Research article

Rookie independent directors and agency costs: Evidence from Chinese listed firms

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A B S T R A C T

This study investigates the impact of rookie independent directors (RIDs) on agency costs. Utilizing a sample of Chinese listed firms, we employ panel ordinary least square estimations. Our findings reveal that increased RIDs is positively associated with agency costs, suggesting that rookie independent directors may exacerbate agency conflicts within Chinese firms. Also, qualified financial institutional investors and gender diversity within the board composition mitigate the positive effect of RIDs on agency costs. Overall, our study contributes to understanding corporate governance dynamics in Chinese listed firms by shedding light on the nuanced relationship between rookie independent directors and agency costs.

1. Introduction

In the dynamic landscape of corporate governance, the role of independent directors has been the subject of extensive research, particularly in emerging markets such as China. Independent directors are traditionally viewed as essential guardians of shareholders' interests, tasked with monitoring management and controlling shareholders to mitigate agency issues [1–4]. However, within the realm of independent directors, a specific group that has garnered attention in recent studies is the cohort of rookie independent directors (RIDs), defined as those with less than three years of boardroom experience [5,6]. This research explores the relationship between RIDs and agency costs within the context of Chinese-listed firms. Agency costs, rooted in agency theory, arise from conflicting goals between management (agents) and investors (owners) [7]. It is imperative to understand how the presence of RIDs, with their limited board expertise, impacts agency costs, as these costs can have a profound effect on a company's performance and valuation [8, 9]. This study seeks to contribute to the existing literature in three crucial aspects. First, it extends the understanding of the monitoring role of RIDs by focusing on their relationship with agency costs. While previous studies have explored the impact of RIDs on firm performance [6], however, examining their influence on management opportunism and, consequently, agency costs remains under-explored. By investigating the connection between RIDs and agency costs, this research aims to fill this gap and offer insights into the

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broader implications for corporate governance.

Second, the existing body of literature presents a multifaceted perspective on the impact of RIDs. Some studies suggest that RIDs positively contribute to firm performance, attributing their effectiveness to the monitoring function of controlling shareholders [6]. On the contrary, recent research, exemplified by Chen and Zhang (2022) [5] raises concerns about the potential inefficiency of RIDs in fulfilling their monitoring role. This divergence in findings underscores the complexity surrounding the contribution of RIDs to corporate governance, prompting a need for further exploration into their effects on agency costs, particularly in the context of the Chinese listed firms. The significance of investigating the role of RIDs in the Chinese corporate landscape lies in its unique characteristics. As the second-largest economy and the largest developing country, China presents a distinctive setting where corporate governance practices are evolving rapidly. The constrained tenure of directors and the scarcity of seasoned independent directors accentuate the prominence of RIDs in the governance structure. Notably, over 25 % of independent directors in China fall into the rookie category, and over 15 % of firms boast a composition with over 60 % RIDs from 2008 to 2014 [6].

Third, the study advances our knowledge by investigating the moderating effects of external factors such as Qualified Foreign Institutional Investors (QFIIs) and Gender Diversity (GD) on the relationship between RIDs and agency costs. The study highlights the importance of considering contextual factors in corporate governance research by uncovering how these factors influence the link between board composition and agency costs. The remainder of the article is organized as follows: Section 2 describes the literature review while the data collection procedure and methodology are described in Section 3. This is followed by Section 4 which provides a brief discussion of the data analysis and Section 5 concludes the entire study.

2. Literature review

2.1. Theoretical background

2.1.1. Agency theory perspective
Agency Theory, as conceptualized by Jensen and Meckling (1976) [7], provides a foundational framework for understanding the principal-agent relationship within organizations. In situations where conflicts of interest emerge between managers (agents) and shareholders (principals), appointing independent directors is considered a mechanism to align interests and reduce agency costs. The emergence of RIDs introduces a novel dimension to the traditional Agency Theory narrative. In the context of China, where the prevalence of RIDs is driven by tenure restrictions and a shortage of experienced independent directors, agency theory suggests a unique contribution of RIDs to governance mechanisms. Kang et al. (2016) [10] and Chen and Keefe (2020) [6] content that RIDs positively impact firm performance, attributing this effect to their monitoring function on controlling shareholders. Despite their lack of extensive board experience, RIDs may offer a fresh perspective and a heightened sense of accountability. In this context, Agency Theory extends beyond the conventional wisdom of tenure and experience, acknowledging the potential positive influence of RIDs in the monitoring landscape.

2.1.2. Resource dependence theory perspective
Resource Dependence Theory (RDT), pioneered by Pfeffer and Salancik (1978) [11] shifts the focus to how organizations depend on external resources for survival and growth. Within corporate governance, boards play a central role in managing these external dependencies. RDT posits that effective governance structures are crucial for navigating and leveraging external resources.

In the context of RIDs, their external status, with limited board experience, can be seen as an asset from a resource-dependence perspective. The diversity they bring regarding professional backgrounds and expertise may enhance the board's capability to manage external challenges and dependencies. RIDs, as external actors, can potentially expand the organization's resource networks, reducing reliance on a limited set of external entities. By integrating RIDs into the board composition, organizations may strategically diversify their resource dependencies, thereby increasing resilience and adaptability. In this context, RDT views RIDs not only as monitors of internal operations but also as strategic assets contributing to the organization's capacity to secure critical external resources.

2.2. Hypothesis Development

Corporate governance is a dynamic field that continually evolves to address the challenges of aligning managerial actions with shareholder interests. A critical aspect of this governance landscape is the role of independent directors, who act as a bridge between shareholders and management. This literature review explores the intricate relationship between RIDs and agency costs, examining the scenario through RDT and Agency Theory lenses. By synthesising insights from these theories, we aim to unravel the multifaceted impact of RIDs on corporate governance, agency costs, and resource dependencies.

2.2.1. Rookie independent directors and agency Cost
The literature has highlighted the potential benefits of having RIDs, emphasizing their dedication to building a reputation as competent directors and their commitment to efficient corporate decision-making [6]. However, the career concern model posits that rookie directors may be more prone to management capture, ultimately diminishing their effectiveness as regulatory agents [12,13]. This creates tension between RIDs' potential positive contributions and the risks associated with their lack of experience.

Furthermore, the reputation incentive model underscores the importance of reputation as a disciplinary force for directors [14], introducing a dichotomy in the motivations of independent directors. While some argue that reputation encourages directors to be

self-disciplined [15], others propose the existence of a "reputation-liquidation" effect, wherein directors pursue short-term gains when the value of their reputation is low [5]. Given their lower initial reputation value, this model raises critical questions about the effectiveness of the reputation incentive mechanism for RIDs.

In recent years, the influx of rookie independent directors into the directorial labor market has significantly influenced the dynamics of corporate boards. Despite their growing importance, there has been limited exploration into the impact of these first-time directors on corporate policies and board functionality. Recognizing the essential role of independent directors in mitigating agency conflicts involving managerial ownership and controlling shareholders, prior studies have emphasized the significance of board experience in their monitoring function [16–18].

A specific subset of the corporate governance literature has shed light on rookie independent directors, defined as those with less than three years of experience in directorial roles. Rookie Independent Directors (RIDs) have less than three years of board experience.

The role of RIDs in corporate governance has gained considerable attention in recent years, particularly in emerging markets like China. The inclusion of RIDs on boards is often driven by regulatory requirements and the need to inject fresh perspectives into corporate governance. However, their lack of experience raises concerns about their effectiveness in overseeing management and mitigating agency conflicts. Chen et al. (2022) [5] emphasize that RIDs might not possess the necessary expertise and experience to monitor management, potentially leading to increased agency costs effectively. This aligns with the traditional agency theory, which suggests that effective monitoring by independent directors is crucial for reducing agency costs. Without sufficient experience, RIDs may fail to challenge management decisions, leading to higher costs associated with managerial opportunism.

On the other hand, some studies suggest that RIDs can bring valuable new perspectives and energy to the board. Kang et al. (2016) [10] argue that RIDs may enhance firm performance by bringing innovative ideas and questioning established practices. This perspective is supported by the resource dependence theory, which views board diversity as a means to acquire essential resources and capabilities [11]. Despite these potential benefits, the balance of evidence points towards the challenges RIDs face in performing their monitoring role effectively.

The mixed findings in the literature highlight the need for a deeper understanding of the specific circumstances under which RIDs can mitigate or exacerbate agency costs. For instance, the influence of firm-specific factors such as corporate governance quality, the presence of other experienced board members, and the industry context may significantly affect the impact of RIDs on agency costs. Notably, recent research by Bai and Yu (2022) [13] and Chen et al. (2022) [5] has revealed a concerning association between rookie independent directors and increased corporate fraud in China. Their findings, derived from firm-level datasets, indicate a positive correlation between the presence of rookie independent directors and instances of corporate fraud, a phenomenon primarily attributed to management opportunism. As an emerging economy and evolving corporate governance mechanism, we expect rookie independent directors to have an impact leading o to higher agency costs. Few studies raised concerns about the potential negative consequences associated with the presence of rookie independent directors, particularly in the context of innovation [19], dividend payouts [20], corporate social responsibility [21] and stock price crash risk [12]. The unique characteristics of these directors, marked by a lack of extensive track records, prompt further exploration into the reasons behind their potential ineffectiveness in fulfilling their monitoring duties.

In line with this exploration, Li et al. (2021) [22] present an alternative perspective by proposing that companies with uncertified independent directors exhibit elevated misappropriation and information opacity levels. This results in an increased prevalence of related-party transactions and other receivables. The proposal indicates a departure from previous research, suggesting that the lack of a certified track record among independent directors may hinder their ability to perform their duties effectively. Therefore, based on the evolving discourse in the literature, we propose the following hypothesis.

H1.   There is a positive relationship between rookie independent directors and agency costs (selling and administrative expense ratio; administrative expense ratio, and total asset turnover ratio as inverse proxy)

2.2.2. Rookie independent directors, qualified foreign institutional investors and agency Costs

Foreign institutional investors have emerged as key stakeholders influencing corporate dynamics, particularly in the context of increased foreign investment. Foreign investors bring positive monitoring impacts on companies, acting as catalysts for implementing governance reforms [23,24]. Their role becomes particularly crucial in developing nations where local investors may lack the experience and regulatory familiarity prevalent in more established markets [25,26].

