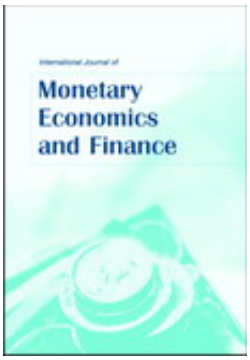

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The impact of corporate social responsibility disclosure and board characteristics on firm performance: evidence from Vietnam-listed firms

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Abstract: This study aims to investigate the influence of corporate social responsibility disclosure (CSRD) and board characteristics on firm performance, proxied by return on assets (ROA), earnings per share (EPS), and Tobin's Q (TQ) in 498 listed firms on the Vietnamese stock market between 2015 and 2019. To examine this impact, we conducted various statistical methods, including pooled ordinary least squares (OLS), fixed effects model (FEM), random effects model (REM), and generalised least squares (GLS) estimation. Our findings indicate a significant and positive association between CSRD and firm performance when evaluated by TQ, whereas a negative relationship is observed when measured by ROA and EPS. Furthermore, the impact of board characteristics on firm performance is partially significant when firm performance is assessed using all three variables (ROA, EPS, and TQ).

Keywords: board characteristics; CSRD; corporate social responsibility disclosure; firm performance; listed firms; non-financial; Vietnam; stakeholder; shareholders.

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1 Introduction

A company's success comes not only from economic contributions or technological advancements but also from the outstanding and long-term values that the company builds and brings to the community. Nowadays, the term 'social responsibility' has evolved into a crucial trend in every nation's growth process. It describes that businesses not only operate effectively but also must have responsibility for the environment, the community, and society. The European Union (EU) published a Green Paper in 2001 "Promoting a European Framework for corporate social responsibility" and defined corporate social responsibility as "a way for companies to incorporate social and environmental issues into their business operations and in their actions with stakeholders voluntarily".

The relationship between corporate social responsibility (CSR) and firm performance has gained significant attention because corporate social responsibility supporters believe it to be an essential element for successful business operations, providing firms with an opportunity to look beyond economic profitability and consider their social responsibility (Jackson and Nelson, 2004). Boesso et al. (2013) similarly argue that companies should

embrace corporate social responsibility disclosure (CSRD) as it can contribute to their public relations goals, including communication and business reputation. By strengthening stakeholder connections, CSRD can subsequently improve firm performance. Moreover, implementing corporate social responsibility activities is not only a choice in the short term but also a management strategy for sustainable performance in the long term (Hoang et al., 2022). In addition to the focus on social responsibility, the role of the board of directors is deemed crucial in directing the growth of the entire company. Specifically, the two significant accounting scandals involving Enron Corporation and WorldCom, as well as the 2008 global financial crisis, exposed flaws in corporate governance. Rodriguez-Fernandez et al. (2014) revealed that some board members exhibit opportunistic behaviours by prioritising short-term finances over ensuring smooth business operations, which negatively impacts the organisation's success. Therefore, studying CSRD and board of directors' characteristics can prove their effects on corporate performance, thereby providing an extra perspective on how to enhance it.

Like many developing countries in Southeast Asia, Vietnam started implementing CSR (Corporate Social Responsibility) relatively late, only about 15 years ago, initially introduced by multinational corporations (Mai, 2017). The Vietnamese government has served as a conduit to promote good practices in social and environmental issues. Despite the ambitious sustainable development goals set by the Vietnamese government, researchers have observed disjointed government-level policies (Hoang et al., 2020) and a lack of awareness among stakeholders regarding sustainable development (Kim et al., 2020; Ling and Nguyen, 2013). Currently, firms in developing economies are adopting reporting standards such as the global reporting initiatives (GRIs), which also emphasise environmental and social aspects, but the third component is economic responsibility rather than corporate governance. According to the GRI disclosure guidelines, economic responsibility encompasses a wide range of activities, from addressing anti-competitive behaviour to supporting infrastructure investment and prioritising local suppliers and local staff recruitment. This economic performance is expected to impact the economic conditions of the firm's stakeholders as well as economic systems at the local, national, and global levels (Global Reporting Initiative, 2016).

However, the understanding and practice of CSRD of countries in the ASEAN region in general and Vietnam in particular are still very limited. In the past, Vietnam has witnessed several incidents involving social responsibility, such as Nike's factory – a well-known fashion brand that faced strong opposition when their workers were forced to work in a polluted environment, and Formosa Ha Tinh Company, which had to acknowledge 53 waste disposal errors that caused damage to land resources, the sea, and domestic water. These scandals exposed the inadequate awareness of social responsibility within Vietnam's corporate community. Furthermore, as the board of directors in Vietnam typically adopts a shareholder management approach, their power significantly impacts corporate strategies, and making incorrect decisions can adversely affect firm performance. In addition to the long-standing challenge of insufficient resources, businesses also grapple with the fact that environmental regulations are scattered across various legal documents, including the 2014 Environmental Protection Law, Environmental Protection Tax Law, and most recently Circular 155, which mandates the disclosure of environmental activities. Inconsistent guidance and the high cost of compliance with environmental protection regulations could significantly detrimentally affect firm performance. This underscores the importance of examining this aspect of

CSR activity, which has received relatively little attention. Vietnam, as a developing country currently adopting GRI standards, provides a suitable research context. As a result, this study aims to broaden the understanding of the relationship between board characteristics, CSR disclosure, and firm performance, thereby promoting a favourable business environment. This study's main contribution will be the application of 2 CSRD measurements and various characteristics of directors' board in studying their influence on corporate performance, which provides reliable and objective results for the research.

The remainder of the research is structured as follows. Section 2 provides a theoretical framework, which serves as the basis to form our testable hypotheses. Section 3 presents our empirical strategy, covering research models, variable construction and data sources, and estimation strategy. Section 4 provides estimation results and the discussion of the results. Finally, Section 5 summarises the findings and provides implications based on the research findings.

2 Theoretical framework

2.1 Stakeholder theory

The stakeholder theory originated from Freeman's stakeholder perspective, which emphasises that a company's survival and success are contingent upon its management's ability to address stakeholder concerns and obtain their approval (Freeman, 1984). The provision of additional social information, such as voluntary demonstrations in annual reports or sustainable development reports, is one effective means of addressing this relationship. Gray et al. (1995) argue that the release of CSR is part of business communication with stakeholders, reflecting the company's appreciation and respect for society. According to Surroca et al. (2009), the level of CSRD significantly correlates with stakeholder interests and the economic efficiency of the firm. CSRD compliance contributes to a positive reputation for the company, as corroborated by the findings of Branco and Rodrigues (2006). Therefore, the stakeholder theory affirms the critical role of stakeholders in determining sustainable activities and information disclosure (Roberts, 1992).

