sustainability

MDPI

Article

Supporter or Supervisor? The Role of Chief Financial Officers in Corporate Innovation

Junqin Huang [1], Youliang Liao [2,*], Bin Lin [1,3] and Lawrence Loh [4]

[1] School of Business, Sun Yat-sen University, Guangzhou 510275, China
[2] Foshan State-Owned Assets Supervision and Administration Commission, Foshan 528000, China
[3] Guangdong Industry Polytechnic, Guangzhou 510300, China
[4] Centre for Governance and Sustainability, NUS Business School, National University of Singapore, Singapore 117592, Singapore
* Correspondence: liaoyliang126@126.com; Tel.: +86-188-1944-5604

Abstract: Like the chief executive officer (CEO), the chief financial officer (CFO) is an important corporate player. However, compared to the role of CEOs, research on the factors influencing corporate innovation has paid very little attention to the role of CFOs. Based on the perspective of role theory, we measure CFO role performance by organizational identification to explore the role of CFOs in corporate innovation. Employing the availability of CFO organizational identification data from a survey of listed firms in China, we find that: (1) CFO organizational identification is negatively associated with innovation output in state-owned enterprises (SOEs) and positively associated with innovation output in non-state-owned enterprises (non-SOEs); (2) corporate misconduct experience positively moderates the relationship between CFO organizational identification and innovation in SOEs; (3) CFO financial industry experience positively moderates the relationship between CFO organizational identification and innovation in non-SOEs. Our results show that CFOs play the supervisor role in innovation in SOEs and the supporter role in innovation in non-SOEs. Our research provides theoretical and practical references for companies to sustainably drive innovation.

Keywords: CFO; organizational identification; corporate innovation; role expectation; role theory

Citation: Huang, J.; Liao, Y.; Lin, B.; Loh, L. Supporter or Supervisor? The Role of Chief Financial Officers in Corporate Innovation. *Sustainability* **2022**, *14*, 9762. https://doi.org/10.3390/su14159762

Academic Editor: Andrea Pérez

Received: 29 June 2022
Accepted: 5 August 2022
Published: 8 August 2022

1. Introduction

Innovation is an important force in promoting the development of a country as well as in the development of all human society. Corporate innovation is an important area of social innovation and also forms the foundation for enterprises to obtain their core competitiveness and sustainable growth [1,2]. Innovation requires a large amount of R&D investment [3], and decisions in R&D investment are mainly controlled by management. Thus, management plays an important role in corporate innovation. An increasing amount of research focuses on the influence of management on corporate innovation. For example, empirical studies have found that the professional background and political connections of the CEO [4], self-confidence [5,6], gender [7], founder's identity [8], military experience [9], academic work experience [10], pilot qualifications [11], and organizational identification [12] have a significant impact on corporate innovation. However, these studies have focused on CEOs, rarely on CFOs.

CFOs play an important role in business management, a role that differs from that of CEOs. Since the 1960s, CFOs have emerged and have come to fulfill an indispensable role in enterprises [13]. CFOs not only need to participate in the formulation of enterprise development strategies and important business decisions, but are also responsible for corporate finance, accounting, and internal control [14]. Empirical research has shown that CFOs can significantly influence a firm's accounting policies and tools [15–17], quality of internal control [18,19], accounting information quality [20,21], financing costs [22,23], tax policy [24], social responsibility [25], and other areas. Additionally, there is a clear

division of labor between CFOs and CEOs, and there are clear differences in their roles in enterprises. It is generally believed that the CEO is the most important daily business decision-maker in a company, while the CFO oversees the company's financial decisions.

Given the differences in the roles of CEOs and CFOs, we believe it is essential to distinguish between the CEO and the CFO. The differences in the roles of the CEO and the CFO result in the possibility that the same variables of the CEO and the CFO may have different outcomes for the enterprise. These different outcomes can be specified in three ways: (1) the intensities of the impact of the CEO and the CFO are different. For example, Geiger and North (2006) [26] find that discretionary accruals decrease significantly following the appointment of a new CFO, but these changes are not caused by the appointment of a new CEO. Because one of the main responsibilities of a CFO is financial reporting, a CFO's equity incentive plays a greater role than does a CEO's equity incentive in earnings management [27] and the risk of stock price crash [23]. (2) The aspects of the impact of the CEO and the CFO are different. Chava and Purnanandam (2010) [28] show that the CEO (CFO) equity incentive affects the company's capital structure and cash-holding decisions (debt-maturity structure and accrual management). Baker et al. (2019) [29] find that accrual earnings management (real earnings management) is greater when the CEO (CFO) is powerful relative to the CFO (CEO). (3) The directions of the impact of the CEO and the CFO are opposite. Xu et al. (2022) [30] find that CEO organizational identification can positively affect corporate philanthropy, whereas the opposite holds for CFO organizational identification. Therefore, the advantages of the process of distinguishing between the CEO and the CFO are obvious, i.e., it leads to more precise conclusions, drives research forward, and is more informative for practice. However, it also has disadvantages in that it requires a finer granularity of data and the research costs are higher. In summary, if conditions permit, the process of distinguishing between the CEO and the CFO is essential.

In this study, we attempt to explore the question: what role do CFOs play in corporate innovation? In general, a CFO's functions include strategic support and supervisory control [26], and these two functions are named as the supporter role and the supervisor role, respectively. These two roles can in most cases be compatible, but in terms of innovative activities, they conflict. Innovation is characterized by high investment, high return, and high risk [31]. Therefore, on one hand, when performing the supporter role, CFOs are undoubtedly responsible for the large amount of R&D investment required for innovation. On the other hand, CFOs uphold the principle of conservatism when performing the supervisor role and may be resistant to riskier R&D investments.

The conflict between the two roles of CFOs in innovation activities can be understood as an internal conflict in the CFO's role—that is, the intrarole conflict of CFOs. The concept of intrarole conflict comes from role theory, the theory that explains how individuals cope with role conflict. Role theory holds that a role is a set of special behavioral expectations for individuals with specific social identities, and role expectations are beliefs and attitudes about what role actors should and should not do [32]. An intrarole conflict, a type of role conflict, refers to the conflict caused by different and incompatible expectations from different groups of the same role [33]. A role conflict can be coped with by establishing the priority level of different roles and playing the top priority role first [34].

To explore the way that CFOs cope with intrarole conflicts in corporate innovation, we must first see CFOs "enter their role," that is, ensure that CFOs have a high enough role performance. However, like other executives, CFOs also face agency problems [35]; this means that they may not be able to devote themselves to the role of the CFO. In alleviating the CFO agency problem, previous studies have largely focused on conventional corporate governance mechanisms—such as compensation incentives [14,21], equity incentives [28,36], replacing incompetent CFOs [16,37], putting CFOs on the board of directors [18], and strengthening the supervision of CFOs by the board of directors [38]. However, these methods are "external forces" and only regulate CFOs' behaviors, and so it is difficult to observe their inner state. Further, it is, of course, difficult to directly gage CFO role performance.

In recent years, scholars have begun to pay attention to internal psychological factors—such as organizational identification—in their research on how to alleviate the corporate agency problem. Organizational identification is a special form of social identification, which is a state in which individuals define themselves according to a specific organizational membership or a perception of belonging to a specific organization [34,39]. In short, members with stronger organizational identification are more willing to align their interests with the organization, and so there are fewer agency conflicts. Previous studies have found that CEO organizational identification can reduce agency costs [40] and reduce the level of earnings management [41]. Thus, compared to conventional governance mechanisms, organizational identification is a more appropriate measure of role performance.

Based on role theory, we measure CFO role performance by organizational identification, and we measure role expectation by corporate owner type, misconduct experience, and CFO financial industry experience, in order to explore the role of CFOs in corporate innovation. The largest challenge of this study lay in the measurement of CFO organizational identification. We obtained data about CFO organizational identification from a survey on listed companies conducted by the China Securities Regulatory Commission (CSRC) in 2014. Other data are from the China Stock Market and Accounting Research (CSMAR) database. Our results suggest that: (1) CFO organizational identification is negatively associated with innovation output in SOEs and positively associated with innovation output in non-SOEs; (2) corporate misconduct experience strengthens the supervisor role expectation of the CFO and positively moderates the relationship between CFO organizational identification and innovation in SOEs; (3) CFO financial industry experience strengthens the supporter role expectation of the CFO and positively moderates the relationship between CFO organizational identification and innovation in non-SOEs. The results show that CFOs play the supervisor role in innovation in SOEs and the supporter role in innovation in non-SOEs.