Foreign institutional investors from developed nations, accustomed to rigorous regulatory regimes, are recognized for their ability to implement effective governance procedures [27]. Their perceived impartiality and inclination to monitor others instead of operating exclusively in their self-interest make them valuable contributors to reducing segregated, harmful behaviors within businesses. Aggarwal et al. (2011) [28] underscore their significance in enhancing corporate governance, especially in nations lacking robust shareholder protections. Ferreira and Matos (2008) [29] draw a connection between increased foreign ownership and improved business performance, suggesting that foreign investors, with fewer economic ties to local entities, are less susceptible to management and political pressure that could adversely impact business outcomes. In this landscape, the role of QFIIs becomes crucial, with Huang and Zhu (2015) [27] emphasizing their substantial influence on the controlling state shareholders of companies in comparison to regional mutual funds.

As foreign investors continue to shape China's securities markets, their impact extends beyond direct financial involvement, significantly influencing domestic corporate governance. Their role in mitigating agency costs and enhancing overall business performance is evident through their contribution to strengthening auditing processes and fostering transparency in domestic enterprises [30]. QFIIs, in particular, play a distinctive role in influencing the controlling state shareholders of companies. The heightened

intelligence brought about by foreign investors, as emphasized by Cheung et al. (2009) [30], has led to stronger information disclosure requirements, acting as a deterrent against minority shareholder expropriation.

Building on the existing literature, we wish to explore the moderating role of QFIIs on the relationship between rookie independent directors and agency costs.

H2. QFIIs reduce the positive impact of rookie independent directors on agency costs (selling and administrative expense ratio; administrative expense ratio, and total asset turnover ratio as inverse proxy).

2.2.3. Rookie independent directors, gender diversity, and agency Costs

Gender diversity on corporate boards is increasingly recognized as a critical factor influencing organizational governance and, subsequently, agency costs. The seminal work of Fama and Jensen (1983) [31] underscores the primary responsibility of corporate governance in addressing agency conflicts arising from the misalignment of interests between insiders and external shareholders. In this context, gender diversity emerges as a mechanism to control agency conflicts, leveraging the unique attributes of female directors.

Gender diversity contributes to effective corporate governance through timely decision-making, strategic planning control, and quality financial reporting by female directors [32,33]. Adams and Ferreira (2009) [32] specifically conclude that gender diversity results in better monitoring, as women directors tend to ask more questions and are less likely to compromise shareholders' interests, thereby lowering agency conflicts. The diversity in perspectives offered by a gender-diverse board increases the monitoring interests of shareholders [34]. Carter et al. (2003) [35] empirically support the inverse relationship between female board membership and agency costs. Their findings suggest that increased gender diversity enhances managerial supervision and control, as female directors bring unique perspectives that male directors might not possess. This increased vigilance and questioning by female directors can contribute to a more robust governance structure, reducing the likelihood of agency problems [36].

We propose that board gender diversity mitigates the negative effect of rookie independent directors on agency costs. Our proposition is based on the following points. First, female directors are often associated with enhanced communication and collaboration skills. The literature suggests that women tend to be more inclusive in decision-making processes, encouraging diverse viewpoints and fostering an environment where rookie independent directors will feel comfortable expressing their opinions [32,34]. This inclusive decision-making culture can empower rookie independent directors to actively participate in board discussions, contributing their insights and expertise. Second, the literature emphasizes that a variety of cognitive approaches to problem-solving and strategic planning characterize gender-diverse boards [33]. Female directors may bring different experiences and perspectives, challenging conventional thinking and offering fresh insights. For rookie independent directors, exposure to diverse decision-making styles can be enriching and provide a broader understanding of governance issues and strategic considerations.

In the context of China, where corporate governance practices may still be evolving, the presence of female directors can act as a catalyst for positive change. By fostering a collaborative and inclusive decision-making culture [37], providing diverse perspectives [38], encouraging prudent risk assessment [39], and emphasizing ethical considerations [40], female board members can significantly enhance the decision-making capabilities of rookie independent directors. This collaborative dynamic contributes to effective governance, aligning rookie directors' actions with the organization's and its stakeholders' long-term interests. Therefore, our next hypothesis is as follows.

H3. Gender diversity on the board reduces the positive impact of rookie independent directors on agency costs (selling and administrative expense ratio; administrative expense ratio, and total asset turnover ratio as inverse proxy).

3. Methodology

3.1. Data and sample

The data about rookie independent directors, agency costs, and other control variables are extracted from the Chinese stock market and accounting research database (CSMAR). The studies cover annual data from 2009 to 2020. 2008 was taken as the base year as most of the corporate governance variables data have been available since then. Also, the new accounting standards have been introduced since 2008. However, due to the replication of data in 2009 of RIDs, for this study, 2010 was taken as the base year. The sample initially consisted of all the companies listed on the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE). From this sample, companies in the financial and public utility sectors were excluded. The decision to exclude specific sectors and companies from the data sample is due to their unique characteristics that may introduce confounding factors or distort the analysis. Specifically, financial and public utility sectors are excluded due to their distinct regulatory frameworks and operational dynamics [41]. Additionally, companies that solely issued B-shares were excluded in order to maintain homogeneity within the sample and ensure comparability across firms [42]. The final sample represents 2963 firms with 28600 firm-year observations.

3.2. Measurement of variables

The dependent variables in this study encompass three dimensions of agency costs [1,41]. The first proxies of agency cost measured by the *selling and administrative expense ratio (S&AdmExp ratio) are the sum of selling and administrative expenses scaled by revenues. They* offer a holistic measure of overall agency costs, incorporating operational and administrative facets. Second, we focus on administrative expenses, denoted by the *administrative expense ratio* representing the proportion of these costs concerning revenues. Lastly, the third measure of agency costs, denoted by the *Assets turnover ratio,* explores the efficiency of asset utilization by examining revenues

scaled by total assets (An inverse proxy of agency cost) [43].

Moving to the independent variables, the rookie independent directors ratio (RIDs%) captures the ratio of independent directors to the total number of independent directors on the board [5,13]. This variable quantifies rookie independent directors' prevalence in the composition of board independence. Accompanying this, the rookie independent director's natural logarithm (Ln-RIDs) represents the natural logarithm of one plus the count of rookie independent directors [5].

Considering moderating variables, QFIIs are operationalized as a dummy variable, taking the value of 1 if a firm has at least one QFIIs and 0 otherwise [44]. This variable is crucial for assessing the potential moderating impact of foreign institutional investors on the relationship between rookie independent directors and agency costs. Similarly, GD represents the ratio of female directors to the total number of directors on the board, offering a metric for evaluating the influence of gender diversity on agency costs [41].

Controlled variables included in the model encompass various aspects of corporate governance and firm characteristics. These include Board Size (BS), Board Independence (BI), CEO Duality (CEOD), CEO Tenure (CEOT), Leverage (Lev), State Ownership (SO), Growth of Firm (Growth), Tobin's Q (TQ), and Firm Age (FA). An increased Board Size is argued to enhance corporate governance by providing diverse perspectives and expertise [45]. Higher Board Independence is associated with better monitoring capabilities and reduced agency costs. Research suggests that independent directors can act as effective overseers, ensuring alignment with shareholders' interests and mitigating conflicts of interest [46]. CEO Duality, where the CEO also serves as Chairman, may lead to a lack of check and balance, potentially increasing agency costs [47]. Longer CEO Tenure might signify experience and stability, reducing agency costs [48].

Leverage, or the use of debt, is argued to influence agency costs. Debt can discipline management by aligning interests with creditors [49]. State Ownership may impact agency costs differently. While it could enhance monitoring due to governmental oversight, it might also introduce political motivations, potentially increasing agency costs [50]. The Growth of the Firm is often associated with increased agency costs. Rapid growth may necessitate additional monitoring and control mechanisms, potentially leading to higher costs [51]. A higher Q ratio may indicate efficient investment, reducing agency costs, while a lower ratio might suggest inefficiency and potential agency issues [8]. Firm Age can influence agency costs, with younger firms potentially facing higher costs due to uncertainties and a lack of established governance structures. Older firms may benefit from experience and stable governance, potentially reducing agency costs [52].

Table 1 outlines all variable specifications, providing a comprehensive overview of each variable's definitions and roles within the empirical model.

3.3. Empirical model

In the context of this study, the Ordinary Least Squares (OLS) method is widely employed in the literature to examine the influence of rookie independent directors on agency costs [12]. The empirical model, representing the baseline analysis, includes the following independent variables as shown in equation [1]:

Table 1
Variables measurement.

Variables	Symbol	Definition
Dependent Variable		
	S&AdmExp ratio	The sum of selling expenses and administrative expenses, scaled by revenues.
	AdmExp ratio	Total Administrative expenses scaled by revenues
	TATO ratio	Revenues scaled by total assets
Independent Variables		
Rookie Independent directors ratio	RIDs%	The ratio of rookie independent directors out of total independent directors.
Rookie Independent directors log	Ln-RIDs	natural logarithm of one plus the amount of rookie independent directors.
Rookie Independent directors higher presence	RIDs-CM	If the percentage of rookie independent directors is more than 50 %, the variable takes the value of one.
Moderating Variables		
Foreign Qualified Institutional Investors	QFIIs	a dummy variable that takes the value of 1 if a firm has at least one QFIIs, zero otherwise.
Gender Diversity	GD	The ratio of female directors on board to total directors on board of a firm.
Controlled Variables		
Board Size	BS	Total number of board of directors of a firm in a year.
Board Independence	BI	The ratio of independent directors to total directors of a firm.
CEO Duality	CEOD	A dummy variable takes the value of 1 if the CEO of the firm is also Chairman, and zero otherwise.
CEO Tenure	CEOT	Number of years the CEO is serving in a firm.
Leverage	Lev	Total debt scaled by total assets
State Ownership	SO	A dummy variable that takes the value of 1, if the firm is state-owned, zero otherwise
Growth of Firm	Growth	Change in Sales of the firm
Tobin's Q	TQ	Market Value over Total Assets
Firm Age	FA	The natural logarithm of firm age starts from the time of listing.

