Top Executives and Accounting Wrongdoing: Essays on CEO and CFO Characteristics

Inaugural dissertation

submitted to attain the academic degree

doctor rerum politicarum

(Doktor der Wirtschaftswissenschaften)

at the

ESCP Business School Berlin

by

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2025

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Day of Disputation: June 6, 2025

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AAERs ..... Accounting and Auditing Enforcement Releases
AF ..... Accounting Fraud
AUC ..... Area Under the Curve
CEO ..... Chief Executive Officer
CFO ..... Chief Financial Officer
CG ..... Corporate Governance
DD ..... Dechow and Dichev
EM ..... Earnings Management
ESG ..... Environment, Social, and Governance
FIN ..... Raw Financial Items
FRM ..... Financial Reporting Misconduct
FSD ..... Financial Statement Divergence
GAAP ..... Generally Accepted Accounting Principles
GLOBE ..... Global Leadership and Organizational Behaviour Effectiveness
IDV ..... Individualism
LR ..... Logistic Regression
MAS ..... Masculinity
MBA ..... Master of Business Administration
NN ..... Neural Network
PDI ..... Power Distance
REM ..... Real Earnings Management
RF ..... Random Forest
SCAC ..... Stanford Securities Class Action Clearinghouse
SEC ..... U.S. Securities and Exchange Commission
SHAP ..... Shapley Additive exPlanation
SOX ..... Sarbanes-Oxley Act
SVM ..... Support Vector Machines
U.S. ..... The United States of America
UAI ..... Uncertainty Avoidance
VHB ..... Verband der Hochschullehrerinnen und Hochschullehrer für Betriebswirtschaft e.V.
WVS ..... World Value Survey
XGB ..... Extreme Gradient Boosting

Abstract

Conducting four separate studies, this dissertation investigates the associations between chief executive officer (CEO) and chief financial officer (CFO) antecedents of accounting wrongdoing. First, Manuscript 1 employs five distinct machine learning algorithms on publicly listed firm years in the United States of America (U.S.) and provides evidence of the predictive value of isolated CEO characteristics and their combination with established raw financial items (FIN) on accounting wrongdoing. In particular, it demonstrates the importance of a CEO's network size, age, and duality and suggests non-linear associations with accounting wrongdoing. Interestingly, the results imply that CEOs of a higher age who do not serve as chairman of the board and high network CEOs of high inventory firms show a larger likelihood of accounting wrongdoing. Second, Manuscript 2 systematically reviews 64 articles on CFOs' accounting wrongdoing antecedents, discusses CEO and CFO similarities, and provides future research avenues. First and foremost, the study highlights that studies predominantly investigate CFO antecedents of isolated fraud dimensions, especially rationalization. Although CEO and CFO antecedents appear necessary for accounting wrongdoing, CFOs demonstrate more substantial incentives, similar opportunities, similar or stronger rationalization, and a slightly wider capacity for accounting wrongdoing than CEOs. Moreover, the type of accounting wrongdoing committed by CFOs and CEOs varies with context-related factors. Third, Manuscript 3 examines the associations among U.S. publicly listed CFOs' individualism and uncertainty avoidance levels, derived from their country of origin, and their firms' accounting wrongdoing likelihood. Interestingly, the study only suggests significantly negative associations between a CFO's individualism and accounting wrongdoing. The CEO's individualism seems to enhance this relationship. However, Manuscript 3 cannot find similar results for the CFO's and CEO's uncertainty avoidance dimension. Lastly, Manuscript 4 draws on publicly listed U.S. CFOs and CEOs and investigates their absolute power, the relative power gap, and distinct relative power constellations related to accounting wrongdoing. The results suggest that a CFO's power is significantly positively associated with accounting wrongdoing, unlike the CEO's power. Moreover, an increasing CEO-CFO power gap, a low power gap, and a high power gap are negatively, positively, and negatively related to accounting wrongdoing. These studies suggest that CEOs' and CFOs' backgrounds are essential antecedents for accounting wrongdoing. This necessitates future scholars to research both actors and their relationship to understand and detect accounting wrongdoing.

1. Introduction

Economic transactions largely rely on the established trust between multiple parties (Dupont and Karpoff 2020). A significant market that affects countless stakeholders around the globe is the capital market (Dupont and Karpoff 2020). Investors and financial institutions provide firms with capital to conduct their operations and invest in future technologies while planning to earn a return on lending (Dupont and Karpoff 2020). Customers rely on the (continuous) supply of goods or services, while suppliers offer their services to businesses, expecting to get money in return. Furthermore, the functioning of governments vastly relies upon the continuity of firms and upon collecting taxes from firms and their employees to finance state expenses. With the presence of asymmetric information in markets (e.g., Akerlof 1970), trust is the essential element to keep society functioning (Dupont and Karpoff 2020).

Unfortunately, trust does not represent an indefinite perpetuum. Just as trust can be established, for instance, via rights of investor protection (Dupont and Karpoff 2020), it can be destroyed. Wrongdoing, such as fraud, is a major destructor of trust that has been of particular public interest (Dupont and Karpoff 2020). It constitutes a recurring global phenomenon that erodes public confidence in capital markets (Rezaee 2005), results in reduced stock market participation (Gianetti and Wang 2016), and causes tremendous harm to firms, investors, employees, and society (Schneider and Brühl 2023). Dyck et al. (2024) estimate that, on average, one-tenth of publicly listed firms commit securities fraud every year, whereas only one in three corporate frauds is detected. The resulting cost is estimated to amount to $830 billion in 2021 alone (Dyck et al. 2024). Accounting-related wrongdoing is of public interest (e.g., Enron, Worldcom, Satyam, Wirecard). While securities fraud is more severe than accounting violations, the latter are suggested to exist on average in almost every second (41%) large company's financial statement (Dyck et al. 2024).[1]

Due to the pervasiveness and vast negative consequences of accounting wrongdoing, multidisciplinary literature investigates related phenomena (e.g., for reviews see Amiram et al. 2018; Schnatterly et al. 2018). More specifically, the identification of antecedents is of particular interest. Although multiple sources might be associated with accounting wrongdoing (e.g., corporate governance, CG; firm performance; regulation), top executives are of specific interest

[1] Although these estimates provide important information on the pervasiveness of fraud, this dissertation acknowledges that accurate estimations of potentially largely undetected frauds have to be interpreted with caution.

due to their strong position in the firm and their impact on strategic choices. Moreover, they are probably particularly susceptible to becoming the main perpetrators because they find themselves in positions that combine extensive pressure (incentive), opportunity, rationalization, and capability (e.g., Daboub et al. 1995; Wolfe and Hermanson 2004; Zahra et al. 2005). Consequently, they are strongly impacted by the aftermath of accounting wrongdoing, including turnover when their firms are found guilty of financial misrepresentation (Karpoff et al. 2008). Regarding top executives, the relationship between their characteristics and wrongdoing is widely researched (for reviews see e.g., Plöckinger et al. 2016; Schnatterly et al. 2018; Velte 2021). More specifically, upper echelons theory suggests that top manager characteristics approximate their cognitive processes, perception, and values, which, in turn, partially predict the behavior of their firm (Hambrick and Mason 1984; Hambrick, 2007), including organizational misconduct (Zahra et al. 2005).

My dissertation advances this research field by conducting four studies on CEO and CFO antecedents of accounting wrongdoing. More specifically, it combines previous research on financial, CEO, and CFO antecedents of accounting wrongdoing to comprehensively approach this topic. Fig. 1 briefly states the topics of the manuscripts of this dissertation and places them in this literature stream. The following section briefly describes the status quo and research gaps of the accounting wrongdoing literature, introduces the manuscripts of this dissertation, and portrays their placement in the literature.

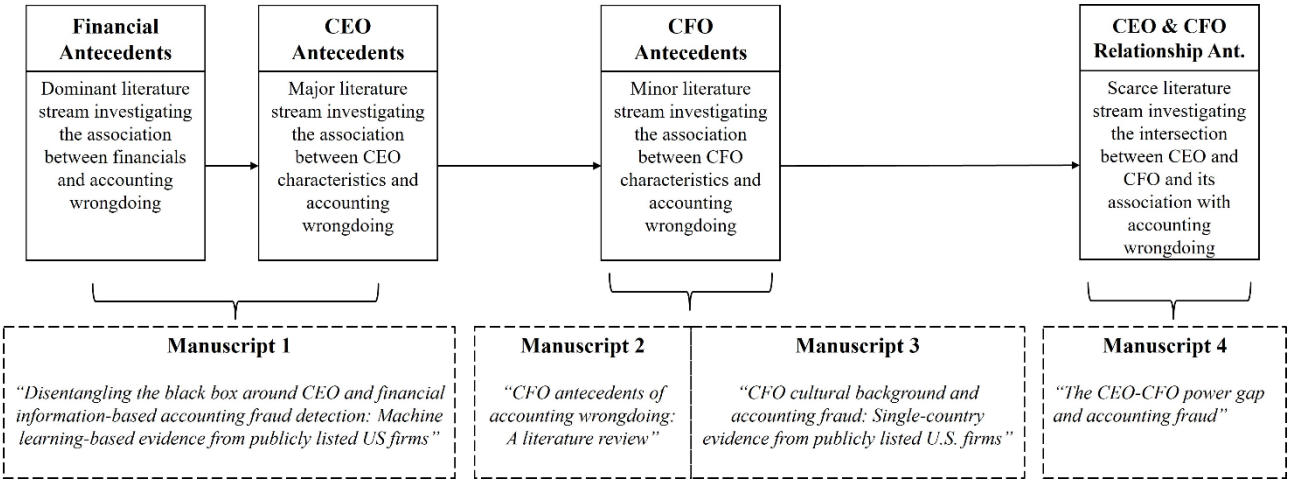

Fig. 1: *Placement and Topic of Manuscripts in the Accounting Wrongdoing Literature*

Since the CEO is typically understood to possess the most powerful position within a company, research focuses on the relationship between CEOs and accounting wrongdoing (e.g., Troy et al. 2011; Koch-Bayram and Wernicke 2018). As timely detection of accounting wrongdoing is paramount to mitigate the associated costs and due to its challenging nature (Bao et al. 2020), the technical development results in increased interest in machine learning methods to detect accounting wrongdoing. This is consistent with recent calls for considering nonlinear relationships (Velte 2021) and using explainable machine learning techniques (Doornenbal et al. 2021). Following the relevance of CEOs for firm outcomes (e.g., Hambrick and Mason 1984; Hambrick, 2007), Manuscript 1 deviates from the predominantly financial item-based literature (e.g., Bao et al. 2020) and investigates the isolated and collective predictive value of CEO characteristics and raw financial items (FIN) in the detection of accounting fraud (AF). In particular, Schneider and Brühl (2023) rely on five well-established machine learning algorithms and introduce novel model-agnostic methods to the accounting fraud literature. Thereby, Manuscript 1 disentangles the black box around the complex relationships among CEO and financial information, and accounting fraud, and significantly advances the current understanding of CEO accounting wrongdoing.

Beyond the CEO, prior literature predominantly ignores the importance of other top executives for firm outcomes (Uhde et al. 2017). Only recently, have researchers intensified their interest in other top managers (Menz 2012), with the CFO being of particular interest regarding financial decisions. For instance, the CFO's importance in the firm has risen (Zorn 2004) and the responsibility and liability of CFOs for financial reporting increased following the Sarbanes-Oxley Act (SOX) (Geiger and Taylor 2003). Preceding studies suggest that CEOs cover general corporate decisions whereas assigning CFOs with specialized choices such as financial decisions related to debt maturity and accrual management (e.g., Chava and Purnanandam 2010; Jiang et al. 2010). In addition, CFOs probably have the most immediate impact on accounting practices (e.g., Ge et al. 2011; Gupta et al. 2020; Jiang et al. 2010; Mian 2001) and are the primary subject to turnover following earnings misstatements (Hennes et al. 2008). Consistent with these findings, allegations of financial statement fraud have implicated CFOs in 65% of cases (Beasley et al. 2010). This notion is supported by studies proposing the incremental association between CFO characteristics and accounting wrongdoing beyond the CEO (e.g., Gupta et al. 2020).

To address the novel interest in the unique position of the CFO and their relationship with accounting wrongdoing, Manuscript 2 synthesizes the dichotomous literature on CFO antecedents

of earnings management (EM) and financial reporting misconduct (FRM). Consistent with prior calls for the examination of moderators (e.g., Plöckinger et al. 2016; Velte 2021), Schneider and Brühl (2024a) focus on the analysis of contextual factors related to CFO accounting wrongdoing. In addition, Manuscript 2 advances the ongoing debate about the relevance of CEOs and CFOs for accounting wrongdoing (e.g., Kutter and Weiß 2023) by comparing their accounting wrongdoing antecedents in a unique subsample. Collectively, Schneider and Brühl (2024a) enhance the understanding of the antecedents of CFO (and to some extent CEO) accounting wrongdoing.

Lately, accounting irregularities reflect another area of interest in the literature on accounting wrongdoing. Therefore, Amiram et al. (2015) introduce the Financial Statement Divergence (FSD) score, which represents deviations of financial statement digits from their expected distribution. Although established accounting fraud measures, such as the U.S. Securities and Exchange Commission's (SEC) Accounting and Auditing Enforcement Releases (AAERs) capture detected and enforced accounting fraud cases, they most likely constitute only a tiny fraction of overall financial misconduct for many cases remain hidden (Dechow et al. 2011; Karpoff et al. 2017). For instance, Dyck et al. (2024) estimate that in an average year, about 10% of firms engage in corporate fraud, but only one in three are detected. The FSD score addresses this challenge.

