The Determinants and Consequences of Board Faultlines: Evidence from China

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ABSTRACT

This thesis examines how board faultlines, subgroup divisions arising from directors' demographic and experiential attributes, shape corporate governance outcomes in China. To capture the multidimensional configuration of director attributes, the thesis employs the average silhouette width (ASW) algorithm to quantify board faultlines. Using 28,528 firm-year observations of Chinese A-share listed firms from 2008 to 2021, the thesis adopts an empirical, three-essay design that traces board faultlines from their formation context to their internal and external governance implications.

The first essay synthesises the literature on board faultlines and their measurement. Complementing this review is an exploratory empirical analysis of faultline patterns across firm life cycle stages and broad industry sectors. Using non-parametric comparisons, the evidence shows systematic variation in faultline strength across life cycle stages—specifically an inverted-U-shaped pattern that peaks in the growth stage—and pronounced differences between the secondary industrial sector and the tertiary service sector. The second essay examines the internal governance consequences of board faultlines for corporate innovation. The results show that stronger faultlines are positively associated with innovation output, and this association is partially explained by financial reporting quality. This is consistent with the notion that faultlines strengthen oversight and improve the information environment. State ownership weakens the innovation benefits. The third essay examines how board faultlines influence audit outcomes. The evidence indicates a significant negative association between faultlines and audit fees, and mediation analyses show that both financial reporting quality and audit report lag partially transmit this relationship. The audit fee reduction is stronger in firms with qualified foreign institutional investors, while the association does not differ significantly between the period under the One-Child Policy and the period following its relaxation. Endogeneity concerns are addressed using instrumental variables and inverse probability matching, and the findings are robust to alternative faultline measures.

Overall, the thesis provides China-based evidence that structured heterogeneity within boards is consequential for monitoring, information quality, and external audit outcomes. Rather than treating faultlines as uniformly detrimental, the findings highlight that board subgroup structures can be associated with governance benefits in China's concentrated ownership environment, while also introducing coordination frictions that surface in audit timeliness.

Key Words: board faultline; audit fee; financial reporting quality; corporate innovation; audit report lag; China

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

GLOSSARY

2SLS	Two-Stage Least Squares
ARL	Audit Report Lag
ASW	Average Silhouette Width
CEO	Chief Executive Officer
CICPA	Chinese Institute of Certified Public Accountants
CPA	Certified Public Accountant
CSA	China Standards on Auditing
CSMAR	China Stock Market and Accounting Research
CSRC	China Securities Regulatory Commission
DAC	Discretionary Accruals
FAU	Faultline Alignment Utility
FRQ	Financial Reporting Quality
GMM	Generalised Method of Moments
IAASB	International Auditing and Assurance Standards Board
IPM	Inverse Probability Matching
IPR	Intellectual Property Rights
IV	Instrumental Variable
KAMs	Key Audit Matters
LCCA	Latent Class Analysis
MOF	Ministry of Finance
OCP	One-Child Policy
ODT	Optimal Distinctiveness Theory
OLS	Ordinary Least Squares
PMD	Polarised Multidimensional Diversity Index
PSM	Propensity Score Matching
QFII	Qualified Foreign Institutional Investors
R&D	Research and Development
RDT	Resource Dependence Theory
REM	Real Earnings Management
SCT	Self-Categorisation Theory
SIT	Social Identity Theory
SMD	Standardised Mean Differences
SOE	State-Owned Enterprise
SSE	Shanghai Stock Exchange
SZSE	Shenzhen Stock Exchange
TMTs	Top Management Teams
UET	Upper Echelons Theory
VIF	Variance Inflation Factor

CHAPTER ONE: INTRODUCTION

1.1 Aim of Research

Group-level strategic decision-making has attracted considerable attention in accounting research (Barker and Barr, 2002; Nielsen and Huse, 2010; Wu, Triana, Richard, and Yu, 2021; Liu and Van Peteghem, 2022; Huang and Zhu, 2024). Prior studies have highlighted how group composition and team dynamics shape organisational outcomes, underscoring the board of directors' role in decision-making and monitoring at the apex of the organisational hierarchy (Forbes and Milliken, 1999; Haleblian and Rajagopalan, 2006). Understanding how board composition and interpersonal dynamics affect firm outcomes is therefore both theoretically and practically important (Van Ees, Gabrielsson and Huse, 2009; Mendiratta, 2023).

This thesis examines the determinants and consequences of board faultlines, focusing on their implications for corporate innovation and audit fees. Following Lau and Murnighan (1998), a faultline is a hypothetical dividing line that splits a group into subgroups based on aligned attributes; members within a subgroup share similarities that differentiate them from others, yielding distinctive behavioural patterns. Applied to corporate boards, the faultline perspective explains how directors may group along certain demographic and professional traits. It extends the traditional view of board diversity by focusing on the patterning of difference, specifically how aligned attributes create subgroups that shape communication, cohesion, and the potential for conflict, rather than on diversity levels alone. Board faultlines are measured using average silhouette width (ASW), a cluster-based measure that evaluates how closely each director resembles members of their own subgroup relative to members of alternative subgroups. Higher ASW values indicate more internally cohesive and clearly separated subgroups and, therefore, stronger potential board faultlines.

Conceptually, faultlines are not merely a by-product of diversity but a structural feature of board composition that can moderate governance effectiveness. Mechanistically, board faultlines can influence innovation by affecting information integration, coalition building, and risk tolerance, and can influence audit pricing by altering auditors' perception of governance quality and engagement risk. While prior work has often emphasised the potential downsides of faultlines for board effectiveness (Van Peteghem, Bruynseels, and Gaeremynck, 2018), this thesis examines both the conditions under which faultlines emerge and their governance consequences, offering a more balanced and empirically grounded perspective.

The empirical setting is China, chosen for three key reasons. First, the bases on which faultlines form in China differ markedly from Western contexts (Li, Barner-Rasmussen, and Björkman, 2007; Xiao and Tsui, 2007). Whereas Western social categories often centre on race or religion (Thomas, 1990), the Chinese way of categorisation more commonly reflects age, kinship, hometown, educational background, work experiences, or other shared experiences (Farh, Tsui, Xin, and Cheng, 1998; Xiao and Tsui, 2007). This enables a locally relevant construction of board faultlines. Second, shaped by Confucian values, relationship building and “circles” (guanxi-based networks) are salient in Chinese business (Chen and Chen, 2004; Chen, Ye, and Jebran, 2019), potentially amplifying faultline effects within boards. Third, China’s institutional diversity (e.g., SOEs vs. private firms), governance reforms, and relatively rich director disclosures provide variation and data necessary to carefully measure faultlines and jointly identify their effects with precision.

1.2 Overview of the Three Essays

This thesis comprises three interrelated essays that collectively examine the determinants and consequences of board faultlines. The essays are structured sequentially, moving from the structural antecedents of board faultlines to their implications for firms’ strategic decisions and external governance outcomes.

1.2.1 An Exploratory Study of Variations in Board Faultlines Across Organisational and Contextual Conditions

The first essay investigates the structural and organisational conditions under which board faultlines emerge. Its primary objective is to move beyond traditional, often simplistic, measures of board composition and identify the underlying firm-level characteristics that systematically lead to the formation and salience of intra-board divisions.

The conceptual imperative for this essay arises from the enduring "diversity paradox" (van Knippenberg and Schippers, 2007; Ghosh et al., 2023). Traditional diversity research, which examined attributes like gender or age in isolation, frequently failed to establish a consistent relationship between board diversity and organisational outcomes (Milliken and Martins, 1996; Williams and O’Reilly, 1998). This paradox highlights that diversity’s true impact is not determined by the mere presence of varied traits, but by the manner in which these traits interact and align within the group.

The concept of a board faultline (Lau and Murnighan, 1998; Thatcher and Patel, 2012) offers a sophisticated theoretical solution. Faultlines are defined as hypothetical dividing lines that segment the board into relatively homogeneous subgroups based on the systematic alignment of directors' multifaceted attributes (demographic, cognitive, and professional). The core argument is that when a large number of characteristics converge (e.g., all directors who are younger also share a specific functional background and shorter tenure), the resulting strong faultline may create a high potential for subgroup conflict, communication breakdown, or closer monitoring of the management team (Li and Hambrick, 2005; Bezrukova, Jehn, Zanutto, and Thatcher, 2009). This can foster the formation of factions, thereby acting as a powerful moderator of a board's effectiveness. Therefore, the first step in exploring the consequences of faultlines is to understand why and when these strong divisions emerge.

Accordingly, the first essay addresses the following research question: How do board faultlines vary across organisational and contextual conditions that may shape the configuration of directors' demographic and experiential attributes in Chinese listed firms?

To address this research question, the essay examines whether board faultline strength varies systematically across two major firm-level contexts: the company's life-cycle stage and industry sector. These contexts may shape the demographic and experiential configuration of the board and, consequently, the strength of potential subgroup divisions. Drawing on established frameworks of firm evolution (Coase, 1937; Dickinson, 2011), this research proposes that the board composition required at different stages of a firm's life cycle—*introduction, growth, maturity, shake-out, and decline*—may influence the mix and alignment of director attributes, thereby contributing to variation in faultline strength (Habib, Bhuiyan, and Hasan, 2018). The empirical analysis provides strong support for this proposition. Across life-cycle stages, faultline strength differs systematically. In particular, faultline strength is significantly higher in *shake-out* firms than in *mature* firms, consistent with the greater instability and strategic refocus during the *shake-out* phase. Significant differences are also observed between *decline* and *growth* firms and between the *introduction* and *mature* stages. Taken together, these findings suggest that the strategic demands associated with different life-cycle stages may shape the required board composition and, consequently, board faultline strength. The essay also investigates the systematic variation of board faultlines across different industry sectors. Because expertise and oversight requirements differ sharply across sectors, boards require different attribute profiles. The empirical results confirm this determinant role. Notably, faultline strength differs considerably between the secondary and tertiary sectors, suggesting that the tertiary sector's complexity and service orientation require a board whose attribute alignment differs fundamentally from that of the goods-producing secondary sector.

By thoroughly analysing these organisational and contextual determinants, the first essay establishes a robust framework for understanding when and why board faultlines emerge in the Chinese context. This crucial empirical foundation enables the two subsequent essays to reliably explore the consequences of these measured faultlines on critical organisational outcomes. It also contributes to advancing faultline theory in the governance literature.

1.2.2 Consequences of Board Faultlines: Corporate Innovation

The second essay builds upon the insights of the first, shifting the analytical focus from the antecedents of board composition to the consequences of intra-board divisions. Specifically, it investigates how board faultlines shape corporate innovation outcomes, and critically, how financial reporting quality (FRQ) mediates this relationship. The essay is motivated by the understanding that once faultlines emerge within a board, they fundamentally alter group dynamics, influencing strategic decision-making, governance effectiveness, and ultimately, firm-level innovation.

Corporate innovation, broadly defined as the generation and implementation of new ideas, products, or processes, is widely recognised as a key driver of long-term firm value and national economic development. However, the board's role in fostering innovation is complex and multifaceted. Diversity, often a precursor to faultline formation, can introduce novel perspectives, cognitive variety, and access to broader networks, all of which are conducive to innovation (Milliken and Martins, 1996; Hundschell, Razinskas, Backmann, and Hoegl, 2022). Yet, when diversity emerges along multiple dimensions, it may also produce salient faultlines that fragment the board into subgroups, potentially leading to communication breakdowns, reduced cohesion, and slower decision-making (Lau and Murnighan, 1998; Thatcher and Patel, 2012). This duality presents a critical tension in corporate governance: how can boards harness the benefits of diversity without succumbing to its divisive effects?

To address this question, I introduce FRQ as a key mediating mechanism in my second essay. High-quality financial reporting enhances transparency, improves internal monitoring, and reduces information asymmetry between managers and stakeholders (Shakespeare, 2020). In the presence of strong faultlines, subgroup dynamics may either impair or enhance FRQ depending on how they influence board oversight and deliberation. When managed constructively, faultlines can stimulate more rigorous debate and sharpen monitoring, which can support stronger reporting integrity (Jiang and Han, 2025). Improved FRQ, in turn, facilitates more efficient resource allocation and mitigates financing frictions by improving investment efficiency and decision-making (Biddle, Hilary, and Verdi, 2009; Barrios, Fujiy, Lisowsky, and Minnis, 2025). Finally, a higher-quality information environment can support the long-horizon commitment required for innovation (Park, 2018; Simpson and Tamayo, 2020).

Empirically, this essay draws on a longitudinal dataset of 28,528 firm-year observations from Chinese publicly listed companies spanning 2008 to 2021. It employs a sophisticated clustering methodology, the ASW algorithm, to measure faultline strength across 10 board attributes, offering a more nuanced and robust assessment than prior studies. The analysis reveals a significant and positive association between board faultlines and corporate innovation, further demonstrating that FRQ partially mediates this relationship. These findings challenge the view that faultlines are uniformly detrimental by documenting potential governance and innovation benefits associated with stronger board faultlines.

The research in this essay makes several contributions to the literature. First, it extends faultline theory into the domain of corporate innovation, a relatively underexplored area in governance scholarship. Second, it integrates FRQ as a mediating mechanism, refining the theoretical framework proposed by Bushman and Smith (2001) by incorporating board composition dynamics. Third, it provides empirical evidence from a non-Western context, highlighting how culturally specific faultline structures shape board behaviours in Chinese listed firms. Finally, in this essay the research offers practical implications for corporate governance reforms, emphasising the importance of managing subgroup dynamics and enhancing FRQ to foster innovation.

In sum, this essay demonstrates that the consequences of board diversity are not uniformly negative. Rather, faultlines represent a complex structural feature of boards that, when understood and managed effectively, can serve as a source of governance strength and strategic advantage. By linking faultlines to FRQ and innovation, the essay provides a novel lens for evaluating board effectiveness and contributes to a more nuanced understanding of how internal board dynamics influence firm-level outcomes.

1.2.3 Consequences of Board Faultlines: Audit Fees

The third essay extends the thesis's exploration of board faultlines by examining their influence on external audit pricing, specifically audit fees, within the context of Chinese publicly listed firms. Board faultlines can significantly alter board dynamics by splitting directors into salient subgroups that can weaken communication and cohesion, yet also intensify internal monitoring through debate and mutual scrutiny (Lau and Murnighan, 1998; Thatcher, Jehn, and Zanutto, 2003). Therefore, in the context of audit pricing, board faultlines can imply a dual effect. On the demand or effort side, subgroup frictions and governance complexity can increase the auditors' expected effort and coordination costs, which is consistent with standard audit pricing theory, which links fees to expected audit hours and engagement inputs (Simunic, 1980; Hay, Knechel, and Wong, 2006). On the supply or risk-premium side, if faultlines strengthen internal oversight and reduce misstatement or engagement risk, auditors may price lower expected ex post losses (e.g., litigation or reputation exposure), reducing the risk premium embedded in fees (Simunic, 1980; Bell, Landsman, and Shackelford, 2001). This essay seeks to disentangle these competing effects and determine the net impact of board faultlines on audit fees.

The research is situated within the Chinese institutional and cultural context, where faultline formation is shaped by unique social categories such as hometown, kinship, and educational background. These culturally embedded divisions influence board interactions and auditor perceptions in ways that differ from Western governance models. Using a longitudinal dataset of 28,528 firm-year observations from 2008 to 2021, the essay employs the ASW algorithm to measure faultline strength across ten board attributes. It finds a significant and negative association between board faultlines and audit fees, suggesting that faultlines may enhance governance quality and reduce perceived audit risk.

This essay introduces two key mediating mechanisms, namely financial reporting quality (FRQ) and audit report lag (ARL), to explain the pathways through which intra-board divisions affect audit pricing. By introducing FRQ and ARL as mediating variables, I provide a more granular understanding of how board faultlines influence audit pricing. Specifically, the mediation results indicate two partially offsetting channels: an FRQ channel associated with lower audit fees and an ARL channel associated with higher audit fees. These opposing effects reveal the complex governance dynamics at play and underscore the importance of considering both internal and external audit factors when evaluating board structures.

This essay contributes to the literature in several ways. First, it expands faultline theory into the domain of audit economics, an area where empirical evidence remains limited. Second, it incorporates FRQ and ARL as mediating mechanisms, offering a novel framework for understanding how internal board dynamics translate into external audit outcomes. Third, it provides empirical evidence from a non-Western context, highlighting the cultural specificity of faultline effects. Finally, it offers practical implications for board design and audit engagement strategies, suggesting that faultlines, when properly managed, can strengthen governance and reduce audit costs.

Together with the preceding essays, this essay reinforces the thesis's central argument: board faultlines are not inherently detrimental. Rather, they represent a structural feature of board composition that, depending on institutional context, can enhance or impair organisational outcomes. By linking faultlines to audit pricing through FRQ and ARL, the essay offers a comprehensive view of how internal board dynamics shape external perceptions of governance quality and risk.

1.3 Structure of This Thesis

Following this introductory chapter, the thesis is structured into 5 chapters.

Chapter Two presents the first research essay. This chapter lays the essential empirical foundation for the thesis by analysing the organisational, firm, and contextual factors, such as the company's life cycle and industry sector, which systematically lead to the emergence and strength of intra-board divisions.

Chapter Three presents the second research essay. This chapter explores the strategic consequences of board faultlines, focusing on their impact on corporate innovation. It investigates the mediating pathway through which strong faultlines enhance financial reporting quality (FRQ), which in turn facilitates innovation. The analysis highlights how subgroup dynamics, when constructively managed, can strengthen governance and support long-term strategic outcomes.

Chapter Four presents the third and final research essay. This chapter extends the thesis by examining the external implications of board faultlines, specifically their influence on audit pricing. The analysis begins by testing the direct association between faultline strength and audit fees, revealing a significant negative relationship. It then investigates two mediating mechanisms: financial reporting quality (FRQ) and audit report lag (ARL). The findings show that faultlines improve FRQ, which lowers audit fees, but also contribute to longer ARL, which raises audit fees. These opposing effects partially offset each other, revealing a nuanced interplay between internal board dynamics and external assurance costs.

Chapter Five concludes the thesis by synthesising the key theoretical and empirical findings of the entire thesis. Further, it discusses the collective implications for corporate governance theory and practice, addresses the limitations of the research, and proposes avenues for future scholarly inquiry.

CHAPTER TWO: AN EXPLORATORY STUDY OF VARIATIONS IN BOARD FAULTLINES ACROSS ORGANISATIONAL AND CONTEXTUAL CONDITIONS (ESSAY ONE)

Chapter Two presents Essay 1 of the thesis. The purpose of this essay is to establish when and why board faultlines are likely to emerge by developing the conceptual foundations of faultline theory and linking these foundations to firm-level contexts that shape board composition. Different organisational and contextual conditions may require different combinations of directors' demographic and experiential attributes, thereby affecting how these attributes align and form potential subgroups within the board. In doing so, the essay motivates the central expectation that faultline strength varies systematically across organisational settings. Accordingly, this essay addresses the following research question: How do board faultlines vary across organisational and contextual conditions that may shape the configuration of directors' demographic and experiential attributes in Chinese listed firms?

The chapter is organised as follows. Section 2.1 reviews the conceptualisation and evolution of faultline theory. Section 2.2 synthesises the theoretical foundations that explain faultline formation and activation in board settings. Section 2.3 reviews methodological approaches to measuring board faultlines, with emphasis on the average silhouette width (ASW) approach used in this thesis. Section 2.4 provides an exploratory empirical analysis of faultline patterns across firm life-cycle stages and industry sectors. Section 2.5 concludes.

2.1 Conceptualisation and Evolution of Board Faultlines

The concept of board faultlines emerged as a key theoretical advance for explaining how diversity shapes group dynamics (Lau and Murnighan, 1998). Faultlines are hypothetical dividing lines that segment boards into relatively homogeneous subgroups when directors' demographic, cognitive, and professional attributes systematically align (Lau and Murnighan, 1998; Thatcher and Patel, 2012). This framework responds to the "diversity paradox", the persistent inconsistency in findings on diversity's effects on organisational outcomes (van Knippenberg and Schippers, 2007; Ghosh, Sengupta, Narayanamurthy, and Ishizaka, 2023). Although diversity can generate benefits such as broader perspectives and innovation, empirical evidence often reports mixed or even negative effects, including higher conflict and weaker performance (Milliken and Martins, 1996; Williams and O'Reilly, 1998; Mannix and Neale, 2005; van Knippenberg and Schippers, 2007; Jackson and Joshi, 2011; Galinsky, Todd, Homan, Phillips, Apfelbaum, Sasaki, Richeson, Olayon, and Maddux, 2015; Carter and Phillips, 2017).

Traditional diversity research typically examined single attributes (e.g., gender or age) in isolation, treating each as a standalone predictor (Williams and O'Reilly, 1998; Richard, Barnett, Dwyer, and Chadwick, 2004). Faultline theory instead introduced a configurational perspective (Lau and Murnighan, 1998; Bezrukova et al., 2009). This perspective suggests that when different personal traits overlap and align in certain patterns, they create hidden divisions within a group that better predict group behaviour than examining any single trait in isolation (Bezrukova et al., 2009; Thatcher and Patel, 2012). Accordingly, diversity matters not only in levels, but in how multiple attributes cluster into subgroups that shape interaction and collective behaviour.

The foundational ideas of faultline theory were first articulated in Lau and Murnighan's (1998) seminal work, which employed a geological metaphor to explain how aligned group characteristics can create potential "break points" or "fissures" in groups. They proposed that just as tectonic plates with similar rock types can form cracks under pressure, groups with aligned demographic (e.g., age, gender, ethnicity), cognitive (e.g., thinking styles, educational backgrounds), and professional (e.g., functional experience, tenure) traits can develop subtle subgroup boundaries prone to conflict (Thatcher et al., 2003) —for instance, a subgroup of young female marketers versus another of older male engineers. This metaphor highlights a critical insight: faultlines are initially latent, meaning they are present but not immediately observable. They only become "behaviourally salient," when specific situations, such as disagreements over strategic direction, leadership transitions, or external crises, cause them to activate (Jehn and Bezrukova, 2010). This helps explain why similarly diverse boards can display different dynamics across time and situations.

Faultline theory shifted attention from counting attributes to analysing subgroup structure and interaction (Lau and Murnighan, 1998; Thatcher, Meyer, Kim, and Patel, 2024). The theory's core proposition is that diversity is necessary but in itself does not cause faultlines to form; instead, faultlines emerge when multiple characteristics converge to create clear, discernible subgroups (Thatcher et al., 2003). This phenomenon occurs neither in perfectly homogeneous groups, where no differences to align, nor in extremely diverse ones, where attributes are so varied that no clear alignments or distinct subgroups can readily emerge (Jehn and Bezrukova, 2010). The theory introduced two important aspects that determine how faultlines impact a group—their strength and their activation—providing a more nuanced understanding of how diversity translates into group outcomes (Bezrukova et al., 2009).

Faultline strength refers to the degree to which group members' characteristics align within subgroups, indicating potential for division. Strong faultlines occur when multiple characteristics (e.g., gender, age, tenure, functional background, educational institution) consistently align to create clearly separate, distinct groups. For instance, if all younger directors on a board are also recent appointees sharing a similar functional background, a strong faultline is created. Conversely, weak faultlines exhibit more mixed arrangements where characteristics cross-cut, with attributes overlapping across different individuals, making clear subgroup formation less likely (Bezrukova et al., 2009). For example, a board might have both young and old members, but if the young members are diverse in gender and functional background, and the older members are similarly diverse, the faultlines would be weak. Consistent with the theory, empirical studies, such as Kaczmarek, Kimino, and Pye (2012), demonstrate that strong faultlines elevate conflict risk. This supports the theory's point that the structure of diversity—how attributes are configured, not just their mere presence—is a key driver of intergroup tensions (Bezrukova et al., 2009). Overall, strong faultlines create clearer subgroups and higher intergroup tension risk, whereas weak (cross-cutting) configurations reduce polarisation.

The activation process explains how hidden faultlines can transform into observable conflict, impacting group dynamics (Jehn and Bezrukova, 2010; Carton and Cummings, 2012). Faultlines may remain inactive or "dormant" indefinitely but become active through specific triggers that highlight subgroup boundaries and make them relevant to the task at hand (Bezrukova et al., 2009; Thatcher et al., 2024). Triggers can include high-stakes strategic disagreements, significant organisational changes, leadership transitions (e.g., a new CEO or board chair), or critical resource allocation decisions (Li and Hambrick, 2005; Carton and Cummings, 2012). Once activated, the theory outlines a sequence of events: first, subgroup perception, where individuals become aware of the faultline-defined subgroups; second, coalition formation, where members align with their perceived subgroups; and third, conflict escalation, where tensions increase along these subgroup lines (Lau and Murnighan, 2005; Jehn and Bezrukova, 2010). This temporal logic explains why similarly structured boards can alternate between collaboration and conflict depending on situational triggers.

Contemporary research extends the theory along three critical dimensions. First, scholars have identified practical strategies to mitigate faultline-related conflicts. These strategies include structural interventions (e.g., strategic board composition that prevents excessive attribute alignment), and process-based approaches (e.g., cross-subgroup task forces and inclusive communication protocols), both of which have been shown to neutralise faultline-related conflicts (van Knippenberg, Dawson, West, and Homan, 2011; Carton and Cummings, 2012). Second, digital governance has expanded faultline theory by shifting key interaction processes online. Virtual meetings and digital platforms may exacerbate faultlines by limiting nonverbal cues and weakening cohesion and trust (Hinds and Bailey, 2003; Gibson and Gibbs, 2006; Cramton and Hinds, 2014)—or bridging them through more equitable participation opportunities and mitigated dominance (Gibson and Gibbs, 2006; Gibson, Gibbs, and Stanko, 2011). Third, emerging critiques have challenged the theory's foundational assumptions, particularly its potential Western-centric bias and methodological limitations (Thatcher and Patel, 2012; Meyer, Glenz, Antino, Rico, and González-Romá, 2014). These concerns are especially pronounced in global contexts, where diverse cultural frameworks shape both the formation of subgroups and the relative importance of different demographic attributes (Stahl, Maznevski, Voigt, and Jonsen, 2010). More culturally nuanced and methodologically sophisticated approaches are thus required.

Despite ongoing refinements, faultline theory remains influential because it explains why similar levels of diversity can produce different governance outcomes across contexts (Van Knippenberg et al., 2011; Vandebeek, 2023). As Mendiratta (2023) emphasises, faultline theory "may be a crucial perspective for corporate governance research on board composition going forward." Unlike traditional approaches that rely on simple, atomistic diversity metrics, faultline theory focuses on how individual attributes are clustered into subgroups and how their contextual salience influences group dynamics and behaviour. This approach offers strong explanatory power for inconsistencies in prior diversity research and provides a useful lens for predicting future governance outcomes (Lau and Murnighan, 1998; Thatcher and Patel, 2012).

2.2 Theoretical Foundations of Board Faultlines

Understanding how board faultlines affect group dynamics and organisational performance requires integrating perspectives from multiple disciplines. Faultline theory offers a clear and systematic framework for examining division risk within boards (Lau and Murnighan, 1998; Thatcher and Patel, 2012). As this theory has evolved, it has expanded beyond its foundational concepts to incorporate various theoretical viewpoints, with significant advancements in recent years (Mendiratta, 2023). Accordingly, this section reviews faultline formation, activation, and consequences in board settings.

2.2.1 Psychological Foundations of Faultlines

At the individual level, the formation of board faultlines can be understood through the lens of identity-based theories. Social identity theory (SIT) and self-categorisation theory (SCT) form the basis for understanding how demographic and professional attributes can align to form group-based divisions, or faultlines, within teams and boards (Meyer, Shemla, and Schermuly, 2011; Thatcher and Patel, 2012). Although the original formulation of faultline theory by Lau and Murnighan (1998) did not explicitly reference SIT or SCT, it is closely aligned in spirit. Their core insight—that aligned attributes can split groups into internally homogeneous subgroups—maps directly onto the central mechanisms of social categorisation (Tajfel and Turner, 1979; Turner, Hogg, Oakes, Reicher, and Wetherell, 1987).

According to SIT, individuals derive part of their self-concept from their membership in salient social groups (Tajfel and Turner, 1979). This identity construction is driven by two interrelated psychological processes: self-categorisation, in which individuals classify themselves and others into distinct social categories (e.g., gender, age, professional role); and self-enhancement, which motivates individuals to perceive their in-group positively in comparison to relevant out-groups (Tajfel and Turner, 1979; Turner et al., 1987; Terry and Callan, 1998). These processes foster in-group favouritism and out-group bias, which can undermine group cohesion, reduce trust, and impair cross-subgroup collaboration—especially in task-oriented settings (Ashforth and Mael, 2004; Hekman, Steensma, Bigley, and Hereford, 2009).

As an extension of SIT, SCT emphasises the situational salience of identity categories. It posits that group distinctions become psychologically meaningful when certain attributes are made salient by the context (Turner et al., 1987). Individuals, SCT suggests, do not always activate every possible identity, but rather attend to the identity dimensions that are most aligned and salient in a given setting. This insight is critical to faultline theory: when multiple demographic attributes align (e.g., age and functional background), they are more likely to trigger subgroup identification, leading to intergroup differentiation and communication silos (Thatcher et al., 2003; Van Dijk, Meyer, Van Engen, and Loyd, 2017). For example, in a team where all young engineers form one subgroup and all older marketers form another, individuals are more likely to perceive "us vs. them" boundaries because both age and function reinforce the same subgroup division. This identity activation process influences not only how individuals perceive others but also how information is shared, how coalitions form, and how conflict emerges (Van Dijk et al., 2017).

Building on SIT and SCT, optimal distinctiveness theory (ODT) offers an important refinement by addressing the inherent tension between individuals' need for inclusion and their desire for uniqueness (Brewer, 1991). While SIT and SCT emphasise the motivation for group identification and the salience of social categories, ODT posits that individuals strive to achieve an optimal balance between assimilation within a group and differentiation from others (Leonardelli, Pickett, and Brewer, 2010; Shore, Randel, Chung, Dean, Holcombe Ehrhart, and Singh, 2011). People are drawn to groups that are inclusive enough to provide belongingness but also distinct enough to maintain a sense of individuality (Leonardelli et al., 2010).

When this balance is achieved, team members may experience a stronger sense of inclusion and be more willing to contribute distinctive perspectives during team deliberations (Shore et al., 2011). From this perspective, faultline-based subgroups may provide members with a sense of belonging while preserving their distinctive identities (Leonardelli et al., 2010; Shore et al., 2011). Moderately strong subgroups may also stimulate team learning and reflective communication (Gibson and Vermeulen, 2003). When subgroup differences are viewed as valuable, faultlines may further encourage the elaboration of diverse information and contribute to improved group performance (Homan, van Knippenberg, Van Kleef, and De Dreu, 2007). In the context of diverse teams or boards, this theory implies that individuals may resist groupings that are either too homogeneous (leading to identity dilution) or too heterogeneous (leading to identity threat) (Shore et al., 2011; Brewer and Pickett, 2014). However, when faultlines create strong, overly distinct subgroups, the need for optimal distinctiveness can be disrupted—members may feel either overly assimilated into a subgroup or marginalised by the broader group context (Mendiratta, 2023). This can weaken cohesion and information exchange in high-stakes board decisions (Carton and Cummings, 2012).

Recent theoretical developments enhance faultline theory and broaden its applicability to contemporary board contexts. Construal level theory (CLT) explains how psychological distance shapes the way individuals mentally represent and evaluate other people and events (Trope and Liberman, 2010). Greater psychological distance is generally associated with more abstract, high-level interpretations, whereas psychological proximity encourages more concrete and detailed interpretations. Interpersonal dissimilarity can also operate as a form of social distance, with the actions of dissimilar others being interpreted at a more abstract level than those of similar others (Liviatan, Trope, and Liberman, 2008). In board settings, directors who differ across several aligned demographic or professional attributes may perceive members of another subgroup as socially distant and interpret them in broad categorical terms rather than as distinct individuals. This may reinforce subgroup boundaries and make cross-subgroup communication and mutual understanding more difficult.

2.2.2 Group-Level Dynamics and Faultline Activation

At the group level, faultline theory synthesises these psychological insights into a structural framework for understanding how multiple aligned attributes (e.g., age, gender, tenure) can segment a board into distinct, internally cohesive subgroups (Lau and Murnighan, 1998; Thatcher and Patel, 2012). These subgroups may not always be visible or active, but under certain conditions, such as conflict, decision-making pressure, or leadership contests, faultlines can become activated (Lau and Murnighan, 1998). When this happens, previously latent divisions turn into clear groups, create communication barriers, and even lead to political infighting, making it hard for the board to deliberate collectively and reach consensus (Jehn and Bezrukova, 2010). This stage connects the cognitive origins of subgroup identity with tangible group dynamics that affect how boards function.

2.2.3 Strategic and Organisational Implications of Faultlines

At the organisational level, combining resource dependence theory (RDT) and upper echelons theory (UET) provides a strategic way to understand faultlines (Pfeffer and Salancik, 1978; Hambrick and Mason, 1984). According to RDT, companies deliberately choose directors with different backgrounds, connections, and skills to gain essential external resources (Pfeffer and Salancik, 1978). Such board diversity can strengthen board capital by broadening the expertise, information, legitimacy, and external connections available to the firm (Hillman and Dalziel, 2003). However, while this diversity helps externally, it can create internal faultlines if these differences line up across several traits, disrupting how the board works together (Lau and Murnighan, 1998). This trade-off is sharper under uncertainty and political pressure (Pfeffer and Salancik, 1978). Adding to this view, UET suggests that a company's results are influenced by the experiences, values, and thinking styles of its top leaders and board members (Hambrick and Mason, 1984). While UET mainly looks at individual qualities, faultline theory brings in an important group-level angle: even talented boards might struggle to use their full potential if deep faultlines lead to poor communication, conflicts between subgroups, or uneven power dynamics (Li and Hambrick, 2005; Thatcher and Patel, 2012). Thus, faultlines can shape how board makeup affects company strategy, either helping or hindering the ability to turn directors' strengths into strong governance (Li and Hambrick, 2005).

As illustrated in Appendix 2.A, faultline theory integrates identity-based psychological foundations with broader organisational perspectives to explain how the alignment of directors' attributes may produce subgroup structures and influence board functioning. Taken together, the integration of social identity theory (SIT), self-categorisation theory (SCT), optimal distinctiveness theory (ODT), construal level theory (CLT), faultline theory, resource dependence theory (RDT), and upper echelons theory (UET) reflects the field's growing recognition of the need to consider multi-level perspectives. Whereas identity-based theories illuminate the psychological mechanisms underlying subgroup formation, organisational theories highlight the strategic origins and outcomes of board diversity. Faultline theory bridges these domains by explaining how individual- and group-level differences interact to influence board dynamics and, ultimately, firm performance. Overall, board faultlines can be a strength or liability depending on their configuration and activation.

2.3 Methodological Approaches to Measuring Board Faultlines

Measuring board faultlines presents unique methodological challenges, as these subgroup dynamics are not directly observable and must be inferred from the alignment of directors' demographic and professional attributes. The evolution of faultline measurement reflects a progression from simple, qualitative assessments to sophisticated, multi-dimensional quantitative indices. This section traces the historical development of these methodologies, highlighting key advancements such as the average silhouette width (ASW) and longitudinal approaches that better capture the complexity of board dynamics.

2.3.1 Early Conceptualisation and Measurement (Late 1990s – Early 2000s)

The conceptual foundation of faultline research was established by Lau and Murnighan (1998), who defined faultlines as "hypothetical dividing lines that may split a group into subgroups" based on aligned attributes such as age, gender, or ethnicity. They argued that when multiple traits align across subgroups, these divisions deepen polarisation and conflict, impacting group cohesion and performance.

Early work was largely qualitative and lacked standardised quantitative metrics (Lau and Murnighan, 1998). Early empirical studies used descriptive or categorical methods, often manually grouping members based on observable traits. For instance, Earley and Mosakowski (2000) examine multinational teams, noting how cultural differences created communication barriers, while Gibson and Vermeulen (2003) identify divisions in diverse teams based on nationality and expertise. These assessments were ad-hoc and heavily reliant on subjective judgment, limiting comparability across studies. Research on corporate boards, for example, might note a clear divide if female directors shared similar backgrounds contrasting with male counterparts (Lau and Murnighan, 2005). Studies such as Li and Hambrick (2005) link demographic splits in management teams to reduced integration, and Pelled, Eisenhardt, and Xin (1999) connect diversity-based divisions to conflict in workgroups. As Thatcher and Patel (2011) later critiqued, the absence of standardised methods in this period highlighted a critical need for systematic, quantitative tools to rigorously analyse subgroup dynamics in diverse teams (Thatcher and Patel, 2011).

2.3.2 Introduction of Quantitative Measures (Mid-2000s)

Addressing the methodological gap, the mid-2000s saw the development of systematic faultline indices. Thatcher et al. (2003) made a seminal contribution by introducing a statistical measure known as faultline strength (FAU). This measure operates by systematically evaluating all possible ways a group can be divided into two subgroups. For each potential split, it calculates the degree of alignment across demographic or other relevant attributes. The final FAU score, which typically ranges from 0 to 1, reflects the maximum alignment identified among all possible splits, thereby pinpointing the group's strongest potential faultline. The FAU measure thus provides a standardised measure of maximum alignment (Thatcher et al., 2003). Concurrently, Shaw (2004) proposed an alternative measure, the faultline strength index, which emphasised the degree of homogeneity within subgroups and heterogeneity between them. Shaw's index incorporated multiple attributes and allowed for weighting based on their relevance to group dynamics, offering a flexible approach to faultline measurement (Shaw, 2004). These quantitative tools marked a significant advancement in the field, transitioning faultline research from primarily conceptual discussions to empirical testing. This shift enabled more comparable empirical tests of faultline strength.

2.3.3 Refinement and Expansion of Measures (Late 2000s – 2010s)

As faultline research advanced, limitations in early quantitative measures, such as their focus on binary splits and equal attribute weighting, became evident. Faultline research also expanded beyond demographic traits. Homan, Van Knippenberg, Van Kleef, and De Dreu

(2007), for example, examined informational diversity faultlines based on characteristics such as functional expertise and educational background, arguing that cognitive and task-related divisions can be as consequential as demographic divisions.