2.2 Agency theory

Agency theory posits that conflicts of interest between shareholders and management arise from the separation of ownership and control in a company (Fama and Jensen, 1983). Shareholders prioritise profit-maximisation goals, while managers may prioritise their interests over those of the shareholders. To protect their interests, shareholders monitor management with the help of the board of directors (Jensen and Meckling, 1976). Strong monitoring by the board of directors has been found to improve firm performance (Fama, 1980; Zahra and Pearce, 1989). Overall, the agency theory provides insight into why board characteristics play an important role in determining firm performance.

2.3 Resource dependence theory

The resource dependency theory, developed by Pfeffer and Salancik (1978), explains the influence of critical external resources on organisational behaviour. The board of directors plays a vital role in helping firms improve their performance by reducing their dependence on the external environment (Pucheta-Martínez and Gallego-Álvarez, 2020) or providing other resources (Hillman et al., 2000). As a key link between the firm and various resources, the board's relationship with the external environment enables firms to achieve strategic aims and develop sustainably (Selznick, 1948). Therefore, board characteristics have a significant impact on firm performance.

3 Literature review and hypothesis development

3.1 Corporate social responsibility disclosure

Carroll (1999) argues that firms have a moral obligation to implement CSR practices that go beyond profit-making and regulatory compliance. One of the main expected benefits of CSR practices is improving future financial performance. Companies are increasingly aware that stakeholder perceptions can be crucial to their performance and survival (Boesso and Kumar, 2007). Font et al. (2012) further highlight the importance of CSRD for maintaining transparency and enhancing organisational performance.

The relationship between CSRD and firm performance has been extensively debated, and there is no consensus on whether CSRD improves or worsens company performance (Orlitzky et al., 2003). However, some studies suggest that CSRD can enhance business efficiency by strengthening stakeholder relationships (Boesso et al., 2013). Nekhili et al. (2017) demonstrated a significantly positive relationship between CSRD and the performance of family companies based on a sample of 91 French companies listed on the SBF 120 index from 2001 to 2011. This result is in line with numerous research (Oeyono et al., 2011; Liu et al., 2021a; Nguyen et al., 2021). In contrast, Liouia and Sharma (2012) stated that CSR can also be viewed by some investors simply as costs and penalties, which can lead to reduced profits and firm performance. Buallay et al.'s (2020) findings, there is a negative relationship between CSRD and firm performance, as measured by its return on assets (ROA), and market value, as measured by Tobin'Q (TQ). Therefore, the hypothesis can be formulated as follows:

H1: CSRD has a positive impact on firm performance

3.2 Board size

Board size is a key factor analysed in several studies investigating the impact of board characteristics on firm performance, such as Yermack (1996), Carter et al. (2003), Wintoki et al. (2012), and Riyadh et al. (2019). Board size refers to the number of directors on the board as of the annual meeting date during each fiscal year (Yermack, 1996). Yermack (1996) discovered a negative correlation between board size and firm value, indicating that companies with smaller boards have more favourable financial ratios and provide stronger incentives for CEO performance from compensation and the threat of dismissal. Kao et al. (2018) also found that the smaller the board size, the stronger the firm's performance. Conversely, from the standpoint of resource dependence

theory, larger boards may have more knowledge or better information due to the greater number of directors, resulting in enhanced business performance (Zahra and Pearce, 1989; Carter et al., 2010). Riyadh et al. (2019) supported this argument by stating that an increase in board capacity is likely to improve the board's effectiveness in providing adequate support. In addition, Nguyen and Le (2021) also found a positive impact of the board of directors' size on firm performance. Therefore, the following hypothesis is proposed:

H2: Board size has a positive effect on firm performance.

3.3 Women on board

Board diversity is a characteristic that has received considerable attention in numerous studies, with gender diversity being the most extensively debated. Research has suggested that gender diversity can have a significant impact on board decision-making processes and the quality of the results of those decisions. This is due to the differences between men and women in terms of their personality, communication style, educational background, career experience, and expertise. As a result, increasing the presence of women on boards has become a crucial topic in the field of corporate governance.

Despite the growing importance of gender diversity on boards, there is still no consensus on its impact on firm performance. Rose (2007) has found no significant relationship between the fraction of women on the board and firm value. However, many researchers have claimed that the presence of women on the board has a positive and substantial impact on firm performance (Carter et al., 2003; Post and Byron, 2015; Riyadh et al., 2019; Dang et al., 2020). Thus, the following hypothesis is proposed:

H3: The presence of women on board has a positive impact on firm performance.

3.4 CEO duality

CEO duality refers to the situation where the Chief Executive Officer (CEO), who runs the corporation at the highest level, also holds the position of Chairman of the Board (Carter et al., 2003; Peng et al., 2007; Dang et al., 2020). Currently, there is a debate about whether the CEO and chairman of the board should be in separate roles. According to Jensen and Meckling (1976), separating the roles is important to prevent managerial opportunism and entrenchment, and ensure that boards can provide effective oversight of management. Furthermore, some studies have indicated that firm value, as measured by ROA and Tobin's Q, declines when CEOs also serve as board chairs (Carter et al., 2003; Dang et al., 2020).

In contrast, Finkelstein and D'Aveni (1994) argued that CEO duality can help to avoid confusion among managers, employees, and other stakeholders regarding who is in charge, which can facilitate more timely and effective decision-making and improve firm performance. Similarly, Peng et al. (2007) found a positive association between CEO duality and firm performance, as measured by return on equity (ROE). Thus, the hypothesis is proposed as follows:

H4: CEO duality has a positive impact on firm performance.

3.5 Non-executive directors

Research has shown that increasing the percentage of outside directors can improve firm performance (Zahra and Pearce, 1989). The inclusion of non-executive directors on the board can enhance the board's effectiveness in monitoring and controlling management, which can help prevent financial statement fraud and improve corporate performance (Beasley, 1996).

However, some studies have found a negative association between the proportion of non-executive directors and firm performance among China's government share-controlling firms (Yang et al., 2006). A higher proportion of non-executive directors on the board in certain situations may lead to over-monitoring effects, which can be detrimental to performance (Adithipyangkul and Leung, 2018). In contrast, other researchers have found no relationship between the proportion of non-executive directors on the board and firm performance (Grace et al., 1995; Haniffa and Hudaib, 2006; Riyadh et al., 2019). We propose the following hypothesis:

H5: Non-executive directors have a negative impact on firm performance.

