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List of Abbreviations

FüPoG	Law for the Equal Participation of Women and Men in Leadership Positions
BGD	Board gender diversity
EM	Earnings management
AEM	Accrual-Based Earnings Management
REM	Real Earnings Management
R&D	Research and development
RDT	Resource Dependence Theory
CMT	Critical Mass Theory
SIZE	Firm Size
OCF	Operating Cash Flow
LEV	Financial Leverage
CDA	Current Discretionary accruals
VIF	Variance Inflation Factors

1. Introduction

In 2015, Germany introduced a major institutional change in corporate governance by passing the Law for the Equal Participation of Women and Men in Leadership Positions (FüPoG, 2015), mandating a 30 percent female quota for the supervisory boards of its largest listed companies. While policymakers hailed this legislation as a long-overdue step toward gender equality, investors and financial regulators were left asking a more pragmatic question: does mandated board gender diversity improve corporate governance outcomes?

At the heart of this question lies the fundamental need to protect shareholders from managerial opportunism, a conflict classically defined by agency theory (Edeh et al., 2025, p. 5). The separation of ownership and control creates inherent incentives for managers to pursue personal interests rather than maximizing shareholder value (Jensen & Meckling, 1976, p. 312). One of the most damaging manifestations of this behavior is earnings management, defined as the intentional manipulation of financial reporting to mislead stakeholders or influence contractual outcomes (Healy & Wahlen, 1999, p. 368). Because earnings management can severely undermine investor confidence, distort capital allocation, and artificially inflate managerial compensation, understanding the mechanisms that constrain such practices remains a central concern in accounting and corporate finance research (Amara et al., 2025, pp. 2, 3; Gull et al., 2018, p. 255; Healy & Wahlen, 1999, p. 375).

To mitigate these agency conflicts, effective corporate governance relies heavily on the board of directors' ability to monitor management and ensure the credibility of financial reporting. In the German two-tier system, this monitoring responsibility is formally assigned to the supervisory board, whose statutory duties include overseeing the management board, reviewing financial statements, and scrutinizing accounting choices (Jungmann, 2006, p. 342). Crucially, this oversight function directly targets areas where managerial discretion is highest (most notably accrual-based accounting) thereby positioning the supervisory board as a key institutional safeguard against accrual manipulation (Usman et al., 2022, p. 8). A well-functioning board must possess the independence, diligence, and cognitive diversity necessary to detect and deter opportunistic accounting practices (Srinidhi et al., 2011, pp. 1612–1613). Consequently, scholars argue that greater gender diversity enhances board effectiveness by introducing different perspectives, improving monitoring quality, and reducing the likelihood of groupthink (Adams & Ferreira, 2009, p. 292). Female directors are often associated with higher levels of diligence, stronger ethical standards, and greater

sensitivity to reputational risks; characteristics that theoretically strengthen the oversight of complex financial reporting processes (Gull et al., 2018, p. 257).

While theoretical frameworks strongly suggest that diverse boards improve oversight, the empirical evidence remains deeply conflicted. Several studies document that firms with higher female board representation exhibit lower levels of earnings manipulation and higher quality financial reporting (Arun et al., 2015, pp. 138, 146; Srinidhi et al., 2011, p. 1638). Conversely, alternative research warns that the mere presence of women on boards may not be sufficient to influence corporate decisions if female directors remain a small minority or lack access to key governance positions such as audit committees (Pucheta-Martínez et al., 2016, p. 378).

This limitation is best articulated through critical mass theory, which proposes that minority group members may only exert meaningful influence once their representation surpasses a certain threshold, often defined as three or more female directors (Torchia et al., 2011, p. 302). Without reaching this critical mass, female directors risk becoming symbolic representatives rather than influential participants in board decision-making (Torchia et al., 2011, pp. 301, 312).

Because of the 2015 FüPoG legislation mentioned previously, Germany provides a unique and highly relevant laboratory to test these conflicting theories. Unlike many Anglo-American systems, Germany operates under a strict two-tier board structure, structurally separating the management board (Vorstand) from the supervisory board (Aufsichtsrat) (Jungmann, 2006, pp. 432, 433; Usman et al., 2022, p. 21). This institutional separation intensifies the importance of supervisory board monitoring, as it creates a clear division between those who prepare financial statements and those responsible for scrutinizing them, particularly in areas susceptible to discretionary accrual manipulation (Usman et al., 2022, p. 21). While the 2015 quota successfully dismantled the historical underrepresentation of women on supervisory boards, critics caution that quota-driven appointments may lead to symbolic or compliance-oriented representation, potentially limiting the true influence of female directors on key governance decisions (Rixom et al., 2023, p. 681).

Against this institutional background, it remains an open empirical question whether legally mandated female board representation in Germany actually translates into measurable improvements in financial reporting quality (Usman et al., 2022, p. 13). The primary objective of this thesis is to examine whether board gender diversity on the supervisory board influences the magnitude of accrual-based earnings management in German listed firms.

Based on the frameworks of agency and critical mass theories, this study tests three hypotheses to distinguish between overall proportion, simple presence, and threshold effects. The first hypothesis (H1) predicts that a higher proportion of female directors is associated with lower discretionary accruals, reflecting improved board monitoring and ethical oversight. The second hypothesis (H2) examines whether the mere presence of at least one female director influences financial reporting behavior. Finally, the third hypothesis (H3) tests whether the governance benefits of gender diversity become stronger when a board reaches a critical mass of female directors.

These hypotheses allow the study to distinguish between incremental representation effects, presence effects, and threshold effects within corporate boards. To address these questions, this thesis examines whether board gender diversity influences earnings management in German listed firms. Specifically, the study investigates whether a higher proportion of female directors (H1), the mere presence of women on the board (H2), or the achievement of a critical mass of female representation (H3) is associated with lower levels of accrual-based earnings management. Using a panel dataset of 998 firm-year observations from German listed companies between 2016 and 2024, discretionary accruals estimated through the Modified Jones model served as the primary proxy for earnings management.

The empirical analysis provides several important insights. First, the results indicate that the proportion of female directors on corporate boards is negatively related to discretionary accruals, although the relationship is not statistically significant.

Practically, this analysis provides highly relevant insights into the broader economic consequences of legislative gender quotas. For regulators, the results suggest that mandatory quotas succeed in increasing representation but do not universally guarantee linear improvements in oversight (Usman et al., 2022, pp. 18–19). Most importantly, for investors and shareholders, this study demonstrates that simply checking a compliance box with a 30 percent quota does not automatically guarantee safer, higher-quality financial reports (Gull et al., 2018, p. 272). True financial integrity requires that diverse directors are substantively integrated into the board's monitoring dynamics rather than serving as mere numerical tokens (Rudyanto & Kusnadi, 2025, pp. 24–25).

The remainder of this thesis is systematically structured as follows. Chapter 2 provides a comprehensive review of the theoretical frameworks, including agency theory and critical mass theory, and critically evaluates the existing empirical literature on board gender diversity and earnings management. Chapter 3 details the research design, outlining the data

collection process, variable measurement, and the specific econometric models utilized. Chapter 4 presents the empirical findings, beginning with descriptive statistics and followed by the results of the multivariate regression analyses and robustness checks. Chapter 5 synthesizes and discusses the findings in relation to existing literature and institutional contexts. Finally, Chapter 6 concludes the thesis by summarizing the primary insights, acknowledging limitations, and suggesting actionable avenues for future academic research.

2. Theoretical Framework and Empirical Evidence

2.1. Board Gender Diversity

The composition of corporate boards has transitioned from a matter of internal firm preference to a central pillar of global corporate governance reform (Kent Baker et al., 2020, p. 232). This shift is increasingly driven by the recognition that boards serve as the primary link between a firm's management and its stakeholders, necessitating a composition that reflects both expertise and demographic breadth (Rose, 2007, p. 404; Terjesen et al., 2009, pp. 320, 329). In recent years, the discourse surrounding board gender diversity (BGD) has intensified, driven by a dual pressure: the ethical imperative for social equity and the economic business case for improved oversight (Martinez-Garcia et al., 2024, p. 1).

Historically, female representation in boardrooms was characterized by token appointments within voluntary regimes. However, as noted by Terjesen et al. (2015, pp. 234–237), there has been a significant global movement toward legislating gender diversity. Their study of 67 countries found that, while initial representation was low at around 10.3%, the introduction of institutional 'shocks', such as mandatory quotas, has been the main driver of subsequent growth to over 16.9% globally (Deloitte, 2019). These institutional factors are particularly relevant in the European context, where cultural and governmental institutions play a decisive role in regulating how firms approach diversity (Martinez-Garcia et al., 2024, pp. 2–3).

In the specific context of Germany, this evolution culminated in the 2015 "Law for the Equal Participation of Women and Men in Leadership Positions" (FüPoG, 2015), which mandated a 30% gender quota for supervisory boards of listed and co-determined firms. This legislative shift reflects a transition from soft law recommendations to hard law requirements, based on the assumption that voluntary measures alone are insufficient to overcome the "old boys' networks" that historically dominated German boardrooms (Huang et al., 2020, pp. 347, 349–351; Joecks et al., 2013, pp. 61, 62; Terjesen et al., 2015, pp. 244, 246).

Beyond mere numbers, scholarship has begun to focus on the qualitative impact of female directors. Unlike their male counterparts, who may be selected through traditional social ties, female directors are often found to possess higher levels of education and diverse professional backgrounds (Conyon & He, 2017, p. 199). This diversity in human capital is theorized to enhance the board's vigilance. Adams and Ferreira (2009, p. 300) argue that female directors tend to exhibit better attendance records and a greater propensity to join monitoring-intensive committees, such as the audit committee, which directly impacts the quality of financial oversight.

However, the impact of gender diversity is often moderated by the institutional structure of the firm. In Germany's two-tier board system, the influence of female directors is concentrated on the Supervisory Board (Aufsichtsrat), which is structurally separated from the executive Management Board (Vorstand) (Jungmann, 2006, pp. 432, 433; Usman et al., 2022, p. 21). The effectiveness of female directors in curbing opportunistic managerial behavior is contingent upon their ability to navigate these institutional boundaries and occupy positions of actual power rather than serving in purely symbolic roles (Gull et al., 2018, pp. 258, 259; Pucheta-Martínez et al., 2016, p. 378). Thus, understanding BGD requires looking beyond headcounts to analyze how female directors transition from tokens to key players within specific national governance frameworks (Abebe & Dadanlar, 2021, p. 6).

2.2. Understanding Earnings Management

2.2.1. Nature of Earnings Management

Understanding the nature of earnings management is of strategic importance for all stakeholders who rely on financial statements for decision-making. Earnings management (EM) is defined as the "intentional intervention in the external financial reporting process to get private gain" (Schipper, 1989, p. 92). This definition emphasizes that EM is not merely a passive accounting error, but a deliberate strategic choice (Yang et al., 2025, p. 3). Managers utilize the inherent flexibility and subjectivity of accounting standards to alter financial reports, either to mislead certain stakeholders about the firm's true underlying economic performance or to influence contractual outcomes, such as executive compensation or debt covenant compliance (Arun et al., 2015, p. 137; Healy & Wahlen, 1999, p. 368).

This is done to mislead stakeholders about the firm´s true underlying economic performance, often to meet or beat earnings targets (Healy & Wahlen, 1999, pp. 368, 371). From an

academic perspective, these interventions are categorized into two primary frameworks of manipulation: Accrual-Based Earnings Management (AEM) and Real Earnings Management (REM).

2.2.2. Accrual-Based Earnings Management

AEM involves the manipulation of accounting choices, assumptions, and estimates within the flexible boundaries of Generally Accepted Accounting Principles (GAAP) (Arun et al., 2015, p. 137; Yang et al., 2025, p. 3). This method does not alter the firm´s underlying operational activities or its real cash flows, it only changes how and when those activities are reported to obscure the firm's true economic performance (Yang et al., 2025, p. 4).

The theoretical basis for AEM lies in the judgment required in financial reporting. Healy and Wahlen (1999, pp. 368–369) argue that standards allow managers discretion to help them convey private information about future cash flows (e.g., estimating bad debts). However, AEM occurs when managers abuse this discretion to mislead stakeholders. To understand this, it is necessary to distinguish between the two components of total accruals. The first are non-discretionary accruals, these are adjustments mandated by the firm´s actual business activities (e.g., an increase in accounts receivable due to a legitimate rise in sales) (García Lara et al., 2017, p. 656; Srinidhi et al., 2011, p. 1637). Secondly there are discretionary accruals, these represent the abnormal component where management intervention occurs(Srinidhi et al., 2011, p. 1615). These are the specific focus of detection models in academic research (Dechow et al., 1995, pp. 194–195).

AEM is accomplished through the use of discretionary accruals. Examples include deferring expenses to a later period, accelerating the recognition of sales before actual delivery, or manipulating non-cash items such as the allowance for doubtful accounts, depreciation schedules, or asset write-down (Yang et al., 2025, p. 3). A critical characteristic of AEM is that accruals reverse over time. For example, if a firm understates bad debt expense today to boost profit, it must eventually record that loss in a future period, which constrains the ability to manage earnings indefinitely (Cohen & Zarowin, 2010, p. 4).

Because AEM leaves a paper trail within the financial statements, it is considered easier to scrutinize and detect by vigilant auditors, regulators, and analysts (Srinidhi et al., 2011, p. 1615; Yang et al., 2025, pp. 17–18). This higher risk of detection means it is more likely to lead to subsequent lawsuits. Consequently, academic research typically measures AEM using regression models that attempt to isolate the discretionary component from total

accruals. The most prominent of these is the Modified Jones Model (Dechow et al., 1995, p. 199), which controls for changes in revenues and property, plant, and equipment to estimate normal accruals, treating the residual as evidence of management. This study employs this established methodology to capture the extent of managerial opportunism.

