how signalling influences both the behavior of investors and market results in an environment where there is high asymmetry of information.

Efficient Market Hypothesis (EMH)

In the 1960s, Eugene Fama put out the efficient market hypothesis (EMH), contending that markets are efficient when all information is reflected in stock values. Since new information is rapidly incorporated, it is impossible to achieve regularly above-average returns adjusted for risk. Weak, semi-strong, and strong forms of market efficiency were distinguished by Fama (1970). The weak form argues current prices reflect all past trade data; the semi-strong form argues all public information is incorporated into prices; and the strong form includes insider information. Gaining an understanding of these differences helps one to appreciate how knowledge influences the Earnings Response Coefficient (ERC) and market behaviour. Analysing the effect of earnings announcements on stock prices depends on the semi-strong form since prices should immediately reflect fresh public information. Still, market efficiency has drawn much discussion. First studies confirmed EMH, but later studies showed discrepancies. One prominent obstacle is post-earnings announcement drift, in which stock prices react to earnings shocks for weeks following an announcement, so running against the semi-strong form. The momentum effect reveals previously unsaid information by highlighting past price movements in stocks that continue to shine. Bekaert and Harvey also noted that market efficiency varies; rising markets show more inefficiencies as a result of higher transaction costs and looser regulations. Recent research shows that behavioural factors, such as investor mood and cognitive biases, can diverge from EMH, despite Barberis et al. (1998) developing an ERC to study these influences.

Empirical Findings from the Literature

This section discusses empirical findings on the Earnings Response Coefficient (ERC) level and its determinants, including profitability, leverage, and systematic risk. It will review the literature on how these factors impact market behaviour in response to earnings announcements and reliance on financial environments.

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Earnings Response Coefficient (ERC)

According to Scott (2009), a higher Earnings Response Coefficient (ERC) indicates an increased reaction of the market to unexpected earnings announcements and more confidence in the accuracy of profit levels. ERC research examines how the relationship between earnings and stock prices is influenced by timing, investor expectations, and other environmental factors. The fact that the ERC value has risen, as Kurniawati and Dwimulyani (2018) points out, indicates that current income statements have been released recently. As Hasanzade et al. (2014) note, investors typically establish expectations regarding financial results before their release, with such expectations influencing stock prices because the ERC reflects the extent of the response based on unexpected events. According to Collins et al. (1984), ERC is a measure of earnings informativeness; thus, the greater the ERC, the more valuable the information contained in the earnings announcement and the greater the magnitude of the stock price reaction. ERC values vary significantly among firms and industries due to differences in systematic risk, leverage, profitability, and growth (Scott, 2009). Thijeel et al. (2025) relate ERC to firm-specific characteristics, demonstrating that the level of disclosure can influence the degree to which markets respond to earnings announcements. Research by DeFond et al. (2018) and Dichev and Tang (2009) notes that earnings stability (earnings persistence) is essential for producing ERC, indicating that stable earnings produce higher-quality information. Additionally, Mousavi et al. (2022) note that both macroeconomic conditions and market sentiment influence ERC, and therefore, economic downturns and/or periods of high volatility reduce the responsiveness of investors to earnings announcements.

Profitability and ERC

Profitability of the corporation impacts ERC, resulting in an increased academic focus on whether a corporation's profit-making abilities impact the overall reactions of the market upon an earnings announcement. Research has shown that a corporation with strong earnings results in a greater ERC due to the fact that profitable corporations are seen as financially stable and as having the potential to grow. In addition, according to Paramita et al. (2020), a corporation with strong profitability indicates that it has strong operational performance and potentially strong future returns, therefore creating a positive correlation with a positive movement of the share price after the announcement.

The benefits of this trend are particularly prevalent in those corporations that have consistently demonstrated their profitability, which typically reinforces investor confidence and can result in the same positive financial outcome for the corporation when the stock price reacts positively. According to Moradi et al. (2010), there was a significant positive correlation between the profitability and ERC, demonstrating that a corporation with a satisfactory level of profitability creates a more favorable response from the market during earnings announcements, because investors use profitability as a measure of a corporation's strategy and its growth potential, thereby increasing ERC. However, the relationship is not always so clear-cut. For example, while Hasanzade et al. (2014) found a negative correlation, they also noted that the

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market reaction to a corporation's high profitability can vary based on the corporation's sustainability issues and/or market saturation. However, Ambarwati and Sudarmaji (2020) were unable to establish a causal relationship between profitability, measured by ROE, and ERC, which implies that variables other than profitability affect how investors respond to earnings announcements. The varying nature of these findings further emphasizes the necessity of conducting additional research regarding how profitability affects ERC within different market environments, as such research will enable investors and corporate management to develop efficient financial communication plans.

