Interlocking Directorships and Firm Performance: The Role of Board Diversity

Abstract

Purpose: This study aims to examine the impact of interlocking directorships on firm performance in Turkey, with a specific focus on the moderating role of board diversity.

Design/methodology/approach: Using a panel dataset comprising the top 100 firms listed on Borsa Istanbul from 2014 to 2018, this study employs regression analysis to investigate the relationship between interlocking directorships, board diversity, and firm performance. It uses firm-level financial data and directorship information to assess the effects of interlocking directorships on firm performance while also considering the moderating influence of board diversity.

Findings: Our findings reveal several important insights. First, the results confirm the "busyness hypothesis" as an increase in the number of interlocks per director negatively impacts firm performance, indicating reduced monitoring effectiveness. However, the study also demonstrates that board diversity plays a significant moderating role. Specifically, board diversity positively influences the relationship between interlocking directorships and firm performance, suggesting that a diverse board can mitigate the negative effects of interlocks and enhance overall firm performance.

Originality/Value: This study contributes to the existing literature in several ways. First, this study extends our understanding of the relationship between interlocking directorships and firm performance, considering contingency factors in the Turkish market. Second, our findings imply that board diversity mitigates the negative impact of busy interlocking directorates and improves firm performance, which provides invaluable directions to firms in setting their boards. Moreover,

this research enhances corporate governance practices in Turkey and beyond in other emerging markets with similar corporate governance mechanisms by identifying the importance of board diversity and its moderating influence.

JEL codes: C23, G3, G34

Keywords: Interlocking directorates, firm performance, board diversity, agency theory, resource dependence theory, Turkey

1. INTRODUCTION

The function of the board of directors has become increasingly crucial in the aftermath of multiple financial crises in emerging markets, such as the 1990 Mexican Peso crisis, the 1997 Asian economic crisis, the 1998 Russian Ruble collapse, the 1998 Brazilian Real crisis, the 2000-2001 Turkish financial crisis, and the 2002 Argentine Peso collapse (Phan et al., 2003). These crises are linked to inadequate corporate governance measures and corporate laws. One of the probable explanations for such failures in emerging economies is the "busyness hypothesis," implying that overly committed directors working on various boards may fail to fulfill the monitoring responsibilities effectively (Clements et al., 2015). Another possible reason could be the inadequate composition of boards that lacks proper board diversity, which is consistent with the tenets of agency theory (Eisenhardt, 1989). For instance, the study by Dhingra and Dwivedi (2024) highlights the importance of broadening research beyond Anglo-Saxon countries and underscores avenues to incorporate board diversity. Nonetheless, the extant literature is in abeyance to illustrate the influence of board diversity and interlocking directorates in promoting firm performance and corporate governance measures, especially in emerging economies.

There is a crucial need to know the influence of interlocking boards on directors on firm performance in emerging economies like Turkey. Moreover, it is still unclear how board diversity

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may effectively overcome the agency issues between majority and minority shareholders, which stems from the concentration of shareholding among families and large institutional investors (Khan & Baker, 2022).

We investigate how interlocking directorates affect firm performance in Turkey's emerging market and explore how board diversity may influence this relationship to address these gaps. Specifically, we answer two research questions: (1) Does board interlocking affect firm performance in Turkey's concentrated ownership structure? and (2) Does board diversity moderate the relationship between board interlocking directorates and firm performance?

Businesses in emerging markets like Turkey are mostly owned and run by families and institutions (Yildirim-Öktem & Üsdiken, 2010; Khan, 2021; Khan & Baker, 2022; Khan et al., 2022; Yilmaz et al., 2022). Firms are united through various links to achieve shared strategic goals. These connections could be through close market-based transactions, cross-ownership, and social networks such as kinship, family, or personal friendship (Khanna & Rivkin, 2006). Moreover, the mutual connections among firms reflect financial dependencies and well-developed social ties (Silva et al., 2006).

Although numerous empirical studies have explored interlocking directorates' affiliations among firms in developed markets (Ramsawak et al., 2023), their relationship with firm performance is context-dependent and not conclusive (Phan et al., 2003; Non & Franses, 2007; Kaczmarek et al., 2014; Peng et al., 2015; Sánchez & Barroso-Castro, 2015; and Zona et al., 2018). Furthermore, board diversity's role in improving corporate governance mechanisms in developed markets may not easily translate to emerging markets. Board diversity is critical in reflecting shareholders' expectations, which is crucial in corporate governance to enhance corporate performance (Carter et al., 2003; Khan, 2021). In developed markets, board diversity may

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overcome principal-agent conflicts and improve firm performance. However, business dynamics and shareholdings differ in emerging markets. Shareholdings are typically concentrated among families and large institutional investors. Thus, the role of board diversity may be more challenging to overcome due to majority and minority shareholding conflicts (i.e., the conflict between principal-principal) (Khan, 2021; Khan & Baker, 2022; Khan et al., 2022). Moreover, the role of concentrated shareholdings among families and large institutions gave them more hegemony to elect the board of directors according to their shares. In this connection, studies conducted in the context of emerging markets have yielded mixed results (Ararat et al., 2015; Kagzi & Guha, 2018). Therefore, we seek to enrich the extant literature by filling the gap in Turkey's emerging market.

