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Analyzing Stock Price Volatility Using the Parkinson Measure to Detect Financial Reporting Opacity Levels and I’ts Reflection on Investor Decisions: An Applied Study on Telecommunications Sector Companies Listed on the Iraq Stock Exchange for the Period 2020–2024

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Abstract
This research focuses on the issue of financial reporting opacity among telecommunications sector firms in the Iraq Stock Exchange (ISX) during 2020–2024. It uses Parkinson Measure as a specialized quantitative instrument for measuring true stock-price volatility from daily high and low price values, considering it as a diagnostic of informational opacity in financial statements. Such is the case for the Parkinson Measure, which is a specialized quantitative tool to calculate actual stock price volatility from daily high and low values of stock price, considered as a diagnostic of the informational opacity within financial statements. The study comprises two telecommunications firms : Asia Cell Telecommunications and Al-Khatam Telecommunications (Zain Iraq), based on a dataset of 310 daily observations spread over an event window of 31 trading days per year (15 days pre-disclosure + disclosure day + 15 days post-disclosure), resulting in 10 main analytical observations. This paper uses descriptive statistics, Pearson correlation analysis, simple linear regression, and paired-samples T-Test to identify significant changes in the variables of the study between the two periods. The results indicate that there were significant differences in the levels of financial reporting opacity between the pre-and post-disclosure periods (Sig = 0.045), suggests that the findings of financial reports are informative, and affect the life of the market in Iraq. Conversely, there are no significant differences were found in the investor decisions (volume traded) for the two periods (Sig = 0.09). In addition, opacity and investor decisions were not even close to being statistically significant, however the evidence shows a rather strong positive relationship (r = 0.841) between the pre- and post-disclosure volatility levels, implying that the decisions of investors are in sum, the accounting content of financial reports is affected by influences outside thereof.

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Keywords: Financial reporting opacity, stock price volatility, investor decisions, Parkinson Measure, Iraq Stock Exchange, telecommunications sector

1. Introduction

The need for making better investment decisions is arguably the closest an element of regulation has come to being a common factor across all financial markets in the world. Essentially, this is a quality of information issue, and the information readily available to investors, particularly the financial disclosures that are supposed to represent the "economic reality" of business entities. Yet this has not always happened with such clarity and completeness to the investors, leading to an information opacity that “muddies” the waters of market efficiency as well as market participant’s behaviour.

The concern regarding financial report opacity (FRO), as both a theoretical and practical issue has grown over the past few years as FRO impacts investor confidence, the cost of capital and the allocation of funds amongst various financial markets. A lack of disclosure in reporting, unclear or vague accounting policies, and an absence of sufficient risk disclosure in company financial statements contribute to significant informational asymmetry between the corporate manager and the investor. Such informational asymmetries create large swings in stock prices and market turbulence.

In order to examine FRO using a rigorous and systematic approach, researchers rely upon metrics that allow for the inference of implied volatility from stock prices. One of the more widely recognized and used measures within the finance literature to accomplish this task is Parkinson's Measure developed by the economist Michael Parkinson. Using a high-low pricing model (high-low price range) within a specified timeframe provides a better measurement of true price variation (and thus volatility) than traditional models that use closing price alone. By examining price movement patterns and magnitude of price ranges, researchers and financial analysts are able to assess levels of informational opacity in reported data. From an economically specific viewpoint, this research will be enhanced significantly by its reliance on data collected from the Iraq Stock Exchange. The exchange is undergoing stable institutionalization with regard to an evolving regulatory and accounting environment during a period of ongoing economic instability. Additionally, the Telecommunications Industry is one of the largest and fastest-growing sectors in Iraq due to rapid advances in technology; changing methods of conducting business; and intense competitive pressure.

The four-year period spanning from 2020 through 2024 represents a unique opportunity for analysis because it contains numerous exceptional events that impacted the business environment and financial markets locally and globally. Some of the key events include but are limited to: the COVID-19 Pandemic, fluctuations in oil prices, and legislative and regulatory reforms implemented in the Iraqi financial sector. All of these events would be expected to affect the level of transparency provided in financial reports as well as the volatility of stock prices. Against this backdrop, the present study seeks to explore and quantify the levels of financial reporting opacity in telecommunications companies listed on the Iraq Stock Exchange. as estimated through stock price volatility using the Parkinson Measure. and to interpret the effect of this opacity on investor decision-making behavior.

2. Scientific Methodology and Literature Review

2.1. Scientific Methodology

2.1.1. Research Problem

The core issue of this research is that the uncertainties of information on the bourse are being intensified.