Following this argumentation, Manuscripts 3 and 4 use the novel FSD score to investigate accounting irregularities as "red flags" of accounting fraud. Thereby, they address the recent call by Velte (2021) to advance the research by considering alternative measures of financial misconduct. Additionally, Manuscript 3 answers recent calls by Dauth et al. (2017) and disentangles the associations between a CFO's cultural background and accounting wrongdoing. In particular, Schneider and Brühl (2024b) investigate the associations among the individualistic and uncertainty avoidance backgrounds of CFOs and accounting wrongdoing, as well as the CEOs' cultural backgrounds as potential moderators. Lastly, Manuscript 4 combines prior literature streams on the separated CEO and CFO antecedents of accounting wrongdoing and focuses on these executives' power and the CEO-CFO power gap. Schmid et al. (2024) challenge prior studies and acknowledge the CFOs' abilities to influence accounting wrongdoing based on their unique position. Among other things, Manuscript 4 develops a power constellation matrix, depicting power gaps as four relative power constellations between CEOs and CFOs. Thereby, Schmid et al. (2024) answer prior calls for the investigation of relative power among top executives (e.g., Ozgen et al. 2024), and the CEO-CFO relationship and its association with fraud (Georgakakis et al. 2022).

Overall, Manuscripts 3 and 4 advance the understanding of CFO accounting wrongdoing and the relationship between CEOs and CFOs in the context of accounting wrongdoing.

Table 1 presents a summary of the manuscripts of this dissertation, including the titles, authors, references, journals, rankings (of the ”Verband der Hochschullehrerinnen und Hochschullehrer für Betriebswirtschaft e.V.”; VHB), the current publication status, and the points attributed to each manuscript as part of the dissertation process. This summary displays that Manuscript 1 was published in the well-known Journal of Business Economics in 2023. Manuscript 2 received a conditional accept and Manuscript 4 passed the desk reject at well-ranked management journals. Lastly, Manuscript 3 constitutes a working paper.[2]

[2] Please note that this cumulative dissertation follows a rule by ESCP Business School Berlin which requires a total of 2,50 points stemming from at least three manuscripts (as of 2020).

Table 1: Summary of Manuscripts[3]

	Manuscript 1	Manuscript 2	Manuscript 3	Manuscript 4
Title	Disentangling the black box around CEO and financial information-based accounting fraud detection: Machine learning-based evidence from publicly listed US firms	CFO antecedents of accounting wrongdoing: A literature review	CFO cultural background and accounting fraud: Single-country evidence from publicly listed U.S. firms	The CEO-CFO power gap and accounting fraud
Authors	Moritz Schneider, Rolf Brühl	Moritz Schneider, Rolf Brühl	Moritz Schneider, Rolf Brühl	Stefan Schmid, Tobias Romey, Moritz Schneider
Reference	Schneider, M., & Brühl, R. (2023). Disentangling the black box around CEO and financial information-based accounting fraud detection: Machine learning-based evidence from publicly listed US firms. Journal of Business Economics, 93, 1591–1628.	Schneider, M., & Brühl, R. (2024). CFO antecedents of accounting wrongdoing: A literature review. Working paper.	Schneider, M., & Brühl, R. (2024). CFO cultural background and accounting fraud: Single-country evidence from publicly listed U.S. firms. Working paper.	Schmid, S., Romey, T., & Schneider, M. (2024). The CEO-CFO power gap and accounting fraud Working paper.
Journal	Journal of Business Economics	Management Review Quarterly	-	Review of Managerial Science
Ranking	B (VHB Jourqual 3)	C (VHB Jourqual 3)	-	B (VHB Jourqual 3)
Status	Published	Conditional Accept	Working Paper	Beyond Desk Reject
Points	1,25	0,75	-	0,83

My dissertation is structured as follows. Section 2 establishes a common understanding of the relied terminologies related to accounting wrongdoing. Section 3 introduces important fraud frameworks and establishes the background on financials, top executives, and accounting wrongdoing of the previous literature upon which the dissertation relies. Section 4 embeds

[3] This dissertation refers to the included manuscripts interchangably both via numbering (e.g., Manuscript 1) or their reference (e.g., Schneider & Brühl 2023). Additionally, "this dissertation" indicates the work of the dissertation that is conducted by the author individually, whereas "we" refers to the cooperative work of the manuscripts. Please also note that the diverging formats of the referred manuscripts in this (short) version of the dissertation were not harmonized. Thus, the referred and submitted manuscripts represent their original formats in their latest version, required by each Journal. For a harmonized version of this dissertation, improving the consistency and readabilty where deemed necessary (e.g., font size, line distance, header format), please see the (full) version of this dissertation, including the four manuscripts directly.

Manuscript 1 into this dissertation. It introduces the literature on financial and CEO-related antecedents of accounting fraud, displays the empirical work, and concludes with a presentation of the results of the first manuscript. The following section shifts the focus from the CEO to the CFO and their antecedents of accounting wrongdoing. Therefore, Manuscript 2 synthesizes the literature on CFO antecedents of accounting wrongdoing and presents the study's findings and future research avenues within the field. In section 6, Manuscript 3 presents an example of a CFO characteristic of interest, i.e., the CFO's cultural background. Based on this foundation, section 7 presents Manuscript 4 and combines the preceding chapters on CEO and CFO antecedents in a specific area widely neglected to date, i.e., the CEO-CFO power relationship. It introduces the importance of the relationship between the CEO and CFO in the context of accounting wrongdoing, presents the investigation of the CEO-CFO power gap as an example of this relationship, and displays the related findings. Section 8 discusses this dissertation's primary results and contributions concerning the current literature and draws practical implications. Subsequently, section 9 summarizes the limitations of the dissertation and proposes areas of future research. Lastly, section 10 concludes the dissertation.

2. Definitions of Accounting Wrongdoing Terminology

It is fundamental to establish a common understanding of the accounting wrongdoing terminology before introducing and presenting the manuscripts of this dissertation. This is of particular necessity because the literature stream combines multidisciplinary research fields like accounting, business ethics and management, facing a great variety of terminology concerning similar concepts (Amiram et al. 2018). Consequently, this section recapitulates the necessary literature and defines the derived accounting wrongdoing terminologies utilized in this dissertation.

2.1 Financial Reporting Misconduct and Accounting Fraud

Following the terminology by Amiram et al. (2018, p. 734), this dissertation subsumes multiple terms that relate to accounting wrongdoing and are not considered as EM under the term *"financial reporting misconduct"*. This includes *"financial misrepresentation"* as a violation of section 13(b) of the 1934 act, *"financial misreporting"* as a violation of section 13(a) of the 1934 act, and

"financial reporting fraud" as a violation of section 17(a)(1) of the 1933 Securities Act or section 10(b) of the 1934 Securities Exchange Act, SEC rule 10b-5 (Amiram et al. 2018, p. 734).[4]

According to section 13(b) of the 1934 Securities Exchange Act, firms are obliged to ensure accurate representation of their financial reports and incorporate internal controls (Amiram et al. 2018). In contrast, section 13(a) requires firms to timely file their financial reports, such as 10-K or 10-Q reports, with the SEC (Amiram et al. 2018). Sections 17(a)(1) of the 1933 Securities Act or section 10(b) of the 1934 Securities Act SEC rule 10b-5 prohibit to *"[…] employ any device, scheme, or artifice to defraud*, *obtain money or property by using material misstatements or omissions, or to engage in any transaction, practice, or course of business which operates or would operate as a fraud or deceit upon the purchaser"*.[5]

Violations against any of these laws constitute actions that impose enforcement actions by the Department of Justice or SEC (Amiram et al. 2018). For instance, in academic research, the SEC's AAERs represent a widely used financial statement fraud proxy (e.g., Dechow et al. 2011). Although it is challenging to prove fraudulent behavior based on intention, AAERs are widely considered to provide a relatively good proxy for financial reporting fraud because the SEC probably focuses its limited resources on investigations and enforcements of FRM for which they can prove intention in the court of law (Dechow et al. 1996; Feroz et al. 1991). Once an indictment takes place, this identification of an intentional fraud case rarely turns out to be wrongful, resulting in a small type I error (Amiram et al. 2018). Including but not limited to these violations, restatements can follow any of these violations (Amiram et al. 2018). In scientific research, the Audit Analytics database represents a widely used source that publishes these restatements (Amiram et al. 2018). The Government Accountability Office and the Stanford Securities Class Action Clearinghouse (SCAC) constitute further broadly utilized operationalizations of financial misreporting in academic literature (Amiram et al. 2018). Interestingly, all these proxies cover slightly different FRM constructs and, hence, result in varying findings, depending on the employed measure (Karpoff et al. 2017). Consequently, any of these operationalizations has to be considered with caution.

[4] Please note, that this dissertation refers to terminologies from the U.S.-context, as the manuscripts predominantly cover American samples, and the literature stream is dominated by the American system.
[5] See https://www.law.cornell.edu/wex/securities_act_of_1933.

In addition to these differences in definitions, all of these proxies of FRM face challenges when it comes to accurately capturing FRM. For instance, severe partial observability exists in so far as that many of the occurring violations are not detected or pursued by regulatory bodies, and hence, are not fully included by these proxies (Amiram et al. 2015; Dechow et al. 2011; Gupta et al. 2020). Dyck et al. (2024) highlight that each year, about 8% of large publicly listed firms commit FRM in the form of AAERs, 10% commit a violation regarding misrepresentation, omission, or other FRM that is settled for at least $3 million and measured according to SCAC, with up to 41% for misconduct of less severity, excluding errors. This lack of accurate identification of all fraud cases is typically referred to as type II error (Amiram et al., 2018).

For this reason, multiple alternative proxies exist and are used in an attempt to capture these latent cases more accurately (Karpoff et al. 2017). The M-score (Beneish 1997; Beneish 1999), the F-score (Dechow et al. 2012), and the more recent FSD score (Amiram et al. 2015) are among the most common models to asses FRM in a non-binary manner. Although these models are not directly related to the aforementioned precise legal violations and enforcement actions by regulatory bodies related to FRM, they are still related to these concepts and can be considered indicators of such (e.g., Amiram et al. 2015; Beneish 1999; Dechow et al. 2012). Therefore, they are also not subject to the limitations of these proxies. More specifically, they represent indicators that should identify a wider range of potential FRM because they also include cases that either remain undetected or not pursued by the regulatory bodies (e.g., due to challenges in proving intention). For instance, the FSD score constitutes a measure that provides information on how strongly actual items of a financial statement diverge from the expected distribution following Benford's law (Amiram et al. 2015)[6]. Therefore, the FSD score probably captures a large number of FRM cases that otherwise would remain undetected (Amiram et al. 2015; Gupta et al. 2020) and, hence, would be excluded from databases of the binary proxies listed above.

Some studies that rely on the M-score, F-score, and FSD score use diverging terminologies, such as *"earnings manipulation"* (Beneish 1999, p. 24), *"material accounting misstatements"* (Dechow et al. 2011, p. 17), and *"financial statement errors"* (Amiram et al. 2015, p. 1540) or *"financial statement irregularities"* (Gupta et al. 2020, p. 802) respectively. For instance, Beneish (1999, pp. 30, 35) clearly distinguishes between *"earnings management"* and *"earnings*

[6] Prior literature found that the occurrence of first and second digits of numbers in various natural datasets follows a mathematical distribution, called Benford's law, which also applies to accounting data (Nigrini 2015).

manipulation", with earnings manipulation including fraudulent cases. Similarly, Dechow et al. (2011, p. 17) understand a *"material accounting misstatement"* as identified by the SEC's AAERs. Regarding "financial statement errors", Amiram et al. (2015, p. 1540) state that they are a *"leading indicator to identify misstatements"* (SEC AAERs).[7] Prior literature understands indicator proxies, such as the FSD score as a *"fraud detection tool"* (Gupta et al. 2020, p. 825), and irregularities as *"intentional misstatements"* (Hennes et al. 2008, p. 1487). Hence, these concepts constitute indicators of FRM. Moreover, Amiram et al. (2015) refer to the FSD score as an indicator of AAERs, which are typically considered as *"material misstatement"* (e.g., Amiram et al. 2015, p. 1540; Gupta et al. 2020, p. 805) or *"accounting fraud"* (e.g., Bao et al. 2020, p. 200; Erickson et al. 2006, p. 119; Miller 2006, p. 1002; Troy et al. 2011, p. 267). To synthesize the vast heterogeneity in terminologies related to FRM and following this literature, this dissertation refers to all FRM cases as "accounting fraud likelihood" or simply "accounting fraud".[8]

2.2 Earnings Management

Besides FRM, EM constitutes another widely researched concept of wrongdoing related to accounting decisions. However, differing from FRM, EM typically exists within the legal boundaries (Amiram et al. 2018). The EM literature often relies on the seminal definition provided by Healy and Wahlen (1999). Consistent with the definition of EM used in Amiram et al. (2018), this dissertation understands EM according to Healy and Wahlen (1999) as follows:

"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen 1999, p. 368).

According to the definition of EM by Healy and Wahlen (1999), earnings can be managed in two ways. First, accrual-based earnings management (AEM) utilizes the judgment in accrual-related accounting decisions to manage the earnings in an intended direction. For instance, *"deferred taxes"*, *"obligations for pension benefits"*, or *"asset impairments"* constitute typical items that are subject to judgment (Healy and Wahlen 1999, p. 369). Multiple models, such as the

[7] For a detailed description of these terminologies please refer to Beneish (1999), Dechow et al. (2011), Amiram et al. (2015), and Amiram et al. (2018).
[8] Following Dyck et al. (2024), this dissertation acknowledges that these measures more accurately describe alleged fraud, yet refers to them as "fraud" or "fraud likelihood" for simplicity within this dissertation.

jones model (Jones 1991), the modified jones model (Dechow et al. 1995), the Dechow and Dichev (DD) model (Dechow and Dichev 2002), the modified DD model (McNichols 2002), or the performance-adjusted modified jones model (Kothari et al. 2005), assess the magnitude of AEM.