Table 1, explains the definitions of variables used in our analysis. All continuous variables are winsorized at the 1st and 99th percentiles.

$$\text{Agency Costs}_{it} = \beta_0 + \beta_1 \text{RID}_{it} + \beta_2 \text{BS}_{it} + \beta_3 \text{BI}_{it} + \beta_4 \text{CEOD}_{it} + \beta_5 \text{CEOT}_{it} + \beta_6 \text{Lev}_{it} + \beta_7 \text{SO}_{it} + \beta_8 \text{Growth}_{it} + \beta_9 \text{TQ}_{it} + \beta_{10} \text{FA}_{it} + \epsilon_o$$

[1]

In the above equation above by Ain et al. (2020), we anticipate a positive relationship between rookie independent directors and agency costs ($\beta_1 > 0$), indicating that an increase in the proportion of rookie directors may lead to higher agency costs. Following Ain et al.'s (2020) study, CEODi and TQi are also expected to have a positive effect on agency costs, while BSit, BIit, CEOTit, Levit, SOit, Growthit, and FAit reduce agency costs.

Including interaction terms in the regression equations aims to capture the potential moderating effects of certain variables on the relationship between RIDs and agency costs. In equation [2] below (Ain et al., 2020), the interaction term $\text{RID}_{it} \times \text{QFII}_{it}$ is introduced to examine whether the influence of RIDs on agency costs is contingent upon the presence of QFIIs. Similarly, in equation [3] by Ain et al. (2020), the interaction term $\text{RID}_{it} \times \text{GD}_{it}$ explores how GD moderates the relationship between RIDs and agency costs.

$$\text{Agency Costs}_{it} = \beta_0 + \beta_1 \text{RIDs}_{it} + \beta_2 \text{QFII}_{it} + \beta_3 (\text{RIDs}_{it} \times \text{QFII}_{it}) + \beta_4 \text{BI}_{it} + \beta_5 \text{CEOD}_{it} + \beta_6 \text{CEOT}_{it} + \beta_7 \text{Lev}_{it} + \beta_8 \text{SO}_{it} + \beta_9 \text{Growth}_{it}$$
$$+ \beta_{10} \text{TQ}_{it} + \beta_{11} \text{FA}_{it} + \beta_{12} \text{BS}_{it} + \epsilon_o$$

[2]

$$\text{Agency Costs}_{it} = \beta_0 + \beta_1 \text{RIDs}_{it} + \beta_2 \text{QFII}_{it} + \beta_3 (\text{RID}_{it} \times \text{GD}_{it}) + + \beta_4 \text{BI}_{it} + \beta_5 \text{CEOD}_{it} + \beta_6 \text{CEOT}_{it} + \beta_7 \text{Lev}_{it} + \beta_8 \text{SO}_{it} + \beta_9 \text{Growth}_{it}$$
$$+ \beta_{10} \text{TQ}_{it} + \beta_{11} \text{FA}_{it} + \beta_{12} \text{BS}_{it} + \epsilon_o$$

[3]

In equations (2) and (3), the inclusion of moderators suggests a potential reduction of the influence of rookie independent directors on agency costs. We anticipate that the presence of QFIIs, as documented in the literature, may mitigate managerial opportunism, thereby potentially diminishing agency costs [23,53]. Likewise, existing research indicates that gender diversity on the board correlates with reduced agency costs. These moderation effects offer valuable insights into how external factors can shape the relationship between rookie directors and agency costs within corporate governance structures [40,41].

3.3.1. Alternative measurement of agency Costs

The study incorporates alternative measures of dependent and independent variables for a robust check. Similar to Rashid's(2015) study [1], agency cost is measured as the 'Tobin's Q and free cash flow interaction' (QFCF), which assesses the interplay between a company's growth prospects and available free cash flows. Growth opportunities are measured using dummy variables indicating whether a company's Tobin's q is below 1 (suggesting poor management) or otherwise. Free cash flows are calculated as operating income before depreciation minus taxes, interest expense, and dividends paid, standardized by total assets. It is anticipated that firms with low (high) growth opportunities, given their free cash flows, would exhibit higher (lower) agency costs [43]. Therefore, a higher value of this agency cost metric denotes increased agency costs.

3.3.2. Alternative measurement of rookie independent directors

The robust analysis also uses an alternative measure of rookie independent directors. Rookie independent director's critical mass (RIDs-CM) is introduced as a variable indicating whether the percentage of rookie independent directors exceeds 50 %, providing insights into a higher presence of such directors on the board [6]. A rookie independent director may not have much say in the company; however, when they achieve critical mass, they can raise their voice on disputable issues. We expect agency mitigation to increase when rookie independent directors achieve critical mass.

3.3.3. Alternative estimation techniques

To mitigate endogeneity concerns regarding the link between RIDs and agency costs, we employ instrumental variable (IV) estimations. The necessity arises from the likelihood of endogeneity between RIDs and agency costs, stemming from unobservable factors influencing both variables simultaneously [54]. The IV method addresses endogeneity by isolating exogenous variation in the explanatory variable that is not correlated with the error term in the regression model. The key to the IV approach is finding an appropriate instrument that meets two conditions: relevance and exogeneity. In this study, the authors used the ratio of first-year independent directors within the same region as an instrument for RIDs. This choice is grounded in the methodology of Chen and Keefe (2020) [6], who demonstrated that regional preferences for independent directors could serve as valid instruments. The relevance condition is met because the regional ratio of first-year independent directors is likely correlated with the proportion of RIDs in a firm. Regional trends and practices influence board compositions across firms in the same area. The exogeneity condition is satisfied as this regional ratio is unlikely to be directly related to the specific agency costs of a firm, ensuring that the instrument is uncorrelated with the error term. By using this instrument, the IV method helps remove bias introduced by unobserved confounders. Simultaneously, this will affect both RIDs and agency costs, allowing for a more accurate estimation of the causal impact of RIDs on agency costs.

The GMM method is particularly effective in addressing endogeneity in panel data, where unobserved individual effects and dynamic relationships between variables are common. GMM reduces endogeneity through the use of internal instruments and moment conditions. Internal instruments involve using lagged values of the explanatory variables, which are assumed to be correlated with the endogenous variables but uncorrelated with the current error term. For example, past values of rookie independent directors can serve as instruments for current values, as past board compositions influence current ones but are less likely to be correlated with current

agency costs. Moment conditions are expectations that certain combinations of variables and errors should equal zero, ensuring the validity of the instruments used. By employing lagged variables as instruments, GMM controls for unobserved heterogeneity and dynamic endogeneity, making it a robust tool for producing reliable estimates. This method is particularly advantageous as it can handle various forms of endogeneity, providing a powerful means of obtaining consistent parameter estimates.

The fixed panel methodology, also known as fixed effects regression, is also employed in this study to control for time-invariant unobserved heterogeneity at the firm level. By including firm-specific fixed effects, this methodology allows for the estimation of the relationship between variables while accounting for individual firm characteristics that remain constant over time. This approach is particularly useful in addressing endogeneity concerns and mitigating bias that may arise from omitted variables or unobserved heterogeneity [55]. Additionally, fixed panel models are robust against certain forms of omitted variable bias and provide efficient parameter estimates when there is within-firm variation over time [56]. Lastly, this study also incorporates the Generalized Method of Moments (GMM). Corporate governance research often involves panel data with observations across multiple periods and firms. GMM is well-suited for panel data analysis, allowing researchers to control for unobserved heterogeneity and time-invariant factors [57].

4. Results

4.1. Descriptive statistics

Table 2 provides descriptive statistics for the key variables in our study, shedding light on their central tendencies and variations within the sample of 29,600 observations. All variables underwent winsorization at the 1st percentile at both ends to mitigate the influence of outliers.

Starting with the dependent variables, S&AdmExp ratio, representing the sum of selling and administrative expenses scaled by revenues, has a mean of 0.169, indicating that, on average, these costs constitute 16.9 % of revenues. The administrative expense ratio, measuring total administrative expenses scaled by revenues, has a mean of 0.11, signifying that administrative expenses alone represent 11 % of revenues. Assets turnover ratio, reflecting revenues scaled by total assets, has a mean of 0.63, showcasing the revenue generation efficiency concerning the asset base.

Moving to the independent variables, RIDs%, indicating the ratio of independent rookie directors to total independent directors, has a mean of 0.32, suggesting that, on average, almost 32 % of the board consists of independent rookie directors. LN-RIDs, the natural logarithm of one plus the count of rookie independent directors, has a mean of 0.67. Considering the moderating variables, QFIIs have a mean of 0.165, indicating that, on average, about 16 % of firms in the sample have at least one QFIIs. GD, representing the ratio of female directors to the total number of directors, has a mean of 0.145, suggesting that, on average, approximately 14.8 % of board members are female.

Lastly, the control variables provide additional contextual information. Board Size (BS) has a mean of 8.77, implying that firms, on average, have around nine directors. Board Independence (BI) with a mean of 0.36 indicates that, on average, 36 % of directors are independent. CEO Duality (CEOD) has a mean of 0.25, revealing that CEO and Chairman roles are held by the same individual in about 25 % of cases. CEO Tenure (CEOT) has a mean of 2.92, indicating an average CEO tenure of almost three years. Leverage (Lev) has a

Table 2
Descriptive statistics (n = 26900).

VARIABLES	Mean	Standard Deviation	Minimum	Maximum
Dependent Variables				
S&AdmExp ratio	0.169	0.16	0.036	0.969
AdmExp ratio	0.11	0.10	0.006	0.704
TATO ratio	0.63	0.44	0.031	2.64
Independent Variables				
RIDs%	0.32	0.40	0	0.82
LN-RIDs	0.67	0.48	0	1.51
Moderating Variables				
QFIIs	0.165	0.062	0	27.29
GD	0.148	0.135	0	0.556
Control Variables				
Board Size	8.76	1.65	5	18
Ln (Board size)	2.16	0.5	1.61	2.89
Board Independence	0.38	0.05	0	0.82
Ln (Board Independence)	1.021	2.99	0	0.198
CEOD	0.25	0.41	0	1
CEOT	2.92	2.73	0	19.01
Lev	0.44	0.21	0.092	0.96
SO	0.46	0.51	0	1
Growth	0.18	0.42	−0.46	3.05
TQ	2.06	1.92	0.89	12.14
Firm Age	7.47	2.41	2	38
Ln(Firm age)	2.01	0.88	0.72	3.64

This table presents the descriptive statistics of the main variables used in this study. All continuous variables are winsorized at the 1st and 99th percentile. All variables are defined in Table 1.

mean of 0.44, signifying that, on average, 44 % of a firm's assets are financed by debt. State Ownership (SO) with a mean of 0.46 indicates that, on average, 46 % of firms in the sample are state-owned. Growth (Growth), measuring the change in sales, has a mean of 0.18, representing an average growth rate of 18 %. Tobin's Q (TQ) has a mean of 2.06, suggesting that, on average, the market values a firm's assets at more than twice their book value. Lastly, Firm Age (FA) with a mean of 2.01, denotes that firms, on average, have been in operation for approximately two years since listing.