Opaciay problem To understand telecommunications ambiguity in XSE, it is necessary to understand that it is a complex, profit volatile industry. Although disclosure is compulsory, the informational value of financial reports has been falling away from that needed by investors to make informed decisions. such a gap is often described as 'financial reporting opacity.' This opacity may not be due to disclosure deficiencies alone, but could be attributed to linguistic complexities or the intentional obfuscation of managers who want to hide bad news or to engage in manipulation of the accounts. Therefore, investors who want to invest in the Iraq Stock Exchange have a hard time making rational decisions, and the reality that they are faced with performing genuine results with fabricated results is not easy to separate making the investment atmosphere in Isa Stock Exchange a risky atmosphere and weak informational symmetry is its feature.

Based on the above, the main research question can now be stated as: "To what extent investor decision (contracted by trade volume) is affected by financial reporting opacity (proxied by Parkinson Measure) in Iraq telecommunications companies? "

Derived from the main question, the related sub-questions are as follows:

- Are the levels of financial reporting opacity in Iraqi telecom companies uniform between pre and post disclosure periods for the years 2020-2024?
- Is there a significant relationship between price volatility associated with financial reporting opacity and investment decisions in the telecom sector of Iraq?

2.1.2. Significance of the Study

This study is important in that it attempts to investigate and analyze the dynamic interaction between stock price volatility (as determined by the Parkinson Measure) and financial reporting opacity. To analyze their effect on investor decisions in the sector of telecommunications in Iraq. To be specific, the study aims to gain more insight into whether informational opacity is the main cause for trading volume variations via investor decisions, or other intervening variables may have an effect on investor decisions. This, on the other hand, gives the companies a management view of the information-processing efficiency (of financial reports) for the period 2020–2024, and how much more disclosure transparency is required to moderate trade volumes.

2.1.3. Objectives of the Study

1. To establish the theoretical framework governing the relationship between stock price volatility (as measured by the Parkinson Measure) and financial reporting opacity, and to elucidate the theoretical mechanisms through which this opacity is reflected in investor decisions.
2. To uncover and analyze levels of financial reporting opacity in Iraqi telecommunications companies for the period 2020–2024, and to determine whether differences in opacity levels before and after financial report disclosure are substantively significant.
3. To measure and analyze the nature of the relationship (correlation and effect) between financial reporting opacity and investor decisions, and to assess the capacity of opacity to explain variations in trading volumes on the Iraq Stock Exchange.

2.1.4. Research Hypotheses

1. There are statistically significant differences in levels of financial reporting opacity across pre- and post-disclosure periods for Iraqi telecommunications companies during the study period.
2. There is a positive correlation between overall levels of financial reporting opacity and investor decisions during the study period.

3. Opacity in financial statements helps to explain fluctuations in the trading volumes of shares of the Iraqi telecommunications firms under consideration during the period of study.

3. Prior Studies and the Distinction of the Current Study

3.1. Prior Studies

First Study: Boyarchenko (2009) [1] — "Credit Spreads Ambiguity, Information Quality and Credit Risk"

Boyarchenko's research identified the effects of ambiguity upon credit spread with regard to the perception that the world-wide financial market experienced a severe liquidity crisis due to BNP Paribas' announcement in August 2007 regarding the loss it was experiencing on securities related to the performance of mortgage backed securities. That is when the researchers realized that as bad as the problem with information quality for lending decisions would be, it could also stop all lending. Using their empirical model on financial institution data, they were able to show that ambiguous information creates ambiguous investors who will exacerbate bad news which causes wide yield spreads, regardless of whether or not there has been a real change in the financial condition of the borrower.

Second Study: Ding *et al*. (2020) [2] — "Social Media, Financial Reporting Opacity, and Return Comovement: Evidence from Seeking Alpha"

The present research aimed to identify the influence of opacity of financial reports on the co-movement of stock returns, with the Seeking Alpha as evidence playing distortions or attenuation effect of social media user on the opacity of financial reports. It found that poor reporting transparency increases stock price comovement and impairs the stock market's ability to glean information from prices. This study was limited to the developed U.S. capital market.

Third Study: Hamidian & Eshaghi (2022) [3] —The effect of comparability of financial statements and financial reporting opacity on the value relevance of earnings and book value per share.

Based on the assumption that comparability as a qualitative characteristic of accounting information increases its relevance and accounting information transparency results in incresed volatility of stock prices and risk of investment and reduction of investors' trust, the current research investigates whether comparability of financial statements and financial reporting opacity impact the value relevance of earnings and book value per share. The research was a sample of 137 companies listed in Tehran stock exchange within the period of 2013 to 2019,and applied panel data technique via multiple regressions model.

Key findings revealed that financial reporting opacity, in interaction with comparability, reduces the value relevance of book value per share, while exerting no significant effect on the value relevance of earnings when moderated by comparability.

Fourth Study: Khoo *et al*. (2025) [4] — "Forecasting **Financial Volatility:** An Approach Based on Parkinson Volatility Measure with Long Memory Stochastic Range Model"

This study aimed to forecast financial volatility using the Parkinson volatility measure in conjunction with a long memory stochastic range model. It further showed that the long memory volatility model has superiority in volatility forecasting. The research was carried out in high level financial market settings focusing on statistical analysis and quantitative volatility modeling.

