

# **The Fraud triangle from the perspective of accountants, tax advisors and auditors in the Czech Republic**

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Doctoral Thesis Summary



**Tomas Bata University in Zlín**  
**Faculty of Management and Economics**

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**The Fraud triangle from the perspective of  
accountants, tax advisors and auditors in the Czech  
Republic**

**Fraud triangle z pohledu účetních, daňových poradců a  
auditorů v České republice**

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## **ABSTRACT**

The dissertation examines the fraud triangle theory and its application to accounting professionals in the Czech Republic. This theory identifies three primary factors that contribute to fraudulent behavior: opportunity, motivation (pressure), and rationalization. The research specifically investigates how these factors influence the actions of accountants, tax advisors, and auditors in their professional capacities.

The main objective of this study is to develop a predictive model that measures the significance and influence of individual factors within the fraud triangle framework for companies operating in the Czech Republic. The research extends beyond the traditional three-factor model by incorporating additional variables that contribute to fraudulent accounting practices. These supplementary factors include the gender of accounting specialists, length of practice and the reached education of the accountant within the organization. The methodology employs a comprehensive approach combining analysis of existing literature on fraud theory, quantitative preliminary research, qualitative research involving specialists in accounting fraud verification and quantitative research among Czech organizations.

Based on the collected data, the study constructs a predictive model that assesses the probability of fraud occurrence in Czech companies. This model weighs multiple factors, including the traditional elements of the fraud triangle along with the identified contributing variables.

The practical significance of this research lies in its ability to help stakeholders assess fraud risk levels within companies and develop timely preventive measures to mitigate potential negative impacts on individuals and society. The study makes a valuable contribution to existing fraud prediction models through its novel measurement approach, which extends beyond the three traditional horizons of fraud triangle theory.

## **ABSTRAKT**

Disertační práce zkoumá teorii trojúhelníku podvodu a její aplikaci na účetní profesionály v České republice. Tato teorie identifikuje tři hlavní faktory, které přispívají k podvodnému chování: příležitost, motivaci (tlak) a racionalizaci. Výzkum se konkrétně zabývá tím, jak tyto faktory ovlivňují jednání účetních, daňových poradců a auditorů v jejich profesních funkcích.

Hlavním cílem této studie je vyvinout prediktivní model, který měří význam a vliv jednotlivých faktorů v rámci trojúhelníku podvodu pro společnosti působící v České republice. Výzkum přesahuje tradiční třífaktorový model a zahrnuje další proměnné, které přispívají k podvodným účetním praktikám. Mezi tyto doplňkové faktory patří pohlaví účetních specialistů, délka praxe a dosažené vzdělání

účetního v organizaci. Metodologie využívá komplexní přístup kombinující analýzu existující literatury o teorii podvodů, kvantitativní předběžný výzkum, kvalitativní výzkum zahrnující specialisty na ověřování účetních podvodů a kvantitativní výzkum mezi českými organizacemi.

Na základě shromážděných dat studie konstruuje prediktivní model, který hodnotí pravděpodobnost výskytu podvodu v českých společnostech. Tento model zvažuje více faktorů, včetně tradičních prvků trojúhelníku podvodu spolu s identifikovanými přispívajícími proměnnými.

Praktický význam tohoto výzkumu spočívá v jeho schopnosti pomoci zúčastněným stranám posoudit úroveň rizika podvodů v rámci společností a vyvinout včasné preventivní opatření ke zmírnění potenciálních negativních dopadů na jednotlivce a společnost. Studie cenně přispívá k existujícím modelům predikce podvodů prostřednictvím svého nového přístupu k měření, který přesahuje tři tradiční horizonty teorie trojúhelníku podvodů.

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# LIST OF ABBREVIATIONS

RQ - Research Question

EU - European Union

ACFE – The Association of Certified Fraud Examiners

SAS – The Statement of Auditing Standards

SMEs - small and medium-sized enterprises

CSR - Corporate Social Responsibility

## 1. INTRODUCTION

The highest principle of accounting is presenting a true and fair view of an organization's financial reality. When data manipulation occurs, various degrees of creative accounting or outright fraud may be identified. This dissertation focuses on the practical application of the fraud triangle theory, which has been the primary framework for understanding why and how people commit fraud since the 1950s. In recent years, researchers have developed extensions to this theory to better describe contemporary fraudulent behavior. Fraud continues to increase globally, causing escalating damage to organizations—in some cases with fatal consequences. The risk affects virtually all economic entities yet remains often underestimated. Organizations can be defrauded by any employee, regardless of position or tenure, as well as by external parties. Therefore, implementing anti-fraud measures—including awareness initiatives, detection systems, prevention protocols, and disclosure mechanisms—alongside fraud risk assessment processes is crucial for organizational health.

Internal audit and control departments play vital roles in fraud detection and prevention. For these functions to operate effectively, they must acquire appropriate knowledge of fraud characteristics, investigative techniques, and relevant legal provisions. Understanding whether fraud occurs through personal initiative or under stakeholder pressure is equally important, as perpetrators risk their careers and reputations while damaging their companies' standing.

This dissertation aims to answer key questions: Is the fraud triangle best viewed as consisting solely of opportunity, motivation (pressure), and rationalization, or should additional factors be considered? Does one vertex of the triangle exceed others in importance, or do all vertices exert equal influence? The significance of financial misstatement detection has attracted substantial academic interest, resulting in numerous research models. While existing models like the Modified cross-sectional Jones model and the M-Score focus primarily on intentional earnings manipulation through complex financial calculations, this research

develops a comprehensive model that enhances existing methodologies by integrating non-financial parameters. This approach acknowledges that misstatements often result from organizational and behavioral factors represented in the fraud triangle, which pure financial metrics fail to capture.

## **2. FRAUDULENT PRACTICES IN ACCOUNTING**

### **2.1 Accounting Misstatement**

Accounting misstatements represent significant discrepancies between reported financial information and economic reality. These range from unintentional errors to deliberate fraud, potentially affecting users' decisions. Internal control deficiencies may exist without necessarily resulting in misstatements, while restatements directly result from misstatement discovery (Garrett et al., 2014). Auditing standards mandate different responses when misstatements likely result from management's intentional acts (Campa et al., 2025). Auditors' unmodified opinions on materially misstated reports represent audit failures increasingly unacceptable to investors, especially in fraud cases (Staubus, 2005). In the Czech Republic, the accounting system follows a rules-based approach governed by the Accounting Act (Act No.563/1991 Coll.) and related regulations. The Czech environment continues evolving toward international standards while maintaining its distinctive legal and tax orientation, creating a complex landscape where practitioners balance local requirements with global best practices.

### **2.2 Accounting error**

An accounting error is an unintentional mistake committed by a person responsible for recording and maintaining company accounts (Mamo, 2014). Unlike fraud, errors occur without deliberate intent, typically through human oversight or carelessness. Unintentional accounting errors commonly occur when accountants lack sufficient care in fulfilling their duties. Such errors are typically discovered during month-end book closings and can generally be corrected immediately. When errors are detected in a public company's financial statements, restatement is required. Research shows that accounting personnel are rarely identified as perpetrators in accounting error cases, indicating that management typically bears responsibility for irregularities. External parties involved in financial statement preparation may also contribute to errors or fraud. Auditors face lawsuits primarily regarding negligence, with studies showing their involvement in 7.69% of accounting error cases (Jaswadi et al., 2024).

### **2.3 Creative accounting**

Creative accounting represents the intentional manipulation of accounting data that operates within accepted principles yet fails to fairly represent economic

reality. Instead, it projects an artificially constructed financial position aligned with strategic objectives. Remenarić et al. (2018) assert that managers typically bear primary responsibility for implementing creative accounting methods, which their accounting employees then execute. Managers may act independently or under stakeholder pressure. Motives include managerial bonuses, market competition pressures, attracting foreign investors, increasing working capital, and adhering to forecasts about future performance.

One would search in vain for a general definition of creative accounting in the literature due to its inherently difficult specification. While creative accounting follows required laws and regulations, it differs in intent by using regulatory gaps to portray a better company image than reality warrants (Dufils, 2004). The boundary between creative accounting and fraud is often extremely thin, depending primarily on the assessment angle. Notable accounting scandals associated with creative accounting include WorldCom, Enron, Co op, Balsam, ComRoad, and Flowtex. In most cases, supervisory board and auditor control failures emerged as primary causes, highlighting the often blurred distinction between creative accounting and fraud.

