

# **Methods to Detect Fraud in Accounting and Finance**

Honor Thesis

Presented in Partial Fulfillment of the Requirements for the  
University Honors Program  
Colorado State University

By

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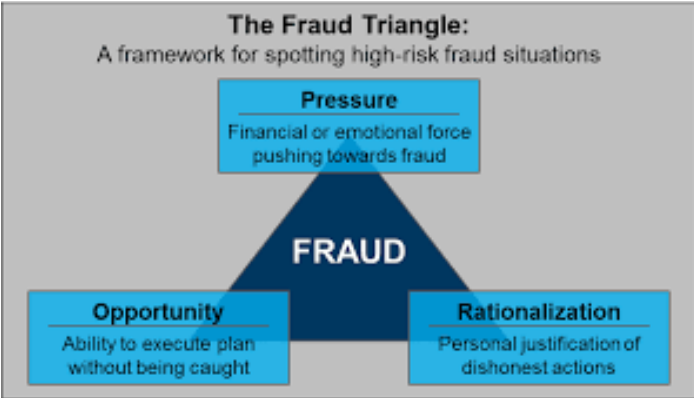
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Spring 2025

**1. Introduction**

Financial fraud has been a dynamic battle in the corporate world. Fraud in finance and accounting is any kind of criminal manipulation for financial gain. This takes place when someone, like a manager, is caught in the perfect triangle of pressure, rational, and opportunity as seen in Figure 1.1. The fraud triangle is perfectly displayed with the Lehman Brothers. From the pressure of appearing financially strong, they took the opportunity to use financial instruments to temporarily hide loans and assets. They rationalize this by thinking they were making temporary fixes to their company and could buy time, which ultimately lead to their contribution to the 2008 financial crisis. Fraud not only harms the company committing it but also its stakeholders and can send a ripple effect through the economy and the market. Oftentimes, it leads to serious consequences, including reputational damage, and even the end of the entire organization. This paper explores into strategies that firms can implement to fight fraud in the current age, such as corporate governance, segregation of duties, internal audit, corporate social responsibility, and booming new technologies like artificial intelligence and machine learning.



*Figure 1.1: The Fraud Triangle*

Throughout this paper, I examine different models of Corporate Governance and explain which one is more effective in certain scenarios. I investigate internal controls like the internal audit and Segregation of Duties and show why it is vital for firms to effectively apply them in their business. I discuss how Corporate Social Responsibility and how to uncover this practice. At the end, I discuss how firms can implement artificial intelligence (AI) and machine learning (ML) to efficiently detect and prevent fraud.

I chose this topic because I believe financial, and accounting fraud remains an organizational challenge and thus a risk to our economy. In recent years, we have seen a surge in U.S. corporate fraud compared to other countries, as illustrated in Figure 1.2, that reached a record high of 56% in 2020. After taking multiple classes in this field, I find it interesting to see the topics I have learned implemented in the real world. I am intrigued by the intersection of governance frameworks and advanced technologies. This paper aims to understand the world we live in and the most effective way to combat fraud. To accomplish this, I research academic literatures, case studies, and detailed articles that examine the many angles of effective strategies to prevent fraudulent activities. I review several reports and academic journals that illustrate the application of these methods to determine which ones are effective. I synergize these findings to provide a comprehensive guidance for firms to follow when tackling financial and accounting fraud.