Another notable development was the introduction of faultline distance by Bezrukova et al. (2009). This measure extends beyond mere attribute alignment by considering the social and psychological distance between subgroups and incorporating both objective demographic differences and subjective perceptions of difference. It recognises that faultlines with similar levels of alignment may differ in their salience and potential effects, thereby offering a more nuanced assessment of subgroup divisions (Bezrukova et al., 2009).

Among later refinements, ASW, originally developed by Rousseeuw (1987) and adapted for faultline research by Meyer and Glenz (2013), emerged as a particularly powerful and versatile tool for measuring subgroup divisions. It assesses clustering quality by measuring how similar an individual is to their own cluster compared to neighbouring clusters, with scores ranging from -1 to 1 (higher values indicating better-defined clusters). Higher scores indicate more clearly defined clusters. In faultline research, ASW therefore captures the clarity and strength of subgroup divisions (Meyer and Glenz, 2013; Meyer et al., 2014).

Average silhouette width offers several advantages over earlier measures such as FAU. It is not limited to binary subgroup splits, allowing detection of multiple subgroups that mirror the complexity of real-world boards. Additionally, ASW uses clustering algorithms (e.g., k-means or hierarchical clustering) to efficiently group individuals based on multiple attributes, computing a score that balances within-subgroup cohesion and between-subgroup separation. This makes it more robust to noise and outliers, computationally feasible for larger groups, and adaptable to diverse data types through weighted attributes. Its standardised, interpretable metric also facilitates comparison across studies, addressing inconsistencies in prior approaches (Meyer et al., 2014).

2.3.4 Recent Developments and Emerging Trends (2010s – Present)

A critical advancement in faultline measurement is the recognition of dynamic faultlines. Meyer et al. (2014) proposed that faultlines are not static but can shift over time due to changes in group composition, context, or external events. This perspective has spurred longitudinal measurement approaches, which track faultline evolution across multiple time points to uncover temporal patterns in subgroup divisions. Such approaches are particularly relevant for tools like ASW, which provide a standardised metric to assess faultline strength consistently over time, offering insights into how board dynamics evolve in response to internal and external changes.

While other trends have emerged in recent years, such as the integration of Social Network Analysis (SNA) to assess relational ties (Carton and Cummings, 2012) and the application of big data and machine learning for large-scale faultline detection (Antino, Rico, and Thatcher, 2019), the focus on ASW and longitudinal methods represents a robust framework for understanding the complex and dynamic nature of faultlines in board settings.

2.3.5 Challenges and Critiques in Faultline Measurement

Despite significant advancements, faultline measurement faces several challenges. One persistent issue is the subjectivity in attribute selection and weighting. Different studies prioritise different attributes (e.g., demographics vs. values vs. skills), making cross-study comparisons difficult. Furthermore, the reliance on self-reported data for certain attributes (e.g., perceptions of difference) introduces potential biases.

Another critique is the overemphasis on faultline strength at the expense of faultline activation. As Jehn and Bezrukova (2010) noted, not all faultlines lead to conflict or performance issues; their impact depends on whether they are activated by situational triggers, such as task type or leadership style. Recent research has called for measurement approaches that integrate faultline strength with activation mechanisms, though such methods remain underdeveloped.

Finally, the applicability of faultline measures to diverse contexts remains a concern. Most measurement tools were developed and tested in Western, organisational settings, raising questions about their validity in cross-cultural or non-traditional group contexts (e.g., informal groups, online communities). Scholars have called for culturally sensitive adaptations of faultline measures to address this gap (Hofhuis, van der Zee, and Otten, 2015).

2.3.6 Conclusion

The measurement of faultlines has undergone a remarkable evolution over the past two decades, transitioning from qualitative assessments to sophisticated quantitative and computational approaches. Early conceptualisations by Lau and Murnighan (1998) laid the groundwork, while subsequent developments in statistical modelling, social network analysis, and machine learning have enriched the field. However, challenges remain, particularly regarding attribute selection, faultline activation, and cross-context applicability. Future work should better integrate activation and context into measurement and adapt tools across cultural settings.

2.4 Empirical Testing on the Determinants of Board Faultlines

2.4.1 Exploring the Determinants of Board Faultlines

Although research has advanced significantly in explaining the consequences of faultlines for group dynamics, governance quality, and firm outcomes, comparatively little is known about their antecedents. The majority of existing studies conceptualise faultlines as fixed structural conditions of boards, treating them as exogenous features rather than outcomes shaped by board composition, ownership arrangements, or institutional context (Lau and Murnighan, 1998; Thatcher and Patel, 2012). This imbalance has created a notable research gap: while prior literature provides extensive evidence of what faultlines do, it offers limited insights into what drives their formation. Empirical examinations of these determinants remain scarce, often relying on descriptive observations or single-dimension diversity proxies (e.g., gender or age splits), leaving untested the broader organisational and contextual factors that systematically shape faultline strength and salience.

Addressing this gap, the research in this essay focuses on empirically examining the determinants of board faultlines and variation across organisational and contextual conditions. Specifically, it examines how directors' demographic and experiential composition, firm-level governance structures, and institutional environments interact to influence the likelihood and intensity of subgroup divisions. To this end, Section 2.4.2 introduces the sample selection, followed by Section 2.4.3 on the measurement of board faultlines, Section 2.4.4 on the descriptive and sensitivity analyses of the ASW-based measure, and Section 2.4.5 on the exploratory analysis of board faultline variations across organisational and contextual conditions. This progression connects theoretical insights with empirical analysis, providing a more comprehensive understanding of the measurement of board faultlines and the conditions associated with variation in their strength.

2.4.2 Sample Selection

This research utilises firm-level data sourced from multiple databases. The primary source is the China Stock Market and Accounting Research (CSMAR) database, which provides comprehensive accounting and financial information for companies listed on the Shanghai and Shenzhen Stock Exchanges. Information about board members is obtained from the China

Listed Firm's Corporate Governance Research Database within the CSMAR database. The sample includes Chinese listed A-share firms from 2008 to 2021[1]. Firms in the financial industry and those with incomplete financial data are excluded from the essay.

2.4.3 Measurement of Board Faultlines

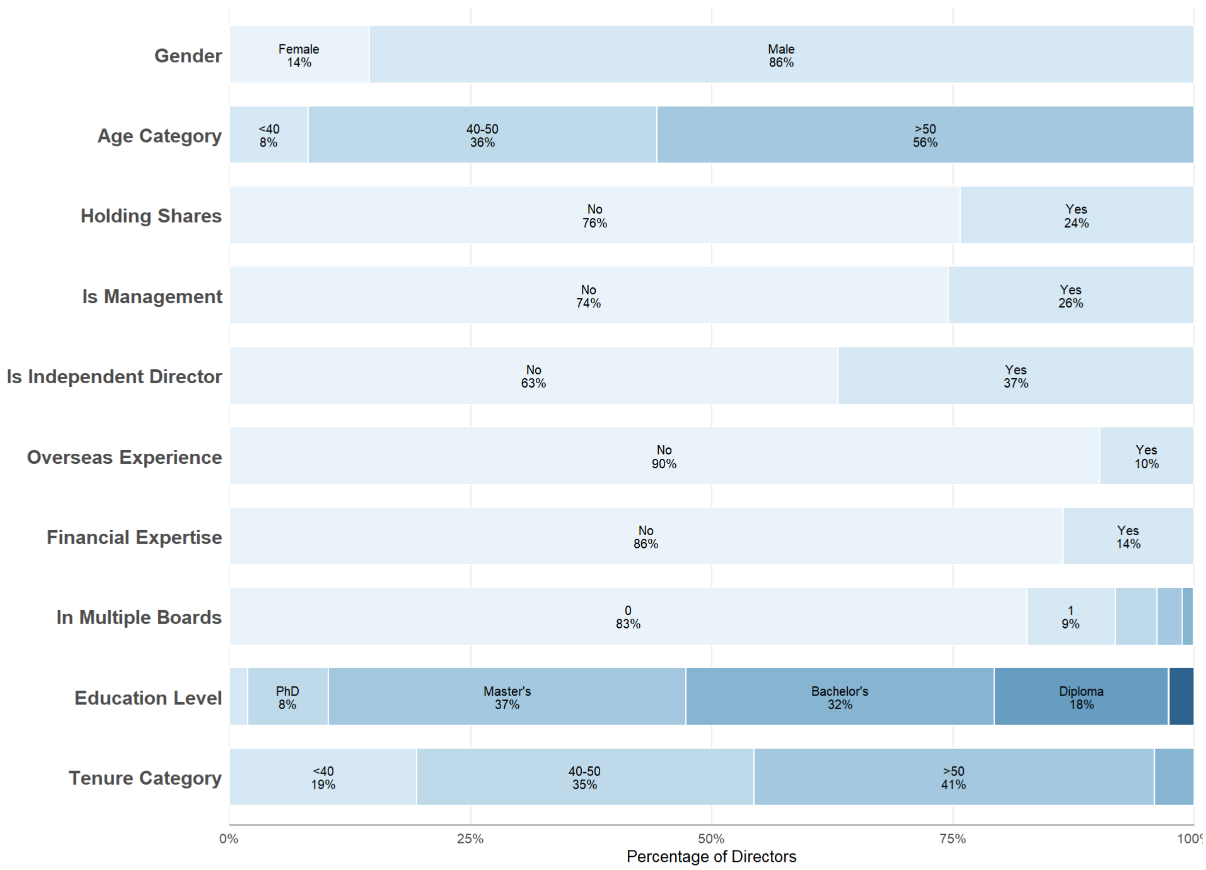
Previous research on board faultlines has predominantly focused on individual diversity factors such as gender or age to delineate board subgroups (Veltrop, Hermes, Postma, and de Haan, 2015; Kagzi and Guha, 2018; Makkonen, 2022). For instance, Wu et al. (2021) categorise boards into male and female subgroups and assess faultlines based on educational background, tenure, nationality, and functional expertise within each group. Recent studies, however, have broadened the rather single-faceted measurement of board faultlines by introducing additional characteristics such as board independence, financial experience, shareholdings, and the type of directorship (Xu, Hu, and Liang, 2021). Arena, Garcia-Torea, and Michelon (2023) explore demographic faultlines, using a similar approach to earlier studies by incorporating more attributes within the demographic aspect, such as race, socioeconomic status, and cultural background. This broadens the scope of board faultlines beyond the traditional measures. Xue, Tang, Xu, Ling, Xie, and Mo (2024) further analyse attributes such as age, education, and tenure, highlighting that while these factors are similar to those studied by Wu et al. (2021), the inclusion of additional demographic and professional characteristics offers a more comprehensive understanding of board dynamics and their impact on governance.

Building on Xu, Hu, and Liang (2021), this study constructs the board faultline measure using ten demographic and experiential characteristics of board directors. The demographic attributes include gender and age, while experiential attributes encompass education, shareholder status, senior management roles, director independence, involvement with other listed companies, overseas experience, financial background, and tenure. Together, these characteristics capture difference in directors' backgrounds, professional roles, knowledge,

[1] The sample ends in 2021 for practical and research-design reasons. Constructing the ASW faultline measure requires extensive director-level demographic and professional information, and extending the dataset beyond 2021 would require substantial additional data collection and harmonization. This constraint is mitigated by the fact that board composition changes gradually and faultline measures tend to be relatively stable within firms over short horizons because directors typically serve multi-year tenures.

incentives, and experience that may shape the formation of board subgroups. Figure 2.1 presents the distribution of directors across the categories used to operationalise each attribute.

Figure 2.1 Composition of the Director Attributes Used to Construct Board Faultlines



Traditional faultline strength measures, such as FAU (Thatcher and Patel, 2012), have been widely used to evaluate board faultlines, although FAU has been criticised for primarily focusing on demographic alignment and may not fully capture the complexities of subgroup interactions (Gibson and Vermeulen, 2003). Therefore, this essay adopts a cluster-based approach known as average silhouette width (ASW), following the methodology proposed by Meyer and Glenz (2013). Particularly valuable in capturing the complex interactions among board members' attributes, ASW provides insights that traditional faultline strength measures fail to address. Comprehensive empirical analyses by Meyer and Glenz (2013), further validated by Meyer et al. (2014), show that ASW is the most effective method for identifying faultlines within groups or organisations. Notably, ASW allows for the identification of multiple subgroups even within small teams, addressing a key concern in faultline research regarding the optimal number of subgroups. This capability is crucial, as an excessive number of subgroups can dilute the effectiveness of faultline measures (Meyer and Glenz, 2013). In this essay, we use FAU as an alternative measure for robustness checks.

Average silhouette width captures the dynamic interactions among board member attributes by evaluating clustering effectiveness within the data. The attributes serve as data points, with the clustering process revealing patterns of similarity or dissimilarity. By measuring the distances between data points within clusters and across different clusters, ASW provides an indication of how distinct these clusters are. According to Meyer and Glenz (2013), ASW is defined as the average silhouette width of team members, reflecting the degree to which an individual aligns more closely with one cluster (A) compared to another cluster (B). The individual silhouette width is calculated using the formula:

$$s(i) = \frac{b_i - a_i}{\max(a_i, b_i)} \qquad (1)$$

where a_i represents the average dissimilarity of individual i to all members within cluster A, and b_i denotes the average dissimilarity of individual i to all members within cluster B. Dissimilarities are quantified using the Euclidean distance metric between individuals.

Table 2.1 presents the descriptive statistics for the ASW measure. The sample contains 28,528 firm-year observations. ASW has a mean of 0.3686, a median of 0.3610, and a standard deviation of 0.0944. Its 10th and 90th percentiles are 0.2521 and 0.4936, respectively, indicating meaningful variation in board faultline strength across the sample. This variation provides the basis for the subsequent analyses of the attributes underlying the ASW measure and the organisational and contextual conditions associated with board faultlines.

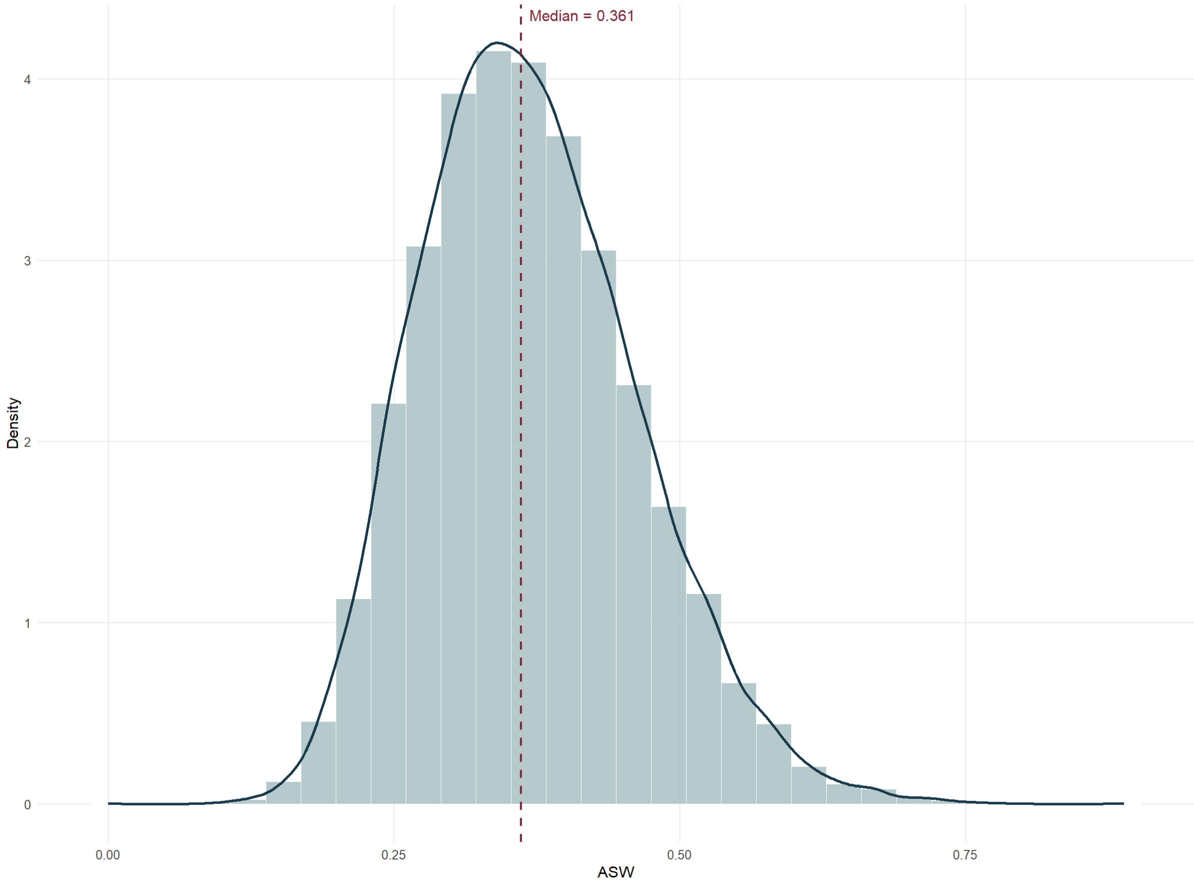
Table 2.1 Descriptive Statistics for the Board Faultline Measure

Variable	N	Mean	SD	Min	P10	P25	Median	P75	P90	Max
Asw	28,528	0.3686	0.0944	0.0000	0.2521	0.3008	0.3610	0.4291	0.4936	0.8889

Note: *Asw* is the average silhouette width measure of board faultline. P10, P25, P75, and P90 denote the 10th, 25th, 75th, and 90th percentiles, respectively.

Figure 2.2 complements the summary statistics in Table 2.1 by showing the full distribution of ASW across the sample. The distribution is unimodal and slightly right-skewed, with the median (0.3610) lying close to the mean (0.3686) and most observations concentrated around the centre of the distribution. The upper tail indicates that a smaller number of firm-year observations exhibit relatively strong board faultlines. Overall, the figure confirms meaningful continuous variation in ASW, supporting its use as the baseline measure in the subsequent analyses.

Figure 2.2 Distribution of Board Faultlines



2.4.4 An Exploratory Analysis of Board Faultline Determinants

Having established the construction and distribution of the baseline ASW measure, this section examines the extent to which ASW is sensitive to each of its ten underlying director attributes. The analysis responds to the concern that a multidimensional faultline measure may be disproportionately influenced by one particular attribute.

The original ASW measure used throughout the thesis serves as the baseline. ASW is then recalculated ten times, with one of the following attributes excluded in each calculation: gender, age, education, shareholder status, senior management role, director independence, involvement with other listed companies, overseas experience, financial background, and tenure. This leave-one-attribute-out approach shows how the measured strength of board faultlines changes when each attribute is omitted while the remaining nine attributes are retained.

For each firm-year observation and omitted attribute, the signed change is calculated as:

$$\Delta Asw_{ij} = Asw_i - Asw_{i,-j}$$

where Asw_i is the original Asw calculated using all ten attributes, and $Asw_{i,-j}$ is the Asw recalculated after excluding attribute j. A negative change indicates that removing the attribute increases Asw. This suggests that the attribute generally cross-cuts the alignment formed by the remaining attributes. Conversely, a positive change indicates that removing the attribute reduces Asw, suggesting that the attribute generally reinforces the alignment formed by the remaining attributes.

Table 2.2 Leave-One-Attribute-Out Sensitivity Analysis of Asw

Attribute removed	Mean *Asw* without attribute	Mean signed change	Negative changes (%)	Spearman correlation
Education	0.4144	−0.0459	70.0	0.576
Age	0.4093	−0.0408	77.0	0.781
Tenure	0.4016	−0.0330	73.0	0.806
Senior management role	0.3930	−0.0244	72.1	0.836
Gender	0.3871	−0.0186	65.2	0.843
Director independence	0.3835	−0.0149	63.2	0.813
Financial background	0.3821	−0.0136	60.7	0.850
Overseas experience	0.3785	−0.0100	56.5	0.859
Shareholder status	0.3780	−0.0095	58.3	0.852
Other listed-company involvement	0.3681	0.0004	51.2	0.642

Note: This table reports the sensitivity of *Asw* to the sequential removal of each of the ten director attributes. The original *Asw*, calculated using all ten attributes, has a mean of 0.3686 and serves as the baseline measure. Mean signed change is calculated as the original *Asw* minus the corresponding leave-one-attribute-out *Asw*. A negative value indicates that removing the attribute increases *Asw*, whereas a positive value indicates that removing the attribute decreases *Asw*. Negative changes (%) reports the percentage of firm-year observations for which the leave-one-attribute-out *Asw* exceeds the original *Asw*. Spearman correlation measures the stability of firm-year rankings relative to the baseline *Asw*. The changes represent sensitivity to attribute removal and should not be interpreted as independent or causal contributions.

Table 2.2 shows that Asw is not equally sensitive to the removal of all ten attributes. Education produces the largest mean signed change. Removing education increases Asw from its baseline mean of 0.3686 to 0.4144, giving a mean signed change of −0.0459. Approximately 70% of the firm-year observations experience a negative change. Education therefore tends to cross-cut the subgroup alignment formed by the other nine attributes.

Age and tenure produce the next largest changes. Removing age increases Asw to 0.4093, corresponding to a mean signed change of −0.0408, while removing tenure increases Asw to 0.4016, producing a mean signed change of −0.0330. Negative changes occur in approximately 77% and 73% of the observations, respectively. These results indicate that age and tenure also tend to weaken, rather than reinforce, the alignment created by the remaining attributes.

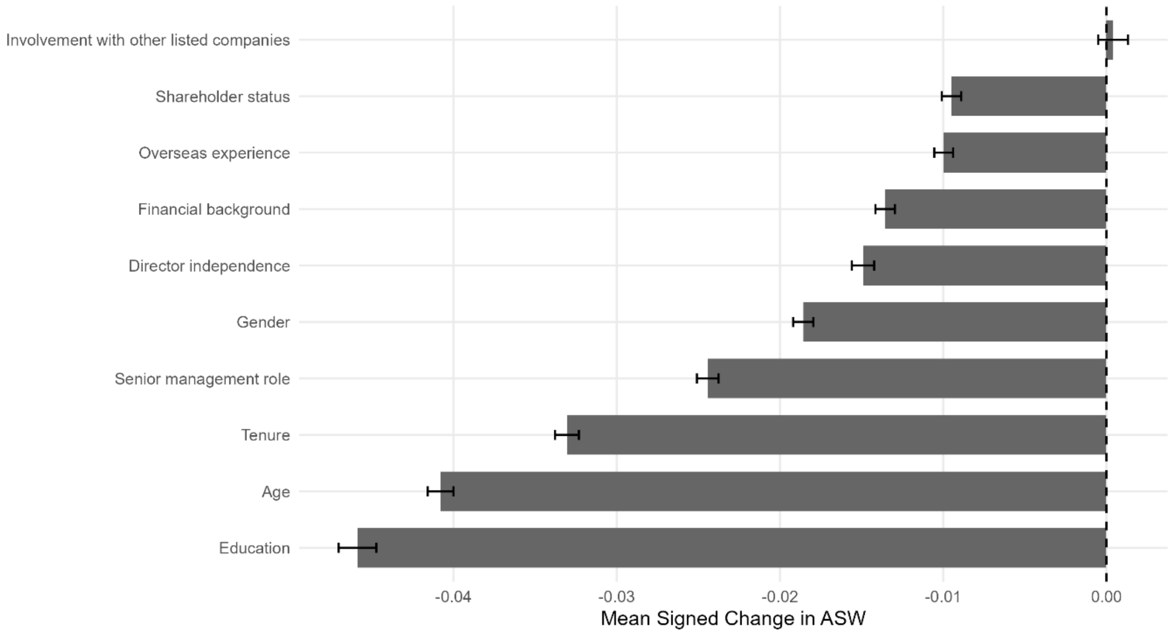
Senior management role and gender produce moderately large negative changes of −0.0244 and −0.0186, respectively. Director independence, financial background, overseas experience, and shareholder status also produce negative average changes, although their magnitudes are smaller. Taken together, these results indicate that most of the attributes included in the Asw measure tend, on average, to cross-cut the alignment formed by the other characteristics.

Other listed-company involvement differs from the remaining attributes. Its mean signed change is close to zero at 0.0004. However, this does not necessarily indicate that the attribute is unimportant. The relatively low Spearman correlation of 0.642 suggests that removing this attribute changes the relative ranking of a substantial number of firm-year observations. Its near-zero mean is therefore more likely to reflect heterogeneous effects: the attribute reinforces faultline alignment in some boards but cross-cuts it in others, causing the positive and negative changes to offset one another at the aggregate level.

The rank correlations provide further evidence regarding the stability of the alternative *Asw* measures. Education produces the lowest Spearman correlation with the baseline *Asw*, at 0.576, indicating that its removal causes the largest change in the relative ranking of firm-year observations. The correlations are higher for most of the remaining attributes, generally exceeding 0.78. Thus, although individual attributes differ in their influence on the calculated *Asw* values, the leave-one-attribute-out measures generally retain a meaningful association with the original faultline measure.

Overall, the sensitivity analysis demonstrates that the ten attributes do not contribute uniformly to the construction of *Asw*. Education, age, and tenure produce the largest systematic changes, while other listed-company involvement produces heterogeneous changes with little average directional effect. Nevertheless, the results do not indicate that the baseline *Asw* is determined solely by one individual attribute. Rather, *Asw* reflects the joint configuration and alignment of multiple demographic and experiential characteristics.

Figure 2.3 Mean Change in ASW Following the Removal of Each Attribute



Note: Change is calculated as baseline ASW minus the leave-one-attribute-out ASW. Error bars show 95% confidence intervals.

Figure 2.3 provides a visual summary of the leave-one-attribute-out results reported in Table 2.2. Education, age, and tenure produce the largest negative mean signed changes, indicating that their removal increases the measured ASW most strongly. Senior management role and gender show smaller but still notable negative changes, while the remaining attributes have more modest average effects. Involvement with other listed companies is the exception, with a mean change close to zero. The 95% confidence intervals shown in the figure make the relative magnitudes of these changes visually clear and reinforce the conclusion that the sensitivity of ASW varies across attributes.

These findings should be interpreted as evidence of the sensitivity of *Asw* to the inclusion of individual attributes, rather than as a decomposition of their independent contributions. *Asw* is a joint and nonlinear clustering measure. Accordingly, the ten leave-one-attribute-out changes are not additive and should not be interpreted as causal effects attributable to individual director characteristics.

The following section extends the analysis from the composition of the *Asw* measure to the organisational and contextual conditions associated with variation in board faultline strength.

2.4.5 An Exploratory Analysis of Board Faultline Variations Across Organisational and Contextual Conditions

Accordingly, this exploratory analysis addresses the following research question: How do board faultlines vary across organisational and contextual conditions that may shape the configuration of directors' demographic and experiential attributes in Chinese listed firms?

An exploratory examination of how board faultlines vary across fundamental internal and external contexts is conducted. While board faultlines are a recognised feature of governance structures, their prevalence and strength may be shaped by contingent factors. I seek to map these potential variations by comparing board faultlines across two key dimensions: the internal context of a company's life cycle stage; and the external context of its broad industry sector. This analysis is intentionally exploratory; it does not test directional hypotheses but rather aims to identify whether systematic patterns in faultline strength exist across these organisational environments. To examine whether board faultline strength differs across life-cycle stages and broad industry sectors, Kruskal–Wallis tests are used to compare the groups, followed by Dunn's post hoc pairwise comparisons (Kruskal and Wallis, 1952).

I first examine the relationship between board faultlines and the internal context of the firm life cycle. Firm life cycle is classified using the methodology established by Dickinson (2011), who identifies five distinct stages, namely *introduction*, *growth*, *mature*, *shake-out*, and *decline*, based on patterns in cash flow from operations, investing, and financing activities. This cashflow-based proxy provides a robust, market-independent measure of a firm's developmental phase, capturing the fundamental economic characteristic of each stage. I posit that the resource demands, strategic imperatives, and governance challenges unique to each life cycle stage may systematically influence the composition and, consequently, the faultline structure of the board. For instance, the resource-acquisition needs of *growth* firms versus the monitoring imperatives of *mature* firms may necessitate different director skill sets, thereby affecting the alignment of directors' demographic and experiential attributes. Life-cycle-specific strategic demands may also make particular attributes, such as professional expertise, tenure, or management role, more salient during board deliberations, increasing or reducing the likelihood that latent faultlines become activated (Jehn and Bezrukova, 2010; Carton and Cummings, 2012). This analysis explores the presence of such systematic variations in faultline strength across these five developmental stages. As shown in Table 2.3 Panel A, our final sample comprises 28,528 firm-year observations. The distribution reflects a typical pattern for listed companies in China, with the majority concentrated in *growth* (31.3%, n=8,918) and *mature* stages (36.7%, n=10,483). *Introduction* (15.1%, n=4,306), *shake-out* (11.6%, n=3,295), and *decline* stages (5.3%, n=1,526) represent smaller proportions for established firms.

Complementing the internal life cycle perspective, I analyse the external context of industry categorisation. The fine-grained CSRC industry classifications are consolidated into three broad sectors based on the classic three-sector model: *primary*, *secondary*, and tertiary sectors (Fisher, 1939; Clark, 1940; Wolfe, 1955). I propose that the competitive landscape, regulatory intensity, and innovation dynamics inherent to each sector exert distinct pressures on corporate governance. A firm in the capital-intensive, stable *secondary* sector, for instance, may assemble a board with different backgrounds than one in the dynamic, human-capital-driven *tertiary* sector. Such compositional differences are likely to manifest in the strength of the board faultlines. Industry context may also influence the salience of subgroup boundaries because sector-specific tasks repeatedly emphasise particular forms of expertise and professional experience. Where these task-relevant attributes align among directors, subgroup identification may become more pronounced and latent faultlines may be more likely to activate during board deliberations. This segment of our analysis therefore explores whether a systematic association exists between these overarching economic sectors and the configuration of board faultlines. Table 2.3 Panel B shows the industry sector distribution, characterised by a strong dominance of the *secondary* sector (71.7%, n=20,455), reflecting the industrial structure of China's A-share market. The *tertiary* sector follows (26.9%, n=7,680), with a minimal representation of the *primary* sector (1.4%, n=393).

Table 2.3 Panel A: Sample Distribution by Company Life Cycles

Life Cycle Stage	Dickinson (2011) Criteria	Frequency	Percentage
Introduction	CFO-, CFI-, CFF+	4,306	15.1%
Growth	CFO+, CFI-, CFF+	8,918	31.3%
Mature	CFO+, CFI-, CFF-	10,483	36.7%
Shake-out	CFO+, CFI+, CFF+/-	3,295	11.6%
Decline	CFO-, CFI+, CFF+/-	1,526	5.3%
Total		28,528	100.0%

Notes: This table presents the distribution of data sample across company life cycles. The criteria of company life follow Dickinson (2011).

Table 2.3 Panel B: Sample Distribution by Industry Sectors

Industry Sector	Frequency	Percentage
Primary	393	1.4%
Secondary	20,455	71.7%
Tertiary	7,680	26.9%
Total	28,528	100.0%

Notes: This table presents the distribution of data sample across industry sectors. Firms in the sample are divided into the primary, the secondary, and the tertiary sector under the criteria of GB/T 4754–2017 based on their industry codes defined by China Securities Regulatory Commission (CSRC).

The analysis of board faultlines across company life cycles reveals statistically significant developmental patterns. The Kruskal-Wallis test shows a highly significant overall difference in faultline strength ($p < 0.01$), confirming that board composition dynamics systematically vary with organisational maturity. Key pairwise comparisons from Table 2.4 Panel A identify specific transition patterns: *growth* phase distinctiveness is suggested by the significant differences between *decline* to *growth* ($Z = -2.34$, $p < 0.05$) and *growth* to *shake-out* ($Z = 2.99$, $p < 0.01$), indicating that growth-stage firms exhibit unique faultline characteristics. The critical maturity transitions are highlighted by the significant *introduction* to *mature* ($Z = -2.56$, $p < 0.05$) and *mature* to *shake-out* ($Z = 3.97$, $p < 0.01$) differences, suggesting that faultline strength differs around the transition into and out of the mature stage. Conversely, the non-significant *decline* to *shake-out* difference ($Z = -0.13$, $p = 0.90$) suggests similar board dynamics in contraction phases. Figure 2.4 visually demonstrates an inverted U-shaped relationship where faultline strength peaks during the *growth* phase (median ASW ≈ 0.36), gradually decreases through *maturity* and *shake-out*, and reaches its lowest point in *decline*. This suggests that board faultlines are most pronounced during high-growth periods, when demands for specialised expertise intensify, whereas more stable phases promote greater homogeneity in board compositions.

Table 2.4 Panel A: Compare Board Faultlines Among Company Life Cycles

Comparison	Z	P-value
Decline to Growth	-2.34**	0.04
Decline to Introduction	-1.24	0.24
Growth to Introduction	1.50	0.22
Decline to Mature	-3.04**	0.01
Growth to Mature	-1.28	0.25
Introduction to Mature	-2.56**	0.03
Decline to Shake-out	-0.13	0.90

Growth to Shake-out	2.99***	0.01
Introduction to Shake-out	1.43	0.22
Mature to Shake-out	3.97***	0.00

Notes: This table presents the comparison results between company life cycles. All statistical tests employ non-parametric methods appropriate for non-normal distribution, with Dunn's test including Benjamini-Hochberg adjustment for multiple comparisons. Z is the Dunn's test value. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test.

The industry sector analysis reveals even more pronounced differences. The Kruskal-Wallis test showed extremely strong significance ($p < 0.01$), indicating that sectoral characteristics fundamentally shape board faultline patterns. Table 2.4 Panel B identifies the core sectoral divergence: the secondary-tertiary divide is overwhelming, with the significance between *secondary* and tertiary sectors ($Z = 4.95$, $p < 0.01$) driving the overall results and suggesting fundamentally different faultline structures between industrial and service-based firms. In contrast, the lack of significant differences between *primary* and either *secondary* ($p = 0.15$) or *tertiary* ($p = 0.73$) sectors may reflect the small sample size but could also indicate *primary* sector neutrality or transitional board characteristics in extractive industries.

Figure 2.4: Distribution of Board Faultlines Across Company Life Cycle Stages

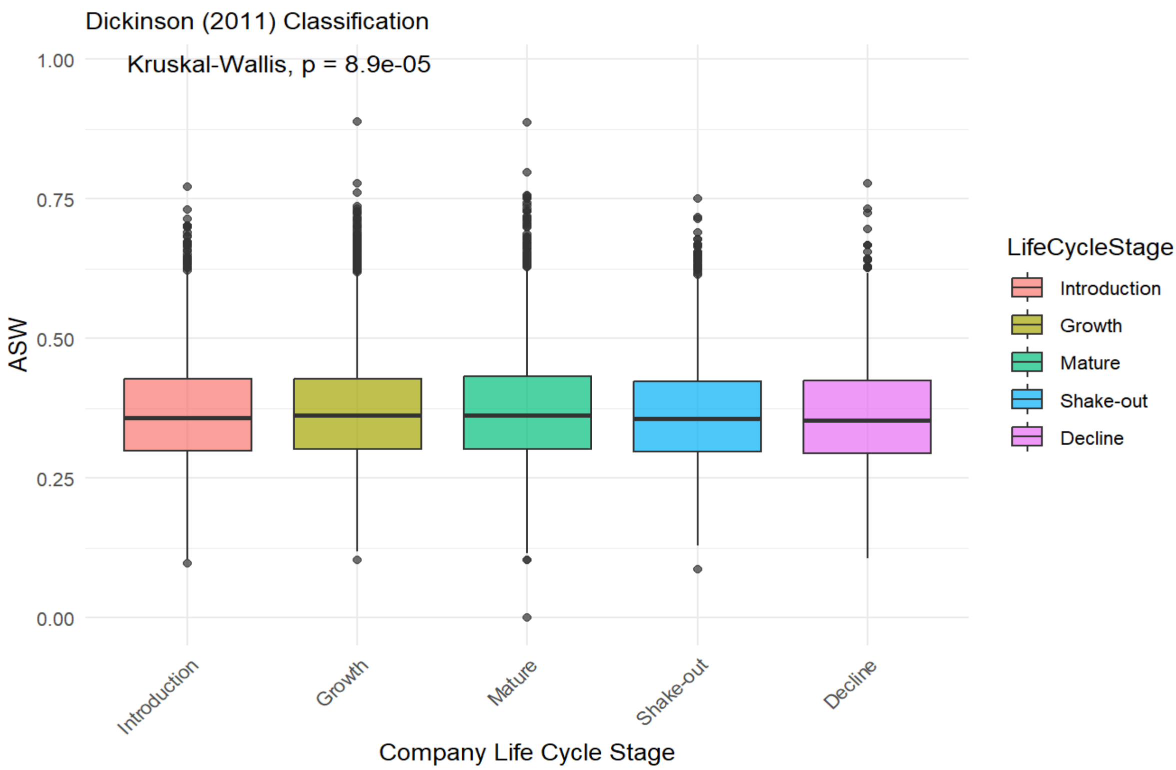


Figure 2.5 further illustrates clear sectoral stratification. *Secondary*-sector firms display consistently higher board faultline strength (median ASW ≈ 0.363) than *tertiary*-sector firms (median ASW ≈ 0.357). Although the numerical gap is modest, its consistency points to

meaningful structural differences in how boards are composed and how director expertise clusters form across industry contexts. Taken together, the evidence suggests that sector-specific business models influence not only the mix of director backgrounds, but also the degree to which these backgrounds coalesce into salient subgroups.

In the *secondary* sector, characterised by capital-intensive production, engineering complexity, and asset-heavy operations, boards tend to accumulate directors with deep technical, operational, and project-management expertise. These competencies often cluster within subsets of directors who share similar professional trajectories (e.g., engineering, mining, energy, manufacturing, logistics). As a result, faultlines become more pronounced, reflecting the presence of technically oriented subgroups that differ not only in functional expertise but also in cognitive schemas, risk assessment approaches, and project evaluation logics.