Our study produces three main theoretical contributions. First, our study explores the role of CFOs in corporate innovation. Most existing studies focus on the role of CEOs in corporate innovation, and the research on the role of CFOs is limited to financial and accounting decision-making. Our study examines the role of CFOs in corporate innovation, enriching the literature on the influencing factors of corporate innovation and conducting research on how the CFO influences enterprise decision-making. Second, our study expands research on organizational identification. Existing research on organizational identification mostly focuses on ordinary employees [42,43]. The sparse literature related to top management organizational identification is mostly about CEO organizational identification. Our study explores the consequences of CFO organizational identification, contributing to literature about organizational identification. Third, our study enriches the application scenarios of role theory. Role theory, derived from social psychology, has been used to explore work-family conflict [44] and leadership style [45] in management research. We use role theory to explain how CFOs respond to role conflict in corporate innovation, exploring new application scenarios of this theory.

2. Theoretical Analysis and Research Hypotheses

2.1. Role Theory

We mainly use the concepts of role expectation and role conflict in role theory. Role theory holds that a role is a set of special behavioral expectations for individuals with specific social identities, and role expectations are beliefs and attitudes about what role actors should and should not do [32]. A role conflict refers to the phenomenon of psychological contradiction and behavioral conflict caused by incompatible role expectations—including interrole conflict and intrarole conflict. An interrole conflict refers to the conflict caused by a lack of sufficient time and energy to meet the expectations of different roles when individuals assume different roles at the same time. An intrarole conflict refers to the conflict caused by different and incompatible expectations of the same role from different groups [33]. Studies have found that when employees face unresolved role conflicts, they feel stressed and their job performance decreases [33,46].

Individuals facing role conflicts have a variety of coping strategies. In organizations, the most common strategy to cope with role conflict is to establish the priority level of roles, to strictly divide the scenes of roles, and to perform roles according to their importance at different occasions [34]. For example, Adler and Adler (1987) [47] describe how college basketball players resolve conflict between their athletic and learning roles by defining themselves as athletes first and students second, and by reducing their learning time accordingly.

According to role theory, we first draw out the following viewpoints: (1) CFOs usually face role conflicts, including interrole conflicts and intrarole conflicts. CFOs facing role conflicts lean toward the role they consider important. (2) CFO interrole conflict is caused by agency problems, which can be alleviated by organizational identification. CFOs with stronger organizational identification are more inclined to align their interests with the organization and work harder to produce higher role performance. (3) CFO intrarole conflict arises from the incompatibility of the supervisor role and the supporter role in innovation activities. (4) The impacting direction of CFO organizational identification on corporate innovation depends on whether the CFO ultimately behaves as a supporter or a supervisor. These viewpoints are elaborated in detail below.

2.2. CFO Interrole Conflict and Coping Strategy

CFOs usually face interrole conflicts between acting as an agent and acting as an organization member due to agency problems. We must clarify that the agent role here is a comprehensive role that refers to the set of roles that have conflicts of interest with the organization. The agent role includes the role of self-interested managers who embezzle company property and do not work with sufficient dedication in agency theory [48,49]. It can also include the role of family members who want to be more family-focused and less work-focused in work-family conflict studies [44]. The role expectation of agents comes from themselves as well as from their family members and others outside the organization. The role of an organization member refers to the role of aligning the interest with the organization and striving for the welfare of the organization. The role expectation of an organization member also comes from many sources, including other members in the same organization (such as colleagues and superiors [50]), and other social norms (such as a set of corporate governance mechanisms that regulate agent behavior [51]). When facing interrole conflicts, CFOs lean toward the role they consider important.

CFOs with stronger organizational identification are more inclined to act in the role of organization member rather than in the role of agent. Organizational identification, a special form of social identification, is a state in which individuals define themselves according to a specific organizational membership, or where there is a perception of belonging to a specific organization [34,39]. According to social identity theory, people tend to classify themselves and others socially, such as by organization, belief, gender, and age—because social classification partially answers the question "Who am I?" for individuals [52]. Members with stronger organizational identification have a higher degree of "depersonalization", that is, they tend to define themselves in terms of organizational identity and consider themselves less in terms of individuals [43]. Therefore, they are more willing to maintain the same interest as those of the organization and seek benefits for the development of the organization [42,53,54]. Studies have shown that organizational identification can alleviate management agency problems, as when, for example, CEO organizational identification can reduce agency costs [40] and earnings management level [41]. In brief, CFOs with stronger organizational identification can produce higher role performance.

2.3. CFO Intrarole Conflict and Coping Strategy

However, the impact of CFO role performance on enterprises depends on the role that the CFO ultimately plays. In general, CFO role expectations from companies can be divided into two categories: supervisory control and strategic support [26]. We name the roles corresponding to the two types of functions as the supervisor role and supporter

role, respectively. The supervisor role is the traditional role of CFOs that embodies the accounting goal of fiduciary responsibility and requires the truthful reporting of corporate financial information and the protection of corporate property. Empirical studies have found that CFOs play an important role in corporate compliance management and risk management, such as in the implementation of conservative accounting policies [15], in the reduction of internal control deficiencies and earnings management [18,21,55], and in reducing the probability of misstatement and restatement [19,20]. As one of the important strategic decision-makers and executors of companies, CFOs also act in the supporter role. The supporter role requires CFOs to leave the original accounting function framework, no longer limited to the company's financial information, and to make decisions from the perspective of the company's long-term development and provide support for the implementation of strategy. Empirical studies have found that CFOs also play an important role in strengthening corporate profitability and sustainable development ability, such as implementing innovative management accounting tools [17], reducing financing costs [22], helping enterprises maintain a low tax burden [24], and promoting corporate social responsibility [25].

The two roles of CFOs are in most cases compatible, but in terms of innovation activities, they conflict with each other, creating intrarole conflict. CFO intrarole conflict is manifested in such a way that the supervisor role inhibits innovation while the supporter role promotes innovation. Innovation is characterized by high investment, high return, and high risk [31]. The optimal incentive scheme for innovation is to have a greater tolerance (or even reward) for early failure and a greater reward for long-term success [56]. Tolerating failure in innovation means that R&D investment may go unrewarded for a long period of time, which is intolerable for the supervisor role. For example, the principle of conservatism in financial accounting requires early recognition of losses and delayed recognition of revenue, which essentially increases penalties for failure. Therefore, it is considered that the accounting conservatism principle inhibits corporate innovation [57]. He and Tian (2013) [58] also find that when the company is followed by more analysts (which means more supervisors), the management faces greater pressure to achieve short-term goals, thus hindering the company's investment in long-term innovation projects. In contrast, CFOs in the supporter role are not limited to financial and accounting decisions. They can not only tolerate failures in R&D, but also can give full play to their professional expertise to support R&D investment, such as in the easing of financing constraints and the improving of financial conditions.

When considering intrarole conflicts in innovation activities, CFOs play the top priority role first according to the role expectations in different types of companies. Specifically, they play the supervisor role in SOEs and the supporter role in non-SOEs.