Second, real earnings management (REM) describes accounting practices that relate to real actions that influence the firm's reported earnings (Roychowdhury 2006). These activities include the use of *"price discounts"*, *"overproduction"*, and the *"reduction of discretionary expenditures"* (Roychowdhury 2006, p. 335). For instance, investment expenditures, such as research and development, can be cut to reduce the firm's annual expenditures and boost the net income (Dechow and Sloan 1991; Roychowdhury 2006). Similar to AEM, models assess the level of REM. For instance, Roychowdhury (2006, p. 351) introduces a model that captures *"abnormal cash flow from operations"*, *"abnormal discretionary expenses"*, and *"abnormal production costs"* to estimate REM.

2.3 Accounting Wrongdoing

This dissertation follows Schnatterly et al. (2018) and adapts the definition of "wrongdoing" by Greve et al. (2010). Accordingly, wrongdoing describes a *"behavior that a social-control agent judges to transgress a line separating right from wrong, where such a line can separate legal, ethical, and socially responsible behavior from its antithesis"* (Schnatterly et al. 2018, p. 2408). Thus, this dissertation follows Schnatterly et al. (2018, p. 2408) and excludes *"in or by organizations"* from the original definition by Greve et al. (2010) to consider the focus on top executives like the CEO and CFO. In contrast, Greve et al. (2010, p. 56) originally defined organizational misconduct as "*behavior in or by an organization that a social-control agent judges to transgress a line separating right from wrong, where such a line can separate legal, ethical, and socially responsible behavior from its antithesis* ".

Diverging from Schnatterly et al. (2018), this dissertation specifies this terminology in the CEO and CFO accounting context. In contrast, Schnatterly et al. (2018) choose a broad definition of wrongdoing across multiple behaviors like market manipulation, asset misappropriation, or lying to capture the variety of existing misbehaviors. However, this dissertation argues that these behaviors could differ significantly between contexts. For instance, the regulatory or corporate governance requirements and scrutiny might vary with wrongdoing types. This provides top executives with strongly diverging incentives, pressure, and rationalization, all of which are

suggested to be associated with wrongdoing (Schnatterly et al. 2018). More specifically, accounting fraud, lying, infidelity, environmental or violent crime, or abuse of power all constitute behaviors that can be considered as wrongdoing but take place in vastly differing contexts.

Regarding accounting misbehavior, Amiram et al. (2018, p. 748) describe the spectrum of financial reporting from *"legally acceptable"* EM to FRM, especially fraud. The definition of "accounting wrongdoing" in this dissertation combines the notions by Schnatterly et al. (2018) and Amiram et al. (2018) and considers both unethical and illegal accounting techniques. Therefore, it includes EM and FRM. Although EM constitutes accounting behavior that is in fact *"legally acceptable"* (Amiram et al. 2018, p. 748), it is typically considered *"wrong"* (Schnatterly et al. 2018, p. 2408). Similarly, Amiram et al. (2018) highlight the differences between EM and FRM, but simultaneously acknowledge that both concepts aim to mislead market participants about the firm's financial statement. Additionally, Amiram et al. (2018) connect these two concepts. More specifically, EM is predictive of FRM (Amiram et al. 2018). Moreover, according to case law, behavior compliant with Generally Accepted Accounting Principles (GAAP) might still be considered fraudulent under certain circumstances (Amiram et al. 2018). Consistent with this argumentation, prior literature largely links EM and FRM through the so-called *"slippery slope"* (Schrand and Zechman 2012, p. 311). This phenomenon refers to the typical transition from the initial legal management of earnings to eventually crossing the legal line and resorting to illegal FRM to maintain the firm's positive image through the improvement of the firm's financials (Dechow et al. 2011). Consistent with this notion, a firm typically demonstrates an increased likelihood of EM prior to experiencing financial statement fraud (Perols and Lougee 2011). Similarly, a firm that manages earnings outside GAAP is likely also pushing its legal limits of EM within GAAP (Dechow et al. 1996).

One major advantage of considering EM as complementary to FRM is that it does not rely on the ex post identification of FRM. This benefit is similar to other continuous proxies like the FSD score (Amiram et al. 2015; Gupta et al. 2020). Therefore, it complements the previous measures in tackling the challenge of only identifying the "tip of the iceberg" of accounting fraud. Following the above reasoning and consistent with Schnatterly et al. (2018), this dissertation considers EM to fall within the wrongdoing definition by Greve et al. (2010). Consequently, this dissertation considers the legal EM, which is typically perceived as unethical, and the illegal FRM (Amiram et al. 2018), and subsumes them under accounting wrongdoing. This definition acknowledges the

legal *"gray area"* between these concepts (Amiram et al. 2018, p. 735), capturing a comprehensive picture of accounting misbehavior.

3. Theoretical Background and Accounting Wrongdoing Literature

Before introducing the manuscripts of this dissertation, this section establishes the necessary theoretical background of the related fraud frameworks. Furthermore, it presents an overview of the status quo of the top executive and accounting wrongdoing literature.

3.1 Fraud Frameworks

Aiming to understand the drivers of fraudulent behavior, multiple conceptual frameworks structure and investigate potential drivers of fraud (e.g., see Dorminey et al. 2012; Trompeter et al. 2013). In particular, Dorminey et al. (2012) highlight the fraud triangle (Cressey 1950; Cressey 1953), the fraud scale (Albrecht et al. 1984), the fraud diamond (Wolfe and Hermanson 2004), the A-B-C analysis *("Bad Apple, Bad Bushel, or Bad Crop")* (Ramamoorti et al. 2009, p. 2), and M.I.C.E. (Money, Ideology, Coercion, Ego or Entitlement) (Kranacher et al. 2011). Especially the fraud triangle is well established in the accounting and auditing literature (Dorminey et al. 2012; Hogan et al. 2008; Trompeter et al. 2013). It represents a seminal and dominant framework whose fraud dimensions are officially referred to in the Statement on Auditing Standards No. 99/AU section 316 by the American Institute of Certified Public Accountants in 2002, the Auditing Standard AS 2401: Consideration of Fraud in a Financial Statement Audit by the Public Company Accounting Oversight Board, and the Manual of the Association of Certified Fraud Examiners (Association of Certified Fraud Examiners 2009 cited in Dorminey et al. 2012; American Institute of Certified Public Accountants 2002; Dorminey et al. 2012; Public Company Accounting Oversight Board 2024). Recent research also relies on the fraud triangle in the field of top executive wrongdoing (e.g., Schnatterly et al. 2018). Consequently, this dissertation strongly builds on the fraud triangle framework (Cressey 1950; Cressey 1953) as well as its extension, the fraud diamond (Wolfe and Hermanson 2004).

The fraud triangle suggests that three dimensions influence perpetrators to commit fraud (Cressey 1950; Cressey 1953). These are pressure/incentive, opportunity, and rationalization (Dorminey et al. 2012). The first dimension refers to an actor's perceived pressure or incentive that triggers committing fraud to solve a problem (Dorminey et al. 2012). Second, the perpetrator must perceive the control system as providing an opportunity with unlikely detection (Dorminey et al.

2012). Third, the perpetrator can rationalize the act and dissolve the potential *"cognitive dissonance"* to maintain inner peace (Dorminey et al. 2012, p. 558). According to previous literature, all dimensions must be present for fraud (Cressey 1950; Cressey 1953; Dorminey et al. 2012). While the seminal framework considers only a *"non-sharable"* financial pressure (incentive) (Cressey 1950, p. 742), the subsequent literature typically deploys a broader definition of this dimension, including elements that can be understood as non-financial pressure (Dorminey et al. 2012; Schnatterly et al. 2018). Moreover, prior literature broadens the definition of the dimensions of the fraud triangle beyond fraud to more general wrongdoing (e.g., Schnatterly et al. 2018). Therefore, this dissertation applies a similar understanding of the fraud triangle to the accounting wrongdoing context.

The fraud diamond by Wolfe and Hermanson (2004) extends the fraud triangle by the capability dimension. Although the initial three dimensions are strong factors in committing fraud, the successful completion of such depends on the actor's capability like *"personal traits and abilities"* (Wolfe and Hermanson 2004, p. 1). Therefore, Wolfe and Hermanson (2004) contend that especially big fraud cases are characterized by the perpetrator's ability to recognize opportunities and act on these multiple times. Accordingly, perpetrators must inherit a relevant position, sufficient intellect, great ego, skills to coerce others, effective lying, and stress resistance (Wolfe and Hermanson 2004). Because top executives often fulfill many of these criteria, they should be of particular interest in the risk assessment by regulators (Wolfe and Hermanson 2004).

The fraud triangle and the fraud diamond are frameworks designed to describe the dimensions contributing to fraud. Although fraud is a concept distinct from wrongdoing, this dissertation follows prior literature such as Schnatterly et al. (2018) who believe their frameworks are similarly applicable to a wrongdoing concept. Because the fraud triangle and the fraud diamond are predominantly linked to the accounting context, they constitute an appropriate theoretical foundation to investigate accounting wrongdoing.

3.2 Financials, Top Executives, and Accounting Wrongdoing

For decades, scholars have examined the relationship between a firm's financials and accounting wrongdoing.[9] The literature stream on predictive models largely relies on financials to assess a firm's accounting wrongdoing risk (for a review see Albizri et al. 2019). More specifically, many seminal works extensively draw on financial ratios or indexes to capture the firm's economic situation (e.g., Beneish 1999; Cecchini et al. 2010; Dechow et al. 2011). For instance, the perception of a firm's poor future financial situation, market expectations, or debt obligations might increase the pressure for accounting wrongdoing (Beneish 1999). Therefore, Beneish (1999, p. 26) establishes the well-known M-Score model on financials that capture a firm's 1) *"future prospects"*, 2) *"cash flows and accruals"*, and 3) *"contract-based incentives"*. More specifically, Beneish (1999, pp. 26-28) considers the following variables, which predominantly consist of indexes to reflect yearly deviations in the firm's financials to indicate manipulations: *"Days' sales in receivables index"*, *"Gross margin index"*, *"Asset quality index"*, *"Sales growth index"*, *"Depreciation index"*, *"Sales, general, and administrative expenses index"*, *"Leverage index"*, and the *"Total accruals to total assets"*. Similarly, Dechow et al. (2011, pp. 34-42) construct the well-established F-score model mainly on financials, including *"accruals quality-related variables"*, *"performance variables"*, *"nonfinancial variables"*, *"off-balance-sheet variables"*, and *"market-related incentives"*. Only recently, has the literature directly considered the underlying raw financial items of prior studies for accounting fraud detection models (e.g., from Cecchini et al. 2010; Dechow et al. 2011) because they are suggested to enhance predictive power over similar ratio-based approaches (Bao et al. 2020). More specifically, Bao et al. (2020, p. 229) provide empirical evidence suggesting that *"Common shares outstanding"*, *"Current assets, total"*, *"Sale of common and preferred stock"*, *"Property, plant and equipment, total"*, and *"Account payable, trade"* are the five most important raw financial data items to detect accounting fraud.[10]

In the wrongdoing literature, another large substream investigates top executives as main actors (e.g., for reviews see Daboub et al. 1995; Schnatterly et al. 2018; Zahra et al. 2005; Zahra et al.

[9] This dissertation acknowledges that there is also a vast literature on board-level antecedents of accounting wrongdoing (e.g., see Velte 2021 for a review). However, this section focuses on the prominently applied financial and top executive antecedents as foundation of this dissertation.

[10] For a detailed description of the described models and their variables please see Beneish (1999), Dechow et al. (2011), and Bao et al. (2020).

2007). Alongside the great responsibility that top executives bear (Geiger and Taylor 2003), top management combines important aspects that are likely related to fraudulent behavior. More specifically, top executives typically perceive pressure or incentives, the opportunity, rationalization, and the capability to pursue their interests at the firm's expense (e.g., Schnatterly et al. 2018; Schneider and Brühl 2024a). For instance, they might experience performance pressure from the market, especially when being new in their role (e.g., Ali and Zhang 2015). Similarly, top managers might have financial incentives through compensation elements to commit fraudulent behavior (e.g., Jiang et al. 2010). Moreover, executives such as CEOs or CFOs possess positions that allow them to influence firm outcomes, including positions such as board membership (duality) which provide them the opportunity to misbehave (e.g., Dechow et al. 1996). Last, top executives are typically experienced in facing inconclusive and far-reaching decisions (e.g., Eisenhardt 1989). They commonly have the skills, such as intellect, practical expertise, or stress resistance, that provide them with the capability to conduct fraud (e.g., Wolfe and Hermanson 2004). Although not every top executive misbehaves, this combination of characteristics will therefore probably increase fraudulent behavior (Dorminey et al. 2012; Trompeter et al. 2013).

Following this argumentation, top executives, particularly CEOs, are of interest for accounting wrongdoing research (e.g., see Plöckinger et al. 2016; Schneider and Brühl 2024a; Velte 2021). More specifically, some high-profile accounting scandals, such as Enron or Worldcom conclude the involvement of the firms' CEOs in these wrongdoings (Schnatterly et al. 2018). Academic literature supports this anecdotal evidence. For instance, Beasley et al. (2010) discovered that 72% of the SEC's AAERs named CEOs as being involved in fraud. Moreover, the CEO is commonly perceived to possess the highest position in a firm and, therefore, the ultimate responsibility for a firm's outcome. This includes their obligation to verify the integrity of the firm's financial statements (Geiger and Taylor 2003). Therefore, the preceding research suggests that CEOs are held responsible for accounting-related misbehavior. For instance, CEOs associated with FRM face higher turnover rates (e.g., Hazarika et al. 2012) and financial detriments (Karpoff et al. 2008). Moreover, upper echelons theory suggests that top management's values and cognitive processes are of particular importance for firm outcomes (Hambrick and Mason 1984). This is based on the assumption that humans face bounded rationality from limited vision, selective perception, and interpretation, especially in complex decision-making processes (Hambrick and Mason 1984). Therefore, a firm's outcomes can probably be predicted by a top executive's demographic

characteristics, which approximate their experiences, values, and cognitive processes (Hambrick and Mason 1984; Hambrick 2007). These, in turn, are likely to influence decision-making (Hambrick and Mason 1984; Hambrick 2007), including illegal firm behavior (Daboub et al. 1995). Following this notion, a vast body of literature investigates top executives' characteristics as antecedents of financial reporting, including accounting wrongdoing (e.g., for reviews see Plöckinger et al. 2016; Velte 2021).