Capital Structure/Leverage and ERC

Empirical research provides a wealth of data, particularly concerning leverage, for understanding the relationship of leverage with capital structure and the resulting earnings response coefficients (ERCs), which are utilized in determining the stock price reaction to earnings announcements. The results of these studies help illustrate how the market responds to the earnings release of a firm. Assagaf et al. (2019) studied the effect of DER on ERC using four different models. Results were indicative of a positive correlation with ERC in models 2 and 4, but showed no correlation with ERC in models 1 and 3. These results indicate that ERC is a function of a number of variables, including industry, market conditions, and investor attitudes; therefore, leverage has a direct effect on ERC.

Results of Akhyar et al. (2023) study also indicated there was no statistically significant relationship between DER and ERC, and further stated that investors may look beyond leverage when evaluating the stock price response to a firm's earnings announcement, and instead focus on other financial ratios or characteristics. The authors state that "the commonly-held view that excessive leverage can lead to pronounced stock price reactions" is often dependent on a variety of firm and market-related variables, rather than solely the amount of leverage. Collins & Kothari (1989) and Sudarmaji & Ambarwati (2018) demonstrated a statistically significant relationship between DER and ERC. The relationship between DER and ERC indicates that highly leveraged firms experience more noticeable changes in the stock price in response to their earnings announcement. The findings support the trade-off theory, which seeks to balance the tax benefits of debt against the potential financial distress implications of leverage. Research by Raza et al. (2018), Alkartobi (2017), and Lukman (2014) supports the notion that leverage positively impacts ERC and implies that the utilization of debt to increase profits through reduced taxable income enhances the firm's market value. Ultimately, it is the operating environment of a company that will determine whether leverage affects ERC.

On the contrary, not all of the studies demonstrate a favorable relationship between leverage and ERC. For example, Romasari (2013) found that while Sari and Rokhmania (2020) concluded that leverage had a negative effect on ERC and found that higher leverage resulted in less investor confidence due to increased financial risk, Romasari (2013) found that the effect of leverage on ERC was not always the same. Also, Ambarwati and Sudarmaji (2020) found that DER had a serious and negative

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effect on ERC. These results suggest that because investors assume that lenders take the majority of earnings, high-levered firms receive little to no market reaction to earnings releases. Ultimately, studies utilizing differing methodologies highlight the complexities involved with the interaction of leverage and ERC.

Systematic Risk and ERC

Systematic risk is very important for understanding how sensitive a firm is to an overall change in the market. Firms with greater systematic risk are expected to be more volatile, and therefore their earnings announcements will be viewed as more important. Research indicates that systematic risk is related to ERC. Baldwin and Glezen (1992) indicate that firms with greater systematic risk (beta) tend to have greater ERCs because the market perceives them as being more responsive to new information. Therefore, systematic risk has a relationship to ERC-based market responses. The studies by Francis et al. (2004) & Core et al. (2008) demonstrate that lower earnings quality, combined with higher systematic risk, tends to produce lower ERCs because investors discount earnings from lower quality firms due to instability concerns. On the other hand, Basu (1977) and Collins et al. (1987), argue that ERC and systematic risk can be offsetting. According to Basu, low-beta firms often incur a negative ERC effect due to the market perception that these firms are safer and will receive positive reactions. Collins et al., also indicated that there was a strong ERC in firms with lower systematic risk and persistent earnings that indicated a higher market value. Cheng et al. (2013) state that both the market condition and the investor sentiment greatly impact the systematic risk-ERC relationship. High beta firms tend to experience a larger ERC when the market is experiencing volatility, especially following an earnings per share shock, but tend to see smaller ERC shifts during periods of calmness in the market as a result of lessened risk manifestations.

Operational Definitions of Variables

Operational definitions of all variables, i.e., Earning Response Coefficient (ERC), Profitability, Leverage, and Systematic Risk, are explained hereunder:

Earning Response Coefficient (ERC) (Dependent Variable)

To examine the relationship between market reaction and earnings information, this study uses Cumulative Abnormal Return (CAR) as a proxy for stock prices and Unexpected Earnings (UE) as a proxy for accounting profit. The Earnings Response Coefficient (ERC) measures investors' responses to earnings announcements and is derived from the regression results between CAR and UE (Soewardjono, 2005). The regression model is as follows:

$$CARit = \alpha° + \alpha 1UEit + \varepsilon it \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where: CAR_{it} = Cumulative Abnormal Return of Firm x in period t; UE_{it} = Unexpected Earnings of Company X in period t; α_0 = Const.; α_1= Coefficient of EU_{it} and CAR_{it}; ε_{it} = error term.