In SOEs, CFOs play the supervisor role, which has an inhibitory effect on innovation. On the one hand, SOEs have stronger expectations for the supervision function of CFOs. The operating objectives of SOEs contain multiple objectives beyond profits, including social stability and social development [59,60], with more requirements for compliance management. On the other hand, CFOs in SOEs themselves also have stronger expectations for their supervisory role. Independence is the core characteristic of the supervisor. Because China's Company Law stipulates that the appointment and removal of the CFO is proposed by the CEO and approved by the board of directors, the independence of CFOs is limited. However, in SOEs, the CFOs' supervisory function and independence are fully guaranteed (For example, the *Provisional Regulations on CFOs in SOEs of Guangdong Province* provide that "CFOs shall be appointed to the board of directors of enterprises in accordance with the law, become members of the board of directors, and perform financial supervision duties in the operation and management activities of enterprises... The CFOs shall be responsible to the provincial government and appointed units and shall regularly report the work to the provincial Finance Department". For another example, the *Provisional Regulations on CFOs in SOEs of Jiangsu Provincial* provide that "CFOs shall be appointed by the provincial SASAC (State-owned Assets Supervision and Administration Commission), responsible

to the provincial SASAC, and shall supervise the company's financial activities on behalf of the provincial SASAC."). The high degree of career stability in SOEs also emboldens CFOs to realize their supervisor role [61]. In contrast, the function of strategic support is less mentioned in SOEs. As noted above, the supervisor role has an inhibitory effect on corporate innovation. And so, in SOEs, a dutiful CFO may stifle innovation.

In non-SOEs, CFOs play the supporter role and promote innovation. On the one hand, non-SOEs have stronger expectations for CFOs' supporter role. The first business objective of non-SOEs is that of profits, and non-SOEs face more serious financing constraints than SOEs [62,63]. Financing constraints seriously restrict the innovation activities of enterprises [64]. Therefore, non-SOEs expect CFOs to act as a supporter to help enterprises alleviate financing constraints and to create an environment that tolerates failure and encourages innovation. On the other hand, the independence of CFOs in non-SOEs is far from sufficient to guarantee their supervisor role. As stipulated in China's Company Law, the appointment and removal of the CFO is decided by the CEO and the board of directors, and the independence of CFOs in non-SOEs is not guaranteed as it is in SOEs. And so, CFOs in non-SOEs must play the supporter role. As noted above, the supporter role can promote corporate innovation. Therefore, in non-SOEs, a conscientious CFO may promote innovation.

In a word, organizational identification can alleviate the interrole conflict of CFOs caused by agency problems, cause CFOs to be more inclined to align their interests with the organization, and motivate CFOs to produce higher role performance. In SOEs, CFOs play the supervisor role and have an inhibitory effect on innovation. In non-SOEs, CFOs play the supporter role and promote innovation. Accordingly, we put forward the following hypotheses.

Hypothesis 1a (H1a). *In SOEs, CFO organizational identification is negatively associated with corporate innovation.*

Hypothesis 1b (H1b). *In non-SOEs, CFO organizational identification is positively associated with corporate innovation.*

2.4. Moderating Effect of Role Expectation from a Dynamic Perspective

In order to investigate the moderating effect of role expectation on the impacts of CFO role performance in a multi-dimensional way, we not only measure static role expectation by corporate owner type, but also measure role expectation from a dynamic perspective. Dynamic role expectation changes include corporate misconduct experience and CFO financial industry experience.

Corporate misconduct experience strengthens the supervisor role expectation of the CFO. According to organizational learning theory, organizational learning is regarded as an important means for organizations to seek, maintain, and improve competitiveness, productivity, and innovation in an uncertain technological and market environment [65]. The classic definition of organizational learning is "diagnosing and correcting mistakes" [66]. Instances of corporate misconduct are clearly major mistakes, resulting in serious damage to corporate reputations and many negative consequences, such as falling stock prices [67], rising financing costs [68], and declining product competitiveness [69]. In order to avoid the recurrence of such mistakes, enterprises with misconduct experiences are motivated to carry out organizational learning and to strengthen compliance control. Studies have shown that enterprises punished for misconduct actively improve their corporate governance to prevent the recurrence of misconduct [70]. Therefore, corporate misconduct experience strengthens the supervisor role expectation of the CFO. We expect to observe that corporate misconduct experience strengthens the impact of CFO role performance in SOEs (where CFOs play the supervisor role) and weakens the impact of CFO role performance in non-SOEs (where CFOs play the supporter role). Accordingly, we put forward the following hypotheses.

Hypothesis 2 (H2). *Corporate misconduct experience positively (negatively) moderates the relationship between CFO organizational identification and innovation in SOEs (non-SOEs).*

CFO financial industry experience strengthens the supporter role expectation of the CFO. According to the imprinting theory, there is a "sensitive" period in a specific environment, during which the individual forms "imprints" to adapt to the environment, and these imprints have a certain inertia and a sustained impact on the individual [71]. The financial industry is characterized by high pressure and high risk. The financial industry experience of senior executives constitutes a sensitive period, leaving them deep imprints, affecting their cognition and ability. Executives with financial industry experience have received more knowledge of financial theory in their careers and are more sensitive to changes in the capital-market environment and tax policies [72]. They are also more familiar with corporate financial conditions and have a deeper understanding of a company's financial policies [73]. It can be inferred that CFOs with financial industry experience carry more expectations as the supporter role, the role devoted to easing the financing constraints and increasing R&D investment. Therefore, we expect to observe that CFO financial industry experience weakens the impact of CFO role performance in SOEs (where CFOs play the supervisor role), and strengthens the impact of CFO role performance in non-SOEs (where CFOs play the supporter role). Accordingly, we put forward the following hypotheses.

Hypothesis 3 (H3). *CFO financial industry experience negatively (positively) moderates the relationship between CFO organizational identification and innovation in SOEs (non-SOEs).*

Based on the above analysis, we draw the conceptual model diagram (Figure 1).

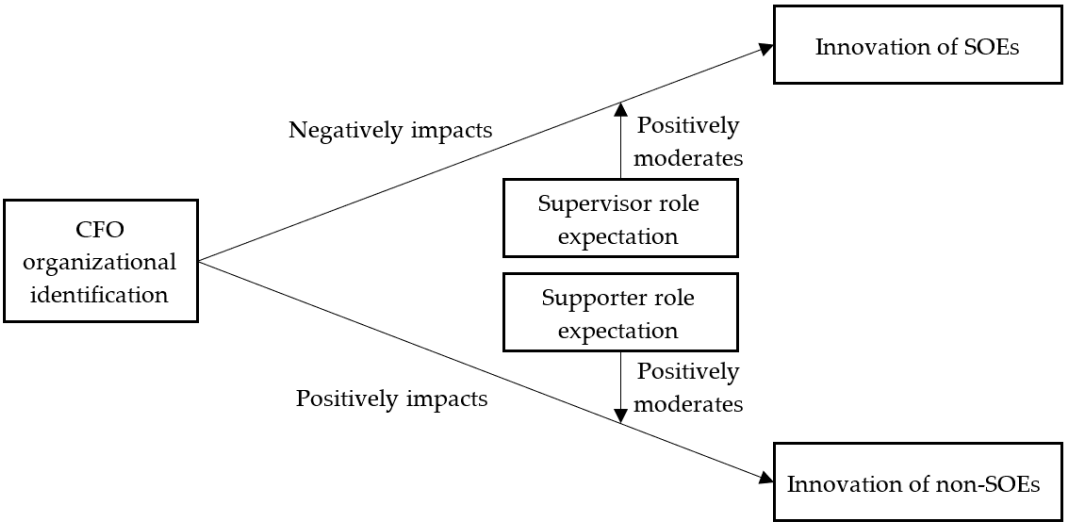

Figure 1. Conceptual model.

3. Research Design

3.1. Data Sources and Sample Selection

The data for CFO organizational identification in our study comes from a survey on listed companies conducted by the China Securities Regulatory Commission (CSRC) in 2014. On 5 September 2014, the research team of CSRC issued questionnaires to 2536 Chinese A-share listed companies. As of 31 October 2014, 2154 sets of questionnaires with a total of 12,551 questionnaires were received, with a response rate of 84.94% (each set of questionnaires consists of seven questionnaires, which are filled out by the chairman of the board, CEO, secretary of the board of directors, CFO, person in charge of internal auditing, person in charge of IT, and person in charge of internal control.). We use this data for the following reasons. First, the data are collected from questionnaires distributed to listed companies by the CSRC, which has high credibility. Second, no new survey has been

conducted so far due to the high cost of distributing questionnaires to listed companies. Finally, there have been no significant changes in China's corporate governance guidelines since 2014, especially in terms of executive responsibilities. Therefore, the data still reflect the current situation, and new research results are continuously published by scholars using this data [12,30,74–76]. The company patent information and financial data are from the China Stock Market and Accounting Research (CSMAR) database.