2.2.3. Real Earnings Management

While AEM relies on the flexibility of accounting standards, REM represents a fundamentally different and arguably more damaging category of manipulation. Roychowdhury (2006, p. 336) defines REM as management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds. Unlike AEM, which merely alters the timing of when economic events are reported, REM alters the firm´s actual operational activities and directly impacts cash flows (Yang et al., 2025, p. 3). Managers typically resort to REM to meet or beat vital capital market benchmarks, such as avoiding reported losses, sustaining year-over-year earnings growth, or meeting financial analysts' forecasts (Roychowdhury, 2006, pp. 337–338; Yang et al., 2025, p. 17).

To achieve these short-term targets, executives manipulate operational decisions across three primary channels. First, managers may engage in sales manipulation by offering aggressive price discounts or highly lenient credit terms toward the end of the fiscal year. While this successfully inflated current-period revenues, the discounted prices lower the overall profit margin, causing the firm to report an abnormally low level of cash flow from operations relative to its sales volume (Roychowdhury, 2006, p. 340). Second, firms may artificially increase production volume beyond the optimal level dictated by actual market demand (Yang et al., 2025, p. 3). By producing excess inventory, the firm's fixed overhead costs are spread across a larger number of units (Roychowdhury, 2006, p. 340). This mathematical dilution lowers the per-unit cost of goods sold, thereby artificially inflating the firm's gross margin and operating income, albeit at the expense of tying up capital and incurring exorbitant inventory holding costs (Roychowdhury, 2006, p. 338). Finally, executives can generate an immediate boost to current-period earnings through the severe reduction of discretionary expenses. By slashing vital spending on research and development (R&D), advertising, employee training, or general selling and administrative expenses, managers achieve a direct, dollar-for-dollar increase in reported net income because these expenses are generally recognized in the period they occur (Roychowdhury, 2006, p. 340).

The consequences of relying on these real activity manipulations are severe. While AEM merely shifts accounting numbers between periods, REM destroys genuine, long-term economic value (Roychowdhury, 2006, p. 365). By cutting R&D or creating costly inventory gluts, managers effectively sacrifice future operational performance and forgo positive net present value projects just to secure a short-term accounting gain (Graham et al., 2005 p. 32 as cited in Cohen & Zarowin, 2010, p. 4; Yang et al., 2025, p. 4). Despite these destructive consequences, managers increasingly favor REM over AEM because it is significantly harder for external stakeholders to scrutinize (Yang et al., 2025, p. 17). Actions like cutting an advertising budget or discounting a product are fundamentally operational decisions that can easily be masked as legitimate business strategies reacting to macroeconomic conditions or competitive pressures (Yang et al., 2025, p. 4). Consequently, vigilant auditors, regulators, and even independent board members struggle to challenge REM, as doing so requires second-guessing the core business judgment of the executive team rather than simply auditing a mathematical accrual estimate (Zang, 2012, p. 680).

2.2.4. The Substitution Effect Between AEM and REM

The literature establishes that managers do not view AEM and REM in isolation. Rather, they treat them as strategic alternatives and actively shift between the two methods based on the relative constraints and costs they encounter (Cohen & Zarowin, 2010, p. 5). Because managers operate under intense capital market pressure to meet or beat immediate earnings expectations, they continually weigh the risk of auditor detection (associated with AEM) against the risk of long-term economic value destruction (associated with REM) (Yang et al., 2025, p. 3).

Historically, executives have exhibited a greater propensity toward AEM because it is relatively cheap in an economic sense, it does not alter actual cash flows or disrupt business operations (Roychowdhury, 2006, pp. 337–338). However, this preference changes dynamically when accounting flexibility is restricted. Analytical models, such as those by Ewert and Wagenhofer (2005, p. 1106), demonstrate that when accounting standards are tightened or when external scrutiny from auditors and regulators intensifies, the cost of executing AEM rises significantly. Under such constrained conditions, managers are highly likely to shift their manipulative efforts toward REM (Yang et al., 2025, p. 5). This substitution effect highlights a critical governance paradox: successfully restricting accrual manipulation does not necessarily eliminate earnings management, it frequently just displaces it into operational channels (Yang et al., 2025, pp. 15, 17; Zang, 2012, p. 701) .

This trade-off suggests that real earnings management serves as a substitute for accrual-based earnings management and may be employed as a last resort when accrual manipulation is restricted (Yang et al., 2025, pp. 5, 18). As the flexibility to alter accounting estimates decreases, managers face a greater incentive to undertake real operational changes, such as cutting vital research and development or offering abnormal price discounts (Roychowdhury, 2006, p. 338). Ultimately, executives make the calculated choice to employ REM, accepting the potential damage to the firm's long-term competitive advantage, in order to satisfy the immediate demands of the market and protect their short-term compensation (Cohen & Zarowin, 2010, p. 13; Yang et al., 2025, p. 4).

While real earnings management represents a significant and potentially more destructive alternative for managers, this thesis focuses empirically on accrual-based earnings management. This methodological choice is motivated by the higher transparency and availability of accrual data within the German reporting context, as well as the established reliability of the Modified Jones Model in capturing managerial opportunism in European settings. Nevertheless, establishing the theoretical implications of REM and the substitution effect is essential for providing a comprehensive view of the earnings management landscape. Acknowledging this dynamic ensures that the empirical findings regarding board gender diversity and AEM are interpreted with an understanding of the broader manipulative strategies available to executive management.

2.2.5. Agency Theory

In the context of this study, agency theory serves as the primary mechanism explaining why board gender diversity acts as a deterrent against AEM. The fundamental function of the board of directors is to mitigate agency conflicts by aggressively monitoring management to ensure their actions align with shareholder interests (Conyon & He, 2017, p. 199; Fan et al., 2019, pp. 2–3; Gharios et al., 2024, p. 2). BGD strengthens this control function through improved independence and diligence (Gull et al., 2018, p. 258). The appointment of female directors is expected to facilitate more informed decisions and enhance the communication processes among board members (Zalata et al., 2022, p. 104). Specifically, female directors are consistently cited as exhibiting greater diligence and preparedness for board meetings, thereby enhancing board independence and the efficacy of internal controls (Pucheta-Martínez et al., 2016, p. 367). By effectively overseeing management, a gender-diverse board minimizes the likelihood of earnings manipulation, thus creating value for shareholders by reducing overall agency costs (Gull et al., 2018, p. 258).

To fully understand this dynamic, it is necessary to examine the foundational tenets of the theory driving it. Agency theory, primarily formulated by Jensen and Meckling (1976, p. 308), provides the foundational framework for modern corporate governance research, particularly concerning monitoring oversight structures. The theory defines the relationship between a principal (e.g., the shareholder) and an agent (e.g., the manager or executive) as a contract wherein the principal delegates decision-making authority and operational functions to the agent (Jensen & Meckling, 1976, p. 308).

The inherent vulnerability in this contract, known as the agency conflict, arises directly from the separation of ownership (principals) and control (agents) (Jensen & Meckling, 1976, p. 308). Managers, driven by rational self-interest, may pursue objectives that are inconsistent with the core goal of maximizing shareholder wealth (Fan et al., 2019, p. 3). Such divergent objectives can include excessive compensation, job security, or the preservation of private benefits. This deviation from optimal behavior is collectively termed managerial opportunism (Gull et al., 2018, p. 255).

Furthermore, the principal-agent relationship is characterized by profound information asymmetry, where managers possess privileged internal information regarding the firm's true financial state that is unavailable to external shareholders (Jensen & Meckling, 1976, p. 308; Usman et al., 2022, p. 3). Earnings management is the ultimate manifestation of this asymmetry. Therefore, the enhanced monitoring and ethical diligence provided by female directors serve as the necessary counterbalance, closing the information gap and actively suppressing the agent's ability to act opportunistically (Zalata et al., 2022, pp. 104–105).

2.2.6. Resource Dependence and Human Capital Theories

Within the context of this research, resource dependence theory (RDT) and human capital theory provide the theoretical justification for why a higher proportion of female directors improves financial reporting quality (Gull et al., 2018, p. 259). While agency theory explains a board's motivation to monitor management, RDT and human capital theory explain a board's capacity to do so effectively by providing critical external links and internal expertise (Dobija et al., 2022, p. 30; Hillman et al., 2007, p. 948). By bringing diverse cognitive resources, unique educational backgrounds, and non-traditional professional networks to the boardroom, female directors significantly expand the board's collective knowledge base (Conyon & He, 2017, p. 199; Dobija et al., 2022, p. 31; Hillman et al., 2002, pp. 758-759,; Kent Baker et al., 2020, p. 241). This broadening of expertise equips the board with the necessary analytical tools to comprehend complex financial maneuvers, thereby directly

increasing its capacity to detect, challenge, and constrain AEM (Gull et al., 2018, p. 259; Pucheta-Martínez et al., 2016, pp. 365–366).

To fully grasp this mechanism, it is essential to understand the foundational premise of RDT, primarily articulated by Pfeffer and Salancik (1978, as cited in Hillman et al., 2007, p. 942). RDT offers a crucial framework for understanding the role of the board of directors beyond mere managerial oversight. The theory views a firm as an open system that is fundamentally dependent on its external environment for the critical resources essential for its survival and prosperity. In this model, the board acts as a vital conduit linking the firm to these external resources (Hillman et al., 2007, p. 942).

Under RDT, female directors are considered a highly strategic resource. They bring unique skills, functional expertise, and non-traditional perspectives to the boardroom, which are vital for high-quality board deliberations on complex strategic and financial issues (Fan et al., 2019, p. 3; Liu et al., 2014, p. 170). For example, female directors are frequently noted for possessing non-business backgrounds or holding advanced academic degrees more often than their male counterparts, fundamentally expanding the board's problem-solving toolkit (Hillman et al., 2002, pp. 755, 758).The differing viewpoints introduced by women improve the depth and breadth of board discussions by actively challenging traditional, homogenous practices and policies (Srinidhi et al., 2011, p. 1613). This nurturing of candidness and analytical rigor is expected to result in better-informed strategic decisions, which is critical for effective oversight and overall organizational transparency (Conyon & He, 2017, p. 200; Fan et al., 2019, p. 1; Srinidhi et al., 2011, pp. 1610–1612).

Complementing RDT at the individual level is human capital theory. This theory posits that an individual’s demographic attributes, such as their formal education, professional experience, and specific technical expertise, enhance their cognitive abilities and, by extension, their productive value to an organization (Becker, 1964, as cited in Gull et al., 2018, p. 259). When applied to corporate governance, this theory suggests that the specific, measurable attributes of female directors are what drive their monitoring effectiveness. For instance, specific business expertise or advanced financial literacy directly improves a director’s capacity to identify red flags, scrutinize complex accrual estimates, and challenge questionable accounting practices, thereby directly constraining managerial opportunism (Gull et al., 2018, p. 259).

By synthesizing the enhanced monitoring incentives derived from agency theory with the cognitive and external linkage benefits of resource dependence and human capital theories,

a comprehensive theoretical foundation for improved financial reporting emerges (Dobija et al., 2022, p. 30). Agency theory dictates that a diverse board is more independent and highly motivated to mitigate opportunistic behavior, while RDT and human capital theory ensure the board actually possesses the requisite technical capacity to execute this oversight effectively (Gull et al., 2018, p. 258; Rose, 2007, pp. 405–406). Consequently, it is expected that a greater proportion of female directors will substantively elevate the board's technical oversight capabilities, ultimately reducing the prevalence of earnings manipulation and thereby protecting shareholder wealth (Arun et al., 2015, p. 140). To empirically test this relationship and the incremental value of these combined theoretical attributes, the following hypothesis is formulated:

H1: a higher proportion of female directors is associated with lower discretionary accruals.

2.2.7. Behavioral and Ethical Theories

Within the context of this study, behavioral and ethical theories provide the psychological rationale for why the presence of female directors translates into a measurable reduction in AEM. While agency theory establishes the structural need for monitoring, behavioral theories posit that women inherently possess cognitive frameworks that make them fundamentally less tolerant of opportunistic accounting practices (Zalata et al., 2022, p. 105). These frameworks include higher risk aversion, lower overconfidence, and stricter ethical compliance. Consequently, the integration of these ethical orientations into board deliberations is hypothesized to foster a corporate culture that prioritizes long-term financial integrity over short-term earnings manipulation (Srinidhi et al., 2011, p. 1614).

A significant portion of this theoretical debate centers on how these inherent behavioral differences affect a director's evaluation of litigation and reputational risks (Srinidhi et al., 2011, p. 1613). Earnings management, particularly in its aggressive accrual-based forms, exposes the firm and its directors to severe consequences, including financial restatements, regulatory penalties, and shareholder lawsuits (Cohen & Zarowin, 2010, p. 15; Yang et al., 2025, p. 4). Due to a documented higher aversion to such risks, female directors are theorized to act as a credible deterrent against financial misreporting (Edeh et al., 2025, p. 2). To protect their personal reputational capital, they are more likely to demand conservative, high-quality financial reporting and actively challenge management's aggressive accounting assumptions (Gull et al., 2018, pp. 257, 259).

The manifestation of these ethical and behavioral traits is structurally observable in the enhanced monitoring function of the board. Empirical studies grounded in these theories find that women directors exhibit greater overall diligence, promote more robust and informed deliberations, and are significantly more likely to join demanding, oversight-intensive committees, such as the audit committee (Adams & Ferreira, 2009, p. 300). This heightened, ethics-driven engagement directly strengthens the board's technical capacity to scrutinize complex financial statements, thereby closing the opportunity structures required for managers to execute AEM without detection (Adams & Ferreira, 2009, p. 301; Fan et al., 2019, p. 2).

