

MINISTRY OF INDUSTRY AND TRADE
HANOI UNIVERSITY OF INDUSTRY



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**RESEARCH ON MODIFIED AUDIT OPINIONS ON THE
FINANCIAL STATEMENTS OF COMPANIES ON THE
VIETNAMESE STOCK MARKET**

Major: Accounting

Code: 9340301

SUMMARY OF DESERTATION IN ACCOUNTING

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- Vietnam National Library

INTRODUCTION

1. The Necessity of the Research Topic

The stock market plays an important role in mobilizing and allocating financial resources for the economy, in which the transparency and reliability of financial statements serve as the foundation for ensuring the efficient operation of the market. In this context, auditors' opinions on financial statements become valuable information signals for investors and related stakeholders. In particular, modified audit opinions reflect the existence of material misstatements or scope limitations that prevent auditors from providing reasonable assurance on the financial statements (IAASB, 2016d). Therefore, studying the factors affecting the likelihood of firms receiving modified audit opinions is significant in both theoretical and practical aspects.

From the theoretical perspective, fundamental theories such as agency theory, information asymmetry theory, financial dependency theory, and signaling theory all indicate that differences in interests and information among entities within firms give rise to the risk of financial information misstatements, thereby affecting the likelihood of modified audit opinions. Based on this foundation, numerous international and domestic studies have examined factors affecting the likelihood of modified audit opinions. These studies have mainly focused on financial factors such as profitability, financial leverage, and operational efficiency, while not simultaneously integrating and testing factors such as accrual quality, audit report lag, prior audit opinions, or audit firm reputation within a comprehensive research model in the Vietnamese context. Meanwhile, several studies by Keasey et al., Gaganis et al., Habib, Tsipouridou & Spathis, and Zarei et al. indicate that these characteristics significantly affect the likelihood of firms receiving unmodified audit opinions. Therefore, developing a systematic research model based on inherited theories and previous studies, while simultaneously incorporating financial characteristics and audit-related factors to enhance the explanatory and predictive ability of modified audit opinions, is necessary.

From the practical perspective, firms receiving modified audit opinions may face many negative consequences. First, this outcome directly affects investor confidence and firms' market value. International and domestic studies have confirmed that financial statements audited with modified opinions often lead to negative stock price reactions because investors perceive higher information risk (Chen et al., 2021; Siagian, 2023; Van Linh et al., 2025). In addition, modified audit opinions increase the cost of capital, as credit institutions and investors require risk compensation through interest rates or expected returns (Francis, 2011; Le et al., 2021). In the long

term, this not only affects firms' ability to raise capital but also increases the risk of being placed under supervision, trading restrictions, or delisting from the stock market.

In practice, many listed firms in Vietnam have experienced severe impacts after receiving modified audit opinions. Typically, Hoa Binh Construction Group Joint Stock Company (HBC) received modified audit opinions for many years relating to going concern uncertainty, accumulated losses, and significant debt pressure, leading to a sharp decline in stock prices and the stock being placed under warning and supervision before delisting from the Ho Chi Minh Stock Exchange (HOSE) (Hoa Binh Construction Group Joint Stock Company, 2023, 2026). Similarly, Ocean Group Joint Stock Company (OGC) continuously received qualified audit opinions during the period 2018–2021 due to accumulated losses, legal disputes, and doubts about going concern ability, resulting in the stock being placed under supervision by HOSE from May 2022 onward. Consequently, stock prices declined, corporate reputation was damaged, investor confidence weakened, and the firm's ability to mobilize capital in the market was restricted (Anh, 2022; CafeF, 2021). These cases demonstrate that early identification of risk signals and factors leading to modified audit opinions is practically significant for firms, auditors, investors, and regulators.

Through a study examining the effects of factors on audit opinions on financial statements of listed firms on the Vietnamese stock market during the period 2016–2020, Thu & Ngoc found that the proportion of modified audit opinions accounted for approximately 6.26%. Meanwhile, the study by Lin et al. found that non-unmodified audit opinions accounted for 11% in the Chinese stock market during 1992–1999. In European countries, the proportion of modified audit opinions was relatively modest, at 2.96% in the UK stock market during 1988–1994 according to Lennox and 3.4% in the Athens stock market during 2005–2011 according to Tsipouridou & Spathis. However, in recent years, non-unmodified audit reports have shown an increasing trend. Specifically, during the period 2016–2023, among a total of 9,199 audited financial statements of firms listed on the Vietnamese stock market, there were 1,472 cases of modified audit opinions, accounting for approximately 16%, according to Van Linh et al. This figure also reflects the considerable prevalence of the phenomenon and highlights the urgent need to study modified audit opinions on financial statements.

Particularly, regarding research methods, most previous studies have primarily employed traditional econometric models-logistic regression-to predict the likelihood of modified audit opinions. Although this method has the advantage of interpretability, it is limited in detecting complex relationships between financial and non-financial variables. In the context of the rapid development of data science and

artificial intelligence, machine learning methods have been increasingly applied in accounting and auditing due to their ability to process large datasets and improve predictive accuracy (Sánchez-Serrano et al., 2020; Stanisic et al., 2019). However, studies applying machine learning to predict modified audit opinions in Vietnam remain relatively limited (Thu & Ngoc, 2024). Therefore, combining modern predictive methods alongside traditional models not only enhances the practical value of the research but also creates methodological novelty in auditing research in Vietnam.

From the above analysis, it can be affirmed that conducting the study entitled *“Research on Modified Audit Opinions on the Financial Statements of Companies on the Vietnamese Stock Market”* is essential both theoretically and practically.

2. Research Objectives and Research Questions

2.1. Research Objectives

The research objectives include both general and specific objectives as follows:

General objective: To examine the current status of modified audit opinions, the determinants influencing modified audit opinions, and to predict modified audit opinions on the financial statements of companies listed on the Vietnamese stock market.

Specific objectives: To achieve the overall research objective, the specific objectives include:

- To examine the current status of modified audit opinions on the financial statements of companies listed on the Vietnamese stock market during the period 2015-2023.
- To identify the factors affecting, and the level of impact of each factor on, modified audit opinions on the financial statements of companies listed on the Vietnamese stock market during the period 2015 - 2023.
- To determine the method with the best predictive capability for modified audit opinions on the financial statements of companies listed on the Vietnamese stock market.

2.2. Research Questions

Based on the research objectives, the study formulates the following research questions:

Research Question 1: What is the current status of modified audit opinions on the financial statements of companies listed on the Vietnamese stock market during the period 2015 - 2023?

Research Question 2: Which factors affect, and to what extent does each factor affect, modified audit opinions on the financial statements of companies listed on the Vietnamese stock market during the period 2015 - 2023?