These antecedents can be categorized into the three dimensions of the fraud triangle (Cressey 1950; Cressey 1953).[11] First, regarding pressure/incentives, prior studies suggest associations between a CEO's stock ownership and financial reporting fraud (O'Connor et al. 2006), between compensation and financial misrepresentation (Harris and Bromiley 2007), and between a CEO's tenure and EM (Ali and Zhang 2015; Dechow and Sloan 1991). Second, related to a CEO's opportunity to commit accounting wrongdoing, evidence suggests associations between duality and accounting fraud (Dechow et al. 1996). Third, a CEO's rationalization of accounting wrongdoing behavior is investigated. Among other things, prior literature implies the link between a CEO's age and accounting fraud (e.g., Troy et al. 2011), and between a CEO's gender and accounting conservatism (Ho et al. 2015). In addition, scholars propose the relationship among a CEO's network size and corporate fraud (Khanna et al. 2015), EM (Bhandari et al. 2018; Krishnan et al. 2011) as well as restatements (Bhandari et al. 2018). Similarly, scholars suggest the connection between a CEO's business degree and accounting fraud (e.g., Troy et al. 2011), and between a CEO's military background and accounting fraud (Koch-Bayram and Wernicke 2018).

Whereas the majority of this literature focuses on the CEO as the top executive perpetrator of accounting wrongdoing (see Plöckinger et al. 2016; Schnatterly et al. 2018; Velte 2021 for reviews), more recent literature challenges this imbalance and considers other top executives' impact on firm outcomes (Menz 2012). The CFO is of particular interest in accounting wrongdoing research lately, due to their position as *"second in command"* (Zorn 2004, p. 360) and because of their most immediate impact on financial reporting (e.g., Ge et al. 2011; Gupta et al. 2020; Jiang et al. 2010; Mian 2001). Moreover, with the introduction of SOX in 2002, the CFO complements the CEO's responsibility and accountability for financial reporting integrity (Zorn 2004). In line with this perception, there was a steep increase in the CFO's involvement in accounting fraud by

[11] This dissertation categorizes the CEO antecedents of accounting wrongdoing according to the fraud triangle instead of the fraud diamond, to remain consistent with the categorization applied on CEO antecedents in Manuscript 1.

about 50% from 1999 to 2010 (Beasley et al. 1999; Beasley et al. 2010). Accordingly, the level of CFO involvement is almost as high as that of CEOs. More specifically, CFOs are named as suspects within AAERs in 65% of cases, as compared to 72% for CEOs (either CEO or CFO: 89%) (Beasley et al. 2010). Interestingly, of the indicted CEOs/CFOs, the conviction rate of CFOs is higher than that of the CEOs (64% vs. 75%) (Beasley et al., 2010). In addition, CFOs are a main subject to turnover following restatements (Collins et al. 2009).

Although the research that focuses on antecedents of accounting wrongdoing shifts from the CEO to the CFO, current literature still centers around the separate investigation of these executives. Interestingly, different literature streams already consider the interplay between the CEO and functional executives (e.g., CFOs) (for a review see Georgakakis et al. 2022). The interplay between the CEO and CFO appears particularly promising related to accounting wrongdoing based on the joint responsibility and accountability for the firm's financial reporting. However, only relatively scarce and recent literature empirically examines CEOs and CFOs in combination (e.g., Baker et al. 2019; Bishop et al. 2017; Florackis and Sainani 2021; Gao et al. 2021). Therefore, the interaction between the CEO and CFO presents another potentially interesting research field. The above argumentation suggests considering the separated and combined associations between CEOs and CFOs with accounting wrongdoing.

The previous sections establish the foundation for the core of this dissertation, i.e., the subsequent four manuscripts. Consistent with the highlighted developments in the literature on financials, top executives, and accounting wrongdoing in section 3.2, section 4 commences the manuscript series of this dissertation by advancing the predominant research on the associations among financials, CEO characteristics, accounting fraud. Subsequently, chapters 5 and 6 follow recent literature developments that transition towards focusing on the widely neglected CFO as a potential actor related to accounting wrongdoing, before jointly focusing on the CEO and CFO relationship and its association with accounting wrongdoing in section 7.

4. CEO Antecedents of Accounting Fraud – A Machine Learning Analysis

4.1 Introduction to Manuscript 1

Manuscript 1 empirically combines the predominant literature stream focusing on financial antecedents of accounting fraud with the research on CEO antecedents for accounting fraud. Much of the literature relies on financials to establish predictive models for accounting fraud detection

(e.g., Bao et al. 2020). Unfortunately, only scant studies consider non-financial information for machine learning (Bertomeu et al. 2021; Fanning and Cogger 1998; Kim et al. 2016; Wang et al. 2018; Wang et al. 2020). More specifically, predictive studies widely neglect CEO-related antecedents, which are also proposed to predict accounting fraud (e.g., Troy et al. 2011). Merging these literature streams, Manuscript 1 challenges the sole importance of financial information for predictive models and includes CEO antecedents for accounting fraud detection. In particular, Schneider and Brühl (2023, pp. 1598-1600) aim to answer the following questions regarding CEO accounting fraud:

1a) *"Do machine learning models for accounting fraud detection based on CEO characteristics achieve a predictive performance superior to random guessing?"*

1b) *"Do machine learning models for accounting fraud detection based on a combination of raw financial and CEO information (CEO+FIN) outperform isolated approaches (CEO, FIN)?"*

2a) *"How influential are individual CEO characteristics for accounting fraud detection within the best CEO+FIN model?"*

2b) *"How do the individual CEO characteristics contribute toward accounting fraud detection within the best CEO+FIN model?"*

2c) *"How do the essential CEO characteristics interact with each other and raw financials within the best CEO+FIN model?"*

To answer these questions, Manuscript 1 investigates a sample of 30,178 U.S.-based publicly listed firm-years, including 198 SEC AAER-identified accounting fraud cases from 2000 to 2018. Schneider and Brühl (2023) assess the predictive value of literature-derived CEO characteristics and financials on accounting fraud in separation as well as in combination. In particular, Manuscript 1 considers CEO characteristics derived from the well-known fraud triangle (Cressey 1953) and suggested to represent a CEO's perceived pressure/incentive, opportunity, and rationalization to commit accounting fraud (Cressey 1950; Cressey 1953; Dorminey et al. 2012; Trompeter et al. 2013). Following this notion, Schneider and Brühl (2023) include the following predictors as CEO characteristics: *CEO Network Size*, *CEO Age*, *CEO Tenure*, *CEO Gender*, CEO Master of Business Administration (*CEO MBA*), and *CEO Duality*. For financials, Schneider and

Brühl (2023) rely on 28 raw financial items highlighted by Bao et al. (2020). Among others, these include the following five most important variables *"Common shares outstanding"*, *"Current assets, total"*, *"Sale of common and preferred stock"*, *"Property, plant and equipment, total"*, and *"Account payable, trade"* (Bao et al. 2020, p. 229).[12]

Methodically, Manuscript 1 employs five distinct machine learning models, well-established in accounting research. Specifically, we apply logistic regression (LR), support vector machines (SVM), random forest (RF), extreme gradient boosting (XGB), and neural networks (NN) (Schneider and Brühl 2023). In addition, Schneider and Brühl (2023) introduce novel model-agnostic techniques like permutation-based feature importance (Breiman 2001) and SHapley Additive exPlanation (SHAP) dependence plots (Lundberg and Lee 2017) to the accounting fraud literature, disentangling the black box around the considered predictive models.

[12] For a detailed list of included financial variables please see Schneider and Brühl (2023).

4.2 Manuscript 1

Manuscript 1	
Title:	Disentangling the black box around CEO and financial information-based accounting fraud detection: Machine learning-based evidence from publicly listed U.S. firms
Authors:	Moritz Schneider, Rolf Brühl
Status:	Published
DOI:	https://doi.org/10.1007/s11573-023-01136-w
Journal:	Journal of Business Economics
Ranking:	B (VHB Jourqual 3)

The Manuscript is available from the author upon request.

4.3 Results of Manuscript 1

Constructing the models on the CEO variables mentioned in section 4.1, Schneider and Brühl (2023) find that all machine learning models outperform the benchmark model with an area under the curve (AUC) of 0.5 by large margins. Interestingly, the nonlinear RF and XGB models demonstrate the best performance, indicating that the associations between CEO characteristics and accounting fraud are complex (Schneider and Brühl 2023).

Next, Manuscript 1 complements the firms' raw financials utilized by Bao et al. (2020) with the aforementioned CEO characteristics and performs equivalent analyses. Schneider and Brühl (2023) show that all of the combined CEO and financial models outperform their isolated CEO or financial equivalents, suggesting that the combination of CEO and financial information enhances prediction results to the isolated accounting fraud prediction models.

Third, Manuscript 1 investigates the importance of the predictors of the best-performing RF model for the combined CEO and financial data. We discover that *CEO Network Size* and *CEO Age* contribute the second and third most toward the overall predictive power of the model (Schneider and Brühl 2023). *CEO Duality* completes these CEO characteristics within the overall top ten predictors (Schneider and Brühl 2023). These results suggest that despite the underrepresentation of CEO characteristics in the predictors of the model (6 of 34), half of them contribute strongly to the best model (Schneider and Brühl 2023).

Applying SHAP dependence plots (Lundberg and Lee 2017), Manuscript 1 investigates the specific associations between the considered CEO characteristics and accounting fraud. Schneider and Brühl (2023) find nonlinear associations for the nonbinary variables. In particular, we suggest a U-shaped, an L-shaped, and a weakly L-shaped relationship between *CEO Age*, *CEO Network Size*, *CEO Tenure*, and accounting fraud (Schneider and Brühl 2023).

Lastly, Manuscript 1 examines the interactions between important predictors and their contribution to the best accounting fraud detection model. Interestingly, we demonstrate an increased likelihood of accounting fraud for firms with aged CEOs who do not serve as chairperson of the board and extensively connected CEOs of high-inventory firms (Schneider and Brühl 2023).

Overall, Manuscript 1 advances academic research by suggesting the isolated predictive value of CEO characteristics for accounting fraud and their joint value with raw financial data. Moreover,

Schneider and Brühl (2023) introduce model-agnostic methods to the accounting fraud literature, acknowledging that scant studies consider complex associations (Velte 2021), and answering the call of scholars to incorporate models that address the caveat of black box models in business research (Doornenbal et al. 2021). Our findings also provide practical implications. More specifically, we encourage regulators and auditors to incorporate machine learning-based models to assess a firm's accounting fraud risk and complement the commonly used financials with CEO-related information (Schneider and Brühl 2023).

5. CFO Antecedents of Accounting Wrongdoing – A Systematic Literature Review

5.1 Introduction to Manuscript 2

Whereas Manuscript 1 advances the predominantly researched literature on financial and CEO antecedents related to accounting fraud, Manuscript 2 follows the recent growth in accounting wrongdoing research that focuses on the CFO as a potential person of interest. To assess the status quo of this substream, Manuscript 2 summarizes the literature on CFO antecedents of accounting wrongdoing.[13] Thus, it combines the current dichotomous CFO literature on EM and FRM because both concepts are intended to mislead financial market participants. Specifically, Schneider and Brühl (2024a) mainly aim to answer the following questions related to CFO accounting wrongdoing:

1) *Which fraud dimensions regarding CFO antecedents of accounting wrongdoing are well-researched?*

2) *Which factors moderate these associations?*

3) *Which similarities or differences exist between CEO and CFO antecedents of accounting wrongdoing?*

4) *What are future research propositions for CFO antecedents of accounting wrongdoing?*

To answer these questions, Manuscript 2 systematically synthesizes 64 articles from various databases and reference-based forward searches of the fragmented literature on CFO antecedents of accounting wrongdoing. Following prior studies, Schneider and Brühl (2024a) consider keywords related to the CFO and accounting wrongdoing to select relevant studies (e.g., Velte

[13] We thank our student assistant Lukas Ansorge for his support with regards to Manuscript 2.

2021; Uhde et al. 2017). Schneider and Brühl (2024a) structure and present the literature relying on the fraud diamond framework (Wolfe and Hermanson 2004), an extension to the well-known fraud triangle (Cressey 1950; Cressey 1953). More specifically, Manuscript 2 categorizes the literature into a CFO's pressure, opportunity, rationalization, and capability to commit accounting wrongdoing. Extending the fraud triangle, this acknowledges the importance of a fraud perpetrator possessing the ability to conduct accounting wrongdoing when pressured and incentivized, provided with an opportunity, and rationalization (Wolfe and Hermanson 2004). Among others, Schneider and Brühl (2024a) diverge from previous studies in answering a recent call by Campa et al. (2023) and focus on context-specific factors that influence the main associations between a CFO's antecedents and accounting wrongdoing. Moreover, based on the studies of our sample, we discuss similarities and differences in CFO and CEO antecedents of accounting wrongdoing (Schneider and Brühl 2024a). Therefore, Schneider and Brühl (2024a) advance the ongoing debate on which of these executives has the most impact on accounting wrongdoing (e.g., Kutter and Weiß 2023). Lastly, we assess causality claims of the included literature and propose future research avenues.

5.2 Manuscript 2

Manuscript 2	
Title:	CFO antecedents of accounting wrongdoing: A literature review
Authors:	Moritz Schneider, Rolf Brühl
Status:	Conditional Accept
Doi:	-
Journal:	Management Review Quarterly
Ranking:	C (VHB Jourqual 3)

The Manuscript is available from the author upon request.