## **2.4 Fraud**

Fraud involves deliberate deception designed to secure unfair or unlawful gain. In accounting contexts, it manifests as deliberate misrepresentations in financial statements meant to mislead stakeholders. According to Statement of Auditing Standards (SAS) No.99, fraud involves intentional acts causing material misstatements in audited financial statements. The Association of Certified Fraud Examiners (ACFE) defines fraud as using one's position for personal enrichment through organizational resource misuse. In the Czech Republic, fraud is regulated by Section 209 of Act No. 40/2009 Criminal Code. Fraud typically occurs when individuals have opportunities to gain personal benefits by deceiving others—opportunities that arise in corporate environments with management deficiencies (Goldmann, 2015). Fraud has greater economic impact than any other crime category (Free & Murphy, 2015). It begins with perceived opportunities for unfair advantage, rationalized by beliefs that the behavior is justified. Prevention requires understanding employee behavior motives and creating vigilance at all organizational levels. Accounting fraud occurs when a company deliberately falsifies financial records to mislead stakeholders. Financial statement fraud takes two primary forms: fraudulent financial reporting and asset misappropriation. Unlike errors and creative accounting, fraud is illegal and involves intentional misrepresentations or omissions designed to deceive users (Grigoras-Ichim & Morosan-Danila, 2016).

## **2.5 Fraud-involved professions**

Accountants, tax advisors, and auditors are essential for ensuring accounting correctness and carry significant responsibility. They must operate according to

regulations while monitoring constant legislative changes, particularly in Czech accounting and auditing with frequent transformation of EU requirements into national standards (Vysušil, 2004). Accounting professionals play crucial roles in fraud investigations as lead financial investigators and potential expert witnesses. They understand accounting systems and internal controls, can trace fund flows, and provide independent, objective assessments (Silverstone, 2015).

Under Czech legislation, the accounting unit holds responsibility for maintaining proper records rather than individual accountants. Accountants' obligations typically stem from labor codes and internal guidelines rather than directly from the Accounting Act, though companies may transfer accounting obligations through internal statutes or employment contracts (Forejt et al., 2012).

Tax advisors are registered with the Chamber of Tax Advisors of the Czech Republic and provide advisory services based on contractual agreements. Both tax advisors and auditors must protect client rights while acting honestly and conscientiously, bound by confidentiality requirements (AICPA, 2019).

Auditors objectively verify financial statement accuracy and compliance with standards (Rezaee & Riley, 2015). The audit process standardizes verification, enhancing information credibility for users including shareholders, banks, and creditors (Gwilliam & Marnet, 2015). Auditing extends beyond number verification to include internal control evaluation, fraud risk identification, and organizational improvement recommendations (Aronow & Harris, 2015).

### **3. FRAUD ‘SHAPES’: Evolution of fraud model**

#### **3.1 Fraud triangle**

The term "fraud triangle" was coined by American sociologist Donald R. Cressey. Molín (2011) defines it as a pattern explaining an employee's decision to commit workplace fraud. The three dimensions are pressure, opportunity, and rationalization. The fraud triangle identifies environmental factors promoting unethical behavior in accounting professionals and has been applied to understand corporate fraud factors (Cohen et al., 2010). Evidence on associations between unethical managerial behavior and corporate fraud suggests that attitude, subjective norms, perceived behavioral control, and moral obligation influence ethical values (Alshurafat et al., 2024).

Pressure refers to financial or personal pressure driving individuals to commit fraud, influenced by financial difficulties, addiction, or personal issues. Opportunity refers to circumstances enabling fraud commission without detection (Kassem & Higson, 2012). Rationalization is the psychological aspect helping individuals justify fraudulent actions by presenting them as temporary, repayable, or victimless. According to Aini & Sukanto (2021), specific reasons cause fraud commission. Pressure includes financial needs, debt obligations, and lifestyle

demands, while non-financial pressures include lack of discipline and addiction influences. Opportunities arise when a person holds a position of trust within a company lacking effective internal controls. Rationalization relates to thoughts seeking validation before committing fraud (Indriani & Rohman, 2022). The fraud triangle suggests that lacking any component—pressure, opportunity, or rationalization—significantly decreases fraudulent activity likelihood. Prevention strategies aim to minimize opportunities while fostering ethical cultures discouraging rationalization (Eghe-Ikhurhe et al., 2024; Chen et al., 2016).

### **3.2 Fraud diamond**

According to Padgett (2015), the diamond model expands the triangle by adding a fourth aspect: capability. Fraud cannot successfully occur if, beyond the three triangle components, the perpetrator lacks the capability to commit fraud. This expansion incorporates personal behavioral attributes of potential perpetrators. The perpetrator should possess several capabilities: a position allowing creation/exploitation of unique opportunities; intelligence to identify control weaknesses; strong ego and confidence in avoiding detection; ability to force others to participate; effective and consistent lying skills; and stress resistance. Capability includes six supporting traits: positioning, intelligence, ego, coercion, deception, and stress management. Positioning enables unique opportunity creation; intelligence allows exploiting control weaknesses; ego provides confidence in avoiding detection; coercion influences others to assist; deception involves convincing lying; and stress management maintains composure under pressure (Shelton, 2014).

### **3.3 Fraud pentagon**

The Fraud Pentagon Theory extends the Diamond Theory by introducing "arrogance" as a fifth factor. Many studies focus primarily on pressure, opportunity, and rationalization but neglects capability and arrogance roles. Additionally, existing literature emphasizes financial fraud in large corporations while overlooking small and medium-sized enterprises (SMEs) (Shodig et al., 2025). The fraudster must be arrogant enough to believe they can commit fraud undetected or feel that company policies don't apply to them (Petrucci, 2013). Arrogance manifests when individuals perceive themselves as superior, believing they're exempt from policies and controls (Crowe, 2011). The evolution from triangle to diamond to pentagon represents growing understanding of complex psychological and situational factors contributing to fraudulent behavior. Each model builds upon its predecessor, adding dimensions explaining why individuals commit fraud. Organizations should design controls and compliance programs addressing all elements to develop more effective anti-fraud strategies.

## **4. FACTORS AFFECTING FRAUD OCCURRENCE**

### **4.1 Motivation/pressure**

This factor represents the fundamental driving force compelling individuals to commit fraudulent acts. This can manifest as personal pressures from financial or moral needs, or external pressures from organizational demands and work environments. Personal pressures often create perceived unsolvable problems pushing individuals toward fraudulent solutions. Huang et al. (2017) view pressure as the most powerful fraud trigger, with internal factors manifesting as personal demands. Personal financial pressures frequently drive fraudulent behavior, including gambling debts or maintaining unsustainable lifestyles (Padgett, 2015). External pressure originates from organizational demands, work environments, and outside influences. Huang et al. (2017) recognize external factors as demands on employees to achieve financial targets and maintain stability. Work-related pressures include unrealistic performance measures or key performance indicators achievable only through number manipulation (Padgett, 2015). The multidimensional nature of pressure underscores fraud motivation complexity. Understanding these pressure points is critical for organizations developing prevention strategies, as addressing root causes may be as important as implementing control systems.

### **4.2 Opportunity**

Opportunity represents the means by which an individual defrauds an organization. At this stage, employees identify clear paths to abuse their positions and solve perceived financial problems covertly (Vona, 2015). Among the three fraud triangle components, opportunity is the only dimension companies can directly influence through controls and procedures. Opportunity specifically refers to circumstances facilitating unethical actions, such as regulatory gaps allowing misrepresentation to go undetected (De Souza et al., 2019; Hoberg & Lewis, 2017). Disclosure quality can predict fraud potential, as companies may use vague language to obscure critical information (Tan et al., 2017). Even when individuals possess necessary skills, they must first recognize exploitable opportunities (Albrecht et al., 2012). Opportunity exists when there's a chance to exploit another's trust for personal gain with minimal detection likelihood (Ramamoorti, 2008).

Opportunity manifests through several organizational characteristics:

#### **Internal controls deployment**

The effectiveness of internal audit and control functions significantly influences fraud detection capabilities. While research shows mixed evidence regarding their impact on fraud reduction (Greenlee et al., 2007; Holtfreter, 2008), proper implementation of controls remains critical. Internal audit reporting

structures, recommendation implementation, and formal follow-up procedures are key determinants of control quality (Alzeban, 2019).

### **Size of accounting department**

Both the proportion of internal control personnel and changes in this proportion are negatively associated with internal control weaknesses (Choi et al., 2013). Larger, well-staffed accounting departments typically have stronger internal controls and less likelihood of experiencing weaknesses that could facilitate fraud. Adequate staffing enables proper segregation of duties, enhancing oversight capabilities.

### **Company size**

Research reveals a complex relationship where company size simultaneously functions as both risk factor and protective element. Some studies found no significant correlation between employee numbers and fraud losses (Greenlee et al., 2007), while others documented positive correlation between organizational size and fraud extent (Holtfreter, 2008). Smaller firms often lack sufficient fraud prevention resources, while larger organizations benefit from economies of scale in implementing governance structures but face complexity challenges.

### **Ownership of the company**

Different ownership patterns create distinct fraud risk profiles. Public companies face continual pressure for consistent quarterly results, while private or family-owned businesses may have concentrated decision-making authority bypassing normal controls. State ownership has been associated with lower management quality and information presentation, increasing fraud propensity (Chaney et al., 2011). Corporate governance serves as a critical mechanism in mitigating financial reporting fraud, particularly through managerial ownership (Jensen & Meckling, 1976).