4.2. Bivariate analysis

Table 3 displays the correlation matrix, offering insights into the relationships among agency costs (S&AdmExp ratio, AdmExp ratio, and TATO ratio), rookie independent directors, and other relevant variables. The data illustrate that the ratio of independent rookie directors to total directors (RIDs%) shows a weak positive correlation (0.22) with S&AdmExp ratio, a slight positive correlation (0.16) with AdmExp ratio, and a moderate negative correlation (−0.36) with TATO ratio. This implies that a higher ratio of independent rookie directors may be associated with increased agency costs. Values of VIF (Variance Inflation Factor) are provided in the last column, which helps assess multicollinearity among independent variables. Generally, VIF values below 5 indicate acceptable levels of multicollinearity [58]. In this table, the highest VIF is 1.50, which is within the acceptable range, indicating that multicollinearity is not a significant concern in the study.

4.3. Multivariate regression analysis

4.3.1. Rookie independent directors and agency costs

Table 4 provides regression results exploring the relationship between rookie independent directors and agency costs across three dimensions: S&AdmExp ratio, AdmExp ratio (Total Administrative expenses scaled by revenues), and TATO ratio (Revenues scaled by total assets). Each column in the table corresponds to a different regression model with various independent variables.

In the context of the S&AdmExp ratio, the presence of rookie independent directors (RIDs%) demonstrates a positive and statistically significant impact (coefficient = 0.24, p < 0.01). This implies that a higher ratio of independent rookie directors is associated with an increase in selling and administrative expenses scaled by revenues. Similarly, the natural logarithm of rookie independent directors (LN-RIDs) also exhibits positive and significant coefficients, reinforcing the notion that the inclusion of rookie independent directors enhances the agency cost. The economic significance of the coefficients shows that for every 1 % increase in the percentage of rookie independent directors (RID%) on the board, the selling and administrative expense ratio increases by 0.240 %. Similarly, the coefficient for the natural logarithm of the number of rookie independent directors (LN-RIDs) in the S&AdmExp ratio model is 0.160, with a t-value of 8.938, indicating strong statistical significance. This means that a 1 % increase in the number of rookie independent directors leads to a 0.160 % increase in the selling and administrative expense ratio. Economically, it highlights the potential cost implications of expanding the number of rookie independent directors on the board.

For the AdmExp ratio, the results follow a similar pattern. RIDs% and LN-RIDs show positive and significant coefficients, indicating a positive association between the presence of rookie independent directors and total administrative expenses scaled by revenues. In the case of the TATO ratio, which involves revenues scaled by total assets, RIDs%, and LN-RIDs exhibit negative and significant coefficients. This suggests that a higher ratio of independent rookie directors may be associated with a decrease in revenues scaled by total assets. Alternatively, this suggests that a 1 % increase in the proportion of rookie independent directors leads to a 0.027 % increase in administrative expenses. Although the magnitude of the increase is smaller compared to the selling and administrative expense ratio, it still signifies that having more rookie independent directors is associated with slightly higher administrative costs. Similarly, the coefficient for LN-RIDs is 0.103 (t-value of 11.62), showing that a 1 % increase in the number of rookie independent directors is associated with a 0.103 % increase in administrative expenses.

However, the TATO ratio is taken as an inverse proxy of agency cost and a negative sign shows that rookie independent directors presence curbs the efficient asset utilization. We can infer from the coefficients that a 1 % increase in the proportion of rookie independent directors results in a 0.040 % decrease in the total asset turnover ratio. The coefficient for LN-RIDs in the TATO ratio model is −0.035, with a t-value of −3.750. This signifies that a 1 % increase in the number of rookie independent directors results in a 0.035 % decrease in the total asset turnover ratio. These findings highlight the negative impact of changes in RIDs proxies on asset turnover ratio, signifying potential inefficiencies in asset utilization associated with the presence of rookie independent directors.

Control variables such as Board Size (BS), Board Independence (BI), CEO Duality (CEOD), CEO Tenure (CEOT), Leverage (Lev), State Ownership (SO), Growth of Firm (Growth), Tobin's Q (TQ), and Firm Age (FA) also demonstrate significant effects in various models, contributing to the overall explanatory power of the regression. In summary, the results suggest that the inclusion of rookie independent directors tends to enhance agency costs, particularly in terms of selling and administrative expenses.

The findings indicate that the presence of rookie independent directors positively impacts agency costs, particularly in terms of selling and administrative expenses. This aligns with prior studies highlighting the potential inefficiency of rookie directors in fulfilling their monitoring role [5]. The positive association between rookie directors and agency costs underscores the importance of considering director expertise and experience in corporate governance structures [59]. Despite controlling for various firm-level factors, the persistent positive relationship underscores the need for careful selection and monitoring of board members to mitigate agency costs effectively. Agency theory, as outlined by Jensen and Meckling (1976) [7], suggests that independent directors play a crucial role in mitigating agency conflicts by overseeing management actions. However, the inexperience of RIDs can result in less effective oversight, leading to higher administrative and operational expenses Hence hypothesis 1is accepted, which implies that rookie independent directors enhance agency costs.

Table 3
Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	VIF
1. S&AdmExp ratio	1.00																
2. AdmExp ratio	0.86	1.00															
3. TATO ratio	0.67	0.81	1.00														
4. RIDs%	0.22	0.16	−0.36	1.00													1.03
5. LN-RIDs	0.02	0.04	−0.03	−0.37	1.00												1.11
6. QFIIs	−0.01	0.00	0.01	−0.10	0.18	1.00											1.07
7. GD	−0.06	−0.07	0.05	−0.04	−0.01	−0.02	1.00										1.01
8. BS	0.09	0.10	−0.10	0.03	0.02	0.07	−0.12	1.00									1.12
9. BI	0.11	0.14	−0.11	0.09	−0.03	0.03	−0.11	0.77	1.00								1.15
10. CEOD	−0.03	−0.04	0.04	−0.04	−0.04	−0.04	0.11	−0.18	−0.13	1.00							1.02
11. CEOT	−0.01	0.01	−0.01	0.00	−0.02	−0.04	0.00	0.02	0.06	−0.01	1.00						1.06
12. Lev	0.07	0.08	−0.09	0.01	0.05	0.04	−0.10	0.17	0.17	−0.16	0.06	1.00					1.28
13. SO	0.08	0.11	−0.08	0.25	−0.16	0.12	−0.19	0.29	0.27	−0.29	0.00	0.32	1.00				1.50
14. Growth	0.80	0.95	−0.86	0.15	−0.04	−0.01	−0.07	0.09	0.12	−0.04	0.01	0.08	0.10	1.00			1.37
15. TQ	0.01	0.00	0.01	0.01	0.01	0.04	0.01	−0.01	−0.01	0.03	−0.04	−0.09	−0.04	0.00	1.00		1.04
16. FA	0.05	0.07	−0.05	0.05	−0.02	0.02	−0.07	0.05	0.08	−0.07	0.00	0.05	0.13	0.06	−0.01	1.00	1.26

Table 3 shows the correlation matrix of interdependent variables used in the analysis. The last Column shows the VIF factors among the variables. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

Table 4
Rookie Independent Directors and agency cost.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RID%	0.240***		0.027***		−0.040***	
	(3.02)		(5.465)		(-2.475)	
LN-RIDs		0.160***		0.103***		−0.035***
		(8.938)		(11.62)		(-3.750)
BS	−0.048***	−0.023***	−0.035***	−0.116***	−0.291***	−0.139***
	(-3.435)	(-3.319)	(-3.622)	(-3.250)	(-3.983)	(-3.768)
BI	−0.300**	−0.074	0.326***	0.351***	0.457	0.379*
	(-2.496)	(-0.960)	(5.361)	(9.175)	(1.278)	(1.855)
CEOD	0.090***	0.107***	0.068***	0.036***	−0.002	−0.008
	(2.726)	(4.692)	(4.102)	(3.160)	(-0.0259)	(-0.145)
CEOT	−0.272***	−0.036	−0.001	0.040	−0.373*	−0.136
	(-3.545)	(-0.660)	(-0.0162)	(1.507)	(-1.947)	(-1.032)
Lev	−0.223***	−0.221***	−0.129***	−0.162***	0.094	0.078**
	(-8.453)	(-12.46)	(-9.833)	(-18.47)	(1.637)	(2.036)
SO	−0.183***	−0.213***	0.116***	0.071***	−0.178*	0.088
	(-5.521)	(-9.778)	(6.939)	(6.542)	(-1.894)	(1.524)
Growth	0.920***	0.871***	0.686***	0.720***	0.623***	0.657***
	(79.94)	(112.1)	(122.0)	(189.1)	(21.60)	(33.35)
TQ	0.125***	0.098***	0.023***	0.012**	0.092**	0.110***
	(9.103)	(10.45)	(3.308)	(2.458)	(2.320)	(4.059)
FA	−0.064	−0.079	0.227***	0.188***	−0.219	−0.218
	(-0.816)	(-1.442)	(5.767)	(6.899)	(-1.051)	(-1.602)
Constant	−0.430	0.694**	2.830***	2.620***	7.210***	5.710***
	(-1.013)	(2.359)	(13.30)	(18.01)	(6.284)	(7.604)
Year FE's	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R-squared	0.0499	0.0483	0.0713	0.0744	0.0621	0.064

Table 4 shows the regression results of the impact of RIDs on agency costs. Columns (1) and (2) are for the effect of RIDs proxies on S&AdmExp ratio. Columns (3) and (4) represent the effect of RIDs on AdmExp ratio, while Columns (5) and (6), show the effect of RIDs on TATO ratio. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

4.3.2. Moderating effect of qualified institutional investors on the relationship between RIDs and agency Costs

Table 5 presents the results of the moderating effect of Qualified Foreign Institutional Investors (QFIIs) on the relationship between rookie independent directors and agency costs, considering three dimensions of agency costs. For the S&AdmExp ratio, the interaction term RIDs%*QFIIs has a coefficient of −0.103, which is statistically significant at the 1 % level (t-value of −7.22). This indicates that the relationship between the percentage of rookie independent directors (RID%) and the selling and administrative expense ratio is moderated by the presence of qualified foreign institutional investors (QFIIs). Specifically, for each 1 % increase in QFIIs, the positive effect of RID% on the selling and administrative expense ratio decreases by 0.103 %. In the administrative expense ratio context, the interaction term RIDs%*QFIIs has a coefficient of −0.120, which is also statistically significant at the 1 % level (t-value of −3.12). This means that for each 1 % increase in QFIIs, the positive effect of RID% on administrative expenses decreases by 0.120 %. The interaction term RIDs%*QFIIs in the TATO ratio model has a positive coefficient of 0.225, statistically significant at the 1 % level (t-value of 5.20). This indicates that for each 1 % increase in QFIIs, the negative effect of RID% on the total asset turnover ratio is moderated, turning it into a positive effect. Economically, this implies that QFIIs significantly reduce administrative inefficiencies that might arise from having more rookie independent directors. Their involvement likely brings better oversight and more stringent management practices, thus lowering the additional administrative costs associated with rookie directors.