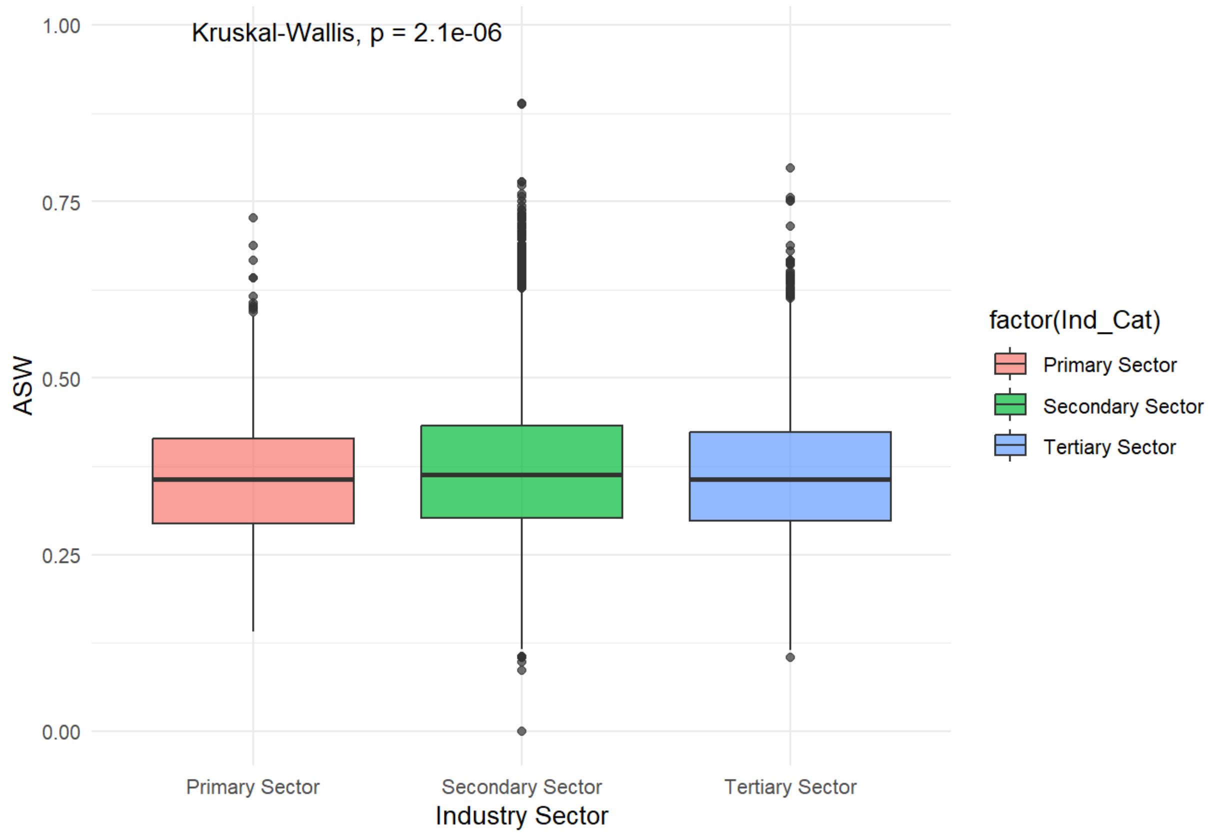
By contrast, in the *tertiary* sector, dominated by service delivery, client relationships, knowledge-intensive tasks, and intangible-asset creation, boards are more likely to attract directors with backgrounds in marketing, consulting, finance, professional services, and customer interface roles. These directors often share broader, cross-functional skillsets and relational orientations, which makes subgroup boundaries less sharply delineated. Service-sector boards may instead form client- or relationship-driven clusters, but these tend to be more fluid and overlapping than the technical subgroups observed in the *secondary* sector. Consequently, faultline strength is lower, reflecting greater integration across director backgrounds.

Table 2.4 Panel B: Compare Board Faultlines Among Industry Sectors

Comparison	**Z**	**P-value**
Primary to Secondary	-1.65	0.15
Primary to Tertiary	-0.34	0.73
Secondary to Tertiary	4.95***	0.00

Notes: This table presents the comparison results between industry sectors. All statistical tests employ non-parametric methods appropriate for non-normal distribution, with Dunn's test including Benjamini-Hochberg adjustment for multiple comparisons. Z is the Dunn’s test value. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test.

Figure 2.5: Distribution of Board Faultlines Across Industry Sectors



The concurrent significance across both contextual dimensions demonstrates that board faultlines are not random phenomena but reflect systematic organisational adaptations to internal developmental needs and external sectoral pressures. The life cycle patterns suggest dynamic board evolution, where board faultlines are present during resource-acquisition intensive *growth* phases and weaken during more stable phases of *maturity* and *decline*. The industry sector analysis results indicate structural board differentiation, with service firms developing distinct composition patterns aligned with knowledge-intensive business models compared to capital-intensive industrial firms.

2.5 Conclusion

This chapter has offered an exploration of board faultlines, tracing their conceptual origins, theoretical foundations, methodological developments, and empirical determinants. By moving beyond demographic measures, faultline theory offers a richer lens for understanding how the alignment of directors' demographic and experiential attributes shapes subgroup dynamics and governance outcomes.

The theoretical review underscores that faultlines are not merely static features of composition, but dynamic phenomena shaped by psychological processes, organisational design, and institutional context. Integrating perspectives from social identity theory, self-categorisation theory, and upper echelons theory demonstrates that faultlines operate at multiple levels, influencing both boardroom interactions and firm-level strategic decisions. The evolution of measurement approaches, particularly the adoption of average silhouette width (ASW), has enabled more rigorous measurement quantification of these complex subgroup dynamics.

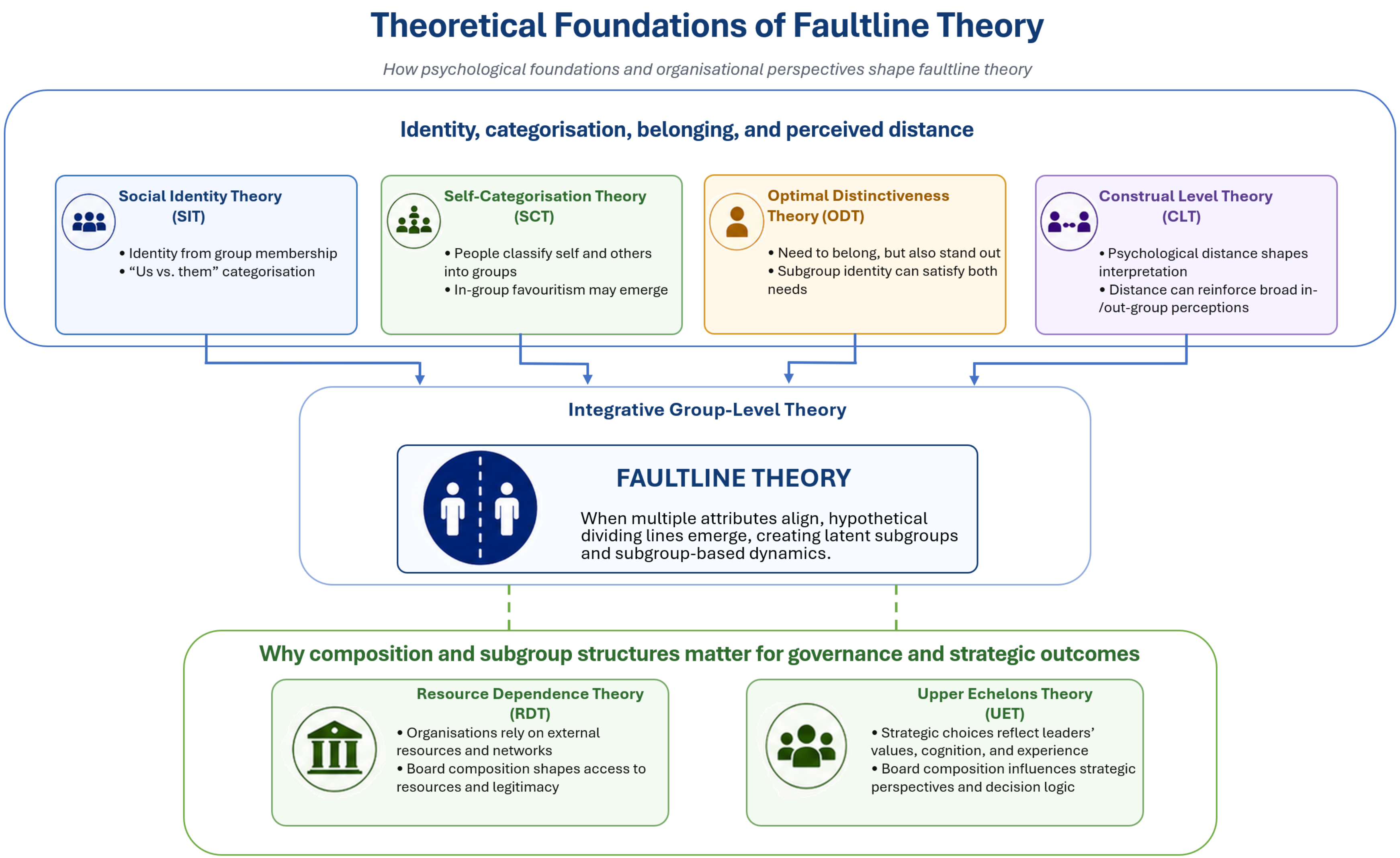
Empirically, this essay makes a distinct contribution by shifting focus from outcomes to antecedents. Using a dataset of 28,528 firm-year observations from Chinese listed firms spanning 2008 to 2021, the analysis reveals that board faultlines are systematically shaped by organisational life cycle and industry sector. The findings demonstrate an inverted U-shaped relationship between faultlines and life cycle stages, with faultline strength peaking during the *growth* phase and declining through *maturity* and *decline*. Significant sectoral differences emerge between *secondary* (industrial) and *tertiary* (service) sectors, suggesting that capital-intensive versus knowledge-intensive business models fundamentally influence board composition patterns. These results address a notable gap in the corporate governance literature, which has predominantly treated faultlines as exogenous conditions rather than as outcomes of broader organisational and contextual forces.

Despite these advances, significant research gaps remain, particularly regarding the mechanisms through which board faultlines influence specific organisational outcomes and their broader implications for external stakeholders. Two critical domains warrant deeper investigation. First, while existing studies document associations between faultlines and corporate innovation, the underlying pathways remain underexplored. Current research on innovation outcomes is preliminary, focusing primarily on innovation inputs (Zhang and Li, 2024) or patent outputs (Li, Li, and Jiang, 2024) without investigating the mediating mechanisms that explain how faultlines translate into innovation performance. Critical questions persist: do faultlines affect innovation directly through enhanced cognitive diversity, or indirectly through their impact on governance quality, information transparency, or financial reporting integrity?

Second, although research identifies links between faultlines and financial reporting quality (Wu et al., 2021), their implications for external audit processes remain underexplored. While audit fees represent a critical outcome where board dynamics meet external accountability, little is known about how board subgroup structures influence audit pricing decisions. Critical questions persist: Do board faultlines reduce audit fees by strengthening governance and enhancing financial reporting quality, thereby lowering auditor-perceived risk? Or do they increase audit fees by complicating internal coordination and extending audit report lag? These effects may operate simultaneously through distinct channels, including financial reporting quality and audit report lag.

In summary, board faultlines represent neither inherent benefits nor inevitable liabilities. Their impact depends critically on how they are formed, activated, and managed within specific organisational and institutional contexts. This duality points to important implications for both scholars and practitioners: researchers must continue investigating the nuanced mechanisms linking board composition to firm outcomes, while practitioners must carefully consider how governance arrangements shape the dynamics of board division and cohesion in pursuit of strategic objectives.

Appendix 2.A: Theoretical Foundations of Faultline Theory



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CHAPTER THREE: BOARD FAULTLINES, FINANCIAL REPORTING QUALITY, AND CORPORATE INNOVATION: EVIDENCE FROM CHINA (ESSAY TWO)

3.1 Introduction

Faultline, as defined by Lau and Murnighan (1998), represents imaginary dividing lines that categorise a group of people into subgroups based on one or more characteristics. These subgroups exhibit similar internal characteristics and differ from other subgroups, leading to distinct behavioural patterns. The notion of board faultlines advances the traditional concept of board diversity by delving deeper into the interactions and dynamics within diverse boards. Whereas board diversity focuses on the existence of varied demographic characteristics such as gender, age, and ethnicity, faultlines theory examines how these attributes align to form subgroups within the board, potentially leading to communication challenges, divergence, alienation, or contradiction.

Lau and Murnighan (2005) note that faultlines often lead to the formation of informal structures, fostering conflicts and hampering effective communication within the team. Hutzschenreuter and Horstkotte (2013) find that demographic faultlines can impair the process of product diversification. Van Peteghem et al. (2018) highlight that faultlines can weaken board effectiveness by fostering the formation of subgroups, which may impede decision-making processes. Accounting and finance research on faultlines is emerging and has so far revealed mixed findings. On the dark side, literature suggests a significant negative impact of board faultlines on financial reporting quality and crash risk (Wu et al., 2021), value of cash holdings (Xu et al., 2021), and innovation-focused initiatives (Arena et al., 2024). Board faultlines may also cause inconsistencies and biases in forecasting accuracy, as noted by Liu and Van Peteghem (2022). On the bright side, prior studies have also noted that board faultlines may bring strategic advantages such as increasing R&D investment (Zhang and Li, 2024) and shaping innovation strategy (Zhang and Ma, 2022), and improving innovation performance (Li et al., 2024; Deng et al., 2025)[2].

[2] Our study differs from previous studies on board faultlines and corporate innovation in several aspects. For instance, Zhang and Ma (2022) use only two cognitive attributes, professional background and education level,

Prior studies have hence documented mixed findings on the association between board faultlines and innovation in Western countries and emerging markets, yet none of the prior studies have investigated the mediating factor that might explain how board faultlines impact innovation. Our study aims at addressing this gap by examining both the direct association between board faultlines and innovation performance in Chinese listed firms and the mediating role of financial reporting quality (FRQ) on this relationship. Studying the impacts of FRQ on corporate innovation is meaningful due to the unique challenges and opportunities in China's economic landscape. High FRQ improves internal resource allocation and uncovers innovation opportunities, which are essential for Chinese firms seeking to compete globally. Understanding these dynamics can help Chinese policymakers and business leaders develop strategies that optimise board configurations to support sustainable economic growth and technological advancement in China.

We contextualise our study in a Chinese setting for three main reasons. First, the characteristics for establishing faultlines in China significantly differ from those in the West (Xiao and Tsui, 2007). While social categories in Western countries are mainly based on race and religion (Thomas, 1990), Chinese people tend to categorise themselves based on characteristics such as age, kinship, hometown, educational background, work experiences, or other shared experiences (Farh et al., 1998; Xiao and Tsui, 2007). The adoption of faultlines in the Chinese context expands its generalisability to an Eastern setting. Second, due to the influence of Confucianism, Chinese people place significant emphasis on establishing and maintaining relationships, with the concept of "circles" being deeply rooted (Chen et al., 2019). Therefore, the influence of team faultlines may be more pronounced in Chinese enterprises.

Our study uses a longitudinal sample of Chinese publicly listed companies encompassing 28,528 firm-year observations spanning 2008 to 2021. We employ the average

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and the faultlines strength method of Thatcher et al. (2003). Their study is also industry-specific, focusing on A-share listed companies in the technology-intensive industries like electronic and machinery. In contrast, our study employs the average silhouette width (ASW) methodology and considers ten demographic and experiential characteristics to measure board faultlines. This approach provides a more nuanced understanding of faultlines as a result of various attributes of a board, providing a more detailed and accurate measure of board faultlines. Second, we examine companies across a wide range of industries, enhancing the generalizability of the findings. Third, prior studies use R&D expenditure as their measure of innovation (e.g., Zhang and Li, 2024). Our study, however, extends these findings by using patent applications and grants as innovation indicators. This approach not only captures the financial investment in innovation but also the tangible outcomes and successful implementation of innovative ideas.

silhouette width (ASW) algorithm[3] — a more sophisticated approach that enhances the detection of subgroup cohesion and optimises the number of clusters (Meyer and Glenz, 2013). By doing so, the ASW algorithm offers a more robust and precise measure of faultlines strength, capturing the complex and multidimensional nature of board subgroup structures. The empirical findings reveal a significant positive association between board faultlines and corporate innovation. Moreover, this positive relationship is partially mediated by FRQ. In other words, board faultlines enhance the quality of financial reporting in Chinese listed firms, which in turn fosters higher levels of corporate innovation in terms of patent applications, patents granted, and R&D investment. These findings withstand various robustness checks, including alternative measures of board faultlines and FRQ and endogeneity tests.

This study makes several key theoretical contributions to the existing literature. First it advances the literature on board diversity by moving beyond traditional, single-attribute measures to embrace the more nuanced concept of board faultlines. The use of the ASW algorithm to measure board faultlines is innovative and contributes methodological rigor. By demonstrating that faultlines can be a productive force for innovation under certain conditions, we challenge the simplified view that diversity-related divisions are universally detrimental.

Second, our research contributes to the theoretical understanding of the mechanism through which an effective governance system can spur corporate innovation. We provide empirical evidence that FRQ is a mediating mechanism in the relationship between board faultlines and corporate innovation. By identifying FRQ as a critical link, we offer a more comprehensive and sophisticated model that illustrates how board faultlines affect innovation both directly and indirectly through governance and information channels.

The remainder of the study is structured as follows. Section 2 provides the institutional background of China with a specific focus on corporate governance of listed firms and

[3] Previous studies examining board faultlines have often relied on single-attribute measures, focusing either on demographic-related traits (e.g., gender, age, ethnicity) (Lau and Murnighan, 2005; Li and Hambrick, 2005; Hutzschenreuter and Horstkotte, 2013; Veltrop et al., 2015) or on task-related characteristics (e.g., education, tenure, functional background) (Kaczmarek et al., 2012; Deng, Xia, and Han, 2025). While these approaches have offered some insights into potential subgroup divisions, they fail to capture the complexity of faultlines that emerge from the alignment of multiple attributes. Building on these methodological gaps, an emerging stream of literature highlights that faultlines formed through the convergence of multiple dimensions provide a more nuanced and predictive understanding of subgroup dynamics than those based on single-attribute measures (Meyer and Glenz, 2013; Stanciu, 2015). Recent studies further advance this perspective by integrating demographic, cognitive, and experiential dimensions within board faultlines analysis (Antoons and Vandebeek, 2025; Mendiratta and Tasheva, 2025).

corporate innovation. Relevant literature on board faultlines and corporate innovation is reviewed in Section 3, and then hypotheses are formulated. Section 4 describes the sample and research methodology, detailing the approach taken for empirical analysis. The findings of the empirical analysis are presented and discussed in Section 5. Section 6 discusses theoretical, practical, and policy contributions of the study, and finanlly, Section 7 summarises the key findings and limitations of the study.

3.2 Institutional Background

3.2.1 Corporate Governance: Regulations on Board Composition

The regulatory landscape governing board composition in Chinese listed companies is shaped by laws, guidelines, and regulations issued by entities such as the China Securities Regulatory Commission (CSRC), the Shanghai Stock Exchange (SSE), and the Shenzhen Stock Exchange (SZSE). The Company Law of China mandates a two-tier board structure for listed companies, consisting of a Board of Directors as the "decision-making body" and a Board of Supervisors as the "monitoring organ" (CSRC, 2018)[4]. The Board of Directors must have 5 to 19 directors, with at least one-third being independent directors, and must include an audit committee with at least one accounting professional (CSRC, 2018, 2022). The Board of Supervisors must have at least 3 supervisors, including one elected by employees and one appointed by shareholders (CSRC, 2018).

Despite these governance regulations, challenges in achieving gender diversity on Chinese corporate boards persist. Confucian traditions historically limited women's leadership roles. However, economic reforms post-1978 have greatly improved women's workforce participation and social status (Du, 2016). China now has one of the highest global proportions of working-age women, nearing 70% (The Economist, 2011). These changes have increased female representation in business leadership, with women holding approximately 13.8% of board positions in Chinese listed companies - a significant improvement over the past decade (Peng and Chandarasupsang, 2023).

The educational background of board members has become increasingly significant, reflecting the country's broader emphasis on education and professional qualifications. Traditionally, many board members were appointed based on political connections or tenure within the

[4] Please refer to Article 3 of The Code of Corporate Governance for Listed Companies (CSRC, 2018).

company (Chen et al., 2015). However, there has been a shift towards valuing formal education and international experience, especially in sectors that require specialised knowledge (Pang et al., 2020).

3.2.2 Corporate Innovation

In China, corporate innovation is now a key part of the country's economic development strategies. This shift is being driven by government efforts to move from a traditionally extensive manufacturing-based economy to one focused on innovation (Liu et al., 2020). This transformation is supported by a complex mix of government policies, legal frameworks, financial systems, and cultural norms (Chen and Naughton, 2016; Liu et al., 2020).

China has implemented significant legislative reforms to strengthen its legal framework, particularly regarding intellectual property rights (IPR) protection. Amendments have been made to patent, trademark, and copyright laws aimed to create an environment conducive to innovation by providing companies with greater certainty and protecting their intellectual assets (Long, 2021; Yu, 2022; Agten and Wu, 2024; Ferrante, 2024).

Cultural shifts towards innovation and entrepreneurship are increasingly visible in China, driven by a growing focus on creativity, experimentation, and risk-taking. The evolving landscape of patent infringement litigation in China reflects the country's increasing emphasis on protecting intellectual property. The establishment of the Intellectual Property Court within the Supreme People's Court in 2019 was a major milestone, enhancing the adjudication process and providing a national-level appeals mechanism for IP cases. This progress aligns with China's broader commitment to fostering a robust environment for innovation.

3.3 Literature Review and Hypotheses Development

3.3.1 Board Faultlines: Theoretical Background

The board of directors holds a crucial role as the highest decision-making authority within companies (Fama and Jensen, 1983). The composition of the board is a critical driver of firm outcomes, with an ideal board comprising individuals with diverse skills, knowledge, and experience (Perry et al., 2023). The concept of board faultlines emerged as a pivotal theoretical development in understanding the intricate ways in which diverse compositions influence group dynamics (Lau and Murnighan, 1998). Faultlines represent hypothetical dividing lines that segment boards into relatively homogeneous subgroups based on the systematic alignment of directors' multifaceted attributes (Lau and Murnighan, 1998; Thatcher and Patel, 2012).

These subgroups possess similar internal characteristics but differ from other subgroups, which can lead to distinct behavioural patterns, including communication challenges, conflict, and alienation.

The main ideas of faultlines theory were first laid out in Lau and Murnighan's (1998) seminal work, using a geological metaphor to explain how aligned group characteristics can create potential "break points" or "fissures" in groups. They propose that just as tectonic plates with similar rock types can form cracks under pressure, groups with aligned demographic (e.g., age, gender, ethnicity), cognitive (e.g., thinking styles, educational backgrounds), and professional (e.g., functional experience, tenure) traits (Thatcher et al., 2003) will also develop subgroups that may struggle with coordination and communication. Faultlines are initially latent, meaning they are present but not immediately obvious. They only become noticeable in behaviour, or "behaviorally salient," when specific situations, like disagreements over strategic direction, changes in leadership, or external crises, cause them to become active (Jehn and Bezrukova, 2010). This activation process is crucial because it explains why some diverse boards experience conflict while others do not, despite similar underlying diversity compositions. Consistent with theory, empirical studies, such as Kaczmarek et al. (2012), demonstrate that strong faultlines elevate conflict risk. This supports the theory's point that the structure of diversity – how attributes are configured, not just their mere presence – is a key driver of intergroup tensions (Bezrukova et al., 2009).

Emerging critiques have challenged the theory's foundational assumptions, particularly its potential Western-centric bias and methodological limitations (Thatcher and Patel, 2012; Meyer et al., 2014). These concerns are especially pronounced in global contexts, where diverse cultural frameworks shape both the formation of subgroups and the relative importance of different demographic attributes (Stahl et al., 2010), calling for more culturally nuanced and methodologically sophisticated approaches. The notion of board faultlines has only recently been introduced into accounting and finance research, and its empirical study is still in its early stages, but revealing significant implications for financial reporting and corporate governance. Strong faultlines can cause conflicts, reduce communication, and impair decision-making, leading to increased stock price crash risk due to weakened oversight. Wu et al. (2021) find that faultlines based on gender, education, and tenure reduce governance efficacy, lowering FRQ and heightening crash risk in Chinese firms. Huang and Zhu (2024) extend this analysis to top management teams in China, demonstrating that task-related faultlines decrease stock price crash risk, while biodemographic faultlines have no significant effect. Additionally, faultlines can lead to inconsistencies and biases in forecasting accuracy, as noted by Liu and Van Peteghem (2022).

Faultlines also have broader impacts on corporate strategic decision-making and firm performance. Van Peteghem et al. (2018) examine U.S. listed firms from 2008 to 2012, finding that boards with strong faultlines are associated with lower firm performance and higher abnormal CEO compensation, often tied to poor oversight of financial decisions. Xu et al. (2021) use data from Chinese listed companies spanning from 2004 to 2016 to explore the relationship between board faultlines and the value of cash holdings. They find that board faultlines significantly reduce the level of cash holdings.

While existing research provides valuable insights into the negative influences of board faultlines, they could also bring strategic advantages. For instance, Zhang and Li (2024) examine the innovation input of Chinese listed companies during 2012 and 2022 and report a positive association between board faultlines and innovation investment. However, their focus on input merely captures managerial intentions or resource allocation, not the actual outcomes of innovation (e.g., patents, technological breakthroughs). Moreover, their analysis lacks a theoretical mechanism to explain how faultlines translate into higher investment—whether through improved information exchange, reduced groupthink, or other pathways—leaving the "black box" of causality unanswered. Deng et al. (2025) further substantiate this relationship by documenting a positive association between task-related faultlines among executives and board members and corporate innovation inputs. Li et al. (2024) extend this inquiry by linking board faultlines to innovation performance in Chinese listed companies from 2010 to 2021. While their finding of a positive association is intriguing, it suffers from similar limitations: the study does not investigate how faultlines influence innovation—whether directly or indirectly through mediating factors like governance quality or information transparency. Critically, both studies do not explore intermediate mechanisms that might explain how faultlines bridge this gap, which is to be explored in this study.

3.3.2 Hypothesis Development

This study employs a theoretical framework adapted from Bushman and Smith (2001), as shown in Appendix 3.A, to develop the baseline and mediating hypotheses on the interplay between board faultlines, FRQ, and corporate innovation. According to this framework, corporate governance mechanisms influence firm performance through two primary channels: directly by improving project identification and monitoring, and indirectly by reducing information asymmetry through financial reporting. Bushman and Smith's (2001) framework emphasises the role of corporate governance and legal/political institutions in influencing the supply of external financial information. Within this framework, FRQ emerges as a key output of an effective corporate governance mechanism, determining how accurately, reliably, and timely firms disclose their financial information (Dechow and Dichev, 2002), which in turn impacts a firm's innovation activities. Appendix 3.B explains the logic behind H1 on the direct association between board faultlines and corporate innovation, and H2 on the mediating role of FRQ between board faultlines and corporate innovation.

3.3.2.1 Board Faultlines and Corporate Innovation

Prior research on board faultlines has highlighted the negative influences of faultlines on decision-making and board effectiveness. Drawing on social categorisation theory (Williams and O'Reilly, 1998), scholars argue that faultlines can intensify intra-group conflict (Kirkman et al., 2004; Li and Hambrick, 2005; Bell et al., 2011; Pu et al., 2023), erode trust and mutual respect among directors (Harrison and Klein, 2007), and obstruct effective information exchange, thereby impeding strategic change (Van Peteghem et al., 2018; Wu et al., 2021). Strong subgroup identities may foster exclusion and discrimination, leading to fragmented communication and impaired decision-making (Williams and O'Reilly, 1998; Lau and Murnighan, 2005). These dynamics can disrupt board interactions, promote bias, and hinder the development of cohesive and forward-looking innovation strategies.

Empirical evidence further supports these concerns. Zhang and Ma (2022), using a large panel of Chinese A-share technology-intensive firms from 2009 to 2019, investigate how different types of board faultlines shape firms' innovation strategies. They distinguish between social-related and cognitive-related faultlines, finding that the former hinder innovation by intensifying subgroup conflict and reducing trust, while the latter enhance innovation through knowledge diversity and information exchange. However, their analysis focuses on innovation strategy orientation rather than measurable innovation outputs, and their faultlines indicators are based on demographic and educational alignment, not continuous subgroup separation measures such as ASW.

Similarly, Arena et al. (2024), examining UK firms from 2011-2017, emphasise that diminished trust and poor communication, often consequences of strong faultlines, can prevent boards from engaging in critical discussions and approving innovation-focused initiatives. Additionally, faultlines may encourage opportunistic behaviour, weakening the board's monitoring role (Eisenberg et al., 1998; Ryan and Wiggins, 2004; Cheng, 2008; Shin and You, 2023). In such cases, ineffective board coordination allows CEOs to consolidate decision-making power, limiting oversight and increasing the risk of earnings manipulation or resource misallocation. These agency problems pose substantial barriers to innovation, particularly in environments where board unity and strategic alignment are essential.

In contrast, the information decision-making perspective suggests that faultlines can enrich strategic decision-making by introducing diverse viewpoints and specialised knowledge (Williams and O'Reilly, 1998; Thatcher et al., 2003), foster resource allocation in investment in R&D (Zhang and Li, 2024), and encourage innovation activities (Li et al., 2024). This perspective implies that the emergence of subgroups within the board encourages varied approaches to problem-solving, creating fertile ground for innovative thinking (Li et al., 2024). Furthermore, faultlines can stimulate constructive debate and deliberation, ensuring that competing viewpoints are critically assessed (Shin and You, 2023; Vandebeek, Voordeckers, Huybrechts and Lambrechts, 2024). This process enhances the rigor of strategic investment decisions. Faultlines can enhance governance under certain conditions, for instance, Xue et al. (2024) demonstrate that, in Chinese listed companies, functional faultlines can reduce corporate financial fraud by improving monitoring effectiveness, a view supported by agency theory (Jensen and Meckling, 1976). Specifically, we argue that this heightened monitoring mitigates groupthink and agency conflicts, ensuring that high-risk innovation investments are rigorously evaluated rather than avoided due to managerial risk aversion. Such effective board oversight of executive behaviour is precisely the internal governance mechanism that Bushman and Smith (2001) identify as critical to influencing a firm's information environment. Therefore, diverse experiences and networks embedded within board subgroups could contribute unique insights and enable easier access to external resources, thereby strengthening the firm's capacity to pursue innovation-led strategies.

Considering these competing arguments, as depicted in Appendix 3.B, we formulate our hypothesis as follows:

H1: There is an association between board faultlines and corporate innovation.

3.3.2.2 Financial reporting quality (FRQ): a mediating factor

Board faultlines arise from diversity in characteristics such as culture, ethnicity, and language, and can significantly affect the quality of financial disclosures (Cohen et al., 2004; Xue et al., 2024). On one hand, increased diversity and faultlines may enhance board monitoring by reducing agency costs and information asymmetry, thereby improving FRQ (Dobija et al., 2022; Ullah, Zhao, Zeb, Iqbal, and Arif Khan, 2023). Hillman and Dalziel (2003) argue that effective monitoring requires a blend of resources and competencies, including diverse knowledge bases and social capital, which faultlines may help provide. On the other hand, faultlines can also hinder communication and coordination, leading to governance challenges and reduced FRQ (Van Peteghem et al., 2018; Cheung et al., 2022). Specifically, Cheung et al. (2022) demonstrate that Cultural, Ethnic, and Language diversity—often a source of faultlines—can degrade information quality when communication within the board is impaired (Srinidhi, 2020).

Drawing from the adapted theoretical framework of Bushman and Smith (2001) in Appendix 3.A, FRQ may drive corporate innovation by enabling managers to make more accurate assessments of the potential returns of R&D projects, thereby efficiently identifying innovation opportunities and reducing investment errors (Biddle et al., 2009). FRQ could also help mitigate agency conflicts and incentivise long-termism by properly designed compensation schemes, which motivate managers to undertake risks that are beneficial for innovation (Fu et al., 2020). Finally, by providing high-quality information to the capital markets, FRQ could significantly alleviate external investors' concerns about adverse selection, enabling firms to secure necessary funding for innovation at a lower cost of capital, thus ensuring the financial viability of innovation activities (Healy and Palepu, 2001; Balakrishnan et al., 2014).

We therefore argue that FRQ serves as a mediator in the relationship between board faultlines and corporate innovation, as shown in Appendix 3.B. Consequently, we propose the following hypothesis:

H2: FRQ mediates the relationship between board faultlines and corporate innovation.

3.4 Research Method

3.4.1 Sample Selection

The main source of our data is the China Stock Market and Accounting Research (CSMAR) database, which covers accounting and financial information of companies listed on the Shanghai and Shenzhen Stock Exchanges. Board members' information is obtained from the China Listed Firm's Corporate Governance Research Database within the CSMAR database; and the information regarding patent applications comes from the China Listed Firm's R&D Innovation Database of CSMAR. The patent application and granted data are also obtained from CSMAR.

The sample consists of Chinese listed A-share firms from 2008 to 2021. 2008 is the starting year because it marks the adoption of new accounting standards that require firms to disclose detailed information on R&D expenditures. The study has an initial sample of 40,572 firm-year observations. We exclude 829 firm-year observations in the financial industry and a further 11,215 firm-year observations with incomplete financial data. A final sample of 28,528 annual observations is obtained. Table 3.1 shows how the sample is selected. The distribution of the final sample across various sectors, based on the China Securities Regulatory Commission's classification, is presented in Table 3.2. All firm-level continuous variables are winsorized at the top and bottom 1% of their respective distribution to reduce the impact of outliers.

Table 3.1: Sample Selection

Initial number of observations	40,572
Less: companies in the finance and insurance industries	-829
Less: data with missing values (final sample)	-11,215
Final sample	28,528
Number of unique companies	3,623

Note: This table presents the sample selection procedure

Table 3.2: Industry Distribution

Industries	**No. of Companies**	**%**
Agriculture, Forestry, Fishing & Hunting	425	1.5%
Mining	716	2.5%
Manufacturing	18,389	64.5%
Utilities	1,039	3.6%
Construction	785	2.8%
Retailing & Wholesaling	1,555	5.5%
Transportation & Warehousing	930	3.3%
Accommodation & Food Services	71	0.2%
Information	1,700	6.0%
Real Estate	1,335	4.7%
Rental & Leasing	314	1.1%
Scientific & technical services	203	0.7%
Water Conservancy, Environ. & Public Facilities	346	1.2%
Personal services	18	0.1%
Education Services	35	0.1%
Healthcare & social Assistance	361	1.3%
Arts, Entertainment & Recreation Complex	306	1.1%
Total	28,528	100.00%

Note: This table presents the industry distribution of the full sample

3.4.2 Measurement of Board Faultlines

Previous research on board faultlines has primarily concentrated on individual diversity variables such as gender or age, to delineate board subgroups (Veltrop et al., 2015; Kagzi and Guha, 2018; Wu et al., 2021; Makkonen, 2022). For example, Wu et al. (2021) segment boards into male and female subgroups, assessing faultlines based on educational level, tenure, nationality, and functional background within each subgroup. Recent scholarship has broadened to explore additional board characteristics. For instance, Xu et al. (2021) incorporate independence, gender, financial experience, tenure, shareholdings, and directorship type in measuring board faultlines, while Arena et al. (2024) examine the demographic faultlines of the board, and Xue et al. (2024) focus on gender, age, education, and tenure.

This study employs a cluster-based approach called ASW to evaluate board faultlines, following the method proposed by Meyer and Glenz (2013). ASW's application in board faultlines analysis is particularly significant as it captures the intricate interplay among board members' attributes, offering insights beyond traditional faultlines strength evaluations. ASW assesses the same underlying construct as the widely used faultlines measure, FAU (Thatcher and Patel, 2012). Through comprehensive empirical analysis by Meyer and Glenz (2013), further supported by Meyer et al. (2014), ASW emerges as the most robust method for detecting faultlines within groups or organisations. Notably, ASW allows for the identification of multiple subgroups, even within small teams, addressing a key concern regarding the determination of the optimal number of subgroups in a group. This capability is crucial, as an excessive number of subgroups tends to diminish the effectiveness of faultline measures (Meyer and Glenz, 2013).

ASW, in the context of board faultlines, captures the dynamic interactions among board member attributes by evaluating clustering effectiveness within the data. Attributes serve as data points, and the clustering process reveals patterns of similarity or dissimilarity. ASW considers the distances between data points within clusters and across different clusters, offering a measure of how distinct and separated these clusters are. Meyer and Glenz (2013) define ASW as the calculation of the average silhouette width of team members, indicating the extent to which an individual aligns with one cluster (A) compared to another cluster (B). Individual silhouette width is computed using the formula:

$$s(i) = \frac{b_i - a_i}{\max(a_i, b_i)} \qquad (1)$$

where a_i represents the average dissimilarity of individual i to all members within cluster A, and b_i denotes the average dissimilarity of individual i to all members within cluster B. Dissimilarities are quantified using the Euclidean distance metric between individuals.

Building on the approach of Xu et al. (2021), the faultline measures constructed in this study consider the demographic and experiential characteristics of board directors. The demographic features include gender and age, while the experiential aspects encompass education, shareholder status, senior management status, director independence, board membership of other listed companies, overseas experience, financial background, and tenure. These characteristics may influence directors' incentives and capabilities to perform effectively.

3.4.3 Measurement of Innovation

Corporate innovation is typically quantified using output-based indicators, with patents being a prominent measure[5]. Patents are categorised into various types, including invention, utility model, and design patents. Three variants of patent applications are commonly utilised: the number of patents applied ($LnPa1_{i.t}$), the number of patents including invention and utility model patents applied ($LnPa2_{i.t}$), and the number of patents including invention, utility model, and design patents applied ($LnPa3_{i.t}$). Additionally, patent grants serve as a proxy for corporate innovation, with three variants of patent grants being employed: the number of patents granted ($LnPg1_{i.t}$), the number of patents including invention and utility model patents granted ($LnPg2_{i.t}$), and the number of patents including invention, utility model, and design patents granted ($LnPg3_{i.t}$). To prevent issues with zero values, all patent variables are transformed into natural logarithms of one plus their original values.

