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Sobhan, Abdus , Bose, Sudipta , Miah, Muhammad Shahin  and Razzaque, Rushdi Md Rezaur (2023) Does certification of corporate governance compliance pay off? Evidence from a unique regulatory setting. *Corporate Governance: An International Review*. ISSN 0964-8410

DOI: <https://doi.org/10.1111/corg.12563>

Publisher: Wiley

Version: Published Version

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Additional Information: This is an open access article which first appeared in *Corporate Governance: An International Review*

Data Access Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Does certification of corporate governance compliance pay off? Evidence from a unique regulatory setting

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Funding information

No funders are available.

Abstract

Research Questions/Issues: Using insights from agency and signaling theories, we examine the effect on companies' market-based performance of a unique monitoring mechanism of compliance with a corporate governance (CG) code, that is, independent certification of compliance with a CG code and type of certification provider. Furthermore, we examine the impact of two boundary conditions, family company status and company-level information asymmetry, influencing the effect of independent CG compliance certification and type of certification provider on the market-based performance of companies.

Research Findings/Insights: Based on 1110 Bangladeshi company-year observations from 2006 to 2017, we firstly find that independent CG compliance certification is positively associated with companies' market-based performance. Secondly, we show that CG compliance certification by a chartered secretarial firm is related to higher market-based performance. Thirdly, we document that family companies attenuate both these associations. Finally, we find that, while company-level information asymmetry reinforces the association between CG compliance certification and market-based performance, it weakens the relationship between certification by a chartered secretarial firm and companies' market-based performance.

Theoretical/Academic Implications: Our findings are consistent with the agency and signaling theory that independent certification of CG compliance and this certification by a chartered secretarial firm reduce information asymmetry between managers and external investors by signaling enhanced credibility of reported CG compliance information. However, the roles of CG compliance certification and certification by a chartered secretarial firm to reduce agency conflict and provide credible signals are conditional on two boundary conditions: family company status and company-level information asymmetry.

Practitioner/Policy Implications: This study's findings highlight the economic implications of a unique mechanism for monitoring compliance with an adopted CG code. The findings have significant implications for policy makers and regulators in emerging economies.

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KEYWORDS

corporate governance, certification of compliance, chartered secretarial firm, market-based performance of companies, emerging economy

1 | INTRODUCTION

Many emerging economies have adopted the Anglo-American-inspired corporate governance (CG) model, leaving the monitoring of companies' compliance with CG codes to capital markets (Armitage et al., 2017). In contrast, the regulator in Bangladesh, the Bangladesh Securities and Exchange Commission (BSEC), in its Bangladesh Corporate Governance Code (BCGC)-2012, mandated that listed companies obtain a certificate of compliance with the BCGC from an external independent professional firm and publish this certificate in the annual reports, next to a BCGC-2012 compliance checklist (BSEC, 2012). We consider this certificate of compliance requirement to be the most far-reaching provision of the BCGC-2012, given that it has the potential to reduce agency conflict between managers and external investors (Carnes et al., 2019; Cortes, 2021) by lowering a company's tendency to overstate compliance with the BCGC-2012 and to provide a credible signal to investors (Khedmati et al., 2015; Zhang & Wiersema, 2009) regarding a company's de facto compliance with the BCGC-2012. Moreover, the BSEC offers listed companies the flexibility of obtaining this CG compliance certification from either an independent practicing chartered secretarial firm or a professional accounting firm. Overall, these provisions bring a unique regulatory framework to the monitoring of compliance with a CG code by companies in the emerging market context. This study utilizes Bangladesh's unique regulatory setting to examine whether companies' market-based performance is affected by the mandatory certification of compliance with a CG code and the type of certification provider.

In the context of emerging markets, a growing body of recent literature investigates the effects of regulatory changes in CG on company-level outcomes by focusing on blanket CG reform (e.g., Dharmapala & Khanna, 2013; Koirala et al., 2020), increased independent board (e.g., Black & Kim, 2012; Ngo et al., 2018), issuer recognition program resulting in improved information disclosure (González et al., 2021), and level of compliance with CG codes (e.g., Black et al., 2012; Price et al., 2011). While many of these studies provide convincing evidence that regulatory changes in CG play roles in reducing agency conflict and providing credible signaling, hence being valued by external investors (Black & Kim, 2012; Claessens & Yurtoglu, 2013; González et al., 2021; Koirala et al., 2020), overall results have been inconclusive (Black et al., 2012; Price et al., 2011). However, an exploration of the effects of CG compliance certification on the market-based performance of firms in this literature, to the best of our knowledge, is rare. Moreover, prior studies find that many companies in emerging markets comply symbolically or overstate their compliance with the provisions of the adopted CG codes (Sobhan, 2016; Wanyama et al., 2009; Witt et al., 2021). Hence, examining the effects of mandatory independent certification of CG compliance and the type of certification provider on companies' market-based performance in emerging market contexts is very relevant.

Finally, another stream of existing empirical studies pertinent to our study has been conducted in the context of the United States since the enactment of the *Sarbanes-Oxley Act of 2002* (SOX). These studies focus on the effects of SOX, Section 404(b), the requirement for external auditors to certify the effectiveness of their clients' internal control over financial reporting (ICFR), with ICFR being an element of CG, on companies' market-based performance (e.g., Carnes et al., 2019; Cortes, 2021; Iliev, 2010; Khedmati et al., 2015). Not only do these studies provide mixed evidence (e.g., Carnes et al., 2019; Cortes, 2021; Iliev, 2010; Khedmati et al., 2015), but also the findings of these studies may not sustain in emerging country contexts as they are characterized by poor investor protection, weak legal enforcement, and family-dominated companies. Moreover, given that only external auditors are permitted to certify the effectiveness of their clients' ICFR under SOX, this prior literature is unable to shed light on whether investors prefer professional accounting firms to alternative certification providers.

Prior literature has also shown that the roles of regulatory changes in CG to reduce agency conflict and provide credible signals differ based on ownership (e.g., Chen et al., 2020; Koirala et al., 2020) and opaqueness of the companies (e.g., Carnes et al., 2019; Hirtle, 2006). Family ownership and control are dominant characteristics of companies in Bangladesh (Farooque et al., 2007; Sobhan, 2014), as in many other emerging economies (Armitage et al., 2017; Fan & Wong, 2005). Therefore, our study further examines the moderating effect of family company status and information asymmetry on the association of independent certification of compliance with the BCGC-2012 and the type of CG compliance certification provider with companies' market-based performance.

Our study's analysis, based on a sample of 1110 Bangladeshi company-year observations from 2006 to 2017, explores the impact of the certification of CG compliance mandated by the BCGC-2012 on companies' market-based performance. This certification of CG compliance is found to be positively associated with companies' market-based performance. Our study also employed a sample of 639 Bangladeshi company-year observations from 2012 to 2017 to assess the impact of the type of CG compliance certification provider on companies' market-based performance. The capital market is found to attach a significantly higher value to CG compliance certification obtained from a practicing chartered secretarial firm. Several robustness tests are conducted in our study to address the possible issue of endogeneity, with these tests comprising reverse causality by using the system generalized method of moments (GMM) as developed by Blundell and Bond (1998), Heckman's (1979) two-stage model, and placebo analysis. All robustness tests support our main findings.

Our study also finds evidence that, in the case of family companies, external investors place a lower value not only on CG compliance certification but also on CG compliance certification provided by chartered secretarial firms. This evidence suggests that capital market

participants perceive CG compliance certification, irrespective of the type of certification provider, as a less credible mechanism in family companies than in their non-family counterparts for signaling de facto compliance with the BCGC-2012. Conversely, company-level information asymmetry positively moderates the effect of CG compliance certification on companies' market-based performance. However, when informationally opaque companies obtain their compliance certification from practicing chartered secretarial firms, investors appear to value it less favorably. This evidence suggests that the value investors place on a CG compliance certificate offered by practicing chartered secretarial firms is negatively affected by their relatively weak audit experience in the case of these companies.

This study contributes to the CG literature in three ways. Firstly, our evidence of the positive impact of CG compliance certification on companies' market-based performance is consistent with the findings of a growing body of literature that is investigating the effect of regulatory changes in CG on company-level outcomes in emerging markets (Black & Kim, 2012; Dharmapala & Khanna, 2013; González et al., 2021; Koirala et al., 2020). However, our study differs from these earlier studies as our focus is on certification of compliance with a CG code and the type of certification provider, instead of on blanket CG reform, more independent board, or overall compliance with adopted CG codes. For instance, Koirala et al. (2020) investigate and find that companies subject to compliance with stricter CG rules, Clause 49 of the Indian CG code, take higher risks that maximize shareholder wealth in the post-reform period than is the case with companies exempt from compliance with these CG rules.¹ Moreover, our findings contribute to the ongoing debate on whether the certification of a CG element by an independent professional firm affects companies' market-based performance (Carnes et al., 2019; Chang et al., 2006; Cortes, 2021; Iliev, 2010; Khedmati et al., 2015; Litvak, 2007; Zhang & Wiersema, 2009) in an emerging economy characterized by poor investor protection, weak legal enforcement, and family-dominated companies.

Secondly, our unique research context offers the opportunity to identify practicing chartered secretarial firms as experts in CG subject matter using prior literature on statutory audit (Ahn et al., 2020; Christensen et al., 2015; Gal-Or et al., 2022; Kanagaretnam et al., 2009) and corporate social responsibility (CSR) assurance (Casey & Grenier, 2015; Clarkson et al., 2019). Our study shows that the value of compliance certification with a CG code is, on average, higher in magnitude when this certification is obtained from practicing chartered secretarial firms rather than professional accounting firms. This evidence is consistent with recent statutory audit literature on the impact of subject matter expertise of auditors on company-level outcome variables (Ahn et al., 2020; Christensen et al., 2015; Gal-Or et al., 2022; Kanagaretnam et al., 2009). Our findings suggest that in the case of CG compliance certification within emerging economies, the subject matter expertise of certification providers provides a positive extrinsic cue to the stock markets about CG compliance certification.

Thirdly, we contribute to prior literature that documents the varying effects of the certification of a CG element on a company's market-based performance depending on the company's characteristics (Carnes et al., 2019; Chen et al., 2020; Hirtle, 2006; Wilkinson & Clements, 2006) by identifying and testing two boundary conditions.

Given the existing evidence that family companies in Bangladesh are reputed to circumvent CG reform by different means (Ahmed & Uddin, 2018, 2022; Sobhan, 2016), our study contributes to the literature by showing that family companies negatively moderate the association of compliance certification with the BCGC-2012 and practicing chartered secretarial firms as CG compliance certification providers with companies' market-based performance. Similarly, the main role of certification is to reduce information asymmetry (Kausar et al., 2016; Zhou et al., 2019), with this role varying based on company-level information asymmetry (Choi & Lee, 2014). Our study adds to this literature by demonstrating the moderating effect of company-level information asymmetry on the association of CG compliance certification and the type of certification provider with companies' market-based performance. Finally, the findings of this study have significant implications for regulators, international financial institutions, investor associations, and company insiders that strive for excellence in CG in emerging economies.

The rest of this paper is structured as follows. Section 2 provides a brief overview of the study's context. Section 3 presents the theoretical framework and develops our hypotheses, followed by a discussion of the research method in Section 4. Section 5 examines the study's empirical results, while Section 6 concludes the paper.

2 | INSTITUTIONAL BACKGROUND

Bangladesh is an emerging economy characterized by a poor legal environment and weak investor protection, with companies owned and controlled by sponsor families (Farooque et al., 2007; Sobhan, 2014). However, as the country has experienced impressive economic growth in recent years, it has felt the need to enhance foreign and domestic investors' confidence in the stock market by improving the transparency and accountability of managers and directors (Khan et al., 2013). Thus, the BSEC has carried out a succession of reforms to its CG codes based on the Anglo-American-inspired model (Sobhan & Bose, 2019). The BSEC implemented its first CG reform in 2006 with the adoption of the BCGC-2006 after the stock market crash in 1996 (Siddiqui, 2010).

The BCGC-2006 was a code based on the "comply or explain" principle and included CG recommendations remarkably similar to the Principles of Corporate Governance of 1999 as set out by the Organisation for Economic Co-operation and Development (OECD) (Sobhan & Bose, 2019; Uddin & Choudhury, 2008). The Dhaka Stock Exchange (DSE) and the Chittagong Stock Exchange (CSE) later included the BCGC-2006 in their listing rules. Since the BCGC-2006's adoption, research based on compliance disclosed in annual reports found a high level of compliance (World Bank, 2009). However, studies using interview and survey data show that the traditionalist culture and cognitive institutional framework mediate CG's rationalist/legalist framework in Bangladesh; therefore, companies, in reality, are not complying with the BCGC-2006 provisions (Sobhan, 2016; Uddin & Choudhury, 2008).

In 2012, the BSEC revised the BCGC-2006 to a "comply"-based code and, in the BCGC-2012, introduced the requirement for compliance certification by an independent practicing chartered secretarial

firm or professional accounting firm (BSEC, 2012). Except for the introduction of this requirement for compliance certification, other provisions of the BCGC-2012 are similar to those of the BCGC-2006 in principle. Significant incongruity is documented in prior research between compliance, as reported in annual reports, and underlying compliance with the BCGC (Sobhan, 2016). Hence, the introduction of independent compliance certification is perhaps a regulatory initiative to reduce this high-level incongruity, thus enhancing de facto compliance with the BCGC-2012. All listed companies are required to publish this certification in their annual reports, next to a checklist specifying their “compliance” with each provision of the BCGC-2012 (BSEC, 2012). The BSEC's Corporate Finance Department (CFD) has taken an active role in monitoring whether a listed company obtains its certificate of compliance with the BCGC-2012 from an external professional firm and submits it to the BSEC on time. If a listed company fails to do so, the CFD independently investigates that company's status of compliance with the BCGC-2012 (BSEC, 2016). If this investigation uncovers the company's unsatisfactory compliance with the BCGC-2012, the CFD takes enforcement actions against that company (BSEC, 2016).

In essence, this certification requirement is similar to that in Section 404(b) of the SOX. However, unlike Section 404(b) of the SOX, the scope of this compliance certification is to certify compliance with all provisions of a CG code, with companies offered discretion to obtain this certification from either a professional accounting firm or a chartered secretarial firm. This discretion regarding the choice of compliance certification provider resembles that of CSR assurance, which can be obtained from either a CSR consultant or a professional accounting firm. Moreover, as with CSR consultants, chartered secretarial firms have better CG subject matter knowledge but, as they lack statutory audit rights, they have less assurance expertise.