Finding the Cumulative Normal Return (CAR), a proxy for market reactions, comes first in computing the ERC (Soewardjono, 2005). The Abnormal Return (AR) is

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calculated using the Market Adjusted Model since stock prices often swing about the days of announcements (Junaedi, 2005). Serving as the dependent variable in the ERC measurement, CAR is the total of aberrant returns. The stock closing price of the company and the stock closing price during the reporting period are the variables used to calculate CAR.

The formula for computing the actual return on day t

$$\text{Rit} = \frac{(\text{Pit} - \text{Pit} - 1)}{\text{Pit} - 1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where: R_{it} = Actual Returns of Firm i in period t; P_{it} = Closing stock price of Firm's i on day t; P_{it}-1= Closing Stock Price of Firm's i on day t-1

Formula for Computing Daily Market Return

$$\text{Rmt} = \frac{(\text{IHSGt} - \text{IHSGt} - 1)}{\text{IHSGt} - 1}$$

Where: Rmt = Market return on day t; $IHSG_t$ = Market Return on day t; $IHSG_t$-1 = Market Return on day t-1

Computation of Abnormal Return

An important indicator of the market situation is abnormal return (AR). It captures the variations between the expected and the real returns. Normal returns in this study are computed using a market-adjusted model. The computation of abnormal returns follows this:

$$\text{ARit} = \text{Rit} - \text{Rmt}$$

Where: AR_{it} = Firm's i Abnormal Return in period t; R_{it} = Firm's i actual Return in period t; R_{mt} = Market return in Period t

Computation of Cumulative Abnormal Return (CAR)

Originally using an 11-day window surrounding the announcement of audited financial statements, this paper computes Cumulative Abnormal Return (CAR) using the method from Delvira and Nelvirita (2013), Anggraini (2015), and Sari and Rokhmania (2020). Their window consisted of five days before the announcement day, and five days after. By contrast, this study spans a shorter 7-day window: three days before, the announcement day, and three days following. This formula yields the CAR:

$$\text{CARit}\,(-3,+3) = \sum_{t=-3}^{+3} \text{ARit}$$

Where: CARit (−3+3) = Cumulative abnormal return of company i during the observation period of ±3 days from the publication date of financial statements for year t. ARit = Abnormal return of firm i in period t.

Computation of Unexpected Earnings

Inspired by Delvira and Nelvirita (2013) and Sari and Rokhmania (2020), Unexpected Earnings (UE) are computed in this paper using the earnings per share measurement and a random walk model. The computation is grounded on the following formula:

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$$UEit = \frac{(EPSt - EPSt - 1)}{EPSt - 1}$$

Where: UE_{it} = Unexpected Earnings of Firm i in period t; EPS_t = Earnings Per Share of Firm i in period t; EPS_t-1 = Earnings Per Share of Firm i in period t-1

Finally, Measuring the ERC coefficient:

$$\beta 1 = \frac{(CARit - \beta o)}{UEit}$$

Where: β_1 = Earning Response Coefficient (ERC); βo= Constant; CAR_{it} = Cumulative Abnormal Return of Firm i in period t; UE_{it} = Unexpected Earnings of Company i in period t.

Profitability

This study gauges profitability with reference to return on assets (ROA). ROA shows a company's profitability generation efficiency concerning its assets. A better ROA implies improved performance of profitability.

Formula: $RoA = \frac{\text{Net Income}}{\text{Total Assets}}$

Where: RoA = Return on Assets

Leverage

The Debt-to-Equity Ratio (DER) proxies leverage in this research. This ratio gauges a company's degree of debt-based operations financing over totally owned funds. More DER denotes more degree of leverage.

The formula for measuring formula is given below:

$$DER = \frac{\text{Total Debt}}{\text{Total Equity}}$$

Systematic Risk (CAPM)

By means of the beta coefficient (β), which denotes the sensitivity of a stock to changes in the market, this study quantifies systematic risk. Calculated using the stock return (RRR) regression equation on market return (Rm), beta comes from the Pefindo Beta Stock. A beta less than one indicates less volatility; a beta greater than one indicates the stock is more erratic than the market. Below is a formula for computing systematic risk:

$$R = \alpha + \beta Rm + \varepsilon$$

Where: R = Stock Return; β = Beta stock (Systematic Risk); Rm = Market Return

Hypotheses of the Study

Hypotheses have been developed based on a thorough review of the literature. The following hypotheses are proposed to test the relationships between the Earnings Response Coefficient and its key determinants: profitability, systematic risk, and leverage. Below, each hypostudy is justified by empirical evidence drawn from the literature.