However, a robust counterargument within the behavioral literature cautions that broad gender stereotypes observed in the general population may not accurately apply to the self-selected group of women who have successfully ascended to elite corporate leadership positions (Adams & Funk, 2012, p. 221; Faccio et al., 2016, p. 206; García Lara et al., 2017, p. 625). Research in this vein demonstrates that female directors do not necessarily conform to traditional gender expectations and may, in fact, exhibit risk-taking and professional behaviors that are statistically indistinguishable from their male counterparts (Adams & Funk, 2012, p. 226; García Lara et al., 2017, pp. 651–652). Further studies suggest that in highly competitive corporate environments devoid of explicit discrimination, the decision-making behaviors of male and female directors converge (García Lara et al., 2017, p. 660). These competing theoretical claims underscore the complexity of boardroom dynamics and highlight the necessity of this study's empirical approach: moving beyond psychological theory to test whether these behavioral propositions actually constrain earnings management in the real-world setting of the German capital market (Adams & Funk, 2012, p. 219; Rose, 2007, p. 406; Srinidhi et al., 2011, p. 1614).

2.2.8. Critical Mass and Tokenism

The influence of female directors is also shaped by the social dynamics within the boardroom, explained by two competing theories. When individuals, such as women or ethnic minority directors, are appointed primarily to meet a perceived social pressure or the appearance of inclusion, or to fulfill a minimum legal mandate, they are viewed through the lens of tokenism (Abebe & Dadanlar, 2021, p. 7; Liu et al., 2014, p. 171). This status generates several negative psychological and behavioral phenomena within the group, making it difficult for the tokens to be effective or influence group outcomes meaningfully (Torchia et al., 2011, p. 301,310).

The presence of only one female director is generally regarded as evidence of tokenism (Adams & Ferreira, 2009, p. 291). For instance, a solo female director may experience the invisibility phase, feeling ignored, dismissed, or excluded from serious consideration (Abebe & Dadanlar, 2021, p. 7). Research suggest that token appointments (typically defined as one or two female or minority directors) are less effective in areas like reducing large-scale discrimination lawsuits compared to a "critical mass" (Abebe & Dadanlar, 2021, pp. 7, 20). The presence of one or two women creates tokenism issues that can even lead to an increase in earnings management activity due to reduced board monitoring quality (Fan et al., 2019, p. 2).

The token members often stands out due to their rarity, causing them to be intensely watched or singled out by their peers (Rixom et al., 2023, pp. 681–682). This hyper-visibility can result in considerable performance pressure, prompting them to either attempt to be less visible by participating less in debates, or to over-achieve to prove their worth (Kanter, 1997, as cited in Rixom et al., 2023, p. 682). On the other hand, the dominant group may feel uncomfortable or threatened by the token's presence, leading them to exaggerate differences between the social groups and distort the token's achievements to fit predefined sex-role stereotypes that contradict perceptions of strong leadership (Liu et al., 2014, p. 171; Torchia et al., 2011, pp. 301, 3010).

To overcome these sociological barriers, boards must reach a specific demographic threshold, a concept formalized as critical mass theory (CMT). CMT posits that once the size of the minority group reaches a specific threshold, they cease to be tokens and gain meaningful influence (Torchia et al., 2011, p. 311). Previous empirical studies suggest that a threshold of at least three or more women are typically required to reach this critical mass, allowing female directors to move beyond tokenism to gain a "voice" (Dobija et al., 2022, p. 32; Liu et al., 2014, p. 170; Torchia et al., 2011, p. 302). When this critical mass is achieved, women are no longer perceived as outsiders; they are differentiated as individuals rather than stereotyped representations of their gender, enabling them to substantially influence strategic board decision-making processes and effectively constrain managerial opportunism (Fan et al., 2019, p. 2; Torchia et al., 2011, p. 311).

However, the definition of a critical mass is highly dependent on the institutional and regulatory context, particularly in regions with mandated gender quotas. If a firm is subject to a strict quota law and only meets the absolute minimum requirement (even if that number technically equals or exceeds the traditional token threshold of one or two), capital market

participants may still view these female directors through the lens of tokenism (Rixom et al., 2023, p. 681). Investors often perceive that women appointed exactly at the quota line were selected for regulatory compliance rather than operational competence, which subsequently leads to negative perceptions and lower investment confidence (Rixom et al., 2023, pp. 680, 693).

To overcome the perceived tokenism introduced by the quota itself, the critical mass threshold must be exceeded. Investors recognize the benefits predicted by resource dependence theory only when the firm exceeds the minimum quota mandate, signaling that the decision is driven by value rather than regulatory necessity (Rixom et al., 2023, pp. 680, 691). This demonstrates that the definition of critical mass is variable and highly dependent on the institutional context.

Thus, the ultimate effect on financial reporting quality depends on the numerical strength and resulting influence of female directors. If female directors possess the capacity to improve earnings quality, this effect should theoretically emerge when they are present on the board, but it should become significantly more pronounced and observable once the critical mass threshold is reached and tokenism is overcome (Dobija et al., 2022, p. 41). Therefore, to empirically test these distinct phases of influence, the following hypotheses are formulated:

H2: Firms with at least one female director exhibit lower discretionary accruals than firms with zero female directors.

H3: The negative association between female directors and discretionary accruals strengthens when the board achieves a critical mass (≥ 3 female directors).

2.3. Empirical Evidence

2.3.1. Gender Diversity and Earnings Management

While theoretical frameworks strongly suggest that BGD should improve corporate governance, the empirical landscape provides the critical evidence testing this proposition. Historically, early scholarships sought to establish a straightforward, positive correlation between diversity and reporting quality (Gull et al., 2018, p. 257; Kent Baker et al., 2020, p. 232; Srinidhi et al., 2011, p. 1611). However, the contemporary academic consensus has evolved to be much more nuanced, demonstrating that the ability of female directors to constrain earnings management is highly dependent on institutional contexts, their independence, and their specific committee assignments (Arun et al., 2015, p. 140).

Across global capital markets, the predominant empirical conclusion confirms the predictions of agency and behavioral theories: higher female representation on boards is negatively associated with earnings manipulation (Dobija et al., 2022, p. 41). Foundational studies in the U.S. and UK markets demonstrate that female directors documented tendencies toward risk aversion and strict ethical compliance directly translate into more conservative accounting practices. For example, Srinidhi et al. (2011, p. 1611) established that U.S. publicly listed companies with greater female board representation exhibited significantly lower levels of AEM and higher overall earnings quality. Conforming this in the UK context, Arun et al. (2015, p. 140) documented a pronounced reduction in discretionary accruals, noting that this constraint on managerial opportunism was particularly strong when the female directors held strictly independent, non-executive positions.

Moving beyond Anglo-American markets, a robust body of literature confirms these dynamics within the specific regulatory environments of Europe. Cross-country analyses of European firms demonstrate that board diversity fundamentally improves financial reporting quality by mitigating agency conflicts. For instance, Kyaw et al. (2015, p. 141) and Saona et al. (2019, p. 636) confirmed that gender-diverse boards across European markets exhibit a structurally lower tolerance for earnings manipulation, actively constraining the aggressive use of accruals. Country-specific studies further isolate this effect within distinct legal regimes; examinations of French corporate boards by Gull et al. (2018, p. 268) observed that the appointment of female directors was directly linked to a significant decline in earnings management practices, particularly when those women possessed specific statutory attributes such as audit experience. Expanding on this, Pucheta-Martínez et al. (2017, pp. 367–368, 370) found that female directors advocate for greater conditional conservatism, ensuring that economic losses are recognized in a timely manner rather than hidden through accounting flexibility.

Crucially, the literature indicates that the mere presence of women on the board is often insufficient if they are not placed in positions of structural power (Rudyanto & Kusnadi, 2025, p. 6). Research highlights that the monitoring benefits of female directors are maximized when they are appointed to key oversight committees (Gull et al., 2018, pp. 258–259). In the Spanish market, Pucheta-Martínez et al. (2016, pp. 363, 373–376, 378) demonstrated that the presence of independent female directors specifically on the audit committee drastically reduced the probability of firms receiving qualified audit opinions, signaling a systemic upgrade in overall reporting integrity. This suggests that female

directors require institutional leverage to effectively challenge management's accounting assumptions.

Finally, recent empirical advancements show that the restrictive influence of female directors is not limited merely to accounting estimates (AEM), but also extends to the operational realm (Edeh et al., 2025, p. 3). Recent empirical analyses, such as the study by Amara et al. (2025, p. 16), demonstrate that gender-diverse boards successfully reduce the likelihood of REM alongside AEM. This suggests that female directors do not just police paper-based accrual manipulations, but actively discourage the strategic, value-destroying distortion of real business operations (such as cutting vital research and development or overproducing inventory). Collectively, this body of empirical evidence provides a robust foundation for the expectation that increased female board representation will actively suppress discretionary accruals within the German market context examined in this thesis.

2.3.2. Contextual Moderators: Institutions, Quotas, and Selection Bias

Although the broader empirical literature largely confirms the constraining effect BGD on EM, contemporary studies suggest that this relationship is not uniform; rather, it is highly moderated by institutional, legal, and firm-specific conditions (Amara et al., 2025, p. 5; Edeh et al., 2025, p. 5; Gull et al., 2018, pp. 256, 257, 271; Kyaw et al., 2015, p. 136). The effectiveness of female directors as corporate monitors is fundamentally shaped by the environment in which they operate (Kyaw et al., 2015, p. 136).

At the macro-institutional level, strict legal environments and rigid accounting standards structurally limit the opportunity for managerial discretion. Analytical models by Ewert and Wagenhofer (2005, p. 1106) and empirical findings by Cohen and Zarowin (2010, p. 3) demonstrate that tightening regulatory oversight actively constrains the flexibility managers have over accruals. Consequently, in institutional settings characterized by historically weaker investor protections or less stringent enforcement mechanisms, the internal monitoring provided by female directors becomes arguably more critical to safeguard earnings quality than in heavily regulated, strictly enforced environments (García Lara et al., 2017, p. 654; Gull et al., 2018, pp. 256–257).

Furthermore, the recent introduction of mandatory gender quotas across European markets introduces complex psychological and behavioral dynamics into the boardroom. While quotas are highly effective at increasing the raw numerical representation of women, they risk artificially triggering the negative effects of tokenism theory (Huang et al., 2020, p. 348;

Rixom et al., 2023, p. 681). Rixom et al. (2023, p. 694) caution that appointments made strictly to fulfill a legal mandate often lead capital market participants to perceive female directors as compliance hires rather than competent, value-adding monitors. This perceived tokenism can severely neutralize their influence. Investors are significantly more likely to perceive these appointments as authentic and capable of enhancing governance only when firms voluntarily exceed the minimum statutory quota thresholds, signaling a genuine corporate commitment to diversity over mere regulatory appeasement (Rixom et al., 2023, p. 691).

Finally, any empirical assessment of gender diversity must account for the critical moderating factor of selection bias within the upper ranks of corporations. In markets characterized by structural discrimination or pronounced glass ceilings, the women who successfully navigate these barriers to reach the boardroom often possess significantly higher qualifications, broader expertise, and more robust ethical frameworks than their average male counterparts (García Lara et al., 2017, p. 654; Hillman et al., 2002, pp. 755, 758–759). García Lara et al. (2017, p. 654) suggest that it is precisely this exceptionalism that drives the observed reductions in earnings management. This implies that the superior monitoring quality frequently attributed to female directors may partially reflect the extreme vetting process they undergo (Hillman et al., 2002, pp. 750–751). This nuance complicates the direct attribution of governance improvements to gender alone, highlighting the critical necessity of empirically examining the specific, measurable attributes of these directors rather than relying solely on their demographic presence (García Lara et al., 2017, pp. 651, 652, 654).

2.3.3. Evidence from Germany: Legal Reforms and Their Effects

Germany presents a unique case in the European context due to its dual-board structure and phased approach to gender diversity regulation. Historically, the German capital market relied on voluntary corporate governance codes to promote board diversity. However, these early self-regulatory measures proved largely ineffective at dismantling entrenched corporate networks, by 2013, fewer than 20% of supervisory board members and only 6.3% of executive board members were women (Holst & Kirsch, 2016 as cited in Huang et al., 2020, p. 348). This resulted in historically stagnant and exceptionally low female representation across both boards (Martinez-Garcia et al., 2024, pp. 1, 12).

The 2015 Law on Equal Participation introduced a mandatory 30% gender quota for supervisory boards of large listed companies, while allowing voluntary targets for management boards (FüPoG, 2015). This regulatory shift had a strong and immediate effect.

Female representation on supervisory boards rose significantly in affected firms, with no observed negative impact on firm performance measures such as Return on Assets or Return on Equity (Banerjee et al., 2024, p. 61; Joecks et al., 2013, pp. 63–64).

However, no comparable demographic improvement was recorded for the management boards, which remained subject only to voluntary self-regulation. This severe discrepancy provides crucial empirical evidence supporting the broader institutional literature: achieving meaningful structural change within elite corporate echelons requires binding, coercive regulation. Without explicit legal pressure and the threat of penalties, gender diversity at the highest levels of corporate leadership frequently remains stagnant, as incumbent groups are rarely incentivized to voluntarily alter the status quo (Huang et al., 2020, pp. 350, 361).

Despite these significant structural gains at the supervisory level, empirical studies specifically investigating how this German quota has subsequently impacted EM remain relatively scarce. Nonetheless, the theoretical integration of critical mass and resource dependence theories suggests that by forcing boards to exceed the tokenism threshold, the German quota has structurally improved the technical oversight capacity of supervisory boards, thereby aligning the German market with the broader European trend of enhanced financial reporting quality (De Acutis et al., 2024, p. 91; Kent Baker et al., 2020, pp. 233, 241; Terjesen et al., 2015, p. 235). This gap in the literature provides the exact empirical setting and justification for the specific hypotheses tested in this thesis.