Unlike CSR assurance, compliance certification with the BCGC-2012 by an external professional firm is mandatory. Also, this certification can only be provided by an external professional firm that is a member of a recognized professional body (i.e., the Institute of Chartered Accountants of Bangladesh [ICAB], the Institute of Cost and Management Accountants of Bangladesh [ICMAB], or the Institute of Chartered Secretaries of Bangladesh [ICSB]) (BSEC, 2012). In other words, all external professional firms that can provide this compliance certification are subject to an enforceable code of ethics with sanctions for non-compliance, thus highlighting the similarities between certification of compliance with the BCGC-2012 and statutory audits. Prior research has shown that the ability of CSR assurance and statutory audits to lessen agency conflict and provide a positive signal about the reliability of reported information varies depending on assurers' and auditors' subject matter knowledge and audit experience (e.g., Ahn et al., 2020; Casey & Grenier, 2015; Clarkson et al., 2019; Gal-Or et al., 2022). Hence, the choice of the type of CG compliance certification provider, given their variability regarding subject matter knowledge in CG and statutory audit experience, is likely to create a different level of impact by enhancing the integrity of compliance with the BCGC-2012 reported in annual reports.

3 | THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

3.1 | External certification within agency and signaling theory perspectives

An external certification process is a form of audit (Jiang et al., 2022). From the standpoint of agency theory, audit is seen as a type of monitoring mechanism (Jensen & Meckling, 1976; Jiang et al., 2022). According to this viewpoint, the benefits of external audit and the appointment of quality auditors include combating fraudulent financial reporting (Singer & You, 2011), improving the reliability and relevance of reported financial information to external parties (Ball, 2001; Ball et al., 2012), and alleviating information asymmetry between managers and external investors (Cortes, 2021; Muller & Riedl, 2002). However, obtaining external auditing and engaging quality auditors involve incurring huge costs, including audit fees and compliance costs associated with audit rules (Jiang et al., 2022). Hence, the economic trade-off between these benefits and costs determines the net benefits and decision to obtain an external audit and appoint a superior quality auditor (DeFond & Zhang, 2014; Hogan, 1997). Also, the extent of agency conflict between insiders and external shareholders depends on boundary conditions such as the heterogeneity of company characteristics (e.g., ownership and control) (Chen et al., 2020; Shi et al., 2022). Consequently, the benefits of obtaining external auditing and engaging quality auditors are found to be conditional on company characteristics (Chen et al., 2020; Choi & Lee, 2014; Wilkinson & Clements, 2006).

The obtainment of external audit and the choice of quality auditors, where managerial discretion is available, are determined not only by monitoring requirements but also by managers' incentives to provide a positive signal to market participants about the integrity of their company's reported information (Anderson et al., 2022; Datar et al., 1991; Lennox & Pittman, 2011). For instance, past empirical evidence (e.g., Fan & Wong, 2005; Firth & Liao-Tan, 1998) suggests that the quality of external auditors provides positive signals about the credibility of the reported financial information. Again, the effectiveness of signaling to influence the perception of the signal receiver depends on sender-related boundary conditions (Bona-Sánchez et al., 2019; Cohen & Dean, 2005; Colombo, 2021; Zhang & Wiersema, 2009). Consistent with this view, Zhang and Wiersema (2009) find that the signaling effect of the chief executive officer's (CEO) certification of financial information on companies' market-based performance is conditioned on the CEO's background.

3.2 | Certification of CG arrangements and companies' market-based performance

In principle, the certification of a CG element by an external professional firm reduces agency conflict as it improves the effectiveness of the CG element that constrains managers from intentional misstatement, increases the reliability and relevance of reported information,

and lowers information asymmetry between managers and external investors (Khedmati et al., 2015; Singer & You, 2011). Moreover, the independent certification of a CG element provides a positive signal to investors about the effectiveness of CG that ensures the integrity of the reported information (Khedmati et al., 2015; Zhang & Wiersema, 2009). Reduced agency conflict and the perceived enhanced integrity of the disclosed information, in turn, increase companies' market-based performance.

Consistent with the views of agency and signaling theories, many studies find that obtainment of an independent ICFR certificate positively affects companies' market-based performance (Carnes et al., 2019; Chang et al., 2006; Cortes, 2021; Jain & Rezaee, 2006; Khedmati et al., 2015; Li et al., 2008). For instance, Carnes et al. (2019) report that investors positively price the equity of an acquirer company that obtains an independent certification of the acquired operation's ICFR effectiveness. Other studies of this nature report a positive abnormal return effect around the dates of the announcement of Section 404 of the SOX and the first filing of independent certification by companies in compliance with Section 404 (Chang et al., 2006; Jain & Rezaee, 2006; Li et al., 2008). In comparison, limited contrary empirical evidence exists, with this explained by the high costs suffered by small companies in complying with the mandatory independent certification of ICFR requirements (Ahmed et al., 2010; Iliev, 2010; Litvak, 2007). On balance, the benefits of the independent certification of ICFR outweigh the costs of compliance and produce net financial reporting benefits for companies, as confirmed by a review of this prior literature by Coates and Srinivasan (2014).

In the context of emerging economies, prior literature, with a few exceptions (e.g., Black et al., 2012; Price et al., 2011), broadly supports the view that better CG reduces agency conflict between managers and shareholders and plays a signaling role (Black & Kim, 2012; Dharmapala & Khanna, 2013; González et al., 2021; Koirala et al., 2020). For example, Dharmapala and Khanna (2013) demonstrate that enactment of stricter CG rules in India provided a favorable signal about the CG structure of companies subject to these new CG rules; hence, around the announcement dates of these new CG rules, the stock market positively priced their equities. Black and Kim (2012), studying CG reform in South Korea, report similar evidence. In India, Koirala et al. (2020) also find that companies subject to compliance with stricter CG rules take higher risks that maximize shareholder wealth in the post-reform period than is the case with companies exempt from compliance with these CG rules. Finally, Claessens and Yurtoglu (2013), in their review of CG literature in emerging economies, conclude that better CG increases access to finance, lowers the cost of capital, and improves performance, also suggesting that CG plays roles in reducing agency conflict and providing favorable signals to shareholders in these markets.

In Bangladesh, regarding the impact of CG elements on company-level outcomes, prior empirical evidence generally demonstrates that CG plays roles in reducing agency conflict (Khan et al., 2013; Muttakin et al., 2015, 2018). For instance, Khan et al. (2013) find that board independence positively affects CSR disclosures. However, prior research shows that the authenticity of compliance with the BCGC

provisions reported in annual reports by companies is questionable (Ahmed & Uddin, 2018; Sobhan, 2016). As a monitoring mechanism, certification of compliance with the BCGC by an external professional firm has the potential to enhance the integrity of dubious compliance. Moreover, an external professional firm is more likely to offer suggestions to rectify weaknesses in the underlying CG arrangements of companies, thus improving these arrangements. This monitoring may increase de facto compliance with the provisions of the BCGC and reduce the incongruity between reported and underlying compliance. Hence, the certification of compliance with the BCGC by an external professional firm improves the reliability of BCGC compliance reported in annual reports and positively influences investors' perceptions of compliant firms' CG structure. Finally, these benefits outweigh the costs of the mandatory requirement of BCGC compliance certification by an external professional firm, as audit fees are generally low in Bangladesh (Belal et al., 2017; Khan et al., 2015). Hence, the certification of compliance with the BCGC by an external professional firm positively influences a company's market-based performance. Accordingly, our study's first hypothesis is stated as follows:

H1. The certification of compliance with the BCGC is positively associated with a company's market-based performance.

3.3 | Type of compliance certification provider and companies' market-based performance

The BSEC (2012) allows companies to obtain the certificate of compliance with the BCGC from either professional accounting firms or practicing chartered secretarial firms. The professional accounting firms eligible to certify compliance with the BCGC are ICAB or ICMA members who have the statutory right to conduct financial and cost auditing in Bangladesh, respectively. Prior studies on CSR assurance argue that professional accounting firms possess superior expertise in the assurance process due to their statutory audit rights and experiences (Channuntapit et al., 2020; O'Dwyer, 2011). This suggests that CSR assurance obtained from professional accounting firms reduces information asymmetry between insiders and external stakeholders, hence reducing agency conflict, to a greater extent than would be the case with CSR consultants. However, Clarkson et al. (2019) provide empirical evidence that only Big 4 accounting firms, rather than all professional accounting firms, drive the positive association between CSR assurance obtained from professional accounting firms and a company's market-based performance.

In Bangladesh, only two of the Big 4 auditing firms have launched their direct operations (Khan et al., 2015). These Big 4 auditing firms charge premium fees for their services (Khan et al., 2015); therefore, companies rarely obtain their certification of compliance with the BCGC-2012 from these firms. Furthermore, unlike the situation in developed countries (Ballou et al., 2018; Casey & Grenier, 2015), the ability of Bangladeshi audit firms affiliated with the Big 4 accounting firms, let alone unaffiliated small local accounting firms, to maintain

professional independence and observe the best audit practices is in doubt (Belal et al., 2017; Uddin & Choudhury, 2008). Hence, professional accounting firms, as providers of certification of compliance with the BCGC, are less likely to increase the reliability of reported CG compliance information to external investors than the practicing chartered secretarial firms.

In contrast, practicing chartered secretarial firms are ICSB members. Due to their lack of statutory audit rights, practicing chartered secretarial firms have less audit-related experience than professional accounting firms. However, prior research shows that chartered secretaries provide their employer companies with guidance on the management of sound CG frameworks and CG culture (International Finance Corporation [IFC], 2016; McNulty & Stewart, 2015). They are also responsible for promoting, enabling, and encouraging efficient and effective functioning of the board of directors and its sub-committees; ensuring proper compliance with relevant CG procedures, laws, and regulations; and facilitating better relationships with shareholders and stakeholders (IFC, 2016; McNulty & Stewart, 2015). This point suggests that chartered secretarial firms have better CG subject matter expertise than professional accounting firms. A recent stream of the auditing research demonstrates that the task-specific expertise of auditors positively influences audit quality (Christensen et al., 2015; Gal-Or et al., 2022) and value relevance (Ahn et al., 2020; Kanagaretnam et al., 2009) of the specific financial components in which the auditors have expertise. For instance, Kanagaretnam et al. (2009) document that the positive association between discretionary components of loan loss provision (LLP) and stock return for banks is driven by auditor expertise within the banking industry and not by Big 4 auditors. Hence, chartered secretarial firms are in a better position than professional accounting firms to ensure reliability and relevance of compliance with the BCGC as disclosed in companies' annual reports.

Moreover, the ICSB is the only professional institute in Bangladesh that develops and disseminates Bangladesh Secretarial Standards (e.g., standards for a board meeting or for an annual general meeting [AGM] that the BSEC recognizes). The providers of certificates of compliance with the BCGC are also required to express an opinion on whether their client companies comply with the provisions of the relevant Bangladesh Secretarial Standards, as adopted by the ICSB (BSEC, 2018). Hence, the engagement of practicing chartered secretarial firms by a company to certify compliance with the BCGC may signal that this company has a genuine interest in compliance with the BCGC and is seeking to improve the effectiveness of its CG arrangements. Finally, Gunn et al. (2022), studying the quality of ICFR certification in China, recently document that the quality of ICFR certification suffers when the same audit firm certifies the ICFR, while also auditing the financial statements. As a professional accounting firm provides the statutory audits, the verification of compliance with the BCGC by a practicing chartered secretarial firm may be more credible in the eyes of investors.

On balance, in the eyes of external investors, the monitoring role and signaling value of the certificate of compliance with the BCGC provided by practicing chartered secretarial firms will be higher than

when provided by professional accounting firms. Thus, we hypothesize the following:

H2. Companies that obtain certification of compliance with the BCGC-2012 from a practicing chartered secretarial firm will have better market-based performance than companies that get this certification from a professional accounting firm.

3.4 | Boundary conditions: family companies and information asymmetry

3.4.1 | Certification of CG arrangements, family companies, and companies' market-based performance

Family companies are the dominant form of publicly listed companies in Bangladesh (Khan et al., 2015; Sobhan & Bose, 2019). Family companies are characterized by unique agency problems (Kabbach de Castro et al., 2017). While lower levels of agency conflict occur between shareholders and managers (Agency Type I problem), family ownership and control increase agency problems between majority and minority shareholders (Agency Type II problem) (Armitage et al., 2017; Chen et al., 2020). However, the overall effect of this unique agency relationship on the trade-off between the benefits and costs of stricter CG remains inconclusive (Hsu et al., 2018).

In the United States, Chen et al. (2020) report that independent certification of ICFR significantly reduces family entrenchment in family companies that maintained ineffective ICFR in the pre-SOX period. Similarly, in India, Koirala et al. (2020) find that the effect of stricter CG on a company's risk-taking behavior toward the maximization of shareholder wealth is more pronounced in family companies. This evidence suggests that certification of compliance with the BCGC by family companies in Bangladesh plays a higher monitoring and signaling role regarding improvement of the reliability of reported compliance with the BCGC than is the case with non-family companies.

However, concentrated inside ownership (e.g., family ownership) is found to have a negative effect on compliance with a CG code (Arcot et al., 2010; Kabbach de Castro et al., 2017; Zeidan, 2014). This tendency of non-compliance is exacerbated in countries like Bangladesh, where the legal environment and investor protection are weak (Chen & Cheng, 2020; Dow & McGuire, 2016). In Bangladesh, family companies have extraordinary capacities to insulate themselves from different disciplinary mechanisms (Ahmed & Uddin, 2022; Khan et al., 2015). For instance, Bangladeshi family companies appoint less-independent individuals as independent directors and restrict their performance of roles by limiting discussion of critical strategic matters in the board meeting and access to the required information (Ahmed & Uddin, 2022). In other emerging market contexts, prior research also shows that family companies negatively affect the monitoring role of stricter CG (Cho & Kim, 2007; Jaggi & Leung, 2007; Prencipe & Bar-Yosef, 2011). For example, Jaggi and Leung (2007) find that family companies in Hong Kong weaken the positive

association between the presence of an audit committee and earnings quality. Moreover, as in Taiwan (Hsu et al., 2018), Bangladeshi family companies appoint inferior-quality auditors and pay lower audit fees than non-family companies (Khan et al., 2015). This evidence suggests that family companies will weaken the monitoring role of the certification of compliance with the BCGC-2012.

Moreover, Zhang and Wiersema (2009) find that investors place a lower value on the attestation of financial statement numbers when the CEO's involvement with the company's prior financial restatement provides negative signals. Given the stronger associations of family companies with manipulation of compliance with the BCGC and appointment of lower quality auditors, the compliance certification that they obtain is likely to send a less positive signal to external investors and to assure them of the reliability of reported compliance with the BCGC in their annual reports. Accordingly, we state the following hypothesis (H1A):

H1A. The positive effect of the certification of compliance with the BCGC on companies' market-based performance is less pronounced in family companies.