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H_1: Profitability positively influences the earnings response coefficient (ERC)

A good number of empirical studies confirm that profitability positively influences ERC. Paramita et al. (2020) found that for companies normally inclined to high profitability, the market's reaction to announcements about profit increases is relatively strong. As such, they would be likely to have an above-average ERC. Their study emphasized that profitability signals good operating performance and future growth potential for companies, so investors tend to respond more favorably to reports of profitable companies.

Hasanzade, Darabi, and Mahfoozi (2014) were also able to demonstrate a positive and significant correlation between profitability and ERC so that high profitability means a high ERC, which implies the level of the ability to elicit a strong market response called forth from the firm's decision. That a higher ERC, as measured by Return on Asset (ROA), in this case, is related to higher profitability has also been corroborated by the findings of Paramita et al. (2020); hence, a high degree of conformity by confirming that profitability increases quality information for investors. There were mixed results regarding profitability's relationship with exchange rate changes, as shown by Hasanzade et al. (2014) and Sari and Rokhmania (2020). This relationship is not linear, indicating that market saturation and concerns about earnings sustainability moderate it. Despite these nuances, substantial evidence suggests that profitability positively impacts the ERC.

H_2: Systematic risk has a negative impact on the earnings response coefficient (ERC)

Research establishing correlations between investor reactions to earnings announcements and market risk supports the notion that systematic risk can reduce ERC by influencing how investors react to earnings announcements. Francis et al. (2004) and Core et al. (2008) found a negative association between systematic risk and both the earnings quality and ERC of a firm. Due to governance and stability issues, investors will discount the reported income of high-risk firms. In addition, low-beta firms generally produce higher ERC than high-beta firms as investors perceive them as less risky and therefore will experience a better market reaction to the announcement of earnings for these firms. According to Cheng et al. (2013), the relationship between systematic risk and ERC is complex, and while some research indicates that firms with higher betas may provide higher ERCs in poor markets and lower ERCs in bad markets, the majority of the research indicates that there is a negative relationship between systematic risk and ERC.

H_3: Leverage has a negative impact on the earnings response coefficient (ERC)

Support for the theory that leverage has a negative effect on ERC, as it generates higher levels of financial risk and lower levels of investor confidence, is provided by research into how capital structure affects market responsiveness to earnings reports. The research of Romasari (2013), reported that leverage has little or no positive influence on ERC, indicating that using more debt may have limited or no improvement to investor reaction to an earnings announcement. Sari and Rokhmania

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(2020) also found a negative relationship between leverage and ERC, indicating that increasing leverage decreases investor confidence in management and subsequently produces a decrease in the level of responsiveness from the market to earnings announcements. Nataliantari et al. (2020) similarly measured the debt-to-equity ratio (DER), and reported that there was a significant and negative relationship between leverage and ERC; which indicates that if investors perceive a company's use of excessive debt, they will assume that the lenders are seeking larger portions of profit from the company, creating unfavorable conditions. The results of this research confirm the theory that leverage negatively impacts ERC and creates both increased financial risk, and decreased investor confidence in companies, and therefore increases the market's lack of responsiveness to the company's earnings report.

METHODOLOGICAL FRAMEWORK

This part offers a structure for examining the Earnings Response Coefficient, the effects of systematic risk, leverage, and profitability on the KSE 100 Index. Defining variable relationships using a quantitative-causal approach, the study finds ERC drivers. It covers population, design, research philosophy, data collection, and analysis approaches. It also covers possible problems, including normality for robust results, heteroscedasticity, and multicollinearity. The foundation for more investigation and result interpretation is set here.

Nature of Research Study

This work shapes its approach by using a particular research philosophy. Understanding knowledge acquisition and interpretation depends on these roots. It is predicated on positivism, according to which measurement and observation produce knowledge. Empirical observation helps one to understand reality apart from perspective. This philosophy develops relationships between variables to predict based on observed data, supporting the quantitative method. In hypothesis testing and statistical methodical causal relationship exploration, positivism is helpful. Emphasising objectivism and empirical measurement by statistical analysis of hypotheses, the study follows the Positivist Paradigm. Intending to establish causal relationships among profitability, leverage, systematic risk, and the Earnings Response Coefficient (ERC), the design emphasises quantifiable data from financial statements and market reports In financial research, it produces replicable, generalisable results that expand the knowledge base. The relationships among these variables are investigated by the quantitative design and causal approach, generating an objective and measurable understanding of how independent variables affect the dependent variable (ERC).