Research Question 3: Which method provides the most accurate prediction of modified audit opinions on the financial statements of companies listed on the Vietnamese stock market?

3. Research Subject and Scope

Research subject: Audit reports and financial statements of companies listed on the Vietnamese stock market.

Scope of the study:

+ *In terms of research content:* The study focuses on analyzing the current status of modified audit opinions on the financial statements of firms on the Vietnamese stock market. It identifies the determinants influencing modified audit opinions and the method that provides the most effective prediction of modified opinions, thereby proposing appropriate implications and policy recommendations for relevant stakeholders.

+ *In terms of scope (geographical/market coverage):* The study is conducted on firms in both financial and non-financial sectors across three exchanges: the Ho Chi Minh City Stock Exchange (HOSE), the Hanoi Stock Exchange (HNX), and the Unlisted Public Company Market (UPCoM). In the descriptive statistical analysis, the study examines both sectors to assess the current status of modified audit opinions across sectors. For regression and prediction analyses, the study focuses on non-financial firms to ensure homogeneity in financial characteristics and audit-related features. The content analysis of the causes leading to modified audit opinions is conducted for both financial and non-financial firms.

+ *In terms of time:* The study uses data from firms listed on the Vietnamese stock market over the period 2015–2023. This period is considered appropriate for the research objectives and scope, as it provides a sufficiently long data series to identify trends, analyze determinants, and evaluate the effectiveness of predictive models for modified audit opinions.

4. Research Methodology

In this study, the author adopts a mixed-methods research approach, in which quantitative research serves as the primary method, while qualitative research is employed to support the interpretation and discussion of the research findings. This combination enables the research results to ensure not only statistical reliability but also theoretical and practical depth.

Regarding the quantitative research method, based on the literature review and underlying theories, the author identifies the independent and dependent variables appropriate for the research model. Subsequently, the author collects data according to the identified variables and measurement scales, codes and processes the data using Stata17 software. Through this software, the author conducts an analysis of the current status of non-unmodified audit opinions and employs Logistic regression to identify the factors affecting non-unmodified audit opinions. In addition, based on the Python programming language, the author combines forecasting methods, including Logistic regression, Decision Tree, Balanced Bagging, XGBoost, and Random Forest, to evaluate

the method with the highest predictive capability for non-unmodified audit opinions on the financial statements of companies listed on the Vietnamese stock market.

Regarding the qualitative research method, the author employs the content analysis technique to examine the “Basis for Auditor’s Opinion” section in non-unmodified audit reports. The author collects, codes, classifies, and systematizes the information presented in the audit reports, thereby identifying the major groups of reasons leading enterprises to receive non-unmodified audit opinions. The results of the content analysis are used to support the interpretation of the findings obtained from the current status analysis, regression analysis, and predictive analysis, while also providing additional practical evidence for developing the policy implications and recommendations of the dissertation.

5. Novel Contributions of the Dissertation

5.1. Theoretical Contributions

- The dissertation systematizes and clarifies the concept, nature, and measurement of modified audit opinions, thereby contributing to the enrichment and refinement of the theoretical foundation of audit opinions in the context of the Vietnamese stock market.

- The dissertation develops and refines a theoretical framework integrating agency theory, stakeholder theory, financial dependency theory, signaling theory, and information asymmetry theory, thereby providing a foundation for constructing a research model that examines:

- + The impact of firm-specific financial factors and audit-related characteristics on modified audit opinions.

- + The prediction of modified audit opinions.

- The dissertation advances the research model by integrating accrual quality with firm-specific financial factors and audit characteristics. This approach remains relatively uncommon in Vietnam, thereby offering a new perspective on the role of accounting information quality in shaping modified audit opinions.

- The dissertation applies traditional quantitative methods alongside modern machine learning algorithms, combined with the SHAP (SHapley Additive exPlanations) approach for model interpretability in predicting modified audit opinions, thereby contributing to the expansion of methodological frameworks in accounting and auditing research in Vietnam toward greater modernity and transparency.

5.2. Practical Contributions

- The dissertation provides empirical evidence on the current status of modified audit opinions on the financial statements of companies listed on the Vietnamese stock market over the period 2015–2023. The results show clear differences in the frequency of modified audit opinions between listed exchanges (Hanoi Stock Exchange & Ho Chi Minh City Stock Exchange) and the unlisted public market (Unlisted Public Company

Market), between financial and non-financial sectors, and across industries such as telecommunications, oil and gas, pharmaceuticals, and utilities.

- The dissertation identifies and quantifies the impact of determinants on modified audit opinions, including accrual quality, inventory turnover, fixed asset turnover, return on assets, leverage, prior-year audit opinion, audit firm reputation, and audit report lag. These findings provide important empirical evidence to support stakeholders in identifying material risk factors.

- The dissertation demonstrates the superior performance of machine learning techniques in predicting modified audit opinions, in which the Random Forest method shows better predictive performance compared to other methods. This result provides an early warning tool for the likelihood of modified audit opinions, thereby enhancing stakeholders' ability to identify and manage risks related to financial statement quality.

- Based on the research findings, the dissertation proposes scientifically grounded and feasible recommendations for various stakeholders, including auditors, audited firms, investors, creditors, analysts, and regulatory authorities, with the aim of improving financial information quality and enhancing market supervision efficiency.

6. Structure of the Dissertation

In addition to the cover pages, table of contents, lists of tables, figures and diagrams, list of abbreviations, introduction, conclusion, appendices, and references, the dissertation is structured into five chapters:

Chapter 1: Research Overview

Chapter 2: Theoretical Background and Conceptual Framework

Chapter 3: Research Model and Methodology

Chapter 4: Research Results

Chapter 5: Discussion of Research Findings and Recommendations

CHAPTER 1. RESEARCH OVERVIEW

1.1. Overview of studies on the impact of modified audit opinions

Modified audit opinions on financial statements have been an interesting topic for many researchers. According to Ianniello & Galloppo (2015), most studies in this area can be classified into two main streams:

- + Experimental studies: These studies examine the reactions of decision-makers (e.g., credit managers and financial analysts) when receiving modified audit opinions;
- + Market-based studies: These studies use archival data to capture stock market reactions around the announcement of modified audit reports.

1.2. Overview of factors affecting modified audit opinions

In this dissertation, the author conducts a literature review and research following the approach commonly adopted by scholars and researchers.