3.4.2 | Type of compliance certification provider, family companies, and companies' market-based performance

Practicing chartered secretarial firms have better expertise in Anglo-American CG models than professional accounting firms. As mentioned earlier, family companies have lower incentives to comply with the provisions of a CG code (Kabbach de Castro et al., 2017). These incentives deteriorate in countries like Bangladesh, where the cognitive-cultural dimension of the institution conflicts with the Anglo-American CG structure (Ahmed & Uddin, 2022; Sobhan, 2016). Therefore, family companies are less likely to benefit from the CG subject matter expertise of a practicing chartered secretarial firm. Moreover, Bangladeshi family companies maintain a high degree of confidentiality and a low level of transparency (Uddin, 2009). Yet, as mentioned previously, practicing chartered secretarial firms have less audit-related experience than professional accounting firms. As a result, practicing chartered secretarial firms may find it more challenging to verify the congruence between compliance as reported in annual reports and the underlying compliance practiced by family companies. In sum, CG compliance certification obtained by family companies from practicing chartered secretarial firms is less likely to assure external investors of the reliability of reported compliance and has a lower impact on the market-based performance of these companies. Hence, our study posits the following hypothesis:

H2A. The positive effect of the certification of compliance with the BCGC provided by a practicing chartered secretarial firm on companies' market-based performance is less pronounced in family companies.

3.4.3 | Certification of CG arrangements, information asymmetry, and companies' market-based performance

One of the crucial roles of assurance is to reduce information asymmetry between companies and external investors (Kausar et al., 2016; Zhou et al., 2019). Hence, from an agency theory perspective, companies suffering from high-level information asymmetry benefit more from assurance than less opaque companies (Fan et al., 2021). Consistent with this argument, Alexander et al. (2013) report that the benefits of mandatory independent certification of the effectiveness of ICFR are more pronounced for firms that maintained poor transparency and accountability in the pre-SOX period. Similarly, Hirtle (2006) provides empirical evidence that the abnormal returns following CEO certification of financial statement numbers are systematically associated with the extent of opacity in banking holding companies. This evidence, when translated into our study's context, suggests that the certification of compliance with the BCGC has a greater role to play in reducing agency conflict in the case of companies suffering from high-level information asymmetry. In other words, the positive impact of certification of compliance with the BCGC on companies' market-based performance will be more pronounced for companies with a higher level of opaqueness. Thus, we hypothesize the following:

H1B. The positive effect of certification of compliance with the BCGC on companies' market-based performance is more pronounced in companies with higher information asymmetry.

3.4.4 | Type of compliance certification provider, information asymmetry, and companies' market-based performance

Previous studies on CSR assurance find that CSR consultants, with their less audit expertise (Channuntapipat et al., 2020; O'Dwyer, 2011), are less able to detect inaccuracies in prior CSR statements (Ballou et al., 2018). This detection of inaccuracies may become more challenging when a company has high-level information asymmetry. Hence, assurers' roles of reducing agency conflict and sending credible signals, if those assurers have relatively poor audit expertise, are compromised by a high degree of company-level information asymmetry. As mentioned previously, practicing chartered secretarial firms have less audit experience than professional accounting firms. They would find it more challenging in companies suffering from high-level information asymmetry to verify the congruence between compliance as reported in annual reports and underlying compliance practiced. The stock market, factoring in this challenge faced by practicing chartered secretarial firms working with informationally opaque client companies, will therefore place a lower value on the certificate of compliance with the BCGC of informationally opaque companies when this is provided by practicing chartered secretarial firms. Hence, our study posits the following hypothesis (H2B):

H2B. The positive effect of certification of compliance with the BCGC by a practicing chartered secretarial firm on companies' market-based performance is less pronounced in companies with higher information asymmetry.

4 | METHODOLOGY

4.1 | Sample and data

The study sample consists of all companies listed on the DSE in Bangladesh from 2006 to 2017. We chose 2006 as the starting year for data collection as the BSEC implemented its first CG reform in 2006, with 2017 being the final year of data collection. The selected period covers 6 years prior to and 6 years following 2012, the year in which CG compliance certification was mandated for Bangladeshi publicly listed companies. We manually collected company-level financial and CG data from companies' annual reports. Company-level stock market data were collected from the DataStream database. We excluded financial industry companies from our sample due to their different assets and liability structures. We merged data from the annual reports with the DataStream database. After exclusion of incomplete company-year observations, our final sample size was 1110 company-year observations with 114 unique companies from 2006 to 2017 for the CG compliance certification model and, for the CG compliance certification provider model, 639 company-year observations with 114 unique companies from 2012 to 2017. Table 1, panel A, provides the sample selection process.

Table 1, panels B and C, presents the industry- and year-wise distribution of companies in the sample, respectively. In the CG compliance certification sample, our sample is dominated by companies operating in the engineering and textiles industries (17.48% each), followed by the pharmaceutical industry (15.32%), while the tannery industry (4.23%) has the lowest number of companies. For the CG compliance certification provider, our sample is dominated by companies operating in the textiles industry (18%), followed by the engineering industry (17.53%), while the tannery industry (3.60%) again has the lowest number of companies. Furthermore, for the CG compliance certification sample, the highest number of observations (10.09% each) is in 2014 and 2016, followed by 2017 (10%), while 2006 has the lowest number (6.13%). For the CG compliance certification provider sample, the highest number of observations (17.53% each) is in 2014 and 2016, followed by 2013 (17.21%), while 2015 has the lowest number (14.40%).

4.2 | Measures of CG compliance certification and provider of CG compliance certification

We measure CG compliance certification (*CGOV_CERT*) as an indicator variable that takes a value of 1 for the years after the issuance of the CG compliance certification guidelines (sample years: 2012–2017) and 0 otherwise (sample years: 2006–2011). This approach is

consistent with prior research that investigated the impact of CG regulations (e.g., SOX) on firm-level outcome variables (e.g., Cohen et al., 2008; Ghosh & Pawlewicz, 2009). Furthermore, we measure the provider of CG compliance certification (*PROVIDER*) as an indicator variable that takes a value of 1 if the CG compliance is certified by practicing chartered secretarial firms and 0 if the CG compliance is certified by professional accounting firms.

4.3 | Measure of companies' market-based performance

We employ Tobin's Q (*TOBINQ*) as a measure of companies' market-based performance in line with prior studies (e.g., Bose et al., 2021; Farooque et al., 2007; Roll et al., 2009). *TOBINQ* is measured as the ratio of the book value of total assets plus the market value of equity minus the book value of equity to total assets. We employ Tobin's Q instead of accounting-based measures of performance, as it signals a company's future growth potential as well as its profit sustainability or expected performance (Bose, Podder, & Biswas, 2017; Luo & Bhattacharya, 2006). Tobin's Q is a risk-adjusted measure and is less sensitive to changes in accounting practices (Bharadwaj et al., 1999). As share price is a key input in calculating Tobin's Q, changes in share price may indicate investors' reactions to CG compliance certification regulation and the choice of certification provider.

4.4 | Empirical models

We adopt a lead-lag approach in all our regression models to address potential endogeneity issues arising from reverse causality related to CG compliance certification and its providers. We utilize the following models (1) and (2) to test *H1* and *H2*, respectively:

$$\begin{aligned} \text{TOBINQ}_{i,t+1} = & \beta_0 + \beta_1 \text{CGOV_CERT}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{LEV}_{i,t} \\ & + \beta_5 \text{GROWTH}_{i,t} + \beta_6 \text{CAPIN}_{i,t} + \beta_7 \text{RISK}_{i,t} + \beta_8 \text{LIQUID}_{i,t} \\ & + \beta_9 \text{INSTOWN}_{i,t} + \beta_{10} \text{FOREIGN}_{i,t} + \beta_{11} \text{GOVT}_{i,t} + \beta_{12} \text{FF}_{i,t} \\ & + \beta_{13} \text{BSIZE}_{i,t} + \beta_{14} \text{BIND}_{i,t} + \beta_{15} \text{DUAL}_{i,t} + \beta_{16} \text{FEMDIR}_{i,t} \\ & + \beta_{17} \text{ACSIZE}_{i,t} + \beta_{18} \text{ACIND}_{i,t} + \beta_{19} \text{FEMAC}_{i,t} + \sum \text{YEAR}_{i,t} \\ & + \sum \text{INDUSTRY}_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (1)$$

$$\begin{aligned} \text{TOBINQ}_{i,t+1} = & \beta_0 + \beta_1 \text{PROVIDER}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{LEV}_{i,t} \\ & + \beta_5 \text{GROWTH}_{i,t} + \beta_6 \text{CAPIN}_{i,t} + \beta_7 \text{RISK}_{i,t} + \beta_8 \text{LIQUID}_{i,t} \\ & + \beta_9 \text{INSTOWN}_{i,t} + \beta_{10} \text{FOREIGN}_{i,t} + \beta_{11} \text{GOVT}_{i,t} + \beta_{12} \text{FF}_{i,t} \\ & + \beta_{13} \text{BSIZE}_{i,t} + \beta_{14} \text{BIND}_{i,t} + \beta_{15} \text{DUAL}_{i,t} + \beta_{16} \text{FEMDIR}_{i,t} \\ & + \beta_{17} \text{ACSIZE}_{i,t} + \beta_{18} \text{ACIND}_{i,t} + \beta_{19} \text{FEMAC}_{i,t} \\ & + \beta_{20} \text{AUDITOR}_{i,t} + \sum \text{YEAR}_{i,t} + \sum \text{INDUSTRY}_{i,t} + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

To test *H1A* and *H1B*, we include the interaction terms, *CGOV_CERT* × *FF* and *PROVIDER* × *FF*, in Equations (1) and (2), respectively. We measure family firm (*FF*) as an indicator variable that takes a value of 1 if the sponsor family owns at least 20% of the

TABLE 1 Sample selection and distribution.

Panel A: Sample selection					
			CGV_CERT model	PROVIDER model	
Total number of firm-year observations from 2006 to 2017/2012 to 2017			1277	661	
Less: Firm-year observations dropped due to insufficient control variables			(167)	(22)	
Final sample size from 2006–2017/2012–2017			1110	639	
Panel B: Industry distribution					
B.1 Corporate governance compliance certification sample			B.2 Certification provider sample		
Industry	Observations	%	Industry	Observations	%
Cement and ceramics	115	10.36	Cement and ceramics	64	10.02
Engineering	194	17.48	Engineering	112	17.53
Food & allied industries	111	10.00	Food & allied industries	57	8.92
Fuel & power	100	9.01	Fuel & power	68	10.64
IT & services	98	8.83	IT & services	60	9.39
Miscellaneous	81	7.30	Miscellaneous	44	6.89
Pharmaceuticals	170	15.32	Pharmaceuticals	96	15.02
Tannery	47	4.23	Tannery	23	3.60
Textiles	194	17.48	Textiles	115	18.00
Total	1110	100	Total	639	100
Panel C: Year-wise distribution					
C.1 Corporate governance compliance certification sample			C.2 Certification provider sample		
Year	Observations	%	Year	Observations	%
2006	68	6.13	2012	102	15.96
2007	73	6.58	2013	110	17.21
2008	73	6.58	2014	112	17.53
2009	78	7.03	2015	92	14.40
2010	82	7.39	2016	112	17.53
2011	97	8.74	2017	111	17.17
2012	102	9.19	Total	639	100
2013	110	9.91			
2014	112	10.09			
2015	92	8.29			
2016	112	10.09			
2017	111	10.00			
Total	1110	100			

company and sponsor family members hold the positions of either chairman or CEO and 0 otherwise (Khan et al., 2013; Sobhan, 2016). Furthermore, to test H2A and H2B, we include the interaction terms, $CGOV_CERT \times HIGH_INFASYM$ and $PROVIDER \times HIGH_INFASYM$, in Equations (1) and (2), respectively. We compute $HIGH_INFASYM$ with the categorical variable that takes a value of 1 if the company's information asymmetry is higher than the sample's yearly median of information asymmetry and 0 otherwise. We measure information asymmetry using the bid–ask spread, following Bose, Saha, et al. (2017). Hence, a positive coefficient for $CGOV_CERT$ and a statistically significant negative coefficient for $CGOV_CERT \times FF$ will support our H1 and H1A, respectively. Similarly, a positive coefficient for

$PROVIDER$ and a negative coefficient for $PROVIDER \times FF$ will support our H2 and H2A. Finally, a positive (negative) coefficient for $CGOV_CERT \times HIGH_INFASYM$ ($PROVIDER \times HIGH_INFASYM$) will support our H1B and H2B, respectively. Appendix A provides the definition of all variables.

We include several control variables in Equations (1) and (2) in line with prior studies (Bose et al., 2021; Roll et al., 2009). Larger companies are more likely to enjoy economies of scale, which may result in companies' improved market-based performance (Bose, Podder, & Biswas, 2017; Farooque et al., 2007). Therefore, we control for company size ($SIZE$). We control for profitability (ROA) as more profitable companies may have favorable investment opportunities, which may

contribute to their higher market-based performance (Roll et al., 2009). Furthermore, we control for leverage (*LEV*) as leverage may influence companies' market-based performance through debt holders' monitoring activities (Roll et al., 2009). We control for capital intensity (*CAPIN*) as the proxy for actual investment opportunities undertaken. Companies that invest more are likely to have higher investment opportunities and a higher value for Tobin's *Q* (Roll et al., 2009). Furthermore, prior studies in emerging markets (e.g., Bose, Saha, et al., 2017; Khan et al., 2015) find that companies with a higher level of market risk (*RISK*) exert a greater impact on companies' market-based performance. Thus, we control for market risk (*RISK*). We control for a company's share trading volume (*LIQUID*) as a higher trading volume indicates greater demand for shares that may positively influence the company's market-based performance (Bose, Saha, et al., 2017; Roll et al., 2009). Following Bose, Saha, et al. (2017), we also control for revenue growth (*GROWTH*) to capture the impact of growth on a company's market-based performance. Moreover, we include the family status of companies (*FF*) in our model to control for their effect on market-based performance.

We also include institutional ownership (*INSTOWN*), foreign ownership (*FOREIGN*), and government ownership (*GOVT*) in our model to control for the influence of these stakeholder groups as they are generally considered to be monitoring agents (Bose et al., 2021). Furthermore, following prior studies (e.g., Bose et al., 2021), we include board size (*BSIZE*), board independence (*BIND*), CEO duality (*DUAL*), female directors (*FEMDIR*), audit committee size (*ACSIZE*), audit committee independence (*ACIND*), and female members on the audit committee (*FEMAC*) to control for the impact of these CG factors on companies' market-based performance.