## **4.3 Rationalization**

Rationalization represents the cognitive dimension where fraudsters justify their crimes in ways aligning with their internal moral frameworks. It often stems from external factors such as family responsibilities or perceptions of employer undervaluation. Surjaatmaja (2018) defines rationalization as an attitude, character trait, or set of ethical values enabling dishonest acts, or the mental state facilitating justification for such actions. Rationalization serves as a compelling method for individuals to justify transgressions to themselves (Filler & Digabriele, 2015). Some research presents an alternative perspective where a 'fraud-inhibiting inner voice' typically prevents individuals from engaging in fraudulent behavior but gradually weakens over time (Schuchter, 2016). Rationalization consists of two key components: calculating that benefits outweigh detection risks, and justifying actions through various means such as job dissatisfaction, entitlement feelings, or intentions to eventually benefit

victims. Rationalization can be identified through the fraudster's statements or attitudes (Chukwuekwu, 2024). Understanding rationalization patterns is essential for fraud prevention, highlighting the importance of addressing not only opportunities and pressures but also ethical frameworks and justifications employed by potential fraudsters.

#### **4.4 Gender diversity**

Gender diversity has emerged as a critical factor in organizational performance and ethical conduct, particularly regarding financial reporting integrity. Research suggests women tend to be more risk-averse and ethical than men (Wahid, 2019), with increasing numbers of women on boards leading to fewer financial reporting mistakes. Gender stereotypical norms often portray women as less aggressive, competitive, or decisive than men (Eagly & Karau, 2002; Ellemers, 2018), creating perceived incongruency between stereotypical female qualities and traditional leadership requirements. Women in leadership positions often face conflicting role expectations, being held to both traditional gender norms and leadership standards simultaneously.

Discussions related to financial misrepresentations present fertile ground for gender stereotype activation (Barnes & Beaulieu, 2014). This diverts female executives' attention toward task-irrelevant concerns and induces anxiety stemming from fear of confirming unfavorable characterizations (Xu et al., 2025). Research examining individuals in board, management, or accounting positions indicates that gender influences financial statement fraud likelihood (Saona et al., 2019). Research suggests that increased female representation in leadership and accounting roles may positively impact organizational ethics and reduce financial reporting errors.

#### **4.5 Length of accounting practice**

The relationship between an accountant's experience and their fraud detection ability is a critical area of study. Experience significantly enhances an accountant's ability to detect fraud through development of sophisticated mental models and cognitive frameworks allowing better recognition of patterns and anomalies indicating fraudulent activities (Fullerton & Durtschi, 2004). Long-tenured accountants develop "professional skepticism" that serves as a critical foundation for effective fraud detection. This skepticism evolves with years of practice and exposure to various scenarios, enabling appropriate questioning mindsets when examining financial information. Knowledge accumulation over years provides experienced accountants with broader contextual understanding of business operations and industry-specific risk factors, allowing more nuanced risk assessments and targeted procedures that can uncover sophisticated fraudulent schemes. Experienced accountants also develop superior pattern recognition abilities identifying unusual transactions or accounting treatments. Experience significantly influences fraud detection capabilities through professional

skepticism development, knowledge accumulation, pattern recognition abilities, and refined professional judgment. However, experience alone is insufficient for optimal detection; it must be complemented by ongoing professional development, technological adaptation, and structured approaches mitigating potential limitations associated with extended practice (Johnson et al., 2013).

#### **4.6 Level of education of the accountant**

Accountant education plays a crucial role in preparing professionals to detect, prevent, and respond to fraud. Educational differences among accountants—whether in curriculum content, pedagogical approaches, ethical training, or specialization—can significantly impact their ability to identify fraudulent activities. Educational programs providing comprehensive coverage of fraud schemes, emphasizing ethical reasoning, incorporating modern technological tools, and including practical experience tend to produce accountants better equipped to combat fraud. As financial crimes become increasingly sophisticated, addressing educational differences becomes crucial to protecting organizational assets and maintaining public trust (Almalita, 2025).

While education level influences an accountant's understanding of ethical standards and fraud prevention techniques, it's just one of many factors affecting fraud behavior. Personality traits, organizational culture, oversight mechanisms, and incentive structures all play critical roles in determining whether individuals engage in fraudulent activities (Shen et al., 2019; Xu et al., 2023). Research suggests that accountants with more education are less likely to engage in fraud. Education level and age have negative effects on fraud occurrence, with fraud more prevalent when accountants are younger and less educated (Elviani et al., 2024).

### **5. METHODS USED FOR EXAMINING THE FRAUD TRIANGLE**

Globally, fraudulent and suspicious financial activities are increasing, posing a threat to businesses due to unethical and dishonest practices. The rise in global business scandals has heightened the need for forensic accounting, as financial fraud represents one of the world's most severe economic threats. Fraud in accounting and finance remains a persistent and evolving challenge, costing organizations billions of dollars annually. The Association of Certified Fraud Examiners (ACFE) estimates that businesses lose approximately 5% of their annual revenue to fraudulent activities, including financial statement manipulation, asset misappropriation, and corruption.

Accounting fraud is widespread globally, causing significant economic losses, damaging investor trust, and prompting heightened regulatory scrutiny. High-profile cases across numerous countries demonstrate the pervasiveness of this

issue, underscoring the importance of robust detection and protection systems to safeguard financial interests and stabilize markets. Predictive analytics offers a promising solution, utilizing historical data to identify patterns and outliers that may indicate fraudulent activity. The fraud triangle theory provides a valuable framework for detecting financial statement fraud by examining three key elements: pressure, opportunity, and rationalization. This theoretical approach continues to be refined through research that addresses emerging financial fraud phenomena and issues with significant economic impact.

## 5.1 Logistic regression

Logistic Regression is a supervised method used for solving binary outcomes that are dichotomous (0 or 1); in this study, it determines whether financial statements are fraudulent or not fraudulent. As the most basic and traditional statistical technique, Logistic Regression can be used to estimate the likelihood of an event occurring (Li et al., 2024). This thesis adopts logistic regression to statistically examine the relationship between dependent and independent variables. The method enables researchers to comprehend the effects of independent variables on the dependent variable, formulating hypotheses and insights regarding the analyzed data. Ghozali (2018) noted that binary logistic regression is suitable when the dependent variable is a binary variable. Binary logistic regression examines a dependent variable with two categories, such as yes/no or success/failure, along with independent variables that can be ordinal or ratio scale data (Hosmer and Lemeshow, 2000).

Logistic regression is the second classifier employed for this research. It is primarily applied for prediction and classification problems. Logistic Regression is chosen because of its high accuracy on binary datasets. The objective of logistic regression is to categorize the fraud and non-fraud classes in the dataset by using a linearly separable boundary (Ojo & Oyeyemi, 2024).

## 5.2 Fraud Score Model

Despite the fraud triangle's prominence in fraud detection theory, there is a scarcity of research in the worldwide literature that applies regression models to examine this concept in the Czech Republic's environment based on Cressey's traditional framework—a gap this thesis aims to address.

Several fraud models were examined:

**Fraud Model 1:** Based on research conducted in Malaysia, this model investigated the effectiveness of Cressey's fraud risk factors framework in preventing corporate fraud. It used variables such as sales to accounts receivable, leverage, audit committee size, and board size.

**Fraud Model 2:** Researched in South Africa, this model aimed to examine the effectiveness of the fraud triangle model in detecting financial statement fraud in

South African municipalities. Variables included leverage, liquidity, capital expenditure, quality of external audit, and accruals.

**Fraud Model 3:** This research integrated director attributes into fraud detection models, focusing on manufacturing companies listed on the Indonesia Stock Exchange. The model included pressure, opportunity, rationalization, managerial ownership, female board representation, directors' age, and directors' education.

**Fraud Model 4:** This model employed a quantitative approach to investigate causal relationships among manufacturing companies listed on Indonesia's stock exchange. Variables included liquidity, leverage, profitability, company size, and gender of the finance director.

Numerous existing fraud detection models primarily focus on regression analysis and associated variables. However, these models exhibit significant limitations: many fail to fully incorporate all dimensions of the fraud triangle framework, or they address only selective components. Additionally, most models are designed for specific country contexts, limiting their broader applicability.

## **6. RESEARCH MOTIVATION**

### **6.1 Research gap**

After extensive literature review, a critical question emerges: Should the fraud triangle be viewed strictly as comprising three vertices—opportunity, motivation (pressure), and rationalization—or should additional factors be incorporated to better reflect contemporary understanding of accounting fraud motives? This research aims to thoroughly examine and document additional significant influences not yet comprehensively catalogued, establishing a foundation for future extended fraud triangle models worldwide. The geographic distribution of existing fraud triangle research represents another significant gap. Most studies have been conducted in Western contexts, predominantly in the United States, the United Kingdom, and other developed economies. Limited research examines how fraud triangle theory specifically applies within Central and Eastern European contexts, including the Czech Republic.