We extract the CFO organizational identification data from the questionnaire survey data and match them with all Chinese A-share listed firms from 2014 to 2015. This approach is based on the assumption that CFO organizational identification does not materially change over a period of a few years (we acknowledge that CFO organizational identification may change over time to some extent. Therefore, as a test of robustness, we reduce the sample period to the year of the questionnaire survey (i.e., 2014), and the empirical results do not change significantly). We also screen the sample and exclude: (1) financial firms, (2) firms with missing values for the variables, (3) firms whose CFOs participated in the survey but left the position within the sample period, (4) firms with less than one year since they went public. In the end, 2309 firm-year observations are obtained, including 745 observations of SOEs and 1564 observations of non-SOEs. In order to reduce the influence of outliers, we winsorize continuous variables at the 1% to 99% quantile level.

3.2. Variable Definition and Empirical Model

3.2.1. Dependent Variables

Drawing on previous literature [5,11], we use the number of patent applications to measure corporate innovation. Enterprise patents include invention patents, utility model patents, and design patents. Among these, invention patents have the highest value and contribute the most to corporate innovation. Therefore, we use the following variables to measure corporate innovation: (1) Patent: the total number of patent applications of enterprises in the year, (2) Invention: the number of patent applications for the invention of the enterprise in the year.

3.2.2. Independent Variable

We measure CFO organizational identification (CFO_OI) using the six-item scale developed by Mael and Ashforth (1992) [39]. As the scale is originally written in English, we follow the "translation and back translation" procedure to translate it into Chinese. The questionnaire asks the respondent to assess to what extent he or she agrees with six statements (1 = Strongly disagree; 5 = Strongly agree). The details on the questionnaire are described in Appendix A. The mean score of the six items is taken as the CFO organizational identification. A higher score indicates a higher level of CFO organizational identification.

3.2.3. Moderator Variables

According to the hypotheses, the moderating variables in our study include corporate misconduct experience and CFO financial industry experience. We use the following measuring indicators: (1) Misconduct: a dummy variable, which measures whether an enterprise has been punished by the CSRC, the Shanghai Stock Exchange (SSE), or the Shenzhen Stock Exchange (SZSE) in previous years. (2) Finback: a dummy variable, which measures whether the CFO has held positions in financial industry (firms in the financial industry include policy banks, commercial banks, investment banks, financial regulatory authorities, fund management companies, insurance companies, exchanges, securities companies, securities registration and settlement companies, futures companies, trust companies, investment management companies, and other financial institutions.).

3.2.4. Empirical Model

Drawing on methods of existing research [5,11], we construct the following empirical models to verify the impact of CFO organizational identification on corporate innovation. The estimation method is the Poisson count model.

$$In(\lambda)_{i,\,t} = \beta_0 + \beta_1 \times CFO\_OI_i + X_{i,t-1} + \sum Year + \sum Industry + \sum Province + \varepsilon_{i,\,t} \quad (1)$$

For H1, we focus on β_1 in Model (1) to observe the impact of CFO organizational identification on corporate innovation.

$$In(\lambda)_{i,\,t} = \beta_0 + \beta_1 \times CFO\_OI_i + \beta_2 \times M_{i,t-1} + \beta_3 \times CFO\_OI_i \times M_{i,t-1} + X_{i,t-1} + \sum Year + \sum Industry + \sum Province + \varepsilon_{i,\,t} \quad (2)$$

For H2 and H3, we focus on β_3 in Model (2) to observe the moderating effect. In the two models, $In(\lambda)_{i,\,t}$ represents the "Poisson arrival rate" of corporate innovation, representing the mathematical expectation of patent applications or invention applications. Variable CFO_OI_i represents organizational identification. Variable $M_{i,t-1}$ represents corporate misconduct experience and CFO financial industry experience. $X_{i,t-1}$ represents control variables at the firm level. Specifically, control variables include: firm size (Size), return on assets (ROA), ratio of liabilities (Lev), book–to–market (MB), firm age (Firm_age), sales-revenue growth rate (Growth), cash asset ratio (Cash), net fixed assets per capita (Fixedpp), sales revenue per capita (Salespp), annual return on stock (Yretwd), standard deviation of stock daily return (Return_sd), and the degree of competition in the industry (Herfindahl index and its quadratic term: HHI, HHI^2). Considering that corporate innovation activities have a certain cycle and that there is a certain time lag from R&D to patent application, we treat all the independent variables in the model with a lag of one period. We also add dummy variables such as Year, Industry, and Province to control the fixed effects of year, industry, and region. The variable definitions are detailed in Table 1.

Table 1. Variable definition.

Variable Type	Variable Name	Variable Definition
Dependent variables	Patent	The number of patent applications in the current year.
	Invention	The number of patent applications for invention in the current year.
Independent variable	CFO_OI	CFO organizational identification.
Moderator variables	Misconduct	An indicator that equals 1 if the enterprise has been punished by CSRC, SSE, or SZSE in the previous year, 0 otherwise.
	Finback	An indicator that equals 1 if the CFO has financial industry experience, 0 otherwise.
Control variables	Size	The natural logarithm of total assets at the end of the year.
	ROA	Net profit for the year divided by total assets at the end of the year.
	Lev	Total liabilities divided by total assets at the end of the year.
	MB	Market value divided by total assets at the end of the year.
	Firm_age	Current year minus year of incorporation.
	Growth	The growth rate of sales income from the prior year to the current year.
	Cash	Ratio of cash assets to total assets at the end of the year
	Fixedpp	The natural logarithm of the net fixed assets divided by the number of employees at the end of the year.
	Salespp	The natural logarithm of the sales income for the year divided by the number of employees at the end of the year.
	Yretwd	Annual return on stock for the year.
	Return_sd	Standard deviation of stock day return for the year.
	HHI	Herfindahl index of the industry at the end of the year.
	HHI^2	Quadratic Herfindahl index of the industry at the end of the year.
	Year	Current fiscal year.
	Industry	The industry to which the enterprise belongs.
	Province	The province where the enterprise is located.

4. Empirical Analysis

4.1. Descriptive Statistics

Table 2 gives the results of descriptive statistics for each variable of our sample. The results show that the average number of patent applications per year is 36.945, of which the average number of invention patents is only 14.975, indicating that the innovation quality of the sample companies needs to be improved. The mean of CFO_OI is 4.251, indicating that CFO organizational identification in the sample tends to show a right-leaning normal distribution. The mean of Misconduct is 0.116, indicating that 11.6% of the enterprises have corporate misconduct experience. The mean of Finback is 0.046, indicating that 4.6% of CFOs have financial industry experience.

Table 2. Descriptive statistics.

Variables	Observations	Mean	SD	Min	Median	Max
Patent	2309	36.945	88.516	0.000	11.000	664.000
Invention	2309	14.975	38.245	0.000	3.000	292.000
CFO_OI	2309	4.251	0.546	1.333	4.167	5.000
Misconduct	2309	0.116	0.320	0.000	0.000	1.000
Finback	2309	0.046	0.209	0.000	0.000	1.000
Size	2309	22.097	1.184	19.222	21.948	25.994
ROA	2309	0.036	0.049	−0.292	0.032	0.206
Lev	2309	0.427	0.211	0.053	0.414	0.986
MB	2309	0.498	0.225	0.107	0.472	1.134
Firm_age	2309	15.997	5.092	4.000	16.000	30.000
Growth	2309	0.154	0.439	−0.620	0.077	2.966
Cash	2309	0.148	0.116	0.007	0.115	0.629
Fixedpp	2309	12.535	1.054	9.301	12.545	15.704
Salespp	2309	13.677	0.875	11.717	13.559	16.645
Yretwd	2309	0.608	0.589	−0.461	0.480	3.172
Return_sd	2309	0.036	0.012	0.013	0.035	0.061
HHI	2309	0.134	0.142	0.024	0.080	0.862
HHI^2	2309	0.038	0.105	0.001	0.006	0.743

4.2. Hypothesis Tests

4.2.1. Test of Hypothesis 1

Table 3 gives the test results for H1. The results show that H1 is supported. CFO organizational identification is negatively associated with innovation output in SOEs and positively associated with the innovation output in non-SOEs. Columns (1) to (2) of Table 3 are the regression results of SOEs, and the regression coefficients of CFO_OI are all negative at the 1% significance level. These results indicate that CFO organizational identification is negatively correlated with the total number of patents and the number of inventions in SOEs, supporting H1a. Columns (3) to (4) of Table 3 are the regression results of non-SOEs. The regression coefficients of CFO_OI are all greater than zero and significant at the level of 1%. These results indicate that CFO organizational identification is positively correlated with the total number of patents and the number of inventions in non-SOEs, supporting H1b.