Our study makes significant contributions to the existing literature in several ways. *First,* our study enhances the understanding of the relationship between interlocking directorates, board diversity, and firm performance within the context of the Turkish market. To transcend the traditional measures of only focusing on gender and foreign diversity attributes, we develop a comprehensive board diversity index by including other diversity characteristics as well, such as education, expertise, age, and tenure, to comprehend the overall board composition among the Turkish firms. The results indicate that board diversity significantly moderates the association between interlocking directorates and firm performance. Our findings confirm the advantages of interlocking directorates based on resource dependence theory, including accessibility to useful information and resources. Similarly, it mitigates the agency costs of the conflict of interest and monitoring. This contribution implies significant practical implications for Turkish firms in establishing their board structure maximize firm performance and promote corporate governance measures.

Second, our study is consistent with the interlocking 'busyness hypothesis' tenets. It endorses the concerns raised by the National Association of Corporate Directors (NACD, 1996) and the Council of Institutional Investors (2003) that recommend directors should avoid assuming full-time roles in more than two boards to work effectively and productively.

Third, our results are helpful to regulators on the Turkish Capital Markets Board (CMB) as they amended the Turkish Commercial Code and the Capital Markets Law (CML) in 2012 (Glass Lewis, 2020) to launch a comprehensive regulatory framework for adequate monitoring and protecting shareholder rights through its communiqués. We recommend regulators and firm management consider promoting directors' optimal engagement while using board diversity for value creation and effective functioning.

The remainder of this study has the following organization. Section 2 illustrates the corporate governance regulations in Turkey. Section 3 presents a literature review and the development of hypotheses, followed by the methodology in Section 4. Section 5 analyzes the outcomes, and Section 6 offers conclusions and recommendations.

2. CORPORATE GOVERNANCE REGULATIONS IN TURKEY

Turkey's legal framework is broadly based on French civil law, but it also incorporates some Anglo-Saxon elements (La Porta et al., 1997). This hybrid system is reflected in its corporate governance structure, which features one-tier board systems and a focus on shareholder profit maximization (Nilsson, 2007). However, the Turkish security market is not as broad as those in Anglo-Saxon countries, and market capitalization is relatively low (Atakan et al., 2008). Additionally, the ownership structure is not widely dispersed, with families controlling a substantial portion of the largest traded companies (Demirag & Serter, 2003; Khan, 2021; Khan et

al., 2021; Khan & Baker, 2022; Yilmaz et al., 2022). Property rights under the law are also relatively weak compared to those in developed countries (La Porta et al., 1997).

In response to these challenges, Turkey began implementing corporate governance reforms in the early 2000s. The OECD's 1999 Corporate Governance Principles played a key role in this process, encouraging Turkey to develop a comprehensive corporate governance code (Usdiken et al., 2015). Organisations such as TUSIAD, TKYD, and the CMB issued the first code in 2003, followed by voluntary codes and principles (Ararat & Ugur, 2006). Since 2011, the CMB launched by setting and mandating corporate governance rules in Turkey (Demirag & Serter, 2003). Such progressive attention in corporate governance mechanisms serves as a transition from a voluntary "comply or explain" framework to a system with obligatory requirements. The CMB's first mandatory code, Communiqué No. 54, was followed by three additional codes, Communiqués No. 56, No. 57, and No. 60. These codes were further updated in 2014 with Communiqué No. 17 to align with the new Turkish Commercial Code that came into effect in 2012 (Usdiken et al., 2015).

Despite the progress made in recent years, Turkey's corporate governance regime still faces some challenges (Atakan et al., 2008), including:

- *Weak institutions:* Law enforcement is uneven, and shareholder and creditor protection are not as strong as in developed countries (Usdiken et al., 2015).
- *Pyramidal business groups:* These groups are common in Turkey and can pose challenges for minority shareholders (Ararat & Ugur, 2006).
- *Dual class shares:* These shares give certain shareholders more voting power than others, which can concentrate power in the hands of a few individuals (Nilsson, 2007).

- *Concentrated family ownership:* Families control a large portion of the leading traded companies in Turkey, which can lead to conflicts of interest (Demirag & Serter, 2003; Khan, 2021).

Turkey has significantly improved its corporate governance practices in recent years instead of these challenges (La Porta et al., 1997). Due to enhanced corporate governance control and more transparency, Turkey has attracted foreign investment and promoted economic growth over the years.

3. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Interlocking boards means a director sitting on more than one board outside the firm. Interlocking boards help enhance decision-making because experienced directors share their expertise (Fich & White, 2005; Shropshire, 2010). Such boards are beneficial in various ways, such as harnessing their expertise in developing strategic decision-making (Ribeiro & Colauto, 2016) and enhancing new corporate practices (Palmer et al., 1993). These directors become the source of unique and diverse information and manage environmental uncertainty through cooptation by securing more resources (Haynes & Hillman, 2010). Interlocking boards improve a firm's overall quality (Kang, 2008).

Santos et al. (2012) state that board interlocking is crucial due to a need for qualified board members. Firms usually strive to get financial and human resources to aid strategic decision-making and foster market competitiveness. Interlocking boards are helpful to firms by improving access to external resources such as successful practices, strategic information, and technology (Shipilov et al., 2010). Moreover, with effective board interlocking, firms benefit from insights and perspectives of diverse boards from various firms (Ribeiro & Colauto, 2016) that ultimately promote competitive strategies (Gales & Kesner, 1994). Board interlocking promotes superior

stock returns (Larcker et al., 2013) and firm performance (Richardson, 1987) by fostering the best managerial practices that enable innovation and product development (Shropshire, 2010).