3.6 Directors with accounting and financial expertise

Regulators have emphasised the importance of having financial and accounting experts on boards to ensure greater accountability across various issues (Guner et al., 2006). According to Aldamen (2011), firms with financial professionals and experts on the audit committee and board are more likely to have better market performance, as evaluated by ROA. Similar findings by Johl et al. (2015) and El Ammari (2022) indicate that having directors with finance and accounting expertise on the board is crucial in improving a firm's credibility, governance standards, and financial performance. Based on these studies, we propose the following hypothesis:

H6: Directors with financial and accounting expertise have a positive impact on firm performance.

4 Methodology

4.1 Data collection

Our sample comprises 498 non-financial firms listed on the Vietnam stock exchange, which includes both the Hanoi Stock Exchange (HNX) and the Ho Chi Minh Stock Exchange (HOSE). The research data was provided by Vietstock, a company specialising in information about listed firms. Initially, the data consisted of 2490 observations from 2015 to 2019. However, after eliminating ineligible observations due to insufficient information or poor quality, the final sample included 2455 observations from the same period.

4.2 Variables Measurement

4.2.1 Dependent variables

According to the findings of several previous studies (Carter et al., 2003; Peng et al., 2007; Aldamen, 2011; Rodriguez-Fernandez et al., 2014; Riyadh et al., 2019; Buallay et al., 2020; Nguyen and Le, 2021), financial measures are commonly used to evaluate firm performance. Accordingly, we will evaluate firm performance using the following measures:

Return on assets (ROA): This metric indicates the accounting income produced for shareholders and is calculated as net profit divided by the total assets of the firm (Lioui and Sharma, 2012; Riyadh et al., 2019; Buallay et al., 2020).

Earnings per share (EPS): EPS is calculated as the profit attributed to equity holders divided by the average shares in issue during the period (Oeyono et al., 2011). This metric is widely used by investors to evaluate firm performance (Pearce and Zahra, 1992; Grace et al., 1995).

Tobin's Q (TQ): TQ is the ratio of the market value of a firm to the replacement cost of its assets (Yermack, 1996). It is a reliable and widely used measure of a firm's future financial efficiency (Yermack, 1996; Carter et al., 2003).

4.2.2 Independent variables

The CSRD variable is measured by an index reflecting the level of CSRD, built based on the GRI Standards. GRI Standards data is collected for the five years, from 2015 to 2019. Following the GRI Standards, there are four categories of GRI disclosure: general corporate information disclosure (GRI-1), economic disclosure (GRI-2), corporate environmental practice disclosure (GRI-3), and corporate social practice disclosure (GRI-4). The total number of GRI Standards indicators that need to be disclosed is 86, which are divided into four categories: 12 indicators for GRI-1, 12 indicators for GRI-2, 29 indicators for GRI-3, and 33 indicators for GRI-4. A scoring methodology of 'yes/no' or (1,0) is applied. In each item of each GRI category, firms that disclose the information are encoded as 1. In contrast, companies that do not publish any information are coded as 0. The narrative content of the four GRI categories is rated from one to five according to the quantity, quality, and form of information disclosed in each category. Thus, the maximum score a company can achieve is 430 GRI scores.

The CSRD variable is presented in two forms:

- *CSRD_I*: the log of one plus GRI scores (Rezaee et al., 2019; Dang et al., 2021)
- *CSRD_R*: the ratio of GRI scores awarded over the maximum GRI scores a firm could achieve (Nekhili et al., 2017; Riyadh et al., 2019; Nguyen et al., 2021).

Board characteristics are measured by five independent variables:

1 *Board size (BSIZE)*: The number of members on the board of directors (Yermack, 1996; Nguyen and Le, 2021)

2 *Women on board (WOMEN)*: The ratio of the number of women to total board members (Carter et al., 2003; Dang et al., 2020; Nguyen and Le, 2021).

3 *Duality (DUAL)*: Dummy variable: 1 if there is duality; 0 if there is no duality (Carter et al., 2003; Peng et al., 2007; Dang et al., 2020; Nguyen and Le, 2021).

4 *Non-executive directors (NED)*: The ratio of the number of non-executive directors to total board members (Riyadh et al., 2019; Nguyen and Le, 2021)

5 *Director with accounting and financial expertise (DAF)*: The ratio of the number of directors with expertise in accounting finance to total board members (Johl et al., 2015; El Ammari, 2022)

4.2.3 Control variables

We use firm size, firm age, leverage, state ownership, foreign ownership, and audit quality as control variables that are based on previous studies. Firm size (SIZE) is measured as the logarithm of total assets (Nguyen and Le, 2021; El Ammari, 2022). Firm age (AGEFIRM) is defined as the period from the start of the firm's establishment and operation (Peng et al., 2007). Leverage (LEV) is measured as the ratio of total liabilities to total assets (Carter et al., 2003; Nguyen et al., 2021b; El Ammari, 2022). State ownership (SO) is measured by the percentage of shares owned by the government to the total number of shares issued (Peng et al., 2007). Foreign ownership (FO) is calculated as the percentage of shares owned by foreign shareholders to the total number of shares issued (Kao et al., 2018). Audit quality (AUDIT) is a dummy variable taking the value 1 if the firm's external auditor is one of the big four audit firms (KPMG, EY, PwC, Deloitte) and 0 if not (Buallay et al., 2020).

Table 1 provides a summary of the measures for the variables examined in this study.

Table 1 Variables measurement

Variables	*Symbol*	*Measurement*	*Data source*
Dependent variables – Firm performance			
Return On Assets	ROA	The ratio of net income to total assets	Vietstock
Earnings Per Share	EPS	The ratio of the profit attributed to the equity holders to the average shares in issue in the period	Vietstock
Tobin's Q	TQ	The ratio of the company's market value to the cost of replacing its assets	Vietstock
Independent variables			
Corporatesocial responsibility disclosure	CSRD_I	Log of one plus the GRI scores	GRI disclosure
	CSRD_R	The ratio of GRI scores awarded over the maximum GRI scores	
Board size	BSIZE	The number of members on the board of directors	Vietstock
Women on board	WOMEN	The ratio of the number of women to total board members	Vietstock
Duality	DUAL	Dummy variable: 1 if there is duality; 0 if there is no duality	Vietstock
Non-executive directors	NED	The ratio of the number of non-executive directors to total board members	Vietstock

Table 1 Variables measurement (continued)

Variables	*Symbol*	*Measurement*	*Data source*
Independent variables			
Director with accounting and financial expertise	DAF	The ratio of the number of directors with expertise in accounting and finance to the total board members	Vietstock
Control variables			
Firm size	SIZE	The logarithm of total assets	Vietstock
Firm age	AGEFIRM	The period from the start of the firm's establishment and operation	Vietstock
Leverage	LEV	The ratio of total liabilities to total assets	Vietstock
State ownership	SO	Percentage of shares owned by the government to the total number of shares issued	Vietstock
Foreign ownership	FO	Percentage of shares owned by foreign shareholders to the total number of shares issued	Vietstock
Audit quality	AUDIT	Dummy variable: 1 if the firm's external auditor is one of the big four audit firms (KPMG, EY, PwC, Deloitte); 0 = otherwise	Vietstock