The group of firm-specific financial factors includes key indicators such as: Accrual quality (DA); Current ratio (Current assets/Current liabilities); Fixed asset turnover (Net revenue/Net fixed assets); Inventory turnover (Cost of goods sold/Average inventory); ROE (Net income/Equity); ROA (Net income/Total assets); Revenue growth ((Current year revenue – Previous year revenue)/Previous year revenue); Leverage ratio (Total debt/Total assets). The author reviews eight variables related to firms' financial characteristics, selectively inherited from prior domestic and international studies, including Keasey et al. (1988), Laitinen & Laitinen (1998), Spathis (2003), Kirkos et al. (2007), Omid (2015), Özcan (2016), Citron & Taffler (1992), Mutchler (1985), Dopuch et al. (1987), Caramanis & Spathis (2006), Moalla (2017), Thur (2017), Chi (2022), and Ngân et al. (2024).

The group of audit-related factors includes key variables such as: Prior-year audit opinion; Audit firm reputation; and Audit report lag in accordance with regulations. These variables have been widely documented in both domestic and international studies as having significant effects on the likelihood of issuing modified audit opinions, in addition to traditional financial indicators, as evidenced by Keasey et al. (1988), Laitinen & Laitinen (1998), Spathis (2003), Kirkos et al. (2007), Omid (2015), Özcan (2016), Citron & Taffler (1992), Mutchler (1986), Dopuch et al. (1987), and Caramanis & Spathis (2006).

1.3. Overview of methods used to predict modified audit opinions

Numerous studies have examined the prediction of factors affecting modified audit opinions using logistic regression, neural networks, and machine learning algorithms, including Dopuch et al. (1987), Keasey et al. (1988), Laitinen & Laitinen (1998), Gaganis et al. (2007), Özcan (2016), Yaşar et al. (2015), Stanisic et al. (2019), and Sánchez-Serrano et al. (2020).

In this section, the author reviews the literature from two perspectives:

- + Studies employing Logistic regression;
- + Studies applying machine learning methods.

1.4. Research Gaps

The literature review reveals three major research gaps.

(i) First, there are relatively few domestic studies that simultaneously incorporate accrual quality, firm-specific financial characteristics, and audit-related characteristics into a single quantitative model to examine their effects on the likelihood of receiving a modified audit opinion.

(ii) Second, domestic studies have mainly relied on the traditional logistic regression model and have rarely extended to the application of modern machine learning techniques for predicting modified audit opinions.

(iii) Third, the scope of domestic studies remains limited, as most have focused only on non-financial firms listed on the HOSE or HNX. The exclusion of the UPCoM market-which comprises a large number of public companies that are not officially listed and are generally characterized by smaller size, lower information transparency, less consistent corporate governance quality, higher risks of material misstatements in financial statements, and a greater likelihood of receiving modified audit opinions-means that existing studies have not fully captured the diversity and segmentation of the Vietnamese stock market.

Based on the identified research gaps, it can be seen that this study not only builds upon prior theoretical foundations and empirical evidence but also contributes novel aspects in terms of both research content and methodology. By comprehensively integrating different groups of determinants into a quantitative model and applying advanced prediction methods in a new research context, this study is expected to address the identified academic gaps while providing practical implications for improving the quality of financial reporting and auditing in Vietnam.

CHAPTER 2. THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

2.1. Audit reports on financial statements

- Concept and role of audit reports on financial statements
- Objectives of audit reports on financial statements
- Types of audit reports on financial statements

2.2. Modified Audit Opinions on Financial Statements

According to ISA/VSA 705 “Modifications to the Opinion in the Independent Auditor’s Report,” an auditor cannot issue an unmodified opinion in the following cases: (1) The financial statements, taken as a whole, contain material misstatements. Such misstatements may arise from the selection or application of accounting policies in recognizing, measuring, classifying, presenting, or disclosing items in the financial statements that are not in accordance with accounting standards and regulations. (2) The auditor is unable to obtain sufficient appropriate audit evidence to conclude that the financial statements, taken as a whole, are free from material misstatement.

Types of modified audit opinions include: Qualified opinion; Disclaimer of opinion; Adverse opinion.

2.3. Theoretical Foundations of Predicting Modified Audit Opinions

- The concept, significance, and role of prediction
- Prediction of modified audit opinions
- Methods for predicting modified audit opinions

2.4. Underlying theories for developing the research model

- **Agency theory** explains the conflict of interest between principals-shareholders and creditors-and agents-the company’s management. When auditors detect abnormal accruals that significantly affect the fairness and reliability of financial statements, the likelihood of issuing a modified audit opinion increases. When ROA is high, firms demonstrate strong performance, thereby reducing the probability of receiving a modified audit opinion. When material issues related to financial statements are identified, auditors from Big4 firms are more likely to issue modified audit opinions compared to non-Big4 audit firms.

Stakeholder theory is applied in this dissertation to explain the selection of variables such as inventory turnover (ITR), fixed asset turnover (IFTR), and revenue growth (GROWTH). From the stakeholder perspective, firms with high operational efficiency and positive revenue growth are often associated with greater financial transparency and stronger going-concern capability, thereby reducing the likelihood of receiving a modified audit opinion.

Financial dependence theory suggests that when firms cannot fully finance their operations through internal funds, they must rely on external capital providers, creating

financial dependence. This dependence increases as the proportion of debt in the capital structure rises, reducing financial autonomy and increasing creditors' influence over managerial decisions. According to this theory, a high leverage ratio is likely to increase the probability of receiving a modified audit opinion.