5.3 Results of Manuscript 2

Overall, Manuscript 2 discovers that within our sample, most studies investigate CFO antecedents related to rationalization (e.g., Campa et al. 2023; Ge et al. 2011; Gupta et al. 2020), followed by pressure and incentives (e.g., Chava and Purnanandam 2010; Feng et al. 2011; Friedman 2014). According to Schneider and Brühl (2024a), studies regarding a CFO's opportunity (e.g., Baker et al. 2019; Buchheit et al. 2019; Collins et al. 2018) or capability are secondary in frequency (e.g., Campa et al. 2023; Ham et al. 2017; Rose et al. 2021). The articles predominantly investigate their main variable of interest as a single dimension of the fraud diamond and propose linear associations between the considered CFO antecedents and accounting wrongdoing (Schneider and Brühl 2024a). Only scant studies consider CFO antecedents of multiple dimensions and acknowledge potential moderators on these links (Schneider and Brühl 2024a). This is particularly interesting, as Schneider and Brühl (2024a) find contrasting results for some antecedents. This, in turn, is in line with Campa et al. (2023), who demonstrate that neglecting contextual factors can result in misleading conclusions regarding the associations between CFO antecedents and accounting wrongdoing. For instance, female CFOs are generally associated with lower REM than their male counterparts (Campa et al. 2023). However, they show similar levels of REM when they simultaneously hold an MBA (Campa et al. 2023). Consequently, we call for future scholars to investigate the potential influence of contextual factors on the relationship between CFO antecedents and accounting wrongdoing (Schneider and Brühl 2024a). On a similar note, Schneider and Brühl (2024a) propose that moderators from other fraud diamond dimensions than the one which the main variable of interest belongs to might be of particular interest.

Current scholars still debate whether CEOs or CFOs mainly influence accounting wrongdoing (Kutter and Weiß 2023). Considering the scant literature of our sample that investigates both CEO and CFO antecedents in equal settings, Schneider and Brühl (2024a) discover that CFOs predominantly hold stronger incentives for earnings manipulation (Chava and Purnanandam 2010; Kohlbeck and Luo 2019; Jiang et al. 2010) or FRM (Hogan and Jonas 2016) and similar opportunities (e.g., Baker et al. 2019) than CEOs. Moreover, CFOs demonstrate similar or stronger rationalization (Dauth et al. 2017; Davidson et al. 2015; Dejong and Ling 2013; Lapointe-Antunes et al. 2022; Li et al. 2021; Peni and Vähämaa 2010), and a slightly greater capacity (Ham et al. 2017) to commit accounting wrongdoing as CEOs (Schneider and Brühl 2024a). Interestingly, Manuscript 2 also notes that contextual factors influence the associations of CEO and CFO

antecedents differently (e.g., Condie et al. 2021). Moreover, Schneider and Brühl (2024a) suggest that associations of CEO as well as CFO antecedents often relate to diverging accounting wrongdoing types, such as AEM or REM (e.g., Baker et al. 2019; Dejong and Ling 2013; Lapointe-Antunes et al. 2022).

6. CFO National Culture and Accounting Fraud – A Regression Analysis

6.1 Introduction to Manuscript 3

Manuscript 2 presents the recently growing research field regarding a CFO's antecedents of accounting wrongdoing. The work proposes future research potential regarding the associations between a CFO's cultural background and accounting wrongdoing, which is in line with Dauth et al. (2017). Therefore, Manuscript 3 addresses this research gap and connects imprinting theory (Lorenz 1935; Lorenz 1937) with Hofstede's (2001) seminal framework on cultural dimensions. First, imprinting theory contends that individuals pass multiple periods in which they are highly sensitive to environmental influences and which significantly shape enduring values (Immelmann 1975). For instance, Kohlberg and Kramer (1969) as well as Noe and Rebello (1994) emphasize that ethical stances mainly develop in early childhood. Second, Hofstede (2001) categorizes culture into four dimensions: Individualism (IDV), uncertainty avoidance (UAI), masculinity (MAS), and power distance (PDI). Notably, the first two dimensions are particularly relevant for accounting decisions (Gray 1988; Hope 2003). This includes unethical decisions (Smith and Hume 2005; Fu and Zhang 2019), such as EM (Han et al. 2010; Kanagaretnam et al. 2011).

Following these notions, Schneider and Brühl (2024b) posit that a CFO's individualism (uncertainty avoidance) background is associated with their firm's accounting wrongdoing likelihood. More specifically, CFO's individualism (uncertainty avoidance) background is characterized by their national upbringing and imprinting of cultural and moral values throughout their formative years, during early childhood (Schneider and Brühl 2024b). Moreover, considering the findings on the importance of the CEO-CFO relationship in Manuscript 2, the CEO's cultural background probably interacts with these connections (Schneider and Brühl 2024b). Scholars propose that a more diverse top management team shows enhanced group and firm performance (Hambrick et al. 1998; Nielsen and Nielsen 2013). Manuscript 3 additionally suggests that the CEO's individualism (uncertainty avoidance) background is positively (positively) associated with

the CFO's relationships with accounting wrongdoing. Overall, Schneider and Brühl (2024b, pp. 7-9) examine the following hypotheses related to CFO accounting wrongdoing:

1) *"A CFO's individualism level is associated with their firm's accounting fraud likelihood."*

2) *"A CFO's uncertainty avoidance level is associated with their firm's accounting fraud likelihood."*

3) *"The association between firms with individualistic CFOs and accounting fraud likelihood is enhanced by a high individualism level of the CEO."*

4) *"The association between firms with uncertainty-avoiding CFOs and accounting fraud likelihood is enhanced by a high uncertainty avoidance level of the CEO."*

To investigate these hypotheses, Manuscript 3 conducts panel regression analyses on 9,883 U.S. publicly listed firm years between 2000 and 2020. Based on this sample, Schneider and Brühl (2024b) assess the relationships between *CFO individualism (uncertainty avoidance)* and the CFO's interactions with the CEO's individualism (uncertainty avoidance) on *FSD scores* as accounting fraud "red flags".

6.2 Manuscript 3

Manuscript 3	
Title:	CFO cultural background and accounting fraud: Single-country evidence from publicly listed U.S. firms
Authors:	Moritz Schneider, Rolf Brühl
Status:	Working Paper
DOI:	-
Journal:	-
Ranking:	-

The Manuscript is available from the author upon request.

6.3 Results of Manuscript 3

Overall, Manuscript 3 partly supports our expectations. First, our results suggest a significantly negative association between a CFO's individualism and their firm's accounting wrongdoing likelihood (Schneider and Brühl 2024b). This relationship is robust to the inclusion of additional controls for a CEO's individualism level, the firm's internationalization, the CFO's foreignness or being British, the corruption perception index of a CFO's country of origin, and Hofstede's (2001) cultural dimensions of uncertainty avoidance, masculinity, and power distance (Schneider and Brühl 2024b). Interestingly, the CEO's individualism is only weakly associated with the firm's accounting wrongdoing likelihood, indicating that the CFO's cultural background is more important for a firm's wrongful accounting than the CEO's cultural background (Schneider and Brühl 2024b). Second, the CFO's uncertainty avoidance level is relatively weak and not robustly related to accounting wrongdoing (Schneider and Brühl 2024b). Third, Schneider and Brühl (2024b) provide evidence that a CEO's individualism positively moderates the association between a CFO's individualism and accounting fraud. Last, the results of Manuscript 3 do not support the CEO's uncertainty avoidance level as an expected positive moderator for the relationship between a CFO's uncertainty avoidance and accounting fraud.

To the best of our knowledge, Schneider and Brühl (2024b) are the first to conduct these analyses in a single-country design, allowing them to address caveats of potential confounders from omitted inter-country heterogeneity, faced by prior research (Han et al. 2010; Kanagaretnam et al. 2011). Moreover, Manuscript 3 answers the calls of previous studies for differentiated cultural research on the links of CFOs with EM (e.g., see Manuscript 2; Dauth et al. 2017) and lines up with the recently growing literature streams that focus on the CFO's impact on accounting wrongdoing (e.g., Gupta et al. 2020). In addition, Schneider and Brühl (2024b) contribute to studies on the novel FSD score (Amiram et al. 2015; Gupta et al. 2020).

7. CEO-CFO Power Gap and Accounting Fraud – A Regression Analysis

7.1 Introduction to Manuscript 4

Manuscripts 1, 2, and 3 provide evidence of the association between CEO and CFO characteristics and accounting wrongdoing. Building on these findings and the widely neglected research on the CEO-CFO relationship and its association with accounting wrongdoing (Schneider and Brühl 2024a), Manuscript 4 investigates the association between CEO and CFO power and accounting

fraud. It is widely accepted that executive power is an important requirement for accounting misbehavior (e.g., Dechow et al. 1996; Feng et al. 2011; Friedman 2014). However, scant studies consider power as a relative construct between the CEO and CFO (Baker et al. 2019; Florackis and Sainani 2021). Unfortunately, these studies predominantly focus on the ability of the CFO to *"resist"* the CEO's power (Florackis and Sainani 2021, p. 1). To our knowledge, only Baker et al. (2019) contemplate that CFOs combine multiple characteristics enabling them to drive accounting misbehavior. Drawing on power circulation theory, which questions the indefinite perpetuum of a CEO's power through the contestation of other functional executives (Ocasio 1994), Manuscript 4 challenges the predominant research focus on the CEO. Accordingly, Schmid et al. (2024) posit the CFO's extraordinary potential to contest the CEO's decisions regarding financial reporting decisions as the CFO's area of expertise. In addition, Manuscript 4 investigates the association between CEO and CFO power on accounting fraud separately as well as utilizing the relative CEO-CFO power gap. Specifically, Schmid et al. (2024, pp. 5-9) examine the following hypotheses related to CEO and CFO accounting wrongdoing:

1a) *"The likelihood of accounting fraud is positively associated with a CEO's power."*

1b) *"The likelihood of accounting fraud is positively associated with a CFO's power."*

2a) *"The likelihood of accounting fraud is associated with the power gap between the CEO and the CFO."*

2b) *"The likelihood of accounting fraud is higher in the case of a low CEO-CFO power gap – with an extremely powerful CFO – compared to a typical CEO-CFO power gap."*

2c) *"The likelihood of accounting fraud is higher in the case of a high CEO-CFO power gap – with an extremely powerful CEO – compared to a typical CEO-CFO power gap."*

Manuscript 4 answers these questions by investigating a sample of U.S. publicly listed firms, including 9,883 years spanning from 2000 to 2020.[14] Relying on panel regressions, Schmid et al. (2024) examine *CEO Power* and *CFO Power* in separation as well as the relative *CEO-CFO Power Gap* and their association with accounting fraud. Following recent studies (e.g., Amiram et al. 2015; Gupta et al. 2020), Manuscript 4 relies on the novel FSD score (Amiram et al. 2015) and

[14] We thank the Nanyang Technological University of Singapore, 50 Nanyang Avenue, Block S3, Singapore 639798 for providing us data access to AuditAnalytics during a research stay.

considers the measure as a “red flag” of accounting fraud. To the best of our knowledge, Schmid et al. (2024) are the first to introduce the multidimensional power framework by Finkelstein (1992) to the CFO accounting fraud literature and operationalize executive power via ownership, expert, prestige, and structural power.

7.2 Manuscript 4

Manuscript 4	
Title:	The CEO-CFO power gap and accounting fraud
Authors:	Stefan Schmid, Tobias Romey, Moritz Schneider
Status:	Beyond Desk Reject
DOI:	-
Journal:	Review of Managerial Science
Ranking:	B (VHB Jourqual 3)

The Manuscript is available from the author upon request.

7.3 Results of Manuscript 4

Overall, Manuscript 4 provides empirical evidence suggesting that a CFO's power is positively associated with the firm's accounting fraud likelihood, whereas we cannot find a significant relationship with the CEO's power. Regarding the relative CEO-CFO power gap, our results demonstrate a negative association between the *CEO-CFO Power Gap* and the likelihood of accounting fraud (Schmid et al. 2024). This indicates that an increased CEO power relative to the CFO power is connected with the firm's reduced accounting fraud likelihood (Schmid et al. 2024). More importantly, Schmid et al. (2024) additionally model the relative CEO-CFO power constellations in a matrix of four scenarios, representing the combinations of high and low CEO and CFO power. Manuscript 4 discovers that low CEO-CFO power gaps, representing extremely powerful CFOs, are positively associated with the firm's accounting fraud likelihood as compared to years with a typical CEO-CFO power gap. However, Schmid et al. (2024) cannot find similar results for high CEO-CFO power gaps, representing extremely powerful CEO years. Related to executive power, these results indicate extremely powerful CFOs instead of CEOs drive accounting fraud (Schmid et al. 2024). Overall, our results suggest that powerful CFOs are associated with their firm's accounting fraud likelihood and that CEOs might mitigate this association as their power increases (Schmid et al. 2024).

8. General Discussion

As described in Fig. 1, this dissertation, including its four manuscripts, integrates into the current research on top executives' antecedents of accounting wrongdoing. In particular, the dissertation advances this literature stream in two ways. First, each manuscript individually provides findings and practical implications. Second, the dissertation synthesizes and connects the individual findings of the manuscripts to enhance current research on CEO and CFO accounting wrongdoing (see Table 1 for an overview of the manuscripts). This section discusses the findings of the dissertation in the context of the preceding literature.