On the other hand, the regulators show concerns about the effectiveness of interlocking boards of directors, linked to the 'busyness hypothesis.' This hypothesis illustrates that too many busy and overcommitted directors on board may be unable to perform their monitoring responsibilities effectively (Clements et al., 2015). It aligns with agency theory's tenets (Eisenhardt, 1989). However, the potential benefits of interlocking boards regarding resource dependence flow (Pfeffer & Salancik, 1978; Walker, 2009) should not be ignored while evaluating the firm performance.

Various studies report mixed and inconclusive results illustrating the relationship between board interlock and firm performance. Such studies range from positive (Geletkanycz & Boyd, 2011; Horton et al., 2012; Peng et al., 2015) to negative (Loderer & Peyer, 2002; Devos et al., 2009; Kaczmarek et al., 2014; Hamdan, 2018) and even no affiliation (Kiel & Nicholson, 2006; Rommens et al., 2007; Lamb, 2017) between these constructs.

Table 1 shows previous studies on the relationship between board interlocks and firm performance. Other studies such as Shropshire (2010), Geletkanycz & Boyd (2011), and Kaczmarek et al. (2014) suggest that the moderating role of board diversity influences overall firm performance due to diverse demographic attributes for creative problem-solving (Williams & O'Reilly, 1998).

(Insert Table 1 here)

Many empirical studies focus on the developed markets for interlocking directorates' affiliations among firms (Phan et al., 2003; Non & Franses, 2007; Kaczmarek et al., 2014; Peng et al., 2015; Sánchez & Barroso-Castro, 2015; Zona et al., 2018; Ramsawak et al., 2023). However,

few studies examine emerging markets on this topic (Mans-Kemp et al., 2018). The dynamics of developed and emerging markets differ widely. The extant research in the Anglo-Saxon countries is characterized by widely-held ownership and powerful executives (Smith & Sarabi, 2021). The businesses in emerging markets are mostly owned and operated by families and institutions. In such business settings, individual firms are united through various links to achieve shared strategic goals. The connections among firms could be through close market-based transactions, cross-ownership, and social networks such as kinship, family, or personal friendship (Khanna & Rivkin, 2006). Another difference is that firms' mutual connections reflect financial dependencies and well-developed social ties (Silva et al., 2006).

3.1 Interlocking directorships and firm performance

According to the resource-dependence theory perspective, interlocking directorates benefit the inter-organizational exchange of critical resources such as information, capital, and market accessibility and monitor environmental uncertainties (Pfeffer & Salancik, 1978). The board of directors plays a pivotal role in coordinating with firms to overcome such uncertainties from the globalization of product and capital markets, deregulation, technological shifts, and political reformation (Mizruchi, 1996). Furthermore, interlocked directors obtain external resources (Filatotchev & Toms, 2003) to offset the environmental uncertainties (Pfeffer & Salancik, 1978) and mitigate the transaction costs (Williamson, 1984) through their connections with outside boards. The interlocked firms secure information to formulate and implement strategies (Pfeffer & Salancik, 1978; Useem, 1982), facilitating firm performance by effectively managing a firm's resources (Hillman & Dalziel, 2003).

From a theoretical and strategic perspective, board members sitting on several boards could be a source of innovative policies and practices (Beckman & Haunschild, 2002). Thus, interlocking

directorates enable companies to secure new strategic options and methods without experimenting with their costs (Geletkanycz & Boyd, 2011). Interlocks provide a low-cost and credible medium for exchanging information and knowledge (Haunschild, 1993). They offer multiple advantages to firms, such as learning and adopting new practices for sustainable business practices. Therefore, the resource dependence theory postulates that interlocking boards may help board performance. Based on these arguments, we hypothesize:

Hypothesis (H1): *The average number of interlocking directorates on the board is positively associated with firm performance.*

However, management control theory suggests that interlocked directors develop social relations with a firm's upper-class members, inhibiting innovations (Useem, 1984). According to the agency theory perspective, excessive interlocking exposes directors to ideas and opinions that they cannot adapt. Consequently, they become ineffectual in monitoring a firm's executive directors and top management (Eisenhardt, 1989). In other words, directors with too many board appointments become too busy to monitor the focal firm's board effectively. Additionally, the dominant families effectively manage type I agency conflicts (principal-agent) due to monitoring efficiencies. However, due to voting power, families and institutional investors may escalate type II agency conflicts (principal-principal), negatively influencing the firm's performance (Purkayastha et al., 2022).

Directors holding too many external seats on various boards, called 'overboarded directors' by Harris & Shimizu (2004), cannot effectively reconcile their monitoring and advising roles. Studies by Ferris et al. (2003) and Harris & Shimizu (2004) show that these busy directors have a detrimental effect on firm performance when they constitute at least half of the board.

Therefore, when the non-executive directors hold more seats than the executive directors and are busy on various other boards, they may negatively affect the firm's performance. This

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result is due to a lack of effective monitoring that leads to agency conflicts. The basis of such an interlocking situation is the agency theory's busyness hypothesis, indicating a negative association between board interlocking and firm performance (Fich & Shivdasani, 2012). Moreover, in uneven situations, interlocking in emerging economies may expropriate minority shareholders, especially in cases where there are more families and ownership concentrated interest, negatively influencing firm performance (Watkins-Fassler et al., 2023). Thus, firms need to be mindful of having "busy" boards from a strategic perspective because interlocking busy directors may negatively affect firm performance. Therefore, we hypothesize that:

Hypothesis (H2): *The condition of a busy board is negatively associated with firm performance.*