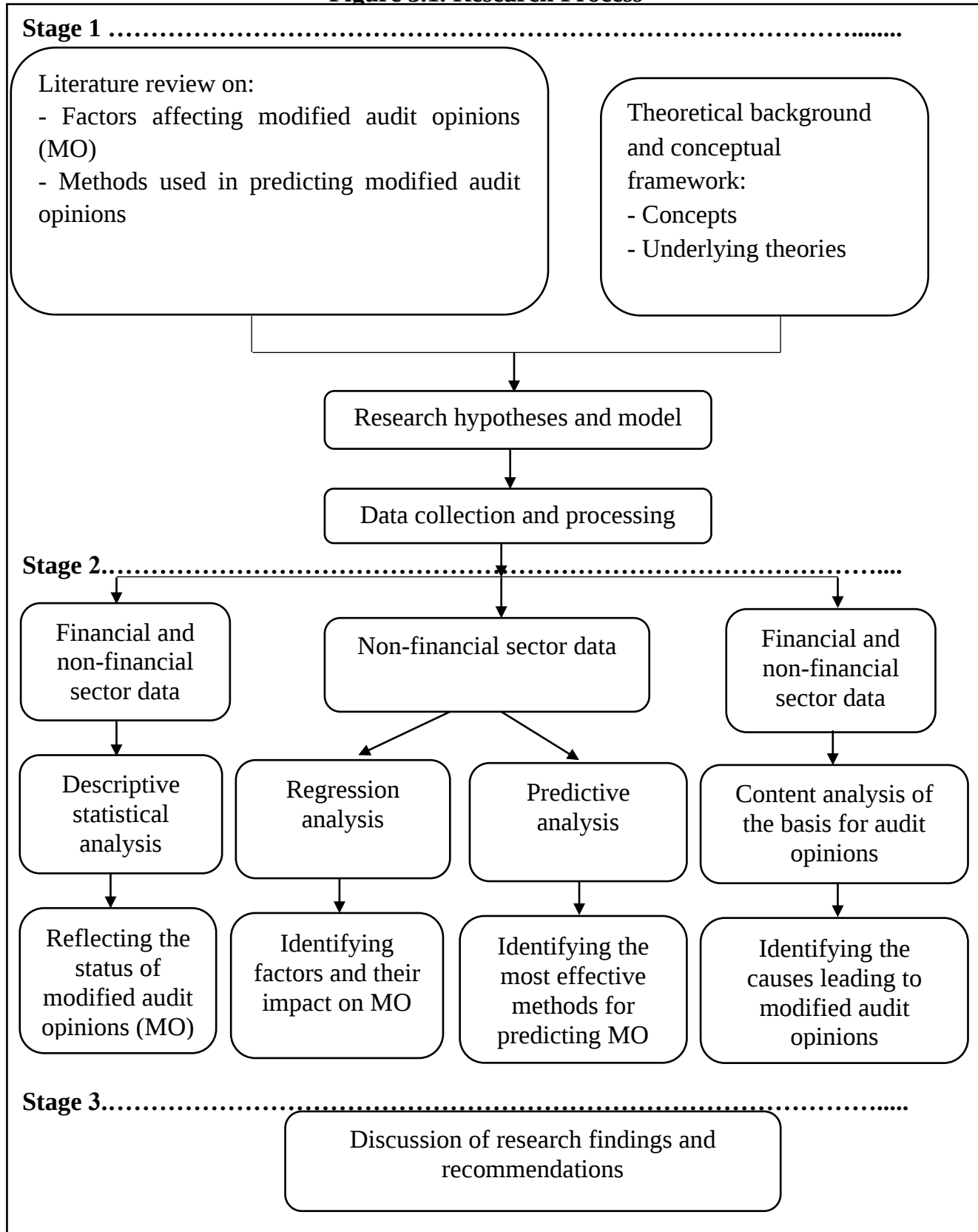
Signaling theory explains how entities with internal information convey signals to external parties in the presence of information asymmetry. From this perspective, the prior-year audit opinion (LagAO) is expected to have a positive relationship with the likelihood of receiving a modified audit opinion in the current year. Considering the timeliness of audit report issuance as a positive signal of financial reporting quality, the study expects audit report lag (in accordance with regulations) to have a negative impact on the probability of receiving a modified audit opinion.

Information asymmetry theory explains the economic consequences arising when market participants possess unequal levels of information. This theory is applied to explain two arguments in the dissertation: (i) when firms fail to provide sufficient audit evidence, information asymmetry increases significantly, leading auditors to be more likely to issue modified audit opinions; and (ii) factors that increase information asymmetry, such as a low current ratio (CR), may lead to a higher likelihood of receiving modified audit opinions.