4.5 | Estimation methods

We employ the ordinary least squares (OLS) regression technique to estimate all our regression models. We apply **robust standard errors clustered by company and year to control heteroskedasticity and serial correlation issues** in our research models. To check the robustness of our models' results for CG compliance certification and CG compliance certification provider, we employ **system GMM regression and placebo analysis**. We also employ **Heckman's (1979) two-stage estimation approach to check the robustness of our model's results for the CG certification provider**. In all our regressions, we use industry and year fixed effects.

5 | RESULTS

5.1 | Descriptive statistics and correlation analysis

Table 2, panels A and B, provides the descriptive statistics of the variables shown, respectively, in Equations (1) and (2). As shown in Table 2, panel A, around 57.60% of observations in our sample fall in the post-CG compliance certification period (*CGOV_CERT*), while

panel B shows that around 12.50% of observations in our sample obtain CG compliance certification services from chartered secretarial firm providers (*PROVIDER*). In our study, the average company performance measured by Tobin's *Q* (*TOBINQ*) is 1.833 for the CG compliance certification model (as shown in panel A), while it is 1.890 for the certification providers' model (as shown in panel B). About 66.10% of our sample observations are classified as family firms (*FF*) for the CG compliance certification model (as shown in panel A), while 67.10% are classified as family firms (*FF*) for the certification providers' model (as shown in panel B). Furthermore, we provide year-by-year descriptive statistics for all variables used in Equations (1) and (2) in Appendix B.

Table 2, panel C, presents the comparison of means and medians of the variables used in Equation (1), based on the years pre- and post-CG compliance certification issuance. The results suggest that companies in the post-CG certification period have higher market-based performance (*TOBINQ*) and are larger (*SIZE*). In addition, they have more leverage (*LEV*), lower sales growth (*GROWTH*), higher capital intensity (*CAPIN*), lower company risk (*RISK*), higher liquidity (*LIQUID*), lower institutional ownership (*INSTOWN*) and foreign ownership (*FOREIGN*), larger board size (*BSIZE*), higher board independence (*BIND*), lower CEO duality (*DUAL*), more female directors (*FEMDIR*), larger audit committee size (*ACSIZE*), higher audit committee independence (*ACIND*), and more female members on the audit committee (*FEMAC*) than in the pre-CG certification period. The median test produces qualitatively similar results.

Table 2, panel C, also presents the comparison of means and medians of the variables used in Equation (2), based on chartered secretarial firm providers versus professional accounting firm providers of CG certification. The results suggest that companies with CG compliance certification provided by chartered secretarial firms have higher market-based performance (*TOBINQ*) and are larger (*SIZE*) and more profitable (*ROA*). They also have lower risk (*RISK*), lower liquidity (*LIQUID*), higher foreign ownership (*FOREIGN*), and higher government ownership (*GOVT*) and are more likely to be family companies (*FF*). Furthermore, these companies have smaller board size (*BSIZE*), more female directors (*FEMDIR*), smaller audit committee size (*ACSIZE*), less female members on the audit committee (*FEMAC*), and lower probability of using the statutory auditor as the CG compliance certification provider (*AUDITOR*) than companies with CG compliance certification provided by professional accounting firms.

Pearson's bivariate correlation matrix for Equations (1) and (2) is reported in Table 3, panels A and B, respectively. In panel A, a company's market-based performance (*TOBINQ*) is positively correlated to *CGV_CERT* ($r = .051$), profitability ($r = .577$), growth ($r = .080$), foreign ownership ($r = .189$), board size ($r = .101$), board independence ($r = .059$), and audit committee size ($r = .133$), while it is negatively correlated to company size ($r = -.055$), leverage ($r = -.090$), institutional ownership ($r = -.138$), government ownership ($r = -.060$), family company ($r = -.304$), and CEO duality ($r = -.110$). Furthermore, in panel B, a company's market-based performance (*TOBINQ*) is positively correlated to *PROVIDER* ($r = .130$), profitability ($r = .577$), growth ($r = .080$), foreign ownership ($r = .189$), board size ($r = .101$),

TABLE 2 Descriptive statistics.

Panel A: Descriptive statistics for certification of corporate governance compliance						
	Observations	Mean	SD	Median	1st quartile	3rd quartile
TOBINQ	1110	1.833	1.317	1.385	1.038	2.150
CGOV_CERT	1110	0.576	0.494	1.000	0.000	1.000
SIZE	1110	7.625	1.659	7.458	6.483	8.720
ROA	1110	5.418	6.419	3.807	1.514	8.442
LEV	1110	0.241	0.290	0.142	0.010	0.355
GROWTH	1110	0.153	0.411	0.097	-0.029	0.232
CAPIN	1110	0.677	0.318	0.683	0.442	0.879
RISK	1110	0.028	0.010	0.027	0.021	0.034
LIQUID	1110	7.563	19.816	1.589	0.477	4.838
INSTOWN	1110	0.161	0.119	0.144	0.069	0.238
FOREIGN	1110	0.049	0.156	0.000	0.000	0.001
GOVT	1110	0.051	0.172	0.000	0.000	0.000
FF	1110	0.661	0.473	1.000	0.000	1.000
BSIZE	1110	2.123	0.245	2.079	1.946	2.303
BIND	1110	0.197	0.107	0.200	0.143	0.250
DUAL	1110	0.119	0.421	0.000	0.000	0.000
FEMDIR	1110	0.140	0.143	0.125	0.000	0.250
ACSIZE	1110	1.507	0.170	1.386	1.386	1.609
ACIND	1110	0.287	0.176	0.333	0.250	0.333
FEMAC	1110	0.112	0.190	0.000	0.000	0.250
HIGH_INFASYM	1110	0.550	0.498	1.000	0.000	1.000
Panel B: Descriptive statistics for the provider of corporate governance compliance certification						
	Observations	Mean	SD	Median	1st quartile	3rd quartile
TOBINQ	639	1.890	1.418	1.374	1.057	2.213
PROVIDER	639	0.125	0.331	0.000	0.000	0.000
SIZE	639	7.994	1.666	7.955	6.936	9.094
ROA	639	5.286	6.407	3.816	1.486	8.215
LEV	639	0.326	0.304	0.261	0.105	0.463
GROWTH	639	0.102	0.362	0.063	-0.067	0.194
CAPIN	639	0.681	0.310	0.691	0.454	0.853
RISK	639	0.025	0.009	0.024	0.019	0.031
LIQUID	639	1.664	1.927	0.971	0.350	2.276
INSTOWN	639	0.152	0.108	0.141	0.068	0.221
FOREIGN	639	0.014	0.053	0.000	0.000	0.000
GOVT	639	0.053	0.178	0.000	0.000	0.000
FF	639	0.671	0.470	1.000	0.000	1.000
BSIZE	639	2.139	0.259	2.197	1.946	2.303
BIND	639	0.241	0.099	0.222	0.200	0.286
DUAL	639	0.020	0.141	0.000	0.000	0.000
FEMDIR	639	0.163	0.141	0.143	0.0000	0.286
ACSIZE	639	1.539	0.177	1.609	1.386	1.609
ACIND	639	0.350	0.146	0.333	0.250	0.333
FEMAC	639	0.136	0.206	0.000	0.000	0.250
AUDITOR	639	0.052	0.221	0.000	0.000	0.000
HIGH_INFASYM	639	0.444	0.497	0.000	0.000	1.000

(Continues)

TABLE 2 (Continued)

	Panel C: Mean and median comparison											
	CGOV_CERT						PROVIDER					
	CGOV_CERT = 1		CGOV_CERT = 0		t-test (p-value)	z-test (p-value)	Chartered secretary		Accountant		t-test (p-value)	z-test (p-value)
	Mean	Median	Mean	Median			Mean	Median	Mean	Median		
TOBINQ	1.890	1.374	1.754	1.398	.000 ^{***}	.000 ^{***}	2.447	1.819	1.811	1.356	0.000 ^{***}	0.002 ^{***}
SIZE	7.994	7.955	7.123	6.886	.000 ^{***}	.000 ^{***}	8.867	8.460	7.870	7.723	0.000 ^{***}	0.000 ^{***}
ROA	5.286	3.816	5.597	3.766	.425	.453 ^{***}	7.607	5.135	4.954	3.737	0.000 ^{**}	0.021 ^{**}
LEV	0.326	0.261	0.124	0.011	.000 ^{***}	.000 ^{***}	0.315	0.257	0.328	0.261	0.730	0.759
GROWTH	0.102	0.063	0.223	0.138	.000 ^{***}	.000 ^{***}	0.077	0.088	0.105	0.061	0.509	0.758
CAPIN	0.681	0.691	0.673	0.671	.673 ^{**}	.825 ^{**}	0.661	0.683	0.684	0.691	0.539	0.450
RISK	0.025	0.024	0.031	0.032	.000 ^{***}	.000 ^{***}	0.022	0.021	0.026	0.025	0.002 ^{***}	0.000 ^{***}
LIQUID	1.664	0.971	1.565	4.599	.000 ^{***}	.000 ^{***}	1.146	0.803	1.739	0.999	0.010 ^{***}	0.013 ^{***}
INSTOWN	0.152	0.141	0.174	0.150	.003 ^{***}	.043 ^{***}	0.030	0.000	0.012	0.000	0.312	0.305
FOREIGN	0.014	0.000	0.095	0.000	.000 ^{***}	.000 ^{***}	0.056	0.000	0.053	0.000	0.004 ^{***}	0.030 ^{***}
GOVT	0.053	0.000	0.048	0.000	.639	.867	0.563	1.000	0.687	1.000	0.873	0.423
FF	0.671	1.000	0.648	1.000	.408	.408	2.203	2.197	2.130	2.197	0.027 ^{**}	0.027 ^{**}
BSIZE	2.139	2.197	2.101	2.079	.011 ^{***}	.022 ^{**}	0.239	0.222	0.241	0.222	0.019 ^{**}	0.008 ^{***}
BIND	0.241	0.222	0.137	0.143	.000 ^{***}	.000 ^{***}	0.000	0.000	0.023	0.000	0.888	0.393
DUAL	0.020	0.000	0.253	0.000	.000 ^{***}	.000 ^{***}	0.110	0.100	0.171	0.167	0.169	0.169
FEMDIR	0.163	0.143	0.109	0.000	.000 ^{***}	.000 ^{***}	1.585	1.609	1.532	1.386	0.000 ^{***}	0.003 ^{***}
ACSIZE	1.539	1.609	1.465	1.386	.000 ^{***}	.000 ^{***}	0.348	0.333	0.350	0.333	0.013 ^{***}	0.004 ^{***}
ACIND	0.350	0.333	0.202	0.250	.000 ^{***}	.000 ^{***}	0.086	0.000	0.143	0.000	0.902	0.601
FEMAC	0.136	0.000	0.080	0.000	.000 ^{***}	.000 ^{***}	0.001	0.000	0.059	0.000	0.022 ^{**}	0.007 ^{***}
AUDITOR	--	--	--	--	--	--	0.000	0.000	0.059	0.023	0.026 ^{**}	0.026 ^{**}

Note: All variables are defined in Appendix A.

^{***}Statistically significant at the 1% level.

^{**}Statistically significant at the 5% level.

^{*}Statistically significant at the 10% level.

board independence ($r = .059$), and audit committee size ($r = .133$), while it is negatively correlated to company size ($r = -.055$), leverage ($r = -.098$), institutional ownership ($r = -.138$), government ownership ($r = -.060$), family company ($r = -.304$), and CEO duality ($r = -.110$). All these coefficients are significant, at least at the 10% level, but no coefficient exceeds a value of .80, with Gujarati and Porter (2009) suggesting that bivariate correlations with values less than .80 do not create any multicollinearity problems. Variables used in Equations (1) and (2) have mean variance inflation factor (VIF) values of 1.52 and 1.40, respectively, with values ranging from 1.02 to 2.26. A VIF value higher than 10 is viewed as leading to potential multicollinearity concerns (Gujarati & Porter, 2009). Thus, our results are unlikely to suffer from multicollinearity problems.

5.2 | Regression results

Table 4 reports the regression results. Model (1) reports the regression results of the CG compliance certification regulation while

Model (2) reports the regression results of the CG compliance certification providers. The adjusted R -squared (R^2) values for Models (1) and (2) are 50.90% and 57.70%, respectively, suggesting that the independent variables adequately explain the variation in the dependent variable. The coefficient of *CGOV_CERT* is positive and statistically significant ($\beta = 1.478$, $p < .01$) in Model (1), thus supporting a positive association between CG compliance certification regulation and companies' market-based performance. The results suggest that CG compliance certification regulation is positively priced by investors, thus supporting H1. In terms of economic significance, based on the coefficients in Model (1), we infer that, on average, Tobin's Q has increased by 147.80% in the post-CG compliance certification period compared to the pre-CG compliance certification period.

In Table 4, Model (2), we present the impact of the choice of CG compliance certification provider on companies' market-based performance. The coefficient of *PROVIDER* is positive and statistically significant ($\beta = 0.305$, $p < .05$) in Model (2), thus supporting a positive association between CG compliance certification provided by

TABLE 3 Correlation matrix.