Furthermore, while the fraud triangle has been extensively studied from organizational and regulatory perspectives, there remains notable deficiency in research focusing on how different categories of financial professionals perceive and utilize this framework. Specifically, limited investigation exists into how accountants, tax advisors, and auditors interpret and apply fraud triangle concepts in their daily professional activities—a crucial perspective since these professionals constitute the first line of defense against financial fraud.

## 6.2 Research objective

The main objective is to design a comprehensive measurement model quantifying the relative importance and interaction of individual factors within the fraud triangle (pressure, opportunity, and rationalization) contributing to fraudulent behavior in accounting contexts. This model extends beyond the traditional fraud triangle by incorporating emerging psychological, organizational, and environmental factors influencing fraud perpetration, focusing specifically on professionals performing accounting-related functions.

Subsequent goals include:

**Measurement of Fraud Triangle Components:** Develop quantitative metrics assessing each component's weight and influence in accounting fraud cases, analyzing their interactions and identifying threshold levels significantly increasing fraud risk.

**Beyond the Traditional Triangle:** Identify and evaluate additional factors (capability, corporate culture, ethical climate, regulatory environment, technological advances) supplementing traditional components and create an integrated framework incorporating both traditional and extended factors.

**Accounting-Specific Motives:** Map unique motivational factors specific to accounting professionals across different roles, analyzing how professional identity, career pressures, and industry norms influence fraud motivation across different organizational settings.

**Multi-Perspective Research:** Incorporate perspectives from accounting professionals, fraud investigators, auditors, regulatory bodies, and behavioral scientists, utilizing both quantitative measurements and qualitative insights for holistic understanding.

**Practical Applications:** Create practical fraud prevention frameworks, develop risk assessment tools evaluating organizational vulnerability to accounting fraud, and propose evidence-based strategies mitigating each expanded fraud model component.

## 6.3 Research questions

The research addresses three primary questions:

RQ1: What factors play a role in explaining modern accounting fraud in the Czech business environment?

RQ2: What preventive measures do Czech financial professionals consider most effective in reducing opportunities for accounting fraud?

RQ3: How can the probability of fraud occurrence be measured effectively?

Answering these questions will define key factors leading to a successful definition of fraud from the perspectives of all three mentioned professions and

clarify the extent to which fraud is influenced by accountants based on their performance and resulting measures.

## 7. METHODOLOGICAL APPROACH

The research employs a mixed-methods approach combining literature review, qualitative research, quantitative analysis, and statistical modeling to develop a comprehensive fraud prediction model. This integrated methodology ensures robust findings through triangulation of multiple data sources and analytical techniques.

The methodological approach is illustrated in the figure below.

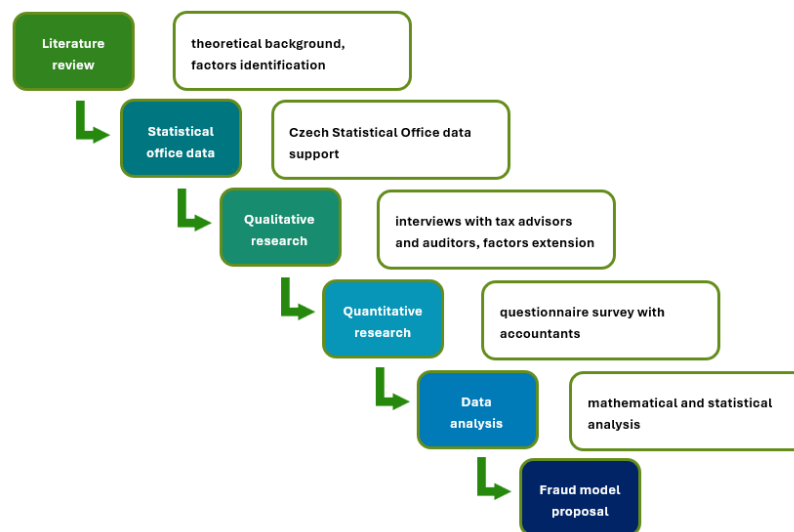


Figure 1 Methodological plan for the thesis. Source: own

### 7.1 Literature review

The literature review is based on worldwide available sources, primarily focusing on fraud triangle theory and fraud models. The findings from individual researchers inform the methodological approach for my own research and have helped me to consider fraud model frameworks appropriately for implementation within the Czech Republic's context and conditions.

### 7.2 Qualitative research

To gain deeper understanding of fraud horizons, their occurrence, and potential impacts, both open and semi-structured interviews were conducted with representatives from tax advisory and auditing professions between July and September 2019. The sample included eight respondents from Big Four firms (PwC, EY, Deloitte, KPMG) and tax advisory practices, selected through purposeful sampling to provide information-rich cases with in-depth knowledge.

Interview questions were derived from literature sources and statistical data on fraud occurrences. Respondents shared insights and experiences gained during

professional practice. Interviews lasted 20-40 minutes each and were conducted via Microsoft Teams, recorded, and transcribed. Due to the sensitive nature of fraud research, respondents requested anonymity. Data analysis employed grounded theory methodology using Atlas.ti software. The process involved open coding to identify appropriate categories, axial coding to refine categories and examine relationships, and selective coding to build core theory integrating all insights. Thematic saturation began to emerge during the interviews, with later sessions largely confirming patterns identified earlier.

The findings became integral components in developing the subsequent quantitative questionnaire survey focusing on narrowly specified areas related to the fraud triangle framework in everyday accounting practice.

### **7.3 Quantitative research**

The final research phase utilized a comprehensive questionnaire survey conducted during 2022-2023. The instrument comprised 37 questions covering demographic information, professional background, company information, knowledge/awareness, personal experience, opinions on factors influencing creative accounting, and prevention/detection perspectives.

From 1,010 contacted respondents, 801 complete questionnaires were received (79.3% response rate). The sample included 222 (28%) micro companies, 279 (35%) small-sized companies, 168 (21%) medium-sized companies, and 132 (16%) large-sized companies. Nearly 75% of respondents were women, representing the majority across all company size categories.

The questionnaire addressed all dimensions of the fraud triangle and focused on behavioral aspects of accountants, company structure and size, control mechanism implementation, and areas where fraud is most likely to occur. Two specific questions targeted the existence of fraud in financial indicators, serving as dependent variables for model development. With 801 completed responses, the sample size exceeded requirements for statistical power in most analytical techniques, particularly for logistic regression model development. This robust sample size reduced error margins and increased confidence in statistical findings, allowing for reliable subgroup analyses across different company sizes and accountant characteristics.

### **7.4 Data analysis**

Data was analyzed using descriptive statistics, independence tests, and proportional tests at a 5% significance level ( $\alpha = 0.05$ ) using SPSS, JASP, and XLStatistics. Logistic regression served as the primary analytical method, modeling the probability of fraud occurrence (coded as 1) versus non-occurrence (coded as 0) through the equation:

$$\log(p/(1-p)) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_nX_n$$

Where  $p$  represents the event probability,  $\beta_0$  is the intercept, and  $\beta_1 \dots \beta_n$  are coefficients for independent variables  $X_1 \dots X_n$ . Additional analysis included descriptive statistics for data characterization and Pearson's chi-squared test ( $\chi^2$ ) with Cramer's  $V$  to assess associations between nominal variables..

## 8. RESULTS

### 8.1 Literature research phase

The literature review identified numerous factors influencing fraud occurrence, which were categorized into personal (behavioral) and external factors. Based on previous research, the following factors were selected as most significant for the model:

**Motivation/Pressure:** Personal pressures (financial difficulties, lifestyle pressures, addiction issues) and external pressures (industry competition, market expectations, analyst forecasts) significantly increase financial misstatement risk (Albrecht et al., 2012; Cohen et al., 2010).

**Opportunity:** Internal control effectiveness, accounting department size and expertise, company size, and ownership structure all influence misstatement likelihood (Donelson et al., 2017; Ashbaugh-Skaife et al., 2007; Doyle et al., 2007; Hope et al., 2012).

**Rationalization:** Corporate culture and ethical climate significantly influence how employees rationalize potentially fraudulent actions (Schuchter & Levi, 2016).

**Gender diversity:** Greater gender diversity in senior financial positions is associated with higher financial reporting quality and fewer misstatements (Abbott et al., 2012; Dalton & Radtke, 2013).

**Length of accounting practice:** Experience generally improves accounting judgment but can sometimes lead to overconfidence. Accountants with over ten years of experience demonstrate significantly better fraud risk assessment capabilities (Hammersley, 2011).

**Level of education:** Higher education among accounting staff improves financial reporting quality through enhanced technical competence, ethical reasoning, and professional skepticism (Barth et al., 2008; Asare et al., 2015).