First, Manuscript 1 advances the scarce literature that investigates accounting fraud prediction models (e.g., Bao et al. 2020; Bertomeu et al. 2021; Cecchini et al. 2010; Craja et al. 2020; Perols 2011). Whereas the current studies predominantly rely upon financials (e.g., Bao et al. 2020; Beneish 1997; Beneish 1999; Cecchini et al. 2010; Dechow et al. 2011), only a few incorporate non-financial predictors (Bertomeu et al. 2021; Wang et al. 2020). Schneider and Brühl (2023)

combine these two literature streams. In particular, Manuscript 1 focuses on the largely neglected CEO characteristics by investigating CEO characteristics-based models as well as raw financial-based models both in isolation and combination. Applying LRs, SVMs, RFs, XGBs, and NNs, Schneider and Brühl (2023) confirm the detection power of raw financial items on accounting fraud (e.g., Bao et al. 2020; Cecchini et al. 2010) and extend prior literature by demonstrating the predictive power of CEO characteristics-based models for accounting fraud prediction. This is consistent with previous research that suggests associations of individual CEO characteristics with accounting wrongdoing (e.g., Ali and Zhang 2015; Troy et al. 2011) and the predictive power of non-financial machine learning models on financial misconduct (Wang et al. 2020). Moreover, Manuscript 1 provides novel empirical evidence of the additional predictive value of the combined CEO+FIN models. This is in line with a similar study by Bertomeu et al. (2021), who discover an improved predictive power of joint accounting, audit, and market variables. In addition, consistent with Craja et al. (2020), across all approaches (CEO, FIN, and FIN+CEO), non-linear models outperform the linear ones, indicating the presence of non-linear relationships between the antecedents and accounting fraud likelihood (Schneider and Brühl 2023).

Within the nascent machine learning-based research, the significant challenge of disentangling black-box models is not addressed sufficiently. Manuscript 1 answers the call by Doornenbal et al. (2021) and tackles this issue in the accounting fraud literature. More specifically, Schneider and Brühl (2023) conduct a permutation-based feature importance ranking (Breiman 2001) to uncover the individual importance of all predictors. In doing so, Manuscript 1 provides empirical evidence of the individual predictive importance of CEO characteristics for accounting fraud. They demonstrate that especially a CEO's network size, age, and duality contribute strongly to the overall predictive power of the model (Schneider and Brühl 2023). Additionally, Schneider and Brühl (2023) add to the understanding of the functional relationships between the predictors and accounting fraud. Introducing the novel SHAP dependence plots (Lundberg and Lee 2017) to this literature stream, they especially discover non-linear relationships for the non-binary variables (Schneider and Brühl 2023). In particular, Schneider and Brühl (2023) suggest U-shaped, L-shaped, and weakly L-shaped links between *CEO Age*, *CEO Network Size*, *CEO Tenure*, and accounting fraud.

Especially the U-shaped association between a CEO's age and accounting fraud aligns with prior studies that suggest a similar relationship (Davidson et al. 2007; Dechow and Sloan 1991;

Huang et al. 2012). For instance, the "horizon problem" (Smith and Watts 1982) describes that CEOs nearing retirement age might tend to increase EM, as future career concerns fade (Davidson et al. 2007; Dechow and Sloan 1991).

The L-shaped association between a CEO's network size and the firm's accounting fraud likelihood is consistent with the argumentation that CEO's with larger social networks might have stronger incentives to avoid reputational damages and labor market consequences from misbehavior (Bhandari et al. 2018). Accordingly, Bhandari et al. (2018) suggest that a larger network of CEOs/CFOs is connected to reduced EM. However, Schneider and Brühl (2023) indicate that this association is not linear but stabilizes around 1000-2000 connections, implying that the reputational awareness seizes once a critical threshold has been reached. Unfortunately, we cannot rule out alternative explanations. For instance, large networks between CEOs and other board members might reduce the firm's oversight mechanisms and result in a reduced detection likelihood (Khanna et al. 2015).

Concerning a CEO's tenure, Ali and Zhang (2015) contend that the uncertainty regarding a novel CEO's perceived abilities by the market might provide them with incentives to commit acocunting wrongdoing to establish a positive performance impression. The authors also provide empirical evidence of higher EM in the initial three years of a CEO's tenure as compared to subsequent years, consistent with this explanation (Ali and Zhang 2015). This could explain the link between an increased accounting fraud likelihood in the initial 3-4 years of a CEO's service and the strict decline afterwards (Schneider and Brühl 2023). In addition, Ali and Zhang (2015) suggest higher EM in the CEO's final year of service, aligning with the horizon problem (Davidson et al. 2007; Dechow and Sloan 1991; Smith and Watts 1982). Because the final year of a CEO's tenure varies for CEOs, this might explain the relatively stable progress after the steep decline.

Overall, Manuscript 1 answers the recent call by Velte (2021) who acknowledges the scant research investigating non-linear relationships in this research field. Lastly, Schneider and Brühl (2023) provide empirical evidence on the interaction of important CEO antecedents and raw financials on accounting fraud. In particular, we discover that older CEOs who do not serve as chairmen of the board and extensively connected CEOs of high inventory firms are associated with an increased likelihood of accounting fraud (Schneider and Brühl 2023). Unfortunately, to the best of knowledge, current literature provides no explanations for these observations.

Second, Manuscript 2 advances the recently growing research on the CFO by extending and updating previous literature reviews (Schnatterly et al., 2018; Plöckinger et al., 2016; Velte, 2021). In particular, Schneider and Brühl (2024a) combine the fragmented and dichotomous literature on the related FRM and EM concepts as accounting wrongdoing by summarizing and structuring the research related to the CFO antecedents. For that, we structure the studies using the fraud diamond and provide insights into the research focus and gaps in the literature concerning these dimensions (Schneider and Brühl 2024a). Moreover, Schneider and Brühl (2024a) highlight contextual influences on the CFO's antecedents and their relationship with accounting wrongdoing, consider a subsample to discuss the similarities and differences in the CEOs' and CFOs' antecedents for accounting wrongdoing, and propose future research potential. Thus, Manuscript 2 contributes to the ongoing debate of the CEO's vs. CFO's influence on accounting wrongdoing (e.g., Kutter and Weiß 2023).

In particular, we discover that CFOs are more strongly incentivized, possess similar opportunities, at least equivalently rationalize, and demonstrate a slightly broader capacity to commit accounting wrongdoing than CEOs (Schneider and Brühl 2024a). Interestingly, contextual factors interact differently with the executives' main association. For instance, Condie et al. (2021) suggest that CFOs and CEOs with an auditor background are related to reduced EM. However, this link decreases over the years only for CFOs (Condie et al. 2021). One explanation for the similar main and differing moderating relationship might be the CFO's main responsibility for the reporting process, whereas the CEO's role is relatively limited (Condie et al. 2021). Moreover, associations between antecedents of CEOs and CFOs vary in the types of accounting wrongdoing, such as REM and AEM (Schneider and Brühl 2024a). For instance, Ham et al. (2017) suggest that CFO narcissism is positively linked to AEM, REM, and the likelihood of restatements, whereas CEO narcissism is unrelated to AEM and the likelihood of restatements. Again, some contextual factors related to the distinct positions might explain this difference.

Overall, similar to prior literature reviews, Schneider and Brühl (2024a) find that moderators are still under-researched (e.g., Plöckinger et al. 2016; Velte 2021). This is of particular importance as Manuscript 2 demonstrates that contextual factors can result in misinterpretations of relationships between CFO antecedents and accounting wrongdoing (e.g., Campa et al. 2023).

Third, Manuscript 3 answers the call from Dauth et al. (2017) to further disentangle top managers' intercultural backgrounds in the financial reporting context. Schneider and Brühl (2024b) complement the preceding literature that demonstrates that firms in different cultures diverge concerning EM (Han et al. 2010; Kanagaretnam et al. 2011) and accounting conservatism (Kanagaretnam et al. 2014). We extend the findings of these cross-country studies and tackle their respective challenges, such as potential omitted variable bias and inter-country heterogeneity, by relying on a U.S.-based single-country design (Schneider and Brühl 2024b).

Schneider and Brühl (2024b) provide evidence of the negative association of IDV and accounting fraud, in line with part of the prior literature (e.g., Viana Jr et al. 2022; Whelan and Humphries 2022; Zhang et al. 2013) but challenging the studies that report a positive relationship (e.g., Han et al. 2010; Kanagaretnam et al. 2011; Kanagaretnam et al. 2014). Therefore, Manuscript 3 implies that CFOs with a strongly individualistic cultural background are linked to reduced accounting fraud. This is in line with the argumentation and findings of Zhang et al. (2013), demonstrating that high individualism is linked to lower EM. Accordingly, this association might be rooted in the individuals' desire to follow concepts of legal rules, morality, and individual rights in individualistic societies (Colby and Kohlberg 1987 cited in Zhang et al. 2013) and to consider morality via assessing *"harm, rights, and justice"* (Shweder 1990, p. 2064). In contrast, collectivistic environments emphasize relationships between individuals (Husted and Allen 2008), and focus their moral understanding on *"duty, hierarchy, and interdependency"* (Shweder 1990, p. 2064). In other words, CFOs with an individualistic background might base their decisions stronger on laws and a sense of justice or harm as compared to collectivistic CFOs who emphasize loyalty and duty in relationships which might contrast the former values.

In contrast, Schneider and Brühl (2024b) cannot find a significant relationship between UAI and accounting fraud. This is consistent with the inconclusive evidence on the association between UAI and accounting wrongdoing (e.g., Callen et al. 2011; Han et al. 2010; Kanagaretnam et al. 2011; Paredes and Wheatley 2017; Whelan and Humphries 2022; Viana Jr et al. 2022). Although there are theoretical arguments and empirical evidence for both directions of a significant link between a CFO's UAI and accounting wrongdoing, none of these associations seems to be dominant in our sample.

Additionally, Manuscript 3 investigates the CEO's IDV or UAI level as a moderator of the main association from the CFO's cultural background. Again, we only find empirical evidence in favor of the significant association of IDV (Schneider and Brühl 2024b). More specifically, beyond the significantly negative main associations for the CFO (and the CEO), Manuscript 3 discovers a similar moderating association for the CEO's IDV, further mitigating accounting fraud. Therefore, the moderation by the CEO's IDV might also follow the above explanation for the CFO and further mitigates this association when both executives share the same cultural background.

Fourth, Manuscript 4 complements the findings on the associations between CEO power, CFO power, and accounting fraud of previous studies (e.g., Dechow et al. 1996; Muttakin et al. 2019). Whereas this literature largely relies on single variables, such as duality or tenure, when referring to power, Schmid et al. (2024) employ a more comprehensive power operationalization following Finkelstein's (1992) power framework. Measuring accounting fraud via the novel FSD score (Amiram et al. 2015), Manuscript 4 also contributes to the related but nascent literature stream (e.g., Amiram et al. 2015; Gupta et al. 2020). However, while prior research predominantly highlights the CEO's power (Baker et al. 2019; Bishop et al. 2017; Florackis and Sainani 2021; Friedman 2014), Schmid et al. (2024) challenge this literature by failing to find a significant positive association between a CEO's power and accounting fraud.

One explanation for this result might be rooted in the heterogeneity in the studies' samples. For instance, Manuscript 4 investigates publicly listed U.S. firms between 2000 and 2020, whereas Baker et al. (2019) consider an earlier U.S. sample from 1992 to 2010. Because regulatory changes, such as the SOX from 2002, occurred during the sample period, the novel legislation could influence the results (Schmid et al. 2024). Accordingly, Baker et al. (2019) highlight that the associations of powerful CEOs and CFOs, differ between pre-SOX and post-SOX periods. Powerful CEOs are associated with lower AEM in the post-SOX period (Baker et al. 2019). This might indicate that CEOs' accounting wrongdoing behavior changed following the SOX, reducing the importance of CEO power on accounting wrongdoing in our, predominantly post-SOX sample as compared to the samples of earlier studies that rely mainly on pre-SOX years.

Interestingly, Manuscript 4 suggests that a CFO's power is positively related to accounting fraud, questioning the view that the CFO safeguards the firm's financial integrity (Florackis and Sainani 2021; Indjejikian and Matejka 2009). This is consistent with the literature's increasing

focus on the CFO's importance for accounting wrongdoing (e.g., for a review see Schneider and Brühl 2024a).

Additionally, Schmid et al. (2024) answer recent calls to investigate the CEO-CFO power relationship and its link to financial reporting (Baker et al. 2019; Florackis and Sainani 2021; Ozgen et al. 2024). Moreover, Manuscript 4 extends recent studies that highlight the importance of a relative power concept between the CEO and the CFO (e.g., Baker et al. 2019; Florackis and Sainani 2021; Friedman 2014). Whereas this literature only views the CEO-CFO relationship as binary (Baker et al., 2019) or linear (Florackis & Sainani, 2021), Manuscript 4 constructs a more comprehensive CEO-CFO power gap and finds that an increasing power gap is negatively associated with accounting fraud. Interestingly, this indicates that a powerful CEO mitigates the CFO's association with accounting fraud (Schmid et al. 2024). This contradicts the suggestion that a powerful CEO drives accounting fraud and proposes the opposite relationship (Schmid et al. 2024). Baker et al. (2019) demonstrate similar results in the EM context. More specifically, they demonstrate that powerful CEOs relative to CFOs are negatively associated with AEM in the post-SOX period (Baker et al. 2019). Considering that the sample by Schmid et al. (2024) predominantly consists of post-SOX observations, the above reasoning by Baker et al. (2019) could explain this finding.

Lastly, Manuscript 4 posits a non-linear relationship between the *CEO-CFO Power Gap* and accounting fraud and introduces a CEO-CFO power constellation matrix to the accounting fraud literature. Schmid et al. (2024) discover that extremely powerful CFOs – relative to CEOs – are significantly more likely to be associated with accounting fraud than CFOs in typical power gap constellations. Interestingly, we fail to find evidence of a similar association for extremely powerful CEOs (Schmid et al. 2024). Accordingly, the results are partly consistent with the expectation of associations between extreme power gaps and accounting fraud. Again, the latter result might be explained by the potential change of CEOs' accounting wrongdoing behavior in the post-SOX period, leading powerful CEOs to behave less opportunistically (Baker et al. 2019). Interestingly, supplementary analyses support the notion of monitoring CEOs that mitigate accounting fraud in the typical and high power gap subsamples (Schmid et al. 2024). In the low power gap subsample, representing extremely powerful CFOs, we fail to find a similar association, potentially due to the strong imbalance in power that does not allow CEOs to influence the CFOs (Schmid et al. 2024).