Panel A: Pearson's correlation matrix for the CG certification model variables																					
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	
TOBINQ	[1]	1.000																			
CGOV_CERT	[2]	.051	1.000																		
SIZE	[3]	-.055	.260	1.000																	
ROA	[4]	.577	-.024	.214	1.000																
LEV	[5]	-.090	.344	.120	-.272	1.000															
GROWTH	[6]	.080	-.146	.056	.225	.012	1.000														
CAPIN	[7]	-.039	.013	-.339	-.196	-.066	-.066	1.000													
RISK	[8]	-.035	-.30	-.430	-.233	-.019	.023	.139	1.000												
LIQUID	[9]	.012	-.347	-.012	.026	-.115	.140	-.056	.119	1.000											
INSTOWN	[10]	-.138	-.090	.035	-.110	-.069	-.007	-.006	-.073	-.017	1.000										
FOREIGN	[11]	.189	-.255	.084	.287	-.14	.081	-.065	-.085	-.060	-.078	1.000									
GOVT	[12]	-.060	.014	.389	-.008	.093	-.032	-.242	-.139	.042	-.008	-.082	1.000								
FF	[13]	-.304	.025	-.160	-.323	.142	.000	.183	.117	.098	.079	-.263	-.415	1.000							
BSIZE	[14]	.101	.077	.383	.147	.051	.037	-.077	-.173	-.112	-.008	.060	.306	.306	1.000						
BIND	[15]	.059	.479	.067	.010	.238	-.037	-.010	-.117	-.174	-.098	-.047	-.042	-.012	-.178	1.000					
DUAL	[16]	-.110	-.273	-.153	-.051	-.156	.048	.047	.073	.068	.006	.022	-.046	.035	.006	-.218	1.000				
FEMDIR	[17]	-.044	.187	-.139	-.101	.106	-.049	.048	.044	-.104	.078	-.185	-.190	.355	-.146	.117	-.123	1.000			
ACSIZE	[18]	.133	.216	.264	.148	.050	-.037	.005	-.158	-.014	-.071	.037	.099	-.184	.146	.136	-.143	-.091	1.000		
ACIND	[19]	.002	.417	.059	-.030	.143	-.017	-.084	-.081	-.186	.010	-.128	.015	-.086	.044	.342	-.167	.171	-.152	1.000	
FEMAC	[20]	.002	.146	-.070	-.041	.045	-.040	.093	.026	-.025	.003	-.080	-.050	.130	-.105	.103	-.084	.429	-.064	.027	1.000
Panel B: Pearson's correlation matrix for the CG certification provider model variables																					
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	
TOBINQ	[1]	1.000																			
PROVIDER	[2]	.130	1.000																		
SIZE	[3]	-.055	.209	1.000																	
ROA	[4]	.577	.095	.214	1.000																
LEV	[5]	-.098	.072	.120	-.272	1.000															
GROWTH	[6]	.080	-.052	.056	.225	.012	1.000														
CAPIN	[7]	-.039	-.014	-.339	-.196	-.066	-.066	1.000													
RISK	[8]	-.035	-.158	-.430	-.233	-.019	.023	.139	1.000												
LIQUID	[9]	.012	-.090	-.012	.026	-.115	.140	-.056	.11	1.000											
INSTOWN	[10]	-.138	-.049	.035	-.110	-.069	-.007	-.006	-.073	-.017	1.000										
FOREIGN	[11]	.189	-.033	.084	.287	-.143	.081	-.065	-.085	-.060	-.078	1.000									

(Continues)

TABLE 3 (Continued)

Panel B: Pearson's correlation matrix for the CG certification provider model variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
GOVT	[12]	-.060	.008	.389	-.008	.093	-.032	-.242	-.139	.042	-.008	-.082	1.000							
FF	[13]	-.304	-.058	-.160	-.323	.142	.000	.183	.117	.098	.079	-.26	-.415	1.000						
BSIZE	[14]	.101	.091	.383	.147	.051	.037	-.077	-.173	-.112	-.008	.06	.306	-.318	1.000					
BIND	[15]	.059	.111	.067	.010	.238	-.037	-.010	-.117	-.174	-.098	-.047	-.042	-.012	-.178	1.000				
DUAL	[16]	-.110	-.079	-.153	-.051	-.156	.048	.047	.073	.068	.006	.022	-.046	.035	.006	-.21	1.000			
FEMDIR	[17]	-.044	-.059	-.139	-.101	.106	-.049	.048	.044	-.104	.078	-.185	-.190	.355	.117	.123	1.000			
ACSIZE	[18]	.133	.127	.264	.148	.050	-.037	.005	-.158	-.014	-.071	.037	.099	.184	.136	-.143	-.091	1.000		
ACIND	[19]	.002	.097	.059	-.030	.143	-.017	-.084	-.081	-.186	.010	-.128	.015	-.086	.044	.342	.171	-.152	1.000	
FEMAC	[20]	.002	-.038	-.070	-.041	.045	-.040	.093	.026	-.025	.003	-.080	-.050	.130	-.105	.103	-.084	.429	-.064	1.000

Note: A correlation coefficient in bold indicates that the correlation is statistically significant at least at the 10% level. All variables are defined in Appendix A. Abbreviation: CG, corporate governance.

practicing chartered secretarial firms and companies' market-based performance. The results suggest that CG compliance certification, when obtained from a practicing chartered secretarial firm, is perceived to provide a higher level of assurance regarding a company's compliance with the BCGC, with this additional assurance enhancing the company's market-based performance, thus supporting H2. In terms of economic significance, based on the coefficients in Model (2), we infer that a company's market-based performance is enhanced by 30.50% when the CG compliance certification is obtained from practicing chartered secretarial firm providers compared to when it is obtained from professional accounting firm providers.

Regarding the control variables, we find that the coefficients of ROA, LEV, RISK, FOREIGN, BSIZE, and ACSIZE are positive and statistically significant in both Models (1) and (2), suggesting that companies with higher profitability, leverage, risk, foreign ownership, board size, and audit committee size have higher market-based performance. On the other hand, the coefficients of SIZE and FF are negative and statistically significant in both Models (1) and (2), suggesting that larger companies and family-owned companies have lower market-based performance. Furthermore, the coefficient of ACIND is negative and statistically significant in Model (1), suggesting that companies that have more independent audit committee members have lower market-based performance. Moreover, the coefficient of LIQUID is negative and statistically significant in Model (2), suggesting that companies with higher liquidity have lower market-based performance. Although the significant relationships between these control variables and companies' market-based performance are generally consistent with our expectations, the negative coefficient for company size (SIZE) is interpreted to mean that larger companies have lower market-based performance compared to smaller companies. Perhaps larger companies have higher agency costs in comparison to smaller companies, with larger companies unable to effectively minimize these costs (Agrawal & Knoeber, 1996; Claessens et al., 2002).

5.3 | Moderating role of family companies and information asymmetry

5.3.1 | Role of family companies

Our study's H1A predicts that family companies negatively moderate the positive association between CG compliance certification and companies' market-based performance. Additionally, H2A predicts that family companies negatively moderate the positive relationship between chartered secretarial firms as providers of CG compliance certification and companies' market-based performance. We report the regression results in Table 5. In order to test the moderation hypotheses, the key variables of interest are CGOV_CERT × FF and PROVIDER × FF in Table 5, Models (1) and (3), respectively. These interaction terms capture the difference in effects of CG compliance certification and chartered secretarial firms as providers of this certification on companies' market-based performance for family companies compared to non-family companies. Equally important, the

TABLE 4 Regression results of association of corporate governance compliance certification and provider of this certification with market-based performance.

	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
CGOV_CERT	1.478*** (8.114)	--
PROVIDER	--	0.305** (2.256)
SIZE	-0.230*** (-7.336)	-0.301*** (-7.424)
ROA	0.111*** (11.076)	0.137*** (9.842)
LEV	0.217* (1.774)	0.378** (2.488)
GROWTH	-0.106 (-0.929)	-0.182 (-1.185)
CAPIN	-0.095 (-0.873)	-0.057 (-0.460)
RISK	0.134*** (2.826)	0.192*** (2.753)
LIQUID	0.001 (0.500)	-0.064*** (-3.313)
INSTOWN	-0.035 (-0.166)	-0.494 (-1.551)
FOREIGN	0.486* (1.757)	3.895*** (3.339)
GOVT	-0.458 (-1.195)	-0.393 (-0.765)
FF	-0.516*** (-4.817)	-0.656*** (-4.252)
BSIZE	0.371** (2.504)	0.559*** (2.730)
BIND	-0.461 (-1.459)	-0.481 (-1.182)
DUAL	-0.083 (-1.442)	-0.133 (-1.171)
FEMDIR	0.049 (0.213)	0.605* (1.955)
ACSIZE	0.388* (1.770)	0.453* (1.668)
ACIND	-0.535*** (-2.965)	-0.291 (-1.095)
FEMAC	0.090 (0.552)	0.222 (1.126)
AUDITOR	--	-0.159 (-1.604)

(Continues)

TABLE 4 (Continued)

	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
Intercept	0.987* (1.677)	1.367 (1.577)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	1110	639
R^2	.526	.599
Adjusted R^2	.509	.577
F-statistics	19.955***	17.605***

Note: This table reports the regression results for the association of corporate governance compliance certification and certification provider with market-based firm performance. Model (1) presents the regression results of Equation (1), while Model (2) shows the regression results for Equation (2). Robust two-tailed t-statistics clustered by firm and year are presented in parentheses. All variables are defined in Appendix A.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

coefficients of *CGOV_CERT* and *PROVIDER* capture the effects of CG compliance certification and chartered secretarial firms as providers of this certification for non-family companies. The coefficients of *CGOV_CERT* and *PROVIDER* are positive and statistically significant ($\beta = 1.888$, $p < .01$ in Model 1; $\beta = 0.706$, $p < .05$ in Model 3, respectively). In contrast, the coefficients of *CGOV_CERT* \times *FF* and *PROVIDER* \times *FF* are negative and statistically significant ($\beta = -0.546$, $p < .01$ in Model 1; $\beta = -0.672$, $p < .05$ in Model 3, respectively). This indicates that family companies attenuate the positive association of CG compliance certification and chartered secretarial firms as providers of CG compliance certification with companies' market-based performance. Hence, H1A and H2A are supported.

5.3.2 | Role of information asymmetry

Our study's H1B and H2B, respectively, predict that information asymmetry positively (negatively) moderates the positive association between CG compliance certification (chartered secretarial firms as providers of CG compliance certification) and companies' market-based performance. Table 5 presents the regression results. To test the moderation hypotheses, the key variables of interest are *CGOV_CERT* \times *HIGH_INFASYM* and *PROVIDER* \times *HIGH_INFASYM* shown in Table 5, Models (2) and (4), respectively. The interaction terms capture the difference in effects of CG compliance certification and chartered secretarial firms as providers of this certification on companies' market-based performance, comparing companies with higher level information asymmetry with those with lower level information asymmetry. Equally important, the coefficients of *CGOV_CERT* and *PROVIDER* capture the effects of CG compliance certification and

TABLE 5 Regression results of association of corporate governance compliance certification and certification provider with market-based performance: role of family companies and information asymmetry.

	Dependent variable = $TOBINQ_{t+1}$		Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)	Model (3)	Model (4)
CGOV_CERT	1.888*** (8.480)	1.253*** (6.496)	--	--
CGOV_CERT × FF	-0.546*** (-4.155)	--	--	--
CGOV_CERT × HIGH_INFASYM	--	0.434*** (3.240)	--	--
PROVIDER	--	--	0.706** (2.573)	0.545*** (3.141)
PROVIDER × FF	--	--	-0.672** (-2.186)	--
PROVIDER × HIGH_INFASYM	--	--	--	-0.618** (-2.257)
HIGH_INFASYM	--	0.019 (0.175)	--	0.033 (0.307)
SIZE	-0.238*** (-7.634)	-0.231*** (-7.494)	-0.306*** (-7.498)	-0.304*** (-7.557)
ROA	0.110** (11.060)	0.106*** (10.634)	0.132*** (9.135)	0.135*** (9.472)
LEV	0.244* (1.957)	0.153 (1.252)	0.353** (2.300)	0.366** (2.423)
GROWTH	-0.097 (-0.862)	-0.084 (-0.749)	-0.174 (-1.125)	-0.176 (-1.155)
CAPIN	-0.105 (-0.978)	-0.051 (-0.473)	-0.122 (-0.954)	-0.087 (-0.694)
RISK	0.132*** (2.848)	0.138*** (2.976)	0.190*** (2.795)	0.198*** (2.778)
LIQUID	0.000 (0.259)	0.001 (0.504)	-0.065*** (-3.363)	-0.063*** (-3.219)
INSTOWN	-0.044 (-0.212)	-0.131 (-0.629)	-0.419 (-1.318)	-0.496 (-1.574)
FOREIGN	0.861*** (3.077)	0.536* (1.959)	4.107*** (3.632)	3.995*** (3.229)
GOVT	-0.417 (-1.117)	-0.468 (-1.246)	-0.437 (-0.869)	-0.451 (-0.886)
FF	-0.179 (-1.541)	-0.499*** (-4.776)	-0.560*** (-3.695)	-0.638*** (-4.197)
BSIZE	0.381*** (2.587)	0.361** (2.500)	0.513** (2.459)	0.544*** (2.672)
BIND	-0.523 (-1.641)	-0.396 (-1.308)	-0.531 (-1.313)	-0.589 (-1.478)
DUAL	-0.079 (-1.400)	-0.101* (-1.765)	-0.141 (-1.322)	-0.139 (-1.292)
FEMDIR	0.104 (0.459)	-0.027 (-0.119)	0.565* (1.815)	0.501 (1.538)

TABLE 5 (Continued)

	Dependent variable = $TOBINQ_{t+1}$		Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)	Model (3)	Model (4)
ACSIZE	0.377* (1.743)	0.416* (1.943)	0.557** (2.044)	0.479* (1.782)
ACIND	-0.536*** (-2.968)	-0.483*** (-2.757)	-0.196 (-0.753)	-0.245 (-0.937)
FEMAC	0.124 (0.762)	0.068 (0.421)	0.237 (1.221)	0.251 (1.273)
AUDITOR	--	--	-0.155 (-1.599)	-0.182* (-1.834)
Intercept	0.785 (1.370)	0.976* (1.672)	1.399 (1.612)	1.435* (1.659)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	1110	1110	639	639
R^2	.534	.541	.604	.603
Adjusted R^2	.517	.524	.581	.580
F-statistics	19.883***	20.598***	17.880***	17.724***

Note: This table reports the regression results for the association of corporate governance compliance certification and certification provider with market-based firm performance. Model (1) presents the regression results of Equation (1), while Model (2) shows the regression results for Equation (2). Robust two-tailed t-statistics clustered by firm and year are presented in parentheses. All variables are defined in Appendix A.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

chartered secretarial firms as providers of this certification for lower level information asymmetry companies. The coefficients of $CGOV_CERT$ and $PROVIDER$ are positive and statistically significant ($\beta = 1.253$, $p < .01$ in Model 2; $\beta = 0.545$, $p < .01$ in Model 4, respectively). In contrast, the coefficient of $CGOV_CERT \times HIGH_INFASYM$ is positive and statistically significant ($\beta = 0.434$, $p < .01$) in Model (2), while the coefficient of $PROVIDER \times HIGH_INFASYM$ is negative and statistically significant ($\beta = -0.618$, $p < .05$) in Model (4). This indicates that higher level information asymmetry accentuates (attenuates) the positive association between the certificate of compliance (the chartered secretarial firm provider of CG compliance certification) and a company's market-based performance. Hence, H1B and H2B are supported.

5.4 | Endogeneity analyses

5.4.1 | Reverse causality analysis

As we estimate our regression models using OLS, due to reverse causality, this may produce biased results. Better performance in the previous year may improve a company's current-year CG compliance as well as attract practicing chartered secretarial firms to engage in CG compliance certification. To mitigate concerns surrounding reverse causality, following El Ghouli et al. (2011), we include an additional

control variable—lagged market-based performance ($TOBINQ_t$)—as an instrumental variable in our baseline regression model. We estimate this dynamic panel data model using the system GMM technique developed by Blundell and Bond (1998).²

Table 6 reports the system GMM regression results. These show that our main findings remain qualitatively similar after considering the possibility of reverse causality flowing from companies' market-based performance to their attainment of independent CG compliance certification and their choice of certification provider. Moreover, the statistically insignificant Sargan overidentification test result confirms the validity of the overidentification restriction. The serial correlation test results for first-order autocorrelation (AR[1]) and second-order autocorrelation (AR[2]) also confirm that our results are not affected by serial correlation. Thus, the specification tests for all our estimated regression models show that the estimations are unbiased and consistent. Overall, we find evidence that (1) CG compliance certification and (2) CG compliance certification by practicing chartered secretarial firms lead to companies' higher market-based performance.