Griliches, Pakes, and Hall (1986), Hall et al. (2001), and Kong et al. (2022) argue that the number of patent applications better reflects the timing of innovation compared to the number of patents granted. Board faultlines do not directly impact the innovation outputs, like patent citations, since the translation of these inputs into significant innovations depends on factors beyond the board's direct influence. Therefore, in this study, we utilise the number of patent applications as the primary proxy for corporate innovation, with the number of patents granted serving as an alternative measure.

3.4.4 Financial Reporting Quality

Building on prior research (Roychowdhury, 2006; Cohen and Zarowin, 2010; Bozzolan et al., 2015), we employ *Rem* (real earnings management) as a proxy for FRQ. *Rem* is quantified by

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[5] R&D expenditure is a widely used input-based measure of corporate innovation. However, prior literature highlights two main limitations of this measure. First, there is often no direct link between R&D expenditure and a firm's innovation strategies and performance (Manso, 2011; Gao et al., 2018). Second, R&D expenditure may not accurately capture R&D expenses, as the decision to capitalize or expense R&D costs can be highly specific (Acharya and Subramanian, 2009). Therefore, we include R&D expenditure solely as an alternative measure of corporate innovation in our robustness tests.

the summation of abnormal production costs, abnormal discretionary expenses, and abnormal cash flow from operations. A higher Rem value suggests a greater likelihood of the firm engaging in REM activities. Refer to Appendix 3.C for a detailed explanation of the measurement.

3.4.5 The Models

To test H1 we develop the following OLS regression specification (Eq. 2) adapted from the model specifications outlined by Chen et al. (2023).

$$Ino_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Size_{i,t} + \beta_3 Roa_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Loss_{i,t} + \beta_6 Capex\%_{i,t} + \beta_7 Tobinsq_{i,t} + \beta_8 Insinv_{i,t} + \beta_9 Ppe\%_{i,t} + \beta_{10} Hhi_{i,t} + \beta_{11} Bsize_{i,t} + \beta_{12} Soe_{i,t} + Ind\,fe + Year\,fe + \varepsilon_{i,t} \quad (2)$$

where $Ino_{i.t}$ is corporate innovation, and is proxied by patent applications (*LnPa1, LnPa2, LnPa3*) and patent grants (*LnPg1, LnPg2, and LnPg3*). *Asw* is board faultlines and is estimated by the ASW model. The control variables in our analysis consist of firm size ($Size_{i,t}$), return on assets ($Roa_{i,t}$), the financial leverage ($Lev_{i,t}$), loss ($Loss_{i,t}$), the capital expenditure ($Capex\%_{i,t}$), Tobin's q ($Tobinsq_{i,t}$), institutional investor shareholding ($Insinv_{i,t}$), PPE ($Ppe_{i,t}$), Herfindahl-Hirschman index ($Hhi_{i,t}$), board size ($Bsize_{i,t}$), and SOE ownership ($Soe_{i,t}$). We also include industry-fixed (*Ind*) and year-fixed (*Year*) dummies in the model to control for the industry- and time-varying effect of corporate innovation. Please consult Appendix 3.D for the definitions of the variables used in the models.

3.4.6 Descriptive Statistics

Table 3.3 provides a statistical summary of the key financial and corporate governance variables utilised in this study. The *Asw*, a proxy for board faultlines, has a mean of 0.368 and a median of 0.361. The value of *Asw* is between -1 and 1, where 1 represents the case where all subgroups are perfectly homogeneous, and there are perfect strong faultlines. The average *Asw* of 0.368 indicates a medium level of faultlines. The mean (median) values of *LnPg1* are 0.661 (0.000), for *LnPg2* are 0.977(0.000), and for *LnPg3* are 1.763 (1.609). The corresponding values for *LnPa1, LnPa2, and LnPa3* have mean values of 1.031, 1.430, and 1.955, respectively, with medians of 0.000, 1.099, and 1.946. These values are consistent with Beladi et al. (2022) and Zhang et al. (2024)[6].

Table 3.3: Descriptive Statistics

Variables	N	Mean	Median	25%	75%	Std. Dev.
Asw	28,528	0.368	0.361	0.301	0.429	0.092
LnPa1	28,528	1.031	0.000	0.000	1.792	1.315
LnPa2	28,528	1.430	1.099	0.000	2.565	1.501
LnPa3	28,528	1.955	1.946	0.000	3.526	1.974
LnPg1	28,528	0.661	0.000	0.000	1.099	1.007
LnPg2	28,528	0.977	0.000	0.000	1.946	1.331
LnPg3	28,528	1.763	1.609	0.000	3.178	1.801
Rem	28,528	0.022	0.026	0.014	0.035	0.021
Dac	28,528	0.057	0.040	0.018	0.077	0.059
Size	28,528	22.970	22.800	22.190	23.590	1.095
Roa	28,528	0.034	0.034	0.012	0.063	0.061
Lev	28,528	0.147	0.017	0.000	0.147	0.301
Loss	28,528	0.111	0.000	0.000	0.000	0.315
Capex%	28,528	0.046	0.032	0.013	0.065	0.046
Tobinsq	28,528	2.051	1.657	1.264	2.367	1.242
Insinv%	28,528	0.461	0.477	0.276	0.653	0.245
Ppe%	28,528	0.221	0.188	0.093	0.316	0.164
Hhi	28,528	0.076	0.046	0.020	0.092	0.092
Bsize	28,528	2.136	2.197	1.946	2.197	0.201
Soe	28,528	0.415	0.000	0.000	1.000	0.493

Note: This table presents the descriptive statistics for the regression variables.

Real earnings management (*Rem*), as a proxy for FRQ, shows a mean of 0.022 and a median of 0.026. A higher real earnings management suggests a company is actively manipulating its financial performance through operational and strategic adjustment, which impacts the financial reporting quality. The absolute discretionary accruals (*Dac*) show a mean of 0.057 and a median of 0.040. Higher *Dac* implies lower FRQ. The firm size (*Size*) has a mean of 22.97 and a median of 22.81, which suggests that the average listed firm in the sample has a market value of RMB 9.5 billion. Board Size (*Bsize*) has a mean of 2.136, which implies there are, on average, 8 to 9 members on the board in our sample. Return on Assets (*Roa*) and Leverage Ratio (*Lev*) have mean values of 0.034 and 0.147, respectively, which suggest a relatively low average return on assets of 3.4% across the sample firms and a moderately low leverage ratio of 14.7% on average. The binary variable *Loss* has a mean of 0.112, which

[6] For example, Zhang et al. (2024) report the mean of *LnPa3* is 2.033 during the period of 2011-2017.

indicates that, on average, 11.2% of the sample firms have suffered financial losses during the period from 2008 to 2021. Capital Expenditure to Total Assets (*Capex%)* has a mean of 0.046, which is consistent with Zhang et al. (2023). This ratio suggests that, on average, the cash-based capital expenditure is 4.6% of the total assets. A higher proportion of capital expenditures relative to total assets (*Capex%)* aligns with the notion that strategic investment is essential for fostering corporate innovation (Fang et al., 2014). The percentage of property, plant, and equipment to total assets (*Ppe%*) has a mean of 22.1%. Tobin's Q Ratio (*Tobinsq*) has a mean of 2.051 and a median of 1.657, indicating that the market value of Chinese listed firms in the sample is, on average, twice as much as the amount of total assets, thus suggesting moderate growth opportunities. Institutional Investment Percentage (*Insinv%)* reports a mean of 46.1%, which shows the institutional investors play a less significant role compared with the state ownership of 41.5% in the sample. Overall, the descriptive statistics for most of the variables are consistent with prior studies in the Chinese context.

Table 3.4 reveals the relationships among key variables, particularly focusing on the correlation between *Asw* and innovation metrics. *Asw* consistently shows positive correlations with most innovation metrics, highlighting a strong link between board faultlines and innovative practices. This suggests that firms with significant board faultlines tend to be more innovative. *Asw* also shows a significantly negative correlation with *Rem* (-0.02, $p<0.01$) and *Dac* (-0.02, $p<0.01$). Furthermore, *Asw* shows a subtle positive correlation with Return on Assets (*Roa*) ($r = 0.03$, $p < 0.01$), indicating a modest connection between faultlines presence and enhanced financial performance.

The results show no strong multicollinearity among independent variables, with coefficients consistently less than 0.6, except for the correlation coefficient between *Loss* and *Roa* (0.67). Variance Inflation Factor (VIF) tests confirm the absence of multicollinearity, as all VIF values are below 5, while their reciprocals are consistently less than 1.

Table 3.4: Pearson Correlation

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.Asw	1																		
2.LnPa1	**0.03**	1																	
3.LnPa2	**0.04**	0.93	1																
4.LnPa3	**0.04**	0.91	0.98	1															
5.LnPg1	**0.02**	0.71	0.66	0.64	1														
6.LnPg2	**0.04**	0.63	0.76	0.72	0.56	1													
7.LnPg3	**0.04**	0.72	0.80	0.81	0.79	0.86	1												
8.Rem	**-0.02**	-0.06	-0.07	-0.07	**-0.04**	**-0.04**	**-0.05**	1											
9. Dac	**-0.02**	-0.08	-0.09	-0.09	-0.06	-0.07	-0.08	-0.08	1										
10.Size	**0.00**	0.16	0.12	0.09	0.16	0.08	0.07	**-0.03**	**-0.03**	1									
11.Roa	**0.03**	0.11	0.10	0.11	0.07	0.06	0.09	-0.30	-0.24	0.16	1								
12.Lev	**-0.01**	-0.13	-0.15	-0.17	-0.10	-0.11	-0.16	0.12	0.06	0.30	-0.18	1							
13.Loss	**-0.03**	-0.06	-0.06	-0.06	**-0.04**	**-0.04**	**-0.04**	0.21	0.23	-0.10	-0.67	0.10	1						
14.Capex%	**0.02**	0.08	0.08	0.09	0.07	0.06	0.08	-0.12	-0.08	**0.03**	0.14	0.06	-0.09	1					
15.Tobinsq	**-0.02**	**0.02**	**-0.01**	**0.01**	**0.03**	-0.06	0.00	-0.14	0.06	-0.09	0.20	-0.22	**-0.02**	**0.02**	1				
16.Insinv%	**0.00**	**-0.04**	-0.07	-0.08	**-0.03**	-0.05	-0.08	-0.06	**-0.03**	0.42	0.15	0.17	-0.11	0.06	-0.06	1			
17.Ppe%	**0.02**	**-0.04**	**-0.03**	**-0.03**	**-0.04**	**-0.02**	**-0.03**	**0.05**	-0.11	**0.00**	**-0.05**	0.14	0.05	0.31	-0.12	0.14	1		
18.Hhi	**0.04**	-0.15	-0.14	-0.15	-0.13	-0.08	-0.14	**0.02**	**0.01**	**0.04**	-0.02	0.06	**0.01**	0.08	**-0.05**	0.16	0.14	1	
19.Bsize	0.12	**0.01**	**0.00**	**-0.01**	**0.02**	**0.00**	**-0.01**	**0.02**	**-0.05**	0.20	**0.04**	0.13	**-0.04**	**0.05**	-0.13	0.24	0.16	0.11	1
20.Soe	**0.01**	-0.08	-0.11	-0.13	-0.06	-0.10	-0.14	0.06	**-0.05**	0.21	**-0.05**	0.22	**-0.01**	-0.07	-0.16	0.42	0.19	0.17	0.27

Notes: This table shows the Pearson correlation matrix of board faultlines, corporate innovation measures, FRQ measures, and control variables. Numbers in bold denote 0.05 significance levels (two-tailed tests). All variables are defined in Appendix 3.D.

3.5 Results

3.5.1 Baseline Regression Analysis

Columns (1) – (6) of Table 3.5 present the regression results for the relationship between board faultlines (*Asw*) and various measures of corporate innovations (Eq. 2). For patent applications (Columns 1-3), the coefficients on *Asw* are consistently positive and significant at the 1% level (*LnPa1*: 0.248 ($p<0.01$), *LnPa2*: 0.485 ($p<0.01$), and *LnPa3*: 0.636 ($p<0.01$)), indicating that stronger board faultlines are associated with greater innovation efforts. In terms of economic magnitude, every one unit increase in *Asw* increases the number of patent applications by 28.15%. (*LnPa1*) relative to the average, which corresponds to approximately 1.74% of the standard deviation of the *Asw* in our pooled sample. The results, therefore, highlight the significant impact of board faultlines on innovation. This suggests that firms with more pronounced board faultlines tend to pursue more innovative strategies, confirming the existence of the direct relationship as proposed in H1. The empirical results further support the positive influence of board faultlines in the Chinese context that were documented in prior studies using different proxies for independent and dependent variables (e.g., Zhang and Li, 2024; Li et al., 2024; and Deng et al., 2025). By using ASW to measure the continuous subgroup separation based on a wide range of ten demographic and experiential characteristics, our study offers slightly different insights from Zhang and Ma (2022). Our finding of a significant positive association between board faultlines and corporate innovation provides crucial empirical evidence for the Information Decision-Making perspective (Williams and O'Reilly, 1998; Van Knippenberg, De Dreu, and Homan, 2004). This result is inconsistent with the predictions of Social Categorisation Theory, suggesting that the benefits derived from constructive debate and the diverse cognitive resources of board subgroups, which are essential for assessing uncertain R&D projects, decisively outweigh the detrimental effects of conflict, leading to greater innovation output. Regarding the patent granted, the coefficients for *LnPg2* and *LnPg3* are 0.444 ($p<0.01$) and 0.520 ($p<0.01$), respectively, further supporting the idea of a positive correlation between *Asw* and corporate innovation success. The consistency of the results across various innovation measures, such as innovation effort (i.e., the number of applications) and innovation quality and outcome (i.e., the number of granted patents) demonstrates that the functional benefits of faultlines lead to substantial improvement in corporate innovation performance.

Table 3.5: Regression Results on the Relationship between Board Faultlines and Innovation

Variables	*LnPa1* (1)	*LnPa2* (2)	*LnPa3* (3)	*LnPg1* (4)	*LnPg2* (5)	*LnPg3* (6)
Intercept	-6.485***	-6.197***	-6.757***	-4.812***	-3.638***	-5.254***
	(0.194)	(0.230)	(0.283)	(0.154)	(0.205)	(0.265)
Asw	0.248***	0.485***	0.636***	0.083	0.444***	0.520***
	(0.075)	(0.089)	(0.110)	(0.060)	(0.079)	(0.103)
Size	0.301***	0.290***	0.320***	0.223***	0.170***	0.255***
	(0.008)	(0.010)	(0.012)	(0.007)	(0.009)	(0.011)
Roa	0.641***	0.751***	1.426***	-0.031	0.341*	0.939***
	(0.166)	(0.198)	(0.243)	(0.132)	(0.175)	(0.227)
Lev	-0.308***	-0.377***	-0.454***	-0.216***	-0.288***	-0.405***
	(0.028)	(0.034)	(0.041)	(0.022)	(0.030)	(0.039)
Loss	-0.061**	-0.101***	-0.083*	-0.025	-0.038	-0.012
	(0.030)	(0.036)	(0.044)	(0.024)	(0.032)	(0.041)
Capex%	1.734***	1.942***	2.523***	1.263***	0.925***	2.132***
	(0.166)	(0.197)	(0.243)	(0.132)	(0.175)	(0.227)
Tobinsq	-0.041***	-0.090***	-0.099***	-0.029***	-0.102***	-0.102***
	(0.006)	(0.008)	(0.009)	(0.005)	(0.007)	(0.009)
Insinv%	-0.282***	-0.320***	-0.346***	-0.192***	-0.163***	-0.274***
	(0.035)	(0.042)	(0.052)	(0.028)	(0.037)	(0.048)
Ppe%	-0.427***	-0.533***	-0.613***	-0.365***	-0.449***	-0.622***
	(0.053)	(0.063)	(0.077)	(0.042)	(0.056)	(0.072)
Hhi	-0.892***	-0.754***	-0.956***	-0.661***	-0.125	-0.767***
	(0.086)	(0.102)	(0.125)	(0.068)	(0.090)	(0.117)
Bsize	0.128***	0.175***	0.231***	0.093***	0.125***	0.199***
	(0.037)	(0.044)	(0.054)	(0.030)	(0.039)	(0.051)
Soe	0.081***	0.000	-0.033	0.041***	-0.072***	-0.117***
	(0.017)	(0.020)	(0.024)	(0.013)	(0.018)	(0.023)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.218	0.237	0.259	0.159	0.151	0.221
F-test	195.2***	217.0***	244.0***	132.8***	125.1***	198.6***

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

Financial metrics like *Size*, *Roa*, *Lev*, and *Loss* show trends consistent with existing literature. The positive coefficient on *Size* is in line with the argument that firms endowed with greater financial resources may allocate more towards innovation efforts (Shefer and Frenkel, 2005). Similarly, higher profitability (*Roa*), and lower leverage (*Lev*) are associated with increased innovation (Tian and Wang, 2014; Balsmeier et al., 2017). Furthermore, the significant negative coefficient of *Ppe%* corresponds with our expectation that firms with a higher ratio of asset tangibility invest less in intangible assets, thus exhibiting lower levels of innovation (Tian and Wang, 2014).

A negative correlation between concentration (*Hhi*) and innovation supports the competition-driven differentiation strategies identified in prior research (Gallagher et al., 2015). Larger boards (*Bsize*) are positively associated with innovation, highlighting the importance of diverse perspectives (Chen et al., 2015; Shapiro et al., 2015). State-owned enterprise (*Soe*) shows a mixed result, having a significantly positive relationship with *LnPa1* and *LnPg1*, but a significantly negative relationship with *LnPg2* and *LnPg3*.

3.5.2 The Mediating Effect of FRQ

The mediating role of FRQ is assessed following the classic 3-step procedure outlined by Baron and Kenny (1986), which is also consistent with the research of Hasan et al. (2018). In Step 1, the direct link between *Asw* and innovation is examined. Step 2 involves testing the relationship between *Asw* and FRQ. In Step 3, the relationship between board faultlines, FRQ, and corporate innovation is investigated.

The following models (Eq. 3 and Eq. 4) investigate the mediating effect of FRQ using OLS regression. In this context, $Ino_{i.t}$ represents the innovation measure of firm i in year t; $Asw_{i.t}$ denotes the board faultlines measure of firm i in year t; and $Rem_{i.t}$ reflects the FRQ measure of firm i in year t.

$$Rem_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Dac_{i,t} + \beta_3 Size_{i,t} + \beta_4 Roa_{i,t} + \beta_5 Lev_{i,t} + \beta_6 Loss_{i,t} + \beta_7 Capex\%_{i,t} + \beta_8 Tobinsq_{i,t} + \beta_9 Insinv_{i,t} + \beta_{10} Ppe\%_{i,t} + \beta_{11} Hhi_{i,t} + \beta_{12} Bsize_{i,t} + \beta_{13} Soe_{i,t} + Iid\ fe + Year\ fe + \varepsilon_{i,t} \quad (3)$$

$$Ino_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Rem_{i.t} + \beta_3 Dac_{i,t} + \beta_4 Size_{i,t} + \beta_5 Roa_{i,t} + \beta_6 Lev_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Capex\%_{i,t} + \beta_9 Tobinsq_{i,t} + \beta_{10} Insinv_{i,t} + \beta_{11} Ppe\%_{i,t} + \beta_{12} Hhi_{i,t} + \beta_{13} Bsize_{i,t} + \beta_{14} Soe_{i,t} + Iind\ fe + Year\ fe + \varepsilon_{i,t} \quad (4)$$

Step 1 is evaluated using Eq. 2, with the regression results discussed in Section 3.5.1. These results indicate a significant positive relationship between *Asw* and corporate innovation.

Step 2 is examined using Eq. 3, and the regression results of *Rem* (the mediating variable) on *Asw* are presented in column 1 of Table 3.6. The significantly negative coefficient of *Asw* in *Rem* (-0.003, p<0.05) suggests that board faultlines improves FRQ (higher *Rem* implies lower FRQ), consistent with our expectations. According to Muller et al. (2005) and Hasan et al. (2018), for the mediating role of FRQ to be confirmed in the relationship between board faultlines (independent variable) and corporate innovation (dependent variable), the relationship between board faultlines and FRQ must be significant. Additionally, controlling for board faultlines, FRQ must have a significant effect on corporate innovation, and the main effect of board faultlines should decrease substantially in both magnitude and statistical significance.

Step 3 is examined using Eq. 4, with the regression results presented in columns 2-7 of Table 3.6. FRQ (*Rem*) exhibits a significantly negative coefficient ($p<0.01$). This negative coefficient on *Rem* indicates that an improvement in reporting quality is associated with an increase in corporate innovations, and vice versa. Additionally, the coefficients of *Asw* are generally positive and significant at the 1% level, affirming that the influence of *Asw* on corporate innovation is mediated by *Rem* (as a proxy of FRQ). To further validate this mediation effect, we employed the Sobel z-test, the value of which is significant, providing statistical evidence that *Rem* indeed mediates the relationship between board faultlines and corporate innovation. This finding supports H2 by showing that FRQ is a channel through which board faultlines positively influence a firm's innovation activities. Our results provide empirical support for the theoretical viewpoint proposed in Bushman and Smith's (2001) framework, thereby confirms that FRQ, as a key product of an effective corporate governance mechanism, could drive innovation by enabling efficient identification of innovation opportunities, mitigating agency conflicts and encouraging long-termism, and offering more transparent financial information to the capital market to secure lower financing costs. Collectively, an improved FRQ stemming from stronger board faultlines could facilitate more innovation efforts in Chinese listed firms.

Crucially, the finding that FRQ partially mediates the relationship provides empirical validation for the dual-channel framework adapted from Bushman and Smith (2001). This partial mediation confirms that while faultlines enhance the strategic channel (direct monitoring and mitigation of groupthink), they also improve the information channel by reducing information asymmetry (via enhanced FRQ), which in turn facilitates resource acquisition for R&D investment.

Table 3.6: Regression Results on the Relationship between Board Faultlines, Innovation and FRQ

Variables	*Rem* (1)	*LnPa1* (2)	*LnPa2* (3)	*LnPa3* (4)	*LnPg1* (5)	*LnPg2* (6)	*LnPg3* (7)
Intercept	0.041*** (0.003)	-6.414*** (0.195)	-6.092*** (0.231)	-6.625*** (0.284)	-4.798*** (0.155)	-3.561*** (0.205)	-5.164*** (0.266)
Asw	-0.003** (0.001)	0.245*** (0.075)	0.481*** (0.089)	0.631*** (0.110)	0.083 (0.060)	0.440*** (0.079)	0.517*** (0.103)
Rem		-1.169*** (0.373)	-1.827*** (0.443)	-2.260*** (0.545)	0.045 (0.296)	-1.510*** (0.394)	-1.371*** (0.510)
Dac	-0.057*** (0.002)	-0.547*** (0.126)	-0.727*** (0.149)	-0.951*** (0.184)	-0.334*** (0.100)	-0.406*** (0.133)	-0.787*** (0.172)
Size	-0.001*** (0.000)	0.301*** (0.008)	0.290*** (0.010)	0.320*** (0.012)	0.223*** (0.007)	0.170*** (0.009)	0.256*** (0.011)
Roa	-0.085*** (0.003)	0.446*** (0.171)	0.472** (0.203)	1.070*** (0.250)	-0.094 (0.136)	0.149 (0.180)	0.681*** (0.234)
Lev	0.002*** (0.000)	-0.305*** (0.028)	-0.373*** (0.034)	-0.448*** (0.041)	-0.215*** (0.022)	-0.285*** (0.030)	-0.401*** (0.039)
Loss	0.004*** (0.000)	-0.047 (0.030)	-0.082** (0.036)	-0.058 (0.044)	-0.019 (0.024)	-0.026 (0.032)	0.007 (0.042)
Capex%	-0.034*** (0.003)	1.684*** (0.167)	1.867*** (0.198)	2.430*** (0.243)	1.257*** (0.132)	0.867*** (0.176)	2.070*** (0.228)
Tobinsq	-0.001*** (0.000)	-0.040*** (0.006)	-0.088*** (0.008)	-0.096*** (0.009)	-0.028*** (0.005)	-0.101*** (0.007)	-0.100*** (0.009)
Insinv%	-0.003*** (0.001)	-0.283*** (0.035)	-0.323*** (0.042)	-0.349*** (0.052)	-0.191*** (0.028)	-0.166*** (0.037)	-0.275*** (0.048)
Ppe%	0.005*** (0.001)	-0.434*** (0.053)	-0.541*** (0.063)	-0.625*** (0.078)	-0.375*** (0.042)	-0.451*** (0.056)	-0.635*** (0.073)
Hhi	0.001 (0.001)	-0.889*** (0.086)	-0.749*** (0.102)	-0.949*** (0.125)	-0.660*** (0.068)	-0.121 (0.090)	-0.762*** (0.117)
Bsize	0.002*** (0.001)	0.126*** (0.037)	0.174*** (0.044)	0.230*** (0.054)	0.090*** (0.030)	0.126*** (0.039)	0.196*** (0.051)
Soe	0.001*** (0.000)	0.078*** (0.017)	-0.004 (0.020)	-0.038 (0.024)	0.038*** (0.013)	-0.074*** (0.018)	-0.122*** (0.023)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.207	0.219	0.238	0.260	0.160	0.152	0.222
Direct effect		0.245***	0.481***	0.631***	0.083	0.440***	0.517***
Indirect effect		0.004***	0.005***	0.007***	0.000	0.005***	0.004***
Total effect		0.248***	0.485***	0.636***	0.083	0.444***	0.520***
Sobel Z		1.913*	2.084**	2.087**	-0.153	2.044**	1.797*
F-test	178.3***	186.8***	208.0***	233.8***	126.9***	119.9***	190.1***

Notes: This table presents the regression results on the relationship between board faultlines, innovation and FRQ for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.5.3 Robustness Tests

3.5.3.1 An Alternative Measure of Board Faultlines

We additionally employ an alternative measure of board faultlines, termed faultlines strength, assessed using a statistical method known as *Fau*, initially introduced by Thatcher et al. (2003). This method quantifies faultlines strength by gauging the proportion of total variation in overall group characteristics explained by the most pronounced group division. *Fau* effectively encapsulates the similarity among subgroup members, computed as the ratio of the sum of squared variances between subgroups to the total squared variance. The formula for calculating *Fau* is as follows:

$$Fau_g = \frac{\sum_{j=1}^{p}\sum_{k=1}^{q} n_k^g(\bar{x}_{kj}-\bar{x}_j)^2}{\sum_{j=1}^{p}\sum_{k=1}^{q}\sum_{i=1}^{n_k^g}(\bar{x}_{ijk}-\bar{x}_j)^2} \quad (5)$$

where $\bar{x}_{kj}$ represents the average value of feature j for the members of subgroup k, $\bar{x}_j$ represents the average value of feature j for all group members, $\bar{x}_{ijk}$ represents the value of feature j for member i of subgroup k, and n_k^g represents the number of members in the kth subgroup under split g. The value range of *Fau* is calculated based on this formula and is between 0 and 1. The higher this value, the greater the similarity among members within a given subgroup.

Eq. 2 through 4 are re-estimated using the alternative proxy for board faultlines, *Fau*. The regression results are presented in Table 3.7, Panels A and B, demonstrating consistency with those in Tables 3.5 and 3.6. In Table 3.7 Panel A, the regression results of *Fau* and corporate innovations reveal a significantly positive relationship between *Fau* and the number of patent applications. Additionally, there is a predominantly positive relationship with the number of patents granted. Column 1 of Table 3.7 Panel B presents the regression results of Eq. 3, indicating a consistently negative relationship between *Fau* and *Rem*, aligning with the findings in Table 3.6. Columns 2 through 7 of Table 3.7 Panel B report the results of regressing Eq. 4, indicating a significantly negative relationship between *Rem* and corporate innovation, while controlling for *Fau*. These additional analyses validate our main findings.

Table 3.7 – Panel A: Regression Results on the Relationship between Alternative Measure of Board Faultlines and Innovation

Variables	*LnPa1*	*LnPa2*	*LnPa3*	*LnPg1*	*LnPg2*	*LnPg3*
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-6.647***	-6.493***	-7.156***	-4.843***	-3.882***	-5.560***
	(0.203)	(0.241)	(0.296)	(0.161)	(0.214)	(0.277)
Fau	0.289***	0.539***	0.721***	0.069	0.461***	0.565***
	(0.078)	(0.092)	(0.113)	(0.062)	(0.082)	(0.106)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.218	0.237	0.259	0.159	0.151	0.221
F-test	195.3***	217.2***	244.3***	132.8***	125.1***	198.7***

Notes: This table presents the regression results on the relationship between alternative measure of board faultlines and innovation for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.5.3.2 Alternative Measures of Corporate Innovation

To further test the robustness of the findings, we utilise corporate research and development (*R&D*) expenses as an alternative measure of corporate innovation.[7] Specifically, we consider R&D expenses scaled by total assets (*R&D*). Table 3.8 presents the regression results of Eq. 2-4, using the alternative measure of corporate innovation. These results are consistent with our previous findings. Column 1 displays the outcomes for Eq. 2, demonstrating a significantly positive relationship between *Asw* and *R&D* expenses (0.415, $p<0.01$). Column 2 presents the results for Eq. 4, indicating a significantly positive relationship between *Asw* and *R&D* expenses (0.409, $p<0.01$) and a significantly negative association between *Rem* and *R&D* expenses (-8.899, $p<0.01$). This suggests a significant mediating effect of *Rem* on the relationship between *Asw* and *R&D* expenses and both direct, and indirect impacts of *Asw* on *R&D* expenses. In summary, these results lend support to hypotheses H1 and H2.

[7] Following Zhang et al. (2024), we also construct a weighted measure for the number of patent applications or patents granted using a subjective weighting scheme of 3:2:1. Specifically, the weighted number of patent applications/grants is calculated as the natural logarithm of the sum of three times the number of all patents applied for (or granted), two times the number of invention and utility model patents applied for (or granted), and one time the number of design patents applied for (or granted), plus 1. The regression results remain consistent with this weighted measure, indicating robustness of the findings (results untabulated).

Table 3.7 - Panel B: Regression Results on the Relationship between Alternative Measure of Board Faultlines, Innovation and FRQ

Variables	*Rem* (1)	*LnPa1* (2)	*LnPa2* (3)	*LnPa3* (4)	*LnPg1* (5)	*LnPg2* (6)	*LnPg3* (7)
Intercept	0.043***	-6.574***	-6.385***	-7.020***	-4.829***	-3.802***	-5.468***
	(0.003)	(0.204)	(0.242)	(0.297)	(0.162)	(0.215)	(0.278)
Fau	-0.003***	0.285***	0.534***	0.713***	0.069	0.456***	0.561***
	(0.001)	(0.078)	(0.092)	(0.113)	(0.062)	(0.082)	(0.106)
Rem		-1.164***	-1.819***	-2.249***	0.045	-1.505***	-1.364***
		(0.373)	(0.443)	(0.545)	(0.296)	(0.394)	(0.510)
Dac	-0.057***	-0.546***	-0.725***	-0.948***	-0.334***	-0.405***	-0.785***
	(0.002)	(0.126)	(0.149)	(0.184)	(0.100)	(0.133)	(0.172)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.207	0.219	0.238	0.260	0.160	0.152	0.222
Direct effect		0.285***	0.534***	0.713***	0.069	0.456***	0.561***
Indirect effect		0.004***	0.005***	0.008***	0.000	0.005***	0.004***
Total effect		0.289***	0.539***	0.721***	0.069	0.461***	0.565***
Sobel Z		2.063**	2.285**	2.288**	-0.151	2.233**	1.918*
F-test	178.3***	186.9***	208.1***	234.1***	126.9***	119.8***	190.2***

Notes: This table presents the regression results on the relationship between alternative measure of board faultlines, innovation and FRQ for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

Table 3.8: Regression Results on the Relationship between Board Faultlines, Alternative Measures of Innovation and FRQ

Variables	*R&D* (1)	*R&D* (2)
Intercept	0.095	0.358
	(0.324)	(0.323)
Asw	0.415***	0.409***
	(0.119)	(0.118)
Rem		-8.899***
		(0.599)
Dac		-0.483**
		(0.215)
Controls	Yes	Yes
Year	Yes	Yes
Industry	Yes	Yes
N	22,098	22,098
Adj. R-squared	0.311	0.318
F-test	244.6***	240.7***

Notes: This table presents the regression results on the relationship between board faultlines, alternative measures of innovation and FRQ for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.5.3.3 The Endogeneity Treatment: Instrumental Variable

The potential endogeneity of the primary independent variable poses a risk of bias in the results. Since boards are not randomly assigned to either strong or weak faultlines, this resembles a form of selection bias. Moreover, endogeneity arises from omitted variable bias, as we may have failed to include many determinants of corporate innovation. If such omitted variables are correlated with board faultlines, the observed predictor, board faultlines, may become correlated with the unobserved residual, resulting in biased coefficient estimates (Hill et al., 2021).

To address the endogeneity resulting from selection bias and omitted variables, we employ various approaches, including GMM[8], lagged measure[9], and instrumental variable regression. Specifically, we identify two suitable instrumental variables based on prior literature on faultlines: the industry average *Asw* (Van Peteghem et al., 2018; Tidbury, Cahan, and Chen 2022; Shin and You, 2023) and the Bartik-type instrumental variable (Bartik, 1991). The industry average *Asw* serves as an instrument to mitigate potential endogeneity issues, as firms are likely to align their governance practices with industry norms, which are unlikely to directly impact corporate innovations (Van Peteghem et al., 2018; Tidbury et al., 2022). The Bartik instrument variable, also known as a shift-share instrument, is particularly effective in this context, leveraging variations in regional or industry-level factors that are exogenous to the firm's internal dynamics but directly affect the composition of the board (Sieweke et al., 2023). By interacting pre-determined regional or industry characteristics with national-level shifts, the Bartik instrument isolates shifts that are plausibly exogenous to local factors, thereby mitigating biases from reverse causality or omitted variable bias. The estimation process can be found in Appendix 3.E.

Panel A of Table 3.9 presents the *2SLS* results where the instrumental variable is the industry average *Asw*. In Column 1 of Table 3.9 Panel A, it is evident that the instrument is positively associated with *Asw* and statistically significant at the 1% level. The instrument identification criteria have been satisfied using the Stock-Yogo test and Kleibergen-Paap_LM

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[8] In untabulated robustness checks, we address endogeneity using a GMM estimator. The results are quantitatively and qualitatively similar to our baseline OLS findings, alleviating concerns that endogeneity drives our conclusions.
[9] Further tests on the lagged impacts of board faultlines on corporate innovation are also conducted. The coefficients on lagged *Asw* are found to be significantly positive (results untabulated).

statistic. In the second stage, the corporate innovation variables serve as the dependent variables, with the predicted value for faultlines variables utilised as the independent variable. Columns 2-7 of Table 3.9 Panel A demonstrate that the coefficients for the board faultlines variables are positive and significant at the 1% level for all corporate innovation measures, except for *LnPg1*.

Panel B of Table 3.9 presents the *2SLS* results when the instrumental variable is the Bartik-type instrumental variable. In Column 1 of Table 3.9 Panel B, it is evident that the instrument is positively associated with *Asw* and statistically significant at the 1% level. The instrument identification criteria have been satisfied using the Stock-Yogo test and Kleibergen-Paap_LM statistic. In the second stage, columns 2-7 of Table 3.9 Panel B demonstrate that the coefficients for the board faultlines variables are positive and significant at the 5% level for all corporate innovation measures. Collectively, these tests provide assurance that our primary analyses are not unduly influenced by endogeneity.

3.5.3.4 The Endogeneity Treatment: Propensity Score Matching Approach

In addressing endogeneity issues, we utilise inverse probability matching (IPM) and standardised mean differences (SMD) because our analysis involves a continuous variable, which makes IPM more suitable than propensity score matching (PSM) (Rosenbaum and Rubin, 1983; Imbens, 2004). IPM corrects for self-selection biases by matching treatment and control groups based on the inverse probabilities derived from observed covariates, thus simulating a randomised assignment. To evaluate the effectiveness of the matching process, we assess balance using SMD. Panel A of Table 3.10 shows the SMD before and after balancing, revealing that most covariates are well-balanced with minimal differences between treatment and control groups, indicating an effective matching process. However, *Bsize* shows a slight increase in SMD from 0.118 to 0.121 after balancing, suggesting some residual imbalance.

Panel B presents regression results for *Asw*, *Rem*, and corporate innovation across various models. The coefficients for *Asw* are consistently positive and significant, ranging from 0.239 to 0.623, indicating that board faultlines positively influence corporate innovation. *Rem* exhibits negative coefficients in most models, from -1.119 to -2.201, suggesting that higher reporting quality is associated with higher levels of corporate innovation. This confirms that our matching process was effective and that the observed relationships between board faultlines, reporting quality, and innovation are robust and significant. The empirical findings align with those from previous baseline regression analyses, reinforcing the reliability of our conclusions.