3.2 Effects of interlocking in the presence of board diversity

Controversy surrounds the relationship between board interlocks and firm performance due to two contrasting theoretical perspectives of agency and resource dependence theory. Several studies use various contextual variables to show the moderating effect that changes the relationship between board interlocking and firm performance. These studies typically use agency and resource dependence theory. Ong et al. (2003) indicate shifting from the existing model focusing on macro-system associations between these variables to a micro-system is pivotal. The former model does not effectively show all network processes, potential conflicts, and resolutions resulting from the interactions. Thus, the latter model requires micro-level variables to analyze the board interlocking and firm performance relationship. These variables include board demographic attributes and processes such as decision-making procedures, cohesiveness, conflicts, and power dynamics. Following Ong et al.'s (2003) approach, Shropshire (2010) introduces a holistic theoretical perspective based on a multi-level model. This model assumes the organizational attributes that

form how a board is receptive to the diffusion of practices. It further considers directors' effectiveness in transferring knowledge or experience concerning corporate practices and factors affecting obtaining that information.

Although researchers contend that interlocks work well by exchanging information about innovation and strategy (Mizruchi, 1996), the exchange mechanism for doing so is unclear. Shropshire recognizes that board diversity may improve a board's ability to grasp knowledge and ideas that an interlocked director can contribute.

Geletkanycz & Boyd (2011) report that the relationship between board interlocking and firm performance is highly contextual to the firm's external factors, such as diversification, concentration, and industry growth. Kaczmarek et al. (2014) propose a contingency-based model consistent with Shropshire's (2010) diffusion model. This model implies that board diversity is an internal contextual variable that moderates the relationship between board interlocking and firm performance. It reconciles the contrasting views of agency theory and resource dependency theory.

Group effectiveness literature implies that diversity enables the board members to secure access to outside group perspectives and information (Ancona & Caldwell, 1992), enhancing a team's analytical ability (Dahlin et al., 2005) based on cognitive conflict (Forbes & Milliken, 1999). This approach is consistent with the 'value-in-diversity' proposition that suggests diversity as a human capital asset (Watson et al., 2003).

Board diversity improves the exchange of information for creative and correct problem-solving (Williams & O'Reilly, 1998). Specifically, gender diversity enhances firm performance when a critical mass of women directors occurs (García-Meca & Santana-Martín, 2023). Accordingly, the interlocked board receiving diverse inputs and information is more likely to influence a firm's ultimate performance. The diverse or demographically heterogeneous group

of board members presents more cooperative and collaborative measures for positive interaction. This situation may overcome the social barriers that arise due to social categorization (Shropshire, 2010). Hence, we hypothesize the following:

Hypothesis (H3): *The level of board diversity positively moderates the relationship between interlocking directorates and firm performance.*

4. METHODOLOGY

We examine the panel dataset of the top 100 firms of Borsa Istanbul (BIST) Turkey. We use total market capitalization and liquidity to represent the dynamics of corporate governance measures for the whole market between 2014 and 2018. The effect of interlocking directorates on firm performance under the moderating influence of board diversity is pivotal during this period. We try to capture the impact of the recent regulatory amendments in the Turkish Commercial Code and the Capital Markets Law (CML) by the Turkish Capital Markets Board (CMB) in 2012 for establishing a comprehensive regulatory framework of effective monitoring and protecting the shareholders' rights (Glass Lewis, 2020). We exclude financial firms and regulated utilities because they are highly regulated and have stringent accounting information and disclosure standards (Sun et al., 2017).

We collect board diversity-related data and information on interlocking directorates in BIST firms from several sources. These sources include annual reports and online website sources like Reuters, MarketScreener, Bloomberg, LinkedIn, official company websites, and the Public Disclosure Platform (KAP) (http://kap.gov.tr). We use annual reports to collect the control variables' data – ownership structure (institutional ownership, family ownership, and closely-held ownership), firm characteristics (firm age), and corporate governance variables (board size, board

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independence, and CEO duality). Finally, we gather the financial and economic data on return on assets (ROA), Tobin's q, leverage, and firm size from the Eikon DataStream database.

4.1 Dependent variable

Firm performance

We use Tobin's q, a market-based measure of firm performance (Bhagat & Bolton, 2008). Tobin's q equals the firm's market value divided by its assets' replacement cost, as measured by its book value. We compute the firm's market value by taking the book value of assets minus the book value of equity plus the market value of equity (De Andres & Vallelado, 2008).

Tobin's q estimates a firm's efficiency for its asset utilization according to investors' perception (Haslam et al., 2010). It indicates the value of an investment in human capital and technology. Its positive value is related to intellectual capital, which is unavailable through traditional accounting-based measures (Kaczmarek et al., 2014).

We consider the return on assets (ROA) as a proxy for a robust test that reflects management's impact more precisely than the market-based measures, which are more sensitive to external economic influences (Elitzur & Yaari, 1995; He & Huang, 2011). ROA equals net income divided by total assets.

4.2 Independent variables

Interlocking directorships

We measure the interlocking directorate by taking the total interlocked directors minus board size and dividing it by board size (Kiel & Nicholson, 2006).

Busy board

A busy board is when the average board member interlocking is at least three (National Association of Corporate Directors 1996). We classify boards as busy with a dummy code 1 if the average board member interlocked is above 3, and 0 otherwise (Fich & Shivdasani, 2012).