How this study differs from existing literature The following are major areas of differences in this study compared to the prior work:

The present study differs from the aforementioned studies in the following significant aspects:

- **Methodology of Measurement:** Unlike Ding *et al*. (2020) and Callen *et al*. (2020), which used traditional textual and accounting opacity proxies, the Parkinson Measure can be trailblazing in detection financial reporting opacity the present research uniquely applies the Parkinson Measure as a diagnostic tool to assess the degree of financial reporting opacity. Khoo *et al*. (2025), although applying the Parkinson Measure, it was solely used to perform statistical predictions rather than identification of financial opacity.
- **Applied Environment:** The current study examines the Iraq Stock Exchange/telecommunications sector an emerging market environment which is different than developed financial environments studied previously due to differences in their legal frameworks as well as institutions.
- **Study Variables:** The current study extends past simply examining volatility and/or measuring levels of financial reporting opacity by tracing directly how varying degrees of financial reporting opacity affect investors' behavior and decision-making processes within an emerging market this aspect was not previously included in prior studies with respect to an integrated/comprehensive research model.

3.2. Literature Review

3.2.1. An Overview of Financial Reporting Opacity

The primary objective of financial reporting is to provide financial information about the economic entity that is useful to current and potential investors, lenders, and other creditors in making sound decisions. Financial statements constitute the most important component of financial reporting [2].

Accordingly, financial reports represent a complete set of financial statements, as clarified by International Financial Reporting Standard No. 1 (Presentation of Financial Statements), which also defined financial reports in general terms as statements prepared for a broad range of users who are unable to directly request information from management to meet their common informational needs [5].

It is noteworthy that financial reports constitute a source of paramount importance for company-specific information required by such users on a wide scale for making critical decisions [6]. Accordingly, these reports must be presented in a format, informational content, and writing style that is accessible and suitable for this broad category of users.

Numerous studies dating back to 1995 have examined the evolution of financial statement readability and comprehensibility in terms of report drafting and presentation. Their findings consistently reveal that the majority of companies demonstrate weak inclinations toward revising reporting formats or information presentation, with the aim of reducing complexity and comprehension difficulty while enhancing informational transparency [7].

Information transparency is achieved via accurate and on-time dissemination of both financial and nonfinancial information so that stakeholders can make good decisions [8]. Metwally *et al*. [9] further pointed out that improving the level of corporate transparency is an important factor in maintaining confidence in the financial markets and attracting investors.

In this way, the results from many international studies contradict each other by emphasizing that the increasing complexity of financial reporting for decades has changed from being merely an answer to the increasingly complexity of transactional activity, to becoming a strategic tool that will have significant effects upon the quality of the information environment.

Linguistic and technical complexities create a high cost of data processing. The increased complexity also creates a form of intentional "opacity" which discourages individual investors and reduces their investment returns because they cannot process the complex disclosures.

The lack of clarity is more than simply confusing words and meanings; It is a method of intentionally hiding and obscuring information with the intention of misleading. Disclosure thus becomes a tool to increase rather than decrease information asymmetry, as management uses complex language to 'mislead' the market and distract it from real risks – which contributes to greater price volatility and errors in earnings forecasts, making the complexity of reporting a significant predictor of potential intentional financial misreporting [10].

Against this background, several definitions of financial reporting opacity may be presented:

Definition 1: Financial reporting opacity has been defined as "the lack of information that prevents investors from determining the fair value of the company, i.e., accessing important company information" [11].

Definition 2: Opacity has also been defined as "the deliberate modification of the content of annual financial reports by management in order to manipulate users' perceptions through various disclosure instruments" [12].

Researcher's Definition: Financial reporting opacity may be defined as "a reduction in the clarity of presented information to a degree that impedes its precise interpretation, as a result of the accumulation of technical details, weak disclosure structuring, and reliance on accounting estimates that have a discernible effect on directing the decisions of stakeholders."

3.2.2. Types of Financial Reporting Opacity

1. Intentional Opacity: This refers to managers' attempts to conceal adverse news through the crafting of texts that are difficult to decode and interpret [13] — that is, opacity in which information is presented in an ambiguous and imprecise manner with the deliberate aim of achieving a specific objective. As Lambertsen [14] confirmed, this involves the deliberate distortion of financial reports and the introduction of greater complexity for the purpose of concealing actual data, manipulating it, or misleading financial report users.

2. Unintentional Opacity: This form of opacity arises from the application of certain regulations or procedures that companies are obligated to follow, such as opacity resulting from the implementation of international standards in their various dimensions, or accounting complexity arising from the application of such standards — for example, complexity stemming from derivative financial instrument contracts, long-term asset revaluations and allocations, and related accounting treatments [15].