CHAPTER 3. RESEARCH MODEL AND METHODOLOGY

3.1. Research Process

Figure 3.1. Research Process



Source: Compiled by the author

3.2. Research Model and Hypotheses

3.2.1. Research Model

Figure 3.2. Research Model

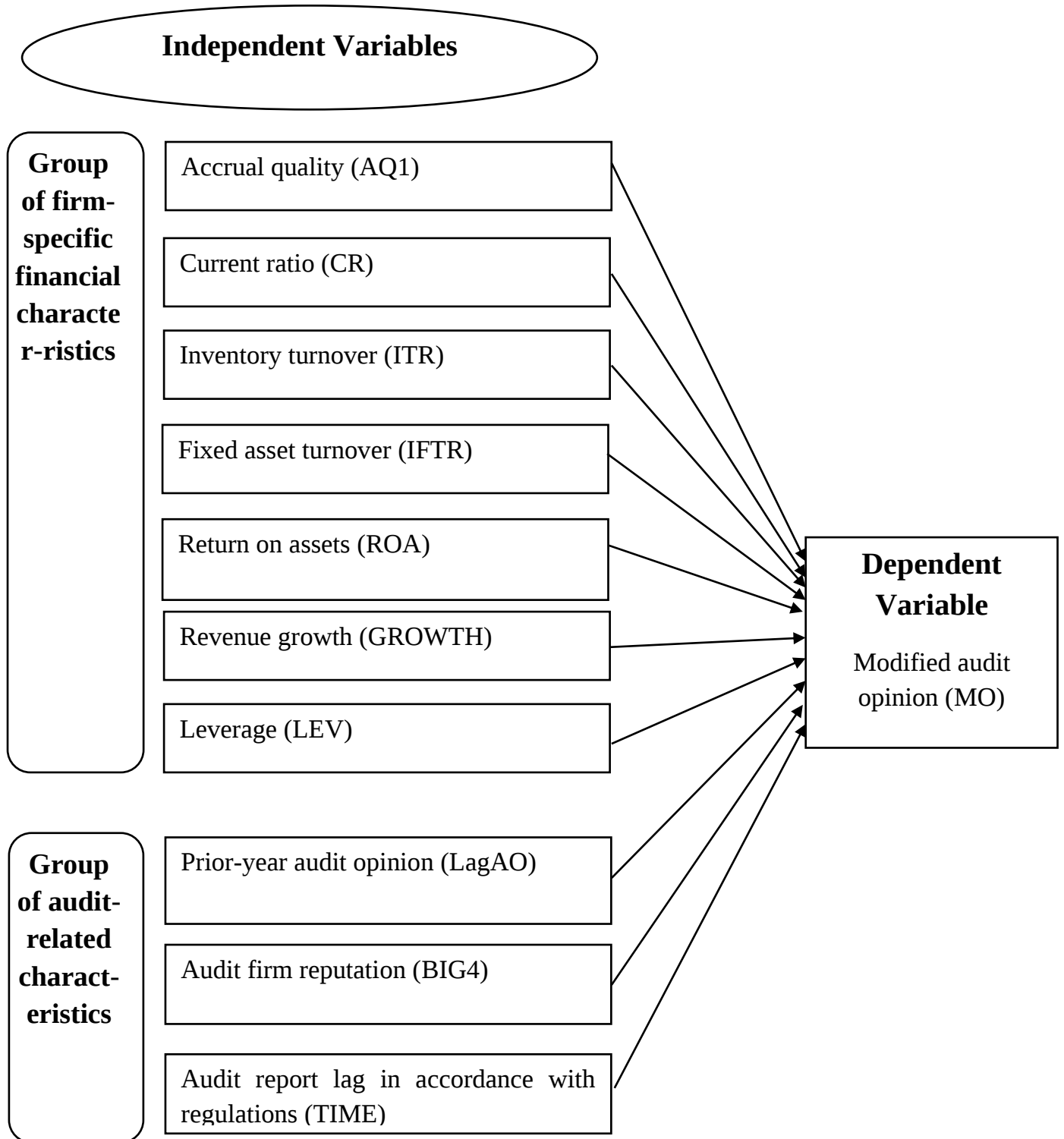


Table 3.1. Measurement of Variables in the Research Model

Variable Name	Code	Variable Type	Measurement	Kỳ vọng dấu
Modified audit opinion	MO	Dependent variable	Takes the value of 1 if the audit opinion is a modified audit opinion (<i>including qualified opinion, adverse opinion, and disclaimer of opinion</i>); otherwise, takes the value of 0 if the audit opinion is an unmodified audit opinion.	
Accrual quality	AQ1	Dependent variable	$AQ1 = -Std(\epsilon_t)$, based on the model of Dechow & Dichev (2002).	-
Current ratio	CR	Dependent variable	Current assets / Current liabilities	-
Inventory turnover	ITR	Dependent variable	Cost of goods sold / Average inventory	-
Fixed asset turnover	IFTR	Dependent variable	Net revenue / Average net fixed assets. Where average net fixed assets = (Beginning net book value of fixed assets + Ending net book value of fixed assets) / 2.	-
Return on assets	ROA	Dependent variable	Net income / Average total assets	-
Revenue growth	GROWTH	Dependent variable	(Current year revenue – Previous year revenue) / Previous year revenue	-
Leverage	LEV	Dependent variable	Total liabilities / Total assets	+
Prior-year audit opinion	LagAO	Dependent variable	Takes the value of 0 if the prior-year audit opinion is unmodified; takes the value of 1 if it is modified	+
Audit firm reputation	BIG4	Dependent variable	Takes the value of 1 if audited by a Big4 firm; takes the value of 0 if audited by a non-Big4 firm	+
Audit report lag (in accordance with regulations)	TIME	Dependent variable	Takes the value of 1 if the reporting time is ≤ 90 days; takes the value of 0 if it exceeds 90 days	-

Source: Compiled and developed by the author

3.3. Data and Data Processing

3.3.1. Research Data

The study employs an unbalanced panel dataset of firms listed on the Vietnam stock market, distributed across three exchanges: HOSE, HNX, and UPCoM, over the period 2015–2023. The dataset is extracted from the FiinPro and Vietstock systems, based on audited annual financial statements (prioritizing consolidated reports when available), along with audit reports including opinion types and issuance dates. The unbalanced panel structure reflects differences in listing and delisting across firms, as well as variations in data availability over time. Identification keys (firm code and fiscal year) are cross-validated to ensure data integrity.

3.3.2. Data Processing

Bảng 3.2. Số lượng mẫu sử dụng trong nghiên cứu

No.	Description	Number of Firms	Number of Observations
1	Total number of firms on the three exchanges HOSE, HNX, and UPCOM during 2015–2023	1.667	15.012
2	Firms without audit opinions	101	1.655
3	Firms in the securities, financial, insurance, and banking sectors	204	1.659
4	Firms with invalid observations or missing values	83	3.082
5	Final sample (5= 1-2-3-4)	1.279	8.616

Source: Compiled by the author

3.4. Quantitative Research

Based on the research model and hypotheses, the author conducts quantitative research using secondary data through three steps: (i) descriptive statistics using Stata 17 to assess the status of modified audit opinions on the financial statements of firms listed on the Vietnam stock market; (ii) regression analysis using Stata 17 to identify the influencing factors and the magnitude of their effects; and (iii) exploration of the most effective methods for predicting modified audit opinions, including Logistic regression and machine learning algorithms (Decision Tree, Random Forest, XGBoost, and Balanced Bagging) implemented on the Python platform.

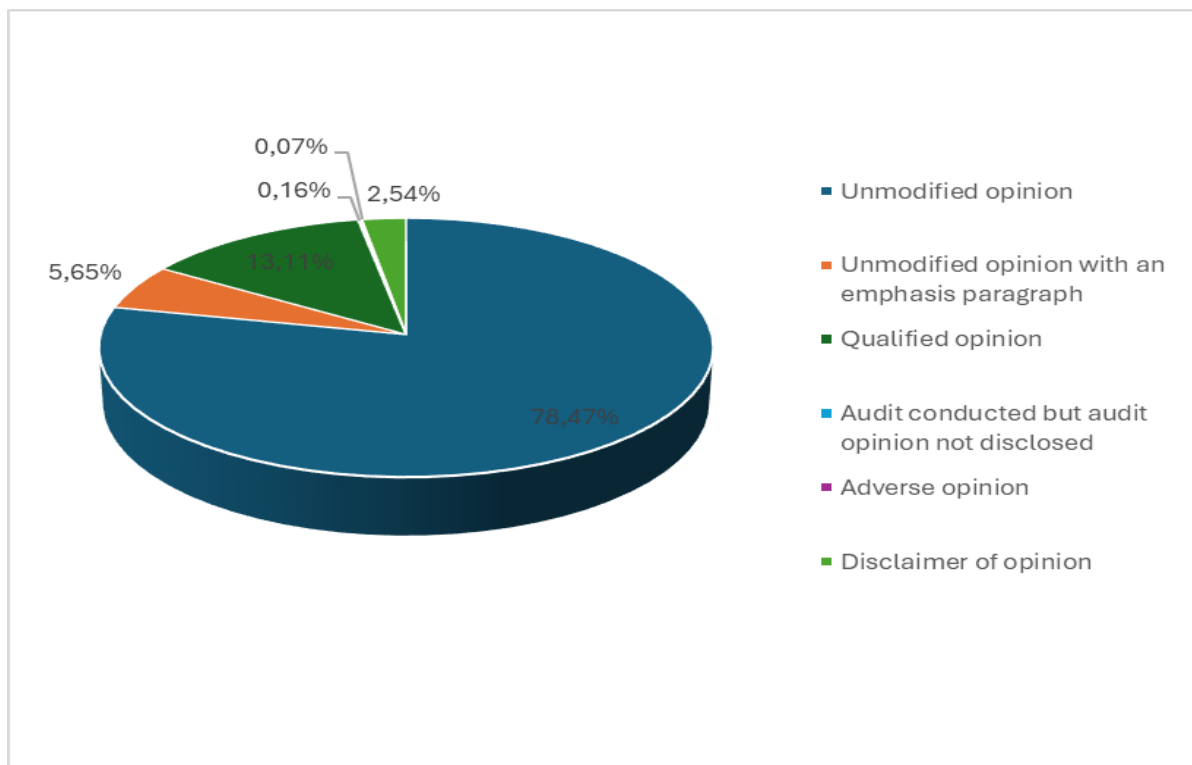
3.5. Content Analysis of Modified Audit Reports