Sampling Technique, Data Collection, Sources, and Period

The population and sampling technique are described here. Clear criteria guarantee the study reflects many sectors in the KSE-100 Index, so it balances statistical significance with practicality. Ranked by market capitalisation on the Pakistan Stock Exchange (PSX), the research covers all 100 listed companies on the KSE-100 Index

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from 2019 to 2022. Major sectors will be represented using a stratified random sampling method. Companies will be arranged according to industry sector for proportional representation; random selection within every sector will produce a balanced sample, thus improving generalisation. Thirty companies, one-third of the total population, were gathered for study to guarantee statistical power while attending to pragmatic concerns, including data availability and time limits. This sample size offers enough sector representation and is sufficient to find notable correlations among variables. The data collection process, including data sources and the analysis period, is also briefly reviewed in this part. Strong conclusions depend on accurate and relevant data. Data came from the annual reports of the chosen companies on the PSX website, as well as other financial databases and the State Bank of Pakistan. Capturing the most recent financial performance and market dynamics, the data spans 2019 to 2022, so it validates conclusions with past data.

Data Analysis Methods

It is then discussed that several statistical methods and models were applied in data collection for this study. This framework seeks to investigate the data suitably so as to generate relationships between profitability, leverage, systematic risk, and Earnings Response Coefficient. Below are specifics of the methods used in this research:

Descriptive Statistics

Descriptive statistics let researchers distinguish the main features of the data, including distribution, central tendency, and variability of the variables under investigation. For every variable, descriptive computed statistics comprise main measures: mean, median, standard deviation, skewness, and kurtosis. These figures reflect the general features of the data set, including systematic risk calculated by beta, leverage stated by DER, and profitability indicated by ROA. The last elements allow one to identify data abnormalities or outliers during the inquiry. By exactly comprehending the data under investigation, descriptive statistics assist later outcomes to be more interpretable and valid (Creswell & Creswell, 2017).

Pooled Ordinary Least Squares (OLS) Model

Estimating the link between ERC and independent variables, profitability, leverage, and systematic risk requires a naïve regression tool, the Pooled OLS model. It combines cross-sectional data with time-series data without separating between specific times or corporate impacts. It provides a fundamental approximation of how any independent variable might affect ERC, thereby serving as a basis for study. The Pooled OLS model offers a basis for evaluating more complex models, such as fixed and random effects, even if it has restrictions in managing heterogeneity between units or periods.

Variance Inflation Factors (VIF)

The computation of variance inflation factors helps one to find multicollinearity between the independent variables in the regression models. In a model,

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multicollinearity is the phenomenon wherein two or more predictors have strong interdependence. This issue may produce erroneous statistical inference and generate inflated standard errors of the regression coefficients. Typically, a VIF value greater than 10 indicates high degrees of multicollinearity, which can result in misleading regression analyses.

The VIF testing technique helps to ensure that the independent variables, such as profitability proxied by ROA, leverage proxied by DER, and systematic risk proxied by beta, do not cause the variance of each other's predictive power, hence maintaining the integrity of the regression analysis.

Normality tests

Normality tests will determine if your data is normally distributed; this is an important assumption in parametric statistical analysis. There are several types of normality tests, including the Doornik-Hansen test to test for multivariate normality, the Shapiro-Wilk W test to test for a single variable, the Lilliefors test, which is a variation of the Kolmogorov-Smirnov test, and the Jarque-Bera test that examines skewness and kurtosis to indicate non-normality. Normality tests should be conducted whenever there is uncertainty about the distribution of the data from a small sample size. If normality tests fail, then you may need to transform the data so that it meets the assumptions of the parametric method or use a non-parametric method to get reliable results (Ghasemi & Zahediasl, 2012).

Heteroscedasticity-Corrected Regression Analysis

Correcting the heteroscedasticity of the financial data used in the study will help produce reliable results about how profitability, leverage, and systematic risk influence the Earnings Response Coefficient (ERC) through the use of a corrected (for heteroscedasticity) regression model. The main problem with using financial data is that it is typically heteroscedastic, which means that the variance of the errors (the difference between the actual values of y and the predicted values of y) is different from one observation to another. When the variance of the errors differs for each observation, there may be bias introduced into the estimated coefficients of the independent variables and their relationship to ERC. Therefore, correcting for heteroscedasticity will provide a better estimate of the relationships between the independent variables and ERC when analyzing the KSE-100 Index.