5.4.2 | Heckman's (1979) two-stage analysis

The nature of a company's discretionary selection of CG certification provider, as stipulated in the BCGC-2012, may create self-selection bias in our findings on the association between CG compliance

TABLE 6 System generalized method of moments regression results of the association of corporate governance compliance certification and provider of this certification with market-based performance.

	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
CGOV_CERT	0.618*** (15.944)	--
PROVIDER	--	0.302** (2.022)
SIZE	0.337*** (8.296)	0.545*** (7.604)
ROA	0.008*** (3.412)	0.018*** (4.778)
LEV	-0.171** (-2.484)	-0.317*** (-4.231)
GROWTH	0.114*** (5.455)	-0.047*** (-2.918)
CAPIN	-0.570*** (-8.170)	-0.241 (-1.603)
RISK	0.196*** (11.836)	0.222*** (17.067)
LIQUID	0.006*** (8.880)	0.002** (2.032)
INSTOWN	0.082 (0.733)	-0.083 (-0.435)
FOREIGN	1.419*** (19.515)	-0.300 (-0.510)
GOVT	0.018 (0.048)	-1.151 (-1.226)
FF	-0.315*** (-6.144)	0.210 (1.508)
BSIZE	0.270*** (3.148)	0.290*** (3.259)
BIND	0.193* (1.764)	0.649*** (2.878)
DUAL	0.174*** (5.818)	-0.107 (-1.398)
FEMDIR	0.070 (0.367)	1.759*** (7.368)
ACSIZE	0.202** (2.436)	0.376*** (4.600)
ACIND	0.023 (0.230)	0.537*** (4.259)
FEMAC	-0.148** (-2.179)	0.001 (0.009)
AUDITOR	--	-0.030 (-0.700)

(Continues)

TABLE 6 (Continued)

	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
TOBINQ	0.409*** (36.437)	0.255*** (13.583)
Intercept	-4.041*** (-3.529)	-13.244* (-1.801)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	965	592
AR(1)	-3.459***	-1.941*
AR(2)	-0.449	-0.335
Sargan test	85.946	67.193
p-value	.361	.304

Note: This table reports the regression results for the association of corporate governance compliance certification and certification provider with market-based firm performance. Model (1) presents the regression results of Equation (1), and Model (2) shows the regression results for Equation (2). Robust two-tailed *t*-statistics clustered by firm and year are presented in parentheses. All variables are defined in Appendix A.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

certification provider and a company's market-based performance. To mitigate this self-selection bias, we implement Heckman's (1979) two-stage model and develop the following probit model:

$$\begin{aligned}
 PROVIDER_{i,t} = & \beta_0 + \beta_1 PROPIND_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 LEV_{i,t} \\
 & + \beta_5 GROWTH_{i,t} + \beta_6 CAPIN_{i,t} + \beta_7 RISK_{i,t} + \beta_8 LIQUID_{i,t} \\
 & + \beta_9 INSTOWN_{i,t} + \beta_{10} FOREIGN_{i,t} + \beta_{11} GOVT_{i,t} + \beta_{12} FF_{i,t} \\
 & + \beta_{13} BSIZE_{i,t} + \beta_{14} BIND_{i,t} + \beta_{15} FEMDIR_{i,t} + \beta_{16} ACSIZE_{i,t} \\
 & + \beta_{17} ACIND_{i,t} + \beta_{18} FEMAC_{i,t} + \sum YEAR_{i,t} \\
 & + \sum INDUSTRY_{i,t} + \varepsilon_{i,t}.
 \end{aligned} \tag{3}$$

In Equation (3), *PROVIDER* is the dependent variable, which is coded 1 if the company obtains CG certification from a practicing chartered secretarial firm and 0 otherwise. Several variables are included in Equation (3), with these defined in Appendix A. Additionally, we include industry pressure for companies to select chartered secretarial firms as their CG certification provider (*PROPIND*) in Equation (3) to satisfy the exclusion restriction criterion in the first-stage model of Heckman's (1979) two-stage model. The rationale behind including *PROPIND* is that if more companies in a given industry obtain CG certification from chartered secretarial firms, then other companies may face pressure to obtain certification from the same group of providers. However, it is unlikely that *PROPIND* affects companies' market-based performance (*TOBINQ*) as an industry includes several companies (Bose et al., 2021). We expect a positive sign for *PROPIND*. To account for sample selection bias, the inverse Mills ratio (*IMR*) is generated from the first-stage model and included in the second-stage model in Equation (2).

TABLE 7 Heckman's (1979) two-stage analysis.

Panel A: Heckman's (1979) first-stage probit regression results			
	Dependent variable = PROVIDER		
	Coefficient	z-statistics	p-value
PROPIND	4.601	2.851	.004***
SIZE	0.297	4.214	.000***
ROA	0.013	0.953	.340
LEV	0.782	2.403	.016**
GROWTH	-0.294	-1.480	.139
CAPIN	0.540	2.076	.038**
RISK	1.768	0.144	.886
LIQUID	0.002	0.044	.965
INSTOWN	0.076	0.081	.935
FOREIGN	-1.423	-1.190	.234
GOVT	1.359	2.329	.020**
FF	0.046	0.195	.845
BSIZE	0.413	0.921	.357
BIND	0.475	0.640	.522
FEMDIR	-1.956	-2.552	.011**
ACSIZE	0.728	1.401	.161
ACIND	0.026	0.043	.965
FEMAC	-0.227	-0.437	.662
Intercept	-10.822	-7.536	.000***
Year fixed effects		Yes	
Industry fixed effects		Yes	
Observations		639	
Pseudo-R ²		.323	
Log pseudo-likelihood		-163.208	
ROC curve		87.37	
Partial R ² -PROPIND		.114***	
Panel B: Heckman's (1979) second-stage regression results between chartered secretary and market-based performance.			
	Dependent variable = TOBINQ _{t+1}		
	Model (1)	Model (2)	Model (3)
PROVIDER	0.304** (2.254)	0.703** (2.556)	0.544*** (3.137)
PROVIDER × FF	--	-0.668** (-2.154)	--
PROVIDER × HIGH_INFASYM	--	--	-0.615** (-2.242)
HIGH_INFASYM	--	--	0.034 (0.317)
SIZE	-0.275*** (-3.996)	-0.290*** (-4.151)	-0.286*** (-4.139)
ROA	0.138*** (9.681)	0.132*** (8.886)	0.136*** (9.239)
LEV	0.447** (1.996)	0.395* (1.717)	0.415* (1.842)
GROWTH	-0.209 (-1.284)	-0.191 (-1.164)	-0.195 (-1.211)

(Continues)

TABLE 7 (Continued)

Panel B: Heckman's (1979) second-stage regression results between chartered secretary and market-based performance.			
	Dependent variable = TOBINQ _{t+1}		
	Model (1)	Model (2)	Model (3)
CAPIN	-0.015 (-0.095)	-0.095 (-0.583)	-0.057 (-0.367)
RISK	0.193*** (2.760)	0.190*** (2.797)	0.198*** (2.782)
LIQUID	-0.064*** (-3.298)	-0.065*** (-3.357)	-0.063*** (-3.212)
INSTOWN	-0.485 (-1.534)	-0.415 (-1.308)	-0.490 (-1.563)
FOREIGN	3.765*** (3.056)	4.027*** (3.362)	3.902*** (2.993)
GOVT	-0.263 (-0.430)	-0.358 (-0.591)	-0.357 (-0.587)
FF	-0.649*** (-4.174)	-0.557*** (-3.654)	-0.633*** (-4.141)
BSIZE	0.592*** (2.718)	0.533** (2.403)	0.568*** (2.603)
BIND	-0.451 (-1.071)	-0.513 (-1.217)	-0.567 (-1.367)
DUAL	-0.133 (-1.173)	-0.141 (-1.322)	-0.139 (-1.293)
FEMDIR	0.425 (0.836)	0.456 (0.893)	0.374 (0.730)
ACSIZE	0.519* (1.795)	0.596** (2.057)	0.526* (1.854)
ACIND	-0.282 (-1.057)	-0.191 (-0.733)	-0.239 (-0.911)
FEMAC	0.200 (1.008)	0.223 (1.139)	0.236 (1.188)
AUDITOR	-0.155 (-1.570)	-0.153 (-1.577)	-0.179* (-1.808)
IMR	0.104 (0.447)	0.063 (0.268)	0.074 (0.318)
Intercept	1.657 (1.043)	1.018 (-0.415)	0.986 (0.604)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	639	639	639
R ²	.599	.604	.603
Adjusted R ²	.576	.581	.580
F-statistics	17.457***	17.622***	17.470***

Note: This table presents the results of Heckman's (1979) two-stage analysis. Panel A reports Heckman's (1979) first-stage regression results. Panel B reports Heckman's (1979) second-stage regression results. Robust two-tailed *t*-statistics clustered by firm and year are presented in parentheses in panel B. All variables are defined in Appendix A.

Abbreviation: ROC, receiver operating characteristic.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

TABLE 8 Placebo analysis and alternative proxy results.

	Dependent variable = $TOBINQ_{t+1}$		
	Placebo test with pseudo-CGOV certification adoption year being 2009, pre-period (2006–2008) and post-period (2009–2011)	Dropping the CGOV certification regulation year	4-year pre-CGOV certification period versus 4-year post-CGOV certification period
	Model (1)	Model (2)	Model (3)
PLACEBO_YEAR	0.075 (1.557)	--	--
CGOV_CERT	--	1.528*** (7.973)	1.038*** (5.920)
SIZE	-0.047*** (-3.974)	-0.236*** (-6.919)	-0.206*** (-5.641)
ROA	0.006*** (2.667)	0.113*** (10.484)	0.116*** (9.949)
LEV	-0.058 (-0.988)	0.150 (1.112)	0.349** (2.361)
GROWTH	0.032 (1.407)	-0.101 (-0.843)	-0.116 (-0.695)
CAPIN	-0.073 (-1.524)	-0.114 (-0.978)	-0.037 (-0.272)
RISK	-2.042 (-1.416)	14.380*** (2.996)	19.529*** (3.418)
LIQUID	0.000 (0.451)	0.001 (0.501)	0.002 (0.862)
INSTOWN	-0.057 (-0.608)	-0.009 (-0.040)	0.002 (0.008)
FOREIGN	0.108** (2.031)	0.462 (1.624)	0.610* (1.738)
GOVT	0.043 (0.427)	-0.349 (-0.850)	-0.621 (-1.466)
FF	-0.021 (-0.668)	-0.523*** (-4.483)	-0.533*** (-4.373)
BSIZE	0.051 (0.792)	0.375** (2.384)	0.408** (2.274)
BIND	-0.196 (-1.251)	-0.563 (-1.591)	-0.334 (-0.937)
DUAL	-0.037 (-1.500)	-0.085 (-1.414)	-0.137 (-1.186)
FEMDIR	-0.012 (-0.127)	0.079 (0.317)	-0.139 (-0.479)
ACSIZE	0.090 (1.161)	0.439* (1.900)	0.094 (0.344)
ACIND	-0.037 (-0.511)	-0.576*** (-2.946)	-0.496** (-2.217)
FEMAC	0.100 (1.312)	0.092 (0.516)	-0.050 (-0.248)
Intercept	1.809*** (8.048)	0.959 (1.523)	1.092 (1.445)

TABLE 8 (Continued)

	Dependent variable = $TOBINQ_{t+1}$		
	Placebo test with pseudo-CGOV certification adoption year being 2009, pre-period (2006–2008) and post-period (2009–2011)	Dropping the CGOV certification regulation year	4-year pre-CGOV certification period versus 4-year post-CGOV certification period
	Model (1)	Model (2)	Model (3)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	403	1008	746
R^2	.175	.527	.525
Adjusted R^2	.109	.510	.503
F-statistics	3.327***	19.764***	14.536***

Note: This table reports the placebo analysis and alternative proxy results for the association of corporate governance compliance certification and market-based firm performance. Model (1) presents the regression results of placebo analysis using Equation (1). Model (2) shows the regression results for Equation (1) dropping the year of corporate governance compliance certification. Model (3) shows the regression results for Equation (1) using a 4-year pre-CGOV certification period versus a 4-year post-CGOV certification period. Robust two-tailed t -statistics clustered by firm and year are presented in parentheses. All variables are defined in Appendix A.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

Table 7, panel A, presents Heckman's (1979) first-stage regression results. The coefficient of *PROPIND* is positive and statistically significant ($\beta = 4.601, p < .01$). The model has a pseudo R^2 value of 32.30%. Furthermore, the model's partial R^2 value for *PROPIND* is 0.114, which is statistically significant at the 1% level, indicating that *PROPIND* is a reasonable exogenous variable to satisfy the exclusion restriction criterion. Table 7, panel B, reports the second-stage regression results. The coefficient of *PROVIDER* is positive and statistically significant ($\beta = 0.304, p < .05$) in Model (1). However, the coefficient for *IMR* is not statistically significant, suggesting that sample selection bias is not a significant concern.³

5.5 | Placebo test

To investigate the possibility that our results may be driven by chance, we implement a placebo analysis by randomly selecting company-year observations in pre-CG compliance certification periods and assigning 2009 as a “pseudo-CG compliance certification adoption” year. Specifically, we classify our company-year observations as the post-CG compliance certification adoption period, taking a value of 1 if the year falls between 2009 and 2011, and as the pre-CG compliance certification adoption period, taking a value of 0 if the year falls between 2006 and 2008. We present the regression results in Table 8, Model (1). The coefficient of *PLACEBO_YEAR* is statistically insignificant ($\beta = 0.075, p > .10$) in Model (1). This result suggests that our findings are not driven by chance. Overall, the placebo test results indicate that our findings on the association between CG compliance certification and companies' market-based performance are less likely to be driven by chance.

5.6 | Different specification tests

Our test variable, *CGOV_CERT*, includes the CG compliance certification adoption year, which is 2012. To evaluate the sensitivity of our main findings, we exclude the CG compliance certification adoption year and recode the *CGOV_CERT* variable; in other words, the pre-CG compliance certification period is from 2006 to 2011, and the post-CG compliance certification period is from 2013 to 2017. We present the regression results in Table 8, Model (2), with these results indicating that the coefficient of *CGOV_CERT* is positive and statistically significant ($\beta = 1.528, p < .01$) in Model (2). These findings corroborate our main findings, thus supporting the robustness of our results.