3. Methodology

3.1. Research Design

This study adopts a quantitative, archival research design to empirically examine whether board gender diversity influences earnings management practices within German listed firms. The core research design closely follows the established empirical strategies utilized in seminal corporate governance literature (Arun et al., 2015, pp. 138–139), while being specifically adapted to the unique regulatory environment of the German two-tier board system. By building upon this established methodological framework, the study ensures high internal validity and allows the findings to be directly positioned within the broader international debate on gender diversity and financial reporting quality.

The empirical analysis focuses on the corporate board as a central governance mechanism responsible for monitoring managerial decision-making and overseeing the financial reporting process. From an agency-theoretical perspective, the board plays a crucial role in

mitigating information asymmetries and conflicts of interest between managers and shareholders by actively constraining opportunistic behavior, including AEM (Pucheta-Martínez et al., 2016, pp. 374–375; Srinidhi et al., 2011, p. 1611; Usman et al., 2022, pp. 4–6). Board composition is therefore expected to influence the quality of financial reporting, as directors are involved in approving financial statements and supervising accounting choices. Examining board gender diversity provides a direct way to assess whether differences in board structure are associated with variations in earnings management (Gull et al., 2018, p. 272).

To test the formulated hypotheses, the study employs multivariate regression analysis utilizing a panel data structure. This design enables the study to exploit both cross-sectional variation across different firms and time-series variation within individual firms over multiple years. Panel data methodology is particularly suitable for corporate governance research (Gharios et al., 2024, p. 11). Board composition and earnings management practices evolve dynamically over time and are highly sensitive to macroeconomic shocks and regulatory interventions, such as Germany's 2015 gender quota legislation (FüPoG, 2015; Martinez-Garcia et al., 2024, p. 8). Furthermore, the use of panel data allows for the inclusion of firm, industry, and year fixed effects, which rigorously controls for unobserved heterogeneity and time-invariant firm characteristics that might otherwise bias the results.

Importantly, the research design explicitly distinguishes between different conceptualizations of gender diversity to capture the complex social dynamics outlined in the theoretical framework. Rather than relying on a single, one-dimensional measure, the study incorporates a layered approach to examine: (H1) the overall proportion of female directors, (H2) the mere presence of at least one female director (testing for Tokenism), and (H3) the existence of three or more female directors (testing for Critical Mass). This layered operationalization is strongly motivated by prior theoretical and empirical work, which suggests that the monitoring influence of women on boards is not strictly linear; rather, it depends heavily on their numerical representation and ability to overcome minority isolation (Fan et al., 2019, p. 2; Torchia et al., 2011, p. 311).

By testing these alternative specifications simultaneously, the design allows for a highly nuanced assessment of whether gender diversity incrementally constrains discretionary accruals, or whether this governance benefit only materializes once a meaningful demographic threshold is achieved. To execute this analysis, the study must first isolate the

discretionary component of earnings, which is detailed in the subsequent section on earnings management measurement.

3.2. Data and Sample Selection

To empirically investigate the relationship between board gender diversity and financial reporting quality, this study adopts a rigorous archival data collection process. All financial accounting data and corporate governance metrics are obtained from the LSEG Workspace (formerly Refinitiv) database. Utilizing a single, comprehensive institutional database ensures strict methodological consistency across all financial and governance variables, thereby minimizing data comparability issues and structural missingness that frequently occur when merging multiple disparate datasets.

Table 1 - Final sample classified by industry (ICB) and Year

ICB	Industries	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
4010	Automobiles and Parts	6	6	8	10	10	10	10	11	11	82
5520	Chemicals	8	9	9	11	12	12	12	12	12	97
5010	Construction and Materials	2	3	3	5	5	5	5	5	5	38
4020	Consumer Products and Services	5	6	8	10	10	11	11	11	11	83
2010	Health Care	9	10	12	13	13	13	13	11	11	105
5020	Industrial Goods and Services	19	21	25	30	35	36	36	36	34	272
4030	Media	2	3	3	3	3	3	3	3	3	26
4040	Retail	2	2	4	4	5	6	6	6	5	40
1010	Technology	7	10	11	19	29	31	32	29	29	197
1510	Telecommunications	6	6	6	6	7	7	7	7	6	58
Total		66	76	89	111	129	134	135	131	127	998

The initial sample population consists of all German firms publicly listed on the Frankfurt Stock Exchange. The sample period is deliberately defined as spanning from 2016 to 2024. This specific timeframe was selected to capture the immediate and subsequent corporate governance landscape following the enforcement of the German Law on Equal Participation in 2015, which fundamentally altered board structures across the market (FüPoG, 2015).

Following the methodology of Arun et al. (2015, p. 139), several exclusions are applied to ensure the validity of accrual-based measures of earnings management. All financial institutions, banks, and insurance companies are excluded from the dataset. This is a mandatory methodological step in earnings management research because the financial sector is subject to highly distinct statutory regulations and fundamentally different accrual-generating processes, which renders their discretionary accruals incomparable to those of standard industrial and commercial firms (Dechow et al., 1995, p. 199; Fan et al., 2019, p. 1). Firm-years with missing data on key variables, such as total assets, revenues, receivables, or board characteristics, are removed from the observation. The final sample consists of 998 firm-year observations. The distribution of the final sample is summarized in *Table 1* according to the Industry Classification Benchmark (ICB) classification.

3.3. Empirical Model and Variable Specification

Earnings management is measured using accrual-based models, as accrual manipulation represents one of the most common and empirically tractable forms of earnings management (Arun et al., 2015, p. 138). Since board members are directly involved in overseeing financial reporting and accounting policies, accrual-based measures are well aligned with the theoretical mechanisms underlying this study.

Modified Jones model (Dechow et al., 1995, p. 199) is applied to estimate current discretionary accruals. This model is widely regarded as one of the most reliable and frequently used methods for estimating discretionary accruals in the accounting literature (García Lara et al., 2017, p. 656). First the total accruals are calculated based on balance sheet components as follows:

$$TACC_t = \Delta CA_t - \Delta Cash - \Delta CL_t + \Delta DCL_t - DEP_t$$

where $TACC_t$ represents total accruals in year t, ΔCA_t is the change in current assets, $\Delta Cash$ is the change in cash and cash equivalents, ΔCL_t denotes the change in current liabilities, ΔDCL_t captures the change in short-term debt included in current liabilities, and DEP_t is depreciation and amortization expense in year *t*. This formulation isolates accrual-based adjustments from cash flows and reflects accounting discretion embedded in working capital and depreciation policies.

To estimate discretionary accruals, total accruals are scaled by lagged total assets and regressed on variables capturing normal accrual-generating activities using the modified Jones specifications:

$$\frac{TACC_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{(\Delta REV_t - \Delta REC_t)}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}} + \varepsilon_t$$

Where A_{t-1} denotes lagged total assets, REV_t is the change in revenues, ΔREC_t is the change in receivables, and PPE_t represent property, plant, and equipment. Cross-sectional estimation of the model by industry and year enables the expected accrual behavior to vary across industries and over time, reflecting differences in business models and economic conditions.

The residuals from this regression represent current discretionary accruals, as they capture the portion of accruals unexplained by normal operating activities. These residuals serve as the primary proxy for earnings management in the subsequent regression analysis. To reduce the influence of extreme observations and improve robustness, discretionary accruals are winsorized at the 1st and 99th percentile.

After estimating current discretionary accruals, the relationship between earnings management and the number of female directors on the board is examined using ordinary least squares (OLS) regression analysis. This baseline specification is used to test Hypothesis H1 as follows:

$$\begin{aligned} CDA_{it} = {} & \beta_0 + \beta_1 Female\%_{it} + \beta_2 SIZE_{it} + \beta_3 OCF_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} \\ & + \beta_6 GSALES_{it} + \beta_7 LOSS_{it} + \sum_{k=1}^{n-1} \beta_k INDUSTRY_i^k \\ & + \sum_{Y=2016}^{2024} \omega_y YEAR_i^y + \varepsilon_{it} \end{aligned}$$

where CDA_{it} denotes signed discretionary accruals for firm *i* in year *t*. Using signed discretionary accruals allows the analysis to capture both income-increasing and income-decreasing earnings management behavior, thereby providing a more comprehensive view of managerial discretion in financial reporting. The key explanatory variable in the baseline model, Female% measures the proportion of female directors on the board. The coefficient β_1 indicates whether a higher share of female directors is associated with higher or lower levels of earnings management.

To test Hypothesis 2, the baseline model is re-estimated using AnyFemale, a binary variable equal to one if at least one female director is present on the board and zero otherwise.

$$CDA_{it} = \beta_0 + \beta_1 AnyFemale_{it} + \beta_2 SIZE_{it} + \beta_3 OCF_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 GSALES_{it} + \beta_7 LOSS_{it} + \sum_{k=1}^{n-1} \beta_k INDUSTRY_i^k + \sum_{Y=2016}^{2024} \omega_y YEAR_i^y + \varepsilon_{it}$$

This specification examines whether the mere presence of female director is sufficient to influence earnings management behavior. This approach captures gender diversity at the extensive margin and is motivated by the argument that even a single female board member may affect board discussion, monitoring intensity, or ethical standards (García Lara et al., 2017, p. 655; Huang et al., 2020, p. 360).

To test Hypothesis H3, the key explanatory variable is replaced with CriticalMass, a dummy variable equal to one if the board includes at least three female directors and zero otherwise.

$$CDA_{it} = \beta_0 + \beta_1 CriticalMass\%_{it} + \beta_2 SIZE_{it} + \beta_3 OCF_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 GSALES_{it} + \beta_7 LOSS_{it} + \sum_{k=1}^{n-1} \beta_k INDUSTRY_i^k + \sum_{Y=2016}^{2024} \omega_y YEAR_i^y + \varepsilon_{it}$$

This specification is grounded in critical mass theory, which suggests that minority group members may only exert meaningful influence once a certain numerical threshold is reached (Dobija et al., 2022, p. 32). By incorporation this variable, the analysis assesses whether the impact of board gender diversity on earnings management becomes stronger when female representation reaches a critical level.

To determine the appropriate panel data specification, a Hausman test is conducted to compare the fixed effects and random effects estimators. The test results ($\chi^2(5) = 16.32$, $p = 0.006$) (see Appendix C) indicate a statistically significant difference between the two estimators, leading to the rejection of the null hypothesis. This suggests that unobserved firm-specific effects are correlated with the explanatory variables. Consequently, the fixed effects model is adopted for all subsequent analyses.

To isolate the association between gender diversity and earnings management, the analysis includes a set of control variables commonly used in the earnings management literature. Firm Size (SIZE) is measured as the natural logarithm of total assets. Larger firms are generally subject to greater scrutiny from regulators, analysts and investors, which may

reduce incentives or opportunities for earnings management (Edeh et al., 2025, p. 23). Following Arun et al. (2015), operating cash flow (OCF) is defined as cash flow from operations scaled by total assets. This scaling ensures comparability across firms of different sizes. High-OCF firms are generally less prone to earnings management through accruals, as their strong liquidity position reduces the pressure to meet specific earnings targets (Arun et al., 2015, p. 139).

Return on Assets (ROA) is measured as net income divided by total assets and captures firm profitability. Prior research suggests that highly profitable firms possess different performance-related reporting incentives than struggling firms (García Lara et al., 2017, p. 655). Leverage (LEV) is calculated as total liabilities divided by total assets. Highly leveraged firms may have stronger incentives to manage earnings in order to comply with debt covenants or present a more favorable financial position to creditors (Edeh et al., 2025, pp. 20–21).

Sales Growth (GSALES) is measured as the annual percentage change in revenues. High-growth firms may face greater uncertainty and stronger incentives to smooth earnings (Roychowdhury, 2006, p. 342). Loss (LOSS) is a binary variable equal to one if the firm reports a negative net income in given year and zero otherwise. Loss-making firms may have different earnings management incentives compared to profitable firms (Srinidhi et al., 2011, p. 270; Yang et al., 2025, p. 13).

To assess potential multicollinearity among the independent variables, variance inflation factors (VIF) are computed. The results indicate that all VIF values are well below the commonly accepted threshold of 10, with the highest value being 2.60 (see Appendix C). This suggests that multicollinearity is not a concern in the regression models. In particular, no evidence of strong correlation is observed between board size and firm size.

4. Empirical Results and Analysis

4.1. Descriptive Statistics

Table 2 presents descriptive statistics for the variables used in the empirical analysis. The table reports mean, minimum, median (P50), maximum, and standard deviation for discretionary accruals, board gender diversity measures, and all firm-level control variables over the sample period from 2016 to 2024.

Table 2 - Descriptive statistics.

	Mean	Min	P50	Max	Sd.
CDA	-0.002	-0.456	-0.003	0.802	0.143
Female%	0.249	0.000	0.300	0.667	0.149
AnyFemale	0.815	0.000	1.000	1.000	0.389
CriticalMass	0.488	0.000	0.000	1.000	0.500
SIZE	21.463	15.733	21.354	27.174	2.078
OCF	0.087	-0.346	0.083	0.505	0.075
ROA	0.043	-0.467	0.044	0.441	0.067
LEV	0.579	0.008	0.591	1.228	0.172
GSALES	0.112	-0.822	0.057	33.000	1.017
LOSS	0.126	0.000	0.000	1.000	0.332

CDA denotes discretionary accruals estimated using the Modified Jones model. Female% is the percentage of female directors on the board. AnyFemale is a dummy variable equal to one if at least one female director is present. CriticalMass is a dummy variable equal to one if the board has at least three female directors. SIZE is the natural logarithm of total assets; OCF is operating cash flow scaled by total assets; ROA is return on assets; LEV is financial leverage; GSALES is sales growth; LOSS equals one if the firm reports a loss, and zero otherwise.