Table 3. The effect of CFO organizational identification on corporate innovation.

	(1) Patent	(2) Invention	(3) Patent	(4) Invention
Sample	SOEs		Non-SOEs	
CFO_OI	−0.296 ***	−0.294 ***	0.198 ***	0.192 **
	(−3.113)	(−2.958)	(2.612)	(2.458)
Size	0.785 ***	0.833 ***	0.822 ***	0.918 ***
	(11.791)	(11.755)	(13.746)	(15.719)
ROA	1.527	1.977	2.628 **	2.037 **
	(0.980)	(1.295)	(2.107)	(1.978)
Lev	−0.625 *	−0.618	−0.418	−0.223
	(−1.855)	(−1.406)	(−1.392)	(−0.831)
MB	−1.167 ***	−1.553 ***	−1.310 ***	−1.797 ***
	(−3.229)	(−3.769)	(−3.506)	(−5.736)
Firm_age	−0.008	−0.013	−0.015	−0.019 *
	(−0.732)	(−1.048)	(−1.542)	(−1.778)
Growth	0.377 ***	0.362 **	0.231 **	0.199 *
	(3.043)	(2.470)	(2.072)	(1.949)
Cash	−0.245	0.277	−0.512	−0.260
	(−0.464)	(0.504)	(−1.202)	(−0.682)
Fixedpp	−0.174 **	−0.141	−0.084	−0.091
	(−2.203)	(−1.616)	(−1.039)	(−1.391)
Salespp	−0.001	−0.012	−0.129 *	−0.023
	(−0.011)	(−0.099)	(−1.778)	(−0.341)
Yretwd	−0.024	0.004	−0.155	−0.249 ***
	(−0.180)	(0.023)	(−1.618)	(−2.909)
Return_sd	3.868	1.353	−0.224	1.413
	(0.306)	(0.096)	(−0.028)	(0.178)
HHI	−2.012	−4.984	1.481	3.369
	(−0.543)	(−1.164)	(0.321)	(1.519)
HHI^2	−0.133	2.951	−1.745	−4.099 *
	(−0.031)	(0.591)	(−0.356)	(−1.703)
Constant	−9.402 ***	−12.140 ***	−13.388 ***	−17.239 ***
	(−4.295)	(−5.376)	(−6.799)	(−11.020)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Pseudo R^2	0.721	0.704	0.529	0.509
Observations	745	745	1564	1564

Note: (1) z-statistics are in parentheses. (2) ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

4.2.2. Test of Hypothesis 2

Table 4 gives the test results for H2. The results show that H2 is partially supported. In SOEs, corporate misconduct experience positively moderates the relationship between CFO organizational identification and corporate innovation. However, in non-SOEs, corporate misconduct experience has no significant moderating effect on the relationship between CFO organizational identification and corporate innovation. Columns (1) to (2) of Table 4 show that the test result of H2 for SOEs and the regression coefficients of interaction (CFO_OI * Misconduct) are significantly negative. This direction is consistent with the influence of CFO organizational identification on corporate innovation in SOEs. In Columns (3) to (4) of Table 4, the test results of H2 for non-SOEs are reported, and the regression coefficients of interaction (CFO_OI * Misconduct) are not significant. The reason why H2 is not established in the sample of non-SOEs may be that the CFO supporter role expectation is too strong in non-SOEs, and the supervisor role expectation brought about by corporate misconduct experience is minimal.

Table 4. The moderating effect of corporate misconduct experience.

	(1) Patent	(2) Invention	(3) Patent	(4) Invention
Sample	SOEs		Non-SOEs	
CFO_OI	−0.181 *	−0.213 **	0.175 **	0.209 **
	(−1.933)	(−2.071)	(2.243)	(2.535)
Finback	3.954 ***	2.929 ***	−1.021	0.538
	(3.912)	(2.594)	(−0.771)	(0.436)
CFO_OI * Misconduct	−0.934 ***	−0.690 **	0.248	−0.190
	(−3.803)	(−2.520)	(0.795)	(−0.645)
Constant	−9.207 ***	−11.869 ***	−13.158 ***	−17.472 ***
	(−4.351)	(−5.350)	(−6.499)	(−11.081)
Controls	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Pseudo R^2	0.728	0.707	0.529	0.511
Observations	745	745	1564	1564

Note: (1) z-statistics are in parentheses. (2) ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively. (3) The coefficients on the same control variables as in Table 3 are included in regressions but are omitted for the sake of brevity.

4.2.3. Test of Hypothesis 3

Table 5 gives the test results for H3. The results show that H3 is partially supported. In non-SOEs, CFO financial industry experience positively moderates the relationship between CFO organizational identification and corporate innovation. However, in SOEs, CFO financial industry experience has no significant moderating effect on the relationship between CFO organizational identification and corporate innovation. Columns (1) to (2) of Table 4 show that test results for H3 for SOEs, and the regression coefficients of interaction (CFO_OI * Finback) are not significant. In Columns (3) to (4) of Table 4, the test results for H3 for non-SOEs are given, and the regression coefficients of interaction (CFO_OI * Finback) are significantly positive. This direction is consistent with the influence of CFO organizational identification on corporate innovation in non-SOEs. The reason why H3 is not established in the sample of SOEs may be that the CFO supervisor role expectation is too strong in SOEs, and the supporter role expectation brought about by CFO financial industry experience is minimal.

Table 5. The moderating effect of CFO financial industry experience.

	(1) Patent	(2) Invention	(3) Patent	(4) Invention
Sample	SOEs		Non-SOEs	
CFO_OI	−0.334 ***	−0.313 ***	0.166 **	0.165 **
	(−3.282)	(−3.002)	(2.133)	(2.073)
Finback	−2.168	−3.143	−2.363 ***	−2.002 **
	(−1.559)	(−1.604)	(−2.928)	(−2.140)
CFO_OI * Finback	0.525 *	0.686	0.507 ***	0.439 **
	(1.676)	(1.605)	(2.610)	(1.961)
Constant	−9.472 ***	−12.257 ***	−13.551 ***	−17.408 ***
	(−4.344)	(−5.424)	(−6.893)	(−11.123)
Controls	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Pseudo R^2	0.723	0.705	0.531	0.511
Observations	745	745	1564	1564

Note: (1) z-statistics are in parentheses. (2) ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively. (3) The coefficients on the same control variables as in Table 3 are included in regressions but are omitted for the sake of brevity.

5. Robustness Tests

To test the robustness of the above regression results, we use the following methods to test the robustness (shown in Table 6):

(1) CEO organizational identification (CEO_OI) is added as a control variable in the regression model. Previous studies have shown that CEO_OI may affect other executives' organizational identification [75] and corporate innovation [12]. Therefore, the relationship between CFO organizational identification and corporate innovation may be driven by CEO_OI. In order to control the effect of CEO_OI, we add CEO_OI as a control variable in the model. The data for CEO_OI also come from the survey on listed companies conducted by CSRC in 2014. The results show that the impact of CFO organizational identification on corporate innovation remains unchanged.

(2) CFO individual characteristic variables are added as control variables in the regression model. Upper echelons theory points out that the background characteristics of executives affect their own behavior and decision-making, and then affect corporate behavior and corporate performance [77]. Therefore, we add CFO personal characteristics as control variables in the regression model, including CFO education, gender, age, and tenure. To control the impact of traditional incentives, we also add CFO shareholding and compensation into the regression model. The results show that the conclusions of our study do not change.