We further classify the CG compliance certification adoption period (*CGOV_CERT*) as 4 years before and after the CG compliance certification adoption year as an alternative window and present the regression results in Table 8, Model (3). The coefficient of *CGOV_CERT* is positive and statistically significant ($\beta = 1.038, p < .10$) in Model (3), suggesting that our results are robust.

5.7 | Other robustness tests

The study's data are unbalanced panel time series. Therefore, we examine Equations (1) and (2) using the balanced panel time-series data to check the robustness of our findings. Panels A–C of Table 9 report the regression results, suggesting that the tenor of our baseline findings remains the same using the balanced panel time-series data. Furthermore, we define family firm using an indicator variable that takes a value of 1 if the sponsor family owns at least 20% of the company and sponsor family members hold the positions of both chairman

TABLE 9 Regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance

Panel A: Regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance using a balanced sample over the sample period		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
<i>CGOV_CERT</i>	1.623*** (8.430)	--
<i>PROVIDER</i>	--	0.492** (2.288)
Intercept	0.620* (0.901)	0.024 (0.033)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	600	462
R^2	.607	.702
Adjusted R^2	.582	.679
F-statistics	23.343***	18.628***
Panel B: Regression results of the moderating role of family companies in the association of corporate governance compliance certification and the provider of this certification with market-based performance using a balanced sample over the sample period		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
<i>CGOV_CERT</i>	-0.202 (-0.884)	--
<i>CGOV_CERT</i> × <i>FF</i>	-0.411** (-2.037)	--
<i>PROVIDER</i>	--	1.519*** (6.419)
<i>PROVIDER</i> × <i>FF</i>	--	-1.486*** (-4.381)
<i>FF</i>	0.052 (0.309)	-0.809*** (-5.545)
Intercept	-0.636*** (-8.393)	1.026 (1.274)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	600	462
R^2	.327	.564
Adjusted R^2	.303	.531
F-statistics	13.379***	16.790***

(Continues)

TABLE 9 (Continued)

Panel C: Regression results of the moderating role of information asymmetry in the association of corporate governance compliance certification and the provider of this certification with market-based performance using a balanced sample over the sample period		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
<i>CGOV_CERT</i>	1.305*** (5.676)	--
<i>CGOV_CERT</i> × <i>HIGH_INFASYM</i>	0.551*** (3.310)	--
<i>PROVIDER</i>	--	0.890*** (3.353)
<i>PROVIDER</i> × <i>HIGH_INFASYM</i>	--	-0.552* (-1.832)
<i>HIGH_INFASYM</i>	-0.147 (-1.061)	0.235*** (2.626)
Intercept	0.752 (1.097)	0.209 (0.305)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	600	462
R^2	0.620	0.681
Adjusted R^2	0.593	0.659
F-statistics	23.397***	30.684***
Panel D: Regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance: role of family companies using alternative definitions		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
<i>CGOV_CERT</i>	1.797*** (7.823)	--
<i>CGOV_CERT</i> × <i>FF</i>	-0.384*** (-2.958)	--
<i>PROVIDER</i>	--	0.465** (2.447)
<i>PROVIDER</i> × <i>FF</i>	--	-0.549** (-2.230)
<i>FF</i>	-0.034 (-0.331)	-0.194 (-1.555)
Intercept	0.656 (1.061)	0.994 (1.096)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes

(Continues)

TABLE 9 (Continued)

Panel D: Regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance: role of family companies using alternative definitions		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
Observations	1110	639
R^2	.519	.585
Adjusted R^2	.502	.561
F-statistics	18.925***	17.497***
Panel E: Regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance: role of family ownership		
	Dependent variable = $TOBINQ_{t+1}$	
	Model (1)	Model (2)
CGOV_CERT	1.550*** (7.545)	--
CGOV_CERT \times FAMOWN	-0.482* (-1.724)	--
PROVIDER	--	1.093*** (3.717)
PROVIDER \times FAMOWN	--	-2.531*** (-3.528)
FAMOWN	-0.056 (-0.253)	-0.219 (-0.858)
Intercept	0.400 (0.899)	1.441* (1.657)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	1105	639
R^2	.495	.595
Adjusted R^2	.478	.573
F-statistics	28.295***	20.530***

Note: This table reports the results of the robustness analysis. Panel A shows the regression results of the association of corporate governance compliance certification and the provider of this certification with market-based performance using a balanced sample over the sample period. Panels B and C show the regression results of the moderating role of family companies and information asymmetry in the association of corporate governance compliance certification and the provider of this certification with market-based performance, respectively, using a balanced sample over the sample period. Panel D shows the regression results of the moderating role of family companies in the association of corporate governance compliance certification and the provider of this certification with market-based performance. Panel E reports the moderating role of family ownership in the association of corporate governance compliance certification and the provider of this certification with market-based performance. Robust two-tailed t -statistics clustered by firm and year are presented in parentheses. All variables are defined in Appendix A.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

and CEO and 0 otherwise (Villalonga & Amit, 2006; Klein et al., 2005). We then test whether our findings hold in relation to the moderating role of family firms in the association of CG compliance certification and provider of this certification with market-based performance. Panel D of Table 9 reports the regression results, suggesting that the tenor of our findings remains the same using the alternative definition of family firms. Additionally, we employ sponsor family ownership as an alternative proxy for the family firm. We report the regression results in panel E of Table 9. The results suggest that our findings remain qualitatively similar as stated in Table 5.

Furthermore, we employ Tobin's Q as a measure of companies' market-based performance in our baseline regression model, with Tobin's Q used as a proxy for unobservable investment opportunities. However, this measure can be subject to measurement errors due to a conceptual gap between actual investment opportunities and the observable measures of Tobin's Q (Erickson & Whited, 2012), which can create bias. Therefore, following prior studies (e.g., Bose et al., 2021; Ferreira & Matos, 2008), we employ two transformations of Tobin's Q ($TOBINQ$): the inverse of $TOBINQ$ ($-1/TOBINQ$) and the natural logarithm of $TOBINQ$. For the sake of brevity, we do not set out the regression results in this paper. However, the unreported results show that our findings are robust when using these alternative transformations of Tobin's Q.

Furthermore, we have run the change model for our baseline analysis. Given that our variable of interest is an indicator variable, we regressed both CG compliance certification and the provider of this certification on changes in $TOBINQ$ and control variables. We do not report the regression results for brevity; however, the unreported results suggest that our results are qualitatively similar as shown in Table 4.

6 | CONCLUSION

In this study, we examined the impact of mandatory independent certification of compliance with the BCGC and the type of CG compliance certification provider engaged on companies' market-based performance in Bangladesh. We find that certification of compliance with the BCGC by an independent professional firm is positively associated with companies' market-based performance. This finding supports the agency and signaling theory view about the role of external certification of CG elements and prior evidence (Carnes et al., 2019; Chang et al., 2006; Cortes, 2021; Jain & Rezaee, 2006; Khedmati et al., 2015; Li et al., 2008), suggesting that independent certification of compliance with a CG code has a positive impact on companies' market-based performance. We extend this stream of literature by demonstrating that certification of compliance with the BCGC obtained from practicing chartered secretarial firms is positively associated with companies' market-based performance. The CG subject matter expertise of chartered secretarial firms acts as a positive cue about their ability to improve client companies' compliance with the BCGC and frames external investors' perception regarding the information-asymmetry-reducing role of CG compliance certification. Several robustness tests support these main findings.

We also report that two boundary conditions, family companies and information asymmetry, are affecting the above associations. We document that the positive relationship between certification of compliance with the BCGC and companies' market-based performance is less significant in the case of family companies. We also find that family companies experience less financial benefit from appointing practicing chartered secretarial firms as CG compliance certification providers. As demonstrated in previous studies in Bangladesh (Ahmed & Uddin, 2018, 2022; Sobhan, 2016), family companies circumvent the role of CG mechanisms by various means to protect their financial and non-financial interests. Owing to family companies' ill reputation regarding compliance with the BCGC, in the case of these companies, certification of compliance and obtainment of this certification from practicing chartered secretarial firms act as a less positive cue to external investors.

In contrast, the positive association between certification of compliance with the BCGC and market-based performance of companies is more pronounced in the case of companies experiencing high-level information asymmetry. However, these companies receive less financial benefits from appointing practicing chartered secretarial firms as CG compliance certification providers. Our findings relating to these boundary conditions suggest that the financial benefits of obtaining a CG compliance certification and engaging a particular type of certification provider are affected by the integrity and reputation of insiders and company-level characteristics. These findings underscore the importance of consideration of boundary conditions when agency and signaling theories are used to test the outcome of certification of CG elements (e.g., Chang et al., 2006; Iliev, 2010; Jain & Rezaee, 2006; Li et al., 2008; Litvak, 2007). Prior literature on the role of certification of CG elements based on agency and signaling theory puts limited attention on the boundary conditions that can affect the influence of external certification to reduce information asymmetry between insiders and external investors.

The findings of this study also have practical and policy implications for other emerging economies. Given their efforts to improve CG by adopting an Anglo-American-based CG model in recent years (Armitage et al., 2017; Cuomo et al., 2016), regulators continually face the challenges of ensuring compliance with an adopted CG code (Sobhan, 2016; Wanyama et al., 2009). Consequently, practitioners recently recommended certification of compliance with a CG code by an external professional firm (Osborne, 2022). However, this certification is rarely proposed by policy makers, stock exchange authorities, or investor associations. The reason, perhaps, is that empirical evidence is lacking on the financial benefits of this certification.

Our study's main findings, that the certification of compliance with a CG code and the obtainment of this certification from a chartered secretarial firm positively influence companies' market-based performance, can be critical to policy makers responsible for revising CG codes. Also, our findings on the positive association between CG compliance certification by a chartered secretarial firm and companies' market-based performance can inform the board of directors and managers to decide about appointing CG compliance certification

providers. However, at the same time, regulators and company insiders need awareness that the marginal benefits of certification of compliance with a CG code and type of certifiers can differ based on boundary conditions (i.e., family-owned and controlled companies and informationally opaque companies). In particular, our study's results suggest that family companies, the dominant form of company in emerging economies (Claessens & Yurtoglu, 2013; Fan & Wong, 2005) with governance that remains a prime concern of regulators (Ahmed & Uddin, 2018, 2022), are less likely to benefit from certification of compliance with a CG code.

The current study's findings should be understood with caution beyond the context of emerging economies. In these economies, external regulatory agencies, financial analysts, and investor associations are not strong enough to act as a substitute for external professional certifying firms in monitoring compliance with a CG code. It is also significant to note that, as this requirement for certification of compliance with the BCGC is imposed uniformly on all companies listed on Bangladesh's stock exchanges, it was not possible for our study to test whether companies that obtained this certificate financially benefit more than companies that are exempt from this requirement. This could be investigated in future research if a suitable research setting could be found. Future studies, taking a qualitative research approach, could also examine whether, and how, external professional firms work behind the scenes while providing these services to encourage companies to adopt the provisions of the CG code in substance.

ACKNOWLEDGMENTS

We would like to thank the two anonymous reviewers for their constructive comments and suggestions. We are also grateful to the assigned editor and Professor Konstantinos Stathopoulos (Editor-in-Chief) for their helpful guidance throughout the review process.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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NOTES

¹ Clause 49 of the Indian CG code requires large companies to have more independent board of directors and audit committee, provide more detailed disclosure, and certify compliance with Clause 49 provisions by external auditors or company secretaries (Dharmapala & Khanna, 2013).

² For details, see <https://www.stata.com/features/overview/dynamic-panel-data/>.

³ An alternative explanation for the insignificant *IMR* is that our selection model is misspecified. Therefore, we further calculate the VIF value for *IMR* to confirm that the insignificant coefficient for *IMR* is not caused by multicollinearity. The unreported VIF value for *IMR* is 2.29, indicating that multicollinearity is not an issue.

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How to cite this article: Sobhan, A., Bose, S., Miah, M. S., & Razzaque, R. M. R. (2023). Does certification of corporate governance compliance pay off? Evidence from a unique regulatory setting. *Corporate Governance: An International Review*, 1–33. <https://doi.org/10.1111/corg.12563>

APPENDIX A: DESCRIPTIONS OF VARIABLES

Variable(s)		Explanation
TOBINQ	Tobin's Q	The sum of the book value of total assets plus the market value of equity minus the book value of equity divided by total assets
CGOV_CERT	Corporate governance compliance certification	An indicator variable coded 1 for years after the issuance of the corporate governance compliance certification regulation (2012–2017) and 0 otherwise (2006–2011)
PROVIDER	Chartered secretarial firm provider	An indicator variable coded 1 if the corporate governance compliance certification is obtained from a chartered secretarial firm and 0 otherwise
SIZE	Firm size	The natural logarithm of total assets
ROA	Profitability	The ratio of net income after tax divided by total assets
LEV	Leverage	The ratio of total debt scaled by total assets
GROWTH	Sales growth	The percentage change in annual sales revenue
CAPIN	Capital intensity	The ratio of capital expenditure to total assets
RISK	Market risk	The standard deviation of daily share return over the fiscal year
LIQUID	Liquidity	The average monthly share trading volume relative to total number of shares outstanding
INSTOWN	Institutional ownership	The percentage of shareholding by institutional investors
FOREIGN	Foreign ownership	The percentage of shares owned by foreign investors
GOVT	Government ownership	The percentage of shareholding by the government
FF	Family firm	An indicator variable that takes a value of 1 if the sponsor family owns at least 20% of the company and sponsor family members hold the position of either chairman or CEO and 0 otherwise
BSIZE	Board size	The natural logarithm of the total number of directors on the board
BIND	Board independence	The percentage of independent directors on the board
DUAL	CEO duality	An indicator variable of 1 if the CEO also serves as the chairperson of the board and 0 otherwise
FEMDIR	Female director	The percentage of female directors to total directors on the board
AC_SIZE	Audit committee size	The natural logarithm of the total number of members on the audit committee
AC_IND	Audit committee independence	The percentage of independent members on the audit committee
FEMAC	Female audit committee members	The percentage of female members on the audit committee
AUDITOR	Same auditor	An indicator variable of 1 if the statutory auditor also certifies corporate governance compliance and 0 otherwise
INFASYM	Information asymmetry	Information asymmetry is measured using the bid–ask spread, following Bose, Saha, et al. (2017). We create an indicator variable of <i>HIGH_INFASYM</i> that takes a value of 1 if the firm has a higher bid–ask spread than the sample's median value and 0 otherwise.
PROPIND	Industry pressure	The proportion of firms in an industry that choose a chartered secretarial firm as a corporate governance compliance certification provider
FAMOWN	Family ownership	The percentage of ownership held by the sponsor family