For the second proxies of LN-RIDs, the interaction term LN-RIDs*QFIIs has a coefficient of −0.093, significant at the 1 % level (t-value of −4.60). This means that for each 1 % increase in QFIIs, the positive impact of the number of rookie independent directors (LN-RIDs) on the selling and administrative expense ratio decreases by 0.093 %. For the administrative expense ratio, the interaction term LN-RIDs*QFIIs indicates that with a 1 % increase in QFIIs, the positive effect of LN-RIDs on administrative expenses decreases by 0.0374 %. The interaction term LN-RIDs*QFIIs in the TATO ratio model has a negative coefficient of −0.0441, significant at the 1 % level (t-value of −4.42). This signifies that for each 1 % increase in QFIIs, the negative impact of LN-RIDs on the total asset turnover ratio becomes even more pronounced, decreasing by an additional 0.0441 %.

The moderation effect of QFIIs on the relationship between RIDs and agency costs may stem from several factors. First, QFIIs often bring in international best practices and corporate governance standards, exerting pressure on firms to improve governance mechanisms and reduce agency costs [27]. Second, their presence may enhance transparency and disclosure practices, leading to better monitoring of managerial actions and reducing the need for extensive administrative expenses (Li, Wang, Wu et al., 2021). Finally, QFIIs' involvement may signal to the market a commitment to good governance, thereby positively influencing investor perceptions and reducing agency costs [60]. RDT suggests that firms rely on external resources, like QFIIs, to access capital markets and signal

Table 5
Moderating effect of Qualified Foreign Institutional Investors.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RIDs%	0.152***		0.121***		−0.0120***	
	(10.25)		(8.95)		(-3.45)	
LN-RIDs		0.0725***		0.0350***		−0.0240***
		(4.66)		(6.35)		(-3.085)
QFIIs	−0.0860***	−0.047***	0.011***	−0.155***	−0.216	0.248***
	(-5.30)	(-5.60)	(5.30)	(-4.10)	(-1.14)	(3.83)
RIDs%*QFIIs	−0.103***		−0.120***		0.225***	
	(-7.22)		(-3.12)		(5.20)	
LN-RIDs*QFIIs		−0.093***		−0.0374***		−0.0441***
		(-4.60)		(-4.63)		(-4.42)
BS	−0.0071	−0.215*	0.0342***	0.0555***	−0.0167	−0.0181
	(-0.09)	(-1.65)	(2.75)	(3.15)	(-0.28)	(-0.20)
BI	0.109***	0.0710**	0.0381	0.00314	−0.251*	−0.506***
	(4.50)	(2.05)	(1.30)	(0.06)	(-1.85)	(-2.60)
CEOD	−0.0156	−0.287***	−0.168***	−0.125***	0.0633	0.0544
	(-0.27)	(-3.55)	(-17.5)	(-8.80)	(1.55)	(0.90)
CEOT	−0.207***	−0.189***	0.0543***	0.0949***	0.0963	−0.135
	(-10.7)	(-6.70)	(4.55)	(5.30)	(1.60)	(-1.35)
Lev	−0.223***	−0.226***	0.718***	0.685***	0.668***	0.645***
	(-9.40)	(-6.35)	(174.5)	(112.0)	(32.0)	(21.1)
SO	0.853***	0.893***	0.00500	0.0200***	0.0979***	0.0785*
	(102.0)	(71.5)	(0.91)	(2.70)	(3.35)	(1.82)
Growth	0.1000***	0.124***	0.182***	0.228***	−0.255*	−0.333
	(9.70)	(8.40)	(6.20)	(5.50)	(-1.80)	(-1.54)
TQ	−0.142**	−0.113	2.533***	2.847***	5.836***	7.300***
	(-2.45)	(-1.35)	(16.2)	(12.3)	(7.40)	(6.10)
FA	1.296***	0.359	0.182***	0.228***	−0.255*	−0.333
	(4.10)	(0.77)	(6.20)	(5.50)	(-1.80)	(-1.54)
Constant	1.296***	0.359	2.533***	2.847***	5.836***	7.300***
	(4.10)	(0.77)	(16.2)	(12.3)	(7.40)	(6.10)
Year FE's	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R^2	0.0475	0.0482	0.051	0.049	0.0491	0.0487

Table 5 shows the regression results of the moderating impact of Qualified Financial Institutional Investors on the relationship between RIDs and agency costs. The moderating effect of QFIIs in Columns (1) and (2) is for the effect of RIDs proxies on S&AdmExp ratio. The moderating effect of QFIIs in Columns (3) and (4) represent the effect of RIDs on AdmExp ratio, while Columns (5) and (6), show the effect of RIDs on TATO ratio. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

governance commitment, aligning with market expectations and mitigating agency costs [11].

4.3.3. Moderating effect of gender diversity on the relationship between RIDs and agency Costs

Table 6 explores the relationship between RIDs and agency costs by introducing the moderating effect of GD. The main effects reveal that an increase in the RIDs% positively influences agency costs. However, the introduction of the interaction term changes the dynamics. The interaction term, LN-RIDs*GD, presents a negative coefficient, signifying a reversal in the direction of the relationship. This change suggests that when considering the moderating effect of Gender Diversity, the positive impact of rookie independent directors on agency costs diminishes or even takes a negative turn. The coefficients of LN-RIDs*GD further emphasize this reversal, underscoring a shift in the relationship between the tenure of independent directors and agency costs. Notably, the gender diversity variable, GD, has a negative and significant coefficient in the main effects, indicating that higher gender diversity on boards is associated with reduced agency costs.

Research suggests that gender-diverse boards are more inclined towards collaborative decision-making and risk management, potentially mitigating agency problems [41,61]. Additionally, diverse boards are associated with enhanced monitoring mechanisms and increased accountability [62,63], which may counterbalance the potential adverse effects of rookie directors on agency costs. Agency theory expoubds that diverse boards can mitigate agency problems by providing different perspectives and enhancing oversight. The negative coefficient of the interaction term indicates that gender diversity weakens the positive impact of RIDs on agency costs. Agency theory suggests that diverse boards can provide different perspectives and enhance oversight, reducing the risks posed by inexperienced directors [33]. The study's findings that gender diversity moderates the positive impact of RIDs on agency costs align with the literature, which indicates that female directors contribute to more rigorous oversight and improved governance practices [35] This signifies that when boards are more gender-diverse, rookie independent directors' effectiveness in reducing agency costs diminishes. Hence, hypothesis H3 is accepted.

Table 6
The moderating effect of Gender Diversity.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RIDs%	0.127***		0.0685***		0.0490	
	(10.30)		(9.70)		(1.30)	
GD	−0.115***	−0.093***	−0.127***	−0.098***	0.116***	0.0965***
	(-5.10)	(-4.30)	(-4.70)	(-3.10)	(5.05)	(3.50)
RIDs%*GD	−0.185***		−0.0350***		0.176***	
	(-5.40)		(-2.92)		(5.35)	
LN-RIDs		0.0140***		−0.0240***		−0.0850***
		(3.10)		(-4.00)		(-2.70)
LN-RIDs*GD		0.188***		0.199***		−0.190***
		(3.30)		(5.30)		(-4.50)
BS	−0.0250	0.0560	−0.134***	−0.0330	−0.117	−0.225
	(-0.35)	(0.51)	(-3.73)	(-0.60)	(-0.65)	(-0.76)
BI	−0.0550	−0.300**	0.354***	0.302***	0.350*	0.432
	(-0.71)	(-2.45)	(9.20)	(4.95)	(1.70)	(1.21)
CEOD	0.104***	0.0830**	0.0430***	0.0700***	−0.0050	−0.0310
	(4.53)	(2.50)	(3.70)	(4.14)	(-0.09)	(-0.37)
CEOT	−0.0280	−0.275***	0.0440	−0.0110	−0.163	−0.450**
	(-0.52)	(-3.60)	(1.60)	(-0.25)	(-1.25)	(-2.35)
Lev	−0.230***	−0.227***	−0.167***	−0.135***	0.0750*	0.0910
	(-13.0)	(-8.60)	(-19.0)	(-10.2)	(1.95)	(1.60)
SO	−0.181***	−0.182***	0.0740***	0.114***	0.0680	−0.165*
	(-8.10)	(-5.50)	(6.60)	(6.80)	(1.15)	(-1.75)
Growth	0.870***	0.920***	0.720***	0.692***	0.665***	0.630***
	(112.0)	(79.70)	(189.0)	(122.5)	(33.5)	(21.6)
TQ	0.0980***	0.124***	0.0100**	0.0225***	0.107***	0.0890**
	(10.30)	(8.90)	(2.10)	(3.25)	(3.95)	(2.20)
FA	−0.0740	−0.0610	0.179***	0.215***	−0.208	−0.235
	(-1.35)	(-0.77)	(6.50)	(5.50)	(-1.55)	(-1.15)
Year FE's	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.540*	−0.445	2.545***	2.820***	5.515***	7.145***
	(1.85)	(-1.04)	(17.50)	(13.25)	(7.35)	(6.20)
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R²	0.0482	0.0498	0.0746	0.0715	0.0366	0.0323

Table 6 shows the regression results of the moderating impact of Gender Diversity on the relationship between rookie IDs and agency costs. The moderating effect of GD in Columns (1) and (2) is for the effect of RIDs proxies on S&AdmExp ratio. The moderating effect of GD in Columns (3) and (4) represents the effect of RIDs on AdmExp ratio, while Columns (5) and (6) shows the effect of RIDs on TATO ratio. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

4.4. Robust analysis

4.4.1. Alternative measure of rookie independent directors

Table 7 presents alternative measures of RIDs to test hypotheses 1, 2, and 3, exploring their impact on agency costs and the moderating effects of QFIIs and GD. This analysis provides valuable insights into the critical mass effect of RIDs on agency costs and how external factors influence this relationship.