4.3 Moderating variables
Board diversity

Our board demographic diversity attributes are gender, nationality, experience, educational background, tenure, and age. Gender diversity is the ratio of female directors to the total board members (Adams & Ferreira, 2009; Byoun et al., 2016). Nationality diversity is the ratio of foreign directors to the total board members (Ararat et al., 2015). We measure experience diversity using the Blau index (Blau, 1977) by assuming that director expertise consists of five categories: (1) financial, (2) consulting, (3) legal, (4) management (executives), and (5) other expertise such as research, technological, and medical (Rose, 2007). Determining educational level diversity involves using the Blau index by considering the directors' qualifications (Dalziel et al., 2011). We determine tenure diversity using the Blau index by considering a director's number of years of board service. We classify director tenure into six levels (Bilimoria & Piderit, 1994). Lastly, we measure age diversity using the Blau index by considering a director's age, consisting of six levels (Bilimoria & Piderit, 1994).

We develop a compound demographic board diversity index (BDI) based on directors' demographic heterogeneity. This index predicts how demographic diversity affects firm performance. To examine the marginal influence of independent directors on firm performance, we augment the demographic diversity index (BDI) with a total board diversity index (TBDI). Calculating BDI involves taking the comprehensive board diversity index created by summing all

six standardized Blau values for diversity attributes. Accordingly, we define TBDI by adding the BDI with the ratio of independent directors used as a proxy for structural diversity.

4.4 Control variables

Ownership structure

Our regression analysis includes several ownership variables and board characteristics to address possible effects on firm performance. We assume three ownership variables: (1) institutional ownership, (2) family ownership (dummy), and (3) closely-held ownership. Institutional ownership is the percentage of institutional owners. Family ownership is a dummy variable: 1 if the family, spouse, and children own at least 10% of the shares (La Porta et al., 2000; Attig et al., 2016). We determine closely-held ownership using the percentage of the closely-held owners (La Porta et al., 2000).

Ownership concentration provides a motive for effective management monitoring and offers opportunities for serving self-interests, especially if the legal protection of shareholders' rights is weak. In an emerging market setting, the controlling shareholders face two choices: (1) a positive incentive influence from ownership shareholding and (2) disproportionate negative control due to private benefits at minority shareholders' expense (Claessens et al., 2002). In the former choice, controlling shareholders can increase the firm value through a strong board to persuade minority shareholders that they will protect and optimally use the firm's resources (Durnev & Kim, 2005).

Firm characteristics

Firm size

We measure firm size using the logarithm of total assets. Large firms typically possess and require more resources. Board interlocks may not be a big concern for large firms because other

factors may affect firm performance (Haunschild & Beckman, 1998). However, interlocks matter in small firms due to their potential impact on performance (Peng & Luo, 2000).

Firm age

We measure firm age by counting the years from establishment to the current year. We expect a negative relationship between the old firms and performance due to lower expected growth rates of profits, sales, and productivity. Hence, a firm's age is likely to be related to its performance (Akben-Selcuk, 2016)

Corporate governance variables

We measure board size by considering the total number of directors on a board. Due to sufficient linkages and strong board interlocks, large boards may positively affect performance (Dalton et al., 1999). However, such boards may negatively affect firm performance due to delays in decision-making (Boyd, 1990). We estimate board independence as the ratio of independent (outside) board members to total board members. Chief executive officer (CEO) duality is a dummy variable: 1 if a CEO is a board member and 0 otherwise. Lastly, financial leverage is the ratio of total debt to total assets. Table 2 contains a brief definition and measurements of all these variables. Furthermore, Figure 1 outlines the conceptual research framework with hypothesized associations and the expected signs.

(Insert Table 2 and Figure 1 here)

4.5 Econometric model and analysis

We use a panel data analysis because of its benefits, including controlling unobserved heterogeneity (Hitt et al., 1998). Our dataset contains time series and cross-sectional observations that suit the panel data analysis (Zakaria et al., 2014). We use the Hausman test for panel data

analysis in the specification test, which compares the fixed-effect and random-effect regression (Baltagi, 2008). The Hausman specification test implies using the random-effect model over the fixed-effect model for Tobin's q but using the fixed-effect model for ROA. We provide the significance levels for each model. We use the pooled regression model as a robust test that produces results similar to random and fixed-effects analysis. The following equations show how board interlocks affect firm performance in the presence of board diversity's moderating effect.

In Model 1, we determine the effect of board interlocking on firm performance. We use Ownership Structure (Institutional Ownership, Family Ownership, and Closely-held Ownership), Firm Characteristics (Firm Size and Firm Age), and Corporate Governance attributes (Board Size, Board Independence, CEO Duality, and Financial Leverage) as control variables.

$$\text{Firm Performance}_{i,t} = C + \beta_1 \text{B.Interlocks}_{i,t} + \beta_2 \text{BusyBoard}_{i,t} + \beta_3 \sum_{O=1}^{O} \beta_k \text{OwnershipStructure}_{i,t}^{O} + \beta_4$$

$$\sum_{F=1}^{F} \beta_j \text{FirmCharacteristics}_{i,t}^{F} + \beta_5 \sum_{C=1}^{C} \beta_j \text{CGCharacteristics}_{i,t}^{C} + e_{i,t} \tag{1}$$

In Model 2, we estimate the relationship between board interlocks and firm performance considering demographic board diversity (BDI).

$$\text{Firm Performance}_{i,t} = C + \beta_1 \text{B.Interlocks}_{i,t} + \beta_2 \text{BusyBoard}_{i,t} + \beta_3 \sum_{O=1}^{O} \beta_k \text{OwnershipStructure}_{i,t}^{O} + \beta_4$$

$$\sum_{F=1}^{F} \beta_j \text{FirmCharacteristics}_{i,t}^{F} + \beta_5 \sum_{C=1}^{C} \beta_j \text{CGCharacteristics}_{i,t}^{C} + \beta_6(\text{BDI}) + e_{i,t} \tag{2}$$