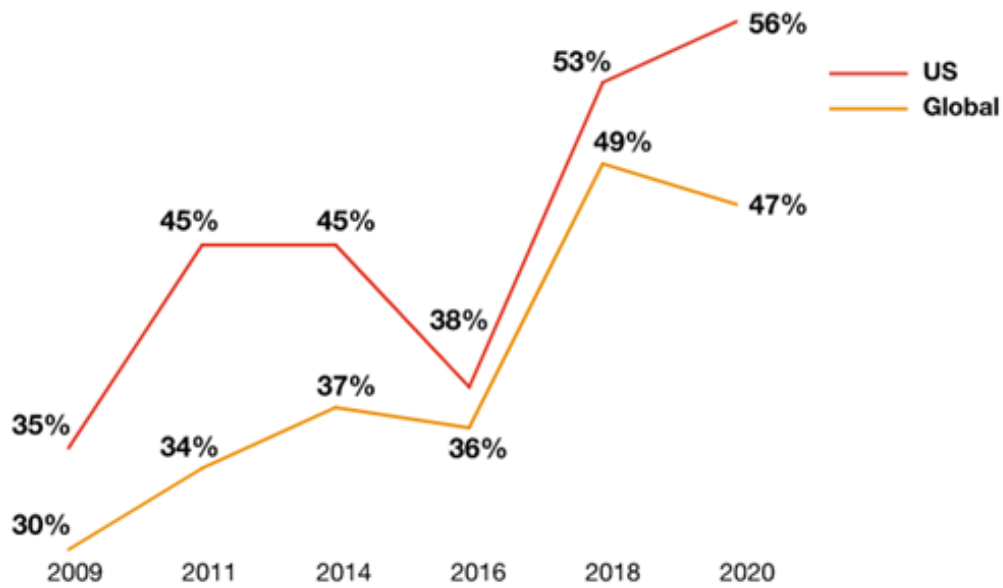


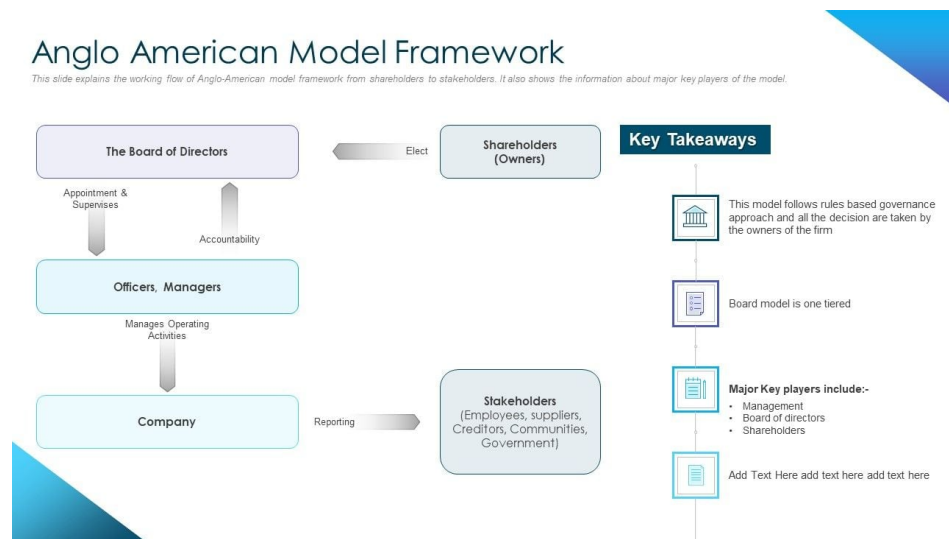
Figure 1.2: PwC's 2020 Global Economic Crime and Fraud Survey

## 2.1 Corporate Governance

Corporate governance is a framework of rules, procedures, and practices through which a company is regulated and governed. It balances all the interest of everyone involved in the company. Effective corporate governance ensures a company is run in an accountable way, thus preventing the possibility of fraud. Corporate governance allows a company to achieve goals, ranging from action plans and internal controls to performance and corporate disclosure. Corporate governance aligns the interests of all stakeholders, which minimizes the chances of fraudulent activities.

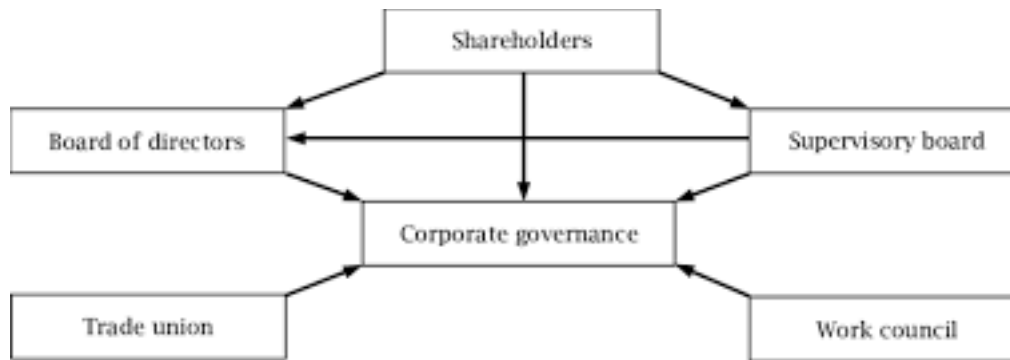
How effective corporate governance is in preventing fraud depends on where it is applied. Due to its strong emphasis on shareholders' rights, the Anglo-American model has conventionally been considered effective in this regard. In this model, shareholders and board of the directors have primary control and the company prioritizes their interest. As seen in Figure