To provide deeper insights into modified audit opinions, the author conducts a content analysis of the “Basis for Opinion” paragraph in audit reports of firms listed on the Vietnam stock market during the period 2021–2023. The selection of this three-year period is based on two reasons: (i) the number of modified audit reports during 2015–2023 is relatively large (2,121 reports), and collecting non-financial data is challenging; and (ii) data from 2021–2023 ensure timeliness and provide meaningful implications for future policy recommendations.

CHAPTER 4. RESEARCH RESULTS

4.1. Results of Descriptive Statistical Analysis

Figure 4.1. Descriptive Statistics of Audit Opinion Types from 2015 to 2023

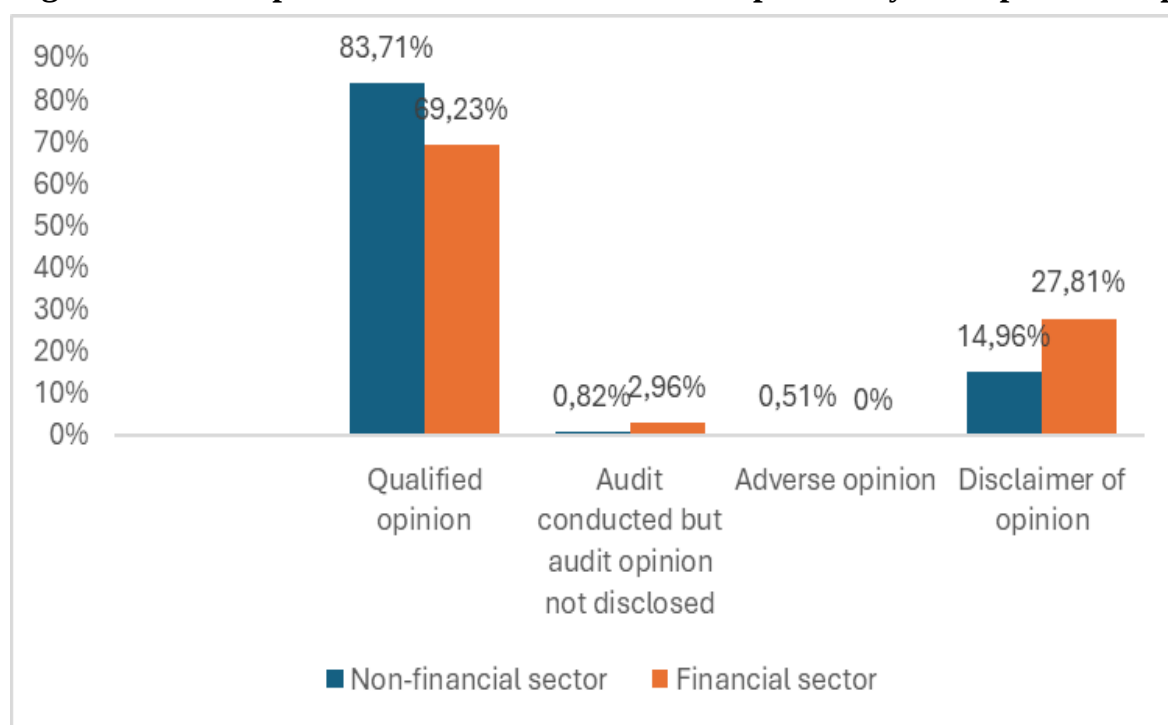


Source: Compiled by the author

Table 4.1. Descriptive Statistics of Audit Opinion Types by Exchange

Audit opinion		Listed			Unlisted	Total
		HNX	HOSE	Tổng	UPCoM	
Unmodified opinion	Number	2.663	3.328	5.991	5.245	11.236
	Percentage (%)	94,40	96,94	95,79	73,84	84,12
Modified opinion	Number	158	105	263	1.858	2.121
	Percentage (%)	5,60	3,06	4,21	26,16	15,88
Total	Number	2.821	3.433	6.254	7.103	13.357
	Percentage (%)	100	100	100	100	100

Source: Compiled by the author

Figure 4.2. Descriptive Chart of Modified Audit Opinions by Enterprise Group

Source: Compiled by the author

4.2. Hypothesis Testing Results

Table 4.2. Results of Tests for Differences in the Likelihood of Receiving a Modified Audit Opinion Between Listed and Unlisted Markets

Audit opinion	Unmod- ified opinion	Modified opinion	Difference	z- statistic	p-value
Listed market	0,9579	0,0421	-0,2195	-34,639	0,000***
Unlisted market	0,7384	0,2616	0,2195	34,639	0,000***
Pearson Chi-square $\chi^2(1)$				—	0,000*** ($\chi^2(1)=1,2e+03$)
Fisher's exact test				—	0,000*** (1-sided=0,0000)

Standard errors in brackets

* $p < 0,1$, ** $p < 0,05$, *** $p < 0,01$

Source: Compiled by the author using Stata 17

Table 4.3. Results of Tests for Differences in the Likelihood of Receiving a Modified Audit Opinion Between Non-financial and Financial Firms

Audit opinion	Unmod- ified opinion	Modified opinion	Difference	z- statistic	p-value
Non-financial firms	0,8331	0,1669	0,065	6,779	0,000***
Financial firms	0,8981	0,1019	-0,065	-6,779	0,000***
Pearson Chi-square $\chi^2(1)$				—	0,000*** ($\chi^2(1)=45,9524$)
Fisher's exact test				—	0,000*** (1-sided = 0,0000)