To summarize the results of the manuscripts, Table 2 presents an overview of the research questions or hypotheses and their related main findings.[15]

[15] Manuscript 2 does not explicitly mention research questions/hypotheses as part of the literature review. Therefore, the research questions stated in this dissertation are created based on the main findings of the manuscript.

Table 2: Overview of the Research Questions and Main Findings of the Manuscripts

Research Questions/Hypotheses	Main Findings
Manuscript 1	
1a) Do machine learning models for accounting fraud detection based on CEO characteristics achieve a predictive performance superior to random guessing?	Yes, all models exceed the AUC benchmark by a large margin
1b) Do machine learning models for accounting fraud detection based on a combination of raw financial and CEO information (CEO+FIN) outperform isolated approaches (CEO, FIN)?	Yes, the combined models outperform the isolated approaches across all models
2a) How influential are individual CEO characteristics for accounting fraud detection within the best CEO+FIN model?	Top 10: 2) CEO Network Size, 3) CEO Age, 9) CEO Duality
2b) How do the individual CEO characteristics contribute toward accounting fraud detection within the best CEO+FIN model?	CEO Age U-shape, CEO Network Size & Tenure L-shape
2c) How do the essential CEO characteristics interact with each other and raw financials within the best CEO+FIN model?	High CEO Age & no Duality, great CEO network & high inventory likely relate to AF
Manuscript 2	
1) Which fraud dimensions regarding CFO antecedents of accounting wrongdoing are well researched?	Most studies focus on one dimension – esp. rationalization
2) Which factors moderate these associations?	Individual, firm, environment
3) Which similarities or differences exist between CEO and CFO antecedents of accounting wrongdoing?	CFO: stronger incentives, equal opportunities, similar/stronger rationalization, broader capacity
4) What are future research propositions for CFO antecedents of accounting wrongdoing?	e.g., CFO culture and power, context, CEO-CFO relationship
Manuscript 3	
1) A CFO's individualism level is associated with their firm's accounting fraud likelihood.	Yes, negative association (β = -0.035, p < 0.01)
2) A CFO's uncertainty avoidance level is associated with their firm's accounting fraud likelihood.	No, not supported (β = 0.009, p > 0.10)
3) The association between firms with individualistic CFOs and accounting fraud likelihood is enhanced by a high individualism level of the CEO.	Yes, negative association (β = -0.030, p < 0.01)
4) The association between firms with uncertainty-avoiding CFOs and accounting fraud likelihood is enhanced by a high uncertainty avoidance level of the CEO.	No, not supported (β = - 0.000, p > 0.10)
Manuscript 4	
1a) The likelihood of accounting fraud is positively associated with a CEO's power.	No, not supported (β = -0.015, p > 0.10)
1b) The likelihood of accounting fraud is positively associated with a CFO's power.	Yes, positive association (β = 0.285, p < 0.01)
2a) The likelihood of accounting fraud is associated with the power gap between the CEO and the CFO.	Yes, negative association (β = -0.121, p < 0.01)
2b) The likelihood of accounting fraud is higher in the case of a low CEO-CFO power gap – with an extremely powerful CFO – compared to a typical CEO-CFO power gap.	Yes, positive association (β = 0.043, p < 0,01)
2c) The likelihood of accounting fraud is higher in the case of a high CEO-CFO power gap – with an extremely powerful CEO – compared to a typical CEO-CFO power gap.	No, negative association (β = -0.053, p < 0,01)

Combining the findings of the four manuscripts of this dissertation, the overall work highlights four main theoretical contributions: First, mainly relying on Manuscript 1, we demonstrate the importance of a CEO's characteristics as antecedents of accounting fraud.

Second, combining the findings of manuscripts 2, 3, and 4, this dissertation provides evidence of the overall importance of CFO antecedents for accounting wrongdoing, with particular evidence of a CFO's individualism and power. This is in line with the nascent literature that argues for extending the angle from focusing on the CEO, who is mainly associated with a firm's outcomes, to focus on alternative functional top executives, such as the CFO (e.g., Menz 2012; Uhde et al. 2017; Zorn 2004).

Third, all manuscripts support the view that widely neglected contextual factors are highly important for top executives' associations with accounting wrongdoing. For instance, Manuscript 1 demonstrates the enhanced predictive value of models that combine financial and CEO information and present interesting interactions. Manuscript 2, on the other hand, highlights results that indicate a CFO's characteristics highly influence each other, such as causing associations with accounting wrongdoing to vanish (e.g., Campa et al. 2023). Manuscripts 3 and 4 suggest the importance of the CEO-CFO relationship for accounting fraud, further providing arguments for the necessity of contextual angles.

Lastly, relying on the findings of Schneider and Brühl (2023), the dissertation provides empirical evidence of non-linear functional relationships between a CEO's characteristics and accounting wrongdoing. This is also in line with Velte's (2021) recent suspicions.

This dissertation further provides practical implications. First, regulators and auditors should consider a CEO's characteristics when implementing or enhancing existing predictive models to detect accounting wrongdoing. In particular, non-linear models, such as RF or XGB, should be considered. More specifically, Schneider and Brühl (2023) suggest these models outperform alternative approaches.

Second, boards, regulators, and auditors should consider the importance of CFOs for accounting wrongdoing (Schneider and Brühl 2024a; Schneider and Brühl 2024b; Schmid et al. 2024). This aligns with and supports previous regulatory adoptions, such as the SOX. For instance, Manuscript 3 suggests an association between a CFO's cultural background in terms of individualism and

accounting wrongdoing. Specifically, the study investigates the imprinting of cultural values via an individual's upbringing (Schneider and Brühl 2024b). However, it could also be interesting to examine the potential association of top executive training programs that enhance cultural values associated with reduced accounting wrongdoing, especially for CFOs.

Third, regulators should pay more attention to potential contextual influences (Schneider and Brühl 2023; Schneider and Brühl 2024a; Schneider and Brühl 2024b; Schmid et al. 2024). More specifically, supervisory boards should apply a multi-faceted approach when considering the inauguration of CEOs or CFOs. For instance, prior literature largely suggests that increased CEO age is linked to the reduced likelihood of accounting wrongdoing (Huang et al. 2012), or only considers the potential horizon problem as a factor that might increase this risk when aged (Davidson et al. 2007; Dechow and Sloan 1991). However, Schneider and Brühl (2023) suggest that a CEO's high age might additionally interact with other characteristics, such as duality. Manuscript 2 highlights a similar importance of contextual influences for CFOs. For instance, Campa et al. (2023) extend previous literature that suggests female top executives are negatively associated with accounting wrongdoing as compared to their male counterparts (e.g., Barua et al. 2010; Gupta et al. 2020). However, they discover that firms with female CFOs holding an MBA show the same REM behavior as male-led firms (Campa et al. 2023). Consequently, from an accounting wrongdoing standpoint, a short-sighted and incomplete consideration of a top executive's characteristics could result in misleading conclusions and suboptimal personnel decisions, for instance when appointing top executives.

Fourth, and related to the importance of contextual factors, Schmid et al. (2024) suggest the importance of the *CEO-CFO Power Gap* for accounting fraud. Therefore, regulators, boards, and auditors should consider the power distribution of a firm's top executives in more detail, as an increase in absolute power does not necessarily go along with a higher accounting fraud likelihood. Instead, the outcome might depend on the respective position (CEO or CFO) and relative power constellations between the CEO and the CFO (Schmid et al. 2024). For an overview of the outlined main results, their contributions to this dissertation, and the practical implications of this dissertation see Fig. 2.

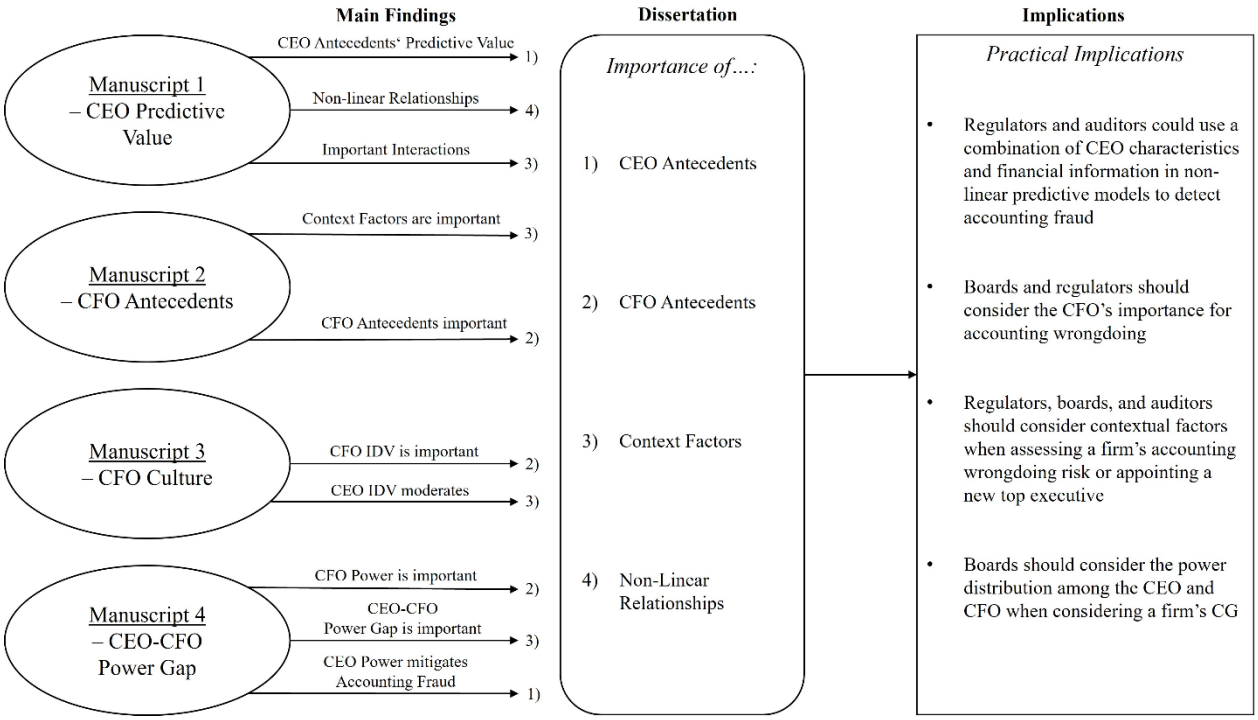

Fig. 2: *Overview of the Contributions and Implications of this Dissertation*

9. Limitations and Future Research

As with any study, this thesis is subject to limitations that allow for future research avenues. In particular, this dissertation identifies six areas of future research that emerge from the limitations of the manuscripts, general limitations as well as their combined contributions. Fig. 3 presents an overview of the placement of these future research propositions in the accounting wrongdoing literature derived from the combined manuscripts of this dissertation. Consequently, this figure constitutes a structured framework upon which the following section relies to present the limitations and future research areas of this dissertation.

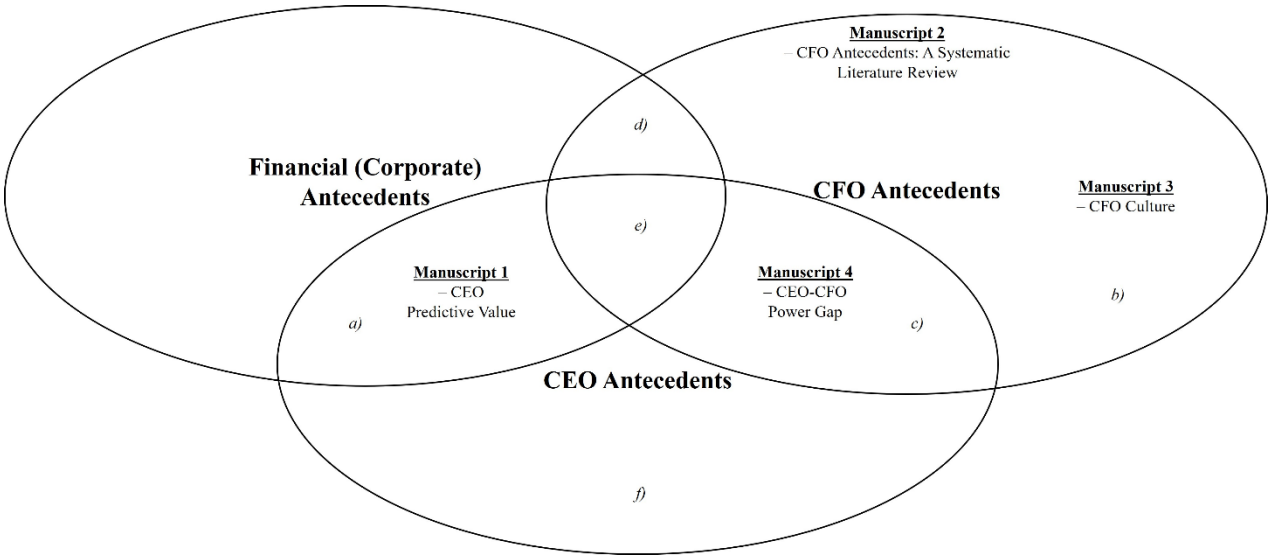

Fig. 3: *Placement of Manuscripts and Future Research in the Accounting Wrongdoing Literature*[16]

First, this dissertation identifies future research areas at the a) intersection of financial and CEO antecedents of accounting wrongdoing from Manuscript 1. More specifically, Schneider and Brühl (2023) demonstrate the additional predictive value of the combined financials and CEO characteristics for accounting fraud detection. Although we include a set of six literature and theory-derived CEO characteristics for which we can obtain substantial data (Schneider and Brühl 2023), this dissertation acknowledges that the set of CEO-based predictors can be enhanced. Consequently, this dissertation encourages future scholars to consider alternative or extending sets of CEO or financial predictors, such as equity incentives (Jiang et al. 2010) or military background (Koch-Bayram and Wernicke 2018) (for further examples see section 3.2).