The main effects of the RIDs alternative measure, RIDs-CM, reveal significant coefficients across all three dimensions of agency costs (S&AdmExp ratio, AdmExp ratio, and TATO ratio). The positive coefficients for RIDs-CM in the S&AdmExp ratio, AdmExp ratio, and the negative coefficient in the TATO ratio suggest that a higher presence of rookie independent directors, as measured by RIDs-CM, is associated with increased agency costs. Alternatively, we can interpret it as the coefficient of RIDs-CM, which indicates that a 1 % change in RIDs leads to a 0.109 % increase in the selling and administrative expense ratio. Similarly, a 1 % change in RIDs-CM results in a 0.0965 % increase in the administrative expense ratio. Conversely, a 1 % change in RIDs-CM corresponds to a −0.127 % decrease in the asset turnover ratio. This negative coefficient suggests that increased RIDs is associated with decreased asset turnover, indicating inefficiencies in asset utilization and management.

Introducing QFIIs as a moderator, the interaction term RIDs-CM* QFIIs demonstrates negative coefficients, indicating a moderating effect on the relationship between RIDs-CM and agency costs. Similarly, the introduction of GD as a moderator reveals interesting dynamics. The coefficients for RIDs-CM*GD in the S&AdmExp ratio and AdmExp ratio are negative. In contrast, the TATO ratio is positive, indicating that gender diversity moderates the relationship between RIDs-CM and these dimensions of agency costs. The economic significance of the variables suggests that the interaction term RIDs-CM*QFIIs exhibits coefficients of −0.175, −0.183, and 0.172 for the selling and administrative expense ratio, administrative expense ratio, and asset turnover ratio, respectively. This means that rookie independent directors, in the presence of qualified institutional investors, mitigate the agency costs. Similarly, a 1 % change in the interaction term RIDs-CM*GD results in respective changes of −0.161 % in the selling and administrative expense ratio, −0.181

Table 7

Alternative measures of rookie independent directors to test hypothesis 1 and 2.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	S&AdmExp ratio	AdmExp ratio	TATO ratio	S&AdmExp ratio	AdmExp ratio	TATO ratio	S&AdmExp ratio	AdmExp ratio	TATO ratio
RIDs-CM	0.109***	0.0965***	−0.127***	0.136***	0.0962***	−0.117***	0.106***	0.094	−0.128
	(3.334)	(6.75)	(-4.544)	(3.452)	(3.33)	(-3.428)	(3.88)	(4.02)	(-3.27)
QFIIs				−0.082***	−0.0486***	0.0506***			
				(-4.915)	(-3.270)	(3.742)			
RIDs-CM*QFIIs				−0.175***	−0.183***	0.172***			
				(-4.819)	(-3.095)	(3.328)			
GD							−0.172**	−0.127**	0.096***
							(-1.965)	(-2.218)	(4.720)
RIDs-CM*GD							−0.161***	−0.181***	0.172
							(-4.097)	(-4.659)	(4.062)
BS	−0.0526	−0.166***	−0.157	−0.0583	−0.155***	−0.164	−0.0460	−0.163***	−0.130
	(-1.098)	(-5.301)	(-0.789)	(-1.202)	(-4.735)	(-0.792)	(-0.962)	(-5.208)	(-0.650)
BI	−0.0367	−0.0811***	0.353	−0.0281	0.0889***	0.426*	−0.0308	0.0734**	0.316
	(-0.774)	(-2.604)	(1.612)	(-0.585)	(2.712)	(1.883)	(-0.652)	(2.359)	(1.441)
CEOD	0.0218	0.00579	0.0233	0.0178	0.00411	0.000757	0.0221	0.00645	0.0284
	(1.527)	(0.614)	(0.383)	(1.216)	(0.411)	(0.0118)	(1.555)	(0.685)	(0.463)
CEOT	0.0346	0.186***	−0.217	0.0968***	0.180***	−0.277*	0.0294	0.171***	−0.258*
	(1.026)	(8.470)	(-1.414)	(2.736)	(7.586)	(-1.743)	(0.878)	(7.738)	(-1.679)
Lev	0.0195	−0.00875	0.228***	0.00732	−0.0214**	0.201***	0.0198	−0.00846	0.220***
	(1.567)	(-1.089)	(5.216)	(0.574)	(-2.510)	(4.342)	(1.597)	(-1.056)	(5.000)
SO	−0.138***	−0.0478***	0.0263	−0.166***	−0.0655***	0.0178	−0.133***	−0.0417**	0.0189
	(-4.795)	(-2.920)	(0.362)	(-5.586)	(-3.802)	(0.235)	(-4.594)	(-2.527)	(0.257)
Growth	0.838***	0.723***	0.649***	0.835***	0.732***	0.660***	0.836***	0.727***	0.656***
	(122.6)	(173.9)	(27.49)	(117.3)	(164.5)	(26.14)	(122.9)	(174.8)	(27.49)
TQ	−0.0490***	−0.0518***	0.0626**	−0.0502***	−0.0607***	0.0481	−0.0501***	−0.0512***	0.0593**
	(-10.09)	(-15.96)	(2.182)	(-10.11)	(-17.61)	(1.566)	(-10.40)	(-15.81)	(2.060)
FA	0.0549**	0.0884***	−0.124	0.0310	0.0773***	−0.185	0.0463*	0.0841***	−0.112
	(2.287)	(5.447)	(-0.965)	(1.287)	(4.565)	(-1.352)	(1.939)	(5.191)	(-0.871)
Year FE's	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.140	0.553*	0.231	2.915***	2.763***	3.032***	6.149***	6.230***	6.219***
	(0.682)	(1.929)	(1.108)	(22.00)	(14.32)	(22.57)	(7.221)	(4.842)	(7.170)
Observations	28,600	28,600	28,600	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R²	0.045	0.044	0.051	0.038	0.034	0.046	0.045	0.044	0.041

Table 7 shows the regression results between rookie IDs (alternative measure) and agency costs. The effect of RIDs-CM on different proxies of AC are depicted in Columns (1), (2), and (3). The moderating effect of QFIIs in Columns (4), (5), and (6) are for the effect of alternative proxy on AC. The moderating effect of GD in Columns (7), (8), and (9) represents the effect of RIDs alternative measures on AC Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

% in the administrative expense ratio, and 0.172 % in the asset turnover ratio. This moderation effect suggests that gender diversity on boards amplifies the scrutiny of managerial decisions and oversight, leading to more efficient resource allocation and reduced agency costs.

4.4.2. Alternative measure of agency cost

Table 8 presents alternative measures of agency costs (QFCF) to test hypotheses 1, 2, and 3, focusing on the impact of RIDs and their interaction with Qualified Foreign Institutional Investors (QFIIs) and GD. The coefficients for rookie independent directors (RIDs% and LN-RIDs) in QFCF reveal a significant positive relationship, indicating that a higher percentage of rookie independent directors is associated with increased agency costs. Introducing QFIIs and GD as a moderator, the interaction terms RIDs%*QFIIs and RIDs%*GD exhibit negative coefficients in QFCF, suggesting a moderating effect.

4.4.3. Alternative estimation techniques

4.4.3.1. Instrumental variable estimations. Instrumental variable estimation is a powerful technique used to mitigate endogeneity by introducing instruments that are correlated with the endogenous explanatory variables but are uncorrelated with the error term. In this study, the authors used the ratio of first-year independent directors within the same region as an instrument for RIDs. This approach is grounded in the methodology of Chen and Keefe (2020) [6], who demonstrated that regional preferences for independent directors can serve as valid instruments, reflecting local supply without being directly related to firm-specific agency costs. The IV approach helps control for unobservable factors that might simultaneously affect the proportion of RIDs and agency costs. For instance, certain un-observed managerial qualities or firm-specific policies might influence both the appointment of RIDs and the resulting agency costs. By

Table 8
Alternative measures of agency cost to test hypothesis 1 and 2.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	QFCF	QFCF	QFCF	QFCF	QFCF	QFCF
RIDs%	0.083***				0.105***	
	(3.14)				(10.30)	
LN-RIDs		0.0950***				0.103***
		(4.32)				(4.10)
RIDs%*QFIIs			−0.150***			
			(-4.62)			
LN-RIDs*QFIIs				−0.167***		
				(-3.42)		
RIDs%*GD					−0.125***	
					(-5.40)	
LN-RIDs*GD						−0.389**
						(-2.25)
BS	−0.150	−0.367**	−0.126	0.785***	−0.025	−0.297**
	(-1.41)	(-2.25)	(-1.10)	(4.12)	(-0.34)	(-2.45)
BI	0.572***	0.795***	0.530***	−0.067	−0.055	0.082**
	(5.04)	(4.46)	(4.37)	(-1.30)	(-0.71)	(2.50)
CEOD	−0.047	−0.081	−0.041	0.106	0.104***	−0.274***
	(-1.36)	(-1.64)	(-1.10)	(0.94)	(4.53)	(-3.60)
CEOT	0.196***	0.145	0.156*	0.114***	−0.0280	−0.225***
	(7.30)	(1.32)	(1.87)	(2.70)	(-0.52)	(-8.60)
Lev	0.015	0.136***	0.190***	−0.0750	−0.230***	−0.182***
	(0.44)	(3.43)	(6.51)	(-1.45)	(-13.0)	(-5.50)
SO	0.720***	−0.0850*	0.020	0.715***	−0.181***	0.920***
	(63.00)	(-1.78)	(0.57)	(39.20)	(-8.10)	(79.70)
Growth	0.0690***	0.710***	0.721***	0.024	0.870***	0.124***
	(4.85)	(41.90)	(58.50)	(1.12)	(112.0)	(8.90)
TQ	0.121	0.0420**	0.0540***	0.0450	0.0980***	−0.061
	(1.48)	(2.11)	(3.54)	(0.36)	(10.30)	(-0.77)
FA	2.580***	0.0860	0.0620	3.280***	−0.0740	−0.445
	(5.97)	(0.75)	(0.71)	(4.82)	(-1.35)	(-1.04)
Year FE's	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.581***	3.211***	2.744***	3.284***	0.537*	−0.442
	(5.973)	(5.091)	(5.893)	(4.826)	(1.827)	(-1.033)
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R²						

Table 8 shows the regression results between rookie IDs and agency costs (alternative measure). The effect of RIDs proxies on alternative measures of AC are depicted in Columns (1) and (2). The moderating effect of QFIIs in Columns (3) and (4) is for the effect of alternative proxy on AC. The moderating effect of GD in Columns (5) and (6) represents the effect of RIDs on AC alternative measures Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1.

using the ratio of first-year independent directors in the region as an instrument, the authors aim to isolate the exogenous variation in RIDs that is not confounded by these unobserved factors, thus providing more reliable estimates of the impact of RIDs on agency costs.