Standard errors in brackets

* $p < 0,1$, ** $p < 0,05$, *** $p < 0,01$

Source: Compiled by the author using Stata 17

4.3. Regression Analysis Results

Table 4.4. Robustness Test Results for the Logit Model

	Logit RE	Logit GEE	Probit RE
main			
AQ1	-5,985*** [1,232]	-2,561*** [0,612]	-3,180*** [0,664]
lagAO	1,611*** [0,217]	1,589*** [0,097]	0,894*** [0,116]
BIG4	-2,000*** [0,344]	-0,981*** [0,193]	-1,021*** [0,173]
TIME	-1,583*** [0,252]	-0,746*** [0,126]	-0,849*** [0,137]
CR	-0,092 [0,296]	-0,146 [0,166]	-0,035 [0,160]
ITR	-0,262*** [0,086]	-0,141*** [0,046]	-0,141*** [0,047]
IFTR	-0,197*** [0,076]	-0,095* [0,039]	-0,107*** [0,041]
ROA	-7,602*** [1,215]	-4,233*** [0,649]	-4,201*** [0,659]
GROWTH	-0,220 [0,174]	-0,126 [0,095]	-0,124 [0,096]
LEV	3,417*** [0,851]	1,868*** [0,424]	1,869*** [0,467]
Constant	-2,635*** [0,685]	-1,512*** [0,354]	-1,543*** [0,375]
Insig2u	2,259*** [0,177]		1,108*** [0,166]
Observations	8.616	8.616	8.616
Robust Standard Error Test (vce(cluster stt))			p<0,01
<i>Standard errors in brackets</i>			
* $p < 0,1$, ** $p < 0,05$, *** $p < 0,01$			

Source: Compiled by the author

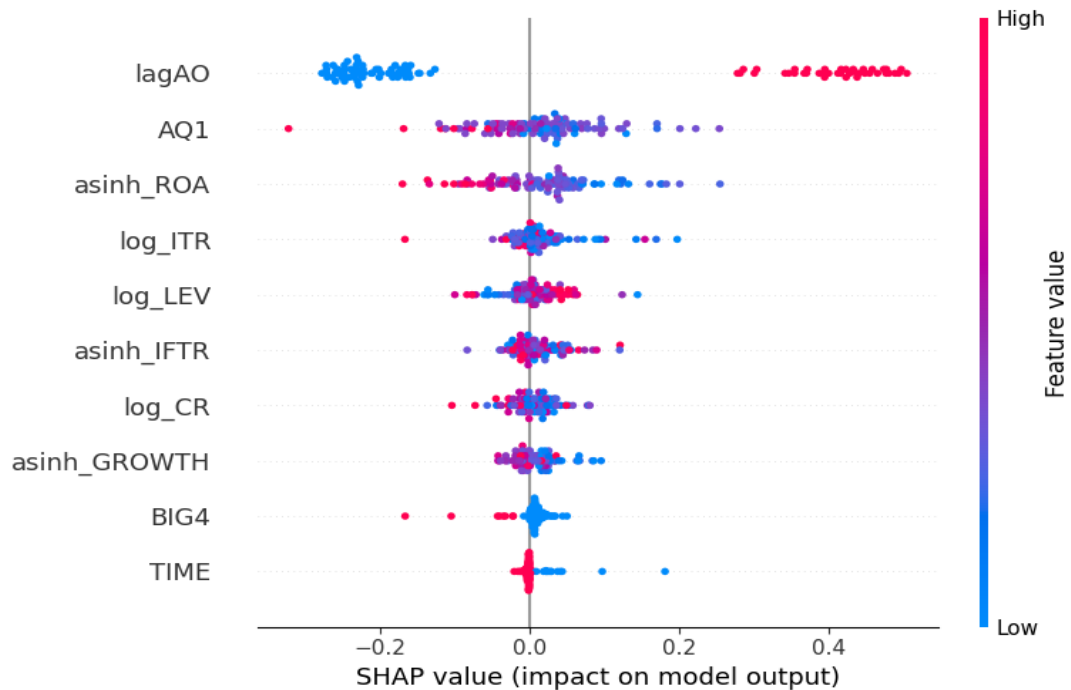
4.4. Forecast Results of Modified Audit Opinions

Table 4.5. Comparison of Forecasting Accuracy for Modified Audit Opinions

Method	Accuracy		AUC		MCC		AP	
	With LagAO	Without LagAO	With LagAO	Without LagAO	With LagAO	Without LagAO	With LagAO	Without LagAO
Logistic Regression	0,867	0,706	0,87	0,71	0,74	0,41	0,92	0,76
Decision Tree	0,888	0,807	0,89	0,81	0,78	0,61	0,84	0,85
Balanced Bagging	0,920	0,867	0,92	0,87	0,84	0,74	0,96	0,92
XGBoost	0,926	0,879	0,93	0,88	0,85	0,76	0,96	0,93
Random Forest	0,937	0,893	0,94	0,89	0,87	0,79	0,98	0,94

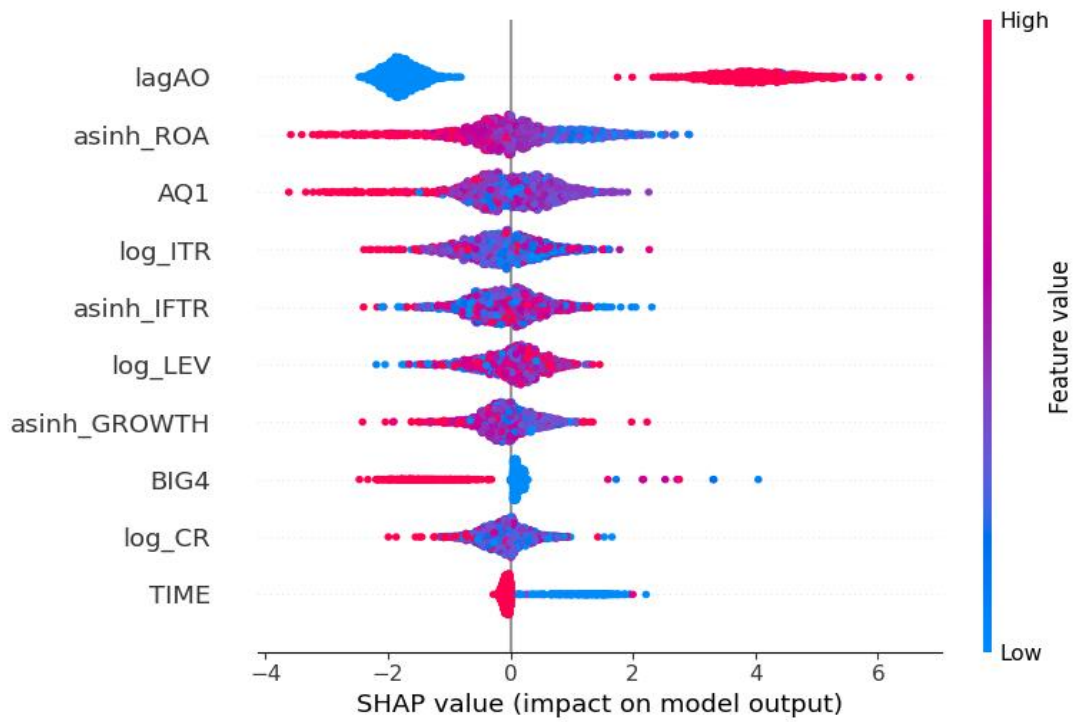
Source: Compiled by the author

Figure 4.3. Variable Importance in Predicting Modified Audit Opinions Using the Balanced Bagging Method