Moreover, correlation-based machine learning models often represent black boxes in which causality is challenging to establish (Molnar 2022). Therefore, Manuscript 1 introduces various model-agnostic methods to address this caveat (Molnar 2022; Zhao and Hastie 2021) and disentangles the associations between CEO characteristics and accounting fraud. However, we cannot entirely rule out that most of the results reflect correlations instead of causal effects. The challenge to identify causality over correlation holds for social science research in general (Brühl 2017). Because there is an ongoing development in techniques, we encourage future scholars to

[16] Please note that this dissertation focuses on CEO and CFO antecedents of accounting wrongdoing. Therefore, future research avenues exclusively related to financial (corporate) antecedents are not further elaborated on in this dissertation.

employ alternative and novel methods and validate our results in similar contexts (Schneider and Brühl 2023).

Lastly, Manuscript 1 treats their sample data as cross-sectional, following the predominant literature in similar machine learning research related to accounting fraud (e.g., Craja et al. 2020). However, neglecting the time dimension of the data might result in an overestimation of the prediction results of the model (Schneider and Brühl 2023). This dissertation acknowledges that recent and scant literature instead conduct similar research considering the panel structure of the data (Bao et al. 2020; Bertomeu et al. 2021; Wang et al. 2018). While this literature mostly relies on vastly available financial and accounting data, Manuscript 1 includes extensive CEO information. This drastically decreases the data availability, escalates the generally scarce identification and unequal distribution of AAERs further, and does currently not allow for incorporating a similar panel data approach without sacrificing the robustness of our results. Therefore, this dissertation proposes that scholars incorporate continuous accounting wrongdoing measures, such as EM or FSD scores, into machine learning models to enhance sample sizes and allow for the consideration of the panel structure of the data.

Second, driven by the recent growth in interest in CFO-related antecedents of accounting wrongdoing, which Manuscripts 2 and 3 largely support, this dissertation posits the importance of future research on b) CFO antecedents. Although Manuscript 2 conducts a thorough literature selection drawing on a systematic literature database and reference-based forward search with a wide variety of established keywords and an expanded search across the entire articles as well as two reviewers, Schneider and Brühl (2024a) cannot rule out that articles might have been missed. Consequently, the conclusions are limited to the sample of the study, requiring additional research on CFO antecedents of accounting wrongdoing. Since Schneider and Brühl (2024a) indicate that not all CEO-related associations with accounting wrongdoing generalize to the CFO, future research should also extend previous CEO-related findings to the CFO or examine novel CFO antecedents of accounting wrongdoing.

Furthermore, Manuscript 2 highlights that many studies only rely on one measure of accounting wrongdoing. Since the literature proposes differences in wrongdoing type depending on the executive position (Manuscript 2), Schneider and Brühl (2024a) imply that future research should consider multiple measures to establish robustness.

Additionally, Manuscript 2 suggests that scant studies account for multiple dimensions of the fraud diamond simultaneously. Consequently, Schneider and Brühl (2024a) propose increased research efforts focusing on the capability dimension of a CFO's characteristics. More specifically, the stress resistance, effective liar, and persuasiveness subdimensions are largely understudied and, hence, offer future research potential (Schneider and Brühl 2024a).

The limitations and findings of Manuscript 3 complement these future research avenues concerning CFO antecedents of accounting wrongdoing. For instance, Schneider and Brühl (2024b) call for extensions on the research on top executives' cultural background and accounting wrongdoing. Although the results of Manuscript 3 are consistent with part of the literature, they might be largely driven by the predominant existence of American CFOs. Therefore, Schneider and Brühl (2024b) conduct supplementary analyses that include multiple controls, including CFO Foreignness. Nevertheless, we call for a cautious interpretation of the results (Schneider and Brühl 2024b). To address this caveat, scholars are encouraged to extend the sample size and increase the heterogeneity in the independent variable via an increased percentage of foreign CFOs (Schneider and Brühl 2024b). More specifically, a different geographical setting could tackle multiple caveats of our study (Schneider and Brühl 2024b). For instance, Fu and Zhang (2019) utilize a British sample of CFOs and find a slightly better heterogeneity in CFOs' cultural backgrounds. Investigating a different geographical context might circumvent the data availability issues in the U.S. and provide empirical evidence of the reliability and generalizability of the results in other contexts. Alternatively, the CEO's cultural background as a main independent variable could be focused on in greater detail to increase the sample size (Schneider and Brühl 2024b).

Moreover, as for similar studies (e.g., Fu and Zhang 2019), the operationalization of a top executive's country of origin approximated through their nationality might introduce measurement errors (Schneider and Brühl 2024b). Although Schneider and Brühl (2024b) follow Fu and Zhang (2019) and address this concern by manually hand-collecting birth data on CEOs and finding a strong accuracy with the nationality data from BoardEx, we cannot rule out a minor measurement error.

Another future research area stems from the complex construct of culture in this study. Therefore, scholars could examine alternative culture frameworks, such as Global Leadership and Organizational Behaviour Effectiveness (GLOBE) (House et al. 2004) or the World Value Survey

(WVS) (Inglehart et al. 2000), to measure an executive's cultural imprinting and complement our findings (Schneider and Brühl 2024b).

Moreover, it might be beneficial to conduct experiments or surveys that use individual cultural backgrounds and, hence, circumvent potential measurement errors to complement these findings. However, typically it is challenging to recruit CFOs (top executives) for such studies (e.g., Suh et al. 2020).

Third, this dissertation encourages future scholars to investigate the CEO-CFO context further. More specifically, the combined research findings from CEO and CFO antecedents (Manuscripts 1, 2, and 3) suggest the importance of the c) CEO-CFO relationship for accounting wrongdoing (Manuscript 4). For instance, the power characteristic indicates that relative and more complex contexts should be considered when aiming to understand the associations between top executives' characteristics and accounting wrongdoing (Schmid et al. 2024). However, Manuscript 4 faces the main challenge of accurately capturing the power construct. Although following Finkelstein's (1992) well-established power framework, Schmid et al. (2024) cannot rule out measurement errors related to the power construct. However, to the best of our knowledge, this study incorporates the most complex operationalization applied in the accounting fraud stream. Therefore, we believe that the executives' power and power gap should be captured very accurately (Schmid et al. 2024). Nevertheless, further scholars are encouraged to validate and complement these results.

In addition, the findings of the CEO-CFO power gap constellations on accounting fraud by Schmid et al. (2024) might apply to other firm contexts. For instance, this dissertation encourages future scholars to investigate similar constellations on alternative firm outcomes, such as different financial crime, investment decisions, firm performance, environment, social, and governance (ESG).

Additionally, Manuscript 2 highlights that only scant studies consider CFOs and other top executives in combination. However, as top executives are not expected to act in a vacuum and recent literature suggests the importance of the executives' contexts for accounting wrongdoing (e.g., Georgakakis et al. 2022; Schmid et al. 2024; Suh et al. 2020), this dissertation calls for future research on the intersection with other executives.

Fourth, this dissertation combines the findings of Manuscripts 1, 2, 3, and 4, highlighting the importance of the additional predictive value of CEOs' characteristics for accounting fraud detection models as well as the importance of the CFO in the accounting wrongdoing context. Consequently, this dissertation proposes future research on the intersection of d) financial and CFO antecedents. Manuscript 2 emphasizes that CEO associations with accounting wrongdoing do not necessarily generalize to the CFO. Therefore, this dissertation posits future research to extend Schneider and Brühl's (2023) findings from the CEO to the CFO position and assess whether the CFO's characteristics also demonstrate predictive value in isolation and combination with financials.

Fifth, this dissertation suggests future research potential at the e) intersection of financial, CEO, and CFO antecedents. More specifically, it could be interesting to investigate and compare the predictive value of both executives and financials in isolation and combination. In particular, the comparison between the isolated predictive powers of the CEO and CFO antecedents could contribute to the recent literature that continues to identify the main contributor of these executives to accounting fraud (e.g., Kutter and Weiß 2023). Additionally, the examination of a predictive CEO-CFO model and its combination with financials could be of particular interest, as Manuscript 4 demonstrated that the CEO-CFO context might be important for accounting fraud. Moreover, consistent with prior studies (e.g., Campa et al. 2023), Schneider and Brühl (2023) discover interactions between CEO characteristics, financials, and accounting fraud, and Schneider and Brühl (2024a) emphasize that moderators are likely to be important in the CEO and CFO and accounting wrongdoing context. Therefore, this dissertation calls for further research on these subjects.

Sixth, besides the considered CEO characteristics within Manuscript 1, this dissertation suggests that the exploration of the f) CEO antecedents on accounting wrongdoing is not exhausted yet. Manuscript 2 suggests the importance of contextual factors on CEO (and CFO) accounting wrongdoing. On a similar note, Schnatterly et al. (2018) propose multiple future research avenues on CEO wrongdoing. For instance, environmental factors such as political or organizational activities (e.g., mergers and acquisitions) could be associated with CEO wrongdoing (Schnatterly et al. 2018), including accounting wrongdoing.

In addition, the manuscripts of this dissertation face general limitations, which necessitate future research. For instance, this dissertation acknowledges that the upper echelon research typically is subject to endogeneity challenges (e.g., Hambrick 2007; Plöckinger et al. 2016). Although we try to mitigate these challenges in our manuscripts, for instance via the use of supplementary analyses using additional controls to alleviate omitted variable bias, we cannot entirely rule out that some endogeneity issues still exist (Schmid et al. 2024; Schneider and Brühl 2024b).

Moreover, it is imperative to acknowledge challenges of fraud measurement (e.g., Dyck et al. 2024; Karpoff et al. 2017). More specifically, the literature largely draws on AAERs, restatements, or computative proxies like EM or FSD scores to capture accounting wrongdoing (e.g., for a review see Schneider and Brühl 2024a). However, there is a necessity to differentiate between actual fraud cases and the *"detection likelihood"* of fraud cases, as a large portion of fraud cases remain hidden (Dyck et al. 2024, p. 736). Unfortunately, as Dyck et al. (2024) demonstrate, this differentiation is incredibly important, however, challenging to make, and, therefore, remains a major caveat. This dissertation addresses this challenge by shifting its research focus to the broader concept of accounting wrongdoing rather than accounting fraud. Thus, the dissertation relies on heterogeneous wrongdoing proxies, including EM and FSD scores, to potentially cover otherwise hidden fraud cases. However, this dissertation acknowledges that these procedures need further improvement and necessitate the cautious interpretation of the results. For instance, whereas the recent literature concludes that the advantages of the novel FSD score outweigh its downsides as an accounting fraud measure (Amiram et al. 2015; Gupta et al. 2020), it potentially includes unintended errors in addition to fraud. Therefore, this dissertation encourages future scholars to advance research on fraud measurement.

On another note, this dissertation aims to combine diverse methods to advance accounting wrongdoing research, which is consistent with the notion of pluralism in methods (Brühl 2017). More specifically, social sciences distinguish between *"analytical-deductive"* (translated from Wild 1975, pp. 2661f cited in Brühl 2017, p. 85) and *"empirical methods"* (translated from Brühl 2017, p. 85), aiming to *"understand"* and *"explain"* observed behaviors (translated from Brühl 2017, p. 87). The dissertation is predominantly based on empirical methods using quantitative research, empirically testing theories and findings of previous research. This only renders it possible to "explain" relationships and to theorize about the potential reasons for their occurrence without "understanding" them (see Manuscripts 1, 3, and 4). In contrast, Manuscript 2 represents

a *"verbal-analytical method"* (translated from Brühl 2017, p. 85). Moreover, the systematic literature review explicitly includes quantitative and qualitative articles to broaden the methodical scope of this dissertation further (see Manuscript 2). Consequently, this dissertation directly or indirectly includes parts related to the "verbal-analytical methods" and "empirical methods", including both quantitative and qualitative methods. Nevertheless, this dissertation calls for extended pluralism in methods in this research field and to focus on the understanding of the observed associations with accounting wrongdoing, for instance, using interviews. However, this dissertation acknowledges the inherent challenge of this pursuit because top executives might neither have the time nor wish to participate in such research projects, especially on a sensitive topic like accounting wrongdoing (e.g., Suh et al. 2020).

Finally, this dissertation stresses that the generalizability of our results might be restricted. Accordingly, our empirical analyses, and most studies in our literature review only cover the U.S. environment (see Manuscripts 1, 2, 3, and 4). Unfortunately, this is common in this literature stream (e.g., for reviews see Plöckinger et al. 2016, Schnatterly et al. 2018; Velte 2021). Interestingly, there is growing research on the Chinese context, whereas the European Union or many other non-American contexts remain largely under-studied (e.g., see Manuscript 2). While it is challenging to circumvent this U.S. focus due to data availability issues in alternative geographical settings, this dissertation encourages future scholars to validate its findings in the context of another corporate governance system, such as in European countries like Germany with a two-tier system contrary to the U.S. system (Schmid et al. 2024).

10. Conclusion

This dissertation aims to advance previous research findings on top executives' associations with accounting wrongdoing. Following the foci of previous research, this thesis transitions from financial- and CEO-related antecedents to CFO characteristics and the dramatically under-studied literature stream of CEO-CFO relationships and their links with accounting wrongdoing. The four manuscripts draw on multiple methodical approaches, such as machine learning, structured literature review, and panel regression analyses, to answer the respective research questions. Thus, they substantially advance the multi-faceted research individually and collaboratively.

Overall, this dissertation highlights the importance of CEO and CFO characteristics as antecedents of accounting wrongdoing, as well as the relevance of contextual factors, including the

CEO-CFO relationship, and considering non-linear relationships related to these antecedents. Although this dissertation significantly advances the current literature, this dissertation also highlights the necessity of future research in this area.

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