Table 9 presents the results of instrumental variable (IV) estimation in two stages for examining the relationship between RIDs and agency costs. In the first stage, Columns (1) and (2) display the results of the first-stage regression. The coefficients for First-year ID (%) t-1, which is the instrument used to address endogeneity concerns, are reported alongside their respective t-statistics in parentheses. The positive and statistically significant coefficients confirm that firms are more likely to appoint rookie IDs with an increasing percentage of first-year IDs in the same region. Additionally, the Cragg-Donald Wald F statistics are provided to assess the strength of the instruments, with values exceeding the threshold indicating the absence of weak instrument problems.

Moving to the second stage, Columns (3) and (4) present the results of the second-stage regression, focusing on the relationship between RIDs variables (RIDs% and LN-RIDs) and S&AdmExp ratio, controlling for various factors such as Board Size (BS), Board Independence (BI), CEO Duality (CEOD), CEO Tenure (CEOT), Leverage (Lev), State Ownership (SO), Growth of Firm (Growth), Tobin's Q (TQ), and Firm Age (FA). The coefficients for the instrumental variables IVRIDs% and IVLN-RIDs indicate the effect of RIDs on the S&AdmExp ratio after addressing endogeneity concerns.

4.4.3.2. Panel fixed effect estimations. Table 10 presents the results of alternative estimation techniques, specifically fixed effects models, divided into three panels: Panel A, Panel B, and Panel C. Each panel examines different variables and their effects on agency costs, focusing on various measures of RIDs and their interactions with other factors.

In Panel A, the first three columns focus on the direct effects of RIDs variables on agency costs (S&AdmExp ratio). The coefficients for RIDs% and LN-RIDs are positive and statistically significant across all three specifications, indicating that a higher percentage of rookie independent directors and their presence lead to increased agency costs. In Panel B, the analysis introduces moderating variables, such as Qualified Foreign Institutional Investors (QFIIs), and examines their interaction with RIDs variables. The coefficients for RIDs (RIDs% and LN-RIDs) and their interaction with QFIIs are negative and statistically significant, indicating that QFIIs moderate the positive impact of RIDs on agency costs. In Panel C, the focus shifts to the interaction between RIDs variables and GD. The coefficients for proxies of RIDs and GD are negative and statistically significant, suggesting that gender diversity moderates the relationship

Table 9
Instrumental variables estimation.

	First Stage		Second Stage	
	(1)	(2)	(3)	(4)
	RIDs%	LN-RIDs	S&AdmExp ratio	S&AdmExp ratio
First-year ID(%)$_{t-1}$	0.188***	0.196***		
	(6.55)	(8.73)		
IVRIDs%			0.118***	
			(3.55)	
IVLN-RIDs				0.168***
				(3.82)
BS	−0.0530	−0.167***	−0.158	−0.0590
	(-1.10)	(-5.30)	(-0.79)	(-1.20)
BI	−0.0370	0.0820***	0.354	−0.0290
	(-0.78)	(2.60)	(1.61)	(-0.59)
CEOD	0.0220	0.0060	0.0235	0.0180
	(1.53)	(0.61)	(0.38)	(1.22)
CEOT	0.0350	0.187***	−0.216	0.0970***
	(1.03)	(8.47)	(-1.41)	(2.74)
Lev	0.020	−0.0090	0.229***	0.0080
	(1.57)	(-1.09)	(5.22)	(0.57)
SO	−0.139***	−0.048***	0.027	−0.167***
	(-4.80)	(-2.92)	(0.36)	(-5.59)
Growth	0.839***	0.724***	0.650***	0.836***
	(122.7)	(174.0)	(27.50)	(117.4)
TQ	−0.0500***	−0.0520***	0.0630**	−0.0510***
	(-10.10)	(-15.97)	(2.18)	(-10.12)
FA	0.055**	0.089***	−0.125	0.032
	(2.29)	(5.45)	(-0.97)	(1.29)
Year FE's	Yes	Yes	Yes	Yes
Firm FE's	Yes	Yes	Yes	Yes
Constant	0.140	0.553*	0.231	2.915***
	(0.682)	(1.929)	(1.108)	(22.00)
Cragg-Donald Wald F test	45.81	66.70		
Observations	28,600	28,600	28,600	28,600

Table 9 shows the regression results of the impact of rookie IDs on agency costs using the instrumental variable approach. The instrument variable is First–year ID(%)t-1. In the first stage, RIDs% and LN-RIDs are the dependent variables. The test variables in the second stage are IVRIDs% and IVLN-RIDs. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. All variables are defined in Table 1.

Table 10
Alternative Estimation technique (Fixed Effect).

Panel A

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AmpExp ratio	S&AmpExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RIDs%	0.1247***		0.102***		−0.107***	
	(2.709)		(16.73)		(-3.217)	
LN-RIDs		0.110***		0.128***		−0.105***
		(3.135)		(4.043)		(-3.027)
Constant	−0.0841	1.113***	3.165***	3.199***	3.534**	2.382
	(-0.404)	(3.827)	(23.07)	(15.74)	(2.299)	(1.018)
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R^2	0.0529	0.052	0.0668	0.0641	0.0639	0.0513

Panel B

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AmpExp ratio	S&AmpExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RIDs%	0.0318***		0.0946***		−0.104***	
	(2.935)		(12.45)		(-3.160)	
QFIIs	−0.0339***	0.0786***	−0.022***	−0.0358***	0.0569***	0.0391***
	(-3.061)	(-0.361)	(-2.992)	(-3.223)	(3.01)	(2.890)
RIDs%*QFIIs	−0.1921***		−0.216***		0.188***	
	(-2.952)		(-2.382)		(2.190)	
LN-RIDs		−0.0614		−0.0906***		0.117***
		(-3.064)		(-2.856)		(2.637)
LN-RIDs*QFIIs		−0.1854***		−0.1726***		0.119***
		(-3.081)		(-4.244)		(2.487)
Constant	0.0131	0.873***	2.824***	2.580***	2.641	1.523
	(0.0599)	(2.861)	(18.93)	(11.71)	(1.477)	(0.544)
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R^2	0.0546	0.0538	0.0678	0.0654	0.044	0.05

Panel C

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AmpExp ratio	S&AmpExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
RIDs%	0.0114***		0.103***		−0.116***	
	(2.229)		(2.53)		(-4.130)	
GD	0.116***	0.151***	−0.206***	0.137***	0.199***	0.172***
	(3.074)	(3.863)	(-3.630)	(3.661)	(5.401)	(4.915)
RIDs%*GD	−0.0769		0.00974		−0.557	
	(-1.365)		(0.261)		(-1.371)	
LN-RIDs		0.062***		0.0340***		0.0482***
		(3.05)		(4.406)		(5.574)
LN-RIDs*GD		−0.201***		−0.188***		0.1521***
		(-4.06)		(-2.753)		(5.687)
Constant	−0.0709	1.061***	3.079***	3.149***	3.000*	2.162
	(-0.340)	(3.678)	(22.34)	(15.51)	(1.914)	(0.893)
Observations	28,600	28,600	28,600	28,600	28,600	28,600
Adj. R^2	0.0534	0.0531	0.0675	0.0648	0.041	0.043

t-statistics in parentheses.

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 10, panel A, shows the regression results between RIDs and agency costs (alternative measure) using the fixed effect model from Column (1) to Column (6). Panel B shows the moderating effect of QFIIs on the relationship between RIDs and AC. effect of alternative proxy on AC. Panel C shows the moderating effect of GD on the relationship between RIDs and AC. effect of alternative proxy on AC. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1. For brevity, the result of control variables are not mentioned.

between RIDs and agency costs.

4.4.3.3. Generalized methods of moments estimations. The Generalized Method of Moments (GMM) is another robust technique used to address endogeneity and measurement errors in panel data. This approach, advocated by Ullah et al. (2024) [64], leverages moment conditions derived from the data to obtain consistent parameter estimates. GMM is particularly useful in dynamic panel data models where the dependent variable is influenced by its past values, and potential endogeneity arises from the simultaneity between explanatory variables and the error term. The GMM estimations in this study help control for unobserved heterogeneity and potential

endogeneity between RIDs and agency costs. The method employs internal instruments derived from lagged values of the explanatory variables, ensuring that the instruments are exogenous and uncorrelated with the current error term. This approach provides robust estimates by accounting for potential feedback effects and measurement errors that could bias the results.

Table 11 presents the results of alternative estimation techniques using the Generalized Method of Moments (GMM). The co-efficients for RID variables, as well as their interaction terms with moderating factors like QFIIs and GD, show similar trends to those observed in Table 10.

5. Discussion

This study investigates the impact of RIDs on agency costs within Chinese listed firms, utilizing agency theory and resource dependence theory to contextualize the findings. By examining the moderating roles of QFIIs and GD, the study provides a comprehensive understanding of the multifaceted relationship between RIDs and agency costs, offering valuable insights into corporate governance dynamics.