Table 3.9 Panel A: 2SLS Instrumental Variable Regression Results

	Panel A: IV = Asw_Ind						
	First Stage	Second Stage					
Variables	*Asw*	*LnPa1*	*LnPa2*	*LnPa3*	*LnPg1*	*LnPg2*	*LnPg3*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.038** (0.018)	-6.490*** (0.265)	-7.045*** (0.317)	-7.924*** (0.385)	-4.818*** (0.214)	-5.177*** (0.287)	-6.928*** (0.367)
Asw_Ind	0.966*** (0.029)						
Asw		0.904** (0.379)	3.575*** (0.472)	4.820*** (0.585)	0.465 (0.298)	5.066*** (0.433)	5.781*** (0.555)
Rem		-1.101*** (0.369)	-1.608*** (0.452)	-1.965*** (0.564)	0.089 (0.287)	-1.214*** (0.413)	-1.023* (0.536)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.057	0.218	0.207	0.223	0.160	0.052	0.152
K–Paap-LM stat.	882.8***						
Cragg–Donald Wald F	1,047.4***						
K–Paap Wald F stat.	1,097.1***						
Durbin		2.61	43.52***	52.69***	1.36	125.0***	95.95***
Wu–Hausman		2.60	43.52***	52.71***	1.36	125.4***	96.13***
Stock–Yogo critical Value at 10%	16.38	16.38	16.38	16.38	16.38	16.38	16.38

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

Table 3.9 Panel B: 2SLS Instrumental Variable Regression Results (continued)

	Panel B: IV = Bartik IV						
	First Stage	Second Stage					
Variables	*Asw*	*LnPa1*	*LnPa2*	*LnPa3*	*LnPg1*	*LnPg2*	*LnPg3*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Intercept	0.184*** (0.014)	-6.382*** (0.239)	-6.111*** (0.276)	-6.623*** (0.332)	-4.774*** (0.194)	-3.606*** (0.239)	-5.207*** (0.311)
Bartik IV	0.341*** (0.005)						
Asw		0.626*** (0.213)	1.169*** (0.254)	1.466*** (0.312)	0.353** (0.170)	1.020*** (0.226)	1.346*** (0.292)
Rem	-0.034 (0.026)	-1.117*** (0.368)	-1.746*** (0.443)	-2.158*** (0.550)	0.082 (0.286)	-1.447*** (0.392)	-1.278** (0.513)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528	28,528
Adj. R-squared	0.143	0.219	0.237	0.259	0.160	0.151	0.221
K–Paap-LM stat.	2,466.1***						
Cragg–Donald Wald F	4,167.1***						
K–Paap Wald F stat.	3,118.3***						
Durbin		3.23*	7.77***	7.49***	2.57	7.14***	8.59***
Wu–Hausman		3.23*	7.76***	7.48***	2.47	7.13***	8.58***
Stock–Yogo critical Value at 10%		16.38	16.38	16.38	16.38	16.38	16.38

Notes: This table presents the 2SLS regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

Table 3.10: Propensity Score – Inverse Probability Matching (IPM)

Panel A: Standardised Mean Differences (SMD)

	Before Balancing	After Balancing
Size	-0.003	-0.003
Roa	0.032	0.034
Lev	-0.013	-0.018
Loss	-0.027	-0.028
Capex%	0.022	0.023
Tobinsq	-0.016	-0.017
Insinv%	-0.001	-0.001
Ppe%	0.016	0.016
Hhi	0.030	0.029
Bsize	0.118	0.121
Soe	0.016	0.016

Panel B: Asw, FRQ and Corporate Innovation after Balancing

	LnPa1	*LnPa2*	*LnPa3*	*LnPg1*	*LnPg2*	*LnPg3*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Intercept	-6.569***	-6.220***	-6.691***	-5.100***	-3.746***	-5.265***
	(0.188)	(0.222)	(0.272)	(0.152)	(0.197)	(0.254)
Asw	0.239***	0.474***	0.623***	0.074	0.432***	0.510***
	(0.076)	(0.089)	(0.109)	(0.061)	(0.079)	(0.102)
Rem	-1.119***	-1.713***	-2.201***	0.081	-1.444***	-1.441***
	(0.359)	(0.423)	(0.518)	(0.290)	(0.377)	(0.485)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528	28,528	28,528
Adj R-squared	0.218	0.235	0.258	0.160	0.148	0.219
F-test	185.3***	205.5***	231.9***	126.4***	115.7***	186.9***

Notes: Panel A: this table presents the standardised mean before and after balancing. Panel B: this table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.5.4 Cross-sectional Tests

The cross-sectional analysis explores the moderating effects of two key factors on the relationship between board faultlines and corporate innovation: state ownership (*Soe* vs. Non-*Soe*) and regional economic development (*Economically Advanced* vs. *Less Advanced provinces*).[10] Both factors are expected to significantly influence board faultlines and, consequently, a firm's innovation outcomes.

3.5.4.1 Moderating Effect of State Ownership

SOEs in China tend to exhibit higher board faultlines due to the complex interaction of political and economic factors influencing director selection and board dynamics. As noted by Jiang and Kim (2020) and Jin, Xu, Xin, and Adhikari (2022), SOEs face significant state control, resulting in boards with directors who have strong political connections and varying degrees of allegiance to the state versus the enterprise. This often creates substantial faultlines as directors contend with conflicting demands between political governance and market-oriented reforms. The pressures of balancing profitability with the state's social and political mandates further exacerbate these faultlines, leading to strategic misalignments.

In contrast, non-SOEs generally experience lower board faultlines, primarily due to the influence of controlling shareholders who exert considerable control over director appointments. This concentration of power tends to produce a more homogeneous board composition, with directors more aligned in their objectives and perspectives, thereby reducing the potential for faultlines within these boards (Jiang and Kim, 2020).

Table 3.11 Panel A presents a univariate analysis of *Asw* across different categories, showing significant differences based on organisational and regional characteristics. SOEs show a significantly higher mean *Asw* compared to non-SOEs ($t = 2.461$, $p = 0.014$), indicating more pronounced board faultlines in SOEs. Further, regression results for patent applications (*LnPa1*, *LnPa2*, and *LnPa3*), as shown in Table 3.11 Panel B, reveal that *Asw* is negatively associated with patent applications in SOEs (e.g., *LnPa1*: -0.220, $p < 0.10$; *LnPa2*: -0.041, $p > 0.10$; *LnPa3*: -0.041, $p > 0.10$), suggesting that faultlines in SOEs may hinder innovation. In contrast, non-SOEs demonstrate a strong positive relationship between *Asw* and patent applications (e.g., *LnPa1*: 0.536, $p < 0.001$; *LnPa2*: 0.787, $p < 0.001$; *LnPa3*: 1.031, $p < 0.001$),

[10] Determined by the provinces' GDP per capita in 2021.

indicating that faultlines in non-SOEs may stimulate innovation by fostering diverse perspectives and debates. The tests of coefficient differences show that the differences in *Asw* coefficients between SOE and Non-SOE firms are statistically significant (t = -4.895, -4.568, -4.845, p < 0.001), highlighting that state ownership hinders the positive impact of board faultlines on innovation.

Table 3.11 Panel A: Univariate Test on the Difference in Asw between Various Categories

	N	Mean	Median	T-test	
SOE	11,847	0.3699	0.3632		Non-SOE
Non-SOE	16,681	0.3672	0.3594	SOE	2.461** (0.014)
Economic Advanced Provinces	22,983	0.3689	0.3618		Economic Less-advanced Provinces
Economic Less-advanced Provinces	5,545	0.366	0.3578	Economic Advanced Provinces	2.092** (0.036)

Note: This table reports the univariate test on the difference in *Asw* between sub-groups. The upper part is for SOE and Non-SOE sub-groups and the lower part is for EcoAdv and Non-EcoAdv subgroups. The differences between the sub-groups are tested using t-tests. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively.

Table 3.11 Panel B: Regression Results Comparing SOE and Non-SOE Firms

Variables	*LnPa1*		*LnPa2*		*LnPa3*	
	SOE	Non-SOE	SOE	Non-SOE	SOE	Non-SOE
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-6.810 *** (0.280)	-6.233 *** (0.269)	-6.718 *** (0.327)	-5.687 *** (0.318)	-7.285 *** (0.398)	-6.080 *** (0.392)
Asw	-0.220 * (0.120)	0.536 *** (0.097)	-0.041 (0.140)	0.787 *** (0.115)	-0.041 (0.170)	1.031 *** (0.142)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	11,847	16,681	11,847	16,681	11,847	16,681
Adj. R-squared	0.264	0.177	0.273	0.198	0.297	0.213
F-test	107.235	90.668	112.406	104.020	125.923	113.977
t-statistic	-4.895***		-4.568***		-4.845***	
P-value	0.000		0.000		0.000	

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.5.4.2 Moderating Effect of Regional Economic Development

Firms in economically advanced provinces in China tend to exhibit stronger board faultlines due to a combination of several factors (Carter et al., 2003; Chang et al., 2014). First, these regions provide access to a larger and more diverse talent pool, allowing companies to recruit directors with varied backgrounds and expertise. Additionally, the regulatory and institutional frameworks in these provinces are more developed, often encouraging or even mandating diversity in corporate governance (Ben Selma, Yan, and Hafsi, 2022). Firms in these regions are also more exposed to global markets, which drives them to adopt diverse boards to align with international standards and stakeholder expectations. Furthermore, the competitive and innovative environment in economically advanced provinces incentivises companies to prioritise diversity as it enhances their strategic capabilities, innovation potential, and ability to manage risks effectively.

Table 3.11 Panel A shows that Economically Advanced Provinces show a higher mean *Asw* than Economically Less-advanced Provinces ($t = 2.092$, $p = 0.036$). Table 3.11 Panel C presents regression results comparing firms from economically advanced provinces (*EcoAdv*) with those from less advanced provinces (*Non-EcoAdv*). The *Asw* coefficient is consistently significant for firms in advanced provinces across all models (e.g., *LnPa1*: 0.235, $p < 0.01$; *LnPa2*: 0.443, $p < 0.01$; *LnPa3*: 0.565, $p < 0.01$), indicating a strong positive relationship between *Asw* and patent applications. For firms in less advanced provinces, the *Asw* coefficient is also significant in most cases (e.g., *LnPa1*: 0.163, $p >0.10$; *LnPa2*: 0.431, $p < 0.05$; *LnPa3*: 0.626, $p <0.01$). The tests of coefficient differences reveal no significant differences between the *Asw* coefficients of firms from advanced and less advanced provinces ($t = 0.417$, 0.061, -0.233, p-values > 0.05), suggesting that the positive impact of *Asw* on patent applications is present in both types of provinces but does not differ significantly between them.

In summary, the positive association between board faultlines and corporate innovation becomes less pronounced when firms are SOEs, whereas regional economic development does not exert a significant moderating effect on the positive association. Consistent with our expectations, our findings suggest that the stronger faultlines in the SOE's board weaken the firm's innovation performance. Although our baseline regression suggests that board faultlines are associated with positive corporate innovation outcomes, suboptimal board faultlines caused by state ownership could weaken the positive impact of faultlines on innovation. In SOEs, the subgroups within the board may have created strong and less meaningful faultlines that foster severe group conflicts and miscommunication rather than diverse and creative thinking. As a result, SOEs could not be guided by an effective board, thus could not be able to efficiently utilise their rich financial and human capital in innovation activities.

Table 3.11 Panel C: Regression Results for Economically Advanced and Less Advanced Provinces

Variables	*LnPa1*		*LnPa2*		*LnPa3*	
	EcoAdv (1)	Non-EcoAdv (2)	EcoAdv (3)	Non-EcoAdv (4)	EcoAdv (5)	Non-EcoAdv (6)
Intercept	-7.184 ***	-4.617 ***	-6.624 ***	-5.516 ***	-6.921 ***	-6.736 ***
	(0.219)	(0.372)	(0.256)	(0.456)	(0.312)	(0.574)
Asw	0.235 ***	0.163	0.443 ***	0.431 **	0.565 ***	0.626 ***
	(0.086)	(0.150)	(0.101)	(0.183)	(0.123)	(0.231)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	22,983	5,545	22,983	5,545	22,983	5,545
Adj. R-squared	0.227	0.173	0.244	0.198	0.267	0.215
F-test	165.880	30.008	182.404	35.216	205.605	38.874
t-statistic	0.417		0.061		-0.233	
P-value	0.676		0.952		0.816	

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 3.D.

3.6 Theoretical, Practical, and Policy Implications

This research contributes to the literature on corporate governance and innovation by documenting the mechanisms through which board faultlines spur corporate innovation activities in China, a country whose distinctive cultural and institutional context offers valuable insights into board dynamics and strategic decision-making. This study makes several key theoretical contributions. First, it advances the literature on board diversity by moving beyond traditional, single-attribute measures (like gender or age) to embrace the more nuanced concept of board faultlines. Unlike traditional approaches that rely on simple, atomistic diversity metrics, faultlines theory focuses on how individual attributes are clustered into subgroups and how their contextual salience influences group dynamics and behaviour. This approach offers a strong explanatory power for inconsistencies in prior diversity research and provides a useful lens for predicting future governance outcomes (Lau and Murnighan, 1998; Thatcher and Patel, 2012). By demonstrating that faultlines can be a productive force for innovation, we challenge the simplified view that diversity-related divisions are generally detrimental. Second, our research contributes to the theoretical understanding of corporate innovation. We propose and validate financial reporting quality as a mediating mechanism through which a board's internal fractures promote corporate innovation in China. This finding highlights that board faultlines not only encourage innovation activities directly but also indirectly through earnings quality, hence a more transparent information environment.

The findings of this study have several important practical implications. Its relevance is especially evident as boards navigate emerging challenges related to digital transformation and growing demands for demographic and cognitive diversity on corporate boards globally (Gibson and Gibbs, 2006). For firms pursuing innovation, greater diversity in board composition should be encouraged, encompassing not just demographic diversity but also diversity in professional background, experience, and skills. Optimal board configurations can create an adequate level of board faultlines that foster healthy debates, creative thinking, a range of perspectives and ideas, thereby enhancing the innovation potential. Corporate boards should also allocate more resources to improving their financial reporting quality, as it plays a crucial mediating role in the relationship between board faultlines and corporate innovation. Transparent and accurate financial reporting can enhance trust and collaboration, lower cost of capital, and thus foster corporate innovation performance. Our research also holds important policy implications, particularly for the governance of SOEs. Although SOEs receive extensive government support, including subsidies, preferential policies, and easy access to resources, our research suggests that SOEs' close ties to the state could lead to a suboptimal level of board faultlines, potentially impeding the firm's innovation capabilities. Thus, our study calls for a shift in policy that promotes greater decentralisation of SOEs so that an adequate level of faultlines on the board could spur a firm's capacity to innovate and compete in the global market.

3.7 Conclusion

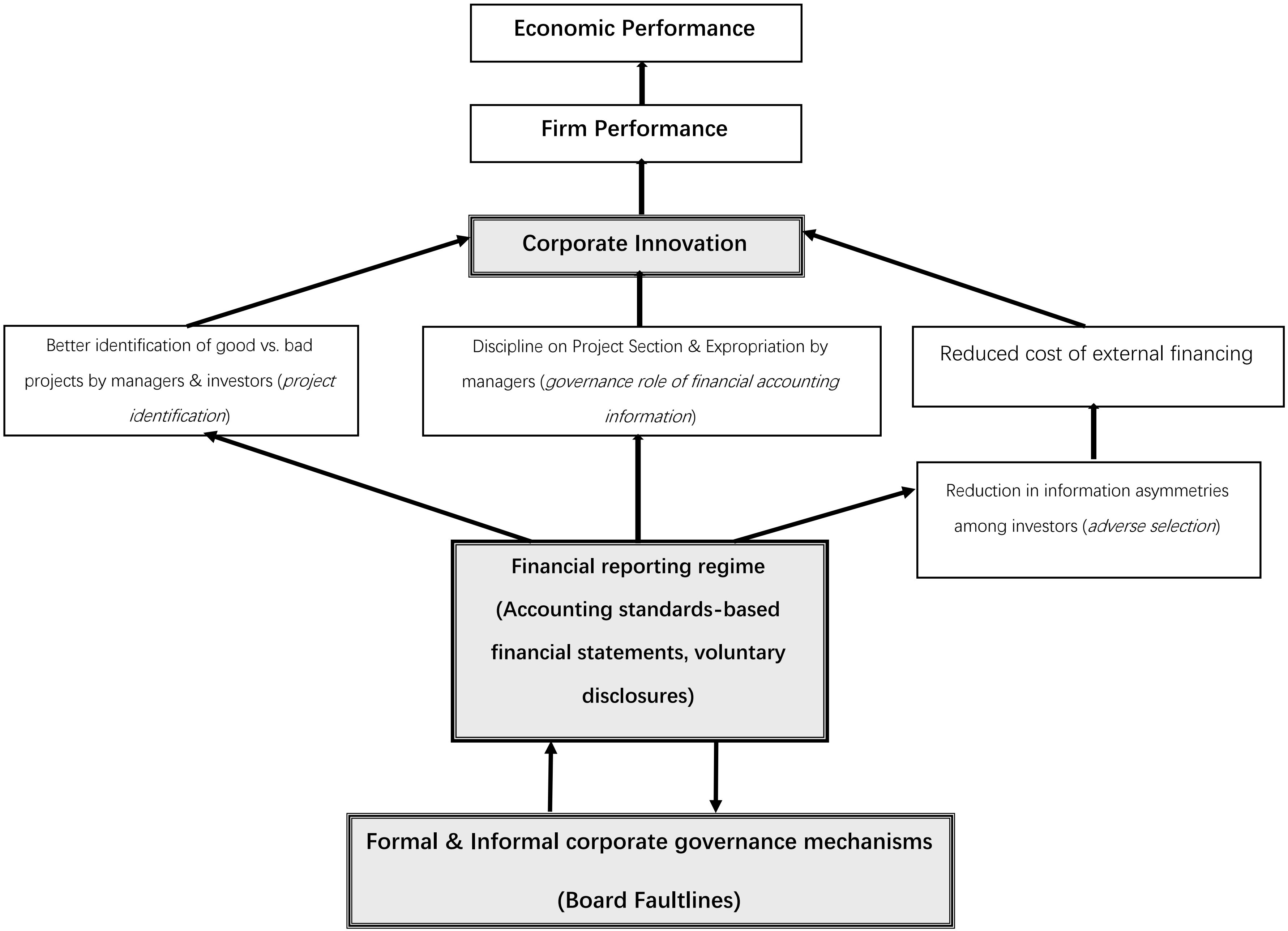
Board dynamics are a critical component of corporate governance, with directors' collective decision-making shaping organisational performance. Faultlines based on multiple director characteristics represent a novel concept that delves deeper into the interactions and dynamics within the board, especially when making critical decisions on innovation strategies.

Compared to approaches in prior studies of board faultlines, which often emphasise the dark side of group dynamics and conflict, our tests using the ASW model to estimate board faultlines effectively capture the intricate interplay among board members' multiple attributes, revealing that board faultlines can also provide significant benefits. Using a large sample of Chinese listed companies from 2008 to 2021, our findings suggest that board faultlines have a significantly positive association with corporate innovation. The positive association is partially mediated by financial reporting quality. These findings remain consistent after performing various robustness checks and endogeneity tests. Overall, the empirical results are in line with arguments that the diverse viewpoints and heightened scrutiny inherent in firms with stronger board faultlines could enhance board monitoring. As highlighted in Bushman and Smith (2001), good governance could lead to a more transparent information environment, which in turn facilitates substantial improvement in corporate innovation performance. Financial reporting quality, therefore, plays an important mediating role in the positive association between board faultlines and corporate innovation performance in China.

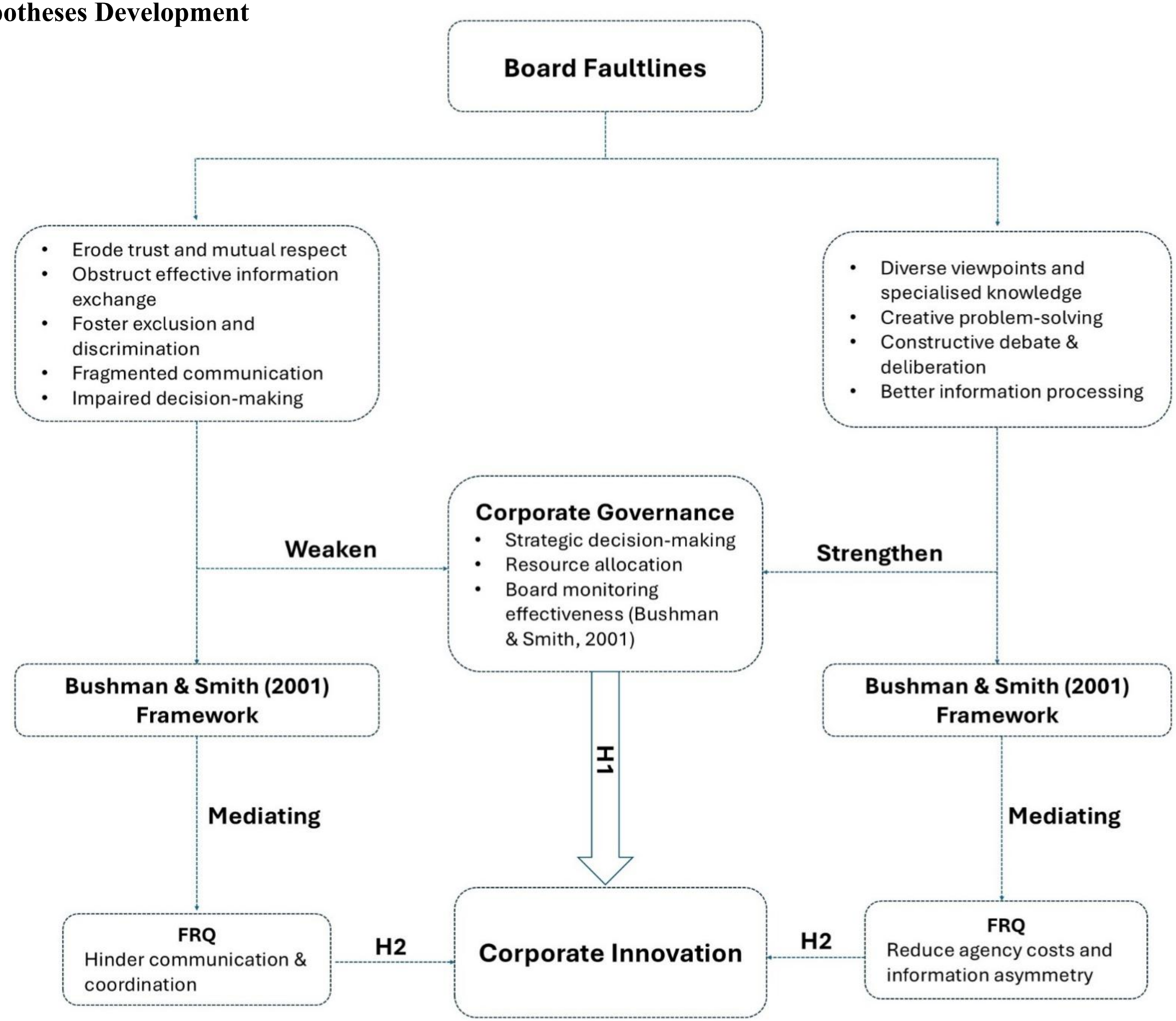
Moreover, the cross-sectional analysis reveals a significant negative moderating effect of state ownership, which suggests that Chinese SOEs characterised by a higher level of board faultlines, tend to have lower innovation performance. This is largely because SOEs are often borne by the complex interplay of political, social, and economic goals. In contrast, non-SOEs appear to benefit more directly from diverse boards, where faultlines positively contribute to innovation.

This study has several limitations that indicate a need for further research. A primary limitation is related to the use of ASW algorithm in estimating board faultlines. While it is an advanced quantitative method for assessing subgrouping, it cannot fully capture the complex, qualitative dynamics of boardroom interactions. Future studies could incorporate qualitative data from board interviews or case studies to provide a richer understanding of how faultlines truly operate in practice. Furthermore, a limitation is the generalisability of our findings to contexts outside of China. Our analysis is based on a pooled sample of Chinese listed companies, where unique institutional and political factors, especially concerning SOEs, may influence the observed relationships. Therefore, it’s crucial for future research to test our hypotheses in different institutional settings, such as other emerging markets, to determine if the positive association between board faultlines and innovation is a universal phenomenon.

Appendix 3.A: Theoretical Framework Adapted from Bushman and Smith (2001)



Appendix 3.B: Hypotheses Development



Appendix 3.C: Measurement of Real Earnings Management (*Rem*)

Following Roychowdhury (2006), *Rem* is estimated by the three components: abnormal levels of cash flow from operations (*Acfo*), abnormal production costs (*Aprod*), and abnormal discretionary expenses (*Adexp*). These three are the residuals of the following cross-sectional regressions, respectively:

$$\frac{Cfo_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t}}{Ta_{i,t-1}} \quad \text{(A.1)}$$

$$\frac{Prod_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t-1}}{Ta_{i,t-1}} \quad \text{(A.2)}$$

$$\frac{Disexp_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t-1}}{Ta_{i,t-1}} \quad \text{(A.3)}$$

$$Rem_{i,t} = (-1) * Acfo_{i,t} + Aprod_{i,t} + (-1) * Adexp_{i,t} \quad \text{(A.4)}$$

where, $Cfo_{i,t}$ is cash flow from operations of firm i in year t; $Ta_{i,t-1}$ is total assets of firm i in year t-1; $\Delta Sales_{i,t}$ is change in sales from year t-1 to t of firm i; $Prod_{i,t}$ is production cost, of firm i in year t, measured as the sum of cost of goods sold and change in inventory; $Disepx_{i,t}$ is discretionary expenses of firm i in year t, measured as the sum of selling general and administrative expenses, advertising and R&D.

$Dac_{i,t}$, the discretionary accruals, is also estimated by using the cross-sectional modified Jones model (Dechow et al., 1995).

$$\frac{Acc_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t} - \Delta Receivable_{i,t}}{Ta_{i,t-1}} + \frac{Ppe_{i,t}}{Ta_{i,t-1}} \quad \text{(A.5)}$$

where $Acc_{i,t}$ is total accruals, calculated as earnings before extraordinary items and discontinued operations minus operating cash flows of firm i in year t; $Ta_{i,t-1}$ is total assets of firm i in year t-1; $\Delta Sales_{i,t}$ is change in sales from year t-1 to t of firm i; $\Delta Receivable_{i,t}$ is change in accounts receivable from year t-1 to t of firm i; and $Ppe_{i,t}$ is gross property, plant, and equipment. $Dac_{i,t}$ is the residual from Eq. A.5.

Appendix 3.D: Definition of Variables

Variables	Definition
Independent variable	
$Asw_{i,t}$	The board faultlines of firm i in year t that is estimated by average silhouette width approach (Meyer and Glenz, 2013).
$Fau_{i,t}$	The board faultlines of firm i in year t that is estimated by faultlines strength approach (Thatcher et al., 2003).
Dependent variable	
$LnPa1_{i,t}$	The number of patents that are applied by firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$LnPa2_{i,t}$	The number of patents, plus the number of invention and utility model patents, that are applied by firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$LnPa3_{i,t}$	The number of patents, plus the number of invention and utility model patents, plus the number of design patents, that are applied by firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$LnPg1_{i,t}$	The number of patents that are granted to firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$LnPg2_{i,t}$	The number of patents, plus the number of invention and utility model patents, that are granted to firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$LnPg3_{i,t}$	The number of patents, plus the number of invention and utility model patents, plus the number of design patents, that are granted to firm i in year t. It is transformed into natural logarithms of one plus their original values to avoid zero values.
$RnD_{i,t}$	The research and development expense of firm i in year t, scaled by the total assets at the end of year t
Firm-specific control variables	
$Rem_{i,t}$	The estimated total real earnings management made by firm i in year t (see Appendix 3.C for detailed calculation procedure).
$Dac_{i,t}$	The absolute value of discretionary accruals of firm i in year t (see Appendix 3.C for detailed calculation procedure).
$Size_{i,t}$	The natural logarithm of the market value of firm i at the end of year t.
$Roa_{i,t}$	The return-on-assets ratio of firm i in year t, calculated as net profit after tax divided by total assets.
$Lev_{i,t}$	The long-term debt ratio of firm i in year t, calculated as long-term debt divided by total assets.
$Loss_{i,t}$	A dummy variable, set to 1 if firm i was in loss in year i, and zero otherwise.
$Capex\%_{i,t}$	The capital expenditure of firm i in year t, scaled by total assets. Capital expenditure is derived from cash flow items and is calculated as the cash paid for acquiring and constructing fixed assets, intangible assets, and other long-term assets, minus the net cash received from the disposal of these assets.
$Tobinsq_{i,t}$	The Tobin's Q of firm i at the end of year t. Tobin's Q is calculated a market value divided by Total Assets at the end of year.
$Insinv_{i,t}$	The percentage of firm i's shares held by institution investors at the end of year t.
$Ppe\%_{i,t}$	The PPE of firm i at the end of year t, scaled by total assets.
$Hhi_{i,t}$	The Herfindahl–Hirschman index of firm i at the end of year t.

$Bsize_{i,t}$	The natural logarithm of the number of directors on firm i's board at the end of year t.
$Soe_{i,t}$	A dummy variable, set to 1 if firm i is ultimately controlled by the state, and zero otherwise.

Appendix 3.E: Estimate the Bartik-type Instrumental Variable

Following Bartik (1991), Flabbi, Macis, Moro, and Schivardi (2019), and Galanakis and Gosling (2024), we construct a Bartik-type instrumental variable using the following algorithm:

Step 1: For each firm, set its first year in the data as its base year. Calculate the average *Asw* by year and province across firms, excluding the given firm ($Average\ ASW_{-i,t,p(i)}$)

Step 2: For each firm, calculate the growth rate ($g_{i,t,r(i)}$) of the average *Asw* as:

$$g_{i,t,r(i)} = \frac{Average\ ASW_{-i,t,p(i)}}{Average\ ASW_{-i,base\ year,p(i)}} \quad \text{(A.6)}$$

Step 3: Construct the instrumental variable ($z_{i,t}$) by interacting with the base year value of the *Asw* with the growth rate calculated in Step 2 as:

$$z_{i,t} = ASW_{i,base\ yaer} * g_{i,t,r(i)} \quad \text{(A.7)}$$

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CHAPTER FOUR: BOARD FAULTLINES AND AUDIT FEES: THE MEDIATING EFFECTS OF FINANCIAL REPORTING QUALITY AND AUDIT REPORT LAG (ESSAY THREE)

4.1 Introduction

This essay aims to investigate the association between board faultlines and audit fees in China, emphasising the mediating role of financial reporting quality and audit report lag. The board of directors plays a critical role in making strategic decisions, overseeing management, and protecting shareholder interests. Previous studies have highlighted the significance of board composition and team dynamics in shaping organisational performance, particularly in decision-making and oversight roles (Forbes and Milliken, 1999; Haleblian and Rajagopalan, 2006).

Central to this research is the concept of faultlines, introduced by Lau and Murnighan (1998). Faultlines are hypothetical dividing lines that split groups into subgroups based on shared characteristics. The concept of board faultlines advances the traditional notion of board diversity by delving deeper into the interactions and dynamics within diverse boards. Board diversity focuses on the existence of various demographic and functional characteristics such as gender, ethnicity, age, past work experience and education, and many more, whereas board faultlines examine how these attributes split a board into subgroups, which could result in communication challenges, divergence, contradiction, or alienation. Prior literature has focused on the negative side of board faultlines by offering evidence on how faultlines can weaken board effectiveness by fostering the formation of subgroup, which may impede decision-making processes (Van Peteghem et al., 2018). This essay extends the literature of board faultlines by examining the relationship between board faultlines and the firm's audit fees.

Existing literature on the relationship between board director characteristics and audit fees has primarily concentrated on single aspects of diversity, such as gender and ethnicity, with mixed results (Harjoto, Laksmana, and Lee, 2015; Lai, Srinidhi, and Gul, 2017; Nekhili, Gull, Chtioui, and Radhouane, 2020). Most of these studies do not consider how the simultaneous interaction of multiple board characteristics could affect audit fees. Even studies adopting a multidimensional measure of board diversity, such as multivariate cluster analysis

(Bezrukova et al., 2009), the polarised multidimensional diversity index (PMD) (Trezzini, 2013), and latent class analysis (LCA) (Barkema and Shvyrkov, 2007), often face measurement challenges in terms of the maximum group size and the number of subgroups it can capture precisely. This essay attempts to overcome such methodological limitations by using a more sophisticated measure: the average silhouette width (ASW) algorithm (Meyer and Glenz, 2013). This algorithm enables a high-quality clustering process with respect to subgroup cohesion and the optimal number of clusters, using various categorisation tools to identify the subgroup with the highest faultline strength.

I contextualise this essay within the Chinese setting for several reasons. First, the baselines for creating board faultlines in China differ significantly from those in Western contexts (Li et al., 2007; Xiao and Tsui, 2007). In Western countries, social categories often revolve around factors such as race and religion (Thomas, 1990). In contrast, in China, individuals tend to classify themselves based on attributes like age, hometown, kinship, educational background, and shared experiences (Farh et al., 1998; Xiao and Tsui, 2007). Applying faultline theory in a Chinese setting helps expand its relevance and applicability beyond the Western models. Second, Chinese culture and philosophies, particularly Confucianism, emphasise relationships and the concept of "circles" (Chen and Chen, 2004; Chen et al., 2019), suggesting that board faultlines may have a more pronounced impact on governance dynamics in Chinese firms compared to their Western counterparts. This context shapes director interactions and auditor perceptions of governance quality, influencing audit fees.

Existing literature suggests that faultlines within top management teams (TMTs) often result in negative outcomes, such as impaired communication, increased conflict, and reduced performance, which can elevate audit fees (Hutzschenreuter and Horstkotte, 2013; Lau and Murnighan, 2005). However, the relationship between faultlines within board directors and audit fees remains unexplored. I anticipate a complex influence of both the demand for and the supply of audit services on audit fees.

Arguing from the demand side of the audit fee model, studies from management and psychology suggest that boards with pronounced faultlines face greater decision-making challenges due to demographic or professional divisions (Zhang and Ma, 2022; Shin and You, 2023). These faultlines can lead to fragmented communication, increased complexity, and difficulties in reaching consensus. This misalignment can elevate business risk, as strategic decisions may be delayed or misinformed, affecting the company's operations and stability. As a result, directors may request more detailed and precise information from auditors to mitigate uncertainty and ensure greater clarity about the company's position. Therefore, firms with significant board faultlines are more likely to demand extensive audit services to manage the business risks associated with these divisions. This greater demand for rigorous auditing processes directly translates to higher audit fees, as firms seek to ensure compliance, uphold governance standards, and protect against potential issues arising from a divided board.

On the supply side, a contrary argument could be that board faultlines may contribute to reduced audit fees by enhancing internal governance, improving monitoring functions, and decreasing audit risk. The competitive environment fostered by faultlines may lead subgroups to monitor each other more closely, enhancing internal controls and increasing oversight (Carter et al., 2003). This improved internal scrutiny reduces perceived financial misreporting risks, making the firm a lower-risk client for auditors. Additionally, the enhanced monitoring function of the board may lead to a more thorough review of financial statements before reaching auditors, reducing the likelihood of significant audit adjustments. As a result, auditors may charge lower fees for firms with higher board faultlines, as stronger internal governance and monitoring functions reduce the need for extensive external audit efforts.

Given these contrasting arguments, I posit that board faultlines are associated with audit fees and this association depends on how faultlines shape board dynamics and governance quality. I propose two mechanisms through which board faultlines exert their influence, namely financial reporting quality (FRQ) and audit report lag (ARL). To empirically test these hypotheses, I utilize a longitudinal sample of Chinese listed companies, comprising 28,528 firm-year observations from 2008 to 2021. The empirical results indicate a significant negative relationship between board faultlines and audit fees. Furthermore, the relationship is partially mediated by both FRQ and ARL. Specifically, board faultlines enhance the quality of financial reporting, which in turn leads to lower audit fees. Board faultlines contribute to longer ARL, which results in higher audit fees. These findings remain robust across various robustness checks, including the use of alternative measures of board faultlines, propensity score matching, and instrumental variable approaches.

This essay contributes to existing literature in several ways. First, it makes an incremental contribution to the governance literature by offering new insights into how internal board dynamics affect the board’s stewardship role, which in turn affects audit pricing decisions. By examining FRQ and ARL as mediators, this essay deepens our understanding of the channels through which board faultlines affect audit fees. Second, this essay employs the ASW methodology and considers ten demographic and experiential characteristics to measure board faultlines. This approach provides a more nuanced understanding of faultlines by employing a more sophisticated and accurate measure of board faultlines. Finally, by exploring the impact of board faultlines within the unique social context of China, this essay offers fresh insights into the cross-cultural applicability of the faultline theory. It highlights how board divisions in Chinese companies—rooted in attributes like age, educational background, and shared professional experiences—exert different influences on governance processes and associated costs compared to faultlines in Western firms. This cultural lens enriches evidence on board dynamics in non-Western contexts.

The structure of the essay is as follows: Section 4.2 provides an overview of the institutional context in China, with an emphasis on corporate governance and audit regulations. Section 4.3 reviews the relevant literature on board faultlines, audit fees, ARL and FRQ, and develops hypotheses. Section 4.4 outlines the data sample and research methodology. Section 4.5 presents and discusses the empirical findings. Finally, Section 4.6 concludes the essay and discusses its implications for theory and practice, along with offering future research directions.

4.2 Institutional Background

4.2.1 Corporate Governance in China

The Company Law of China requires a two-tier board structure for listed companies: a Board of Directors, which acts as the decision-making body; and a Board of Supervisors, which is responsible for oversight. The Board of Directors must consist of 5 to 19 members, at least one-third of whom must be independent directors, and must include an audit committee with at least one member holding accounting expertise (CSRC, 2018, 2022). The Board of Supervisors must have at least three members, including one elected by employees and one appointed by shareholders (CSRC, 2018).

Confucian traditions, which historically restricted women from leadership, have had a lingering impact. However, since 1949, the Communist Party's policies have significantly improved women's social status and workforce participation (Luo, Xiang, and Huang, 2017). Economic reforms from 1978 further reduced gender inequality, and societal attitudes towards working women have largely improved (Du, 2016). Today, nearly 70% of working-age women in China are employed (The Economist, 2011). As a result, women now hold approximately 13.8% of board positions in Chinese listed companies, a notable increase over the past decade (Peng and Chandarasupsang, 2023).

The educational background of board members has also become an important selection criterion. Historically, board members were appointed based on political connections or tenure within the company (Wang, 2014). Regulatory bodies in China have increasingly emphasised educational qualifications and international experience in good governance; board members should have qualifications from prestigious universities and relevant professional certifications (Pang, Zhang, and Zhou, 2020). The shifts in board composition over the years have resulted in greater diversity.

4.2.2 Audit Regulations in China

In China, the regulation of auditor selection and auditor change for listed companies is governed by both the CSRC and the Ministry of Finance (MoF). Listed firms are required to hire certified public accounting (CPA) firms to conduct mandatory annual audits. Auditor independence is a critical factor, and Chinese regulations mandate periodic auditor rotation, requiring that the same audit partner must be changed after a maximum of five consecutive years (Fan, Hu, and Chen, 2024).