3.2.3. The researcher has developed the following categorization system for levels of financial reporting (financial statement) opacity:

1. Numerical Opacity: Lack of transparency about how numbers were arrived at; lack of explanation of individual line item(s); large inter-period differences; inconsistencies in data within the same document.

2. Linguistic Opacity: How financial documents are written; use of ambiguous language and/or overly complicated language that allows for multiple interpretations of what is being said; use of phrases such as "may," "possibly," "likely" and other hedging terms in the narrative portions of the document; very long, complicated sentence structures; and/or conflicting information in various parts of the document.

3. Structural Opacity: This refers to opacity arising from the use of multiple approaches in preparing financial reports, particularly in the presentation of financial statements, or the adoption of inconsistent policies in presenting certain data, resulting from the application of particular standards, guidelines, or company-specific management procedures.

3.2.4. Drivers of Financial Reporting Opacity

Several drivers of financial reporting opacity have been identified across economic entities, the most significant of which are as follows:

1. Protection of Trade Secrets and Industrial Confidentiality: Companies sometimes reduce disclosure to protect their competitive secrets, particularly when the cost of disclosure exceeds its benefit [16].

2. Protection of Company Innovation and Potential Competitive Advantage: The disclosure of R&D strategies and current/future patent positions may lead companies to make their financial disclosures less transparent (e.g., [17]).

3. **Meeting Earnings Targets / Earnings Management**: Earnings management describes the practice of managements using accounting rules to manipulate earnings to either meet internal targets or external benchmarks [18].

4. **Tax Pressures and Government Incentives**: Tax incentives and planning also lead firms to distort their financial statements to show tax results that are the most advantageous to management within the boundaries of the law [19].

5. **Underdeveloped External Monitoring and Corporate Governance Systems:** A non-executive board member or external audit could be biased, therefore executives can distort openness of financial statements when the board or the external monitoring do not directly punish veil infringements immediately [20].

6. **Economic/risk crises (e.g., COVID-19):** It is more common for companies to estimate vaguely during a big economic crisis or in an uncertain era (COVID-19 pandemic). This practice intends to prevent negative market reaction, but in fact, makes a more blurred report (Wan & Tian [21].

7. **Complexity of Financial Instruments and Accounting Models**: The result is the use of obscure valuation methodologies which reduce the amount of straightforward disclosure, the potential for misstatements and the prevalent user's ability to understand [22].

8. **Protection of short-term strategic decisions:** firms occasionally hide information about their liabilities or risks of exposure to prevent a drop in its stock price or other types of harm to its reputation or strategic plans.

such as when preparing for an acquisition or entering a new market. Under such conditions, financial secrecy is treated as a tool of tactics [23].

3.2.5. Stock Price Behavior

Stock price volatility has long been a popular variable in financial economics and it is defined as the rate at which the price of a stock changes over time. It acts as a sensitive barometer to measure the level of risk and uncertainty in the financial market--the more volatile of the stock price is the riskier of investing that stock [24].

Financial volatility is fundamental to contemporary asset pricing theories and quantifies the extent to which the value of assets undergoes unpredictable changes over time. It can be described as a time-varying process that evolves as time goes on and as a function of new information arriving to the market and, for that reason, is a necessary tool in the study of financial time series [25].

Price volatility is a consequence of market participants' behavior and is determined by several factors such as available information, expectations about the future, economic events, and results of corporate earnings. Volatility can be caused by an investment decision that investors are divided regarding the "correct" price for their investments leading to an increase in the number of trades occurring at the same time. Volatility also has some important characteristics of its own including the persistence of the effects of shocks. The persistence of shock impacts indicates that the influences of shock do not diminish quickly and continue to affect stock prices over longer time frames. This continued influence provides for better comprehension of the nature of returns associated with stocks over longer term intervals [26].

Recently researchers have demonstrated many of the characteristics referenced above. Researchers [4] suggest that volatility demonstrates both volatility clustering -- whereby sequential clusters of high volatility occur -- and the long memory characteristic -- whereby the shocks are felt over a period of time.

3.2.6. Investor Decisions

The importance, potential consequences and complexity of the Investment Decision have led to it being considered among the most significant choices made by investors. The goal of the investment decision is to place resources within an identified asset (e.g., equity) over a particular length of time in anticipation of receiving cash flow returns from the asset. These cash flows will be used to repay the investor for the time during which he/she had invested in the asset [27].

Thus, an investor's ability to achieve his/her goals as an investor is directly influenced by the extent to which he/she understands his/her investments. In order to gain an understanding of an investment, investors require access to sufficient information regarding their investments; otherwise, there would be no distinction between types of investors: those who are interested in understanding the quality/characteristics of a firm before investing in the firm (i.e., before making an investment), versus those who simply purchase stock without considering the characteristics of the firms whose stock they are purchasing. The former type of investor usually conducts thorough scientific studies and analyses prior to making an investment decision. The results of these studies support his/her belief that the firms in which he/she intends to make investments will produce a positive rate of return in the future. Therefore, based upon actual knowledge of what each firm does or what is referred to as the "essence" of each firm, this investor feels confident that his/her projected earnings estimates will occur.