Validity and Reliability

Data quality and the accuracy/reliability of data used within this study have been assured through the use of the established best practices of data collection and analysis as applied to all high-quality studies. First, it has established the validity of its approach with the utilization of widely tested and recognized financial measures (ROA, DER, and beta). Data will be obtained from reliable and consistent information resources. Reliability will be assured by utilizing the same method of extracting data and testing results via statistical analysis. Finally, the reliability of the conclusions

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made within this study will be increased by utilizing multiple data sources and cross-referencing data points.

Ethical Considerations

At this point, it is a good idea to think about the ethics involved with this study. Ethical principles will be followed while working with all companies' information by keeping it confidential and anonymous. All of the data utilized in this research has been made available to the public, and there was no divulgence of any information that would be considered proprietary or sensitive. It also follows other ethical standards that have been set forth in past financial studies, such as an accurate representation of the findings and views of the limitations.

Research Limitations

The study identifies potential limitations that could affect the generalizability of the findings. A potential limitation for the study includes a reliance on secondary data (i.e., reporting bias) as well as a relatively small sample of thirty firms, which may not be representative of the total population of firms included in the KSE-100 Index. Another limitation for the study was its time frame - from 2019 to 2022 - which could limit the identification of longer-term trends and/or significant events such as COVID-19. The above-mentioned limitations were acknowledged upon analyzing the data and addressed within the conclusions of this study.

DATA ANALYSIS AND INTERPRETATION

Introduction

Within the KSE-100 Index, this part examines data testing the effects of profitability, leverage, and systematic risk on the Earnings Response Coefficient (ERC). Descriptive statistics first help to summarise the distribution of important variables. The next part offers robustness of results against multicollinearity and heteroscedasticity using regression analysis. These results help one to understand the relevance and direction of the links among profitability, leverage, systematic risk, and ERC. At last, the results are discussed in light of the Pakistani market, providing information for legislators and investors.

Descriptive Statistics of the Study Variables

Table 1: Descriptive Statistics

Statistics	ERC	ROA	D/E	Beta
Mean	0.025	0.070	6.392	0.248
Standard Error	0.020	0.015	2.420	0.058
Median	-0.001	0.059	1.563	0.068
Mode	N/A	0.075	N/A	0.019
Standard Deviation	0.193	0.140	22.959	0.546
Sample Variance	0.037	0.020	527.118	0.298

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Kurtosis	4.560	33.329	79.279	15.693
Skewness	1.005	5.502	8.661	3.333
Range	1.359	1.038	215.216	4.423
Minimum	-0.566	-0.058	0.070	-0.867
Maximum	0.793	0.980	215.286	3.556
Sum	2.222	6.329	575.258	22.329
Count	90.000	90.000	90.000	90.000

Table 1 shows descriptive statistics for the Earnings Response Coefficient (ERC), Return on Assets (ROA), debt to equity ratio (D/E), and Beta. The average ERC of 0.025 indicates a modest stock price response to earnings announcements. The average ROA of 0.070 signifies typical profitability at 7% of assets. The very large (6.392) Debt-to-Equity Ratio of a company indicates that it has a large amount of leverage and is relying on a great deal of debt financing. A very low (0.248) Average Beta indicates that this company will have less price volatility than the overall stock market. The Standard Deviation statistics indicate that there are a lot of variations in both the Earnings Return on Capital (ERC) and Return on Assets (ROA), but that there is a lot of variability in the Debt to Equity (D/E). This means that companies may be employing many different leveraging strategies. The extreme values of skewness and kurtosis suggest that there is a long tail distribution for these metrics; i.e., a few companies are having extremely high earnings return on assets (ROA) and a very high D/E. These extreme values represent the most likely outliers for these metrics. The very large ranges in both the Debt to Equity (D/E) and Beta metrics suggest that there is a tremendous amount of variation in capital structures and risk exposures across all of the companies.

Regression Analysis

Table 2: Model 1: OLS, using observations 1-90 (Dependent variable: ERC)

	Coefficient	**Std. Error**	**t-ratio**	**p-value**
Const	0.124	0.026	0.915	0.036
ROA	0.358	0.147	2.435	0.011
Leverage	-0.253	0.062	-4.081	0.001
Beta (Systematic Risk)	-0.0523	0.019	-2.752	0.012
Sum squared resid	3.295		S.E. of regression	0.196
R-squared	0.391		Adjusted R-squared	0.344
F(3, 86)	10.23		P-value(F)	0.015
Log-likelihood	21.133		Akaike criterion	-34.265
Schwarz criterion Durbin-Watson stat	-24.266 1.648		Hannan-Quinn	-30.233

Table 2 demonstrates that profitability (ROA) affects the Earnings Response Coefficient (ERC); therefore, if the company has high profitability, it will have a

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strong Earnings Response, whereas leverage (D/E) and Beta (systematic risk) both negatively impact the ERC; thus, with increasing leverage and increasing systematic risk, companies' earnings response will be weakened. The R-squared = 0.391 indicates that the model accounts for 39.1% of the variance in the Earnings Response Coefficient (ERC). The p-value = 0.015 indicates that the model is statistically significant.