2.21, the shareholders both elect the board of directors, and at the end are the ones reported to. Separation of ownership and control and the existence of independent directors on boards help monitor managerial actions. Yet, the emphasis on short-term shareholder value can also drive managerial behavior that serves near-term financial performance at the expense of long-term sustainability, thereby heightening the risk of fraud. For instance, the pressure to achieve quarterly earnings estimates may tempt management to manipulate earnings or commit other types of financial fraud.



*Figure 2.21: Anglo-American Model*

The Continental model, with its broader stakeholder focus, is generally considered more effective in bringing long-term stability and reducing the possibility of fraud. In this model, there are two boards - one is in charge of corporate management and the other oversees it, as illustrated in Figure 2.22. If employees are part of the board of directors, they can provide additional monitoring since they have specific interest in the firm’s long-term success. However, this model has been proven to be less adaptable during economic transitions.



*Figure 2.22: Continental Model*

An effective governance mechanisms depends on the specific model and the context in which it is applied, "Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment" (Shleifer and Vishny, 1997). This highlights how aligning the interest of managers with that of investors can prevent fraud. During times of structural changes such as corporate restructuring, non-traditional governance mechanisms can be more effective in preventing fraud. By establishing independent oversight committees, an additional monitoring layer can reduce the potential of fraud. Such a layer could entail committees consisting of independent directors or outside experts that can oversee the restructuring and ensure that it is done in a transparent and ethical manner. Increased transparency through more disclosure requirements can also help prevent fraud during these periods of change. External audits can further provide an objective assessment of a company's financial statements and internal controls, reducing the likelihood of fraud. Maintaining a high level of audit during times of change can reassure investors that firms' financial statements are fairly stated.

The corporate governance models that fail to prevent fraud tend to not rely on transparency and independent oversight. One such model, displayed in Figure 2.23, is the state-

owned enterprise model. This model prioritizes political agendas over firms' financial performance. Similarly, the family-based model can lead to bad decisions when family members participate in governance and management. As seen in Figure 2.24, the family dips their toes into both the ownership and business sides of the company. The lack of independent oversight can increase the risk of fraudulent activities when managers prioritize their self-interest above that of other stakeholders.

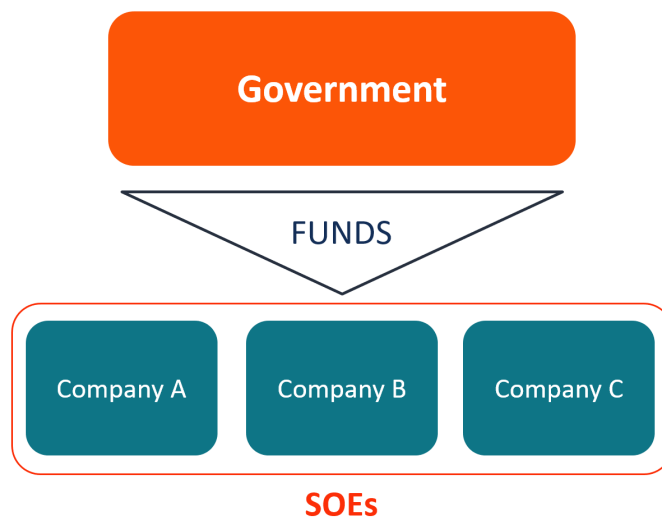
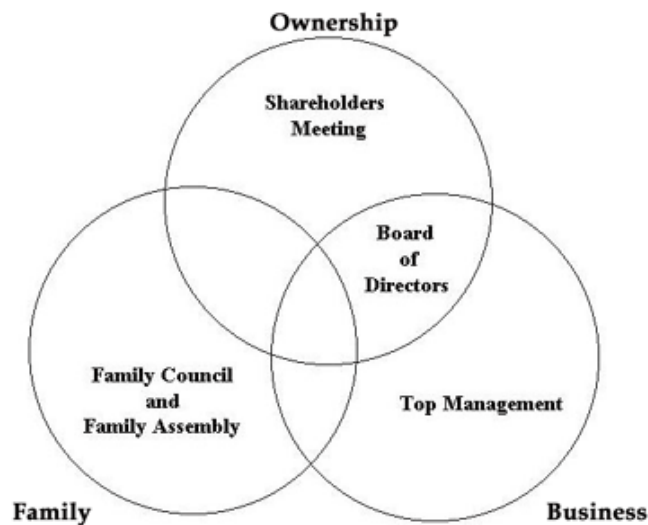