4.3 Research model

The relationships between CSRD, board characteristics and firm performance were estimated by analysing the multivariate regression models as follows:

$$ROA_{i,t} = \alpha_1 + \alpha_2 CSRD_{i,t} + \alpha_3 BOARD\ CHARACTERISTICS_{i,t} + \alpha_4 CONTROL_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$EPS_{i,t} = \beta_1 + \beta_2 CSRD_{i,t} + \beta_3 BOARD\ CHARACTERISTICS_{i,t} + \beta_4 CONTROL_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$TQ_{i,t} = \gamma_1 + \gamma_2 CSRD_{i,t} + \gamma_3 BOARD\ CHARACTERISTICS_{i,t} + \gamma_4 CONTROL_{i,t} + \varepsilon_{i,t} \quad (3)$$

Where $CSRD_{i,t}$ is the independent variable that refers to the CSRD for firm i at time t; $BOARD\ CHARACTERISTIC_{i,t}$ are independent variables for firm i at time t, including BSIZE, WOMEN, DUAL, NED and DAF. $CONTROLi,t$ are control variables relating to character company for firm$i$at time$t$, including SIZE, AGEFIRM, LEV, FO, SO and AUDIT. Further, α_1, β_1 *and* γ_1 are constants; α_2, β_2, γ_2, α_3, β_3, γ_3, α_4, β_4, γ_4 are coefficients, while $\varepsilon_{i,t}$ is an error term.

4.4 Research methodology

We used Stata 16 to run regressions on panel data to analyse the impact of CSRD and board characteristics on firm performance. We conducted the Pooled OLS regression method. However, this method assumes that there are no separate (business-specific) and time effects. Using the OLS method without accounting for spatial and time dimensions in the combined data can lead to inaccurate estimation results. Therefore, we also conducted the random effects model (REM) and the fixed effects model (FEM) to solve the problem of biased estimation results due to the influence of the residuals and the

mutual correlation between independent variables. The selection of the appropriate estimation model was based on the Hausman test. If the p-value was less than 0.05, we rejected the null hypothesis (H0) that the REM model was appropriate, and we used the FEM model instead, and vice versa. In addition, we used the robust standard errors to defect the heteroscedasticity of OLS, FEM, and REM models. However, the autocorrelation cannot be fixed by the robust standard error model, hence the GLS model is selected as the most suitable model that can solve both problems. Moreover, further analyses are conducted to confirm the robustness of our baseline findings across alternative fixed-effect settings and regressions.

5 Discussion of results

5.1 Descriptive statistics

The results in Table 2 show that firm performance is measured by ROA, EPS, and TQ. With 498 firms with 2455 observations measured, we have an average ROA of 0.054, where the minimum value is –0.69 and the maximum value is 0.78. When ROA indicators have a negative value, a company is operating inefficiently and has inadequate asset management and income-generating capabilities. Table 2 also shows that there is a big change in TQ values, which fluctuates with a minimum value of 0.095, a maximum value of 9.04, and an average value of 1.09. This demonstrates the existence of various indicators of the future profitability of companies. In addition, we find that the per-share profit index (EPS) receives an average value of 2147.9, with a maximum value of 51,411, a minimum value of –28,679, and a standard deviation of 3285, respectively.

In Table 3, we found that the correlation coefficient between each pair of variables in the table has a coefficient less than 0.5 indicating that there is no correlation between the variables.

Table 2 Descriptive statistical analysis

Variables	*Obs*	*Mean*	*Std. dev.*	*Min*	*Max*
TQ	2455	1.091981	0.5643198	0.094274	9.043993
ROA	2455	0.053804	0.093574	–1.693255	0.7836998
EPS	2455	2145.16	3281.998	–28,679	51,411
CSRD_I	2455	1.788916	0.3418325	0.7781513	2.619093
CSRD_R	2455	0.1974584	0.1866545	0.0116279	0.9651163
BSIZE	2455	5.434623	1.15245	2	11
WOMEN	2455	0.1475101	0.1695019	0	1
DUAL	2455	0.2362525	0.4248656	0	1
NED	2455	0.667189	0.1771139	0	1
DAF	2455	0.4673228	0.3332042	0	1
SIZE	2455	27.30091	1.566161	23.44062	33.63179
AGEFIRM	2455	26.92179	13.90213	7	92
LEV	2455	0.4980681	0.2277108	0.0005884	2.030631
SO	2455	14.83954	23.45803	0	96.72
FO	2455	11.28085	14.24772	0	80.52312
AUDIT	2455	0.2729124	0.445547	0	1

Table 3 Analysis of correlation coefficient

	CSRD_I	*CSRD_R*	*BSIZE*	*WOMEN*	*DUAL*	*NED*	*DAF*	*SIZE*	*AGEFIRM*	*LEV*	*SO*	*FO*	*AUDIT*
CSRD_I	1.0000												
CSRD_R	0.9188	1.0000											
BSIZE	–0.0259	–0.0323	1.0000										
WOMEN	0.0281	0.0250	0.0478	1.0000									
DUAL	–0.0231	–0.0262	–0.0442	0.0667	1.0000								
NED	0.0061	0.0206	0.0686	0.0524	–0.3190	1.0000							
DAF	0.0099	0.0209	0.0213	0.0655	0.1018	–0.0162	1.0000						
SIZE	0.0127	0.0199	0.3148	–0.0164	–0.0542	0.0237	0.0149	1.0000					
AGEFIRM	0.0292	0.0403	0.0105	–0.0143	–0.0134	–0.1116	–0.0040	–0.0027	1.0000				
LEV	–0.0159	–0.0072	–0.0307	–0.1321	–0.0083	–0.1735	–0.1211	0.3288	0.0711	1.0000			
SO	–0.0453	–0.0468	–0.0339	–0.1117	–0.1847	–0.0152	–0.0305	0.0167	0.1553	–0.0491	1.0000		
FO	–0.0012	–0.0045	0.3158	0.0884	0.0026	0.0322	0.0135	0.2575	–0.0537	–0.1941	–0.0631	1.0000	
AUDIT	–0.0222	–0.0149	0.1570	–0.0172	–0.0781	0.1120	0.0177	0.4846	–0.0079	0.0207	0.0045	0.3003	1.0000