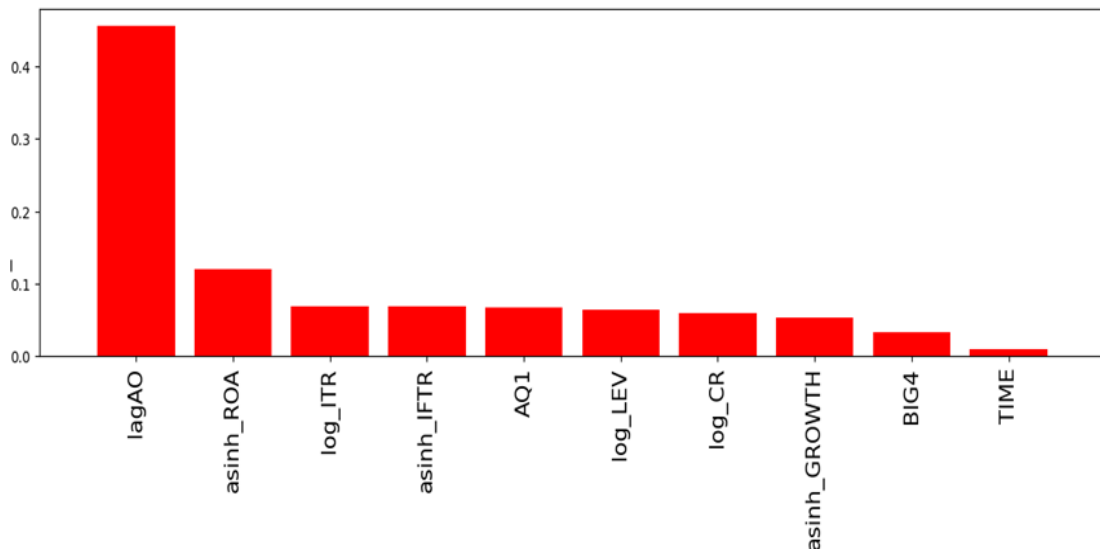
Source: Compiled by the author

Figure 4.4. Variable Importance in Predicting Modified Audit Opinions Using the XGBoost Method



Source: Compiled by the author

Figure 4.5. Variable Importance in Predicting Modified Audit Opinions Using the Random Forest Method



Source: Compiled by the author

4.5. Results of Content Analysis of Modified Audit Reports

The results of the content analysis identify ten main groups of causes leading auditors to issue modified audit opinions, reflecting fundamental limitations in firms' accounting systems and corporate governance. The most prevalent cause is the lack of sufficient appropriate audit evidence and scope limitations, with 605 cases, indicating that many firms have not met requirements for transparency and information disclosure. This is followed by issues related to going concern (255 cases), reflecting financial risks and the ability to sustain operations. In addition, insufficient or improper provisioning (195 cases) and issues related to construction-in-progress projects (150 cases) are also significant causes. Other factors include financial investments and capital contributions (120 cases), non-compliance with accounting standards and recognition errors (100 cases), and issues related to taxation and financial obligations to the State (80 cases). Errors in prior-period adjustments, legal issues concerning asset ownership, and related-party transactions account for smaller proportions but still reflect risks regarding legality and transparency of information. Overall, these causes indicate problems not only in compliance with accounting standards but also in financial management capacity and transparency, thereby highlighting the need to strengthen internal controls and improve disclosure systems.

CHAPTER 5. DISCUSSION OF RESEARCH FINDINGS AND RECOMMENDATIONS

5.1. Discussion of Research Findings

Discussion on the status of modified audit opinions: The frequency of modified audit opinions is high among firms listed on UPCoM and small-sized firms, whereas listed firms maintain a relatively low proportion of modified audit opinions. This indicates that current listing regulations are effective in preventing firms with poor information quality from accessing public investors. The divergence in the rate of modified audit opinions between financial and non-financial sectors is a statistically significant finding. Further industry-level analysis reveals a concentration of audit risk in sectors characterized by complex business models, asset structures, and high sensitivity to macroeconomic variables.

Discussion on factors affecting modified audit opinions: The factors influencing modified audit opinions include accrual quality, inventory turnover, fixed asset turnover, return on assets, leverage, prior-year audit opinion, audit firm reputation, and audit report lag in accordance with regulations. These findings provide useful insights for stakeholders in identifying key risk factors.

Discussion on the prediction of modified audit opinions: The prediction results reflect the current status of audit opinions on financial statements of firms on the Vietnam stock market. At the same time, these results demonstrate a significant advancement in applying machine learning algorithms to address the prediction of modified audit opinions-a challenging task due to the structural data imbalance inherent in the market.

5.2. Recommendations Based on Research Findings

- Recommendations for auditors
- Recommendations for stakeholders

5.3. Limitations of the Study and Directions for Future Research

Limitations of the study: The limitations of this study primarily relate to data scope, econometric methodology, and the proxy variables employed: First, issues of endogeneity and model assumptions; Second, the absence of certain important non-financial factors such as audit fees and internal control.

Directions for future research: Based on the above limitations, this study proposes several potential research directions to further deepen the understanding of factors affecting modified audit opinions in the Vietnam stock market: First, applying advanced econometric methods to address endogeneity issues; Second, extending the model by incorporating additional non-financial factors.

LIST OF PUBLICATIONS RELATED TO THE DISSERTATION

[1]. Pham Thi Thu Oanh, Dang Ngoc Hung, Vu Thi Thuy Van (2024), “Forecasting audit opinions on financial statements: statistical algorithm or machine learning?” *Electronic Journal of Applied Statistical Analysis*, Vol. 17, Issue 01, March 2024, pp. 133–152.

[2]. Pham Thi Thu Oanh, Dang Ngoc Hung, Hoang Thi Viet Ha (2025), “Overview of audit opinions using a bibliometric analysis approach.” *Journal of Science and Technology (Hanoi University of Industry)*, Vol. 61, No. 6 (June 2025), pp. 172–181.

[3]. Pham Thi Thu Oanh, Dang Ngoc Hung, Hoang Thi Viet Ha (2026), “The impact of earnings quality and audit firm reputation on modified audit opinions: Evidence from listed companies in Vietnam.” *Journal of Economics and Finance (Ministry of Finance)*, February 2026.