APPENDIX B: DESCRIPTIVE STATISTICS YEAR BY YEAR OVER THE SAMPLE PERIOD

Panel A: 2006																						
	TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	68	68	--	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68
Mean	1.006	0.000	--	6.569	4.409	0.065	0.184	0.688	0.021	2.804	0.211	0.114	0.027	0.662	2.057	0.087	0.441	0.112	1.447	0.189	0.077	0.165
SD	0.372	0.000	--	1.232	5.363	0.123	0.294	0.940	0.006	4.867	0.144	0.243	0.107	0.477	0.229	0.096	0.920	0.156	0.139	0.179	0.165	0.000
Median	0.946	0.000	--	6.513	2.912	0.000	0.142	0.679	0.020	1.481	0.168	0.000	0.000	1.000	2.079	0.095	0.000	0.000	1.386	0.250	0.000	0.000
1st quartile	0.779	0.000	--	5.765	1.257	0.000	0.081	0.417	0.017	0.250	0.102	0.000	0.000	0.000	1.946	0.000	0.000	0.000	1.386	0.000	0.000	0.000
3rd quartile	1.164	0.000	--	7.203	7.404	0.095	0.266	0.939	0.024	3.201	0.313	0.011	0.000	1.000	2.197	0.167	1.000	0.183	1.386	0.333	0.000	0.000
Panel B: 2007																						
	TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	73	73	--	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Mean	1.220	0.000	--	6.816	4.121	0.062	0.121	0.683	0.030	6.589	0.207	0.123	0.046	0.630	2.104	0.124	0.356	0.104	1.463	0.179	0.078	0.162
SD	0.645	0.000	--	1.432	5.162	0.131	0.354	0.328	0.007	18.253	0.144	0.251	0.159	0.486	0.213	0.077	0.752	0.147	0.149	0.178	0.162	0.000
Median	1.017	0.000	--	6.752	3.067	0.000	0.067	0.683	0.031	1.349	0.167	0.000	0.000	1.000	2.079	0.143	0.000	0.000	1.386	0.250	0.000	0.000
1st quartile	0.876	0.000	--	5.794	1.335	0.000	-0.028	0.445	0.024	0.290	0.099	0.000	0.000	0.000	1.946	0.100	0.000	0.000	1.386	0.000	0.000	0.000
3rd quartile	1.359	0.000	--	7.720	6.061	0.049	0.232	0.939	0.034	2.653	0.320	0.021	0.000	1.000	2.197	0.167	1.000	0.167	1.609	0.333	0.000	0.000
Panel C: 2008																						
	TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	73	73	--	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Mean	1.395	0.000	--	6.971	4.624	0.069	0.199	0.670	0.036	13.386	0.171	0.129	0.046	0.630	2.107	0.137	0.260	0.096	1.461	0.174	0.084	0.165
SD	0.721	0.000	--	1.451	5.844	0.156	0.391	0.324	0.009	27.045	0.124	0.257	0.159	0.486	0.218	0.065	0.602	0.138	0.145	0.178	0.165	0.000
Median	1.220	0.000	--	6.828	3.129	0.000	0.145	0.673	0.036	3.514	0.147	0.000	0.000	1.000	2.079	0.143	0.000	0.000	1.386	0.200	0.000	0.000
1st quartile	0.910	0.000	--	5.889	1.349	0.000	0.018	0.476	0.030	0.832	0.079	0.000	0.000	0.000	1.946	0.111	0.000	0.000	1.386	0.000	0.000	0.000
3rd quartile	1.707	0.000	--	7.875	6.702	0.061	0.260	0.886	0.040	11.434	0.250	0.070	0.000	1.000	2.303	0.167	0.000	0.167	1.609	0.333	0.000	0.000
Panel D: 2009																						
	TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	78	78	--	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
Mean	2.103	0.000	--	7.213	6.221	0.069	0.096	0.665	0.034	18.830	0.166	0.107	0.061	0.654	2.099	0.139	0.244	0.089	1.469	0.166	0.080	0.160
SD	1.303	0.000	--	1.497	7.039	0.147	0.327	0.323	0.010	29.891	0.119	0.239	0.188	0.479	0.214	0.066	0.488	0.132	0.151	0.176	0.160	0.000
Median	1.670	0.000	--	6.932	3.993	0.000	0.082	0.680	0.034	7.551	0.159	0.000	0.000	1.000	2.079	0.143	0.000	0.000	1.386	0.100	0.000	0.000
1st quartile	1.262	0.000	--	6.122	1.284	0.000	-0.071	0.423	0.027	2.879	0.070	0.000	0.000	0.000	1.946	0.111	0.000	0.000	1.386	0.000	0.000	0.000
3rd quartile	2.607	0.000	--	8.157	9.839	0.079	0.213	0.880	0.041	17.824	0.243	0.009	0.000	1.000	2.303	0.167	0.000	0.167	1.609	0.333	0.000	0.000

Panel E: 2010																				
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC
N	82	--	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
Mean	2.595	0.000	--	7.356	7.298	0.061	0.234	0.028	31.827	0.157	0.104	0.058	0.646	2.107	0.140	0.207	0.085	1.472	0.166	0.073
SD	1.427	0.000	--	1.565	7.654	0.121	0.476	0.009	41.626	0.116	0.243	0.184	0.481	0.223	0.066	0.408	0.128	0.156	0.176	0.152
Median	2.137	0.000	--	7.181	4.900	0.000	0.146	0.680	15.770	0.146	0.000	0.000	1.000	2.079	0.143	0.000	0.000	1.386	0.100	0.000
1st quartile	1.586	0.000	--	6.278	1.890	0.000	0.038	0.426	5.053	0.067	0.000	0.000	0.000	1.946	0.111	0.000	0.000	1.386	0.000	0.000
3rd quartile	3.107	0.000	--	8.237	12.259	0.061	0.273	0.908	34.419	0.229	0.007	0.000	1.000	2.303	0.167	0.000	0.167	1.609	0.333	0.000
Panel F: 2011																				
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC
N	97	--	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
Mean	1.961	0.000	--	7.586	6.334	0.352	0.439	0.038	16.534	0.146	0.018	0.048	0.660	2.123	0.179	0.082	0.156	1.471	0.308	0.085
SD	1.126	0.000	--	1.614	6.428	0.319	0.650	0.009	23.589	0.128	0.060	0.167	0.476	0.238	0.109	0.277	0.139	0.157	0.137	0.157
Median	1.649	0.000	--	7.477	5.044	0.264	0.232	0.650	7.762	0.119	0.000	0.000	1.000	2.079	0.167	0.000	0.167	1.386	0.333	0.000
1st quartile	1.250	0.000	--	6.531	2.303	0.113	0.067	0.407	3.578	0.026	0.000	0.000	0.000	1.946	0.125	0.000	0.000	1.386	0.250	0.000
3rd quartile	2.355	0.000	--	8.693	10.843	0.482	0.499	0.901	20.352	0.206	0.000	0.000	1.000	2.303	0.200	0.000	0.250	1.609	0.333	0.200
Panel G: 2012																				
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC
N	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
Mean	1.538	1.000	0.088	7.785	5.543	0.326	0.669	0.031	2.019	0.147	0.011	0.052	0.657	2.122	0.216	0.039	0.156	1.507	0.332	0.128
SD	0.868	0.000	0.285	1.646	6.073	0.327	0.266	0.006	2.229	0.116	0.045	0.178	0.477	0.239	0.113	0.195	0.143	0.156	0.158	0.201
Median	1.368	1.000	0.000	7.711	4.738	0.249	0.088	0.659	1.191	0.137	0.000	0.000	1.000	2.079	0.200	0.000	0.155	1.386	0.333	0.000
1st quartile	1.000	1.000	0.000	6.712	1.668	0.109	-0.067	0.473	0.475	0.062	0.000	0.000	0.000	1.946	0.143	0.000	0.000	1.386	0.250	0.000
3rd quartile	1.702	1.000	0.000	8.997	9.095	0.403	0.220	0.907	2.594	0.198	0.000	0.000	1.000	2.303	0.250	0.000	0.286	1.609	0.333	0.250
Panel H: 2013																				
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC
N	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Mean	1.807	1.000	0.127	7.893	5.484	0.305	0.670	0.029	1.527	0.144	0.009	0.054	0.673	2.138	0.239	0.027	0.161	1.513	0.355	0.126
SD	1.238	0.000	0.335	1.622	6.138	0.290	0.176	0.008	1.687	0.120	0.035	0.178	0.471	0.255	0.100	0.164	0.143	0.157	0.160	0.196
Median	1.464	1.000	0.000	7.918	4.352	0.242	0.040	0.687	0.966	0.127	0.000	0.000	1.000	2.079	0.222	0.000	0.143	1.386	0.333	0.000
1st quartile	1.132	1.000	0.000	6.820	1.565	0.090	-0.051	0.454	0.334	0.040	0.000	0.000	0.000	1.946	0.167	0.000	0.000	1.386	0.250	0.000
3rd quartile	2.014	1.000	0.000	8.912	8.192	0.477	0.122	0.861	2.176	0.216	0.000	0.000	1.000	2.303	0.286	0.000	0.286	1.609	0.333	0.250

Panel I: 2014																					
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112
Mean	1.877	1.000	0.134	7.990	5.120	0.320	0.681	0.024	1.631	0.153	0.009	0.052	0.688	2.145	0.248	0.027	0.168	1.520	0.358	0.143	
SD	1.486	0.000	0.342	1.645	5.762	0.301	0.302	0.006	1.689	0.114	0.036	0.176	0.466	0.263	0.097	0.162	0.140	0.173	0.143	0.221	
Median	1.329	1.000	0.000	8.011	4.022	0.262	0.699	0.023	1.185	0.132	0.000	0.000	1.000	2.197	0.222	0.000	0.143	1.386	0.333	0.000	
1st quartile	1.071	1.000	0.000	6.942	1.623	0.099	0.483	0.019	0.348	0.061	0.000	0.000	0.000	1.946	0.200	0.000	0.000	1.386	0.250	0.000	
3rd quartile	2.037	1.000	0.000	9.013	7.492	0.448	0.860	0.028	2.273	0.232	0.000	0.000	1.000	2.303	0.286	0.000	0.286	1.609	0.333	0.268	
Panel J: 2015																					
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Mean	2.091	1.000	0.098	8.036	5.471	0.342	0.673	0.028	1.539	0.143	0.014	0.063	0.652	2.161	0.243	0.011	0.170	1.562	0.344	0.138	
SD	1.684	0.000	0.299	1.680	7.031	0.346	0.321	0.012	1.842	0.101	0.055	0.193	0.479	0.266	0.088	0.104	0.140	0.179	0.130	0.216	
Median	1.358	1.000	0.000	8.071	3.856	0.248	0.666	0.025	0.808	0.126	0.000	0.000	1.000	2.197	0.222	0.000	0.143	1.609	0.333	0.000	
1st quartile	1.058	1.000	0.000	6.941	1.709	0.104	0.456	0.021	0.422	0.058	0.000	0.000	0.000	1.946	0.200	0.000	0.000	1.386	0.250	0.000	
3rd quartile	2.575	1.000	0.000	9.115	8.965	0.432	0.815	0.032	2.033	0.211	0.000	0.000	1.000	2.350	0.286	0.000	0.286	1.609	0.333	0.250	
Panel K: 2016																					
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112
Mean	1.962	1.000	0.134	5.594	0.315	0.119	0.691	0.022	1.542	0.163	0.020	0.052	0.670	2.132	0.249	0.009	0.158	1.555	0.357	0.138	
SD	1.527	0.000	0.342	1.690	7.016	0.278	0.320	0.008	1.950	0.102	0.064	0.176	0.472	0.272	0.096	0.094	0.142	0.185	0.143	0.212	
Median	1.352	1.000	0.000	8.100	3.577	0.277	0.706	0.021	0.695	0.145	0.000	0.000	1.000	2.197	0.222	0.000	0.125	1.609	0.333	0.000	
1st quartile	1.048	1.000	0.000	7.008	1.133	0.115	0.437	0.016	0.246	0.094	0.000	0.000	0.000	1.792	0.200	0.000	0.000	1.386	0.250	0.000	
3rd quartile	2.430	1.000	0.000	9.124	8.967	0.446	0.852	0.026	1.953	0.229	0.004	0.000	1.000	2.303	0.286	0.000	0.286	1.609	0.333	0.250	
Panel L: 2017																					
TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111
Mean	2.071	1.000	0.162	8.180	4.557	0.351	0.698	0.020	1.737	0.162	0.023	0.048	0.685	2.140	0.248	0.009	0.167	1.577	0.351	0.140	
SD	1.529	0.000	0.370	1.720	6.484	0.293	0.322	0.008	2.112	0.095	0.069	0.171	0.467	0.262	0.094	0.095	0.140	0.200	0.140	0.195	
Median	1.409	1.000	0.000	8.110	2.907	0.298	0.717	0.018	0.900	0.155	0.000	0.000	1.000	2.197	0.222	0.000	0.143	1.609	0.333	0.000	
1st quartile	1.042	1.000	0.000	7.053	1.121	0.119	0.416	0.013	0.330	0.098	0.000	0.000	0.000	1.946	0.200	0.000	0.000	1.386	0.250	0.000	
3rd quartile	2.811	1.000	0.000	9.228	5.784	0.505	0.879	0.024	2.324	0.216	0.011	0.000	1.000	2.303	0.286	0.000	0.286	1.609	0.400	0.250	

Panel M: Full descriptive statistics

	TOBINQ	CGOV_CERT	PROVIDER	SIZE	ROA	LEV	GROWTH	CAPIN	RISK	LIQUID	INSTOWN	FOREIGN	GOVT	FF	BSIZE	BIND	DUAL	FEMDIR	ACSIZE	ACIND	FEMAC	
N	1,110	1,110	639	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110
Mean	1.833	0.576	0.125	7.625	5.418	0.241	0.153	0.677	0.028	7.563	0.161	0.049	0.051	0.661	2.123	0.197	0.119	0.140	1.507	0.287	0.112	
SD	1.317	0.494	0.331	1.659	6.419	0.290	0.411	0.318	0.010	19.816	0.119	0.156	0.172	0.473	0.245	0.107	0.421	0.143	0.170	0.176	0.190	
Median	1.385	1.000	0.000	7.458	3.807	0.142	0.097	0.683	0.027	1.589	0.144	0.000	0.000	1.000	2.079	0.200	0.000	0.125	1.386	0.333	0.000	
1st quartile	1.038	0.000	0.000	6.483	1.514	0.010	-0.029	0.442	0.021	0.477	0.069	0.000	0.000	0.000	1.946	0.143	0.000	0.000	1.386	0.250	0.000	
3rd quartile	2.150	1.000	0.000	8.720	8.442	0.355	0.232	0.879	0.034	4.838	0.238	0.001	0.000	1.000	2.303	0.250	0.000	0.250	1.609	0.333	0.250	