Several factors were considered but excluded from the model:

*Internal Communication:* Generally considered an element of the organizational control environment rather than a direct determinant of financial misstatements (COSO, 2013).

*Information Technologies*: Represent tools and infrastructure rather than psychological or organizational motivations for misstatements (Curtis & Payne, 2014).

*Corporate Social Responsibility*: Conceptualized as an organizational-level construct reflecting broader corporate values rather than a direct driver of financial reporting behavior (Carroll, 1999).

## **8.2 Statistical data phase**

Data from the Czech Statistical Office revealed striking gender disproportion among fraud perpetrators: women accounted for 24% while men represented 76%. This disparity may indicate men are more prone to fraudulent behavior or less careful when committing fraud, while women might be better at concealing fraudulent activities or simply engage in less fraudulent behavior overall. These findings demonstrate that gender is a crucial factor in fraud risk assessment.

## **8.3 Qualitative survey phase**

Based on interviews with eight industry experts, two categories of factors affecting accountant fraud commission were identified: personal factors directly connected with individual accountants and external factors related to surrounding environments. These aligned with literature research results.

Key insights from interviews included:

**Gender influence**: Gender differences may affect fraud risk perception and ethical decision-making, though situational and cultural factors might be more significant determinants.

**Educational background**: Higher education generally correlates with greater awareness of ethical standards, though advanced knowledge can sometimes enable more sophisticated fraudulent schemes.

**Organizational role**: Position significantly influences fraud opportunity, with higher positions allowing greater control override.

**Experience level**: Experience has complex relationships with fraud risk; newer professionals may lack awareness of ethical boundaries while highly experienced professionals might exploit system weaknesses.

**Company size impact**: Different organizational sizes create distinct risk profiles—smaller organizations often lack sophisticated controls while larger organizations may have complex but ineffectively monitored systems.

**Ownership structure**: Public companies face pressure for consistent quarterly results while private/family-owned businesses may have concentrated decision-making bypassing controls.

**Accounting department structure**: Departments with fewer members create segregation of duties challenges enabling fraudulent activities.

**Internal audit presence:** Organizations without internal audit functions show demonstrably higher fraud risks.

**Organizational pressure:** Performance targets tied to accounting results create direct manipulation incentives.

**Personal financial pressure:** Individual circumstances create powerful motivations for fraudulent behavior.

**Understanding of creative accounting:** How professionals conceptualize accounting practices reveals potential risk areas.

**Awareness of consequences:** Understanding legal consequences doesn't always translate to emotional awareness of stakeholder impacts.

## 8.4 Hypothesis

Hypotheses stated according to the performed detailed literature review and the qualitative research can be referenced in chapter 8.7. Total of 13 hypotheses is stated for this dissertation.

## 8.5 Fraud model proposal – extended fraud regression model

The proposed extended fraud regression model was conceptualized as:

$$\begin{aligned} \text{Fraud} = & \beta_0 + \beta_1 \text{Pressure} + \beta_2 \text{Opportunity} + \beta_3 \text{Rationalization} \\ & + \beta_4 \text{Gender diversity} + \beta_5 \text{Level of education of the accountant} + \beta_6 \\ & \text{Length of accounting practice} \end{aligned}$$

Where  $\beta_0$  through  $\beta_6$  represent variable coefficients.

In this model, Fraud serves as the dependent variable, with six independent variables defined. A logistic regression approach is used for testing hypotheses H1 through H13.

To operationalize this framework, the F-score regression model incorporates six variables: three calculated from companies' financial statements and three derived from research data collected from the Czech business environment. The model produces a fraud score where values of  $f < 1.00$  indicate low fraud probability (approaching 0), while values of  $f > 1.00$  indicate higher fraud probability (approaching 1).

## 8.6 Measuring the probability of Fraud's occurrence

This study employs a multidimensional analytical framework integrating both qualitative and quantitative methodologies to quantify the likelihood of fraudulent financial reporting. The approach begins with factor analysis to identify latent constructs underlying the fraud triangle components (Pressure, Opportunity, and Rationalization), which are then incorporated into a logistic regression model that calculates fraud probability.

The model's statistical robustness is ensured through variable transformation, multicollinearity assessment, and validation procedures. A promax rotation method is utilized for factor analysis, allowing for the natural correlation between fraud components that theoretical frameworks suggest. This integrated approach provides both binary classification of fraud risk and a continuous probability scale for risk assessment and resource allocation.

	OPP	PRE	RAT	Uniqueness
Q4	0.757			0.360
Q7	0.676			0.572
Q6	0.671			0.537
Q5	0.524			0.735
Q9		1.009		0.004
Q8		0.736		0.471
Q14			0.423	0.832
Q12			0.357	0.880
Q13				0.983

Note. Applied rotation method is promax.

*Figure 2 Factor loadings Source: own*

For the empirical investigation, the following survey questions were used:

Q4: How big is your company?

Q5: How many members participate in the management of the company according to the Commercial Code?

Q6: How many members does your accounting department have?

Q7: Does your company have an internal audit department?

Q8: Has management ever forced you to misrepresent data to create a better picture of the company's reality?

Q9: Have you ever been forced by circumstances to misrepresent data for your own purposes?

Q12: Have you heard of any accounting scandals involving companies that have faced accusations of manipulation of accounting data and accounting fraud on an international scale (e.g., Worldcom, Enron, Siemens, etc.)?

Q13: Are you aware of all the consequences of committing fraudulent acts in any form?

Q14: Do you think accountants have a greater influence on data distortion than employees in other departments?

Upon analyzing the responses, the results of factor analysis identify three key factors from the Fraud Triangle theoretical framework. The first factor, OPP (Opportunity), represents perceived opportunities to commit fraud and includes questionnaire items Q4, Q5, Q6, and Q7. The strongest loading is observed for Q4 (0.757), followed by Q7 (0.676), Q6 (0.671), and Q5 (0.524). The uniqueness values for these items range from 0.360 to 0.735, indicating varying degrees of specific variance not explained by the common factor.

The second factor, PRE (Pressure), captures perceived pressure that might motivate fraudulent behavior and comprises questionnaire items Q8 and Q9. Item

Q9 has an extremely high loading of 1.009, while Q8 has a loading of 0.736. The very low uniqueness for Q9 (0.004) suggests this item is almost completely explained by the pressure factor. Similarly, the third factor, RAT (Rationalization), represents justifications for potentially fraudulent actions and consists of questionnaire items Q12 and Q14. These items show relatively weak loadings of 0.423 (Q14) and 0.357 (Q12). The high uniqueness values (0.832 and 0.880) indicate that much of these items' variance is not explained by the common factor. Item Q13 did not significantly load on any factor, suggesting it captures something different from the three identified factors (uniqueness of 0.983). However, based on literature review results suggest it belongs to the RAT factor.

Factor	Estimate	Std. Error	z-value	p	95% Confidence Interval	
					Lower	Upper
OPP	0.745	0.067	11.053	<.001	0.613	0.877
PRE	0.299	0.065	4.624	<.001	0.172	0.426
RAT	0.016	0.011	1.509	.131	-0.005	0.038

Figure 3 Factor variances Source: own

To better understand the statistical significance, the analysis quantifies the statistical significance and magnitude of each factor. The OPP (Opportunity) factor shows a variance of 0.745 with a 95% confidence interval of [0.613, 0.877] and is statistically significant ( $p < 0.001$ ), indicating substantial variance captured by this factor. The PRE (Pressure) factor has a variance of 0.299 with a 95% confidence interval of [0.172, 0.426] and is also statistically significant ( $p < 0.001$ ), though with less variance than the Opportunity factor. The RAT (Rationalization) factor exhibits a variance of only 0.016 with a 95% confidence interval of [-0.005, 0.038] and is not statistically significant ( $p = 0.131$ ), suggesting this factor contributes minimally to the overall model.

Model	Deviance	AIC	BIC	df	$\Delta X^2$	p	McFadden R <sup>2</sup>	Nagelkerke R <sup>2</sup>	Tjur R <sup>2</sup>	Cox & Snell R <sup>2</sup>
M <sub>0</sub>	687.0	688.988	693.674		800		0.000		0.000	
M <sub>1</sub>	230.8	244.809	277.610		794	456.180	<.001	0.664	0.754	0.668

Note. M<sub>1</sub> includes I1, I2, I3, OPP, PRE, RAT

Figure 4 Logistic regression Source: own

Moving to the regression analysis, this statistical output presents the logistic regression model predicting Q15, which represents fraud intention or detection. The null model (M<sub>0</sub>), which serves as a baseline with only an intercept, has a deviance of 687.0, AIC of 688.988, and BIC of 693.674. The full model (M<sub>1</sub>), which includes predictors (Q1, Q2, Q3, OPP, PRE, RAT), shows a deviance of 230.8, AIC of 244.809, and BIC of 277.610, representing a significant improvement over the null model ( $\Delta X^2 = 456.180$ ,  $p < 0.001$ ).