In Model 3, we estimate the relationship between board interlocks and firm performance considering the moderating effect of demographic board diversity (BDI).

$$\text{Firm Performance}_{i,t} = C + \beta_1 \text{B.Interlocks}_{i,t} + \beta_2 \text{BusyBoard}_{i,t} + \beta_3 \sum_{O=1}^{O} \beta_k \text{OwnershipStructure}_{i,t}^{O} + \beta_4$$

$$\sum_{F=1}^{F} \beta_j \text{FirmCharacteristics}_{i,t}^{F} + \beta_5 \sum_{C=1}^{C} \beta_j \text{CGCharacteristics}_{i,t}^{C} + \beta_6(\text{B.Interlocks*BDI}) + e_{i,t} \tag{3}$$

In Model 4, we estimate the relationship between board interlocks and firm performance considering total board diversity (TBDI).

$$\text{Firm Performance}_{i,t} = C + \beta_1 \text{B.Interlocks}_{i,t} + \beta_2 \text{BusyBoard}_{i,t} + \beta_3 \sum_{O=1}^{O} \beta_k \text{OwnershipStructure}_{i,t}^{O} + \beta_4$$

$$\sum_{F=1}^{F} \beta_j \text{FirmCharacteristics}_{i,t}^{F} + \beta_5 \sum_{C=1}^{C} \beta_j \text{CGCharacteristics}_{i,t}^{C} + \beta_6(\text{TBDI}) + e_{i,t} \tag{4}$$

In Model 5, we estimate the relationship between board interlocks and firm performance considering the moderating effect of total board diversity (TBDI).

$$\text{Firm Performance }_{i,t} = C + \beta_1 \text{B.Interlocks}_{i,t} + \beta_2 \text{BusyBoard}_{i,t} + \beta_3 \sum_{O=1}^{O} \beta_k \text{ OwnershipStructure }_{i,t}^{O} + \beta_4$$

$$\sum_{F=1}^{F} \beta_j \text{ FirmCharacteristics }_{i,t}^{F} + \beta_5 \sum_{C=1}^{C} \beta_j \text{ CGCharacteristics }_{i,t}^{C} + \beta_6(\text{B.Interlocks*TBDI}) + e_{i,t} \qquad (5)$$

5. ANALYSIS OF THE OUTCOMES

Table 3 shows all our variables' means, standard deviations, and Pearson correlation matrix. The average number of board interlocks on a firm's board in Turkey was 9.83 between 2014 and 2018. A plausible reason for such a high number of director interlocks is family-owned business groups that account for 74% of the total market shares. This number is much higher than the threshold Ferris et al. (2003) defined, which implies three or more directorships to estimate busyness. Furthermore, busy directors make up 93% of the sampled firms, based on Fich & Shivdasani (2012). They define a board as busy when the non-executive board members hold three or more directorships, establishing more than half of the board.

Pearson's correlation matrix does not show a multicollinearity issue, given that none of the correlations between the pairs of explanatory variables exceeds 0.80, as suggested by Bryman & Cramer (1997). Another measure of multicollinearity involves a variance inflation factor (VIF). No formal VIF value is available for determining the presence of multicollinearity. Some researchers regard a VIF above ten as indicating multicollinearity. However, Gujarati & Porter (2003) suggest a lower threshold between five and ten. Since none of our VIFs exceeds 2.92, multicollinearity does not appear to be a concern.

(Insert Table 3 here)

Table 4 shows the regression models' results testing H1, H2, and H3. The coefficient of board interlocks is positive and insignificant (Model 1: β = 0.042, p = 0.208; Model 2: β = 0.042, p = 0.210; and Model 4: β = 0.040, p = 0.220). Table 5 shows that we use ROA as a dependent variable, capturing the firm performance from an internal management perspective as a robust test.

The results indicate an insignificant relationship between ROA and board interlock after considering the earlier factors.

Our findings imply that the association between board interlocks and firm performance may be more nuanced than previously thought. Simply counting the number of interlocking directorates may insufficiently capture the true impact of these relationships on firm performance. This perspective contrasts with the resource dependence theory (Pfeffer & Salancik, 1978), which asserts the need to promote accessibility to critical resources such as information, capital, and market access. Moreover, it eventually improves managerial abilities to overcome environmental uncertainties and improve performance. Our results show that interlocking directorates' benefits may be contingent upon other moderating factors. Our findings imply that the relationship between board interlocks and firm performance is complex and may vary depending on contextual factors, which are consistent with other studies such as Kiel & Nicholson (2006), Rommens et al. (2007), and Lamb (2017). This finding contributes by enhancing the theoretical lens by looking beyond the simplistic interpretation of resource dependence theory. Thus, our findings do not directly support H1, Instead, they underscore the importance of considering other factors as moderators in defining the relationship between board interlocks and firm performance.

(Insert Tables 4 and 5 here)

We obtain a significantly negative coefficient of the busy board and Tobin's q proxy (Model 1: $\beta = -2.459$, $p = 0.000$; Model 2: $\beta = -2.331$, $p = 0.000$; Model 3: $\beta = -2.060$, $p = 0.000$). These results are consistent with alternative proxy, using ROA to measure firm performance. Therefore, we find support for H2, indicating a negative relationship between a busy board and firm performance.