Figure 2.23: State-Owned Enterprise Model

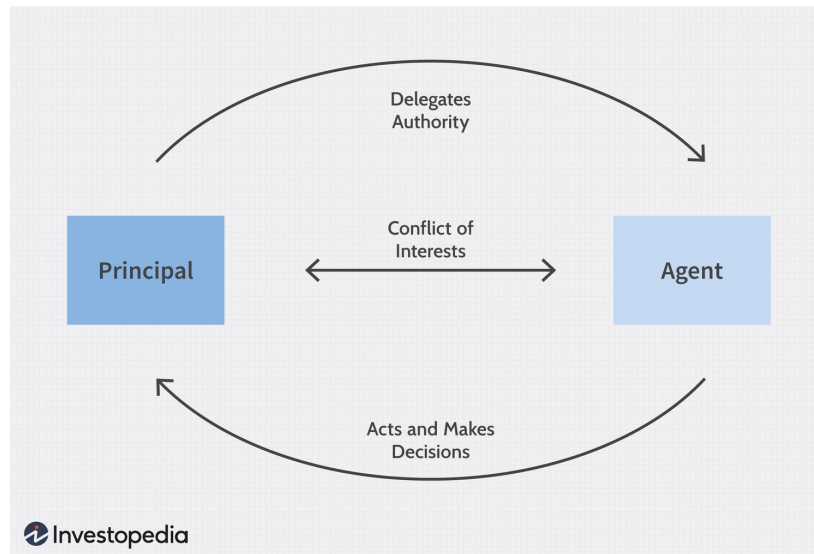


*Figure 2.24: Family-Based Model*

External corporate governance deals with regulatory oversight and external audits that can hold management accountable and, thus, can prevent fraud. When managers face pressure to meet market expectations, they are incentivized to manage the financial performance. Through accrual-based earnings management, firms can commit fraud by over-inflating their earnings. They do this by either overstating revenues or understating expenses or both. Firms can also manipulate earnings through real operational activities such as inducing their customers to purchase early or cutting research and development expenditures. While these practices technically meet accounting standards, they can easily slide into accounting fraud. External independent audits can also be on the watch for excessive tax avoidance through strategies like aggressive transfer pricing between subsidiaries to minimize tax liabilities that borders fraud.

Agency theory explores the conflict of interests between principals (shareholders) and agents (managers). This can happen through information asymmetry where the agent has more information than the principal, potentially leading to fraud. This relationship is displayed in Figure 2.25. External governance can deter managers from acting opportunistically by placing external pressure and oversight. However, external governance may have a counteractive effect on the propensity of fraud. According to Shi et al (2017), “when top managers face more stringent external control mechanisms, in the form of activist shareholders, the threat of a takeover, or zealous securities analysts, they are actually more likely to engage in financial misbehavior”. This cognitive evaluation theory implies that external factors can affect managers’ internal motivations. The behavioral perspective highlights how it can sometimes halt managers’ motive to commit fraud by crowding their sense of autonomy and self-determination. Looking

back at Figure 1.1, we can see this relationship between external governance and managerial psychology, and how it exposes the complex human motivations for fraud. Therefore, these corporate governance models can make real impacts in preventing fraud.



*Figure 2.25: Agency Theory*

## 2.2 Segregation of Duties

Segregation of duties is an internal control that divides responsibilities among multiple people to prevent fraud and errors. The rationale is that no one person has complete control of every step of a process. Separating these duties minimizes the risk of intentional fraud, unauthorized actions, and even unintentional errors. With segregation of duties, one person should approve the transactions, another should manage the asset, a different person documents these transactions, and another one verifies the accuracy of these steps. To prevent errors and fraud in accounting, each account should be handled by multiple people. For example, “segregation of duties in accounts payable (AP) means that one person approves invoices,

another processes payments, and a third is responsible for reconciling bank statements in AP.”(Segregation of Duties Helps Manage Fraud Risk – Trustpair, 2024). For each account, one should record it, another should authorize it, and one more should have custody over account it.