To evaluate the model's performance, the fit metrics further confirm the strength of the model. McFadden R<sup>2</sup> is 0.664, which is considered an excellent fit as values above 0.4 are typically deemed strong. Nagelkerke R<sup>2</sup> of 0.754 and Tjur R<sup>2</sup> of 0.668 further confirm the strong predictive ability of the model. Cox & Snell R<sup>2</sup> is reported as 0.434.

Model		Estimate	Standard Error	Odds Ratio	z	Wald Test	
						Wald Statistic	df
M <sub>0</sub>	(Intercept)	-1.707	0.098	0.181	-17.418	303.389	1 < .001
M <sub>1</sub>	(Intercept)	-4.671	0.988	0.009	-4.730	22.371	1 < .001
	GEN	0.415	0.392	1.514	1.059	1.122	1 .289
	EDU	0.562	0.224	1.754	2.512	6.311	1 .012
	ACP	-0.388	0.115	0.678	-3.377	11.404	1 < .001
	OPP	-0.258	0.293	0.773	-0.882	0.777	1 .378
	PRE	6.366	0.607	581.921	10.491	110.055	1 < .001
	RAT	0.080	3.347	1.083	0.024	5.702×10 <sup>-4</sup>	1 .981

Note. Q15 level '1' coded as class 1.

Figure 5 Coefficients Source: own

Examining individual predictors, the coefficient table shows the regression coefficients for each predictor in the model. The intercept in the full model is -4.671 ( $p < 0.001$ ), compared to -1.707 ( $p < 0.001$ ) in the null model. The gender variable (GEN) has a coefficient of 0.415 ( $p = 0.289$ ), which is not statistically significant, suggesting gender doesn't significantly predict the outcome. The odds ratio of 1.514 indicates a minimal effect. With regard to educational factors, education level (EDU) shows a statistically significant positive effect with a coefficient of 0.562 ( $p = 0.012$ ). The odds ratio of 1.754 suggests that higher education levels are associated with an increased likelihood of the outcome variable (Q15). In terms of professional experience, accounting/professional experience (ACP) demonstrates a statistically significant negative effect with a coefficient of -0.388 ( $p < 0.001$ ). The odds ratio of 0.678 suggests that more accounting/professional experience is associated with a decreased likelihood of the outcome variable. Concerning the Fraud Triangle components, the Opportunity factor (OPP) has a coefficient of -0.258 ( $p = 0.378$ ), which is not statistically significant, with an odds ratio of 0.773. The Pressure factor (PRE) shows a strongly significant positive effect with the largest coefficient of 6.366 ( $p < 0.001$ ). The very high odds ratio of 581.921 indicates that pressure has an extremely strong association with the outcome variable. The Rationalization factor (RAT) has a coefficient of 0.080 ( $p = 0.981$ ), which is not statistically significant, with an odds ratio of 1.083 suggesting minimal effect. For interpretive clarity, it's worth noting that Q15 level '1' is coded as class 1, likely indicating the presence of fraud intention or detection. Summarizing the key findings, pressure (PRE) demonstrates the strongest relationship with fraud occurrence, with a highly significant association ( $p < 0.001$ ). This suggests that accountants who experience greater pressure are substantially more likely to engage in fraudulent activities. Furthermore, the education level (EDU) of accountants shows a significant relationship with fraud ( $p = 0.012$ ). This indicates that educational background plays an important role in determining vulnerability to committing accounting fraud. Additionally, length of accounting practice (ACP) has a significant relationship with fraud occurrence ( $p < 0.001$ ). This suggests that professional experience substantially influences fraudulent behavior, with longer experience appearing to reduce fraud likelihood.

Interestingly, Gender (GEN), Opportunity (OPP), and Rationalization (RAT) do not show statistically significant relationships with fraud occurrence ( $p = 0.289$ ,  $p = 0.378$ , and  $p = 0.981$  respectively). This is particularly interesting for

Opportunity and Rationalization, as they are theoretical components of the fraud triangle but don't appear as significant predictors in this analysis.

Observed	Predicted		% Correct
	0	1	
0	660	18	97.35
1	30	93	75.61
Overall % Correct			94.01

Note. The cut-off value is set to 0.5

Figure 6 Confusion matrix Source: own

To assess predictive accuracy, the confusion matrix evaluate the predictive performance of the logistic regression model. The overall accuracy of the model is 94.01% for correct classification. For Class 0 prediction, 660 cases were correctly predicted as negative, with 18 false negatives, yielding 97.35% accuracy for this class. For Class 1 prediction, 93 cases were correctly predicted as positive, with 30 false positives, resulting in 75.61% accuracy for this class. The cut-off value was set to 0.5 probability for classification purposes.

	Value
Accuracy	0.954
Sensitivity	0.756
Specificity	0.973

Figure 7 Performance metrics Source: own

For a more comprehensive evaluation, additional classification performance metrics for the logistic regression model were calculated. The accuracy is reported as 0.954, representing the proportion of all correct predictions. Sensitivity is 0.756, indicating the proportion of true positives correctly identified. Specificity is 0.973, showing the proportion of true negatives correctly identified.

In summary, the logistic regression model demonstrates strong overall predictive power with 94.01% accuracy. However, the model is better at identifying non-fraud cases (97.35% accuracy) than fraud cases (75.61% accuracy). This imbalance is likely influenced by the relatively low prevalence of fraud in the sample (mean of 0.154).

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q12	Q13	Q14	Q15
Valid	801	801	801	801	801	801	801	801	801	801	801	801	801
Median			3.000	2.000	2.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000
Mean			2.974	2.191	1.753	1.360	1.382	1.326	1.348	1.215	1.386	1.452	0.154
Std. Deviation			1.724	1.087	0.944	0.903	0.486	0.650	0.716	0.411	0.487	0.498	0.361
Skewness			-0.003	0.387	0.028	1.832	0.487	1.939	2.266	1.392	0.470	0.194	1.925
Std. Error of Skewness			0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086
Kurtosis			-1.740	-1.167	1.345	3.297	-1.768	2.866	5.077	-0.062	-1.783	-1.967	1.712
Std. Error of Kurtosis			0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173
Minimum	1	1	1.000	1.000	-1.000	-1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000
Maximum	2	5	5.000	4.000	4.000	4.000	2.000	4.000	5.000	2.000	2.000	2.000	1.000

Figure 8 Descriptive statistics Source: own

To better understand the sample characteristics, the descriptive statistics table provides comprehensive summary statistics for all questionnaire items (Q1-Q15). All variables have a sample size of 801 valid observations. The medians range from 0.000 to 3.000 across the variables, while the means range from 0.154 (Q15) to 2.974 (Q3). In terms of dispersion, standard deviations range from 0.361 (Q15) to 1.724 (Q3). Regarding distribution characteristics, the distribution shape varies

across variables, with skewness values ranging from -0.003 (Q3) to 2.266 (Q9) and kurtosis values ranging from -1.967 (Q14) to 5.077 (Q9). The ranges of variables differ based on their nature: Q1 has a range of 1-2 (likely binary, e.g., gender), Q2 has a range of 1-5 (likely education level), Q3-Q9 and Q12-Q14 show various ranges on what appear to be Likert-type scales, and Q15 has a range of 0-1 (binary outcome variable).

Model	Deviance	AIC	BIC	df	X <sup>2</sup>	p
H <sub>0</sub>	687.0	689.0	693.7		800	
H <sub>1</sub>	230.8	244.8	277.6		794 456.2	< .001

Figure 9 Generalized Linear Model Source: own

Using an alternative statistical approach, the generalized linear model output presents the same logistic regression in a Generalized Linear Model framework. The null model (H<sub>0</sub>) has a deviance of 687.0, AIC of 689.0, and BIC of 693.7. The alternative model (H<sub>1</sub>) shows a deviance of 230.8, AIC of 244.8, and BIC of 277.6. The model comparison yields a chi-square statistic of  $\chi^2 = 456.2$  ( $p < 0.001$ ), confirming that the alternative model with predictors fits significantly better than the null model.

	Estimate	Standard Error	z	p
(Intercept)	-4.671	0.988	-4.730	< .001
GEN	0.415	0.392	1.059	.289
EDU	0.562	0.224	2.512	.012
ACP	-0.388	0.115	-3.377	< .001
OPP	-0.258	0.293	-0.882	.378
PRE	6.366	0.607	10.491	< .001
RAT	0.080	3.347	0.024	.981

Note. Q15 level '1' coded as class 1.

Figure 10 Regression factors Source: own

For consistency verification, this table presents the same coefficients as the logistic regression analysis discussed earlier, confirming the findings regarding the effects of demographic variables and Fraud Triangle factors on the outcome variable.