However, the future is inherently unpredictable and, therefore, extremely difficult for any investor to accurately forecast. Furthermore, the difficulty of forecasting the future is exacerbated when the investor is information-poor. As a result of being unable to obtain enough information regarding the characteristics of the firms in which they wish to invest, this type of investor will likely make fewer accurate investment decisions than investors who are able to gather sufficient amounts of data relative to their intended investment(s) [28].

3.3. Information Perspective

As far as the amount of information that is available to investors, the Information Perspective indicates that managers attempt to provide information that balances their motivation to provide investors with complete and clear information about the firm with their need to protect strategic and confidential information that provides them with a competitive advantage. Based on this perspective, managers do not reveal all information related to the firm. Instead, managers attempt to find a balance between revealing information related to the firm and protecting sensitive information that could potentially damage their competitive positioning.

Furthermore, according to this perspective, providing accounting disclosures can communicate strategic-related information to stakeholders about how the firm makes its strategic decisions. If too much information related to strategic decisions were to be disclosed by the firm, then it could negatively impact the firm's competitive advantages. Accordingly, managers continually assess whether or not they should continue to increase or decrease the level of information that they release about the firm so that they can maintain the optimal balance between the cost-benefit tradeoff associated with providing information transparency and maintaining their competitive positions [29].

Definition: An investment decision has been defined as "the process of identifying the best option from all available investment alternatives, with good decisions generally depending on comprehensive information about the investment, obtained from many sources including financial statements and the Internet." [30]

Consistent with the name of this research project, the researcher defines an investment decision as: "the optimal method for allocating money into assets that create reliable future profits and utilize information provided through publicly accessible financial reports of companies; whereupon said financial report information causes changes in stock prices due to reactions from investors toward such information."

3.3.1. The Relationship Between Financial Reporting Opacity and Investment Decisions

Financial awareness and knowledge are major components for making rational investment decisions that maximize the value of the money invested. The degree of financial awareness and knowledge depends on the information provided to the investor. While theory suggests that investors should be able to make rational decisions when they have all of the required information, reality shows that investors who do not receive clear, complete information will likely make less-than-optimal investment choices. For example, Shah *et al.* [31] found that "the lack of access to reliable and timely information" was an important reason why investors failed to fully invest in stocks and bonds. In addition, Shah *et al.* [32] stated that, "Investors' reliance on information is critical in forming opinions about investments." Similarly, Ghanbari et al. [33] stated that "investor confidence is directly related to the transparency of firms," which can impact how much investors invest. Informational ambiguity or "opacity" can create confusion and conflicting views among investors over what information means in relation to their individual investment decisions, which can cause different investment choices from similar situations [34].

Transparency in financial reporting also plays a role in creating investment risks. Transparency issues in the financial markets increase uncertainty for investors, which creates potential for two types of investment risk, including Adverse Selection Risk and Moral Hazard Risk.

Adverse Selection occurs before an investor makes a decision because investors make decisions using the information they have available. If there is informational ambiguity, then investors will often base their decision on incomplete or incorrect information. This will result in the wrong investment choice. The risk of adverse selection increases as the point of investment decision-making approaches. At this time, investors find it increasingly difficult to distinguish between companies with good performance but little risk, and companies that perform poorly and represent high levels of risk due to the informational ambiguity [36].

On the other hand, Moral Hazard occurs after an investor has made his or her decision. Managers take advantage of the fact that investors do not know as much about the company as managers do, and therefore cannot provide adequate oversight. As a result, managers implement policies or procedures that are beneficial to themselves rather than beneficial to the investors. Therefore, the managers use their superior knowledge of the firm to allocate funds so that they benefit personally while reducing the effectiveness of the investors' investment decisions [37].

Therefore, financial reporting transparency is an important factor affecting the quality of investment decisions. When there is a large amount of transparency in reported information, it is easier to compare alternative investments and make better-informed decisions. Conversely, if there is very little transparency in reported information, then evaluating competing investment opportunities is even harder and investors become uncertain. As a result of the uncertainty created by limited transparency, investors behave differently in financial markets and the overall market does not function efficiently [38].

4. Methods

This part applies empirically the research model as an attempt to measure and verify a causal link or relation between the independent variable which is financial reporting opacity measured through the Parkinson Measure of stock price volatility and the dependent variable which are investor decision making activities represented by volume of trade. In addition, this part aims to translate the conceptual framework into quantifiable form based on the actual data of telecommunication companies operating at the Iraqi Stock Market from 2020 to 2024 and to achieve precise statistical results to be utilized in verifying the research hypotheses.