Table 4 The results of Pooled OLS regression

	Coef.				*P>t*				*VIF*	*1/VIF*	
Variables	*ROA*		*EPS*	*TQ*	*ROA*	*EPS*	*TQ*				
CSRD_I	–0.0086713		–760.3968	0.0022132	0.080	0.000	0.943		1.01	0.990910	
CSRD_R		–0.0099466	–1002.743	–0.0198716	0.285	0.003	0.734		1.01		0.988796
BSIZE	0.0023077	0.0023624	44.65002	48.30961	0.0329008	0.0326905	0.160	0.151	0.459	0.424	0.001	0.002	1.21	0.827082	0.826432
WOMEN	–0.0077091	–0.0079253	169.0652	152.753	0.3503095	0.3508186	0.459	0.446	0.658	0.690	0.000	0.000	1.05	0.956449	0.956561
DUAL	–0.0079227	–0.0079766	148.9048	142.0273	–0.0383181	–0.0386736	0.071	0.070	0.356	0.379	0.166	0.162	1.19	0.843779	0.843866
NED	–0.0154044	–0.0159247	–878.2235	–921.6994	0.2513695	0.2518717	0.140	0.127	0.022	0.016	0.000	0.000	1.19	0.837101	0.836965
DAF	0.0062928	0.0063101	148.4224	151.3683	0.0813414	0.0815814	0.232	0.231	0.442	0.434	0.014	0.014	1.03	0.967348	0.967037
SIZE	0.0050031	0.004486	147.1912	102.9724	0.0200378	0.0203632	0.000	0.000	0.000	0.000	0.000	0.000	1.73	0.577435	0.577242
AGEFIRM	0.0004996	0.0004924	25.90891	25.36966	–0.2613373	–0.2621845	0.000	0.000	0.000	0.000	0.000	0.000	1.05	0.954727	0.953583
LEV	–0.170314	–0.1692551	–2717.608	–2628.113	0.0015853	0.0015732	0.000	0.000	0.000	0.000	0.001	0.001	1.37	0.731201	0.731579
SO	0.000142	0.0001449	0.3152388	0.5009007	0.004441	0.0044386	0.065	0.060	0.911	0.860	0.000	0.000	1.10	0.910307	0.909999
FO	0.0001741	0.0001811	33.54867	34.16336	0.0644418	0.0638135	0.203	0.185	0.000	0.000	0.014	0.014	1.30	0.767274	0.767273
AUDIT	–0.0071866	–0.0063456	–40.40202	30.9402	0.0056208	0.0056392	0.085	0.125	0.792	0.839	0.000	0.000	1.41	0.710046	0.710248
R_sq	0.3768	0.3764	0.3637	0.3614	0.8095	0.8095	Mean VIF						1.22		

5.2 Regression analysis results

Based on the OLS model's regression results in Table 4, the *F*-test with sig = 0.0000 helps us reject the H0 hypothesis and accept the H1 hypothesis that independent variables and control variables can predict dependent variables. Adjusted R2 values indicate that independent variables and control variables interpret 37.68%, 36.37%, and 80.95% of the change in firm performance (measured by ROA, EPS, and TQ) according to CSRD_I measurement; 37.64%, 36.14% and 80.95% according to CSRD_R measurement.

After running the OLS regression, we conducted a multicollinearity test. The VIF coefficients of all independent and control variables are smaller than 2 so the model does not have a multi-linear phenomenon. We use the FEM fixed effects model and REM random effects model to analyse the data, then, conduct the Hausman test to select the more suitable model.

The results (Appendix I) show that *p*-value Prob > chi2 = 0.0000 < α = 0.01, the FEM model is more suitable than the REM model for ROA, EPS, and TQ in both ways of calculating CSRD. When we examine the defect of the model, we find that the EPS model has autocorrelation; the ROA and TQ model has both autocorrelation and heteroscedasticity. To fix these defects, we conduct the Robust Standard Errors models and have the results shown in Table 5.

5.3 Robustness test

We conduct further analyses to confirm the robustness of our baseline findings across alternative fixed-effect settings and regressions. We proceed to replace the fixed-effect setting in columns (1) to (2) with alternative fixed dimensions, alternative regression in columns (3) to (6), and re-estimate the regressions with EPS and ROA are independent variables, respectively. In line with our baseline results, the impact of CSRD_I on EPS and ROA is negative, respectively. The findings showed the same results with the relationship between CSRD_R and EPS, TQ as two firm performance proxies.

Based on Table 6, it can be observed that the CSRD variable has a negative relationship with EPS in the CSRD_I case, with a 1% significance level. It also has a reverse relationship with ROA in the CSRD_I case and no relationship with CSRD_R. However, when measured using Tobin's Q and the CSRD_R case, it has a positive relationship with a coefficient of 0.031 and a 1% significance level. Thus, the hypothesis is accepted when Tobin's Q is used to measure firm performance. This result is in line with the research of Nekhili et al. (2017). To explain the GLS model result, implementing CSR may result in cost-raising, thus reducing ROA, and EPS of the enterprises. However, practicing CSR could help raise Tobin's Q, and we anticipate that CSRD will give enterprises additional value in terms of not only financial profits but also reputation and public trust. Since social responsibility and stakeholder interests are intertwined, businesses that successfully operate while simultaneously fulfilling their social responsibility will attract more attention from the stakeholders.