The "risk-oriented" audit model introduced by the 2006 Audit Standards underscores the importance of assessing both business risks and the risk of material misstatement (Gao, Ho, and Agnello, 2015). Although China's audit market is highly competitive and dominated by smaller firms with low market concentration (Huang, Raghunandan, Huang, and Chiou, 2015), companies facing elevated business or engagement risks may incur higher audit fees due to the increased audit effort required. Additionally, regulatory requirements—such as mandatory auditor rotation—affect auditor selection and continuity, further influencing pricing decisions (Zhang et al., 2022). These regulatory and market dynamics contribute to the complexity of the audit environment in China and must be accounted for in models examining audit fee variability.

4.3 Literature Review and Hypothesis Development

4.3.1 Literature on Board Faultline

Diversity is often described as having a "double-edged nature," capable of producing both beneficial and adverse effects on organisational outcomes (Homberg and Bui, 2013; Guillaume, Dawson, Otaye-Ebede, Woods, and West, 2017). Research in accounting and finance has provided abundant empirical support for the positive impact of board diversity—gender and age in particular—on corporate governance and firm-level outcomes (Adams and Ferreira, 2009; Perry, Srinidhi, and Yang, 2023). For instance, gender diversity correlates with improved financial prudence and active oversight, as female directors often introduce varied perspectives and decision-making styles (Bear, Rahman, and Post, 2010). Boards with gender diversity tend to enhance oversight and resource allocation, which can lead to improved firm performance (Carter, Simkins, and Simpson, 2003; Rose, 2007; Liu, Wei, and Xie, 2014). Age diversity is also crucial, as a blend of younger and older directors contributes a wider array of experiences and viewpoints (Kilduff, Angelmar, and Mehra, 2000; Wegge, Roth, Neubach, Schmidt, and Kanfer, 2008).

Conversely, the economic rationale for viewing diversity as a potential liability derives from social identity theory (Billig and Tajfel, 1973; Tajfel and Turner, 1979), which indicates that salient social categories can create in-group and out-group distinctions. This can result in dysfunctional team dynamics, preventing teams from effectively utilising their informational resources. Thus, the benefits of diversity in group decisions are not guaranteed but are contingent on factors such as occupational demographics (Kochan, Bezrukova, Ely, Jackson, Joshi, Jehn, Leonard, Levine, and Thomas, 2003; Guillaume et al., 2017). Moreover, diverse teams and organisations may experience increased conflict and reduced social cohesion (Kirkman, Tesluk, and Rosen, 2004; Bell, Villado, Lukasik, Belau, and Briggs, 2011), complicating a board's decision-making process and leading to significant communication challenges for a public company (Schwab, Werbel, Hofmann, and Henriques, 2016).

While existing research on board diversity has primarily concentrated on individual diversity factors such as gender and age (Kagzi and Guha, 2018; Makkonen, 2022), examining heterogeneous board traits that encompass both demographic and experiential characteristics offers a more nuanced understanding of their collective impact on decision-making processes (Sun, Xu, and Govind, 2022). Ruigrok, Peck and Tacheva (2007) suggest that viewing directors as a "bundle of attributes" allows for a deeper insight into their potential contributions to board decisions.

To assess how various board traits split a board into subgroups, a novel approach is to measure board faultlines (introduced by Lau and Murnighan, 1998), which capture differences among directors by considering multiple characteristics simultaneously. Faultlines are defined as hypothetical dividing lines that create subgroups within a team based on shared attributes, where each subgroup exhibits similar internal characteristics but differs from others, leading to distinct behavioural patterns. Lau and Murnighan (2005) argue that faultlines foster informal structures that can lead to conflicts and hinder effective communication.

The application of faultlines in accounting and finance research is relatively recent. Using a sample of U.S. listed firms from 2008 to 2012 to investigate the effects of board faultlines on performance, Van Peteghem et al. (2018) find that boards with pronounced faultlines are linked to poorer firm performance, diminished sensitivity of CEO turnover to performance metrics, and elevated abnormal CEO compensation. Existing literature suggests that board faultlines based on gender, education, and tenure can create conflicts and hinder communication, diminishing boards' effectiveness in governance, which negatively affects FRQ and increases crash risk (Wu et al., 2021). However, evidence on crash risk is mixed. Huang and Zhu (2024) find that task-related faultlines in top management teams reduce stock price crash risk, while biodemographic faultlines have no significant effect. Xu, Hu, and Liang (2021) document a significantly negative relationship between board faultlines and cash holdings in Chinese listed companies from 2004 to 2016.

Prior studies on the board's monitoring function present mixed findings. Ryan and Wiggins (2004) suggest that board faultlines can reduce the board's effectiveness in overseeing corporate activities. Pu, Xie, and Wang (2023), drawing on a sample of Chinese A-share listed firms from 2010 to 2020, find that board faultlines can disrupt internal board order and lower both the willingness and ability of directors to monitor effectively. The contrasting view, however, comes from Xue, Tang, Xu, Ling, Xie, and Mo (2024), who argue that the social disidentification induced by board faultlines reduces the opportunities for collusion between board members and management, leading to an enhanced monitoring function.

To summarise, literature on board faultlines is still developing, and findings regarding their consequences are mixed. The complexity is likely to arise from variations in how faultlines are measured across studies, and differences in the selection of research samples. Moreover, the impact of faultlines may be contingent upon specific corporate governance environments and cultural contexts. While prior research has offered insights into the relationship between board faultlines and a firm's operational performance, there is a notable gap in understanding faultlines' influence on audit pricing. This research seeks to address this important gap by delving into how board faultlines affect the audit fees.

4.3.2 Literature on Audit Fees

Simunic's (1980) audit pricing theory explains that audit fees are determined by two primary components: the resource cost component, which reflects the actual audit effort and resources expended; and the expected future loss component, which captures engagement risks such as business instability and potential litigation (Simon and Francis, 1988; Hay et al., 2006). The audit pricing model suggests that when engagement risk increases, auditors typically respond by modifying their audit approach, devoting greater effort to understanding the client's industry, business model, and risk profile (Bell, Doogar, and Solomon, 2008). This enhanced risk assessment often leads to higher audit fees, as auditors assign more experienced personnel, implement specialised audit techniques, and broaden the scope of their procedures to mitigate potential risk (Francis and Wang, 2008; Ghosh and Pawlewics, 2009).

Existing audit research offers mixed findings on the relationship between board governance and audit fees. On the one hand, an effective board enhances corporate governance by making clear decisions, ensuring strong oversight, and maintaining effective communication. This could lead to better financial transparency, stronger internal controls, fewer errors, and lower fraud risk. As a result, auditors perceive lower engagement risk, which leads to lower audit fees (Zaman, Hudaib, and Haniffa, 2011).

On the other hand, board characteristics could significantly influence audit fees by demanding more thorough audit work or by influencing auditors' perceived engagement risks. Carcello, Hermanson, Neal and Riley (2002) examine US firms and find that boards with a higher proportion of independent and financially literate directors are associated with higher audit fees. They argue that such boards often want more thorough audits to make sure everything is accurate and well-managed. Independent directors usually take their monitoring role seriously and may ask auditors to do extra work to reduce the risk of misreporting or fraud.

The auditing literature collectively suggests that there are both demand-side and supply-side influences on audit fees, and more importantly, board characteristics have a significant yet mixed impact on audit pricing decisions. Therefore, examining how board faultlines affect audit pricing provides new insight into understanding the economic consequences of faultlines on audit fees.

4.4 Hypothesis Development

This study employs a theoretical framework adapted from Bushman and Smith (2001), as shown in Appendix 4.A, to develop the baseline and mediating hypotheses on the interplay between board faultlines, FRQ, audit report lag (ARL) and audit fees. The framework of Bushman and Smith (2001) emphasises the role of corporate governance and legal/political institutions in influencing the supply of external financial information. Within this framework, FRQ emerges as a key output of an effective corporate governance mechanism, determining how accurately, reliably, and timely firms disclose their financial information (Dechow &

Dichev, 2002; Schipper & Vincent, 2003), which in turn affects a firm's audit fees. Appendix 4.B explains the logic behind H1 on the direct association between board faultlines and audit fees, and H2 and H3 on the mediating roles of FRQ and ARL between board faultlines and audit fees, respectively.

4.4.1 The Impacts of Board Faultlines on Audit Fees

Board faultlines may influence audit fees through both demand- and supply-side drivers (Ittonen, Miettinen, and Vähämaa, 2010). The interplay between board faultlines and audit dynamics highlights the impact of governance attributes on audit risk and effort. Extensive literature has documented the negative side of board faultlines, suggesting that corporate boards with higher faultlines often experience increased internal scrutiny and oversight. These faultlines may lead to fragmented communication, slower consensus-building, and misaligned strategies, all of which elevate business risk.

In terms of the demand-side, the board may seek more comprehensive audit services to develop a clearer understanding of the company's financial position and risk exposures (Hermanson and Neal, 2002). Consequently, firms with large board faultlines are likely to demand more extensive audit procedures to manage governance challenges and mitigate associated risks—leading to higher audit fees.

Conversely, while often associated with governance inefficiencies, board faultlines can contribute to better corporate governance under certain conditions. From a group-dynamics perspective, board faultlines may strengthen monitoring when subgroup differences stimulate active debate and mutual scrutiny. Such enhanced oversight may, in turn, help mitigate agency problems, consistent with agency theory's emphasis on monitoring as a mechanism for reducing agency costs (Jensen and Meckling, 1976). Where board subgroups represent different interests, directors may be less likely to reach immediate consensus and more likely to scrutinise competing positions. Xue, Tang, Xu, Ling, Xie, and Mo (2024) demonstrate that boards with factional faultlines can reduce the likelihood of corporate financial fraud by enhancing monitoring effectiveness. The authors further claim that fractured boards may offer a broader range of perspectives and expertise, improving the board's monitoring function. In this context, faultlines may contribute to effective governance by fostering critical discussions and diverse viewpoints that promote robust internal controls.

From a supply-side perspective, audit fees are influenced by the auditor's evaluation of the client's audit risk and business risk. High business risks typically lead auditors to apply more thorough audit procedures. However, effective corporate governance can mitigate an auditor's perceived elevated level of business risks. By creating an environment of strong monitoring and accountability, good governance lowers the auditor's perceived risks (Hay et al., 2006).

I therefore argue that board faultlines increase scrutiny, which enhances monitoring of the top management team. This could help mitigate the perceived audit risk and the need for auditors to conduct extensive investigative procedures. Hence, I propose that board faultlines could either increase the complexity of the audit (demand-side), leading to higher audit fees, or enhance perceived monitoring effectiveness and lower perceived risk (supply-side), resulting in lower audit fees. The following hypothesis is developed:

H1: There is an association between board faultlines and firm audit fees in China.

4.4.2 Mediating Role of Financial Reporting Quality

A firm's FRQ is a key indicator of the accuracy, reliability, and timeliness of its disclosures (Dechow and Dichev, 2002; Schipper and Vincent, 2003). An effective board plays a vital role in overseeing the financial reporting process and ensuring the reliability of a firm's financial statements, thus improving FRQ (Fama and Jensen, 1983). Board faultlines have been recognised as an influential yet controversial factor in shaping board dynamics.

The increased scrutiny stemming from faultlines might lead to a more rigorous review of accounting policies and greater diligence in the preparation of financial statements, leading to enhanced FRQ (Xue, Tang, Xu, Ling, Xie, and Mo, 2024). Qiu (2024) reports that board faultlines significantly reduced the incidence of corporate fraud among Chinese A-share listed companies from 2011 to 2022. Audit fees incorporate an auditor's assessment of the quality of a firm's underlying accounting systems. Therefore, auditors would be inclined to lower audit fees because the client firm has relatively lower business risks.

The counterargument, however, is that the effects of faultlines are not uniformly positive. Social identity theory posits that subgroup formation can lead to in-group favouritism and out-group bias, fostering division and interpersonal conflict. Li and Hambrick (2005) find that team faultlines reduce directors' willingness to monitor effectively. Additionally, strong subgroup divisions may hinder communication and knowledge sharing within the boardroom, impeding the flow of information and undermining internal transparency (Lim, Busenitz, and Chidambaram, 2013). When a client's financial reporting quality is poor, auditors tend to gather more information about the firm's business risk to mitigate the audit risks, which results in higher audit fees (Hribar, Kravet, and Wilson, 2014).

FRQ is selected as a mediating variable because it connects the board's monitoring effectiveness with the auditor's assessment of client risk. The board oversees the financial reporting process and constrains managerial opportunism. Accordingly, changes in board monitoring effectiveness arising from board faultlines may affect the reliability of the financial information presented to external auditors. Lower-quality financial reporting increases the risk of material misstatement and information uncertainty, potentially requiring additional audit procedures and a higher audit-risk premium. FRQ therefore captures the information-quality and audit-risk channel through which board faultline strength may influence audit fees.

Other potential mechanisms include internal control quality and information asymmetry. However, these constructs are closely related to the broader financial-reporting environment captured by FRQ and may operate as antecedents or dimensions of reporting risk. Earnings management is not treated as a separate mediating mechanism because it is commonly used to operationalise financial reporting quality. FRQ is therefore adopted as a parsimonious representation of the reporting-quality mechanism linking board faultlines to audit fees.

Therefore, I propose the following hypothesis that the effect of board faultlines on audit fees is partly explained through their influence on the quality of financial reporting:

H2: Financial reporting quality (FRQ) mediates the relationship between board faultlines and audit fees.

4.4.3 Mediating Role of Audit Report Lag

Audit report lag (ARL) refers to the length of time required to complete the audit process and issue the audit report. Building on the main hypothesis H1, this essay further proposes that board faultlines may affect audit fees indirectly by influencing the time required to complete the audit and approve the audit report. Faultline theory suggests that aligned director attributes create latent subgroup boundaries that may become activated when directors confront salient or contested issues (Lau and Murnighan, 1998; Jehn and Bezrukova, 2010). Audit findings, accounting judgements, and proposed adjustments may provide such triggers because they require directors to evaluate competing interpretations and reach collective agreement.

Once faultlines are activated, disagreements between board subgroups may take the form of either task conflict or relationship conflict. Task conflict concerns differences over the substance of the issue under consideration, such as the interpretation of audit findings, accounting estimates, or proposed audit adjustments (Jehn, 1995; Jehn and Mannix, 2001). Such disagreement may encourage more detailed scrutiny and critical evaluation; however, it may also require additional discussion and evidence before the board reaches agreement, thereby extending the audit completion process. Relationship conflict, by contrast, involves interpersonal tension, distrust, and incompatibility between subgroup members (Jehn, 1995). This form of conflict may impede communication and coordination between directors, management, the audit committee, and the external auditor, creating further delays in resolving outstanding audit matters.

Thus, task conflict and relationship conflict may both contribute to a longer ARL, although through different mechanisms. Task conflict may lengthen the process through more intensive evaluation and deliberation, whereas relationship conflict may do so through dysfunctional communication and coordination difficulties. A longer ARL generally reflects additional audit work, unresolved issues, or an extended engagement period, all of which may increase auditor effort and audit fees (Simunic, 1980; Hay, Knechel, and Wong, 2006).

ARL is selected as the second mediating variable because it captures the time and process-efficiency dimension of the external audit. It therefore represents the audit-effort and process-efficiency channel through which board faultline strength may affect audit fees, complementing FRQ, which captures the information-quality and audit-risk channel.

Potential alternatives include actual audit hours, auditor–client negotiation complexity, and the number or severity of unresolved audit adjustments. These measures may provide more direct indications of audit effort, but they are generally not publicly observable at the firm-year level. ARL provides an observable and consistently available measure of the duration of the audit process and is therefore suitable for examining whether board faultlines affect audit fees through changes in audit effort and completion efficiency.

Accordingly, board faultlines may indirectly increase audit fees by prolonging ARL.

H3: Audit report lag mediates the relationship between board faultlines and audit fees.

4.5 Research Method

4.5.1 Sample Selection

This research utilises firm-level data sourced from multiple databases. The primary source is the China Stock Market and Accounting Research (CSMAR) database, which provides comprehensive accounting and financial information for companies listed on the SSE and SZSE. Information about board members is obtained from the China Listed Firm’s Corporate Governance Research Database within the CSMAR database. The sample includes Chinese listed A-share firms from 2008 to 2021. Firms in the financial industry and those with incomplete financial data are excluded from the essay. To mitigate the effects of outliers, all continuous firm-level variables are winsorized at the top and bottom 1% of their respective distributions.

4.5.2 Measurement of Board Faultlines

Previous research on board faultlines has focused on individual diversity factors such as gender or age to delineate board subgroups (Veltrop, Hermes, Postma, and de Haan, 2015; Kagzi and Guha, 2018; Makkonen, 2022). Wu et al. (2021) categorise boards into male and female subgroups and assess faultlines based on educational background, tenure, nationality, and functional expertise within each group. More recently, however, studies have broadened the single-faceted measurement of board faultlines by including additional characteristics such as board independence, financial experience, shareholdings, and the type of directorship (Xu, Hu, and Liang, 2021). Arena, Garcia-Torea, and Michelon (2024) expand on demographic faultlines by incorporating more attributes, such as race, socioeconomic status, and cultural background. Xue, Tang, Xu, Ling, Xie, and Mo (2024) further analyse attributes such as age, education, and tenure, highlighting that while these factors are similar to those studied by Wu et al. (2021), the inclusion of additional demographic and professional characteristics offers a more comprehensive understanding of board dynamics and their impact on governance.

Building on Xu, Hu, and Liang (2021), the faultline measure developed in this essay considers both demographic and experiential characteristics of board directors. Demographic factors include gender and age, while experiential factors encompass education, shareholder status, senior management roles, director independence, involvement with other listed companies, overseas experience, financial background, and tenure.

Although traditional faultline strength measures are widely used to evaluate board faultlines (e.g., FAU (Thatcher and Patel, 2012)), they have been criticised for primarily focusing on demographic alignment and may not fully capture the complexities of subgroup interactions (Gibson and Vermeulen, 2003). Therefore, this essay uses Meyer and Glenz's (2013) cluster-based measure—average silhouette width (ASW) —to quantify board faultlines. As a robustness check, I also compute FAU as an additional measure. Consistent with further validation by Meyer et al. (2014), ASW is shown to be the most effective method for identifying faultlines within groups or organisations. Notably, ASW allows for the identification of multiple subgroups even within small teams, addressing a key concern in faultline research regarding the optimal number of subgroups.

Average silhouette width captures the dynamic interactions among board member attributes by evaluating clustering effectiveness within the data. The attributes serve as data points, with the clustering process revealing patterns of similarity or dissimilarity. Distances can be measured between data points within clusters and across different clusters, indicating how distinct these clusters are. Following Meyer and Glenz (2013), the average silhouette width (ASW) summarises how well observations fit within their clusters, reflecting the degree to which an individual aligns more closely with one cluster (A) compared to another cluster (B). The individual silhouette width is calculated using the formula:

$$s(i) = \frac{b_i - a_i}{\max(a_i, b_i)} \qquad (1)$$

where a_i represents the average dissimilarity of individual i to all members within cluster A, and b_i denotes the average dissimilarity of individual i to all members within cluster B. Dissimilarities are quantified using the Euclidean distance metric between individuals.

4.5.3 Financial Reporting Quality

Building upon earlier research (Roychowdhury, 2006; Cohen and Zarowin, 2010; Bozzolan, Fabrizi, Mallin, and Michelon, 2015), this essay employs real earnings management (Rem) measures as an indicator of financial reporting quality (FRQ). A higher Rem score suggests a greater tendency for the firm to engage in real earnings management practices.

Adhering to the approach established by Roychowdhury (2006), *Rem* is assessed through three components: abnormal cash flow from operations ($Acfo_{i,t}$), abnormal production costs ($Aprod_{i,t}$), and abnormal discretionary expenses ($Adexp_{i,t}$). These components are obtained from the residuals of the cross-sectional regressions outlined below:

$$\frac{Cfo_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t}}{Ta_{i,t-1}} \qquad (2)$$

$$\frac{Prod_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t}}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t-1}}{Ta_{i,t-1}} \qquad (3)$$

$$\frac{Disexp_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{Sales_{i,t-1}}{Ta_{i,t-1}} \qquad (4)$$

$$Rem_{i,t} = (-1) * Acfo_{i,t} + Aprod_{i,t} + (-1) * Adexp_{i,t} \qquad (5)$$

where $Cfo_{i,t}$ represents the cash flow from operations for firm i in year t; $Ta_{i,t-1}$ denotes the total assets of firm i in year t-1; $\Delta Sales_{i,t}$ indicates the change in sales for firm i; $Prod_{i,t}$ refers to the production costs of firm i in year t, which are calculated as the sum of the cost of goods sold and the change in inventory; $Disepx_{i,t}$ represents discretionary expenses for firm i in year t, measured as the sum of selling, general, and administrative expenses, along with advertising and research and development costs.

Discretionary accruals (*Dac*) are also estimated using the cross-sectional modified Jones model (Dechow, Sloan, and Sweeney, 1995). The equation is as follows:

$$\frac{Acc_{i,t}}{Ta_{i,t-1}} = \frac{1}{Ta_{i,t-1}} + \frac{\Delta Sales_{i,t} - \Delta Receivable_{i,t}}{Ta_{i,t-1}} + \frac{Ppe_{i,t}}{Ta_{i,t-1}} \quad (6)$$

where $Acc_{i,t}$ refers to total accruals, which are calculated as earnings before extraordinary items and discontinued operations minus operating cash flows for firm i in year t; $Ta_{i,t-1}$ represents total assets of firm i in year t-1; $\Delta Sales_{i,t}$ indicates the change in sales from year t-1 to t of firm i; $\Delta Receivable_{i,t}$ represents the change in accounts receivable from year t-1 to t of firm i; and $Ppe_{i,t}$ denotes gross property, plant, and equipment. *Dac* is the residual from Eq. 6.

4.5.4 The Models

To test Hypothesis 1 (H1), I establish the following OLS regression model (Eq. 7), drawing on the frameworks developed by Kim, Li, and Li (2014) and Bills, Lisic, and Seidel (2017):

$$\begin{gathered} LnFee_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Dac_{i,t} + \beta_3 Size_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Inv_{i,t} + \beta_6 Rec_{i,t} + \\ \beta_7 Merger_{i,t} + \beta_8 Lev_{i,t} + \beta_9 Intan_{i,t} + \beta_{10} MtB_{i,t} + \beta_{11} Age_{i,t} + \beta_{12} InsInv_{i,t} + \\ \beta_{13} B\_ind_{i,t} + \beta_{14} B\_to_{i,t} + \beta_{15} B\_size_{i,t} + \beta_{16} Ac_{i,t} + \beta_{17} Dual_{i,t} + \beta_{18} Soe_{i,t} + \\ \beta_{19} Mainboard_{i} + \beta_{20} Pc_{i,t} + \beta_{21} Mkt_{i,t} + \beta_{22} Top10_{i,t} + \beta_{23} Aduchg_{i,t} + \beta_{24} Gc_{i,t} + \\ \beta_{25} Partner_{i,t} + Ind\ fe + Year\ fe + \varepsilon_{i,t} \quad (7) \end{gathered}$$

where $LnFee_{i.t}$ is the dependent variable, representing the natural logarithm of the audit fees incurred by firm i in year t. $Asw_{i.t}$ denotes board faultlines and is derived using the ASW model, considering differences among directors based on demographic and experiential characteristics.

Drawing on the audit fee literature, I incorporate four categories of control variables: firm-specific characteristics, corporate governance-related variables, capital market factors, and auditor characteristics. Firm-specific controls include absolute discretionary accruals ($Dac_{i,t}$), firm size ($Size_{i,t}$), revenue growth ($Growth_{i,t}$), inventory levels ($Inv_{i,t}$), accounts receivable ($Rec_{i,t}$), involvement in mergers or acquisitions ($Merger_{i,t}$), long-term debt ratio ($Lev_{i,t}$), intangible assets ($Intan_{i,t}$), the market-to-book ratio ($MtB_{i,t}$), and firm age ($Age_{i,t}$). Corporate governance-related variables include institutional ownership ($InsInv_{i,t}$), board independence ($B\_ind_{i,t}$), director turnover ($B\_to_{i,t}$), board size ($B\_size_{i,t}$), the existence of an audit committee ($Ac_{i,t}$), CEO duality ($Dual_{i,t}$), and state ownership ($Soe_{i,t}$). Three capital market-related control variables are included: firms listed on the Main Board ($MainBoard_i$), political connection ($Pc_{i,t}$), and marketisation ($Mkt_{i,t}$). Finally, auditor characteristics are controlled in the model. A substantial body of research has identified a link between auditor factors and audit fees, including auditor reputation, experience, and market concentration (Ferguson, Francis, and Stokes, 2003; Choi, Kim, Kim, and Zang, 2010; Eshleman and Lawson, 2017). Thus, I incorporate the presence of the top 10 auditors ($Top10_{i,t}$) to control for audit quality and reputation.[11] The variable $Audchg_{i,t}$ captures fee negotiations during the initial audit engagement (Simon and Francis, 1988). $Gc_{i,t}$ indicates a modified audit opinion and serves as a measure of audit risk (Ettredge, Xu, and Yi, 2014). Lastly, partnership as proxied by $Partner_{i,t}$, in unlimited liability form, is exposed to higher intrinsic liability and therefore is more conservative (Firth, Mo, and Wong, 2012).

Table 4.1 Panel A shows how the sample is selected. Table 4.1 Panel B reports on the distribution of firms by industry and stock exchange market. Industries are categorised according to the Guidance on the Industry Category of Listed Companies issued by the CSRC in 2012. The top three sectors in our sample are manufacturing (64.5%), followed by software and information technology services (6.0%) and wholesale and retail trade (5.5%). The industry distribution of the full sample is consistent with the fact that the manufacturing sector dominates listed firms in China.

Table 4.1 Panel A: Sample Selection

Initial number of observations	40,572
Less: companies in the finance and insurance industries	-829
Less: data with missing values (final sample)	-11,215
Final sample	28,528
Number of unique companies	3,623

Note: This table presents the sample selection procedure

[11] In China, the auditing market includes several major local firms that compete closely with the Big 4 in market share and influence. The top 10 audit firms, therefore, give a good picture of high-quality auditing practices, covering both international and large domestic firms. Many studies on audit quality in China use the top 10 auditors as a standard for high-quality audits (Fang, Pittman, Zhang, and Zhao, 2017; Weng, Chi, and Li, 2023).

Table 4.1 Panel B: Industry Distribution

Industries	Main Board	GEM	Total	%
Agriculture, Forestry, animal husbandry, and fishery	373	52	425	1.5%
Mining	681	35	716	2.5%
Manufacturing	15193	3196	18,389	64.5%
Electricity, heat, gas, and water production and supply	1022	17	1,039	3.6%
Construction	727	58	785	2.8%
Wholesale and retail trade	1512	43	1,555	5.5%
Transportation, warehousing, and postal services	914	16	930	3.3%
Accommodation and catering	71	0	71	0.2%
Software and information technology services	946	754	1,700	6.0%
Real Estate	1335	0	1,335	4.7%
Leasing and business services	280	34	314	1.1%
Scientific research and technical services	130	73	203	0.7%
Water conservancy and public facilities management	261	85	346	1.2%
Residential services, repairs, and other services	18	0	18	0.1%
Education	24	11	35	0.1%
Health social work	274	87	361	1.3%
Culture, sports and entertainment	306	0	306	1.1%

Note: This table presents the industry and board distribution of the full sample

4.5.5 Descriptive Statistics

Table 4.2 presents a statistical summary of the core financial and corporate governance variables analysed in this essay. The board faultline proxy, *Asw*, has an average value of 0.368 and a median of 0.361. With *Asw* ranging from -1 to 1, where values close to 1 indicate stronger faultlines due to more homogeneous subgroups within the divisions, the mean of 0.368 reflects a moderate faultline. *LnFee* has a mean of 13.81 and a median of 13.71, indicating that the average audit fee is RMB994,505, while the median stands at RMB899,865. *Arl* has a mean of 97.01 and a median of 102.0 days. These figures align with previous studies (Alkebsee, Tian, Usman, Siddique, and Alhebry, 2021; Alkebsee, Habib, Huang, and Tian, 2022; Teng and Han, 2023). As for real earnings management (*Rem*), which proxies for FRQ, the mean value is 0.022, and the median is 0.026, consistent with prior research like Majeed, Yan, and Zhong (2022). A higher *Rem* indicates increased manipulation of financial performance and hence implies a lower FRQ. The absolute discretionary accruals (*Dac*) mean is 0.057, and the median is 0.040, consistent with the findings of Chen, Guo, Liu, and Tong (2021), and a higher *Dac* reflects a lower FRQ.

Table 4.2: Descriptive Statistics for all Variables

Variables	N	Mean	Median	Min	25%	75%	Max	Std.
Asw	28,528	0.368	0.361	0.187	0.301	0.429	0.615	0.092
Fau	28,528	0.451	0.439	0.279	0.379	0.512	0.715	0.095
LnFee	28,528	13.810	13.710	12.510	13.300	14.190	16.290	0.710
ARL	28,528	97.01	102.00	38.00	85.0	113.0	119.0	1.860
Rem	28,528	0.022	0.026	-0.066	0.014	0.035	0.058	0.021
Dac	28,528	0.058	0.040	0.001	0.018	0.077	0.324	0.059
Size	28,528	22.970	22.800	21.050	22.190	23.590	26.450	1.095
Growth	28,528	0.265	0.116	-0.703	-0.062	0.362	5.284	0.755
Inv	28,528	0.151	0.116	0.000	0.061	0.190	0.722	0.141
Rec	28,528	0.115	0.092	0.000	0.032	0.169	0.455	0.101
Merger	28,528	0.039	0.000	0.000	0.000	0.000	1.000	0.193
Lev	28,528	0.147	0.017	0.000	0.000	0.147	1.777	0.301
Intan	28,528	0.047	0.034	0.000	0.017	0.058	0.325	0.051
MtB	28,528	4.642	3.728	1.298	2.675	5.395	22.609	3.316
Age	28,528	2.818	2.890	1.609	2.639	3.091	3.466	0.361
InsInv	28,528	0.461	0.477	0.004	0.276	0.653	0.938	0.245
B_ind	28,528	0.378	0.364	0.250	0.333	0.429	0.600	0.064
B_to	28,528	0.179	0.111	0.000	0.000	0.286	0.875	0.213
B_size	28,528	2.136	2.197	1.609	1.946	2.197	2.708	0.201
Ac	28,528	0.994	1.000	0.000	1.000	1.000	1.000	0.077
Dual	28,528	0.264	0.000	0.000	0.000	1.000	1.000	0.441
Soe	28,528	0.415	0.000	0.000	0.000	1.000	1.000	0.493
Mainboar	28,528	0.844	1.000	0.000	1.000	1.000	1.000	0.363
Pc	28,528	0.326	0.000	0.000	0.000	1.000	1.000	0.469
Mkt	28,528	9.412	9.656	4.076	8.552	10.610	12.390	1.743
Top10	28,528	0.642	1.000	0.000	0.000	1.000	1.000	0.479
Audchg	28,528	0.165	0.000	0.000	0.000	0.000	1.000	0.371
Gc	28,528	0.013	0.000	0.000	0.000	0.000	1.000	0.114
Partner	28,528	0.763	1.000	0.000	1.000	1.000	1.000	0.425

Note: All variables are defined in Appendix 4.C.

Firm size (*Size*) shows a mean of 22.97 and a median of 22.81, corresponding to an average market value of RMB 9.5 billion for listed firms. Inventory (*Inv*) and accounts receivable (*Rec*) display mean (median) values of 0.151 (0.116) and 0.115 (0.092), respectively, suggesting that these items represent 15.1% and 11.5% of total assets. The binary variable for mergers (*Merger*) has a mean of 3.9%, with a median of 0%, indicating that 3.9% of firms were engaged in merger and acquisition activities on average. The leverage ratio (*Lev*) averages 0.147, implying a low average leverage ratio of 14.7%. The average proportion of intangible assets to total assets (*Intan*) is 0.047, suggesting that intangible assets are a minor part of total assets. The market-to-book ratio (*MtB*) averages 4.642, with a median of 3.728, indicating the high market valuation of firms listed on China's stock exchanges. Firm age (*Age*) has a mean (median) of 2.818 (2.890), which is equivalent to 16.7 (18.9) years, implying that most firms in the sample are relatively young. These statistics are consistent with recent studies (such as Xiang and Song, 2021; Huang, Li, and Liao, 2021; Wang, Chen, Li, and Tian, 2021; Cao, Chen, Lu, and Richardson, 2023; Alarussi and Gao, 2023; Chang, Fang, and Mo, 2023; Rahman, Zhu, Zhang, and Hossain, 2024).

Average institutional ownership (*InsInv*) is 46.1%. Board-related variables indicate that 37.8% of directors are independent, 17.9% of board members are new, and an average board has eight directors. The dummy variable of existing audit committee (*Ac*) has a mean of 0.994 and a median of one, which is consistent with the introduction of the compulsory requirement for an audit committee in 2018. In 26.4% of firms, the CEO also holds the role of chairman (*Dual*). These statistics are in line with prior literature (Gull, Atif, Issa, Usman, and Siddique, 2021; Bai, Han, Ma, and Zhang, 2022; Noureldeen, Elsayed, Elamer, and Ye, 2024; Rahman, Zhu, Zhang, and Hossain, 2024).

For the ownership variable (*Soe*), on average, 41.5% of firms are state controlled. *MainBoard* and *Pc* have mean values of 0.844 and 0.326, respectively, implying that 84.4% of firms in the sample are listed on the mainboard, and 32.6% of firms in the sample have political connections. The marketability index (*Mkt*) has a mean of 9.412 and a median of 9.656, which is consistent with Jiang, Lin, Khan, and Han (2023). The binary variables *Top10* and *Audchg* have mean values of 0.642 and 0.165, respectively, implying that 64.2% of firms were audited by the top 10 auditors, while 16.5% experienced an auditor change during the year, consistent with Teng and Han (2023). The *Gc* variable has a mean of 0.013, indicating that 1.3% of firms received an audit report with a going concern opinion, in line with Teng and Han (2023). The binary variable *Partner* has a mean of 0.763, implying that 76.3% of auditors in this sample are from audit firms with a partnership organisational structure.

Table 4.3 highlights the relationships among key variables. There is a negative correlation between *Asw* and *LnFee*, suggesting that firms with more pronounced board faultlines tend to pay lower audit fees. *Asw* is also negatively correlated with FRQ variables (*Rem*: -0.02, $p<0.05$, and *Dac*: -0.02, $p<0.01$), indicating a positive association between board faultlines and enhanced FRQ. *LnFee* correlates positively with *Rem* (*LnFee*: 0.05, $p<0.01$), suggesting that lower FRQ is associated with higher audit fees. Multicollinearity is not a significant issue, as the correlation coefficients among the independent variables are consistently below 0.6. Variance inflation factor (VIF) tests confirm this, with all VIF values below 5, and their reciprocals below 1.

Table 4.3: Pearson Correlation

Variables	1	2	3	4	5	6	7	8	9	10	11
1.LnFee	1										
2.ARL	0.14***	1									
3.Asw	-0.02***	0.00	1								
4.Fau	-0.06***	0.03***	0.69***	1							
5.Rem	0.05***	0.10***	-0.02**	-0.03***	1						
6.Dac	-0.05***	0.03***	-0.02***	0.01	-0.08***	1					
7.Size	0.69***	0.01**	0.00	-0.09***	-0.03***	-0.03***	1				
8.Growth	0.01	-0.01*	-0.01**	0.00	-0.26***	0.06***	0.06***	1			
9.Inv	0.00	-0.03***	0.02***	0.03***	-0.01**	0.15***	0.05***	0.09***	1		
10.Rec	-0.05***	0.08***	0.03***	0.07***	-0.15***	0.02***	-0.15***	0.01**	-0.10***	1	
11.Merger	-0.02***	0.01*	0.00	0.00	-0.13***	0.06***	0.02***	0.03***	-0.04***	0.02***	1
12.Lev	0.19***	-0.01**	-0.01	-0.07***	0.12***	0.06***	0.30***	0.05***	0.19***	-0.22***	0.01
13.Intan	0.02***	-0.01	0.00	-0.03***	0.03***	-0.07***	-0.01	-0.02***	-0.21***	-0.13***	0.02***
14.MtB	-0.1***	-0.02***	-0.01**	0.01**	-0.12***	0.18***	0.10***	0.07***	0.08***	0.08***	0.05***
15.Age	0.18***	0.15***	-0.05***	-0.04***	0.10***	-0.01	0.14***	0.01	0.04***	-0.09***	0.01*
16.InsInv	0.24***	-0.14***	0.00	-0.14***	-0.06***	-0.03***	0.42***	0.03***	0.04***	-0.22***	-0.01*
17.B_ind	0.03***	0.03***	-0.01**	0.20***	0.00	0.01**	0.02***	0.00	0.01*	0.04***	0.00
18.B_to	0.03***	0.01	-0.01**	-0.03***	0.03***	0.04***	0.03***	0.00	-0.01**	-0.01	0.05***
19.B_size	0.13***	-0.07***	0.12***	-0.35***	0.02***	-0.05***	0.20***	-0.02***	-0.03***	-0.11***	-0.02***
20.Ac	0.03***	0.03***	0.00	-0.01	0.01*	0.00	0.02***	0.00	0.00	-0.02***	-0.01**
21.Dual	-0.03***	0.08***	-0.02**	0.07***	-0.02***	0.02***	-0.08***	0.02***	-0.02***	0.09***	0.01**
22.Soe	0.1***	-0.15***	0.01**	-0.14***	0.06***	-0.05***	0.21***	-0.04***	0.04***	-0.21***	-0.04***
23.Mainboard	0.1***	-0.08***	0.01	-0.07***	0.01**	-0.03***	0.17***	-0.04***	0.11***	-0.23***	-0.05***
24.Pc	0.01	-0.03***	0.00	0.00	0.00	0.00	0.01	0.00	0.04***	-0.05***	-0.02***
25.Mkt	0.2***	0.15***	-0.02***	0.07***	-0.03***	-0.01**	0.05***	0.00	0.00	0.17***	0.01*
26.Top10	0.19***	0.01	0.02***	0.01	0.00	-0.05***	0.15***	-0.01**	-0.03***	0.02***	0.01
27.Audchg	-0.02***	0.01	0.00	-0.02***	0.00	0.03***	-0.01**	0.03***	0.00	0.03***	0.01
28.Gc	0.04***	0.11***	-0.02***	0.00	0.07***	0.11***	-0.04***	-0.01	-0.01**	0.01**	0.01**
29.Partner	0.26***	0.25***	-0.03***	0.04***	0.11***	-0.07***	0.20***	-0.01**	-0.11***	0.12***	0.07***

Table 4.3: Pearson Correlation (continued)

Variables	12	13	14	15	16	17	18	19	20	21	22	23
12.Lev	1											
13.Intan	0.02***	1										
14.MtB	0.18***	-0.02***	1									
15.Age	0.09***	-0.02***	0.00	1								
16.InsInv	0.17***	0.04***	0.01	0.01	1							
17.B_ind	-0.02***	-0.03***	0.02***	-0.02***	-0.09***	1						
18.B_to	0.03***	0.01	0.04***	0.05***	0.03***	0.07***	1					
19.B_size	0.13***	0.04***	-0.07***	0.00	0.24***	-0.42***	0.02***	1				
20.Ac	0.01	0.00	0.00	0.04***	0.02***	0.00	0.00	0.01	1			
21.Dual	-0.09***	-0.03***	0.05***	-0.05***	-0.19****	0.11***	-0.02***	-0.19***	-0.01	1		
22.Soe	0.22***	0.05***	-0.06***	0.12***	0.42***	-0.11***	0.08***	0.27***	0.03***	-0.27***	1	
23.Mainboard	0.14***	0.03***	-0.07***	0.10***	0.30***	-0.08***	0.01*	0.18***	0.09***	-0.15***	0.30***	1
24.Pc	0.01	0.03***	-0.04***	-0.09***	0.02***	0.00	-0.06***	0.05***	-0.01	-0.05***	-0.04***	0.01
25.Mkt	-0.13***	-0.10***	-0.03***	0.17***	-0.16***	0.06***	-0.01**	-0.15***	0.00	0.15***	-0.24***	-0.16***
26.Top10	0.02***	0.02***	0.00	-0.01	0.04***	0.02***	0.00	0.02***	0.00	0.03***	-0.01	-0.01
27.Audchg	0.02***	-0.02***	0.02***	-0.02***	0.02***	0.01	0.03***	0.01	0.00	0.00	0.05***	-0.01
28.Gc	0.01*	0.01*	0.07***	0.03***	-0.05***	0.00	0.04***	-0.02***	0.01	0.01*	-0.06***	-0.02***
29.Partner	-0.07***	-0.01	0.00	0.36***	-0.16***	0.08***	0.05***	-0.14***	-0.02***	0.10***	-0.18***	-0.17***

Variables	24	25	26	27	28	29
24.Pc	1					
25.Mkt	-0.05***	1				
26.Top10	0.00	0.08***	1			
27.Audchg	-0.03***	-0.01**	-0.01*	1		
28.Gc	-0.01**	0.02***	-0.03***	0.03***	1	
29.Partner	-0.10***	0.34***	0.22***	-0.03***	0.04***	1

Notes: This table shows the Pearson correlation matrix of board faultlines, audit fees, corporate innovation measures, FRQ measures, and control variables. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. All variables are defined in Appendix 4.C.