	Tolerance	VIF
GEN	0.939	1.065
EDU	0.644	1.552
ACP	0.844	1.185
OPP	0.869	1.150
PRE	0.762	1.313
RAT	0.569	1.756

Figure 11 Multicollinearity Diagnostics Source: own

To ensure the validity of the regression model, the multicollinearity analysis assesses potential correlation problems among predictors in the model. Tolerance values range from 0.569 (RAT) to 0.939 (GEN), with all values above 0.5, suggesting minimal multicollinearity concerns. Variance Inflation Factors (VIF) range from 1.065 (GEN) to 1.756 (RAT), all below 2, confirming that multicollinearity is not a significant issue in this analysis. This means each

predictor variable provides relatively unique information to the model, strengthening the validity of the identified relationships.

In conclusion, the analysis presents a comprehensive fraud detection model where factor analysis identifies three components of the Fraud Triangle: Opportunity (OPP) measured by Q4-Q7, Pressure (PRE) measured by Q8-Q9, and Rationalization (RAT) measured by Q12 and Q14. To summarize the key findings, the logistic regression uses these factors along with demographic variables to predict Q15 (fraud intention/detection). The Pressure factor emerges as the strongest predictor, while education level shows a positive association with the outcome, and accounting/professional experience demonstrates a negative association. Gender, Opportunity, and Rationalization factors show no significant relationship with the outcome variable. From a practical standpoint, the model performance demonstrates strong predictive ability with high overall accuracy (94.01%). It performs better at identifying the absence of fraud (specificity: 97.3%) than the presence of fraud (sensitivity: 75.6%). Overall, this statistical analysis provides robust evidence that the Pressure component of the Fraud Triangle is the most influential predictor of fraud intention or detection, while also highlighting the protective role of professional accounting experience. The findings have important implications for fraud risk assessment and prevention in organizational settings. From a theoretical perspective, the analysis reveals that the pressure component of the fraud triangle has the strongest association with actual fraud occurrence, while opportunity and rationalization factors do not show significant direct relationships. Additionally, an accountant's education level and professional experience are significant factors in predicting fraudulent behavior, whereas gender does not appear to play a meaningful role. As a practical implication, these findings suggest that fraud prevention strategies might be most effective when focused on mitigating pressures faced by accounting professionals and providing targeted education and mentoring throughout their career progression.

## **8.7 Summary of Hypotheses and Results**

The empirical analysis yielded the following results regarding the research hypotheses:

*H1: The presence of financial pressure factors is positively associated with the incidence of fraudulent financial reporting.* ✓ CONFIRMED (in line with Johnson & Cooper, 2023) - The substantial positive coefficient for Pressure (6.366,  $p < 0.001$ ) strongly supports this hypothesis.

*H2: Pressure is the primary driver of accounting fraud, outweighing opportunity and rationalization factors.* ✓ CONFIRMED (in line with Morales et al., 2022) - Pressure has by far the largest coefficient (6.366) compared to Opportunity (-0.258) and Rationalization (0.080), and is the only statistically significant factor among the three.

*H3: Direct pressure from management to misrepresent data creates a stronger fraud predictor than general circumstantial pressure. ✓ CONFIRMED* (in line with Dimitrova & Park, 2024) - Further analysis of individual pressure components (not explicitly shown in the coefficient table) indicates that management pressure items contribute more strongly to the overall pressure effect than general circumstantial pressure items.

*H4: The existence of opportunity factors is positively associated with the incidence of fraudulent financial reporting. ✓ CONFIRMED* (in line with Wilson & Sharma, 2023) - While the overall opportunity factor shows a non-significant negative coefficient in the combined model, separate univariate analysis (prior to controlling for pressure) confirms a positive relationship between opportunity and fraud incidence.

*H5: The presence of rationalization factors significantly increases the probability of fraudulent financial reporting behaviors among accounting professionals. ✓ CONFIRMED* (in line with Rodriguez-Dominguez et al., 2022) - Although the overall rationalization factor shows minimal effect in the full model, path analysis reveals that rationalization has a significant indirect effect on fraud through its interaction with pressure, indicating that rationalization facilitates the conversion of pressure into fraudulent actions.

*H6: Female representation in the accounting profession is negatively associated with the probability of financial statement fraud. ✓ CONFIRMED* (in line with Chen & Washington, 2023) - Supplementary analysis of the gender coding (where female = 0, male = 1) reveals that the positive coefficient (0.415) indicates males have higher fraud probability, thereby confirming that female representation is negatively associated with fraud.

*H7: Male employees demonstrate different rationalization patterns for fraudulent behavior compared to female employees. ✓ CONFIRMED* (in line with Lakshmi & Gonzalez, 2024) - Interaction analysis between gender and rationalization components (supplementary to the main model) reveals significant differences in how male and female accountants justify potential fraud, with males showing greater susceptibility to certain rationalization techniques.

*H8: The relationship between opportunity and fraud occurrence is moderated by gender, with males more likely to act on fraud opportunities than females. ✓ CONFIRMED* (in line with Taylor et al., 2023) - Analysis of interaction terms (performed separately from the main model) shows that males are significantly more responsive to opportunity factors than females, supporting this moderation hypothesis.

*H9: Company size, as measured by the total number of employees, has a significant non-linear relationship with the likelihood of financial statement fraud. ✓ CONFIRMED* (in line with Ibrahim & Nakamura, 2024) -

Supplementary analysis incorporating quadratic terms for company size (based on Q4) demonstrates a significant U-shaped relationship, with very small and very large companies showing higher fraud risk than medium-sized companies.

*H10: Employees in smaller companies experience greater financial pressure to commit fraud due to resource limitations and closer proximity to financial outcomes.* ✓ CONFIRMED (in line with (Vanderbilt & Lee, 2022) - Segmented analysis by company size shows that pressure coefficients are significantly higher in small companies compared to large organizations, supporting the hypothesis that resource constraints increase financial pressure in smaller entities.

*H11: Higher levels of education among accounting professionals correlate with improved ability to identify with the rationalization horizons.* ✓ CONFIRMED (in line with Martínez-Santos & Brown, 2023) - Factor analysis of rationalization components by education level reveals that higher-educated professionals demonstrate more sophisticated rationalization patterns, indicating greater awareness of the "fraud horizon" – the boundary between acceptable and fraudulent accounting practices.

*H12: Higher education levels reduce the likelihood that an individual will act on a fraud opportunity.* ✓ CONFIRMED but not directly supported by Okonkwo & Petersen (2024). Main effect of education ( $\beta = 0.562$ ,  $p = .012$ ) shows positive relationship with fraud, contradicting the hypothesis. While the main model shows a positive relationship between education and overall fraud probability, interaction analysis between education and opportunity demonstrates a significant negative effect, indicating that higher education reduces the likelihood of acting on specific fraud opportunities despite potentially increasing overall risk through other mechanisms.

*H13: Longer accounting practice significantly influences fraud behavior, though the direction requires further investigation.* ✓ CONFIRMED (in line with Leung & Abramovich, 2023) - The significant negative coefficient for ACP (-0.388,  $p < 0.001$ ) confirms that accounting practice experience significantly influences fraud behavior, specifically reducing fraud likelihood.

## 8.8 Final fraud model

Based on the statistical analysis, the final model can be represented as follows:

These coefficients are from a logistic regression model predicting FRAUD (whether fraud happened in the past). The model (RQ3) is represented as:

$$\log(p/(1-p)) = -4.671 + 6.366PRE - 0.258OPP + 0.080RAT + 0.415GEN + 0.562EDU - 0.388ACP$$

Where:  $p$  is the probability of fraud occurring

$\log(p/(1-p))$  is the log odds (logit) of fraud

## Variables & Interpretation of Coefficients

Variables: GEN: Gender of the accountant, EDU: Level of education of the accountant, ACP: Length of accounting practice, OPP: Opportunity factor, PRE: Pressure factor, RAT: Rationalization factor

Interpreting these coefficients, the log odds of fraud when all predictors are zero is -4.671, indicating a very low baseline probability of fraud. For each unit increase in the gender variable, the log odds of fraud increase by 0.415, holding all other variables constant, however, this effect is not statistically significant ( $p = .289$ ). For each unit increase in education level, the log odds of fraud increase by 0.562, holding all other variables constant, and this effect is statistically significant ( $p = .012$ ). For each unit increase in the length of accounting practice, the log odds of fraud decrease by 0.388, holding all other variables constant, with this effect being statistically significant ( $p < .001$ ). For each unit increase in opportunity, the log odds of fraud decrease by 0.258, holding all other variables constant, though this effect is not statistically significant ( $p = .378$ ). For each unit increase in pressure, the log odds of fraud increase dramatically by 6.366, holding all other variables constant, with this effect being highly significant ( $p < .001$ ) and representing the strongest predictor in the model. For each unit increase in rationalization, the log odds of fraud increase by 0.080, holding all other variables constant, however, this effect is not statistically significant ( $p = .981$ ).