(3) The sample period is reduced to 2014. The sample period of the hypothesis test is from 2014 to 2015, and the premise is that CFO organizational identification remains unchanged during this period. Admittedly, we cannot fully guarantee that there has been no change in CFO organizational identification. Therefore, we reduce the sample period to the year of the questionnaire survey (i.e., 2014) and then conduct the robustness test. As a result, the conclusions of our study still hold.

Table 6. Robustness test results.

	(1) Patent	(2) Patent	(3) Patent	(4) Patent	(5) Patent	(6) Patent
Test	Adding CEO_OI		Adding CFO characteristics		Reducing period to 2014	
Sample	SOEs	Non-SOEs	SOEs	Non-SOEs	SOEs	Non-SOEs
CFO_OI	−0.228 ***	0.034 **	−0.342 ***	0.195 **	−0.433 ***	0.328 ***
	(−2.618)	(2.309)	(−3.668)	(2.534)	(−3.220)	(3.222)
Constant	−4.591 **	−6.018 ***	−11.618 ***	−13.466 ***	−9.207 ***	−14.604 ***
	(−2.265)	(−7.312)	(−4.967)	(−6.801)	(−3.155)	(−5.482)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.760	0.604	0.728	0.536	0.736	0.580
Observations	562	877	745	1564	399	806

Note: (1) z-statistics are in parentheses. (2) *** and ** indicate 1% and 5% significance levels, respectively. (3) Except where otherwise noted, the coefficients on the same control variables as in Table 3 are included in regressions but are omitted for the sake of brevity.

6. Conclusions and Discussion

Based on the perspective of role theory, we measure CFO role performance by organizational identification and we measure role expectation by corporate owner type, misconduct experience, and CFO financial industry experience—to explore the role of CFOs in corporate innovation. We obtained data of CFO organizational identification from a survey of listed companies conducted by the China Securities Regulatory Commission (CSRC) in 2014. Other data are from the China Stock Market and Accounting Research (CSMAR) database.

6.1. Findings

Our results suggest that: (1) CFO organizational identification is negatively associated with innovation output in SOEs and positively associated with innovation output in non-SOEs; (2) corporate misconduct experience strengthens the supervisor role expectation of the CFO and positively moderates the relationship between CFO organizational identification and innovation in SOEs; (3) CFO financial industry experience strengthens the supporter role expectation of the CFO and positively moderates the relationship between CFO organizational identification and innovation in non-SOEs. Our results show that CFOs take on the supervisor role in innovation in SOEs and the supporter role in innovation in non-SOEs.

6.2. Contributions and Implications

Our study addresses the gaps in current literature in a timely manner. First, our study enriches the research on the executive-level influence factors on corporate innovation. Corporate innovation has received much scholarly attention in recent years. The CEO's pivotal role in corporate decision-making has led to a large number of studies focusing on the impact of CEO characteristics on corporate innovation [4–12], but few studies have focused on CFOs. However, the differences between the roles of CEOs and CFOs result in the proposal that the research conclusions related to CEOs cannot be directly applied to CFOs. For example, Du et al. (2022) [12] find that CEO organizational identification helps promote corporate innovation. In contrast, our study finds that CFO organizational identification promotes innovation in non-SOEs and inhibits innovation in SOEs. Thus, our study enriches, in a timely manner the research on the impact of executives' personal characteristics, especially organizational identification, on corporate innovation. Second, our study enriches the research on the corporate consequences of CFOs. After the global financial crisis in 2008, firms are paying more and more attention to risk management. Accordingly, the position of CFOs in enterprises is growing day by day, which has received a great deal of research attention. Empirical research has shown that CFOs can significantly influence a firm's accounting policies and tools [15–17], quality of internal control [18,19], accounting information quality [20,21], financing costs [22,23], tax policy [24], social responsibility [25], and so on. With the increasing importance of corporate innovation, it is urgent to explore the role of CFOs in corporate innovation. Our study is therefore timely in addressing the gaps in the research on the corporate consequences of CFOs.

Our study also has the following practical implications. First, our findings indicate that CFOs should focus their efforts according to their role expectations in different types of enterprises. CFOs with strong organizational identification are more committed to innovation in non-SOEs (where CFOs play the supporter role), while the opposite holds true for CFOs in SOEs (where CFOs play the supervisor role). CFOs with strong organizational identification in non-SOEs, especially with financial industry experience, can participate in more corporate innovation-related projects to better support corporate innovation. However, CFOs with strong organizational identification in SOEs can be less involved in corporate innovation-related projects and more invested in compliance-related work, especially in companies with misconduct experiences.

Secondly, our findings are useful for CEOs to nominate a CFO and assign the CFO's work. A CEO needs to be paired with the right CFO and assign the right projects to the CFO in order to better leverage synergies. Innovation activities are high-risk, and an aspiring CEO should ideally be paired with a like-minded CFO to best promote corporate innovation. However, prior research has been controversial about the risk preferences of CFOs [23,30]. Our study somewhat reconciles this controversy by finding that CFOs support innovation in non-SOEs and inhibit innovation in SOEs. Thus, CEOs committed to innovation in non-SOEs can nominate a CFO with strong organizational identification, especially with financial industry experience, to assist them in driving corporate innovation. CFOs with strong organizational identification in SOEs are not good partners for CEOs committed to innovation. The CEOs in SOEs can place the CFO with strong organizational identification

in more compliance-related tasks and fewer innovation-related tasks to reduce the CFO's inhibitions in regards to innovation.

Finally, our findings are also informative for the Chinese government in promoting SOE reform. The current focus of SOE reform remains on ownership structure reform [78]. Our study argues that CFOs in SOEs inhibit innovation for multiple reasons, including SOE goal diversification and a high degree of executive job stability. Therefore, for SOEs with innovation potential, government authorities can reduce the policy burden on these SOEs, or can implement pilot market-based hiring of executives in these SOEs, thus stimulating innovation in these SOEs.

6.3. Limitations and Prospects

This study has limitations that provide promising directions for future research. First, to examine what role the conscientious CFO performs in corporate innovation, we use organizational identification to measure CFO role performance. Such a measure, while richly supported by theory, is not meant to be a perfect measure. For example, CFOs with strong organizational identification but weak capability do not necessarily perform well, and conversely, CFOs with weak organizational identification but strong capability do not necessarily perform poorly. Although we have added CFO personal characteristics as controls in our robustness tests, the effects of measurement bias and omitted variables cannot be completely ruled out. Therefore, future research should look for variables that directly measure CFO role performance. Second, we use a sample of Chinese listed companies to test our hypotheses. China is the world's most populous country and the world's second largest economy, so our findings have a wide range of applications. However, China is still an emerging market country with unique institutions and culture, so our findings are not necessarily applicable to other countries. Future research could be conducted across cultures to test the applicability of our findings.

Author Contributions: Conceptualization, J.H.; Data curation, Y.L.; Formal analysis, B.L.; Funding acquisition, B.L.; Investigation, Y.L.; Methodology, Y.L.; Resources, B.L.; Software, J.H.; Supervision, L.L.; Validation, L.L.; Writing—original draft, J.H.; Writing—review and editing, J.H. and Y.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the National Social Science Foundation of China (grant number 18VSJ082), Philosophy and Social Science Foundation of Guangdong Province (grant number GD21TW07-01), Famous Accounting Training Project of China Ministry of Finance (grant number [2016] No.15), and Science and Technology Plan Project of Guangzhou (grant number 202200110001).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this paper are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Questionnaire of organizational identification.

	Strongly Disagree 1	2	3	4	Strongly Agree 5
When someone criticises my firm, I feel that they are criticising me					
I am interested in knowing what others think about my firm					
I usually use "we" to describe my firm rather than "they"					
I think the success of my firm is also my own success					
When someone praises my firm, I feel that they are praising me					
I would feel embarrassed if my firm was covered by the media for negative news					

Based upon the factual situation of your firm and your personal views, please mark "√" in the appropriate spaces.