Segregation of duties is among the most effective internal controls in place because it reduces the opportunities to commit fraud, whether intentional or not. This helps detect errors between recorded transactional and reconciled statements for immediate investigation and correction. Segregation of duties also keeps each one accountable for their actions. The internal control makes such a significant difference that many regulations require firms to have segregation of duties as an internal control.

The most efficient way to implement segregation of duties is to apply it to high risk areas for fraud like financial reporting or payroll. Each employee must have their specific roles and responsibilities highlighted clearly so that no person has control of all sides of a transaction. This can work tightly with corporate governance because internal audits should review these controls to ensure that segregation of duties is implemented effectively. The board of directors and the audit committee should ensure that segregation of duties is part of their internal framework and have clear transparency with their shareholders about these matters.

While segregation of duties can be effective, there are setbacks to its implementation. First, taking this control to the extreme can reduce operational efficiency. If the division of roles is too granular, a simple transaction can require too many approvals. Second, the effectiveness of segregation of duties can reduce with the extent to which employees collude to bypass controls. Third, it is challenging to implement segregation of duties in small businesses that do not have enough employees to segregate into that many roles. Despite these setbacks, segregation of

duties seeks to create individual accountability and is thus part of the controls checked in the internal audit.

### **2.3 Internal Audit**

The internal audit is used to evaluate and improve the effectiveness of the firm's governance, managing the risk, and the internal controls the firms placed for these risks, "Internal Audit may not direct or develop processes or implement controls inside of its own function. Instead, it provides independent and objective assurance and consulting services designed to add value and improve an organization's operations." (Home | The Institute of Internal Auditors | The IIA, 2025). This highlights the core purpose of the audit. These measures can prevent fraud because it is taken independently and away from any bias unlike the first and second line. If a weakness in the controls is identified, then the audit can help a firm establish stronger ones. Auditors look for anomalies or material misstatements that can indicate fraudulent behavior. In doing so, auditors can keep management and others in line. The auditors ensure that the firm is within the extents of the laws and regulations.

The internal audit is often confused with an external audit. While an external audit provides auditors' opinions on the company's statement and controls, the internal audit helps the company improve these controls after their evaluation. Internal auditors report these evaluations directly to the board of directors and senior management to inform them of any necessary improvements. These evaluations are broader in scope and are conducted more frequently than the annual external audits. As such, internal audits can reduce the risk of fraud. This line is particularly suitable to prevent fraud because it prioritizes high risk areas like financial reporting. This can be done through advanced analytical tools to identify outliers and anomalies in the large

data to spot fraud. It also often provides employees with a safe channel to report suspicious activities from management or their colleagues. Essentially, internal auditing evaluates how effective corporate controls are internally, while Corporate Social Responsibility is sometimes about the company's image externally.

## **2.4 Corporate Social Responsibility**

Corporate Social Responsibility (CSR) is a commitment a company makes to operate with a focus on the social, economic, and environmental impacts of their business. CSR seeks to go beyond the idea of a business making profit and focuses on ethical practices. CSR can help prevent fraud by creating a corporate culture that values ethical behaviors over short-term performance. Companies build trust with their stakeholders by clearly communicating to the public that their businesses are ethical. CSR is closely related to corporate governance, as companies that are CSR-oriented tend to have strong internal controls in place to prevent fraud.

Despite the benefits of CSR, some firms use it to cover their fraudulent activities. Li et al. (2021) find a positive relationship between CSR performance and fraud, especially for firms with weak corporate governance and for those in more religious states. They further find that, during periods of fraud, firms improve their CSR performance, and managers tend to maintain good relationship with key stakeholders due to their access to insider information. Managers are also less likely to be investigated by the SEC if they and their company have good publicity image. Thus, this study suggests that firms can improve their CSR performance to cover fraudulent activities.

To prevent this, CSR needs to be in line with the corporate core values, allowing it to be authentic rather than a publicity stunt. Firms should disclose their CSR activities in detail. This, along with regular audits, should make it challenging for firms to use CSR to cover fraud. CSR should also be tied to corporate governance with the board oversight. Additionally, firms should also consider using AI and/or ML to enhance their fraud prevention.