Table 5 OLS robust, FEM robust, REM robust regressions

	ROA				*EPS*				*TQ*			
Variables	*OLS robust*	*FEM robust*	*REM robust*		*OLS robust*	*FEM robust*	*REM robust*		*OLS robust*	*FEM robust*	*REM robust*	
CSRD_I	−0.00867**	−0.000708	−0.00261		−760.4***	−143.7	−234.5*		0.00221	0.00742	−0.000598	
	[−2.10]	[−0.20]	[−0.73]		[−4.39]	[−1.17]	[−1.90]		[0.07]	[0.35]	[−0.03]	
CSRD_R	−0.00995	0.00193	−0.00397		−1002.7***	−140.4	−389.7**		−0.0199	0.0435		0.0213
	[−1.32]	[0.33]	[−0.68]		[−3.62]	[−0.72]	[−1.98]		[−0.28]	[1.08]		[0.58]
BSIZE	0.00231	0.00165	0.00238		44.65	78.24	85.10		0.0329***	−0.00326	−0.00303	0.0104	0.0107
	[1.31]	[1.34]	[0.83]		[0.75]	[0.81]	[1.01]	[1.02]	[1.15]	[2.90]	[2.87]	[−0.32]	[−0.30]	[1.09]	[1.11]
WOMAN	−0.00771	−0.00793	−0.0438	−0.0296	−0.0297	169.1	152.8	−285.0	−296.6	−293.6	−301.4	0.350***	0.351***	0.215**	0.215**	0.243***	0.242***
	[−0.45]	[−0.46]	[−1.31]	[−1.17]	[−1.18]	[0.42]	[0.37]	[−0.48]	[−0.50]	[−0.58]	[−0.59]	[4.69]	[4.71]	[2.13]	[2.12]	[2.73]	[2.72]
DUAL	−0.00792*	−0.00798*	−0.00867	−0.00607	−0.00608	148.9	142.0	−183.5	−185.7	61.59	59.85	−0.0383*	−0.0387*	−0.0561*	−0.0559*	−0.0495*	−0.0493*
	[−1.81]	[−1.82]	[−1.21]	[−1.07]	[−1.07]	[0.72]	[0.69]	[−0.93]	[−0.94]	[0.29]	[0.29]	[−1.71]	[−1.73]	[−1.71]	[−1.71]	[−1.76]	[−1.76]
NED	−0.0154	−0.0159	0.0219	0.0218	−0.00762	−0.00755	−878.2**	−921.7**	−371.2	−371.9	−865.4*	−858.3*	0.251***	0.252***	−0.00997	−0.0108	0.0324	0.0314
	[−1.23]	[−1.27]	[0.57]	[0.57]	[−0.32]	[−0.32]	[−2.04]	[−2.14]	[−0.78]	[−0.78]	[−1.90]	[−1.88]	[4.32]	[4.33]	[−0.14]	[−0.16]	[0.50]	[0.49]
DAF	0.00629	0.00631	0.00396	0.00397	0.00212	0.00216	148.4	151.4	183.9	186.3	56.64	60.94	0.0813**	0.0816**	0.0732*	0.0729*	0.0755**	0.0752**
	[0.98]	[0.99]	[0.36]	[0.36]	[0.29]	[0.30]	[0.70]	[0.71]	[0.72]	[0.73]	[0.24]	[0.26]	[2.43]	[2.44]	[1.85]	[1.85]	[2.09]	[2.08]

Table 5 OLS robust, FEM robust, REM robust regressions (continued)

	ROA				*EPS*				*TQ*			
Variables	*OLS robust*	*FEM robust*	*REM robust*		*OLS robust*	*FEM robust*	*REM robust*		*OLS robust*	*FEM robust*	*REM robust*	
SIZE	0.00500***	0.00449***	0.0748***	0.0746***	0.0142***	0.0142***	147.2***	103.0***	2361.6***	2354.3***	671.3***	671.0***	0.0200***	0.0204***	–0.0180	–0.0196	–0.00442	–0.00514
	[6.82]	[6.83]	[3.44]	[3.43]	[3.33]	[3.33]	[6.29]	[5.34]	[4.84]	[4.83]	[5.45]	[5.46]	[4.52]	[5.28]	[–0.32]	[–0.35]	[–0.20]	[–0.23]
AGEFIRM	0.000500***	0.000492***	–0.00988***	–0.00993***	0.000445**	0.000446**	25.91***	25.37***	–295.1***	–295.5***	18.57**	18.57**	0.00562***	0.00564***	–0.00995	–0.0106	0.00351**	0.00344**
	[4.51]	[4.45]	[–4.71]	[–4.69]	[2.21]	[2.22]	[5.45]	[5.35]	[–6.49]	[–6.48]	[2.05]	[2.07]	[7.33]	[7.41]	[–1.55]	[–1.64]	[2.30]	[2.28]
LEV	–0.170***	–0.169***	–0.395***	–0.395***	–0.232***	–0.232***	–2717.6***	–2628.1***	–8593.7***	–8589.3***	–5200.0***	–5196.3***	–0.261***	–0.262***	0.161	0.162	–0.0123	–0.0117
	[–7.26]	[–7.23]	[–3.86]	[–3.86]	[–4.52]	[–4.52]	[–5.40]	[–5.24]	[–5.23]	[–5.24]	[–4.52]	[–4.53]	[–4.15]	[–4.18]	[1.10]	[1.10]	[–0.11]	[–0.10]
SO	0.000142***	0.000145***	–0.000314**	–0.000313**	0.0000764	0.0000762	0.315	0.501	–10.53***	–10.50***	–0.357	–0.417	0.00159***	0.00157***	–0.00137**	–0.00136**	0.0000223	0.0000429
	[2.78]	[2.83]	[–2.46]	[–2.46]	[1.07]	[1.07]	[0.12]	[0.19]	[–3.11]	[–3.10]	[–0.11]	[–0.13]	[3.36]	[3.30]	[–2.30]	[–2.28]	[0.04]	[0.08]
FO	0.000174	0.000181	–0.000493	–0.000495	–0.000228	–0.000228	33.55***	34.16***	–5.504	–5.614	9.236	9.193	0.00444***	0.00444***	–0.000654	–0.000668	0.00250	0.00250
	[1.17]	[1.22]	[–1.21]	[–1.21]	[–0.86]	[–0.86]	[5.12]	[5.19]	[–0.30]	[–0.30]	[0.79]	[0.79]	[3.61]	[3.61]	[–0.38]	[–0.39]	[1.59]	[1.59]
AUDIT	–0.00719*	–0.00635	–0.00332	–0.00321	–0.0136*	–0.0136*	–40.40	30.94	–347.5	–340.9	–491.6*	–488.6*	0.0644**	0.0638**	–0.0127	–0.0119	0.0487	0.0495
	[–1.66]	[–1.45]	[–0.46]	[–0.45]	[–1.81]	[–1.80]	[–0.25]	[0.19]	[–1.23]	[–1.21]	[–1.94]	[–1.93]	[2.50]	[2.49]	[–0.23]	[–0.22]	[1.22]	[1.24]
N	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455
R-sq	0.377	0.376	0.213	0.213			0.364	0.361	0.139	0.139			0.810	0.810	0.014	0.015		

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

Table 6 Robustness test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Alternative fixed-effect setting		*Alternative regression (GLS)*		*Alternative regression (GLS)*		*Alternative fixed-effect setting and regression*	
Variables	*EPS*	*EPS*	*EPS*	*EPS*	*ROA*	*ROA*	*TQ*	*TQ*
CSRD_I	–730.978***		–106.888***		–0.002**		0.009	
	(184.259)		(37.704)		(0.001)		(0.006)	
CSRD_R		–883.459**		–77.416		–0.002		0.031***
		(346.354)		(69.107)		(0.002)		(0.011)
BSIZE	35.612	39.673	60.595**	63.749**	0.001**	0.001*	0.004	0.004
	(60.348)	(60.455)	(25.223)	(25.251)	(0.001)	(0.001)	(0.004)	(0.004)
WOMAN	187.872	170.318	–273.567*	–255.155*	–0.014***	–0.015***	0.108***	0.109***
	(381.205)	(381.882)	(148.222)	(149.660)	(0.004)	(0.004)	(0.028)	(0.027)
DUAL	113.053	107.304	–121.386**	–117.835**	–0.003*	–0.003*	–0.025***	–0.025***
	(161.326)	(161.675)	(51.994)	(53.141)	(0.002)	(0.002)	(0.010)	(0.010)
NED	–807.121**	–849.944**	–729.094***	–717.012***	–0.012***	–0.012***	0.029	0.029
	(383.301)	(383.842)	(138.131)	(137.963)	(0.004)	(0.004)	(0.022)	(0.022)
DAF	159.612	162.284	123.049	126.199*	0.001	0.001	0.053***	0.053***
	(192.875)	(193.257)	(74.815)	(75.420)	(0.002)	(0.002)	(0.013)	(0.013)