Our results are consistent with management control theory and agency theory perspectives, which imply that directors with excessive external board commitments may be overburdened and unable to monitor and advise the focal firm's management effectively (Rouyer, 2016). This situation can lead to agency problems (Jensen & Meckling, 1976; Jensen, 1986), such as conflicts of interest and a lack of oversight, ultimately harming firm performance (Fich & Shivdasani, 2006; Field et al., 2013). Furthermore, shareholders may worry that busy directors would be less effective in promoting performance because of their duties across various organizations (Rouyer, 2016). These situations create tangible implications for management practices, such as hindering strategic decision-making, risk management, and efficient resource allocation. Therefore, firms should be careful of board composition and avoid overburdening directors with numerous external interlockings to ensure effective oversight and guidance for internal operations. Our result is consistent with the findings of Loderer & Peyer (2002), Devos et al. (2009), Kaczmarek et al. (2014), and Hamdan (2018).

We find board diversity significantly and positively moderates the relationship between board interlocks and Tobin's q (Model 3: $\beta = 0.091$, $p = 0.087$). We validate this result through a robust test considering ROA as a proxy for firm performance. Hence, our evidence supports H3 that board diversity positively moderates the relationship between board interlocks and firm performance. One of the justifications for diverse boards is based on their distinct experiences, backgrounds, and perspectives. Their involvement across various boards aids in promoting firms due to effective networks connecting firms with valuable resources and opportunities in the market. The moderating influence of board diversity on the relationship between board interlocks and firm performance reconciles the contrasting perspectives of agency theory and resource dependence theory. From the agency theory's perspective, a busy board can lead to conflicts of

interest and hinder effective management monitoring (Fama & Jensen, 1983). Conversely, such a negative influence can be mitigated by promoting more informed and effective decision-making (Fich & Shivdasani, 2002). From the resource dependence theory perspective, our findings suggest that diverse boards can better leverage the knowledge and connections of their interlocked directors, which leads to improved firm performance (Geletkanycz & Boyd, 2011; Kaczmarek et al., 2014). Our findings imply that despite valid agency concerns around busy boards, diverse boards reap the potential benefits of interlocking directorates due to distinct skills and perspectives. This insight underscores the importance of cultivating diverse boards from an ethical perspective and as a strategic tool for enhancing and maximizing the value of interlocking networks.

Our findings also show a positive relationship between market-based firm performance (Tobin's q) and institutional investors (Model 1: β = 2.103, p = 0.008; Model 2: β = 2.880, p = 0.000; Model 3: β = 2.881, p = 0.000; Model 4: β = 2.880, p = 0.000; and Model 5: β = 2.870, p = 0.000) and closely-held investors (Model 1: β = 3.498, p = 0.000; Model 2: β = 3.870, p = 0.000; Model 3: β = 3.830, p = 0.000; Model 4: β = 3.920, p = 0.000; and Model 5: β = 3.860, p = 0.000) but a negative affiliation with firm size, board size, and leverage. The accounting and management-based performance measure (ROA) implies a positive association with firm size, which contrasts with Tobin's q based on differences between management and external investors' views (Hoskisson et al., 1994). Family ownership is negatively related to ROA, implying that families predominantly control businesses in Turkey. Furthermore, financial leverage is negatively related to ROA. Table 6 summarizes the hypotheses with the level of support for each hypothesis.

(Insert Table 6 here)

6. ROBUSTNESS TEST: TWO-STEP SYSTEM GMM ESTIMATION

The presence of endogeneity, where a lagged explanatory variable correlates with the error terms, may bias the conventional panel estimations like pooled ordinary least squares (OLS), random effects, or fixed effects. Therefore, we use a robust multivariate dynamic panel estimator, the generalized method of moments (GMM), to address this issue.

Arellano and Bond's difference GMM model uses the first difference of independent variables as instruments to tackle the correlation between error terms and the lagged dependent variable. However, its effectiveness in short panels (N > T) is restricted. By contrast, the System GMM, which simultaneously assimilates both levels and difference equations, overcomes this impediment. It offers a broader range of instruments to address autocorrelation and endogeneity more effectively.

Researchers prefer a two-stage least square (2SLS) system GMM over a one-step system GMM due to its superior accuracy and efficiency. Researchers often use diagnostic tests like Wald F, AR(1), AR(2), and Hansen J to assess model validity. A suitable model requires rejecting the Wald F test's null hypothesis while accepting the AR(2) and Hansen J statistics. Although we do not present the 2SLS system GMM model results for brevity, they align with the results of the preceding estimation models, reinforcing the confidence and reliability of our findings as free from endogeneity and heterogeneity concerns.

7. CONCLUSIONS AND RECOMMENDATIONS

This study investigates the relationship between interlocking directorates and firm performance in Turkish firms between 2014 and 2018, focusing on board diversity as a moderator. Our research is unique because most studies on this topic involve developed markets, not emerging markets like Turkey. Therefore, it provides a meaningful contribution to the existing literature in several ways.

First, to the best of our knowledge, this study is the first to investigate this topic in Turkey. Second, our findings could be valuable to regulators in Turkey, such as the Turkish Capital Markets Board (CMB), as it strives to establish a comprehensive regulatory framework for effective monitoring and protecting shareholders' rights. Third, our evidence suggests that firms with directors who have full-time employment should avoid sitting on more than two other boards to work effectively. Finally, our research highlights the positive moderating effect of board diversity between interlocking directorates and firm performance, emphasizing the importance of promoting directors' optimal engagement and upholding board diversity to create value and enhance effective operations.