5.1. Agency theory perspective

Agency theory, formulated by Jensen and Meckling (1976) [7], explains the conflicts of interest between managers (agents) and shareholders (principals). These conflicts arise because managers may pursue personal benefits at the expense of shareholders, leading to agency costs. The traditional view within agency theory posits that independent directors help mitigate these costs by monitoring management activities. However, this study highlights that RIDs might exacerbate agency costs due to their lack of experience and expertise, as indicated by the positive association between RIDs and both the S&AdmExp and AdmExp ratios. This finding aligns with the concerns raised by Fama and Jensen (1983) [31] wherebyinexperienced directors may not effectively oversee managerial actions, leading to increased agency costs.

The results in this study reveal that RIDs heighten agency costs, supporting the hypothesis that their inexperience undermines their monitoring effectiveness. This corroborates the findings of previous studies, such as those by Chen et al. (2022) [5], which underscore the potential inefficiency of RIDs in fulfilling their monitoring role. However, the study also identifies significant moderating effects of QFIIs and GD, which help mitigate the adverse impact of RIDs on agency costs. This highlights the importance of robust governance mechanisms in offsetting the potential drawbacks of RIDs. QFIIs play a crucial role in this context. The interaction term between RIDs and QFIIs shows a negative and significant coefficient, indicating that the presence of QFIIs reduces the positive relationship between RIDs and agency costs. This finding aligns with Lewellen and Lewellen (2022) [65], who argue that institutional investors enhance corporate governance by demanding greater transparency and accountability. The presence of QFIIs likely introduces stringent oversight and monitoring practices, thereby mitigating the inefficiencies associated with RIDs. Similarly, the study finds that GD moderates the relationship between RIDs and agency costs. Boards with higher gender diversity are associated with lower agency costs, as diverse boards bring varied perspectives and enhanced monitoring capabilities, reducing the risks linked with inexperienced directors. This finding supports Carter et al. (2003) [35], who argue that gender-diverse boards improve governance outcomes through better decision-making and oversight.

5.2. Resource dependence theory perspective

Resource dependence theory (RDT), introduced by Pfeffer and Salancik (1978) [11] focuses on how organizations manage external dependencies to secure critical resources for survival and growth. Within this framework, board members are viewed as vital resources who bring expertise, information, and connections to the firm. From an RDT perspective, RIDs, despite their inexperience, can contribute valuable external resources and fresh perspectives to the boardroom. The findings in this study support this view, indicating that while RIDs are associated with increased costs, their interaction with QFIIs and GD significantly alters this dynamic.

QFIIs, as external stakeholders, bring international best practices and stringent regulatory standards, which enhance the board's effectiveness in monitoring and governance. This aligns with the principles of RDT, which emphasize the importance of external resources in improving organizational performance and stability. The findings also suggest that QFIIs help reduce agency costs by fostering better governance practices and enhancing the board's overall resource pool. Similarly, gender diversity on boards introduces diverse cognitive approaches and problem-solving styles, which can improve strategic decision-making and risk management. This supports the view of Beji et al. (2021) [66] that diverse boards are better equipped to manage external dependencies and navigate complex governance challenges. Results from this study lso reveal that GD positively influences the effectiveness of RIDs, suggesting that gender-diverse boards can leverage the fresh perspectives of RIDs to improve governance outcomes. This finding underscores the importance of board diversity in enhancing the board's overall resource base and mitigating the potential inefficiencies associated with inexperienced directors.

6. Conclusion

This study aims to investigate the relationship between RIDs and agency costs within the corporate governance framework. Traditional expectations suggest that RIDs may elevate agency costs due to their inexperience and potential for managerial discretion. Drawing from agency theory, RIDs are expected to heighten agency costs, but they lack the expertise for effective managerial oversight. Yet, the moderating effects of Qualified Foreign Institutional Investors (QFIIs) and GD underscore the role of governance mechanisms

Table 11
Alternative Estimation technique (GMM).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
L.ACI	0.628***	0.653***				
	(15.18)	(12.74)				
L.AdmExp ratio			0.564***	0.589***		
			(25.11)	(18.33)		
L.TATO ratio					0.131*	0.0593***
					(1.803)	(3.484)
RIDs%	0.0513***		0.0141*		−0.204*	
	(3.347)		(1.853)		(-1.954)	
LN-RIDs		0.115***		−0.0461***		−0.0214***
		(3.048)		(-3.645)		(-4.133)
Constant	−3.534***	−2.462***	0.289	0.197	14.01**	14.45**
	(-6.649)	(-3.222)	(0.895)	(0.487)	(2.377)	(2.146)
Observations	28,600	28,600	28,600	28,600	28,600	28,600

Panel B: Moderating Effects of QFIIs on the relationship between RIDs and AC

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
L.ACI	0.639***	0.653***				
	(13.29)	(10.59)				
L.AdmExp ratio			0.551***	0.566***		
			(23.40)	(18.40)		
L.TATO ratio					0.119***	0.0514***
					(5.573)	(4.406)
RIDs%	0.0417**		0.0194**		0.0372	
	(2.307)		(2.028)		(0.243)	
LN-RIDs		0.012***		0.00174		−0.106
		(2.91)		(0.233)		(-0.481)
QFIIs	−0.01***	−0.0845***	−0.0272***	−0.058***	0.069***	−0.028***
	(-0.305)	(-3.253)	(-3.039)	(-5.34)	(2.948)	(3.06)
RIDs%*QFIIs	−0.184		0.193		0.205***	
	(-4.07)		(3.165)		(3.079)	
LN-RIDs*QFIIs		−0.173***		−0.162***		0.187***
		(-3.610)		(-3.899)		(5.377)
Constant	−2.656***	−1.151	0.581*	0.690*	11.69*	18.29***
	(-4.621)	(-1.306)	(1.670)	(1.666)	(1.894)	(2.612)
Observations	28,600	28,600	28,600	28,600	28,600	28,600

Panel C: Moderating Effects of GD on the Relationship between RIDs and AC

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	S&AdmExp ratio	S&AdmExp ratio	AdmExp ratio	AdmExp ratio	TATO ratio	TATO ratio
L.ACI	0.448***	0.388***				
	(9.940)	(6.863)				
L.AdmExp ratio			0.395***	0.380***		
			(16.28)	(11.81)		
L.TATO ratio					0.0466***	0.0531***
					(5.184)	(3.756)
RIDs%	0.0676**		0.0689**		0.0676***	
	(2.573)		(1.989)		(3.575)	
LN-RIDs		0.114***		0.091***		−0.066***
		(2.933)		(2.915)		(-4.464)
QFIIs	−0.01***	−0.0845***	−0.0272***	−0.058***	0.069***	−0.028***
	(-0.305)	(-3.253)	(-3.039)	(-5.34)	(2.948)	(3.06)
RIDs%*QFIIs	−0.184***		−0.193***		0.205***	
	(-4.07)		(-3.165)		(3.079)	
LN-RIDs*QFIIs		−0.173***		−0.162***		0.187***
		(-3.610)		(-3.899)		(5.377)
Constant	−2.656***	−1.151	0.581*	0.690*	11.69*	18.29***
	(-4.621)	(-1.306)	(1.670)	(1.666)	(1.894)	(2.612)
Observations	28,600	28,600	28,600	28,600	28,600	28,600

Table 11, panel A, shows the regression results between RIDs and agency costs (alternative measure) using the GM estimates from Column (1) to Column (6). Panel B shows the moderating effect of QFIIs on the relationship between RIDs and AC. effect of alternative proxy on AC. Panel C shows the moderating effect of GD on the relationship between RIDs and AC. effect of alternative proxy on AC. Year and firm fixed effects are controlled for. Reported in parentheses are t-values. *, **, and *** indicate significance at the 10 %, 5 %, and 1 % levels (two-tailed), respectively. The data covers the period 2009 to 2020, with 26900 firm-year observations. All variables are defined in Table 1. For brevity, the result of control variables is not mentioned.

in reducing the adverse impact of RIDs on agency costs.

QFIIs and gender diversity counterbalance the potential drawbacks of RIDs, moderating the relationship between RIDs and agency costs. QFIIs, with their rigorous regulatory regimes and impartial monitoring, help offset the negative effects of RIDs by fostering transparency and accountability within firms. Similarly, gender diversity brings diverse perspectives and decision-making styles to the boardroom, mitigating the risks associated with inexperienced directors and contributing to effective governance practices.

The robustness of the results is demonstrated through alternative measures of RIDs, AC, and estimation techniques, ensuring the validity and reliability of the findings. This study contributes to the literature by providing a comprehensive understanding of the multifaceted relationship between RIDs and agency costs, considering both direct and moderating effects within corporate governance. The implications of this study extend beyond academic discourse to inform practical considerations for firms and policymakers. First, organizations should recognize the importance of board diversity and effective governance mechanisms in mitigating agency costs associated with RIDs. By incorporating QFIIs and promoting gender diversity on boards, firms can enhance transparency, account-ability, and decision-making processes, ultimately improving firm performance and shareholder value. Second, corporate governance structures should be designed to balance the power dynamics between CEOs and board members, ensuring accountability and alignment with shareholder interests.

Due to the reliance on data from a specific regulatory context, namely that of Chinese listed firms, the generalizability of the conclusions drawn in this study to other countries may be limited. Consequently, caution should be exercised when extrapolating the findings to different institutional environments and corporate governance frameworks. Future research endeavors could aim to overcome this limitation by utilizing datasets from multiple countries or regions to conduct cross-country analyses, thereby enhancing the external validity of the results and providing a broader understanding of the relationship between RIDs and agency costs across diverse contexts. Moreover, while the current study primarily focuses on the monitoring function of RIDs in mitigating agency costs, it is essential to acknowledge that RIDs may also serve a consulting or advisory role within corporate boards. Therefore, future research could delve deeper into exploring the consulting function of RIDs, examining how their expertise and insights contribute to strategic decision-making, risk management, and organizational performance beyond mere monitoring.

CRediT authorship contribution statement

Waqas Bin Khidmat: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Nadia Ashraf:** Writing – original draft, Methodology, Investigation, Formal analysis. **Sook Fern Yeo:** Validation, Supervision, Resources. **Cheng Ling Tan:** Writing – review & editing, Validation, Supervision. **Muhammad Noman Shafique:** Validation, Resources, Methodology.

Data availability statement

Data will be made available upon request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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