## **2.5 Artificial Intelligence**

AI has been a significant technological breakthrough. It aims to replicate human intelligence at a much greater capacity. Since its introduction, AI has appeared in all aspects of business, and has been slowly adding more to fraud detection in the U.S. since around 2016. AI has offered new avenues for detecting fraud by analyzing massive amounts of data to detect anomalies. With the use of AI, behavioral analytics can provide real time insights into potential fraud. Specifically, AI can learn normal behavior patterns from historical data and then continually monitor transactions to identify any deviations from the baseline. Each transaction flagged is then assigned a risk score for further investigation. This acts as a corporate control at the firm level and can be used to catch suspicious activity in any account that deviates from historical benchmarks. It can also identify if an employee accessing sensitive data outside normal working hours. As a recent game changer, AI has been able to make its mark in anti-money laundering (AML).

AML is a set of regulations and producers put in place to prevent criminals from hiding the money they make from fraud. While traditional AML pushed out a lot of false positives, the inclusion of AI has made this control a lot stronger. In an article from Oracle, Ricadela (2024) wrote that McKinsey & Company reported a 40% increase in identifying suspicious activity in

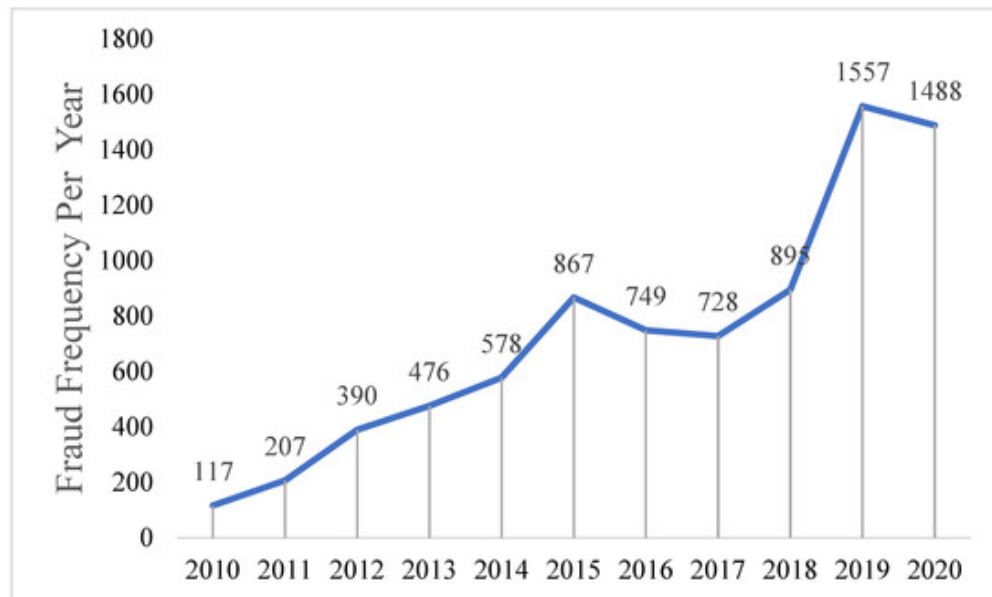
banks when AI was used with AML. AI analyzes transactions for money laundering patterns like structuring where large transactions are broken into smaller ones to hide fraud. It can also map relationships between entities to uncover over complex money laundering operations. Moreover, AI continuously learns from new data and to improve its accuracy. AI has specifically improved natural learning processing with its ability to analyze unstructured data like emails to identify potential fraud.

Another way AI can prevent fraud is through predictive modeling. This analyzes patterns in transactional data and looks for any potential fraudulent activities. A predictive model gathers past data on transactions of both fraud and non-fraud. It then identifies relevant variables of fraud. From there, it uses algorithms like decision tree and trains the model based on the data. This trained model can then predict the likelihood of fraud. Accountants can use this process to detect outliers in financial statements by identifying abnormal accounting numbers.

Prior research has tested this process in detecting material accounting misstatements, proxied by the SEC's Accounting and Auditing Enforcement Releases (AAERs). Bao et al. (2020) use predictive modeling to minimize bias and estimation variance to estimate model parameters. They use two models, the ratio based logistic regression and the benchmark model. They extend the benchmark model further by using ensemble learning, an advanced machine learning paradigm. Based on support vector machine (SVM), this model maps raw financial data into a set of ratios from the same year and translates it into ratios across different years. From this test, the authors conclude that machine learning can lead to more accurate fraud detection. The main takeaway from this study is that AI combined with machine learning can significantly enhance fraud detection accuracy.