The dependent variable CDA, has a mean close to zero (-0.002) and a median of -0.003, indicating that, on average, firms in the sample do not systematically engage in income-increasing or income-decreasing earnings management. The wide range of CDA values, with a minimum of -0.456 and a maximum of 0.802, suggests substantial heterogeneity in earnings management behavior across firms and years. The standard deviation of 0.143 is comparable to values reported in prior earnings management studies, indicating that measure captures meaningful variation in accrual-based discretion.

Regarding female percentage on the board, *Table 2* shows that the mean has a value of 0.249 and the median a value of 0.300. This implies that, on average, approximately one quarter of board members are female, with half of the observations exhibiting female representation of 30% or less. The minimum value of zero indicates that some firms still have entirely male boards, while the maximum value of 0.667 suggests that female representation rarely exceeds two-thirds of the board. The standard deviation of 0.149 reflects notable cross-sectional variation in board gender diversity.

The dummy variable AnyFemale has a mean of 0.815, indicating that more than 80% of firm-year observations include at least one female director on the board. This suggests that

female board representation is widespread among German listed companies during the sample period, although the presence of at least one female director does not necessarily imply a high proportion of women on the board. In contrast, CriticalMass, which equals one if the board includes at least three female directors, has a mean of 0.488. This indicates that while the vast majority of firms have appointed at least one woman, fewer than half of the observations meet the threshold of three women required to theoretically overcome minority isolation and exert structural influence over financial reporting (Dobija et al., 2022, pp. 32, 34).

With respect to the control variables, firm size has a mean of 21.463 and exhibits considerable variation, reflecting differences in scale among German listed companies. Operating cash flow has a positive mean of 0.087 and a median of 0.083, indicating that most firms generate positive operating cash flows, although the negative minimum value suggests that some firms experience liquidity constraints.

Return on assets has a mean of 0.043, indicating modest profitability on average, while the negative minimum value reflects the presence of loss-making firms in the sample. Leverage (LEV) has a mean of 0.579, suggesting that liabilities account for a substantial portion of total assets, which is consistent with a capital structures commonly observed in German firms. Sales growth shows a mean of 0.112 but a wide dispersion, with both negative and extremely high positive values, indicating heterogeneity in growth opportunities across firms and years. Finally, the LOSS indicator has a mean of 0.126, implying that approximately 13% of firm-year observations report negative net income.

Table 3 - The number and proportion of female directors on boards, classified by year.

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Board Size	905	1008	1116	1232	1321	1348	1362	1389	1403	11084
NFEM	224	261	309	351	379	402	417	442	466	3251
Female%	0.248	0.259	0.277	0.285	0.287	0.298	0.306	0.318	0.332	0.293

NFEM = number of females on the board, Female% = percentage of female on the board

Table 3 shows the evolution of board size and female board representation from 2016 to 2024. Overall board size increases steadily over the sample period, from 905 board seats in 2016 to 1403 in 2024. This is due to growing data availability and also reflects an expansion in the number of listed firms and board positions. At the same time, the number of female

directors rises continuously from 224 to 466, indicating a substantial increase in female participation on corporate boards. This rise can also be partially explained due to the increase in data availability over the years.

Female board representation increases from 24.8% in 2016 to 33.2% in 2024, with the total average across all years amounting to 29.3%. This gradual but persistent demographic shift provides direct empirical evidence of the market´s response to the 2015 German Law on Equal Participation. By mandating a 30% quota for supervisory boards, the regulatory intervention successfully forced an upward trajectory in diversity that is clearly reflected in the latter half of the sample period (FüPoG, 2015)

Table 4 - Correlation matrix.

Variable		A	B	C	D	E	F	G	H	I	J
A	CDA	1.000									
B	Female%	-0.068*	1.000								
C	AnyFemale	-0.097*	0.803*	1.000							
D	CriticalMass	-0.052	0.632*	0.469*	1.000						
E	SIZE	-0.101	0.428*	0.413*	0.638*	1.000					
F	OCF	-0.166*	-0.023	-0.085*	-0.019	-0.094*	1.000				
G	ROA	0.049	-0.115*	-0.148*	-0.095*	-0.113*	0.558*	1.000			
H	LEV	-0.030	0.104*	0.139*	0.282*	0.248*	-0.153*	-0.327*	1.000		
I	GSALES	-0.029	-0.054*	-0.067*	-0.111*	-0.019	-0.019	0.161*	-0.094*	1.000	
J	LOSS	0.031	-0.021	-0.033	-0.028	-0.087	-0.221	-0.607	0.126*	-0.131*	1.000

CDA=current discretionary accruals using the modified Jones model; Female%=percentage of female directors on the board; AnyFemale=dummy variable equals 1 if there is at least one female on the board, and 0 otherwise; CriticalMass = dummy variable equals 1 if there is at least 3 female on the board, and 0 otherwise; SIZE: Firm size; OCF: Operating cash flow; ROA: Firm performance; LEV: Financial leverage; GSALES: Growing sales; LOSS: Coded 1 if the firm has a loss and 0 otherwise.
* Correlation is significant at the 0.05 level.

Table 4 presents the pairwise correlation matrix for the main variables used in the analysis. The correlations provide initial insights into the bivariate relationships between board gender diversity measures, earnings management, and control variables, and serve as a preliminary check for potential multicollinearity.

The correlation between discretionary accruals and the board gender diversity variables is negative throughout. CDA is negatively correlated with Female% (-0.068) and AnyFemale (-0.097), with both correlations being statistically significant. These negative associations suggest that higher female representation on the board and the presence of at least one female

director are associated with lower levels of earnings management. The correlation between CDA and CriticalMass is also negative (-0.052), although it is not statistically significant at conventional levels. Overall, these bivariate results provide preliminary support for the hypotheses that board gender diversity is associated with reduced earnings management.

With respect to firm characteristics, SIZE is positively correlated with all gender diversity measures, indicating that larger firms tend to have more gender-diverse boards. This finding is consistent with prior literature suggesting that larger firms face greater regulatory pressure and public scrutiny regarding board composition. SIZE is also negatively correlated with CDA, suggesting that larger firms engage in less earnings management on average.

OCF shows a significant negative correlation with CDA (-0.166), indicating that firms with stronger cash flow positions are less likely to engage in accrual-based earnings management. ROA is strongly positively correlated with OCF and negatively correlated with LOSS, reflecting expected relationships between profitability, liquidity, and financial distress. LEV is positively correlated with several gender diversity measures and negatively correlated with ROA, suggesting that more highly leveraged firms tend to be less profitable.

Overall, the correlation coefficients are of moderate magnitude and do not indicate excessively high correlations among the control variables. This suggests that multicollinearity is unlikely to pose serious concern in the multivariate regression analysis. While the correlation matrix provides useful preliminary evidence, the subsequent regression analysis is necessary to assess the relationship between board gender diversity and earnings management while controlling firm-specific characteristics and fixed effects.

4.2. Baseline OLS Results

Table 5 reports the results of the multivariate regression analysis examining the association between board gender diversity and discretionary accruals. The three model specifications correspond to Hypotheses H1 to H3, each using a different measure of board gender diversity. All regressions include industry and year fixed effects, and standard errors are clustered at the firm level.

Table 5 - Regression results concerning the number of female directors on the board.

CDA	Exp. Sign	Model 1	Model 2	Model 3
Intercept	-	0.154*	0.148**	0.210**
		-0.078	-0.073	-0.087
Female%	-	-0.016		
		-0.045		
AnyFemale	-		-0.023	
			-0.016	
CriticalMass	-			0.015
				-0.012
SIZE	-	-0.006*	-0.005	-0.009**
		-0.003	-0.003	-0.004
OCF	-	-0.691***	-0.692***	-0.702***
		-0.156	-0.158	-0.159
ROA	+	0.813***	0.794***	0.821***
		-0.256	-0.256	-0.258
LEV	+	0.018	0.017	0.012
		-0.041	-0.042	-0.041
GSALES	±	-0.039*	-0.040*	-0.036*
		-0.021	-0.021	-0.02
LOSS	+	0.059**	0.057**	0.059**
		-0.027	-0.026	-0.027
Industry		Included	Included	Included
Year		Included	Included	Included
Observations		998	998	998
Adjusted R^2		0.088	0.09	0.089
F-value		1.900	2.020	1.870

CDA=current discretionary accruals using the modified Jones model; Female%=percentage of female directors on the board; AnyFemale=dummy variable equals 1 if there is at least one female on the board, and 0 otherwise; ; CriticalMass = dummy variable equals 1 if there is at least 3 female on the board, and 0 otherwise; SIZE: Firm size; OCF: Operating cash flow; ROA: Firm performance; LEV: Financial leverage; GSALES: Growing sales; LOSS: Coded 1 if the firm has a loss and 0 otherwise.

*** Correlation is significant at the 0.01 level.

** Correlation is significant at the 0.05 level.

* Correlation is significant at the 0.10 level.

Model 1 examines Hypothesis H1, which predicts a negative relationship between the proportion of female directors on the board and earnings management. The coefficient on Female% is negative (-0.016), which is consistent with the theoretical expectation that greater board gender diversity enhances monitoring quality and constrains managerial discretion in financial reporting. However, the estimated coefficient is not statistically significant at conventional levels.

The negative sign of the coefficient suggests that firms with a higher proportion of female directors tend to exhibit lower discretionary accruals, lending directional support to the monitoring hypothesis. This finding is in line with prior literature arguing that female directors are more risk-averse, more ethically oriented, and more likely to challenge aggressive accounting practices (Edeh et al., 2025, pp. 2, 6; Gull et al., 2018, pp. 258, 259; Pucheta-Martínez et al., 2016, p. 367; Zalata et al., 2022, pp. 102, 105). Nevertheless, the lack of statistical significance indicates that this effect is not sufficiently strong or systematic to be distinguished from zero once firm characteristics, industry effects, and year effects are taken into account.

One possible explanation for this result is that female board representation in German listed companies may not yet be high enough to exert a measurable influence on earnings management. Although female representation has increased over time, descriptive statistics indicate that the average proportion of female directors remains below one third. As a result, female directors may still constitute a minority on many boards, limiting their ability to influence board decision related to financial reporting and accounting oversight.

In addition, the German corporate governance system may attenuate the effect of board gender diversity on earnings management. Germany´s two-tier board structure and strong stakeholder orientation imply that monitoring responsibilities are shared across multiple governance mechanisms, such as a supervisory boards, auditors, and employee representatives (Jungmann, 2006, pp. 432, 433; Usman et al., 2022, p. 21).. In this context, the marginal contribution of female board representation to monitoring effectiveness may be less pronounced than in the governance systems where boards play a more centralized monitoring role.

An additional explanation for the lack of statistical significance may relate to data availability constraints, which limit the effective sample size. Board gender diversity information is not available for all German listed firms and years, and the estimation of discretionary accruals further requires complete financial statement data as well as sufficient

observations within industry-year groups. As a result, the final regression sample is substantially smaller than the initial population of listed firms. Moreover, the inclusion of industry and year fixed effects, combined with firm-level clustered standard errors, increases estimation precision requirements and may reduce statistical power. Consequently, while the coefficient on Female% is not statistically significant, the consistently negative sign suggests that limited data availability and reduced power may partly explain the absence of statistically detectable effect.

Finally, an analysis of the control variables within Model 1 indicates that the baseline regression is well-specified and highly consistent with prior empirical accounting literature, verifying the mechanical soundness of the model. OCF exhibits a highly significant negative association with discretionary accruals (-0.691, $p < 0.01$), confirming that firms with robust operational liquidity face significantly less pressure to manipulate earnings (Arun et al., 2015, p. 141). In contrast, ROA is positive and highly significant (0.813, $p < 0.01$), aligning with the expectation that highly profitable firms systematically engage in income-smoothing or face performance-related reporting incentives(Watts and Zimmerman, 1190 as cited in Arun et al., 2015, p. 139; Zalata et al., 2022, pp. 127, 129–130).

SIZE is significantly negative (-0.006, $p < 0.10$), reflecting the constraining effect of heightened regulatory scrutiny and analyst following on large firms. The LOSS indicator is significantly positive (0.059, $p < 0.05$), indicating that distressed firms utilize accruals opportunistically to mask poor underlying economics (García Lara et al., 2017, pp. 655, 660). Lastly, GSALES exhibits a weakly significant negative coefficient (-0.039, $p < 0.10$), while LEV remains statistically insignificant in this sample.

4.3. Presence vs. Critical Mass

In *Table 5* Model 2 tests Hypothesis H2, which examines whether the mere presence of at least one female director on the board is associated with earnings management. The coefficient on AnyFemale is negative (-0.023), consistent with the expected sign, but statistically insignificant. This finding suggests that the presence of single female director does not significantly constrain accrual-based earnings management in German listed companies during the sample period.

The negative coefficient provides directional support for the argument that female directors may contribute to improved monitoring and oversight. However, the lack of statistical significance indicates that the influence of a single female board member may be limited in

practice. This result aligns with arguments in the corporate governance literature suggesting that token representation may be insufficient to affect board dynamics or decision-making processes, particularly in boards dominated by male directors (Torchia et al., 2011, p. 308).

One possible explanation is that a single female director may face constraints in influencing discussions related to financial reporting, especially in complex and technical areas such as accrual accounting. Board decisions concerning earnings management often require collective agreement and substantial influence, which may be difficult to achieve when female representation is minimal (Dobija et al., 2022, pp. 32, 36; Pucheta-Martínez et al., 2016, p. 378). As a result, the monitoring benefits associated with gender diversity may not materialize unless female directors reach a more substantial level of representation.