4.6 Results Discussion

4.6.1 Baseline Regression Analysis

Table 4.4 presents the regression results for the relationship between board faultlines (*Asw*) and audit fees (*LnFee*) (Eq. 7). Column 1 shows the OLS regression results, while Column 2 shows the firm FE regression results. In Column 1, the coefficient for *Asw* is negative and statistically significant at the 1% level (-0.111, p<0.01), suggesting that stronger board faultlines are linked to lower audit fees, potentially due to enhanced board monitoring leading to reduced perceived audit risk. Economically, a one-unit increase in *Asw* (-0.111), which is a substantial change given its scale, results in a decrease in audit fees of 10.51% ($e^{-0.111} - 1$). This translates to a reduction of RMB104,484, underscoring the substantial impact of board faultlines on audit costs.[12] In Column 2, the coefficient for *Asw* is still negative and significant (-0.069, p<0.01). The findings support H1 and indicate that firms with more pronounced board faultlines tend to incur lower audit costs.[13] The finding of a significantly negative association between board faultlines and audit fees provides clear support for the supply-side explanation of audit pricing. The evidence indicates that board faultlines strengthen internal governance and control systems in ways that lower auditors' assessments of engagement risk, thereby reducing the price they are willing to charge. This pattern runs counter to the demand-side perspective, which would anticipate higher fees due to potential increases in audit complexity and coordination costs arising from subgroup divisions. Instead, the results suggest that, in the Chinese context, the governance-enhancing benefits of board faultlines outweigh any additional informational or communication frictions they might produce.

The coefficients of firm size (*Size*) are positive and significant at 1% level (0.418, p<0.01; 0.265, p<0.01). Larger firms (*Size*) typically require more auditing effort due to the complexity and scope of their operations, leading to higher audit fees (Hay et al., 2006). Higher inventory levels (*Inv*) and larger accounts receivable (*Rec*) are associated with increased audit fees, aligning with findings that business complexity drives more audit efforts (Blankley, Hurtt, and MacGregor, 2012; Eshleman and Guo, 2014). Leverage (*Lev*) and intangible assets (*Intan*),

[12] The mean of audit fees is $e^{13.81} = \text{RMB}994{,}505$. Therefore, the reduction of audit fees is $\text{RMB}994{,}505 * (1 - e^{-0.111}) = \text{RMB}104{,}484$.

[13] Further tests on the lagged impacts of board faultlines on audit fees are also conducted. The regression results of *Asw* on the audit fees in next year are still significantly negative.

proxies for client risk, both exhibit a significantly positive relationship with audit fees (Datta, Jha, and Kulchania, 2020). The market-to-book ratio (*MtB*) is significantly negatively correlated with audit fees, aligning with the argument that firms with growth opportunities tend to pay lower audit fees (Gul and Goodwin, 2010; Hay, 2013). Older firms (*Age*), given their need to maintain reputation and ensure high-quality reporting, often demand more extensive audit services, leading to higher fees (Alkebsee et al., 2021). *InsInv* has a significantly negative coefficient, which is as expected and consistent with Mitra, Hossain, and Deis (2007). The coefficients of revenue growth (*growth*) are all negative and significant at 1% (-0.022, $p<0.01$; -0.006, $p<0.01$), which is opposite to the expectation. One possible explanation in the Chinese context could be that rapidly growing firms in our sample might have simpler initial organisational structures or are perceived as less risky in their early high-growth phase, leading to lower initial audit fees. Involvement in mergers or acquisitions (*Merger*) is significantly negatively associated with audit fees (-0.088, $p<0.01$; -0.133, $p<0.01$).

Among corporate governance variables, board independence (*B_ind*), board turnover (*B_to*), and board size (*B_size*) have a significantly positive association with audit fees. The positive coefficients of board independence (*B_ind*) and board size (*B_size*) are as expected and suggest that a higher proportion of independent directors and a larger board both lead to higher demand for audit services, which is consistent with Karim, Robin, and Suh (2016) and Jizi and Nehme (2018). The positive coefficient of board turnover (*B_to*) is also as expected, indicating that auditors view high board turnover as a signal of weaker corporate governance, thus charging more due to the associated client risks (Arthaud-Day, Certo, Dalton, and Dalton, 2006). Aligning with our expectations, the existence of an audit committee (*Ac*) and CEO duality (*Dual*) suggests that audit committees enhance monitoring and CEO duality may increase perceived risk, leading to higher fees.

Firms listed on the main board (*Mainboard*) show a significant positive correlation with audit fees. This supports the notion that main board firms, being relatively mature and concerned with maintaining their reputation, tend to require more audit effort, as noted by Kong and Huang (2023). Political connection (*Pc*) also shows a significantly positive correlation with audit fees, due to the potential for increased scrutiny and risk (Bushman, Piotroski, and Smith, 2004). The marketisation of the province where the head office of the firm is located (*Mkt*) shows a positive association with audit fees.

Table 4.4: Regression Results of Board Faultlines and Audit Fees

Variables	Expected Sign	*LnFee* (1)	*LnFee* (2)
Intercept		3.366 ***	5.457 ***
		(0.085)	(0.267)
Asw	?	-0.111 ***	-0.069 ***
		(0.028)	(0.020)
Dac	+	-0.014	-0.077 ***
		(0.046)	(0.028)
Size	+	0.418 ***	0.265 ***
		(0.003)	(0.004)
Growth	+	-0.022 ***	-0.006 ***
		(0.004)	(0.002)
Inv	+	0.064 ***	0.135 ***
		(0.025)	(0.025)
Rec	+	0.282 ***	0.202 ***
		(0.029)	(0.035)
Merger	+	-0.088 ***	-0.133 ***
		(0.014)	(0.008)
Lev	?	0.144 ***	0.127 ***
		(0.011)	(0.009)
Intan	+	0.557 ***	0.349 ***
		(0.055)	(0.057)
MtB	+	-0.030 ***	-0.020 ***
		(0.001)	(0.001)
Age	-	0.026 ***	0.330 ***
		(0.009)	(0.023)
InsInv	-	-0.044 ***	-0.127 ***
		(0.013)	(0.016)
B_ind	+	0.097 **	-0.024
		(0.045)	(0.033)
B_to	+	0.059 ***	0.017 **
		(0.012)	(0.007)
B_size	+	0.061 ***	0.102 ***
		(0.015)	(0.015)
Ac	+	0.059 *	0.056 ***
		(0.034)	(0.020)
Dual	+	0.000	0.011 **
		(0.006)	(0.005)
Soe	-	-0.030 ***	0.063 ***
		(0.006)	(0.010)
Mainboard	+	0.047 ***	2.034 ***
		(0.008)	(0.252)
Pc	+	0.025 ***	0.008
		(0.006)	(0.005)
Mkt	+	0.047 ***	-0.007
		(0.002)	(0.004)
Top10	+	0.103 ***	0.010 *
		(0.006)	(0.006)
Audchg	-	-0.015 **	-0.010 **
		(0.007)	(0.004)
Gc	+	0.323 ***	0.190 ***
		(0.023)	(0.014)
Partner	+	-0.005	-0.009

	(0.018)	(0.010)
Year & Industry	Yes	Yes
Firm	No	Yes
N	28,528	28,528
Adj. R-squared	0.580	0.875
F-test	729.3***	55.5***

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at the firm level are in parentheses. All variables are defined in Appendix 4.C.

The results for the three auditing-related variables—*Top10*, *Audchg*, and *Gc* —are consistent with expectations. Firms audited by the top 10 auditors pay higher fees, consistent with Mohapatra, Elkins, Lobo, and Chi (2022). Auditor changes (*Audchg*) lead to reduced audit fees, consistent with low-balling behaviour as noted by Chang et al. (2023). The positive coefficients for going concern opinion (*Gc*) suggest a strong association with higher audit efforts, which result in increased audit fees (Wang, Chen, Li, and Tian, 2021).

Table 4.4 reports an adjusted R^2 of 0.580, indicating that the model explains approximately 58% of the variation in audit fees. This is comparable with relevant governance and audit-fee research. For example, Huang et al. (2015) report adjusted R^2 values of approximately 0.54, while Bozec and Dia (2017) report values ranging from 0.476 to 0.576. Larasati et al. (2019) report adjusted R^2 values of approximately 0.61–0.62, and the models in Grosse et al. (2024) produce values of approximately 0.68–0.69. More recent evidence from China also reports adjusted R^2 values ranging from approximately 0.51 to 0.63 across several audit-fee specifications (Tawiah et al., 2025). Therefore, the adjusted R^2 of 0.580 is within the range observed in related audit-fee studies and indicates a reasonable level of explanatory power. Differences in explanatory power across studies may arise from variations in samples, institutional settings, control variables and fixed-effect structures. Accordingly, the adjusted R^2 should be interpreted together with the theoretical specification, coefficient estimates and diagnostic tests rather than as a standalone measure of model quality.

4.6.2 Additional Tests of Non-linearity

To examine whether the association between board faultlines and audit fees is sensitive to potential non-linearities, I conduct two additional analyses. First, I augment Equation (7) by including the mean-centred quadratic term Asw_sq, together with the linear ASW term[14]. The regression model is:

$$LnFee_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Asw\_sq_{i,t} + \beta_3 Dac_{i,t} + \beta_4 Size_{i,t} + \beta_5 Growth_{i,t} + \beta_6 Inv_{i,t} + \beta_7 Rec_{i,t} + \beta_8 Merger_{i,t} + \beta_9 Lev_{i,t} + \beta_{10} Intan_{i,t} + \beta_{11} MtB_{i,t} + \beta_{12} Age_{i,t} + \beta_{13} InsInv_{i,t} + \beta_{14} B\_ind_{i,t} + \beta_{15} B\_to_{i,t} + \beta_{16} B\_size_{i,t} + \beta_{17} Ac_{i,t} + \beta_{18} Dual_{i,t} + \beta_{19} Soe_{i,t} + \beta_{20} Mainboard_i + \beta_{21} Pc_{i,t} + \beta_{22} Mkt_{i,t} + \beta_{23} Top10_{i,t} + \beta_{24} Aduchg_{i,t} + \beta_{25} Gc_{i,t} + \beta_{26} Partner_{i,t} + Ind\ fe + Year\ fe + \varepsilon_{i,t} \quad (8)$$

Where:

$$Asw\_sq_{i,t} = \left(Asw_{i,t} - \overline{\mathrm{Asw}}\right)^2$$

As reported in Table 4.5 Panel A, the coefficient on the quadratic term is negative but statistically insignificant ($\beta = -0.065,\ p > 0.10$), while the coefficient on the linear ASW term remains negative and significant ($\beta = -0.109,\ p < 0.01$). The quadratic specification also does not improve model fit. Its AIC and BIC values are higher than those of the baseline linear model, while the adjusted R^2 remains unchanged. These findings provide no evidence of either a U-shaped or an inverted U-shaped relationship between board faultline strength and audit fees.

Second, I partition the sample into four subsamples based on the quartile distribution of ASW and re-estimate the baseline model (i.e. Equation (7)) separately for each subsample. As reported in Panel B of Table 4.5, the estimated ASW coefficients are statistically insignificant in all four subsamples. The coefficients are -0.147, -0.054, 0.161, and 0.012 for the first, second, third, and fourth quartiles, respectively. Panel C further reports that none of the pairwise differences between the four ASW coefficients is statistically significant. Consistent with these results, the omnibus equality test fails to reject the null hypothesis that the four coefficients are equal ($\chi^2(3) = 1.125,\ p = 0.771$). Therefore, the subsample analysis provides no evidence that the association between ASW and audit fees differs systematically across the four ASW quartiles.

Overall, the additional analyses provide no evidence of a U-shaped, inverted U-shaped, or systematically varying relationship across the ASW distribution. The insignificant quadratic term, the absence of significant coefficient differences across the four subsamples, and the lack

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[14] The quadratic term is calculated as $(Asw - \overline{Asw})^2$ to reduce the high correlation between the linear and squared terms and to facilitate interpretation of the linear coefficient.

of improvement in model fit support retaining the linear specification as the most parsimonious representation of the negative association between board faultline strength and audit fees.

Table 4.5: Tests of Non-linearity in the Association between Board Faultline Strength and Audit Fees

Panel A. Quadratic specification

	(1) *LnFee*	(2) *LnFee*
ASW	-0.111*** (0.028)	-0.109*** (0.030)
ASW_sq		-0.065 (0.242)
Observations	28,528	28,528
Adjusted R^2	0.580	0.580
AIC	33,726.9	33,728.8
BIC	34,189.4	34,199.5
Control variables	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes

Panel B. Baseline regressions estimated separately by ASW quartile

	(1) Q1: Lowest	(2) Q2	(3) Q3	(4) Q4: Highest
ASW	-0.147 (0.172)	-0.054 (0.299)	0.161 (0.263)	0.012 (0.102)
Observations	7,132	7,132	7,132	7,132
Adjusted R^2	0.559	0.589	0.611	0.562
Control variables	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Panel C. Tests of equality across the four subsample coefficients

Test	Coefficient difference	z / χ^2 statistic	p-value
Q1 versus Q2	-0.093	-0.269	0.788
Q1 versus Q3	-0.308	-0.981	0.327
Q1 versus Q4	-0.159	-0.796	0.426
Q2 versus Q3	-0.215	-0.540	0.589
Q2 versus Q4	-0.066	-0.209	0.835
Q3 versus Q4	0.149	0.529	0.597
Omnibus equality test		$\chi^2(3) = 1.125$	0.771

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at the firm level are in parentheses. The dependent variable is the natural logarithm of audit fees. Panel A compares the baseline linear specification with a specification including the mean-centred quadratic term, *ASW_sq*. Panel B reports the baseline model re-estimated separately for four mutually exclusive subsamples defined by the quartile distribution of *Asw*. Panel C reports pairwise coefficient-equality tests and the omnibus test of the null hypothesis that the four *Asw* coefficients are equal. Control-variable coefficients and individual industry and year fixed-effect coefficients are not reported. Standard errors are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All variables are defined in Appendix 4.C.

4.7 The Endogeneity Treatment

4.7.1 The Endogeneity Treatment: Instrumental Variable

The risk of bias in the results arises from the potential endogeneity of the key independent variable, board faultlines (*Asw*). Since the assignment of boards to exhibit strong or weak faultlines is unlikely to be a random process, this scenario resembles a selection problem. Moreover, if omitted variables affect audit fees and correlate with board faultlines, the predictor (board faultlines) may correlate with the unobserved error term, leading to biased coefficient estimates (Hill, Johnson, Greco, O'Boyle, and Walter, 2021).

To address the endogeneity concern stemming from treatment selection and omitted variables, I apply the instrumental variable (IV) regression technique. Drawing on prior faultline research, I identify the Bartik-type instrument—a shift-share instrument (Bartik, 1991). It capitalises on variations in regional or industry factors that are external to the firm's internal governance but directly influence board composition (Sieweke, Bostandzic, and Smolinski, 2023), making it particularly relevant in this context. By interacting predetermined regional or industry characteristics with broader national trends, the Bartik instrument helps isolate shifts that are plausibly exogenous to local dynamics, thereby reducing bias from reverse causality or omitted variables. The calculation steps of the Bartik instrument are explained in Appendix 3.E.

A two-stage least squares (2SLS) regression analysis is conducted. In the first stage, instrumental variables are employed to predict ASW, and this predicted value is then used in the second-stage regression to account for endogeneity concerns. Columns 1 and 2 of Table 4.6 present the 2SLS results using the Bartik-type instrumental variable. The endogeneity test assesses whether the regressor in the model is indeed endogenous. The Durbin (1954) and Wu-Hausman (Wu, 1974; Hausman, 1978) statistics for the 2SLS estimator are reported, with significant test results indicating that the variables in question must be treated as endogenous. In Table 4.6, the Durbin and Wu–Hausman statistics are not statistically significant, indicating that the null hypothesis of exogeneity cannot be rejected. Accordingly, the 2SLS analysis is interpreted primarily as an additional robustness test rather than as evidence that ASW is necessarily endogenous. Additionally, it is reasonable to argue that the instrument is not correlated with the residuals for audit fees (Dalton, Daily, Ellstrand, and Johnson, 1998). In Column 1 of Table 4.6, the instrument shows a positive association with *Asw* and is statistically significant at the 1% level (0.341, $p<0.01$).

In the second stage of regression, audit fees (*LnFee*) serve as the dependent variable, with the predicted values of the faultline variables used as the independent variable. To further account for potential sample-selection bias, a Heckman two-step procedure is applied. The inverse Mills ratio (Asw_Imr), estimated from the first-stage selection equation, is included as an additional control variable in the second-stage regression. Column 2 of Table 4.6 shows that the coefficients for board faultlines are negative and significant at the 5% level (-0.191, $p<0.05$), consistent with our main results. The significantly negative coefficient of *Asw* in Table 4.6 suggests that our main findings still hold.

Table 4.6: 2SLS Regression using Bartik as Instrumental Variable

	IV=Bartik	
Variables	*Asw* (1)	*LnFee* (2)
Intercept	0.147*** (0.017)	-0.840 (0.791)
Asw		-0.191** (0.080)
Bartik	0.341*** (0.005)	
Asw_Imr		2.887*** (0.537)
Dac	-0.019** (0.009)	-0.547*** (0.109)
Size	-0.001** (0.001)	0.365*** (0.010)
Growth	-0.001 (0.001)	-0.043*** (0.005)
Inv	0.024*** (0.005)	0.644*** (0.110)
Rec	0.022*** (0.006)	0.885*** (0.116)
Merger	0.002 (0.003)	-0.022 (0.018)
Lev	-0.003* (0.002)	0.019 (0.025)
Intan	-0.005 (0.011)	0.789*** (0.070)
MtB	0.000 (0.000)	-0.029*** (0.001)
Age	-0.001 (0.002)	-0.194*** (0.042)
InsInv	-0.002 (0.003)	-0.192*** (0.031)
B_ind	0.052*** (0.009)	1.298*** (0.227)
B_to	-0.005** (0.002)	-0.087*** (0.030)
B_size	0.050*** (0.003)	1.452*** (0.258)

Ac	-0.003	0.044
	(0.007)	(0.035)
Dual	0.000	-0.079***
	(0.001)	(0.016)
Soe	-0.001	-0.019***
	(0.001)	(0.007)
Mainboard	-0.001	0.136***
	(0.002)	(0.019)
Pc	0.000	0.032***
	(0.001)	(0.006)
Mkt	0.000	0.059***
	(0.000)	(0.003)
Top10	0.002**	0.165***
	(0.001)	(0.013)
Audchg	-0.002	-0.067***
	(0.001)	(0.012)
Gc	-0.007	0.103**
	(0.005)	(0.047)
Partner	-0.005	-0.165***
	(0.003)	(0.035)
Year	Yes	Yes
Industry	Yes	Yes
N	28,528	28,528
Adj. R-squared	0.145	0.584
F-test	90.6***	703.9***
K–Paap-LM stat.		2,458.5***
Cragg–Donald Wald F		4,129.2***
K–Paap Wald F stat.		3,093.6***
Durbin		1.473
Wu–Hausman		1.473
Stock–Yogo critical Value at 10%	16.38	16.38

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

4.7.2 The Endogeneity Treatment: Inverse Probability Matching Approach

To further address the issue of potential endogeneity, I employ the inverse probability matching (IPM) approach. I choose IPM and report standardised mean differences (SMDs) because our analysis deals with a continuous treatment variable (board faultlines), making IPM a more appropriate method for addressing potential imbalances compared to traditional propensity score matching (PSM) (Rosenbaum and Rubin, 1983; Imbens, 2004). IPM corrects for self-selection biases by matching treatment and control groups based on the inverse probabilities calculated from observed covariates, effectively simulating a randomised assignment. This allows us to create a counterfactual control group that is more comparable to the treatment group in terms of observed characteristics. To ensure the matching process is successful, I evaluate balance using SMD. Panel A of Table 4.7 compares the SMD before and after balancing, showing that most covariates are well-balanced, with minimal differences between the treatment and control groups. This indicates an effective matching process. Panel B of Table 4.7 provides regression results for *Asw* and *LnFee*. The coefficients for *Asw* remain consistently negative and significant for *LnFee* (-0.114, $p<0.01$; -0.070, $p<0.01$), suggesting that board faultlines have a negative impact on audit fees.

Overall, the results of the endogeneity tests are consistent with previous baseline regression analyses, reinforcing the reliability of our findings.

Table 4.7: Inverse Probability Matching (IPM)

Panel A Standardised Mean Differences (SMD)

	Before Balancing	After Balancing
Dac	-0.0158	-0.0157
Size	-0.0043	-0.0043
Growth	-0.0135	-0.0133
Inv	0.0193	0.0194
Rec	0.0285	0.0281
Merger	-0.0032	-0.0028
Lev	-0.0095	-0.0084
Intan	-0.0032	-0.0033
MtB	-0.0118	-0.0115
Age	-0.0486	-0.0479
InsInv	-0.0014	-0.0015
B_ind	-0.0144	-0.0155
B_to	-0.0133	-0.0125
B_size	0.1167	0.1196
Ac	-0.0037	-0.0037
Dual	-0.0241	-0.0240
Soe	0.0146	0.0153
Mainboard	0.0093	0.0090
Pc	0.0024	0.0027
Mkt	-0.0169	-0.0168
Top10	0.0172	0.0169
Audchg	-0.0049	-0.0049
Gc	-0.0186	-0.0195
Partner	-0.0273	-0.0269

Panel B Board Faultlines and Audit Fees after Balancing

	LnFee (1)	*LnFee* (2)
Intercept	3.395***	5.452***
	(0.086)	(0.267)
Asw	-0.114***	-0.070***
	(0.028)	(0.020)
Controls	Yes	Yes
Industry	Yes	Yes
Year	Yes	Yes
Firm	No	Yes
N	28,528	28,528
Adj R-squared	0.585	0.891

Notes: Panel A: this table presents the standardised mean before and after balancing; Panel B: this table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

4.8 The Mediation Effects of Financial Reporting Quality and Audit Report Lag

4.8.1 The Mediating Effect of Financial Reporting Quality

The mediating role of FRQ is assessed following the classic 3-step procedure outlined by Baron and Kenny (1986). The following models (Eq. 9-10) investigate the mediating effect of FRQ. In this context, $LnFee_{i.t}$ represents the audit fees paid by firm i in year t; $Asw_{i.t}$ denotes the board faultlines measure of firm i in year t; $Rem_{i.t}$ reflects the FRQ measure of firm i in year t.

$$Rem_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Dac_{i,t} + \beta_3 Size_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Inv_{i,t} + \beta_6 Rec_{i,t} + \beta_7 Merger_{i,t} + \beta_8 Lev_{i,t} + \beta_9 Intan_{i,t} + \beta_{10} MtB_{i,t} + \beta_{11} Age_{i,t} + \beta_{12} InsInv_{i,t} + \beta_{13} B\_ind_{i,t} + \beta_{14} B\_to_{i,t} + \beta_{15} B\_size_{i,t} + \beta_{16} Ac_{i,t} + \beta_{17} Dual_{i,t} + \beta_{18} Soe_{i,t} + \beta_{19} Mainboard_i + \beta_{20} Pc_{i,t} + \beta_{21} Mkt_{i,t} + \beta_{22} Top10_{i,t} + \beta_{23} Aduchg_{i,t} + \beta_{24} Gc_{i,t} + \beta_{25} Partner_{i,t} + Ind\ fe + Year\ fe + \varepsilon_{i,t} \quad (9)$$

$$LnFee_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Rem_{i,t} + \beta_3 Dac_{i,t} + \sum Other\ Controls + \varepsilon_{i,t} \quad (10)$$

Step 1 evaluates the direct link between *Asw* and audit fees using Eq. 7, with the regression results discussed in Section 4.6.1. These results indicate a significant negative relationship between *Asw* and audit fees.

Step 2 involves testing the relationship between *Asw* and FRQ and is examined using Eq. 9, and the regression results of *Rem* (the mediating variable) on *Asw* are presented in Column 1 of Table 4.8. The significantly negative coefficient of *Asw* (-0.003, p<0.01) suggests that board faultlines reduce *Rem* levels (i.e., higher FRQ). Consistent with the approaches taken in Muller, Judd, and Yzerbyt (2005) and Hasan, Kobeissi, Liu, and Wang (2018), the negative and significant coefficient of *Asw* confirms the significant relationship between board faultlines and FRQ.

Step 3 investigates the relationship between board faultlines, FRQ, and audit fees using Eq. 10, with the regression results presented in Column 2 of Table 4.8. To support the mediating role of FRQ, FRQ should be significantly associated with audit fees after controlling for board faultlines, while the coefficient on board faultlines should decrease in magnitude.

Table 4.8: OLS Regression of Board Faultlines on Audit Fees and Mediating Effect of FRQ and ARL

Variables	*Mediator = Rem*		*Mediator = ARL*	
	Rem (1)	*LnFee* (2)	*ARL* (3)	*LnFee* (4)
Intercept	0.067 *** (0.004)	3.259 *** (0.086)	86.470 *** (3.359)	3.190 *** (0.086)
Asw	-0.003 *** (0.001)	-0.106 *** (0.028)	2.576 ** (1.113)	-0.117 *** (0.028)
Rem		1.614*** (0.142)		
ARL				0.002*** (0.000)
Dac	-0.022 *** (0.002)	0.021 (0.046)	10.848 *** (1.800)	-0.036 (0.046)
Size	-0.002 *** (0.000)	0.421 *** (0.003)	0.027 (0.121)	0.418 *** (0.003)
Growth	-0.007 *** (0.000)	-0.011 *** (0.004)	-0.418 *** (0.141)	-0.021 *** (0.004)
Inv	-0.010 *** (0.001)	0.081 *** (0.025)	2.493 *** (0.967)	0.059 ** (0.025)
Rec	-0.025 *** (0.001)	0.322 *** (0.029)	5.584 *** (1.151)	0.270 *** (0.029)
Merger	-0.014 *** (0.001)	-0.066 *** (0.014)	-0.357 (0.535)	-0.088 *** (0.014)
Lev	0.008 *** (0.000)	0.131 *** (0.011)	2.847 *** (0.414)	0.138 *** (0.011)
Intan	0.001 (0.002)	0.555 *** (0.055)	4.337 ** (2.151)	0.548 *** (0.055)
MtB	-0.001 *** (0.000)	-0.028 *** (0.001)	-0.159 *** (0.034)	-0.029 *** (0.001)
Age	0.002 *** (0.000)	0.022 ** (0.009)	1.164 *** (0.346)	0.023 *** (0.009)
InsInv	-0.005 *** (0.001)	-0.035 *** (0.013)	-4.152 *** (0.525)	-0.035 *** (0.013)
B_ind	-0.002 (0.002)	0.101 ** (0.045)	-0.123 (1.773)	0.098 ** (0.045)
B_to	0.002 *** (0.001)	0.056 *** (0.012)	0.479 (0.487)	0.058 *** (0.012)
B_size	0.001 ** (0.001)	0.059 *** (0.015)	0.955 (0.606)	0.059 *** (0.015)
Ac	0.002 (0.001)	0.056 (0.034)	3.572 *** (1.353)	0.052 (0.034)
Dual	0.000 (0.000)	-0.001 (0.006)	1.080 *** (0.244)	-0.003 (0.006)
Soe	0.001 *** (0.000)	-0.032 *** (0.006)	-2.910 *** (0.255)	-0.024 *** (0.006)
Mainboard	-0.001 * (0.000)	0.048 *** (0.008)	0.531 * (0.318)	0.046 *** (0.008)
Pc	0.000 (0.000)	0.025 *** (0.006)	0.445 ** (0.224)	0.024 *** (0.006)
Mkt	-0.001 *** (0.000)	0.048 *** (0.002)	-0.061 (0.069)	0.047 *** (0.002)

Top10	-0.001 *** (0.000)	0.104 *** (0.006)	-0.448 ** (0.223)	0.104 *** (0.006)
Audchg	0.001 *** (0.000)	-0.016 ** (0.007)	0.155 (0.280)	-0.015 ** (0.007)
Gc	0.013 *** (0.001)	0.302 *** (0.023)	12.815 *** (0.903)	0.297 *** (0.023)
Partner	0.000 (0.001)	-0.005 (0.018)	1.415 ** (0.691)	-0.007 (0.018)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	28,528	28,528	28,528	28,528
Adj. R-squared	0.229	0.581	0.149	0.582
Direct Effect		-0.106***		-0.117***
Indirect Effect		-0.005***		0.005**
Total Effect		-0.111***		-0.111***
Sobel Z		-2.724***		2.281**
F-test	158.3***	721.6***	93.74***	723.9***

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

FRQ (*Rem*) exhibits significantly positive coefficients (1.614, p<0.01). This positive coefficient on *Rem* indicates that higher REM increases audit fees. Additionally, the coefficient of *Asw* is negative and significant (-0.106, p<0.01). To further validate this mediation effect, I employed the Sobel z-test (-2.724, p<0.01), the value of which is significant, providing statistical evidence that *Rem* mediates the relationship between board faultlines and audit fees. This result affirms that the influence of *Asw* on audit fees is partially mediated by *Rem* (as a proxy of FRQ) with a small but significant negative indirect effect, thereby confirming H2.

Crucially, the finding that FRQ partially mediates the negative association between board faultlines and audit fees provides robust support for the supply-side mechanism of audit pricing. The partial mediation indicates that board faultlines exert not only a direct downward effect on audit fees by strengthening monitoring and supervisory oversight, but also an indirect effect by improving the firm's information environment through enhanced FRQ. Higher FRQ reduces the information risk perceived by external auditors, thereby further contributing to lower audit fees. Together, these pathways confirm that the governance-enhancing effects of board faultlines operate through both direct oversight improvements and audit risk reduction, consistent with the supply-side explanation.

4.8.2 The Mediating Effect of Audit Report Lag

The mediating role of ARL is also assessed following the classic 3-step procedure outlined by Baron and Kenny (1986). The following models (Eq. 11-12) investigate the mediating effect of ARL. In this context, $LnFee_{i.t}$ represents the audit fees paid by firm i in year t; $ARL_{i.t}$ denotes the ARL of firm i in year t; $Asw_{i.t}$ denotes the board faultlines measure of firm i in year t.

$$Arl_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Dac_{i,t} + \beta_3 Size_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Inv_{i,t} + \beta_6 Rec_{i,t} + \beta_7 Merger_{i,t} + \beta_8 Lev_{i,t} + \beta_9 Intan_{i,t} + \beta_{10} MtB_{i,t} + \beta_{11} Age_{i,t} + \beta_{12} InsInv_{i,t} + \beta_{13} B\_ind_{i,t} + \beta_{14} B\_to_{i,t} + \beta_{15} B\_size_{i,t} + \beta_{16} Ac_{i,t} + \beta_{17} Dual_{i,t} + \beta_{18} Soe_{i,t} + \beta_{19} Mainboard_i + \beta_{20} Pc_{i,t} + \beta_{21} Mkt_{i,t} + \beta_{22} Top10_{i,t} + \beta_{23} Aduchg_{i,t} + \beta_{24} Gc_{i,t} + \beta_{25} Partner_{i,t} + Ind\,fe + Year\,fe + \varepsilon_{i,t} \quad (11)$$

$$LnFee_{i.t} = \alpha_0 + \beta_1 Asw_{i.t} + \beta_2 Arl_{i,t} + \beta_3 Dac_{i,t} + \sum Other\ Controls + \varepsilon_{i,t} \quad (12)$$

Columns 3-4 of Table 4.8 report steps 2 and 3 to investigate the ARL mediating effect. Step 2 is examined using Eq. 11, and the regression results of *Arl* (the mediating variable) on *Asw* are presented in Column 3 of Table 4.8. The significantly positive coefficient of *Asw* (2.576, $p<0.05$) suggests that board faultlines increase ARL, which supports H3 that board faultlines have a significant association with ARL.

Step 3 is examined using Eq. 12, with the regression results presented in Column 4 of Table 4.8. ARL (*Arl*) exhibits significantly positive coefficients (0.002, $p<0.01$), which indicates a positive association between ARL and audit fees. Additionally, the coefficient of *Asw* is negative (-0.117) and is significant at the 1% level. The Sobel z-test is 2.281 ($p<0.05$), which confirms a small positive indirect effect of ARL. The results suggest that board faultlines may lead to audit delay, which slightly increases audit fees. However, the overall impact of faultlines is still evidenced in lower audit fees; thus, the results provide support for H3.

The partial mediation of the relationship between board faultlines and audit fees via ARL provides clear evidence that demand-side coordination frictions operate alongside the supply-side benefits documented earlier. Specifically, while faultlines exert a direct negative effect on audit fees by enhancing board monitoring and reducing perceived audit risk, they also impose indirect upward pressure on fees by prolonging the audit process. The longer ARL reflects the additional time required for fragmented boards to deliberate, reconcile divergent viewpoints, and approve audit outcomes. This reporting delay necessitates greater auditor effort, thereby increasing audit fees and partially offsetting the direct governance-driven reduction.

Overall, the mediation result confirms that although demand-side coordination costs are present, they do not fully counteract the dominant supply-side effect.

4.9 Cross-Sectional Tests

The cross-sectional analysis investigates two factors that may moderate the relationship between board faultlines and audit fees: the presence of qualified foreign institutional investors (QFII) and the relaxation of the One-Child Policy (PostOCP).

4.9.1 Qualified Foreign Institutional Investors

The presence of qualified foreign institutional investors (QFII) can affect board faultlines. The QFII scheme allows foreign investors to participate in China's domestic capital markets, bringing with them diverse investment strategies, corporate governance practices, and cultural perspectives. These foreign investors often advocate for stricter corporate governance standards, promoting greater board independence to ensure accountability and transparency. While this enhanced board independence improves oversight and reduces conflicts of interest, it can also create faultlines. The push for transparency and international best practices by QFII-influenced directors might contrast with the priorities of domestically focused directors, creating factions and faultlines within the board (Wang, Wang, and Shi, 2022).

4.9.2 One-Child Policy

The relaxation of the One-Child Policy (OCP), which began with policy changes implemented from 2014 and was followed by broader reform in 2015, may have affected board dynamics related to faultlines (Abrahamson, 2016). As highlighted by Qin, Kong, Zhu, and Xiong (2025), this policy change may have contributed to shifts in family dynamics and workforce composition. Some female directors may have been more likely to leave their board positions to focus on family responsibilities. Where boards became more homogeneous following the ending of the OCP, the nature of the remaining faultlines may also have changed. These faultlines may have existed within a more homogeneous group, making them less pronounced and potentially less influential in governance processes. With fewer women on boards, the remaining demographic faultlines, such as age, education and tenure, may not have generated the same level of cognitive conflict that had previously been associated with stronger monitoring efficiency and lower audit fees. Auditors' risk assessments may have also shifted if they perceived that boards had become more homogeneous. They may have viewed the remaining faultlines as providing few governance benefits and therefore may have been less willing to associate them with lower audit fees.