4.1. Study Population and Period

The study sample consists of all firms traded in the telecommunications industry at the Iraq Stock Exchange which includes Asia Cell Telecommunications and Al-Khatam Telecommunications (Zain Iraq). This research spans over the five sequential fiscal years 2020-2024.The researcher used a dataset of 310 daily observations over an event window of 31 trading days per year (15 days pre-disclosure + disclosure day + 15 days post-disclosure) for two firms combined, resulting 10 primary analytical observations.

4.2. Statistical Tools and Methods

So as to be certain and objective, the following statistical procedures were used:

• Descriptive statistics: In order to describe the data of the study variables (independent and dependent), i.e., to calculate the mean, median, standard deviation, skewness, and kurtosis coefficients.• Independent Variable: Daily price volatility (a proxy for financial opacity) was measured by the Parkinson Measure using daily high and low prices as per the well-known Parkinson formula:

$$\sigma_P = \sqrt{\frac{1}{4 \times n \times \ln 2} \times \sum_{i=1}^{n} \left(\ln \frac{H_i}{L_i} \right)^2}$$

where H_t is the daily high price, and L_t is the daily low price.• Dependent Variable: Dependent variable (investor decisions) was proxied by number of shares traded daily on Iraq Stock Exchange (trading volume) for each firm during the period of study.. Trading volume is an objective quantitative indicator of investor decisions, reflecting the degree of their activity and responsiveness to information available in the market.

• Pearson Correlation Test: To determine the strength and direction of the linear relationship between study variables before and after the disclosure of financial reports.

• Simple Linear Regression Analysis: To measure and interpret the effect of financial reporting opacity on investor decisions.

• Paired Samples T-Test: To determine whether statistically significant differences exist in opacity levels and investor decisions between pre- and post-disclosure periods.

5. Results and Discussion

5.1. Descriptive Statistics of Primary Variables

Table 1: Descriptive Statistics of Primary Variables

Statistical Indicator	Information Asymmetry Before Report Release	Information Asymmetry after Report Release	Information Asymmetry Report day	Stock Market Turnover Rate
Mean	0.007126	0.005201	0.005397	15,043,262
Median	0.006651	0.004729	0.004476	6,545,555
Std. Deviation	0.004826	0.003958	0.005238	21,283,524
Min	0	0	0	28,348
Max	0.016629	0.012372	0.014613	66,042,029
Skewness	0.499	0.376	0.705	1.77
CV%	67.71%	76.12%	97.05%	141.48%

Source: Prepared by the researcher based on statistical software outputs, relying on data published by the Iraq Stock Exchange.

Table (1) presents the descriptive statistics for the primary study variables**,** Descriptive results indicate a variation in stock price behavior levels between the pre-disclosure period and post-disclosure period. The average volatility for the pre-disclosure period was higher than that of the post-disclosure period; which suggests the presence of informational opacity prior to the disclosure event. After financial reports are issued investor decisions (trading volume), show a clear response with a strong positive skewness coefficient. This indicates that regardless of how clearly or unclearly investors interpret the financial reporting process, the primary driver for liquidity flows and buy/sell activity among listed companies is the content of those reports.

5.2. Measuring Financial Reporting Opacity Levels

Table 2 illustrates the variation in the levels of ambiguity in the financial reports of both companies over a five-year period (the study period).

Table 2: Financial Reporting Opacity Levels for the Study Sample — Period 2020–2024

Fiscal Period	Listed Entity	Pre-Disclosure Ambiguity Index	Post-Disclosure Ambiguity Index	Ambiguity Index on Reporting Date	Percentage Variation
2020	Asia Cell Telecom	0.005014	0.001940	0.002675	−61.31%
2020	Al-Khatam Telecom	0	0	0	0
2021	Asia Cell Telecom	0.010656	0.008075	0.007167	−24.22%
2021	Al-Khatam Telecom	0.004239	0.000647	0.012916	−84.73%
2022	Asia Cell Telecom	0.006703	0.008390	0.007651	+25.16%
2022	Al-Khatam Telecom	0.001851	0.004918	0	+165.71%
2023	Asia Cell Telecom	0.010416	0.008008	0.014613	−23.11%
2023	Al-Khatam Telecom	0.006599	0.003114	0	−52.81%
2024	Asia Cell Telecom	0.016629	0.012372	0.005090	−25.60%
2024	Al-Khatam Telecom	0.009156	0.004541	0.003862	−50.40%

Source: Prepared by the researcher based on statistical software outputs, relying on data published by the Iraq Stock Exchange.

Percentage of the differences in the price volatility of shares prior to and post the reporting of financial results for each firm and year are illustrated in this table. Large percentage changes indicate large changes in price behavior post reporting — i.e., the result of previously ambiguous or opaque information becoming clear to investors resulting in rapid revision of investment positions. A significant increase in price volatility (e.g. 165%) signifies an unstable marketplace and could be indicative of ambiguity with respect to financial statement information or the revelation of new/unsurprising information that will affect investor expectations.