References

1. Cho, H.; Pucik, V. Relationship between Innovativeness, Quality, Growth, Profitability, and Market Value. *Strateg. Manag. J.* **2005**, *26*, 555–575. [CrossRef]
2. Shin, I.; Park, S. Role of Foreign and Domestic Institutional Investors in Corporate Sustainability: Focusing on R&D Investment. *Sustainability* **2020**, *12*, 8754. [CrossRef]
3. Wang, S.; Zhao, S.; Shao, D.; Liu, H. Impact of Government Subsidies on Manufacturing Innovation in China: The Moderating Role of Political Connections and Investor Attention. *Sustainability* **2020**, *12*, 7740. [CrossRef]
4. Lin, C.; Lin, P.; Song, F.M.; Li, C. Managerial Incentives, CEO Characteristics and Corporate Innovation in China's Private Sector. *J. Comp. Econ.* **2011**, *39*, 176–190. [CrossRef]
5. Hirshleifer, D.; Low, A.; Teoh, S.H. Are Overconfident CEOs Better Innovators? *J. Financ.* **2012**, *67*, 1457–1498. [CrossRef]
6. Li, Z.; Zhang, Y. CEO Overconfidence and Corporate Innovation Outcomes: Evidence From China. *Front. Psychol.* **2022**, *13*, 760102. [CrossRef]
7. Han, S.; Cui, W.; Chen, J.; Fu, Y. Female CEOs and Corporate Innovation Behaviors—Research on the Regulating Effect of Gender Culture. *Sustainability* **2019**, *11*, 682. [CrossRef]
8. Fahlenbrach, R. Founder-CEOs, Investment Decisions, and Stock Market Performance. *J. Financ. Quant. Anal.* **2009**, *44*, 439–466. [CrossRef]
9. Benmelech, E.; Frydman, C. Military CEOs. *J. Financ. Econ.* **2015**, *117*, 43–59. [CrossRef]
10. Shao, D.; Zhao, S.; Wang, S.; Jiang, H. Impact of CEOs' Academic Work Experience on Firms' Innovation Output and Performance: Evidence from Chinese Listed Companies. *Sustainability* **2020**, *12*, 7442. [CrossRef]
11. Sunder, J.; Sunder, S.V.; Zhang, J. Pilot CEOs and Corporate Innovation. *J. Financ. Econ.* **2017**, *123*, 209–224. [CrossRef]
12. Du, D.; Tang, X.; Wang, H.; Zhang, J.H.; Tsui, S.; Lin, D. CEO Organizational Identification and Corporate Innovation Investment. *Account. Financ.* **2022**. [CrossRef]
13. Zorn, D.M. Here a Chief, There a Chief: The Rise of the CFO in the American Firm. *Am. Sociol. Rev.* **2004**, *69*, 345–364. [CrossRef]
14. Indjejikian, R.; Matějka, M. CFO Fiduciary Responsibilities and Annual Bonus Incentives. *J. Account. Res.* **2009**, *47*, 1061–1093. [CrossRef]
15. Ge, W.; Matsumoto, D.; Zhang, J.L. Do CFOs Have Style? An Empirical Investigation of the Effect of Individual CFOs on Accounting Practices. *Contemp. Account. Res.* **2011**, *28*, 1141–1179. [CrossRef]
16. Mian, S. On the Choice and Replacement of Chief Financial Officers. *J. Financ. Econ.* **2001**, *60*, 143–175. [CrossRef]
17. Naranjo-Gil, D.; Maas, V.S.; Hartmann, F.G.H. How CFOs Determine Management Accounting Innovation: An Examination of Direct and Indirect Effects. *Eur. Account. Rev.* **2009**, *18*, 667–695. [CrossRef]
18. Bedard, J.C.; Hoitash, R.; Hoitash, U. Chief Financial Officers as Inside Directors. *Contemp. Account. Res.* **2014**, *31*, 787–817. [CrossRef]
19. Ham, C.; Lang, M.; Seybert, N.; Wang, S. CFO Narcissism and Financial Reporting Quality. *J. Account. Res.* **2017**, *55*, 1089–1135. [CrossRef]
20. Gupta, V.K.; Mortal, S.; Chakrabarty, B.; Guo, X.; Turban, D.B. CFO Gender and Financial Statement Irregularities. *Acad. Manag. J.* **2020**, *63*, 802–831. [CrossRef]
21. Hossain, S.; Monroe, G.S. Chief Financial Officers' Short- and Long-term Incentive-based Compensation and Earnings Management. *Aust. Account. Rev.* **2015**, *25*, 279–291. [CrossRef]
22. Francis, B.; Hasan, I.; Wu, Q. The Impact of CFO Gende..er on Bank Loan Contracting. *J. Account. Audit. Financ.* **2013**, *28*, 53–78. [CrossRef]
23. Kim, J.; Li, Y.; Zhang, L. CFOs Versus CEOs: Equity Incentives and Crashes. *J. Financ. Econ.* **2011**, *101*, 713–730. [CrossRef]
24. Francis, B.B.; Hasan, I.; Wu, Q.; Yan, M. Are Female CFOs Less Tax Aggressive? Evidence from Tax Aggressiveness. *J. Am. Tax. Assoc.* **2014**, *36*, 171–202. [CrossRef]
25. Sun, L.; Rakhman, F. CFO Financial Expertise and Corporate Social Responsibility. *Int. J. Law Manag.* **2013**, *55*, 161–172. [CrossRef]