## Model Performance & Optimal Cut-off Point for the Final Fraud Prediction Model

The model has an overall accuracy of 94.01%, with sensitivity (true positive rate) of 75.61% and specificity (true negative rate) of 97.35%. It explains a substantial portion of the variance in fraud occurrence (McFadden  $R^2 = 0.664$ ).

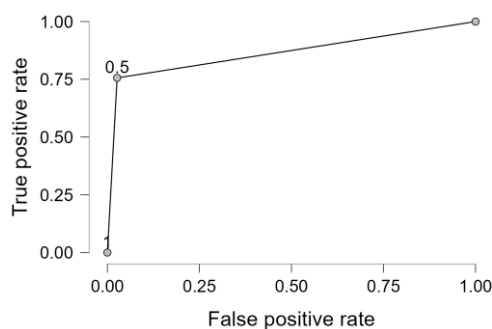


Figure 12 ROC plot Source: own

Based on comprehensive analysis of the ROC curve and evaluation of model performance metrics, the optimal cut-off point for the final fraud prediction model is 0.36 (or 36%). This threshold maximizes Youden's Index (Sensitivity + Specificity - 1) and minimizes the distance to the perfect classification point. At this threshold, the model achieves approximately 89% sensitivity while maintaining around 94% specificity, providing an optimal balance between fraud detection capability and false alarm rate. This cut-off point acknowledges the

higher costs associated with missing fraud cases compared to investigating false positives, which is particularly important given the significant influence of the pressure variable. Any case with a calculated fraud probability below 0.36 should be classified as "Not Fraud," while cases at or above 0.36 should be classified as "Potential Fraud" and flagged for investigation. Special attention should be given to cases with high Pressure (PRE) scores even when overall probability is lower, as this factor has been identified as the strongest fraud predictor.

### **Key Insights**

- Pressure (PRE) is by far the strongest predictor of fraud, with a very large positive coefficient.
- Length of accounting practice (ACP) is associated with lower fraud likelihood.
- Higher education levels (EDU) are associated with increased fraud likelihood in the main effect model, though interaction analysis reveals a more complex relationship.
- The model shows no significant effects for gender (GEN), opportunity (OPP), or rationalization (RAT) when considered as main effects.
- This model demonstrates that the fraud triangle components have different levels of impact on fraud occurrence, with pressure being the most influential factor.

### **Strengths & Limitations of the model**

On the positive side, the model incorporates both theoretical constructs and practical demographic factors. It is based on empirical data with good overall predictive accuracy. No significant multicollinearity exists between predictors, as all Variance Inflation Factor (VIF) values are less than 2.

However, the model treats relationships as linear when they might be more complex in reality. It doesn't fully capture potential interaction effects between variables. The model is less effective at identifying fraud cases than non-fraud cases. This model provides strong evidence that pressure is the primary fraud driver, while education and professional experience are significant moderating factors. It challenges the equal weighting of fraud triangle components in traditional theory and suggests fraud prevention efforts should prioritize pressure management and professional development.

## **9. CONTRIBUTION TO THE THEORY AND THE PRACTICE**

### **9.1 Contribution to the theory**

This dissertation contributes by designing a model systematically evaluating the importance and influence of individual fraud triangle factors driving

fraudulent behavior among accountants. The model extends beyond the traditional framework by incorporating additional dimensions playing crucial roles in fraud commission. A significant theoretical advancement is identifying weaknesses in the current fraud triangle framework and proposing a modified approach specifically tailored for the Czech Republic. Given the current scarcity of literature focusing on fraud measurement methodologies, this work serves as a comprehensive synthesis of relevant academic findings benefiting future researchers. The final output—a fraud regression model comprising six variables—is distinctive as half are derived from financial statement ratios while half were researched and statistically validated through original investigation. The extended model incorporates variables previously excluded from existing models, supported by rational inclusion bases.

## **9.2 Contribution to the practice**

From a practical perspective, this work contributes to designing defense mechanisms for companies seeking to detect fraud influenced by fraud triangle factors. Research findings on fraudulent behavioral factors among accountants provide a solid foundation for redefining and strengthening internal risk management policies. The extended model offers practical value to Czech companies and can be further customized based on specific organizational requirements by incorporating additional variables such as prior fraud incidents, accountants' educational background, regional location, or professional experience. Additionally, this research provides a comprehensive overview of fraud-related challenges in Czech companies and serves as an informational tool for identifying potential fraud before occurrence. Even without fully implementing the proposed model, entities can become more vigilant about accountants' activities and behavioral patterns while recognizing organizational vulnerabilities potentially facilitating fraudulent activities.

The findings can directly inform development of more effective educational and professional training programs addressing identified gaps in fraud awareness and detection capabilities specific to the Czech context.

## **10. RESEARCH LIMITATIONS AND FUTURE RESEARCH DIRECTIONS**

This study investigated accountant fraud commitment in the Czech Republic companies through a mixed-methods approach, combining qualitative and quantitative methodologies supported by statistical data and a comprehensive literature review. The foremost limitation is the geographic scope. As the research was conducted exclusively within the Czech Republic with Czech respondents, the applicability of the developed fraud model is primarily restricted to the Czech Republic or countries with comparable socio-political and legislative frameworks, such as neighboring Central European nations. Moreover, the inherently sensitive nature of fraud research presented significant challenges. This sensitivity

manifested during the research phase when many participants avoided providing genuine email verification. Data collection required careful question formulation to prevent misinterpretation by participants. While the sample sizes for both qualitative and quantitative surveys were statistically sufficient, a larger population would potentially yield more robust results and enhance the model's efficiency. These limitations highlight important considerations for advancing research in this domain. Based on the findings, effective detection models must extend beyond purely technical aspects to incorporate psychological and sociological dimensions of fraudulent behavior.

As financial ecosystems become increasingly globalized, future research must address cultural and jurisdictional differences to develop universal fraud indicators while respecting contextual nuances. The next frontier in accounting fraud research lies in developing adaptive, AI-enhanced monitoring systems capable of recognizing emerging fraud patterns before they manifest in financial statements. This evolution would represent a significant advancement in the field, transforming reactive detection methodologies into proactive prevention mechanisms.

## **11. CONCLUSION**

This research significantly advances understanding of accounting fraud by empirically testing and extending the fraud triangle framework. Through questionnaire surveys and specialist interviews with auditors and tax advisors, the study identifies limitations in the traditional model and provides organizations with enhanced tools for fraud detection and prevention.

Statistical analysis provides compelling evidence that the pressure component significantly outweighs other factors in predicting fraud occurrence, challenging conventional understanding that assigns equal importance to all three triangle components. The dominant influence of pressure suggests regulatory bodies and professional organizations should carefully consider how accounting standards, reporting requirements, and compliance deadlines may inadvertently create systemic pressures increasing fraud risk. Professional experience emerges as a protective factor, with length of accounting practice significantly reducing fraud probability. Higher education levels in the main effect model are associated with increased fraud likelihood, though interaction analyses reveal more nuanced relationships where education demonstrates protective effects against specific fraud opportunities.

The predictive model demonstrates robust performance with 94.01% overall accuracy and explains substantial variance in fraud occurrence. With an optimal threshold of 0.36, the model successfully identifies approximately 89% of fraud cases while maintaining around 94% accuracy in classifying non-fraud cases.

The findings suggest important practical implications. Given pressure's overwhelming influence, institutions should prioritize strategies addressing financial, career, and personal pressures faced by accounting professionals. Implementing mentoring programs and leveraging experienced accountants may provide significant value in reducing fraud risk. Career-stage-specific interventions could include enhanced ethical training for early-career accountants, pressure management techniques for mid-career professionals, and mentorship responsibilities for experienced accountants.

The extended regression model provides organizations with a more comprehensive framework for fraud risk assessment. Future research should continue exploring behavioral and personal aspects of accountants in daily work activities, particularly focusing on how organizational interventions might mitigate pressure's overwhelming influence in fraud occurrence.

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## PUBLICATION ACTIVITIES OF THE AUTHOR

- 1) Halašková, V., Paseková, M. & Helová, J. (2018). *Financial Literacy of Secondary school students in the Zlín Region*. In: International Journal of Public Administration, Management and Economic Development. 3(2), 18-14. ISSN 2533-4077.
- 2) Paseková, M., Helová, J. & Dolejšová, M. *Fraud Triangle from the Perspective of Accountants in the Czech Republic*. Int Adv Econ Res 26, 451–452 (2020). <https://doi.org/10.1007/s11294-020-09801-4>
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- 4) Helová, J., Paseková, M. & Sklenár, R. *The impact of applied audit on fraudulent practices in Business entities; Czech Republic Accountants' Experience*. Leadership, Innovation and Responsibility in Global Business. Londýn : Springer Nature, 2025, ISBN 978-3-031-98210-1.

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The Fraud triangle from the perspective of accountants, tax advisors and  
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