Conversely, small percentage changes (i.e. 23%, 25%) are representative of minimal change in volatility; therefore, there is a greater level of stability within the marketplace and clarity regarding financial information. Percentages close to 0 would represent virtually no change in volatility possibly due to lack of trading activity/investor interest rather than higher quality of reported financial data. In general, larger changes in percent prices are generally reflective of an increase in uncertainty in the marketplace that can arise from the reporting of financial statements that contain ambiguous or non-transparent information. Conversely, smaller percentage changes are reflective of a better defined and more stable marketplace where investors have a basis on which they can make rational investment decisions.

5.3. Testing Research Hypotheses

Table 3: Summary of Pearson Correlation Analysis (Pearson r, n=10, df=8) Between Financial Reporting Opacity and Investor Decisions

Study Phase	Correlation Coefficient (r)	Test Statistic (t)	Probability Value (p)	Coefficient of Determination	Critical Value (α=0.05)	Statistical Outcome
Before Publication ($X_1 \leftrightarrow Y_1$)	0.548	1.854	0.101	0.301	0.632	No significant statistical relationship
After Publication ($X_2 \leftrightarrow Y_2$)	0.613	2.193	0.060	0.375	0.632	No significant statistical relationship
On Publication Day ($X_0 \leftrightarrow Y_0$)	0.609	2.173	0.062	0.371	0.632	No significant statistical relationship
X_1 vs X_2 (Before↔After)	0.841	4.391	0.002	0.707	0.632	Significant statistical relationship

Source: Have been prepared by the researchers based on extortion outputs of the data published by the Iraq Stock Exchange.

Table 4: Summary of Predictive Modeling Between Financial Reporting Opacity and Investor Decisions"

Regression Scenario	Intercept Value (B_0)	Estimated Slope Parameter (B_1)	Standardized Weight (β)	Test Statistic (t)	Predictive Model Formula
Before Publication	−2,187,353	2,417,862,482	0.548	1.854	$\hat{Y} = -2.19M + 2.42B \times \sigma\_P$
After Publication	+269,321	1,241,459,595	0.613	2.193	$\hat{Y} = +0.27M + 1.24B \times \sigma\_P$
On Publication Day	+1,803,230	1,541,367,530	0.609	2.173	$\hat{Y} = +1.80M + 1.54B \times \sigma\_P$

Source: Prepared by the researcher based on statistical software outputs, relying on data published by the Iraq Stock Exchange.

Table 5: Paired Samples T-Test Results (Paired T-Test, df=9)

Analysis Type	Average Disparity	Statistical Dispersion	Test Statistic (t)	Degrees of Freedom	SProbability Levelig.	Statistical Outcome
Financial Reporting Opacity — Before vs. After Publication	−0.001926	0.002615	−2.329	9	**0.045 ***	**Significant**
Investors' Decisions — Before vs. After Publication	−8,317,689	13,852,257	−1.899	9	0.090	Not Significant

Source: Prepared by the researcher based on statistical software outputs, relying on data published by the Iraq Stock Exchange.

5.4. Analysis of Differences in Opacity Levels (Paired Samples T-Test)

The statistical findings demonstrate a statistically significant difference in the level of financial reporting opaqueness for both time intervals prior to and subsequent to disclosure at (Sig = 0.045), which is less than the threshold value (0.05) used to determine significance. The reason for this is due to the materiality of disclosing historical financial information as it affects investors expectations. Therefore, the changes in price volatility are indicative of how the market responds to new information and its potential to be a shock to the system, further demonstrating that there exists within the Iraqi context, relevant informational content contained within the annual report that will affect measures of opacity and volatility.

5.5. Analysis of Differences in Investor Decisions (Trading Volume)

The findings are different from those related to the level of transparency; no statistically significant differences were observed in trading volume (a reflection of investor decision-making) between the two time frames prior to and subsequent to disclosure; (Sig = 0.09). One possible explanation for this result may be due to an apparent tendency for Iraqi Stock Exchange investors to exhibit "conservative" or "wait and see" attitudes towards disclosed information, such that they do not react by rapidly increasing their buying/selling activities once data has been publicly released. Another possible interpretation of the result may relate to poor efficiency within the Iraqi Stock Exchange's operations or a tendency among shareholders to retain shares as a means of generating annual dividend payments, rather than purchasing/selling them in response to the content of financial reports.

5.6. Analysis of Pearson Correlation Coefficient

Correlation coefficient results indicate a weak direct linear relationship between opacity and investor decisions when measured separately for each period (pre-, day-of, post-), as significance values (Sig) exceeded (0.05) in all cases. Nevertheless, a very strong positive correlation of (0.841) emerged when measuring the overall change between the two periods. The scientific rationale underlying this finding is that the cumulative effect of accounting information becomes more apparent when comparing the overall performance across two distinct time periods — implying that the 'direction' of change in opacity corresponds with the 'direction' of change in investor decisions over the long run, despite the weakness of this correlation at the immediate moment of disclosure.