Furthermore, the institutional context of Germany may further limit the effectiveness of token female representation. In a two-tier board system, monitoring responsibilities are distributed across supervisory boards, auditors, and employee representatives, potentially reducing the marginal impact of individual board members (Jungmann, 2006, pp. 432,

433).. In such a setting, the presence of a single female director may not be sufficient to meaningfully alter financial reporting outcomes.

Model 3 in *Table 5* examines Hypothesis H3, which tests whether boards with a critical mass of female directors exhibit lower levels of earnings management. The coefficient on CriticalMass is positive (0.015) and statistically insignificant, indicating that reaching a threshold of female representation does not significantly affect discretionary accruals in the sample of German listed firms.

This result contrasts with the theoretical expectations derived from critical mass theory, which argues that once minority group representation surpasses a certain threshold, members are better able to influence group decision-making and challenge dominant norms (Fan et al., 2019, p. 2; Torchia et al., 2011, p. 302). Applied to corporate boards, this theory suggests that a higher number of female directors should enhance monitoring quality and reduce opportunistic financial reporting behavior. However, the empirical findings in Model 3 do not support this prediction.

Several explanations may account for this outcome. First, while three female directors may technically constitute a numerical critical mass, mere presence does not equate to structural power. Advanced corporate governance literature emphasizes that board influence is heavily dependent on specific committee assignments. Gull et al. (2018, pp. 256, 272) demonstrate

that female directors only successfully constrain opportunistic reporting when they are appointed to the highly technical Audit Committee. If female directors in the German sample are systematically routed toward softer committees (such as HR or CSR) rather than the audit or finance committees, their ability to police complex accrual manipulations remains neutralized, despite having achieved a numerical critical mass on the broader board.

Second, the proliferation of "critical mass" boards in this sample is largely a direct mechanical consequence of the 2015 German Law on Equal Participation, which mandated a 30% quota. Rixom et al. (2023, pp. 682, 693) caution that when firms rapidly appoint women to satisfy strict legal mandates, both internal management and external investors often perceive these women as compliance hires rather than competent operational monitors. If incumbent male directors view the newly achieved critical mass as a forced regulatory exercise, they may strategically sideline these female directors from core financial oversight discussions, thereby neutralizing the governance benefits predicted by resource dependence theory.

Third, the insignificance of the CriticalMass coefficient may be related to sample characteristics and data constraints. Although the proportion of firms with at least three female directors has increased over time (Table 2), the number of firm-year observations meeting this criterion remains relatively limited. This reduced variation may lower statistical power, making it more difficult to detect significant effects even if they exist in practice.

Overall, the results of Model 3 suggest that achieving a critical mass of female directors alone is not sufficient to significantly influence earnings management behavior. Together with the findings from Models 1 and 2, this result indicates that the relationship between board gender diversity and earnings management is complex and likely depends on institutional context, board dynamics, and the substantive roles occupied by female directors, rather than solely on numerical representation.

4.4. Robustness Check.

4.4.1. Absolute Discretionary Accruals

To assess the robustness of the main findings, the regression models are re-estimated using the absolute value of discretionary accruals (|CDA|) as the dependent variable. While the baseline analysis employs signed discretionary accruals to capture the direction of earnings management, the absolute value focuses on the overall magnitude of accrual-based earnings management, independent of whether earnings are managed upward or downward. As

argued by Hribar and Nichols (2007, p. 1018. 1821), using unsigned (absolute) accruals is a critical robustness measure because firms may engage in earnings management for highly divergent strategic reasons, such as income smoothing, loss avoidance, or regulatory considerations. These can cancel each other out in a signed sample. By using |CDA|, the analysis tests whether board gender diversity restricts the general intensity of earnings management. *Table 6* shows the robustness check.

Table 6 - Regression results using the absolute value of current discretionary accruals

|CDA|	Exp. Sign	Model 1	Model 2	Model 3
Intercept	-	0.129***	0.130***	0.085
		-0.048	-0.047	-0.052
Female%	-	-0.011		
		-0.029		
AnyFemale	-		-0.007	
			-0.012	
CriticalMass	-			-0.016**
				-0.007
SIZE	+	-0.006***	-0.006***	-0.004*
		-0.002	-0.002	-0.002
OCF	?	0.019	0.018	0.027
		-0.069	-0.07	-0.07
ROA	?	0.157	0.153	0.158
		-0.164	-0.166	-0.163
LEV	?	0.035	0.035	0.041
		-0.033	-0.034	-0.034
GSALES	?	0.01	0.01	0.008
		-0.013	-0.013	-0.012
LOSS	?	0.050***	0.050***	0.051***
		-0.017	-0.018	-0.017
Industry		Included	Included	Included
Year		Included	Included	Included
Observations		998	998	998
Adjusted R^2		0.207	0.207	0.209
F-value		6.850	6.710	6.700

CDA=current discretionary accruals using the modified Jones model; Female%=percentage of female directors on the board; AnyFemale=dummy variable equals 1 if there is at least one female on the board, and 0 otherwise; ; CriticalMass = dummy variable equals 1 if there is at least 3 female on the board, and 0 otherwise; SIZE: Firm size; OCF: Operating cash flow; ROA: Firm performance; LEV: Financial leverage; GSALES: Growing sales; LOSS: Coded 1 if the firm has a loss and 0 otherwise.

*** Correlation is significant at the 0.01 level.

** Correlation is significant at the 0.05 level.

* Correlation is significant at the 0.10 level.

The robustness regressions follow the same empirical specification as the baseline models. All control variables SIZE, OCF, ROA, LEV, GSALES, LOSS are retained. In addition, industry and year fixed effects are included, and standard errors are clustered at the firm level to ensure consistency with the main analysis.

The results of the robustness analysis are largely consistent with the baseline findings (Table 6). The coefficient on the proportion of female directors (Female%) remains negative but statistically insignificant, suggesting that the absence of a significant relationship in the main analysis is not driven by the directional properties of discretionary accruals. Similarly, the AnyFemale dummy continues to exhibit no statistically significant association with |CDA|, indicating that the mere presence of at least one female director does not appear to constrain the overall level of earnings management.

In contrast, the CriticalMass variable becomes negative and statistically significant (-0,016, $p < 0,05$), implying that boards with at least three female directors are associated with lower levels of discretionary accruals in absolute terms. This finding provides additional support for the critical mass argument, suggesting that meaningful female representation on corporate boards is required before governance effects materialize in financial reporting behavior. Importantly, this result persists when focusing on the magnitude rather than the direction of earnings management, thereby strengthening the credibility of the baseline conclusion.

4.4.2. Performance-Matched Discretionary Accruals

As an additional robustness check, this study re-estimates the baseline models using performance-matched discretionary accruals (PM_CDA) as an alternative proxy for earnings management. The performance-matched Modified Jones model follows Kothari et al. (2005, pp. 165, 174) and extends the standard Modified Jones framework by explicitly controlling for firm performance through the inclusion of ROA in the accrual estimation stage. This approach mitigates concerns that discretionary accruals may be mechanically correlated with firm performance rather than managerial discretion.

Table 7 - Regression results using performance-matched discretionary accruals.

PM_CDA	Exp. Sign	Model 1	Model 2	Model 3
Intercept	-	0.114**	0.126***	0.117***
		-0.058	-0.044	-0.044
Female%	-	-0.0004		
		0.00033		
AnyFemale	-		-0.026**	
			-0.012	
CriticalMass	-			-0.004
				-0.007
SIZE	-	-0.003	-0.002	-0.003
		-0.003	-0.002	-0.002
OCF	-	-0.609***	-0.627***	-0.625***
		-0.125	-0.123	-0.122
ROA	±/?	0.537***	0.485***	0.511***
		-0.155	-0.143	-0.148
LEV	+	-0.02	-0.028	-0.025
		-0.032	-0.031	-0.031
GSALES	-/?	-0.021*	-0.024*	-0.023*
		-0.012	-0.013	-0.013
LOSS	+	0.049***	0.044***	0.047***
		-0.016	-0.014	-0.015
Industry		Included	Included	Included
Year		Included	Included	Included
Observations		998	998	998
Adjusted R^2		0.082	0.105	0.1
F-value		2.92	3.02	2.99

PM= performance matched discretionary accruals; Female%=percentage of female directors on the board; AnyFemale=dummy variable equals 1 if there is at least one female on the board, and 0 otherwise; ; CriticalMass = dummy variable equals 1 if there is at least 3 female on the board, and 0 otherwise; SIZE: Firm size; OCF: Operating cash flow; ROA: Firm performance; LEV: Financial leverage; GSALES: Growing sales; LOSS: Coded 1 if the firm has a loss and 0 otherwise.

*** Correlation is significant at the 0.01 level.

** Correlation is significant at the 0.05 level.

* Correlations is significant at the 0.10 level.

Table 7 reports the regression results using PM_CDA as the dependent variable. Model (1) examines the effect of the proportion of female directors (Female%), Model (2) replaces Female% with the AnyFemale indicator, and Model (3) focuses on the CriticalMass dummy.

Across all specifications, the estimated coefficients of the main control variables are largely consistent with the baseline results. OCF remains negative and highly statistically significant in all models, confirming that firms with stronger cash-generating ability engage in less accrual-based earnings management. ROA exhibits a positive and statistically significant association with PM_CDA, suggesting that firm performance remains an important determinant of accrual behavior even after performance matching. The LOSS indicator is positive and significant across all models, indicating that loss-making firms continue to have stronger incentives to manage earnings.

Regarding the key explanatory variables, Female% in Model 1 remains negative but statistically insignificant, consistent with the baseline findings. This suggests that incremental increases in female board representation do not, on their own, exert a statistically detectable effect on performance-matched discretionary accruals in the sample period.

In contrast, AnyFemale in Model 2 is negative and statistically significant (-0,026, $p<0,05$), indicating that firms with at least one female director exhibit significantly lower levels of earnings management when performance effects are controlled for. This result provides evidence that the mere presence of female directors, rather than their proportional representation, may be sufficient to strengthen board monitoring and constrain opportunistic reporting behavior.

The CriticalMass variable in Model 3 remains negative but statistically insignificant. While the coefficient sign aligns with theoretical expectations, the lack of significance suggests that reaching a critical mass of female directors does not lead to additional reductions in earnings management beyond the effect captured by female presence alone. This may reflect limited variation in the CriticalMass indicator or the relatively small number of firms meeting the threshold within the sample.

Overall, the robustness analysis confirms that the main conclusions of the study are not sensitive to the choice of earnings management proxy. In particular, the finding that female board presence is associated with lower earnings management remains robust when using performance-matched discretionary accruals, thereby strengthening the credibility of the baseline results.

5. Discussion

5.1. The Incremental Impact of Gender Diversity (H1)

The primary hypothesis (H1) posited that as the percentage of women on board increases, earnings management would decrease incrementally. This hypothesis is based on arguments from agency theory and ethical decision-making literature, which suggest that female directors naturally enhance monitoring quality, exhibit higher risk aversion, and consequently reduce opportunistic managerial behavior (Gull et al., 2018, p. 258; Pucheta-Martínez et al., 2016, p. 367; Srinidhi et al., 2011, p. 1638; Zalata et al., 2022, p. 104). The baseline regression results reveal a negative but statistically insignificant relationship between the proportion of female directors on the board and discretionary accruals. While the sign of coefficients is consistent with Hypothesis H1 and with much of the prior literature, the lack of statistical significance suggests that proportional female representation alone does not exert a sufficiently strong influence on accrual-based earnings management.

This finding contributes to an ongoing debate in the literature regarding whether gender diversity operates through incremental representation or whether more qualitative aspects of board composition matter (Dobija et al., 2022, p. 41; Gull et al., 2018, p. 256; Rudyanto & Kusnadi, 2025, pp. 6–7). From an agency-theoretical perspective, higher female representation should strengthen monitoring and reduce managerial opportunism (Edeh et al., 2025, p. 9; Pucheta-Martínez et al., 2016, p. 366,369). However, the results indicate that this effect may not materialize automatically as the proportion of female directors increases. One possible interpretation is that proportional representation does not necessarily translate into effective influence over financial reporting decisions, particularly if female directors remain a minority on the board or lack positions on key monitoring committees such as the audit committee (Pucheta-Martínez et al., 2016, p. 378).

From a RDT perspective, one would expect that more women would bring more diverse human capital (skills, expertise) and social capital (connections), thereby improving board performance (Dobija et al., 2022, p. 30; Gull et al., 2018, p. 259; Hillman et al., 2007, p. 948; Pucheta-Martínez et al., 2016, pp. 365–366). The lack of significance here may suggest that in German firms, the resources provided by female directors are not yet being fully utilized in the financial oversight process. This result must be analyzed alongside the German Gender Quota (FüPoG, 2015). Many firms in the sample may be appointing women primarily to comply with the 30% legal requirement. If these appointments are seen as compliance exercises rather than strategic shifts, the diverse perspectives might be

marginalized, preventing the expected improvement in reporting quality (Rixom et al., 2023, pp. 682, 693).

Moreover, the German corporate governance system may attenuate the expected effect of female board representation. Germany´s two-tier board structure, with a clear separation between management and supervisory boards, implies that monitoring responsibilities, are distributed across multiple actors, including supervisory board members, employee representatives, external auditors, and regulators (Jungmann, 2006, pp. 432,

433; Usman et al., 2022, p. 21). In such an institutional setting, the marginal impact of board composition on accrual-based earnings management may be weaker than in one-tier systems where boards play a more centralized monitoring role. As a results, increases in female board representation may improve governance in ways that are not immediately reflected in accrual-based earnings management measures.