## 2.6 Machine Learning

Using machine learning to enhance AI is not limited to the U.S. setting. This level of detection works internationally and helps detect fraud against foreign business policies and regulations. In Chinese companies alone, the frequency of fraud only seems to be increasing as seen in Figure 2.71. Rahman and Zhu (2023) compare conventional ensemble machine learning algorithms, like CUSBoost, RUSBoost, XGBoost, and AdaBoost, with AI against logistic regression algorithms for China A-Share firms. They find that fraud data are highly skewed, and that data-level methods were under sampling and over sampling. Even for Chinese firms, the collaboration of AI with machine learning proves highly accurate and performs better in the context of accounting fraud detection.



*Figure 2.71: Annual fraud frequency of Chinese listed companies*

This new form of analyzing data is also being used for risk measurement and decision making by the board. Liu et al (2023) speak to how machine learning could be used to more

accurately predict and measure financial fraud risk. They also discuss the topic of financial fraud relating to China and Chinese committees, finding that more independent directors can better detect and correct financial fraud. Moreover, this prediction depends on the directors' characteristics on corporate behavior. The authors study the decision making of the board and its effect on the independent director system.

Using Chinese firms' voting data, the authors examine whether independent directors are more likely to vote against the boards' financial proposals when the company is at risk of financial fraud and whether disagreement can reduce the risk for financial fraud. They use the probability of a firm's financial fraud that is predicted by machine learning to measure the risk of fraud. By using the risk of fraud and the independent director voting, the authors show that independent directors tend to vote against the boards' financial proposal if the risk of fraud is high, especially when they have a finance background and when they have higher reputation. Machine learning has proven to be better in analyzing data for fraud and to help bring conclusions on decision making and behavior.

### **3. Conclusion**

To successfully prevent fraud in finance and accounting, firms need strong structural integrity made up of consistently strong internal controls. My paper seeks to suggest some strategies to help companies achieve this goal. Having such frameworks as the internal audit and CSR in place will allow firms to improve their controls and prevent fraud. Advanced technologies based on artificial intelligence and machine learning are also robust approaches to detect fraud. The battles of today cannot be fought with the controls of yesterday, but rather with these synergized strategies of tomorrow.

## REFERENCE

- Anti–Money Laundering AI Explained*. (n.d.). Retrieved April 26, 2025, from <https://www.oracle.com/financial-services/aml-ai/>
- Bao, Y., Ke, B., Li, B., Yu, Y. J., & Zhang, J. (2020). Detecting Accounting Fraud in Publicly Traded U.S. Firms Using a Machine Learning Approach. *Journal of Accounting Research*, 58(1), 199–235. <https://doi.org/10.1111/1475-679X.12292>
- Corporate governance of the Continental model | Download Scientific Diagram*. (n.d.). Retrieved May 7, 2025, from [https://www.researchgate.net/figure/Corporate-governance-of-the-Continental-model\\_fig2\\_357643640](https://www.researchgate.net/figure/Corporate-governance-of-the-Continental-model_fig2_357643640)
- Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997). Toward a Stewardship Theory of Management. *The Academy of Management Review*, 22(1), 20. <https://doi.org/10.2307/259223>
- Fraud Analytics: How Behavioral Analytics Enhances Detection | Infosys BPM*. (n.d.). Retrieved April 26, 2025, from <https://www.infosysbpm.com/blogs/bpm-analytics/behavioural-analytics-fraud-detection.html>
- Freeman, R. E. E., & McVea, J. (2005). A Stakeholder Approach to Strategic Management. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.263511>
- Home | The Institute of Internal Auditors | The IIA*. (n.d.). Retrieved April 26, 2025, from <https://www.theiia.org/>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Lehman Brothers: Financial Fraud In 2008 | ipl.org*. (n.d.). Retrieved May 7, 2025, from <https://www.ipl.org/essay/Lehman-Brothers-Financial-Fraud-In-2008-PJAEW7Q36G>
- Li, X., Kim, J. B., Wu, H., & Yu, Y. (2021). Corporate Social Responsibility and Financial Fraud: The Moderating Effects of Governance and Religiosity. *Journal of Business Ethics*, 170(3), 557–576. <https://doi.org/10.1007/S10551-019-04378-3/TABLES/8>
- Liu, Y., Wu, B., & Zhang, M. (2023). Can independent directors identify the company’s risk of financial fraud: Evidence from predicting financial fraud based on machine learning. *China Journal of Accounting Studies*, 11(3), 465–492. <https://doi.org/10.1080/21697213.2023.2239670>
- Marisetty, V. B., & Moturi, S. (2023). Boundaries of the firm and real earnings management. *Journal of International Accounting, Auditing and Taxation*, 52, 100567. <https://doi.org/10.1016/J.INTACCAUDTAX.2023.100567>