5.7. Analysis of Effect and Predictability (Regression Model and F-value)

Regression results indicate that the study model lacked sufficient predictive capacity with respect to investor decisions based on opacity levels, as model significance values reached (0.101) and (0.06). This rejection of the effect is attributable to the presence of 'external' variables that influence investor decisions with greater force than accounting opacity — including political conditions and other events such as COVID-19 and security incidents. Financial transparency alone does not enough to explain trading volume movements in terms of financial reporting opacity

Final conclusion: by combining the results from each test we can reach one final conclusion. The dissemination of financial statements changes the state of affairs concerning transparency within the investment community; however it has no impact on investors' decision-making. Therefore, the report found that there was a difference in the level of transparency between the two groups as required by our first hypothesis. However, there were not sufficient data to support either our second or third hypotheses

6. Conclusions

Based upon the findings from this research's statistical analysis, the following conclusions can be made:

1. There is evidence that the reported financial data in annual reports issued by Iraq's telecommunications companies have some value to investors that would influence investor perceptions of risk or investment opportunity, due to statistically significant differences in volatility (Sig =.045) prior to and subsequent to the release of their annual reports.
2. The level of financial reporting quality, measured as informational opacity using the volatility measure (percentage change), varied significantly during the course of the study over the five year period studied, with the range being from a low of 23 percent to high of 165 percent, which indicates there was no regular or consistent level of transparency in financial reporting through the duration of the study.
3. The Parkinson Measure provided sufficient accuracy and usefulness as a diagnostic tool to identify different levels of informational opacity when compared to traditional methods of measuring volatility based on closing stock prices; therefore it appears that traditional methods may understate true volatility.
4. The state of informational opacity precedes the publication of financial reports and recedes following disclosure, confirming that report publication serves a fundamental function in reducing uncertainty and improving the market information environment.
5. No statistically significant differences were recorded in trading volume between pre- and post-disclosure periods (Sig = 0.09), revealing that Iraqi investors are characterized by caution and restraint, and do not immediately translate published information into active trading decisions.
6. The effect of financial opacity on investor decisions did not attain statistical significance in regression models (Sig = 0.101 and 0.06), indicating that accounting opacity alone is insufficient to explain variations in trading volumes.
7. Pearson correlation results reveal a strong positive relationship between pre- and post-disclosure volatility levels ($r = 0.841$), with a coefficient of determination of ($R^2 = 70.70\%$), confirming the sustained effect and temporal continuity of informational opacity across both periods.
8. Decision-making in the Iraqi market for investors is affected by an array of factors rather than only the financial statements content, most notably the political and economic status, aftershocks of COVID-19, inefficiency in market work, and investors are considered as long term investors to hold for shares to receive dividend income not to be active traders in the stock market.

7. Recommendations

The findings of this study suggest several recommendations:

1. The Iraqi Securities Commission should issue directives that require all public traded companies to provide the required financial disclosures on a timely basis and establish an ongoing process for determining if these disclosures are presented clearly (and in sufficient detail) and providing feedback to both the companies and the Securities Commission regarding compliance.
2. The independent roles of both Boards of Directors and Internal Audit Committees at publicly traded telecommunication companies should be strengthened to reduce the potential for intentional lack of transparency resulting from poor corporate governance practices.
3. All public traded companies should be required to provide simple explanatory supplements to each official release, which will allow retail investors to understand what is contained in the formal reports without requiring the assistance of accountants or other professionals.
4. Regulatory bodies should develop methods to measure financial reporting transparency, such as the Parkinson Index and/or other relevant metrics, and include these metrics in evaluating the efficiency and transparency of capital markets.
5. Publicly traded telecommunication companies should implement a policy of proactive, continuing disclosure of material information throughout the year via quarterly reports and/or regular managerial statements, to narrow the time interval between when management has knowledge of events affecting the company's operations and when that information becomes available to investors.
6. Individual investors should become more knowledgeable about finance and accounting through formal education programs designed to teach them how to read and analyze financial statements and access more general information about their investment universe beyond just financial statements (e.g., industry trends; economic data).
7. Future studies should extend the application of the Parkinson Index to additional sectors listed on the Iraq Stock Exchange, allowing for cross-industry comparisons of financial reporting opacity and increasing our overall understanding of financial reporting opacity in the Iraqi environment.
8. Future research should expand upon the prior studies by investigating various mediating/moderating factors (e.g., corporate governance characteristics, audit quality, institutional ownership percentages) over a longer period of time to provide a clearer picture of the long term impact of financial reporting opacity on investor decision making.

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