Finally, the lack of an incremental impact can be explained by complex sociological dynamics within the boardroom environment. Corporate governance sociology suggests that as a minority group (women) gradually grows in proportion, the established dominant in-group (men) may subconsciously or overtly react with exclusionary behavior (Abebe & Dadanlar, 2021, p. 7; Huang et al., 2020, p. 360; Pucheta-Martínez et al., 2016, p. 376). Torchia et al. (2011, p. 310) note that dominant majorities frequently feel threatened by shifting demographics, leading them to exaggerate social differences and tighten their informal decision-making networks. This polarization can result in social loafing or the deliberate exclusion of the growing female minority from pre-meeting technical discussions. Therefore, even as the percentage of women increases incrementally, these entrenched sociological barriers effectively prevent the additional female members from translating their numerical growth into an incremental impact on technical accounting oversight.

5.2. The Influence of Mere Presence (H2)

Hypothesis 2 focused on whether the mere presence of at least one female director (AnyFemale) influences board dynamics and monitoring intensity. While the presence of at least one female director is not significant is the baseline model using signed discretionary accruals (Table 5), the robustness check using the Kothari et al. (2005, p. 165) performance-matched model (Table 7) revealed a statistically significant negative association at the 5% level. This suggests that the transition from homogenous, all-male board to a heterogeneous one represents a critical juncture for financial reporting quality.

This finding provides a partial support for the Agency Theory perspective and suggests that female board presence may influence the overall intensity of earnings management once firm performance is adequately controlled for. Jensen and Meckling (1976, pp. 308–309) define the board´s role as mitigating the agency costs that arise when manager´s interests diverge from those of shareholders. Huang et al. (2020, p. 360) show that even a single female director can fundamentally alter board vigilance. The presence of a gender outsider can disrupt established groupthink and internal social cohesion among male directors, which often allows aggressive accounting practices to go unchallenged (Conyon & He, 2017, p. 199; Edeh et al., 2025, p. 2). From a governance perspective, this supports the argument that even a single female director can alter board dynamics by introducing different perspectives, increasing ethical sensitivity, or enhancing monitoring effort. Even a single female director can disrupt groupthink and demand higher transparency, thereby reducing the agency costs associated with opportunistic reporting (Huang et al., 2020, p. 360).

Furthermore, behavioral and ethical decision-making theories offer a psychological basis for this finding. Literature consistently suggests that female directors exhibit higher levels of ethical sensitivity and a lower tolerance for risk-taking compared to their male counterparts (Arun et al., 2015, p. 138; Edeh et al., 2025, p. 2). The presence of a woman acts as a credible deterrent against earnings manipulation (Gull et al., 2018, pp. 271–272). Managers, anticipating a more conservative and risk-averse oversight style, may preemptively reduce their use of discretionary accruals to avoid the reputational and legal risks associated with financial misstatements. This deterrence effect appears to be triggered by the simple presence of a diverse perspective, regardless of the specific percentage of seats held.

However, the fact that H2 was statistically significant while the linear representation (H1) was not, suggests a diminishing marginal utility of gender diversity in the specific area of AEM. Once the initial monitoring shock of the first female appointment is absorbed, further increases may be subject to the "Substitution Effect" discussed in Chapter 2.2.3. As the board becomes more transparent and AEM becomes harder to hide, managers may shift their opportunistic REM (Yang et al., 2025, pp. 15, 17). Because REM involves operational decisions, such as cutting R&D or overproducing inventory. Because of this it is often harder for a Supervisory Board to identify as unethical manipulation (Roychowdhury, 2006, pp. 336–337). Thus, while the mere presence of a woman (H2) successfully closes the door on traditional accounting manipulation, it may unintentionally push management toward more sophisticated, operational forms of earnings management that are less visible in accrual-based measures.

RDT suggests that diversity provides a firm with a broader range of human capital and external links (Conyon & He, 2017, p. 199; Dobija et al., 2022, p. 31; Hillman et al., 2002, pp. 758-759,; Kent Baker et al., 2020, p. 241).. The lack of significance here may suggest that in German firms, the resources provided by female directors are not yet being fully utilized in the financial oversight process. This result must be analyzed alongside the German Gender Quota (FüPoG, 2015). Many firms in the sample may be appointing women primarily to comply with the 30% legal requirement. If these appointments are seen as compliance exercises rather than strategic shifts, the diverse perspectives might be marginalized, preventing the expected improvement in reporting quality (Rixom et al., 2023, p. 681).

Finally, the institutional specificities of the German two-tier system must be considered. In a system where the Supervisory Board is structurally separated from the Management Board, the presence effect may be more about a change in the culture of oversight than a change in technical accounting expertise (Jungmann, 2006, pp. 432,

433). While the Management Board prepares the accounts, the Supervisory Board's role is to challenge them. The presence of at least one woman may effectively change the questioning culture of the supervisory board, even if the structural distance prevents a linear relationship from forming as more women join (Dobija et al., 2022, pp. 31, 39, 41).

5.3. The Critical Mass Hypothesis (H3)

Hypothesis 3 (H3) extended the investigation beyond mere presence to examine the critical mass effect, positing that the benefits of gender diversity for financial reporting quality only fully materialize when at least three women are present on the board. This hypothesis is rooted in the transition from a minority being perceived as tokens to becoming substantive voice capable of shifting from group dynamics(Liu et al., 2014, p. 171; Torchia et al., 2011, p. 302). The empirical results show that the CriticalMass variable is statistically insignificant in the baseline models and in the performance-matched specifications, although it becomes significant when the absolute value of discretionary accruals is used.

From the perspective of Critical Mass Theory, the lack of significance suggests that German listed firms may not yet have reached a stage where a triple-female presence fundamentally reconfigures the power balance within the boardroom. According to Torchia et al. (2011, pp. 311–312) while one or two women are often marginalized as tokens, three women constitute a tipping point that facilitates higher levels of dissent and more rigorous information

processing. The insignificant findings in this study may imply that even when the count of women reaches three, their substantive influence on technical accounting oversight is not yet powerful enough to be reflected in a reduction of discretionary accruals.

This result must be critically interpreted within the context of the German Gender Quota (2015). Institutional pressures such as mandatory quotas can lead to symbolic adoption (Srinidhi et al., 2011, p. 1634; Usman et al., 2022, p. 13). If firms increase female representation to three or more members solely to comply with legal mandates, these directors may be subject to decoupling, where their presence on the board is visible but their actual involvement in the audit or financial reporting processes is limited (Rixom et al., 2023, p. 694). Furthermore, as noted in Mandating Diversity (California Legislature, 2018, p. 4), if investors and managers perceive quota-driven appointments as a legal box-ticking exercise, the perceived legitimacy of these directors may be undermined, preventing them from exercising the influence necessary to curb opportunistic earnings management.

This interpretation is further supported by the descriptive distribution of the sample which is shown in Table 8. Statistical analysis reveals that the lack of significance for H3 cannot be attributed to a lack of statistical power or a skewed distribution. Specifically, 52% of the firm-year observations in the dataset have already reached the critical mass threshold of three or more women, while 48% have not. This nearly equal distribution provides an ideal environment for the model to detect a treatment effect if one existed. Furthermore, variance inflation factor scores for the CriticalMass variable remain well below the conservative threshold of 3, ruling out multicollinearity as a cause for the inflated standard errors.

Table 8 - Distribution of Firm-Year Observations by Critical Mass Threshold

	Critical Mass (3+ women on board)		
Year	Not achieved	Achieved	Total
2016	27	39	66
2017	33	43	76
2018	38	51	89
2019	55	56	111
2020	68	61	129
2021	69	65	134
2022	70	65	135
2023	66	65	131
2024	56	71	127
Total	482 (48%)	516 (52%)	998

Consequently, the statistical insignificance of H3 is a substantive finding: it suggests that in the contemporary German context, reaching the number of three female directors is a normalized state rather than a rare tipping point. When more than half of the market has achieved this threshold (likely due to the institutionalization of the 2015 Gender Quota) the unique monitoring advantage once theorized by critical mass researchers may become a baseline expectation, thereby losing its power to statistically distinguish firms' earnings management behaviors.

Moreover, the German Two-Tier System serves as a significant institutional moderator that may dilute the critical mass effect. Because the quota applies specifically to the supervisory board, a critical mass of women may be successfully monitoring the final outputs, yet they remain structurally buffered from the Management Board, which is responsible for the day-to-day operational decisions that drive accrual estimates. As suggested by Adams and Funk (2012, pp. 230–231) and the impact of a diverse board is contingent upon its proximity to the actual decision-making process. In the German dual-board structure, the marginal benefit of moving from two to three women may be attenuated by this structural distance, making it difficult to detect a significant shift in AEM measures.

5.4. The Substitution Effect and Real Earnings Management (REM)

The final area of discussion pertains to the interplay between different earnings management strategies. The overall weak significance of the AEM results leads to an important theoretical discussion regarding the Substitution Effect (discussed in Chapter 2.2.3). While the previous sections focused on AEM, the theoretical framework in Chapter 2.2.3 highlighted that managers do not operate in a vacuum; rather, they choose between AEM and REM based on the relative costs and visibility of each method. Although this study did not empirically test REM, the findings regarding AEM must be interpreted through the lens of the substitution effect.

From a theoretical standpoint, Yang et al. (2025, p. 5) posits that when the accounting gate is tightened through stricter monitoring, managers are incentivized to shift toward operational manipulations. Real earnings management involves purposeful deviations from optimal business practices, such as price discounts to temporarily boost sales, overproduction to lower cost of goods sold, or the reduction of discretionary expenditures like R&D, to meet specific earnings targets (Roychowdhury, 2006, p. 338; Yang et al., 2025, p. 3). Because these actions represent actual business decisions, they are significantly more

difficult for a supervisory board to distinguish from legitimate strategic responses to market conditions than accounting-based accruals (Ewert & Wagenhofer, 2005, p. 1106).

The significance of H2 (AnyFemale) suggests that the mere presence of gender diversity on the board enhances vigilance and disrupts the groupthink that often facilitates blatant AEM. As women directors demand higher transparency and conservative accounting (Arun et al., 2015, p. 141; Gull et al., 2018, p. 259; Pucheta-Martínez et al., 2016, pp. 364, 376; Srinidhi et al., 2011, p. 1613), the cost of managing earnings through accruals increases due to the higher probability of detection and subsequent reputational damage. However, if this monitoring intensity does not extend to the technical complexities of operational decision-making, managers may substitute AEM with REM. This would explain why an increase in the proportion of women (H1) or a critical mass (H3) might not result in a further linear decrease in AEM; the low-hanging fruit of accrual manipulation has already been restricted, and the remaining manipulation has migrated to the real activity domain.

Furthermore, the German Two-Tier Board System likely exacerbates this substitution. While the Supervisory Board has the legal authority to oversee the financial statements (AEM), it is structurally prohibited from interfering in the day-to-day management of the firm, which is the domain where REM occurs. As Martinez Garcia et al. (2024, p. 12) note, institutional settings define the reach of board monitoring. In Germany, female directors may be highly effective at policing the auditor and the final accounts, but they lack the operational proximity to prevent a CEO from cutting a vital R&D project to save the quarterly profit. Consequently, the presence of gender diversity may lead to a "cleaning" of the balance sheet, while operational inefficiencies (REM) persist or even increase.

In summary, the substitution effect suggests that the impact of gender diversity on earnings quality is a zero-sum game if monitoring is not holistic. If female directors act as a deterrent for AEM but are excluded from operational oversight, the overall quality of earnings may not improve as expected. This underscores the importance of future research, incorporating REM proxies to determine if gender-diverse boards in Germany are truly reducing total earnings management or simply forcing it into more opaque, operational channels (Rudyanto & Kusnadi, 2025, p. 1; Usman et al., 2022, p. 28).

As AEM becomes more difficult to execute due to increased monitoring (driven by gender diversity and stricter European auditing standards), managers may shift their efforts toward REM. Since REM involves operational decisions (like cutting R&D or overproducing inventory) that are harder for a supervisory board to detect than accounting entries, the

impact of gender diversity might be hidden in operational data that this study's AEM models do not capture (Ewert & Wagenhofer, 2005, p. 1106; Yang et al., 2025, pp. 3, 5).

5.5. Summary of Analysis

The overarching analysis of the empirical results suggests a complex and non-linear relationship between board gender diversity and earnings management within the German capital market. By evaluating the three levels of diversity, incremental proportion (H1), binary presence (H2), and critical mass (H3), this study reveals that the impact of female directors is heavily moderated by the institutional framework of the German two-tier board system and the recent legislative mandate for gender quotas.

Table 9 - Synthesis of Findings

Hypothesis	Relationship tested	Proxy	Expected Sign	Result	Supported
H1	A higher % of female directors is associated with lower discretionary accruals.	Female%	Negative (-)	Negtive but statistically insignificant	Not supported
H2	Firms with at least one female director exhibit lower discretionary accruals.	AnyFemale	Negative (-)	Negative and significant in performance-matched model	Partially supported
H3	Negative association between female directors and discretionary accruals strengthens when the board reaches a critical mass	CriticalMass	Negative (-)	Insignificant in baseline models; significant only for absolute accruals	Mixed Evidence

The primary conclusion drawn from the analysis is that the mere presence of at least one female director (H2) serves as the most potent catalyst for enhancing financial reporting quality. From an agency-theoretical perspective, this finding confirms that the disruption of boardroom homogeneity is a necessary condition for improved monitoring vigilance (Banerjee et al., 2024, p. 62; Rose, 2007, p. 405). The significance of H2, contrasted with the insignificance of H1 and H3, suggests that the monitoring shock provided by the first female appointment creates a shift in the board's questioning culture that is not necessarily amplified by simply adding more women to the group.