Multicollinearity Test using Variance Inflation Factors (VIF) Model
Table 3: Variance Inflation Factors

ROA	1.025
Leverage	1.011
Systematic Risk	1.131

The VIF (Variance Inflation Factor) is shown in Table 4.3: ROA = 1.025; Leverage = 1.011; Systematic Risk = 1.131. All three are under the critical value of ten, so there are no Multicollinearity problems with these variables, i.e., ROA, Leverage, and Systematic Risk do not correlate very highly. Therefore, this will increase the reliability of our Regression Results, avoid Coefficient Distortion, and validate the use of the Model to assess the Impact of these Metrics on the Earnings Response Coefficient.

Normality Test
Table 4: Test for Normality of ERC

Table: Test for normality of ERC		
Test	**Test Statistic**	**p-value**
Doornik-Hansen	1.231	0.325
Shapiro-Wilk W	0.954	0.231
Lilliefors	0.055	0.125
Jarque-Bera	2.013	0.224

The results for the normality tests (Shapiro-Wilk W, Lilliefors, Doornik-Hansen, and Jarque-Bera) in Table 4 indicate that all have a p-value > .05; therefore, no evidence was found to suggest that the ERC data deviated from normal distribution at a statistically significant level. The test results were such that none of them rejected the null hypothesis that the ERC data follow a normal distribution.

Table 5: Regression Analysis Corrected for Heteroscedasticity

Table: Heteroskedasticity-corrected, using 90 observations				
Dependent variable: ERC				
	Coefficient	S.E.	t-ratio	p-value
const	0.0695	0.0217	3.2102	0.0108

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ROA	0.2416	0.0556	4.3463	0.0013
Leverage	-0.3391	0.1824	-1.8595	0.0368
Systematic Risk	-0.0803	0.0358	-2.2443	0.0267
Statistics Based on the Weighted Data				
Sum squared resid	774.8308		S.E. of regression	3.0016
R-squared	0.3598		Adjusted R-squared	0.2959
F(3, 86)	3.5287		P-value(F)	0.0128
Log-lelikihood	-224.5820		Akaike criterion	457.1641
Schwarz criterion	467.1633		Hannan-Quinn	461.1964

Finally, the results of the regression analysis correcting for heteroscedasticity (Table 5) also reveal several important aspects of determinants of the Earning Response Coefficient. In this regard, it can be seen that there is a positive relationship between ROA and ERC (coefficient 0.2416, p=0.0013), which would suggest that when companies have higher levels of returns on their assets; they experience larger responses from the markets. On the other hand, both leverage (D/E) and systematic risk were found to have negative effects on ERC (coefficients -0.3391 [p=0.0368] and -0.0803 [p=0.0267]). The R2 was 0.3598, therefore, approximately 36% of the variance in ERC can be explained by the model. The F statistic was 3.5287, and p = 0.0128, therefore, the overall model is statistically significant. Thus, the findings suggest that financial performance and risk factors are very influential in determining how the markets react to earnings announcements.

FINDINGS, CONCLUSION, AND RECOMMENDATIONS

The purpose of this section is to combine the results of the analysis that was performed in Section 4, by using the results to conclude and offer concrete policy recommendations to firms, policymakers, and investors, while also discussing these results in light of prior research. This section will conclude with an identification of potential avenues for future research, as well as a set of specific recommendations to firms, policymakers, and investors to address the determinants of the Earnings Response Coefficient (ERC) for the KSE-100 Index.

Findings

Descriptive statistics, regression analysis, multicollinearity test, normality test, and heteroscedasticity-corrected regression all yield the following key findings regarding the determinants of the Earnings Response Coefficient within the KSE-100 Index.

Descriptive Statistics

An average ERC of 0.025 indicates a modest stock price response to earnings announcements.

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The average ROA is 0.070, suggesting typical profitability is about 7% of assets.
This results in an average D/E ratio of 6.392, reflecting high leverage and reliance on debt financing.
A mean Beta of 0.248 shows these firms have lower volatility than the market, indicating they are less risky. risky.