- Office of Internal Audit | The Three Lines of Defense - Office of Internal Audit.* (n.d.). Retrieved April 26, 2025, from <https://internalaudit.olemiss.edu/the-three-lines-of-defense/>
- Olechnicka, A., Ploszaj, A., & Zegler-Poleska, E. (2024). *Virtual academic conferencing: a scoping review of 1984-2021 literature. Novel modalities vs. long standing challenges in scholarly communication.* <https://doi.org/10.47909/ijsmc.93>
- Pfeffer, J., & Salancik, G. R. (1978). *The External Control of Organizations: A Resource Dependence Perspective.* <https://papers.ssrn.com/abstract=1496213>
- Preventing Corporate Fraud: 4 Things You Should Know | Harney Partners.* (n.d.). Retrieved May 7, 2025, from <https://harneypartners.com/preventing-corporate-fraud-5-things-you-should-know/>
- Principal-Agent Problem Causes, Solutions, and Examples Explained.* (n.d.). Retrieved May 7, 2025, from <https://www.investopedia.com/terms/p/principal-agent-problem.asp>
- Rahman, M. J., & Zhu, H. (2023). Predicting accounting fraud using imbalanced ensemble learning classifiers – evidence from China. *Accounting and Finance*, 63(3), 3455–3486. <https://doi.org/10.1111/ACFI.13044;PAGEGROUP:STRING:PUBLICATION>
- Segregation of duties helps manage fraud risk - Trustpair.* (n.d.). Retrieved April 26, 2025, from <https://trustpair.com/blog/why-is-the-segregation-of-duties-so-important-in-managing-fraud-risk/>
- Shi, W., Connelly, B. L., & Hoskisson, R. E. (2017). External corporate governance and financial fraud: cognitive evaluation theory insights on agency theory prescriptions. *Strategic Management Journal*, 38(6), 1268–1286. <https://doi.org/10.1002/SMJ.2560>
- Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *Journal of Finance*, 52(2), 737–783. <https://doi.org/10.1111/J.1540-6261.1997.TB04820.X;PAGE:STRING:ARTICLE/CHAPTER>
- State Owned Enterprise (SOE) - Definition, Example.* (n.d.). Retrieved May 7, 2025, from <https://corporatefinanceinstitute.com/resources/career/state-owned-enterprise-soe/>
- Tax Avoidance Is Legal; Tax Evasion Is Criminal | Wolters Kluwer.* (n.d.). Retrieved April 26, 2025, from <https://www.wolterskluwer.com/en/expert-insights/tax-avoidance-is-legal-tax-evasion-is-criminal>
- The Fraud Triangle Theory - Brumell Group.* (n.d.). Retrieved May 6, 2025, from <https://www.brumellgroup.com/news/the-fraud-triangle-theory/>
- The Three Components of Family Governance | John A. Davis.* (n.d.). Retrieved May 7, 2025, from <https://johndavis.com/three-components-family-governance/>

Wang, C., Strauss, J., & Zheng, L. (2021). High-Speed Railway Opening and Corporate Fraud. *Sustainability* 2021, Vol. 13, Page 13465, 13(23), 13465. <https://doi.org/10.3390/SU132313465>

*What is the continental governance model? - CGI.* (n.d.). Retrieved April 26, 2025, from [https://www.thecorporategovernanceinstitute.com/insights/lexicon/what-is-the-continental-governance-model/?srsltid=AfmBOooChUGmk4fnOdCdVQ7T-qiK6\\_7H6GnpWv5NM1vhOREpVPtW3Bf6](https://www.thecorporategovernanceinstitute.com/insights/lexicon/what-is-the-continental-governance-model/?srsltid=AfmBOooChUGmk4fnOdCdVQ7T-qiK6_7H6GnpWv5NM1vhOREpVPtW3Bf6)

Williamson, O. E. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting.* <https://papers.ssrn.com/abstract=1496720>