However, the lack of significance for proportional representation (H1) and critical mass (H3) highlights a compliance paradox inherent in the German 30% quota. While the quota has successfully increased the number of women on supervisory boards, the results suggest that these increases may be subject to symbolic adoption (De Acutis et al., 2024, p. 3). If firms appoint women primarily to fulfill legal requirements rather than as a strategic integration of diverse human capital, the expected benefits of resource dependence theory may remain unfulfilled. The marginalized out-group status of female directors, potentially exacerbated by the structural distance between the Supervisory and Management Boards, likely prevents higher percentages of diversity from translating into a measurable reduction of discretionary accruals (Abebe & Dadanlar, 2021, p. 7).

Finally, the discussion of the Substitution Effect provides a vital qualification to the study's findings. The results indicate that while gender diversity may successfully constrain AEM, this success might be a zero-sum game if managers respond by shifting manipulation toward more opaque REM. This suggests that the presence of female directors makes the accounting books cleaner, but the institutional buffer of the two-tier system may leave operational manipulations outside the reach of their oversight. Ultimately, this thesis demonstrates that gender diversity is an effective governance tool for enhancing transparency, but its impact is constrained by the very structures designed to distribute power within the German corporate landscape.

6. Conclusion and Limitations

This thesis examined whether board gender diversity influences earnings management in German listed firms. Specifically, the study investigated whether a higher proportion of female directors (H1), the mere presence of women on the board (H2), or the achievement of a critical mass of female representation (H3) is associated with lower levels of accrual-based earnings management. Using a panel dataset of 998 firm-year observations from German listed companies between 2016 and 2024, discretionary accruals estimated through the Modified Jones model served as the primary proxy for earnings management.

The empirical analysis provides several important insights. First, the results indicate that the proportion of female directors on corporate boards is negatively related to discretionary accruals, although the relationship is not statistically significant. This suggests that while gender diversity may directionally improve monitoring and financial reporting quality, incremental increases in female board representation alone are insufficient to produce a statistically detectable reduction in earnings management. This finding contrasts with earlier

empirical studies conducted in other institutional contexts that document a strong negative association between female board representation and earnings manipulation (Arun et al., 2015, p. 138). One explanation may lie in the institutional structure of the German corporate governance system, where monitoring responsibilities are distributed across several actors, including supervisory boards, auditors, and employee representatives, thereby reducing the marginal impact of board composition on financial reporting oversight.

Second, the results provide partial support for the hypothesis that the mere presence of female directors can improve financial reporting quality. While the baseline model using signed discretionary accruals does not yield statistically significant results, the robustness analysis using performance-matched discretionary accruals indicates that firms with at least one female director exhibit significantly lower levels of earnings management. This finding suggests that the transition from a completely male board to a gender-diverse board may represent an important governance threshold. Prior research suggests that female directors tend to demonstrate stronger monitoring behavior, higher ethical sensitivity, and greater diligence in board activities, which can strengthen oversight of financial reporting processes (Adams & Ferreira, 2009, p. 296; Srinidhi et al., 2011, pp. 1614, 1638). Consequently, even the presence of a single female director may disrupt groupthink and increase scrutiny over managerial accounting decisions.

Third, the analysis does not provide strong evidence supporting the critical mass hypothesis. While the presence of three or more female directors becomes significant in one robustness specification using absolute discretionary accruals, the effect is not consistently observed across the baseline and performance-matched models. These results suggest that numerical representation alone may not guarantee meaningful influence within the boardroom. Critical mass theory argues that minority members gain influence once their representation reaches a certain threshold (Torchia et al., 2011, p. 311). However, the findings of this study indicate that achieving a numerical threshold does not automatically translate into greater oversight effectiveness. Instead, the influence of female directors may depend more strongly on their roles within board committees, particularly audit committees, which are directly responsible for financial reporting oversight (Pucheta-Martínez et al., 2016, pp. 365–367).

The findings also highlight the importance of institutional context. Germany's two-tier board system structurally separates management and supervisory boards, potentially limiting the ability of supervisory board members to influence day-to-day operational decisions related to financial reporting. Additionally, the 2015 German gender quota may have increased

female representation primarily through regulatory compliance rather than through voluntary strategic appointments. Previous research suggests that quota-driven board appointments may sometimes be perceived as symbolic or compliance-oriented, which can reduce the perceived authority and influence of female directors within boardroom decision-making processes (Rixom et al., 2023, pp. 682, 693). These institutional characteristics may partially explain why increases in female representation do not consistently translate into measurable reductions in discretionary accruals.

Another important implication concerns the potential substitution between different forms of earnings management. Prior literature shows that managers can substitute between accrual-based earnings management and real earnings management depending on monitoring intensity and regulatory constraints (Cohen & Zarowin, 2010, pp. 3, 12; Roychowdhury, 2006, p. 338). If gender-diverse boards strengthen oversight of accounting choices, managers may shift toward operational forms of earnings management that are more difficult to detect. Since this study focuses on accrual-based earnings management, it cannot directly assess whether such substitution occurs in German firms. Future research could therefore extend the analysis by incorporating measures of real earnings management to provide a more comprehensive assessment of earnings manipulation strategies.

Overall, the findings contribute to the growing literature on corporate governance and board diversity by demonstrating that the relationship between gender diversity and earnings management is complex and highly dependent on institutional context. While female representation on boards appears to enhance monitoring in certain circumstances, the effect is not universally linear and may depend on factors such as board structure, committee assignments, and regulatory environments. These results suggest that policies promoting gender diversity may improve governance outcomes, but the effectiveness of such policies depends on how female directors are integrated into the board's decision-making structure.

This study also offers practical implications for policymakers and firms. For regulators, the results suggest that mandatory gender quotas may successfully increase female representation but may not automatically translate into improved financial reporting quality unless accompanied by measures that ensure meaningful participation in governance processes. For firms, the findings highlight the importance of integrating female directors into key oversight roles, particularly audit committees, where their monitoring capabilities can have the greatest impact on financial reporting integrity.

Despite its contributions, this study is subject to several limitations. First, the analysis focuses exclusively on accrual-based earnings management, which captures only one dimension of financial reporting manipulation. Second, the sample is limited to German listed firms and may therefore not be fully generalizable to other institutional settings. Third, the measurement of board gender diversity is based primarily on numerical representation and does not capture qualitative aspects such as directors' expertise, independence, or committee membership, which may influence monitoring effectiveness.

Future research could address these limitations by examining both accrual-based and real earnings management simultaneously, expanding the analysis to cross-country datasets, and incorporating more detailed governance characteristics such as audit committee composition or director expertise. Such extensions would provide a more comprehensive understanding of how gender diversity interacts with corporate governance mechanisms to influence financial reporting behavior.

In conclusion, this thesis provides evidence that board gender diversity may contribute to improved financial reporting oversight in German listed firms, particularly through the presence of female directors. However, the results also demonstrate that numerical representation alone is insufficient to guarantee stronger governance outcomes. The effectiveness of gender diversity in reducing earnings management ultimately depends on institutional structures, board dynamics, and the substantive roles female directors occupy within corporate governance systems.

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Appendices:

Appendix A: Abstract

This thesis investigates whether board gender diversity influences earnings management in German listed firms following the introduction of the 2015 *Law for the Equal Participation of Women and Men in Leadership Positions* (FüPoG), which mandated a 30 percent female quota for supervisory boards. While prior literature suggests that gender-diverse boards may strengthen corporate governance and improve financial reporting quality, empirical evidence remains mixed and largely focuses on single-tier board systems. Germany's two-tier governance structure therefore provides a unique institutional setting to examine whether female representation on supervisory boards constrains managerial opportunism.

Using a panel dataset of 998 firm-year observations from German listed companies between 2016 and 2024, this study examines the relationship between board gender diversity and accrual-based earnings management. Discretionary accruals are estimated using the Modified Jones model and analyzed through multivariate regression models. The analysis tests three hypotheses that distinguish between proportional representation, the presence of female directors, and critical mass effects.

The results indicate that the proportion of female directors is negatively but not significantly associated with discretionary accruals. However, the presence of at least one female director significantly reduces earnings management in performance-matched models. In contrast, the critical mass hypothesis receives only limited support. Overall, the findings suggest that the governance impact of gender diversity in German supervisory boards operates primarily through the presence of female directors rather than through incremental increases in representation.

These results contribute to the literature on corporate governance and financial reporting by providing new evidence from the German two-tier board system and by evaluating the effectiveness of gender quota legislation in improving board monitoring.

Appendix B: Abstrakt

Diese Arbeit untersucht, ob die Geschlechterdiversität in Vorständen und Aufsichtsräten das Gewinnmanagement deutscher börsennotierter Unternehmen nach der Einführung des Gesetzes für die gleichberechtigte Teilhabe von Frauen und Männern an Führungspositionen (FüPoG) aus dem Jahr 2015 beeinflusst, welches eine Frauenquote von 30 Prozent für Aufsichtsräte vorschreibt. Während frühere Studien darauf hinweisen, dass geschlechterdiverse Boards die Corporate Governance stärken und die Qualität der Finanzberichterstattung verbessern können, ist die empirische Evidenz bislang uneinheitlich und konzentriert sich überwiegend auf Ein-Board-Systeme. Das deutsche Zwei-Säulen-System der Unternehmensführung bietet daher einen besonderen institutionellen Kontext, um zu untersuchen, ob weibliche Repräsentation in Aufsichtsgremien opportunistisches Verhalten des Managements begrenzen kann.

Anhand eines Panel-Datensatzes von 998 Firmenjahr-Beobachtungen deutscher börsennotierter Unternehmen aus den Jahren 2016 bis 2024 untersucht diese Studie die Beziehung zwischen der Geschlechterdiversität im Aufsichtsrat und dem accrual-basierten Gewinnmanagement. Diskretionäre Accruals werden mithilfe des modifizierten Jones-Modells geschätzt und durch multivariate Regressionsmodelle analysiert. Die Analyse testet drei Hypothesen, die zwischen proportionaler Repräsentation, der reinen Präsenz weiblicher Aufsichtsratsmitglieder und Effekten der kritischen Masse (Critical Mass) unterscheiden.

Die Ergebnisse zeigen, dass der Anteil weiblicher Directors negativ, jedoch nicht signifikant mit diskretionären Abgrenzungen zusammenhängt. Dagegen reduziert bereits die Präsenz mindestens einer weiblichen Director das Earnings Management signifikant in performance-gematchten Modellen. Für die Critical-Mass-Hypothese findet sich hingegen nur begrenzte empirische Unterstützung. Insgesamt deuten die Ergebnisse darauf hin, dass der Governance-Effekt von Geschlechterdiversität in deutschen Aufsichtsgremien vor allem über die Präsenz weiblicher Directors wirkt und weniger über eine schrittweise Erhöhung ihres Anteils.

Diese Ergebnisse leisten einen Beitrag zur Literatur über Corporate Governance und Finanzberichterstattung, indem sie neue Erkenntnisse aus dem deutschen dualen Board-System liefern und die Wirksamkeit der gesetzlichen Frauenquote im Hinblick auf die Verbesserung der Aufsichtsratskontrolle bewerten.

Appendix C: Hausman Test and Variance Inflation Factors

Fixed and Random Effects Model

	(1) Fixed Effects	(2) Random Effects
Female%	0.00114	-0.000115
	(0.00119)	(0.000688)
Board_size	-0.0110	-0.00149
	(0.0128)	(0.00278)
SIZE	0.0679**	-0.0226***
	(0.0335)	(0.00752)
ROA	-0.232	-0.114
	(0.195)	(0.146)
GSALES	-0.0326	-0.0341
	(0.0350)	(0.0323)
Constant	-1.270*	0.618***
	(0.718)	(0.142)
Observations	998	998
R-squared	0.0127	

Female%=percentage of female directors on the board; Board_size = the size of the board; SIZE=firm size as measured by natural logarithm of total assets; ROA=firm's performance as measured by net revenue to total assets ratio; GSALES=growing sales
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Hausman test

```
.  hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
female_prc	.0011353	-.0001154	.0012507	.0009676
board_size	-.0110187	-.0014915	-.0095272	.0125413
SIZE	.0678985	-.02256	.0904585	.0326217
ROA	-.2317619	-.113691	-.118071	.1288615
GSALES	-.0325798	-.0341034	.0015236	.0134838

b = Consistent under H0 and Ha; obtained from **xtreg**.
B = Inconsistent under Ha, efficient under H0; obtained from **xtreg**.

```
Test of H0: Difference in coefficients not systematic

    chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =  16.32
Prob > chi2 = 0.0060
```

Variance Inflation Factors

Variance inflation factors of board size, firm size and female percentage.

Variable	VIF	1/VIF
board_size	**2.60**	**0.384280**
SIZE	**2.50**	**0.400429**
female_prc	**1.30**	**0.768072**
GSALES	**1.05**	**0.954417**
ROA	**1.05**	**0.954672**
Mean VIF	**1.70**	

Variance inflation factors for the CriticalMass variable (H3)

Variable	VIF	1/VIF
CriticalMass	**1.31**	**0.765587**
SIZE	**1.50**	**0.665352**
OCF	**1.57**	**0.635519**
ROA	**2.55**	**0.391841**
LEV	**1.36**	**0.736236**
GSALES	**1.15**	**0.868023**
LOSS	**1.76**	**0.566899**
icb_id		
3	**2.00**	**0.499617**
4	**1.55**	**0.646416**
5	**2.05**	**0.487132**
7	**2.16**	**0.463709**
8	**3.26**	**0.306417**
9	**1.41**	**0.710335**
11	**1.46**	**0.685613**
12	**3.37**	**0.296565**
13	**1.71**	**0.584582**
year		
2017	**1.83**	**0.546398**
2018	**1.87**	**0.534237**
2019	**1.95**	**0.512495**
2020	**2.10**	**0.475359**
2021	**2.09**	**0.479434**
2022	**2.11**	**0.473612**
2023	**2.05**	**0.487412**
2024	**2.04**	**0.490095**
Mean VIF	**1.93**	