Regression Analysis

Better performance relates to bigger reactions on the part of markets toward earnings announcements when the value of the coefficient is 0.358. Firms that earn more money produce more reliable earnings; therefore, they will have an even greater ERC. The Leverage (D/E ratio): The negative coefficient (-0.253) suggests that if a firm has more debt, the reaction of the markets to its earnings announcement is less intense, which means that a high degree of leverage reduces the quality of earnings. The Systematic Risk Proxy: Beta = 0.0523, represents the relationship between firms with high systematic risk and their lower ERC. Earnings confidence is undermined by the volatility of the market. All VIF values for the independent variables (ROA, Leverage, and Beta) are less than 1.2; thus, there are no multicollinearity issues to be concerned about with this study, and the regression analysis can be trusted. The normality tests using Doornik-Hansen, Shapiro-Wilk W, Lilliefors, and Jarque-Bera do not indicate any statistically significant differences for the ERC data; consequently, the use of parametric tests and regression models can be justified. Even after adjusting for heteroskedasticity, the results continue to support that ROA positively affects ERC, and Leverage and Beta negatively affect ERC. The R-squared value of .3598 shows that these variables account for approximately 36% of the variation in ERC.

Discussions

The findings of this study have significant theoretical and practical implications for understanding the determinants of ERC for the KSE-100 Index. The results from all of the regression models (models) show a positive relationship between ROA and ERC, clearly demonstrating that profitability has an impact on how the market reacts to earnings announcements, which is supported by recent studies that indicate that investors tend to see companies with higher profitability as more stable and less risky, thereby affecting how they react to the announcement. This shows that investors give profitability top priority as a main gauge of financial situation for the KSE 100 Index, thus strengthening the credibility of earnings announcements. On the other hand, the negative link between leverage and ERC suggests that high debt levels cause investor worries about the stability of a company, so compromising reactions to earnings releases. This supports the trade-off theory, which holds that although debt provides tax advantages, too much leverage causes financial stress and reduces the quality of earnings, as observed by Raza et al. (2018). Positive market opinions on earnings announcements for companies in the KSE-100 Index depend thus on keeping an ideal capital structure. Especially in volatile emerging markets like Pakistan, a negative Beta coefficient indicates that companies with more systematic risk respond less to earnings announcements. Francis et al. (2004) point out that investor uncertainty

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about the accuracy of earnings from companies with more market risk can help to explain reduced ERC. As a result, low-volatility businesses are better able to produce earnings surprises that impact stock prices. Heteroscedasticity-corrected regression improves finding reliability by addressing potential distortions in conventional regression models, which account for 36% of ERC variance. Other factors, like corporate governance, market conditions, or investor attitude, may also be quite significant, even though profitability, leverage, and systematic risk are significant determinants.

Conclusions

Emphasising profitability, leverage, and systematic risk, this study clarifies the factors controlling the response coefficient in the KSE-100 Index. Since ROA is a good indicator of ERC, stock prices of more profitable companies respond more forcefully to earnings announcements, therefore signalling better quality earnings. Conversely, the debt-to-equity (D/E) ratio, which gauges leverage, has a negative effect on ERC. When debt levels are higher, investor worries about financial soundness create less market reaction. Moreover, beta denotes systemic risk and so affects ERC negatively. High or low beta businesses, which show market volatility, usually have smaller ERCs since they show that the market is cautious about riskier businesses. These outcomes underline the need for effective capital structure management and risk-reducing strategies for positive market reactions during income announcements. This paper provides actual data on the key factors of the ERC inside the KSE-100 Index, therefore enabling a better understanding of market behaviour and enhancement of financial decision-making for corporate managers, investors, and legislators.

Recommendations

The following recommendations are proposed based on the findings for firms listed on the KSE-100 Index Investors and Policymakers:

Reduce costs and enhance efficiency. High ROA strengthens market reactions to earnings announcements. Transparency in reporting boosts investor confidence.

Carefully manage debt to avoid using too much leverage, which distorts earnings perceptions. Examine the benefits and drawbacks of debt financing.

To guarantee steady profits, lessen reliance on market conditions through hedging, diversification, or prudent financial practices.

Highly profitable businesses should be given preference by investors since they are more likely to surpass earnings projections.

High-leverage companies should raise suspicions among investors due to possible financial distress and erratic earnings reports.

Examine a company's beta and how it affects market volatility, particularly in developing nations like Pakistan.

-To improve the quality of information for investors, policymakers should increase the transparency of financial reporting to make profitability, leverage, and risks clearer.

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Offer incentives for firms to adopt risk management strategies that mitigate earnings volatility and strengthen financial market stability.

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