Table 6 Robustness test (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Alternative fixed-effect setting		*Alternative regression (GLS)*		*Alternative regression (GLS)*		*Alternative fixed-effect setting and regression*	
Variables	*EPS*	*EPS*	*EPS*	*EPS*	*ROA*	*ROA*	*TQ*	*TQ*
SIZE	151.007***	109.001***	108.665***	101.252***	0.005***	0.005***	0.029***	0.029***
	(23.042)	(19.817)	(8.417)	(8.089)	(0.000)	(0.000)	(0.001)	(0.001)
AGEFIRM	27.709***	27.134***	11.360***	11.340***	0.000***	0.000***	0.003***	0.003***
	(4.660)	(4.665)	(2.577)	(2.613)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	–2736.099***	–2650.471***	–2844.508***	–2863.434***	–0.167***	–0.169***	0.018	0.014
	(315.363)	(314.937)	(160.007)	(162.323)	(0.004)	(0.004)	(0.027)	(0.027)
SO	–0.900	–0.683	–0.657	–0.536	0.000	0.000	–0.000	–0.000
	(2.854)	(2.859)	(1.067)	(1.072)	(0.000)	(0.000)	(0.000)	(0.000)
F0	33.281***	33.866***	26.879***	26.126***	0.000	0.000	0.002***	0.002***
	(5.013)	(5.020)	(2.721)	(2.795)	(0.000)	(0.000)	(0.000)	(0.000)
AUDIT	–44.470	24.063	29.189	52.904	–0.002	–0.002	0.015	0.015
	(152.974)	(151.941)	(70.744)	(71.909)	(0.002)	(0.002)	(0.012)	(0.012)
Firm FE	No	No	No	No	No	No	No	No
Year FE	Yes	Yes	No	No	No	No	Yes	Yes
Observations	2455	2455	2455	2455	2455	2455	2455	2455
R-squared	0.367	0.364						

In general, when applying the alternative fixed-effect model, the board size variable (BSIZE), the women on board variable (WOMEN), and the CEO duality variable (DUAL) do not correlate with EPS.

On the other hand, the alternative GLS model proves to be more suitable when the board size variable (BSIZE) has a positive relationship with ROA and EPS in both the CSRD_I and CSRD_R cases. However, there is no correlation with Tobin's Q in both cases of CSRD measurement. Thus, the hypothesis is accepted when ROA and EPS are used to measure firm performance, and this finding aligns with the study of Riyadh et al. (2019). A board of directors that is sizable enough will have access to expert resources and various stakeholder relationships, enabling the company to achieve its performance objectives. According to statistics from the sample we utilised. The size of the board of directors in Vietnam is approximately 5–6 people, which is ideal for the successful development of the business.

The women on board variable (WOMEN) has a negative relationship with ROA and EPS, and a positive relationship with Tobin's Q in both cases of CSRD measurement, with a 1% significance level. Thus, the hypothesis is accepted when Tobin's Q is used to measure firm performance. This finding is consistent with the results reported by Carter et al. (2003). The explanation for this result is that gender diversity on the board of directors of businesses promotes stakeholders' trust, thus increasing the market value of the business. We also believe that their presence reduces the likelihood of financial misrepresentation. Because of this, businesses will operate more safely, which results in lower rates of ROA. Women, however, are frequently more cautious, which helps firms avoid many hazards associated with investing and doing business.

The CEO duality variable (DUAL) has a negative relationship with Tobin's Q, EPS, and ROA in both cases of measuring CSRD at the 1%, 5%, and 10% levels respectively. Thus, the research hypothesis is rejected in all cases using ROA, EPS, and Tobin's Q to measure firm performance. This result is in line with the results reported in Dang et al. (2020) study. The separation of the two positions of CEO and chairman of the board also ensures the goal of business governance and performance. The above results are consistent with the actual situation of firms listed on the Vietnam stock market when the duality still exists.

The non-executive director's variable (NED) has a negative relationship with ROA and EPS, with a 1% significance level, and no relationship with Tobin's Q in both cases of measuring CSRD. Thus, the hypothesis is only accepted when ROA and EPS are used to measure firm performance. This finding aligns with the research of Yang et al. (2006). This result is in line with the reality that companies listed on the Vietnam stock exchange have not yet established a structure for the distribution of executive and non-executive directors. We hope that the policy managers will have solutions to solve this problem.

The director with accounting and financial expertise variable (DAF) is positively correlated with Tobin's Q in both the CSRD_I and CSRD_R cases at a 1% significance level. Likewise, there is a positive relationship between DAF and EPS in the CSRD_R case. However, there is no relationship between the presence of accounting and financial experts and ROA. Thus, the hypothesis is rejected when ROA is used to measure firm performance and accepted when EPS and Tobin's Q are used. This finding aligns with the study of Johl et al. (2015). In Vietnam, the standards for directors with financial and accounting expertise are having a bachelor's degree in finance, or accounting; a master's

degree in finance, or economics. Therefore, highly specialised resources are always guaranteed for business development.

Table 7 The results of hypotheses testing

		Testing results		
Hypotheses	*Hypotheses*	*ROA*	*EPS*	*TQ*
H1	CSRD has a positive impact on firm performance in the future.	Disproved	Disproved	Proved
H2	Board size has a positive impact on firm performance.	Proved	Proved	Disproved
H3	The presence of women on board has a positive impact on firm performance.	Disproved	Disproved	Proved
H4	CEO duality has a positive impact on firm performance.	Disproved	Disproved	Disproved
H5	Non-executive directors have a negative impact on firm performance.	Proved	Proved	Disproved
H6	Directors who have financial and accounting expertise have a positive impact on firm performance.	Disproved	Proved	Proved

6 Conclusion and recommendation

We indicate that there is a significantly positive relationship between CSRD and firm performance, as measured by TQ. However, the results show a negative relationship when firm performance is measured by ROA and EPS.