4.9.3 Results of Cross-Sectional Tests

Table 4.9 provides the regression results incorporating interaction terms. Each column corresponds to a regression model that includes an interaction term between *Asw* and one of these factors (*Qfii* or *PostOcp*). In terms of the main effects of the moderating factors, *Qfii* (0.058, $p < 0.05$) and *PostOcp* (0.114, $p < 0.01$) exhibit significant positive coefficients. Column 1 focuses on the presence of QFII investors. While the coefficient for *Asw* is significantly negative (-0.079, $p < 0.05$), the interaction term (*Asw***Qfii*) is significantly negative as well (-0.169, $p < 0.05$), highlighting that the presence of QFII investors strengthens the negative relationship between *Asw* and audit fees. Therefore, QFII has a meaningful moderating effect on the relationship between Asw and audit fees.

Column 2 explores the interaction between *Asw* and the *PostOCP* period. The coefficient for *Asw* is marginally significant and negative (-0.089, $p < 0.10$), but the interaction term (*Asw***PostOcp*) is not statistically significant, providing no evidence that the association between Asw and audit fees differs significantly between the PreOCP and PostOCP periods.

These interaction results should be interpreted with caution. First, QFII and PostOCP are broad proxy variables and may not fully capture the underlying governance and institutional conditions that they are intended to represent. The QFII indicator identifies the presence of QFII investors but does not measure the size of their holdings, their level of engagement, or their actual influence on board monitoring. Similarly, the PostOCP indicator distinguishes two broad periods but does not isolate the effect of the policy change from other economic, regulatory, or governance developments occurring over the same period. Second, the interaction analysis identifies conditional associations rather than establishing that QFII presence or the PostOCP period causes changes in the relationship between board faultlines and audit fees. Accordingly, the findings should be regarded as supplementary evidence regarding potential contextual variation in the ASW–audit fee association.

Table 4.9 Regression Results on Audit Fees Across Various Subgroups

Variables	*Dependent Variable = LnFee* (1)	(2)
Intercept	3.375 ***	3.381 ***
	(0.086)	(0.087)
Asw	-0.079 **	-0.089 *
	(0.031)	(0.052)
QFII	0.058 **	
	(0.027)	
*Asw*QFII*	-0.169 **	
	(0.071)	
PostOCP		0.114 ***
		(0.034)
*Asw*PostOCP*		-0.031
		(0.061)
Dac	-0.007	-0.007
	(0.046)	(0.046)
Size	0.418 ***	0.418 ***
	(0.003)	(0.003)
Growth	-0.021 ***	-0.021 ***
	(0.004)	(0.004)
Inv	0.058 **	0.059 **
	(0.025)	(0.025)
Rec	0.283 ***	0.283 ***
	(0.029)	(0.029)
Merger	-0.087 ***	-0.087 ***
	(0.014)	(0.014)
Lev	0.140 ***	0.140 ***
	(0.011)	(0.011)
Intan	0.559 ***	0.559 ***
	(0.055)	(0.055)
MtB	-0.029 ***	-0.029 ***
	(0.001)	(0.001)
Age	0.019 **	0.019 **
	(0.009)	(0.009)
InsInv	-0.058 ***	-0.058 ***
	(0.013)	(0.013)
B_ind	0.097 **	0.098 **
	(0.045)	(0.045)
B_to	0.055 ***	0.055 ***
	(0.012)	(0.012)
B_size	0.054 ***	0.054 ***
	(0.015)	(0.015)
Ac	0.058 *	0.058 *
	(0.034)	(0.034)
Dual	0.004	0.004
	(0.006)	(0.006)
MainBoard	0.043 ***	0.043 ***
	(0.008)	(0.008)
Pc	0.028 ***	0.028 ***
	(0.006)	(0.006)
Mkt	0.048 ***	0.048 ***

	(0.002)	(0.002)
Top10	0.103 ***	0.103 ***
	(0.006)	(0.006)
Audchg	-0.016 **	-0.016 **
	(0.007)	(0.007)
Gc	0.326 ***	0.327 ***
	(0.023)	(0.023)
Partner	-0.004	-0.004
	(0.018)	(0.018)
Year	Yes	Yes
Industry	Yes	Yes
N	28,528	28,528
Adj. R-squared	0.579	0.579
F-test	715.4***	728.4***

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

4.10 Robustness Tests

4.10.1 An Alternative Measure of Board Faultlines

I also utilize an alternative measure of board faultlines, FAU, originally proposed by Thatcher, Jehn, and Zanutto (2003). This approach assesses faultline strength by determining the proportion of total variance in group characteristics accounted for by the most distinct subgroup division. FAU effectively captures the degree of similarity among subgroup members and is computed by dividing the sum of squared variances between subgroups by the total squared variance.

$$Fau_g = \frac{\sum_{j=1}^{p} \sum_{k=1}^{q} n_k^g (\bar{x}_{kj} - \bar{x}_j)^2}{\sum_{j=1}^{p} \sum_{k=1}^{q} \sum_{i=1}^{n_k^g} (\bar{x}_{ijk} - \bar{x}_j)^2} \tag{13}$$

where $\bar{x}_{kj}$ denotes the average value of characteristic j for subgroup k members, $\bar{x}_j$ represents the average value of characteristic j for all group members, $\bar{x}_{ijk}$ signifies the value of characteristic j for member i of subgroup k, and n_k^g indicates the number of members in subgroup k under split g. The *Fau* value ranges from 0 to 1, where higher values represent greater similarity among subgroup members.

To evaluate the robustness of our baseline results, Eq. 7 is re-estimated using *Fau* as an alternative proxy for board faultlines. The corresponding results are reported on Panel A of Table 4.10. These findings align with the baseline results, reaffirming the negative association between board faultlines and audit fees. Column 1 shows the regression result of *Fau* on audit fees (*LnFee*), controlling for year and industry fixed effects, while Column 2 reports the result with additional controls for firm fixed effects. Both models yield significantly negative coefficients for *Fau* (-0.088, $p < 0.01$; -0.074, $p < 0.01$), underscoring a robust inverse relationship between faultline strength and audit fees.

The consistency of these results further supports Hypothesis 1 (H1) by demonstrating that stronger board faultlines, as captured by *Fau*, are associated with lower audit fees.

Table 4.10 Panel A: OLS Regression of Alternative Measure of Board Faultlines on Audit Fees

Variables	*LnFee* (1)	*LnFee* (2)
Intercept	3.402 ***	5.499 ***
	(0.088)	(0.267)
Fau	-0.088 ***	-0.074 ***
	(0.029)	(0.020)
Dac	-0.014	-0.077 ***
	(0.046)	(0.028)
Size	0.419 ***	0.265 ***
	(0.003)	(0.004)
Growth	-0.022 ***	-0.006 ***
	(0.004)	(0.002)
Inv	0.063 **	0.135 ***
	(0.025)	(0.025)
Rec	0.280 ***	0.202 ***
	(0.029)	(0.035)
Merger	-0.088 ***	-0.133 ***
	(0.014)	(0.008)
Lev	0.144 ***	0.127 ***
	(0.011)	(0.009)
Intan	0.556 ***	0.349 ***
	(0.055)	(0.057)
MtB	-0.030 ***	-0.020 ***
	(0.001)	(0.001)
Age	0.026 ***	0.331 ***
	(0.009)	(0.023)
InsInv	-0.044 ***	-0.128 ***
	(0.013)	(0.016)
B_ind	0.099 **	-0.020
	(0.045)	(0.033)
B_to	0.059 ***	0.017 **
	(0.012)	(0.007)
B_size	0.041 **	0.087 ***
	(0.016)	(0.016)
Ac	0.060 *	0.056 ***
	(0.034)	(0.020)
Dual	0.000	0.011 **
	(0.006)	(0.005)
Soe	-0.030 ***	0.063 ***
	(0.006)	(0.010)
Mainboard	0.047 ***	2.030 ***
	(0.008)	(0.252)
Pc	0.025 ***	0.008
	(0.006)	(0.005)
Mkt	0.047 ***	-0.007 *
	(0.002)	(0.004)
Top10	0.103 ***	0.009 *
	(0.006)	(0.006)
Audchg	-0.015 **	-0.010 **
	(0.007)	(0.004)
Gc	0.324 ***	0.190 ***
	(0.023)	(0.014)

Partner	-0.004 (0.018)	-0.009 (0.014)
Year & Industry	Yes	Yes
Firm	No	Yes
N	28,528	28,528
Adj. R-squared	0.579	0.891
F-test	729.0***	55.5***

Notes: This table presents the regression results for the period 2008 to 2021. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

Table 4.10 Panel B: OLS Regression of Board Faultlines on Audit Fees with Control of Key Audit Matters

Variables	*LnFee* (1)	*LnFee* (2)
Intercept	3.366 *** (0.085)	3.703 *** (0.472)
Asw	-0.111 *** (0.028)	-0.091 ** (0.042)
PostKam	0.096 *** (0.026)	
Readability		0.240 *** (0.067)
Dac	-0.014 (0.046)	0.325 *** (0.069)
Size	0.418 *** (0.003)	0.401 *** (0.004)
Growth	-0.022 *** (0.004)	-0.016 *** (0.005)
Inv	0.064 *** (0.025)	0.034 (0.039)
Rec	0.282 *** (0.029)	0.370 *** (0.041)
Merger	-0.088 *** (0.014)	-0.062 *** (0.020)
Lev	0.144 *** (0.011)	0.205 *** (0.018)
Intan	0.557 *** (0.055)	0.549 *** (0.083)
MtB	-0.030 *** (0.001)	-0.039 *** (0.001)
Age	0.026 *** (0.009)	-0.029 ** (0.015)
InsInv	-0.044 *** (0.013)	-0.010 (0.020)
B_ind	0.097 ** (0.045)	0.045 (0.066)
B_to	0.059 *** (0.012)	0.072 *** (0.018)
B_size	0.061 *** (0.015)	0.030 (0.023)
Ac	0.059 * (0.034)	-0.085 (0.093)
Dual	0.000	0.017 *

	(0.006)	(0.009)
Soe	-0.030 ***	-0.062 ***
	(0.006)	(0.010)
Mainboard	0.047 ***	0.022 **
	(0.008)	(0.010)
Pc	0.025 ***	0.021 **
	(0.006)	(0.009)
Mkt	0.047 ***	0.041 ***
	(0.002)	(0.003)
Top10	0.103 ***	0.069 ***
	(0.006)	(0.008)
Audchg	-0.015 **	0.020 *
	(0.007)	(0.010)
Gc	0.323 ***	0.307 ***
	(0.023)	(0.029)
Partner	-0.005	1.100 **
	(0.018)	(0.450)
Year&Industry	Yes	Yes
Firm	No	Yes
N	28,528	14,100
Adj. R-squared	0.580	0.533
F-test	729.3***	359.0***
Data Period	2008-2021	2017-2021

Notes: This table presents the regression results. *, ** and *** denote 0.1, 0.05 and 0.01 significance levels, respectively, in a two-tailed test. Robust standard errors clustered at firm-level are in parentheses. All variables are defined in Appendix 4.C.

4.10.2 Inclusion of Key Audit Matters as Control Variables

China's Ministry of Finance (MoF) introduced the China Standards on Auditing (CSA) No. 1504 on December 23, 2016 (Ministry of Finance of the People's Republic of China, 2016). This requires auditors to include key audit matters (KAMs) in their reports to make the process clearer and more transparent. Identified during the audit, KAMs are critical issues that require extra attention from certified public accountants. These issues are chosen based on professional judgment and discussions between auditors and management. Auditors must explain why these matters are important and how they were dealt with during the audit.

This standard is similar to ISA 701, issued by the International Auditing and Assurance Standards Board (IAASB) in 2015, and was introduced gradually. In 2016, 90 firms listed on both Mainland China's A-share and Hong Kong's H-share markets were the first to disclose KAMs for their 2016 financial reports. By 2017, this rule applied to other firms, and by early 2018, all publicly traded Chinese companies had to include KAMs for fiscal years ending in 2017.

Prior studies document that KAM requirements are associated with higher audit fees (Espahbodi, Lin, Liu, Mock and Song, 2023; Baatwah, Almoataz, Omer, and Aljaaidi, 2024).

One possible explanation is that identifying, documenting, and reporting KAMs adds complexity and requires more time, effort, and resources. Auditors need to make difficult judgments, spend extra hours, and use more resources, all of which increase costs.

To control for the potential effects of the KAM reporting requirements, two variables, *PostKam* and *Readability*, are included in the analysis. *PostKam* is a dummy variable, set to 1 if the year is 2017 or later, and 0 otherwise. *Readability* refers specifically to the readability of KAM disclosures contained in the external audit report. It measures the ease with which the textual content of KAM disclosures can be understood. Following Li and Zheng (2024), *Readability* is measured by transforming unstructured information into structured data using word embedding vectors, where each word is converted into a fixed-length vector. Subsequently, optimisation is performed according to the principles of negative sampling and Hierarchical Softmax, incorporating each word in the dictionary into the probability expression to obtain sentence generation probability values. Finally, *Readability* is computed as the log-likelihood mean of the product of each sentence generation probability. Higher *Readability* values indicate greater ease of comprehension and enhanced readability of the text. The equation can be expressed as follows:

$$Readability_{i,t} = \frac{1}{N}\sum_{s=1}^{N} logP_s$$

where, P_s is the probability of sentence s being generated, and N is the total number of sentences in the text.

Panel B of Table 4.10 shows the results. The coefficient for *PostKam* is positive and significant (0.096, $p < 0.01$), indicating that audit fees are higher in the Post-KAM period. The coefficient for *Readability* is also positive and significant (0.240, $p < 0.01$), indicating a positive association between KAM readability and audit fees. Across both specifications, the coefficient for Asw remains negative and statistically significant, providing further evidence of the robustness of the main findings.

4.11 Conclusion

This essay examines the relationship between board faultlines—measured by the ASW algorithm—and audit fees in Chinese listed firms. The primary analysis reveals that stronger board faultlines are associated with lower audit fees. To address endogeneity issues, this essay uses instrumental variable methods and inverse probability matching, both of which support the main findings. To enhance the robustness of the empirical results, this essay also tests alternative measures of faultlines, including the Fau index, and finds consistent results.

This essay further tests the mediating role of financial reporting quality and audit report lag. It finds that financial reporting quality partially mediates this relationship, meaning that board faultlines improve financial oversight, which lowers audit risk and fees. On the other hand, audit report lag partially mediates the negative association between board faultline and audit fees. This highlights that although board faultlines may cause audit delay, which slightly increases audit fees, the overall effect of faultlines is still a reduction in audit fees.

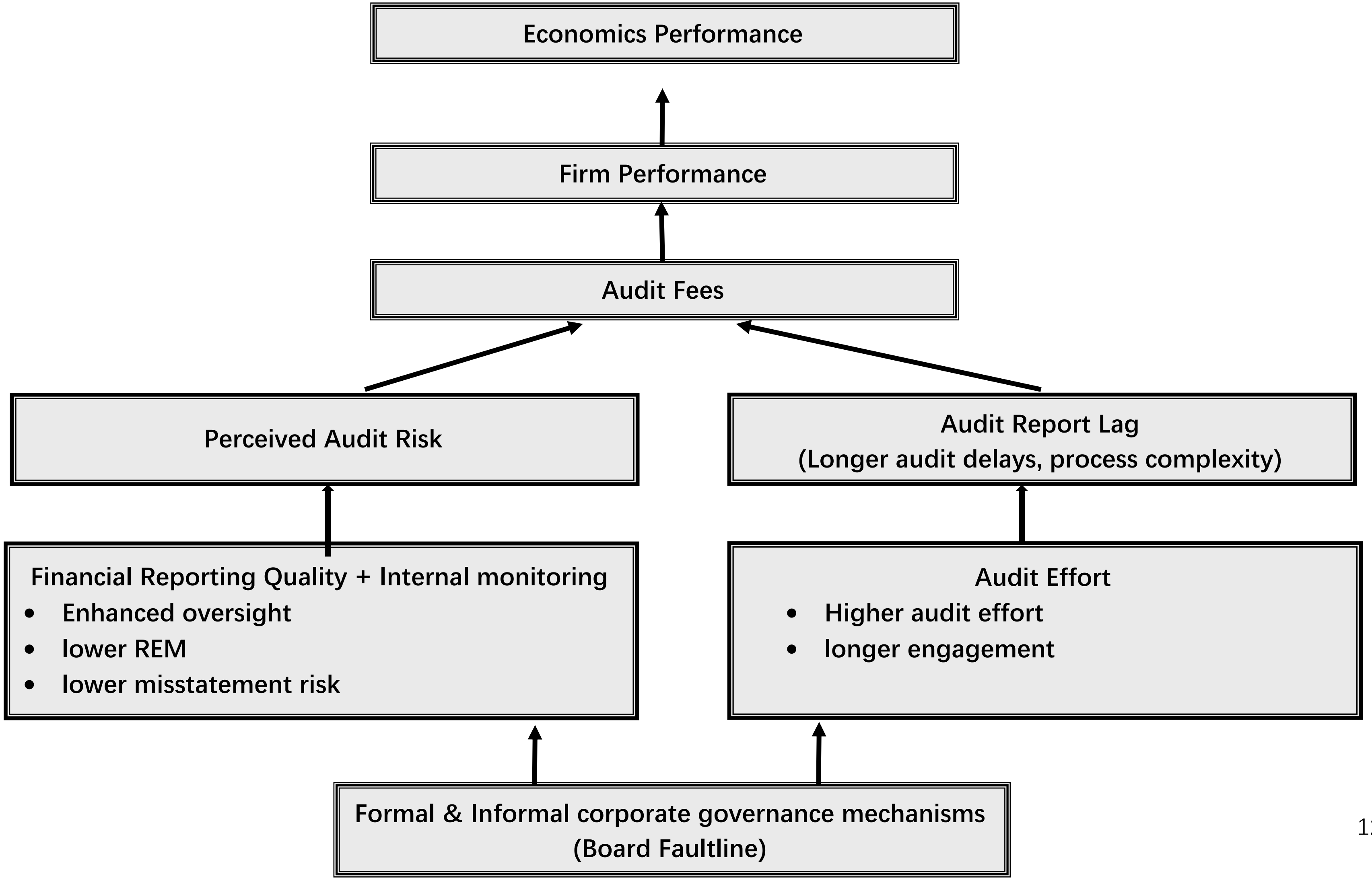
Further analysis shows that the negative association between board faultline and audit fees is more pronounced when firms have QFII shareholders. The presence of QFII shareholders introduces an additional layer of governance oversight and enhances transparency, potentially reducing agency problems. This intensified monitoring effect, combined with the diversity-driven benefits of board faultlines, appears to alleviate auditors' concerns, thereby leading to lower audit fees.

This research contributes to corporate governance and audit literature in several important ways. First, it makes an incremental contribution to the faultline theory by documenting that well-managed board subgroups can strengthen financial oversight rather than hinder decision-making. Second, it offers empirical evidence from China's unique regulatory environment by examining whether governance and institutional factors, including QFII shareholding and the period surrounding the relaxation of the One-Child Policy, condition the association between board faultlines and audit outcomes. By incorporating audit report lag as a mediator, we also advance the understanding of how board composition interacts with audit efficiency and audit pricing.

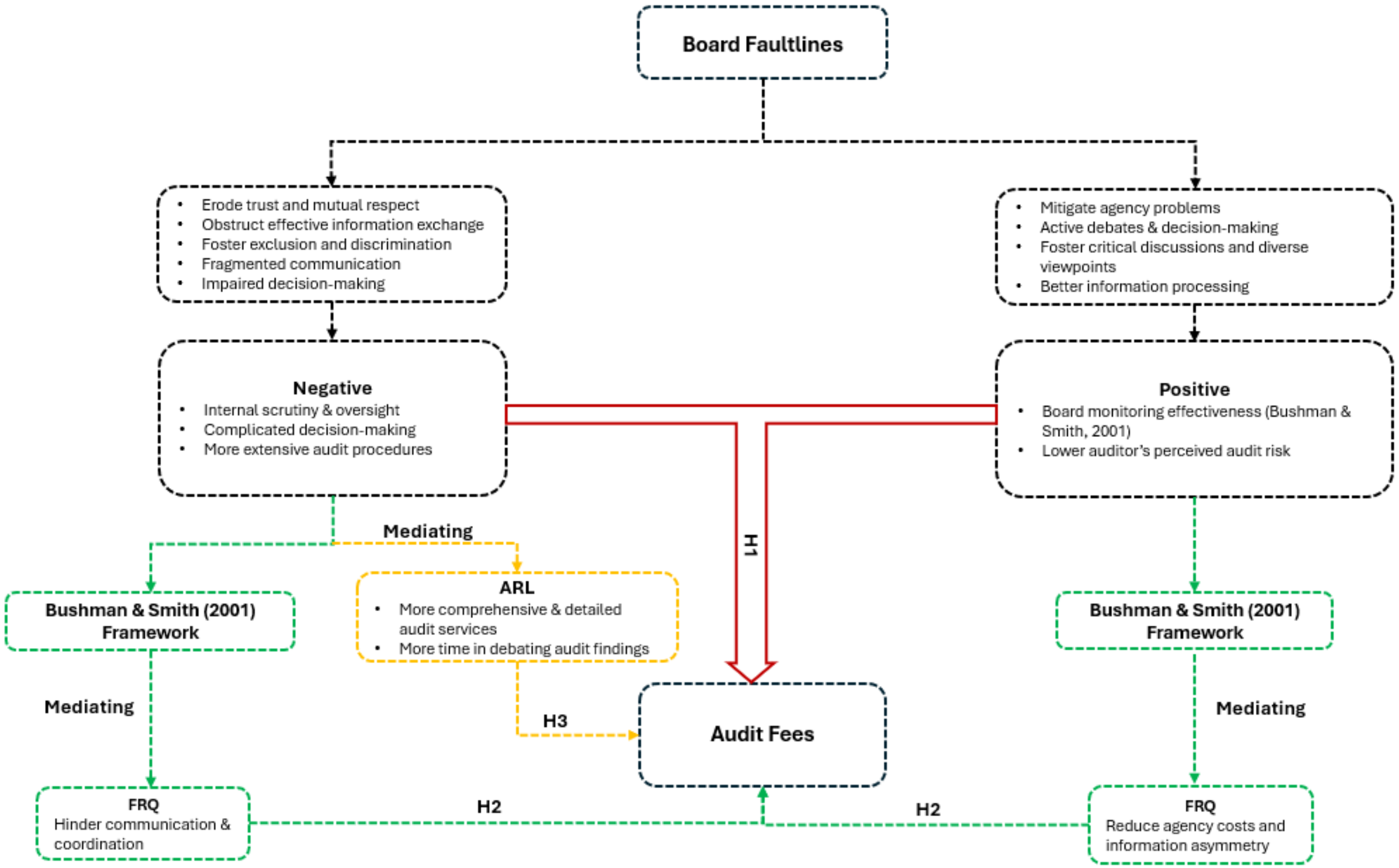
From a practical perspective, the essay clarifies the common misperception that board faultlines deteriorate corporate decision-making, and by highlighting the lower audit fees resulting from board faultlines, the essay offers practical advice on board composition. The essay also draws auditors' attention to a largely neglected aspect of board dynamics when assessing audit risk and setting their fees.

In summary, our research comprehensively examines how board faultlines affect audit fees through improved financial reporting quality and audit timelines. By highlighting the complex trade-offs between enhanced oversight and potential inefficiencies, this essay deepens our understanding of how board composition shapes governance and audit practices.

Appendix 4.A: Theoretical Framework for the Review (Adapted from Bushman and Smith (2001) & Huang, Habib, Sun, Liu, and Guo (2021))



Appendix 4.B: Hypothesis Development



Appendix 4.C: Definition of Variables

Variables	Definition
Independent variable	
$Asw_{i,t}$	The board faultlines of firm i in year t that is estimated by average silhouette width approach (Meyer and Glenz, 2013).
$Fau_{i,t}$	The board faultlines of firm i in year t that is estimated by faultline strength approach (Thatcher et al., 2003).
$Asw\_sq_{i,t}$	The mean-centred quadratic term of Asw for firm i in year t, calculated as: $Asw\_sq_{i,t} = (Asw_{i.t} - \overline{\text{Asw}})^2$.
$Asw\_Imr_{i,t}$	The inverse Mills ratio estimated from the first-stage Heckman selection equation and included to control for potential sample-selection bias.
Dependent variable	
$LnFee_{i,t}$	The natural logarithm of the auditing fees paid by firm i in year t.
$Arl_{i,t}$	The ARL of firm i in year t, measured as the number of days between the end of a firm's fiscal year and the signature date on the audit report, which reflects the time required to complete the audit process (Knechel and Payne, 2001; Lobo and Zhao, 2013).
Firm-specific control variables	
$Rem_{i,t}$	The estimated total real earnings management made by firm i in year t (Roychowdhury, 2006).
$Dac_{i,t}$	The discretionary accruals of firm i in year t (Dechow et al., 1995; Alali, 2011).
$Size_{i,t}$	The natural logarithm of the market value of firm i at the end of year t.
$Growth_{i,t}$	The revenue growth of firm i in year t, measured as the ratio of year *t*'s revenue to the previous year ′s revenue minus 1 (Cho, Kwon, and Krishnan, 2021).
$Inv_{i,t}$	The amount of inventory of firm i at the end of year t, scaled by total assets.
$Rec_{i,t}$	The amount of accounts receivable of firm i at the end of year t, scaled by total assets.
$Merger_{i,t}$	A dummy variable set to 1 if firm i is engaged in a merger or acquisition during year t, and 0 otherwise (Hoitash, Hoitash, and Bedard, 2008).
$Lev_{i,t}$	The long-term debt ratio of firm i in year t, calculated as long-term debt divided by total assets.
$Intan_{i,t}$	The amount of intangible assets of firm i at the end of year t, scaled by total assets.
$MtB_{i,t}$	The market value to book value ratio of firm i the end of year t.
$Age_{i,t}$	The natural logarithm of the age of firm i at the end of year t.
Corporate governance control variable	
$InsInv_{i,t}$	The institution ownership, measured as the percentage of firm i's shares held by institution investors at the end of year t.
$B\_ind_{i,t}$	Board independence, measured as the proportion of independent directors on the board of firm i at the end of year t

$B\_to_{i,t}$	Director turnover, measured as the proportion of directors on the board of firm i that were elected in year t
$B\_size_{i,t}$	Board size, which is the natural logarithm of the number of directors on firm i's board at the end of year t.
$Ac_{i,t}$	A dummy variable, set to 1 if firm i had an audit committee in year t, and 0 otherwise.
$Dual_{i,t}$	A dummy variable, set to 1 if the CEO of firm i is also the Chairman of the board, and zero otherwise.
$Soe_{i,t}$	A dummy variable, set to 1 if firm i is ultimately controlled by the state, and zero otherwise.
Capital market-related control variable	
$Mainboard_{i}$	A dummy variable, set to 1 if the share of firm i is listed on the main board of SSE or SZSE, and zero otherwise.
$Pc_{i,t}$	A dummy variable, set to 1 if the CEO or Board Chairman of firm i is or was a government official, and zero otherwise.
$Mkt_{i,t}$	The marketability index by province, sourced from the China Market Index Database
$ExtDir_{i,t}$	The proportion of external directors on the board of firm i refers to the percentage of directors who are not part of the firm's management team (Xue, Tang, Xu, Ling, Xie, and Mo (2024)).
$QFII_{i,t}$	A dummy variable, set to 1 if firm i has shares held by qualified foreign institute investors, and zero otherwise (Wang, Wang and Shi (2022)).
$PostOCP_{i,t}$	A dummy variable, set to 1 if the year is 2014 or later, and zero otherwise (Qin, Kong, Zhu, and Xiong (2025)).
$PostKam_{i,t}$	A dummy variable, set to 1 if the year is 2017 or later, and zero otherwise.
$Readability_{i,t}$	A measure of KAM readability (Li and Zheng (2024))
Auditor characteristics control variable	
$Top10_{i,t}$	A dummy variable that sets to 1 if auditors are the top 10 audit firms[15] based on total revenue, and zero otherwise.
$Audchg_{i,t}$	A dummy variable that sets to 1 if it is the first year that the auditor provides auditing services to the firm, and zero otherwise.
$Gc_{i,t}$	A dummy variable set to 1 if the auditor issues a going concern opinion to firm i in year t, and zero otherwise (Ettredge et al., 2014).
$Partner_{i,t}$	A dummy variable, set to 1 if the organisational type of the audit firm associated with firm i's auditor is a general partnership, and 0 otherwise.

[15] The list of the top 10 audit firms is obtained from the Top 100 Accounting Firms in China by Revenue released annually by The Chinese Institute of Certified Public Accountants (CICPA). Further information could be found on the website of CICPA (http://cicpa.org.cn).

CHAPTER FIVE: CONCLUSION

5.1 Introduction

This thesis examines the role of board faultlines in shaping corporate governance outcomes. While prior research has extensively documented the effects of board diversity, considerably less is known about how internal subgroup alignments among directors, captured through board faultlines, influence firms' governance processes, both internally and externally. Existing studies predominantly portray faultlines as inherently detrimental, emphasising coordination failures and interpersonal conflict. However, this perspective overlooks the possibility that structured heterogeneity within boards may simultaneously enhance monitoring effectiveness, information processing capacity, and overall governance quality.

Motivated by this theoretical and empirical gap, this thesis adopts a quantitative research design using Chinese A-share listed firms to examine board faultlines in terms of both their formation mechanisms and governance consequences. Drawing on a panel dataset covering 2008-2021 and 28,528 firm-year observations, the thesis investigates (i) the determinants of board faultlines formation, (ii) their internal governance effects on corporate innovation, and (iii) their external governance implications for audit outcomes, including audit pricing and reporting timeliness. By integrating evidence across these three essays, the thesis develops a more comprehensive and balanced account of board faultlines as an active governance mechanism—one that shapes monitoring, decision processes, and the corporate information environment—rather than merely a descriptive structural attribute.

5.2 Integrative Synthesis of the Core Findings

Viewed collectively, the three essays offer a coherent and progressive narrative about how board faultlines operate within the corporate governance system of China's A-share market, where ownership concentration, state influence, and rapid institutional change shape board functioning and monitoring demands.

The first essay lays the conceptual and empirical foundation for the thesis by addressing an under-developed question in the faultline literature, namely, how board faultlines vary systematically across firms and governance contexts. It begins by integrating insights from research on board composition and group faultlines. Building on this foundation, the essay argues that faultlines should be treated as endogenously configured governance features shaped by firms' strategic demands and institutional constraints, rather than incidental by-products of diversity (Hermalin and Weisbach, 2003). For the empirical analysis, the essay uses data from Chinese A-share listed firms over 2008–2021 (28,528 firm-year observations) and measures faultlines via the ASW approach. It documents systematic variation in faultline strength with internal organizational evolution, proxied by firm life-cycle stages, and external operating context, proxied by consolidated CSRC sectors. Faultlines are strongest around the growth stage and are more pronounced in the secondary (industrial) sector than in the tertiary (service) sector. Together, these results suggest that, in China's institutional setting, board faultlines are predictable and context-contingent, providing a necessary basis for interpreting the governance effects examined in Essays 2 and 3.

The second essay examines the internal governance consequences of board faultlines for strategic outcomes in China's A-share market, focusing on corporate innovation. Using the ASW algorithm to quantify faultlines and a large panel of Chinese listed firms over 2008–2021, the evidence shows that stronger board faultlines are associated with higher innovation output. Mediation analyses further indicate that financial reporting quality partially mediates this relationship, consistent with the interpretation that faultlines can intensify scrutiny, improve the information environment, and support the allocation of resources towards longer-horizon innovative investment. These results remain robust across extensive sensitivity analyses and endogeneity-oriented tests. Importantly, the cross-sectional results reveal that state ownership attenuates and may reverse these benefits: in SOEs, stronger faultlines are linked to weaker innovation performance, consistent with the constraints imposed by multi-task objectives and institutional influences.

The third essay extends the analysis to the external monitoring environment in China's A-share market by examining how board faultlines relate to audit pricing. The evidence shows that stronger faultlines are associated with lower audit fees, and this pattern is robust to a range of endogeneity and measurement checks, including instrumental-variable estimation, inverse probability matching, and alternative faultline indices. Mediation analyses indicate that this association operates partly through improved financial reporting quality, consistent with faultlines strengthening financial oversight and reducing auditors' perceived engagement risk. At the same time, faultlines are linked to longer audit report lag, reflecting greater coordination and communication demands during the audit. Importantly, these timing frictions do not overturn the pricing effect: the fee-reducing channel via enhanced reporting quality dominates;

therefore, the overall association remains negative. The results are also more pronounced in firms with QFII shareholdings, suggesting that external monitoring complements faultline-related internal oversight in shaping auditors' risk assessments and pricing decisions.

Collectively, these findings indicate that board faultlines operate through multiple, partially offsetting channels. On the one hand, faultlines enhance monitoring intensity and information quality, yielding tangible benefits in both internal decision-making processes and external audit pricing. On the other hand, they introduce coordination frictions that manifest in extended audit timelines. Importantly, these effects are not contradictory but rather complementary, underscoring the multifaceted nature of board faultlines as a governance mechanism with both benefits and costs.

5.3 Theoretical Contributions

This thesis makes incremental theoretical contributions to the literatures on board faultlines, corporate governance, and auditing by clarifying the governance roles that board subgroup structures can play in the Chinese setting, and by identifying the informational channel through which these structures are reflected in observable outcomes.

First, the thesis contributes to the board faultlines literature by shifting attention from viewing faultlines as uniformly harmful to recognising that faultlines represent a configurational form of board heterogeneity whose implications are contingent on the governance environment and on how subgroup structures shape monitoring and deliberation. Rather than disputing the established evidence that faultlines can generate conflict and fragmentation, the thesis highlights that faultlines can also be associated with monitoring-enhancing properties in China's A-share context, where ownership concentration, state influence, and relationship-based interactions can shape how director subgroups operate.

Second, the thesis advances corporate governance theory by identifying the firm's information environment, proxied by financial reporting quality, as a central pathway that links board configuration to both strategic and assurance outcomes. Building on the view that governance operates through information production and oversight, the thesis shows that board subgroup structures are systematically related to reporting quality, which helps explain why faultlines can be associated with stronger innovation outcomes and lower perceived audit risk. This contribution is theoretical in the sense that it positions faultlines not only as a demographic pattern but as a board structure that can influence monitoring intensity and information credibility.

Third, the thesis contributes to the auditing literature by connecting within-board configuration to external monitoring responses. It shows that auditors' pricing and timeliness outcomes are associated with board faultline structures, consistent with the idea that auditors incorporate signals of governance quality and coordination demands when planning and executing engagements. This extends audit research by introducing board subgroup configuration as a relevant board-level construct alongside more conventional governance proxies.

Taken together, these contributions support a more nuanced understanding of board heterogeneity in China. They suggest that the implications of faultlines should not be inferred from conflict arguments alone; the net governance implications depend on the extent to which subgroup structures strengthen information quality and monitoring, while also creating coordination frictions that can surface in process outcomes such as audit timeliness. This thesis therefore complements a largely developed-market literature that often emphasises negative consequences by documenting evidence consistent with monitoring-related benefits in an emerging-market setting, without claiming that faultlines are universally beneficial.

5.4 Practical and Policy Implications

The findings of this thesis offer practical implications for boards, regulators, and auditors in China's A-share market and in other emerging-market settings with evolving governance regimes.

First, for boards and nominating committees, the results suggest that diversity initiatives should consider not only whether directors are heterogeneous, but also how multiple attributes combine to form stable subgroups. Because faultline strength varies systematically with organisational conditions such as life-cycle stage and industry sector, boards may benefit from aligning director recruitment with the firm's strategic and operating context. In particular, boards should pay attention to whether subgroup structures are likely to support constructive scrutiny and information production, or whether they are likely to create coordination frictions that slow key governance processes.

Second, for regulators and policymakers, the thesis suggests that board composition reforms should move beyond "more diversity is better" prescriptions. In China, where institutional forces and ownership structures shape board appointments, policies that encourage diversity are likely to have heterogeneous effects across firms. A more holistic approach is to consider the configuration of director attributes and the governance channels through which board structure affects outcomes, especially financial reporting quality and innovation incentives. For SOE governance, the evidence also reinforces the need to recognise that state ownership can constrain the innovation benefits associated with board subgroup dynamics, implying that reforms aimed at improving board effectiveness in SOEs may require complementary changes to incentives and accountability mechanisms.

Third, for auditors and audit firms, the results indicate that board faultline configurations contain useful information for engagement planning. Stronger faultlines are associated with higher financial reporting quality and lower audit fees, consistent with lower perceived risk, while also being associated with longer audit report lag, consistent with greater coordination and communication demands. Audit teams can therefore incorporate board structural characteristics into risk assessment and scheduling decisions, and thus proactively manage interactions with boards where subgrouping is more pronounced.

5.5 Limitations and Future Research

Several limitations of the thesis warrant acknowledgment and suggest promising avenues for future research. First, the thesis is conducted within a single institutional setting, China's A-share market, which may limit generalisability of findings to jurisdictions with different governance regimes and board appointment processes. Cross-country comparative studies would be valuable for assessing external validity and identifying which institutional features amplify or weaken faultline effects. At the same time, a practical barrier is data availability. In many countries, detailed director-level information needed to construct multidimensional faultline measures, especially consistent coding of directors' demographic and professional attributes, is incomplete or not comparable across databases. Improving cross-country data coverage and harmonisation is therefore an important prerequisite for broader comparative evidence.

Second, although the thesis employs established quantitative measures of faultlines, these remain proxies for complex social interactions and power relations within boards. They cannot directly observe coalition formation, communication patterns, or influence dynamics in the boardroom. Future research could complement archival analyses with qualitative approaches such as interviews, case studies, or direct observation, as well as behavioural experiments that isolate specific subgroup mechanisms.

Third, the use of observational data constrains causal interpretation, notwithstanding the application of identification and robustness approaches designed to mitigate endogeneity concerns. Future studies could strengthen causal inference by exploiting quasi-experimental settings, regulatory shocks, or plausibly exogenous variation in director appointments, and by integrating richer micro-level measures of board processes.

Additional research directions include examining the dynamic evolution of board faultlines over time; exploring interactions with CEO power and controlling shareholder influence; testing effects on other governance outcomes such as executive compensation and payout policy; and analysing how firms manage coordination frictions through formal mechanisms such as committee structure and board leadership roles, as well as informal social processes.

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