26. Geiger, M.A.; North, D.S. Does Hiring a New CFO Change Things? An Investigation of Changes in Discretionary Accruals. *Account. Rev.* **2006**, *81*, 781–809. [CrossRef]
27. Jiang, J.; Petroni, K.R.; Yanyan Wang, I. CFOs and CEOs: Who Have the Most Influence on Earnings Management? *J. Financ. Econ.* **2010**, *96*, 513–526. [CrossRef]
28. Chava, S.; Purnanandam, A. CEOs Versus CFOs: Incentives and Corporate Policies. *J. Financ. Econ.* **2010**, *97*, 263–278. [CrossRef]
29. Baker, T.A.; Lopez, T.J.; Reitenga, A.L.; Ruch, G.W. The Influence of CEO and CFO Power on Accruals and Real Earnings Management. *Rev. Quant. Financ. Account.* **2019**, *52*, 325–345. [CrossRef]
30. Xu, Y.; Shi, W.; Qin, X.; Zhang, J.; Tang, X. Is Identification All the Same? The Differential Effects of CEO and CFO Organizational Identification on Corporate Philanthropy. *Manag. Organ. Rev.* **2022**, *18*, 73–107. [CrossRef]
31. Holmstrom, B. Agency Costs and Innovation. *Econ. Behav. Organ.* **1989**, *12*, 305–327. [CrossRef]
32. Biddle, B.J. Recent Developments in Role Theory. *Annu. Rev. Sociol* **1986**, *12*, 67–92. [CrossRef]
33. Rizzo, J.R.; House, R.J.; Lirtzman, S.I. Role Conflict and Ambiguity in Complex Organizations. *Admin. Sci. Quart.* **1970**, *15*, 150–163. [CrossRef]
34. Ashforth, B.E.; Mael, F. Social Identity Theory and the Organization. *Acad. Manag. Rev.* **1989**, *14*, 20–39. [CrossRef]
35. Collins, D.; Fleischman, G.; Kaden, S.; Sanchez, J.M. How Powerful CFOs Camouflage and Exploit Equity-Based Incentive Compensation. *J. Bus. Ethics* **2018**, *153*, 591–613. [CrossRef]
36. Feng, M.; Ge, W.; Luo, S.; Shevlin, T. Why Do CFOs Become Involved in Material Accounting Manipulations? *J. Account. Econ.* **2011**, *51*, 21–36. [CrossRef]
37. Hennes, K.M.; Leone, A.J.; Miller, B.P. The Importance of Distinguishing Errors from Irregularities in Restatement Research: The Case of Restatements and CEO/CFO Turnover. *Account. Rev.* **2008**, *83*, 1487–1519. [CrossRef]
38. Uhde, D.A.; Klarner, P.; Tuschke, A. Board Monitoring of the Chief Financial Officer: A Review and Research Agenda. *Corp. Gov. Int. Rev.* **2017**, *25*, 116–133. [CrossRef]
39. Mael, F.A.; Ashforth, B.E. Alumni and Their Alma Mater: A Partial Test of the Reformulated Model of Organizational Identification. *J. Organ. Behav.* **1992**, *13*, 103–123. [CrossRef]
40. Boivie, S.; Lange, D.; Mcdonald, M.L.; Westphal, J.D. Me or We: The Effects of CEO Organizational Identification on Agency Costs. *Acad. Manag. J.* **2011**, *54*, 551–576. [CrossRef]
41. Abernethy, M.A.; Bouwens, J.; Kroos, P. Organization Identity and Earnings Manipulation. *Account. Organ. Soc.* **2017**, *58*, 1–14. [CrossRef]
42. Bergami, M.; Bagozzi, R.P. Self-Categorization, Affective Commitment and Group Self-Esteem as Distinct Aspects of Social Identity in the Organization. *Brit. J. Soc. Psychol.* **2000**, *39*, 555–577. [CrossRef] [PubMed]
43. Riketta, M. Organizational Identification: A Meta-Analysis. *J. Vocat. Behav.* **2005**, *66*, 358–384. [CrossRef]
44. Michel, J.S.; Kotrba, L.M.; Mitchelson, J.K.; Clark, M.A.; Baltes, B.B. Antecedents of Work–Family Conflict: A Meta-Analytic Review. *J. Organ. Behav.* **2011**, *32*, 689–725. [CrossRef]
45. Chang, S.M.; Budhwar, P.; Crawshaw, J. The Emergence of Value-Based Leadership Behavior at the Frontline of Management: A Role Theory Perspective and Future Research Agenda. *Front. Psychol.* **2021**, *12*, 635106. [CrossRef] [PubMed]
46. Ahmad, Z.; Taylor, D. Commitment to Independence by Internal Auditors: The Effects of Role Ambiguity and Role Conflict. *Manag. Audit. J.* **2009**, *24*, 899–925. [CrossRef]
47. Adler, P.; Adler, P.A. Role Conflict and Identity Salience: College Athletics and the Academic Role. *Soc. Sci. J.* **1987**, *24*, 443–455. [CrossRef]
48. Bertrand, M.; Mullainathan, S. Enjoying the Quiet Life? Corporate Governance and Managerial Preferences. *J. Polit. Econ.* **2003**, *111*, 1043–1075. [CrossRef]
49. Jensen, M.C.; Mecking, W.H. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [CrossRef]
50. Marginson, D.; Bui, B. Examining the Human Cost of Multiple Role Expectations. *Behav. Res. Account.* **2009**, *21*, 59–81. [CrossRef]
51. Bebchuk, L.; Cohen, A.; Ferrell, A. What Matters in Corporate Governance? *Rev. Financ. Stud.* **2009**, *22*, 783–827. [CrossRef]
52. Tajfel, H.; Turner, J.C. The Social Identity Theory of Intergroup Behaviour. In *Psychology of Intergroup Relations*, 2nd ed.; Worchel, S., Austin, W.G., Eds.; Nelson Hall: Chicago, IL, USA, 1985; pp. 7–24.
53. Dukerich, J.M.; Golden, B.R.; Shortell, S.M. Beauty is in the Eye of the Beholder: The Impact of Organizational Identification, Identity, and Image on the Cooperative Behaviors of Physicians. *Admin. Sci. Quart.* **2002**, *47*, 507–533. [CrossRef]
54. Van Dick, R.; Wagner, U.; Stellmacher, J.; Christ, O. The Utility of a Broader Conceptualization of Organizational Identification: Which Aspects Really Matter? *J. Occup. Organ. Psych.* **2004**, *77*, 171–191. [CrossRef]
55. Barua, A.; Davidson, L.F.; Rama, D.V.; Thiruvadi, S. CFO Gender and Accruals Quality. *Account. Horiz.* **2010**, *24*, 25–39. [CrossRef]
56. Manso, G. Motivating Innovation. *J. Financ.* **2011**, *66*, 1823–1860. [CrossRef]
57. Xin, C.; Hilary, G.; Kang, J.; Wenrui, Z. Does Accounting Conservatism Impede Corporate Innovation? *INSEAD Work. Pap. Collect.* **2013**, *2*, 1–42.
58. He, J.J.; Tian, X. The Dark Side of Analyst Coverage: The Case of Innovation. *J. Financ. Econ.* **2013**, *109*, 856–878. [CrossRef]
59. Bai, C.; Lu, J.; Tao, Z. The Multitask Theory of State Enterprise Reform: Empirical Evidence from China. *Am. Econ. Rev.* **2006**, *96*, 353–357. [CrossRef]

60. Bai, C.; Xu, L.C. Incentives for CEOs with Multitasks: Evidence from Chinese State-Owned Enterprises. *J. Comp. Econ.* **2005**, *33*, 517–539. [CrossRef]
61. Xin, Q.; Bao, A.; Hu, F. West Meets East: Understanding Managerial Incentives in Chinese SOEs. *China J. Account. Res.* **2019**, *12*, 177–189. [CrossRef]
62. Fan, J.P.H.; Rui, O.M.; Zhao, M. Public Governance and Corporate Finance: Evidence from Corruption Cases. *J. Comp. Econ.* **2008**, *36*, 343–364. [CrossRef]
63. Huang, Y. *Selling China: Foreign Direct Investment during the Reform Era*; Cambridge University Press: Cambridge, UK, 2005.
64. Brown, J.R.; Martinsson, G.; Petersen, B.C. Law, Stock Markets, and Innovation. *J. Financ.* **2013**, *68*, 1517–1549. [CrossRef]
65. Dodgson, M. Organizational Learning: A Review of Some Literatures. *Organ. Stud.* **1993**, *14*, 375–394. [CrossRef]
66. Argyris, C.; Schon, D.A. *Organizational Learning: A Theory of Action Perspective*; Addison-Wesley: Boston, MA, USA, 1978.
67. Karpoff, J.M.; Lee, D.S.; Martin, G.S. The Cost to Firms of Cooking the Books. *J. Financ. Quant. Anal.* **2008**, *43*, 581–611. [CrossRef]
68. Hribar, P.; Jenkins, N. The Effect of Accounting Restatements on Earnings Revisions and the Estimated Cost of Capital. *Rev. Account. Stud.* **2004**, *9*, 337–356. [CrossRef]
69. Goldman, E.; Peyer, U.; Stefanescu, I. Financial Misrepresentation and Its Impact on Rivals. *Financ. Manag.* **2012**, *41*, 915–945. [CrossRef]
70. David, B.F. Restoring Trust after Fraud: Does Corporate Governance Matter? *Account. Rev.* **2005**, *80*, 539–561.
71. Marquis, C.; Tilcsik, A. Imprinting: Toward a Multilevel Theory. *Acad. Manag. Ann.* **2013**, *7*, 195–245. [CrossRef]
72. Custódio, C.; Metzger, D. Financial Expert CEOs: CEO's Work Experience and Firm's Financial Policies. *J. Financ. Econ.* **2014**, *114*, 125–154. [CrossRef]
73. Graham, J.R.; Harvey, C.R.; Puri, M. Managerial Attitudes and Corporate Actions. *J. Financ. Econ.* **2013**, *109*, 103–121. [CrossRef]
74. Chen, Y.; Lin, B.; Lu, L.; Zhou, G. Can Internal Audit Functions Improve Firm Operational Efficiency? Evidence from China. *Manag. Audit. J.* **2020**, *35*, 1167–1188. [CrossRef]
75. Liao, Y.; Lin, B.; Zhou, H.; Yang, X. The Power of Unrequited Love: The Parasocial Relationship, Trust, and Organizational Identification Between Middle-Level Managers and CEOs. *Front. Psychol.* **2021**, *12*, 3743. [CrossRef] [PubMed]
76. Zhou, M.; Cao, J.; Lin, B. CEO Organizational Identification and Firm Cash Holdings. *China J. Account. Res.* **2021**, *14*, 183–205. [CrossRef]
77. Hambrick, D.C. Upper Echelons Theory: An Update. *Acad. Manag. Rev.* **2007**, *32*, 334–343. [CrossRef]
78. Wang, J.C.; Yi, J.; Zhang, X.; Peng, M.W. Pyramidal Ownership and SOE Innovation. *J. Manag. Stud.* **2022**. [CrossRef]