The results suggest that board size (BSIZE) has a positive effect on firm performance (ROA and EPS). And, non - executive directors (NED) also have a positive impact on firm value (TQ). We also find a positive relationship between DAF and financial performance (EPS and TQ).The board of management, with a reasonable size of 3 to 11 members, and the inclusion of members with strong expertise and non-executive directors can help prevent financial statement-related fraud. Thus, the companies could operate effectively and achieve their highest performance.

Moreover, the women on the board variable (WOMEN) has a positive effect on firm value (TQ). We advocate that the presence of women on boards can increase the effectiveness of decision-making, problem-solving and creative outcomes.

The duality of the CEO (DUAL) has a negative effect on financial performance. Therefore, firms should separate the board of directors from the management function to create objectivity and avoid abuse of power in management.

Sustainable development will be the direction that businesses aim for in the future. We hope that practicing social responsibility will open up a healthy business environment. In addition, businesses also need to pay attention to issues related to the board of directors to improve efficiency.

Although this study highlights the correlation between CSRD and the characteristics of the board of management with firm performance, there are still many limitations, such as sample size or ignoring the relationship between CSRD and board characteristics. Additionally, when considering the scope of for-profit firms, the implementation of social responsibility may not be as focused as in non-profit firms. Our research aims to provide a deeper understanding of the impact of social responsibility and the characteristics of the board on firm performance, creating or improving corporate awareness with sustainable growth.

Limitation and further research: Due to limitations in terms of time, research techniques, and data, we have identified the handling of endogenous phenomena as a limitation, and we will conduct further studies in the future.

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Appendices

Appendix I: Results of regression according to the FEM, REM models

	ROA				*EPS*				*Tobin's Q*			
Variables	*FEM*		*REM*		*FEM*		*REM*		*FEM*		*REM*	
CSRD_I	–0.000708		–0.00261		–143.7		–234.5*		0.00742		–0.000598	
	[–0.16]		[–0.60]		[–1.07]		[–1.73]		[0.40]		[–0.03]	
CSRD_R		0.00193		–0.00397		–140.4		–389.7		0.0435		0.0213
		[0.24]		[–0.50]		[–0.57]		[–1.58]		[1.27]		[0.63]
BSIZE	0.00165	0.00168	0.00238	0.00238	78.24	79.52	85.10	85.11	–0.00326	–0.00303	0.0104	0.0107
	[0.67]	[0.69]	[1.21]	[1.21]	[1.03]	[1.05]	[1.29]	[1.29]	[–0.31]	[–0.29]	[1.08]	[1.11]
WOMEN	–0.0436***	–0.0438***	–0.0296**	–0.0297**	–285.0	–296.6	–293.6	–301.4	0.215***	0.215***	0.243***	0.242***
	[–2.62]	[–2.63]	[–2.30]	[–2.31]	[–0.55]	[–0.58]	[–0.67]	[–0.69]	[3.02]	[3.01]	[3.77]	[3.76]
DUAL	–0.00867	–0.00868	–0.00607	–0.00608	–183.5	–184.7	61.59	59.85	–0.0561**	–0.0559**	–0.0495*	–0.0493*
	[–1.35]	[–1.35]	[–1.16]	[–1.17]	[–0.92]	[–0.93]	[0.35]	[0.34]	[–2.04]	[–2.04]	[–1.95]	[–1.94]
NED	0.0219	0.0218	–0.00762	–0.00755	–371.2	–371.9	–865.4**	–858.3**	–0.00997	–0.0108	0.0324	0.0314
	[1.45]	[1.44]	[–0.61]	[–0.61]	[–0.79]	[–0.79]	[–2.08]	[–2.06]	[–0.15]	[–0.17]	[0.54]	[0.52]
DAF	0.00396	0.00397	0.00212	0.00216	183.9	186.3	56.64	60.94	0.0732**	0.0729**	0.0755**	0.0752**
	[0.47]	[0.47]	[0.32]	[0.33]	[0.70]	[0.71]	[0.25]	[0.27]	[2.01]	[2.00]	[2.29]	[2.28]

Appendix I: Results of regression according to the FEM, REM models (continued)

	ROA				*EPS*				*Tobin's Q*			
Variables	*FEM*		*REM*		*FEM*		*REM*		*FEM*		*REM*	
SIZE	0.0748***	0.0746***	0.0142***	0.0142***	2361.6***	2354.3***	671.3***	671.0***	–0.0180	–0.0196	–0.00442	–0.00514
	[12.49]	[12.46]	[6.65]	[6.64]	[12.75]	[12.71]	[8.33]	[8.32]	[–0.70]	[–0.77]	[–0.33]	[–0.38]
AGEFIRM	–0.00988***	–0.00993***	0.000445**	0.000446**	–295.1***	–295.5***	18.37**	18.57**	–0.00995**	–0.0106**	0.00351**	0.00344**
	[–9.08]	[–9.07]	[2.19]	[2.20]	[–8.76]	[–8.72]	[2.27]	[2.29]	[–2.14]	[–2.26]	[2.39]	[2.34]
LEV	–0.395***	–0.395***	–0.232***	–0.232***	–8593.7***	–8589.3***	–5200.0***	–5196.3***	0.161**	0.162**	–0.0123	–0.0117
	[–21.49]	[–21.49]	[–19.49]	[–19.49]	[–15.10]	[–15.09]	[–12.33]	[–12.33]	[2.05]	[2.05]	[–0.19]	[–0.18]
SO	–0.000314**	–0.000313**	0.0000764	0.0000762	–10.53**	–10.50**	–0.357	–0.417	–0.00137**	–0.00136**	0.0000223	0.0000429
	[–2.13]	[–2.12]	[0.77]	[0.77]	[–2.31]	[–2.30]	[–0.10]	[–0.12]	[–2.18]	[–2.16]	[0.04]	[0.08]
FO	–0.000493	–0.000495	–0.000228	–0.000228	–5.504	–5.614	9.236	9.193	–0.000654	–0.000668	0.00250**	0.00250**
	[–1.61]	[–1.62]	[–1.20]	[–1.21]	[–0.58]	[–0.59]	[1.36]	[1.35]	[–0.50]	[–0.51]	[2.38]	[2.37]
AUDIT	–0.00332	–0.00321	–0.0136**	–0.0136**	–347.5	–340.9	–491.6**	–488.6**	–0.0127	–0.0119	0.0487	0.0495
	[–0.33]	[–0.32]	[–2.16]	[–2.15]	[–1.13]	[–1.11]	[–2.18]	[–2.16]	[–0.30]	[–0.28]	[1.40]	[1.42]
R-sq	0.213	0.213	0.213	0.213	0.139	0.139	0.139	0.139	0.014	0.015	0.014	0.015
N	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455
Hausman Prob. > chi^2		Prob. > chi^2 = 0.0000				Prob. > chi^2 = 0.0000				Prob. > chi^2 = 0.0000		

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