Our study proposes three hypotheses. The results do not support our first hypothesis (H1), suggesting that interlocking directorates positively influence firm performance. However, our evidence supports our second hypothesis (H2), indicating a significant and negative effect of a busy board on firm performance. This evidence implies that increasing the number of interlocks per director reduces a board's monitoring effectiveness due to the high busyness of various boards. Our findings also support our third (H3) hypothesis, suggesting a positive relationship between board interlocks and firm performance in the presence of moderators, including board diversity. This evidence indicates that integrating ideas and knowledge transfer among firms through interlocked directors facilitates board diversity changes. These results are consistent with a robustness test involving accounting- and management-based performance measures of ROA.

Our findings also reveal a positive relationship between market-based firm performance (Tobin's q) and institutional investors and closely-held investors but a negative association with firm size, board size, and leverage. On the other hand, accounting- and management-based performance measures (ROA) indicate a positive association with firm size, which contrasts with Tobin's q based on differences between management's and external investors' views. Additionally, family ownership is negatively related to ROA, implying that families predominantly control businesses in Turkey. Furthermore, financial leverage is negatively related to ROA.

7.1 MANAGERIAL IMPLICATIONS

Our findings may be valuable to firm managers and Turkish regulators, such as the Turkish Capital Markets Board (CMB) and the Council of Institutional Investors. Our study supports the

interlocking busyness hypothesis, emphasizing the need for firms to be more cautious when appointing directors with multiple seats on outside boards.

Besides, our findings imply that firms can consider the efficacy of diverse boards by regarding the interlocking directorates' benefits, such as accessibility to valuable resources and information, and potentially reducing the likelihood of agency costs, i.e., conflicts of interest (Fich & Shivdasani, 2002; Kiel & Nicholson, 2006). Our finding is consistent with the extant focus on board diversity in corporate governance practices (Carter et al., 2010; Dalton et al., 1999). Our results indicate that firms should promote board diversity by constructing boards based on considering various factors such as gender, nationality, experience, educational background, tenure, and age (Carpenter et al., 2005; Carter et al., 2010). Such a diverse board can improve strategic decision-making and improve firm performance due to the breadth of perspectives, knowledge, and expertise represented on the board.

Moreover, firms should carefully assess the potential inverted-U relationship between interlocking directorates and firm performance (Fich & Shivdasani, 2002). Although a moderate level of interlocking directorates can supply firms with access to valuable information and resources, excessive interlocking directorates (i.e., busy boards) can lead to overburdened directors and reduced monitoring effectiveness. Thus, firms should strike a balance between the potential benefits and risks of interlocking directorates.

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TABLE 1
Directorship Interlock and Firm Performance

This table shows studies on interlocking directorates and firm performance.

Author(s)	Sample/ Duration	Dependent Variable(s)	Explanatory Variables	Methodology	Theory	Result
Phan et al. (2003)	191 Singaporean firms	Board interlocks, firm performance (ROE)	Outside directors, Institutional ownership, industry interlocks, board Interlocks	OLS regression	Theory of hegemony and resource dependence theory	Positive
Pombo & Gutiérrez (2011)	Colombia, 335 firms per year for 1996–2006	Financial performance (ROA and ROE)		Unbalanced panel data analysis	Busyness hypothesis and working hypothesis	Positive
Geletkanycz & Boyd (2011)	US, 460 firms listed in the 1987 Fortune 1000	Firm performance (ROA and return on sales)	CEO outside directorships	Multiple regression	Agency theory	Positive
Horton et al. (2012)	4,278 listed UK firms	Total stock return, market-to-book, and ROA	Director interlock	Regression analysis	Social capital theory	Positive
Peng et al. (2015)	Top 200 largest listed firms in Hong Kong (1993 and 1995).	Financial performance (ROA and ROE)	Number of interlocks	Cross-sectional analysis	Resource dependence theory, institutional theory, and resource-based theory	Positive
Hamdan (2018)	131 Saudi firms (2016)	Financial performance	Board interlocking (levels), foreign director (moderating variable)	Regression analysis	Agency theory and resource dependence theory	Positive due to moderating variables, otherwise negative
Zona et al. (2018)	145 Italian firms (2001–2006)	Financial performance (ROA)	Number of Interlocks	Panel data analysis	Agency theory and resource dependence theory	Positive/ negative, depending on the firm's relative resources and ownership
Loderer & Peyer (2002)	All publicly listed firms in Switzerland	Tobin's q and ROA	Director interlock	Panel data analysis	Collusion hypothesis	Negative
Non & Franses (2007)	101 large Dutch firms (1994–2004)	Financial performance (ROA and ROE)	Board interlocks	Panel data analysis	Upper-class cohesion the**ory and** busyness hypothesis	Negative
Devos et al. (2009)	3,566 firms (2001–2003)	Tobin's q and ROA	Director interlock	Tobit and probit regression analysis	Resource dependence theory	Negative
Santos et al. (2012)	320 Brazilian listed firms in 2001, 2003, and 2005	Firm value (Tobin's q and price-to-book value)	Number of interlocks	Panel data analysis	Agency theory and resource dependence theory	Negative
Kaczmarek et al. (2014)	350 UK-listed financial and utility companies (1999–2008).	Financial performance (Tobin's q)	Number of interlocks, board diversity (moderating variable)	Generalized method of moments (GMM) regression.	Agency theory, resource dependence theory, and contingency theory	Negative

Makhlouf et al. (2018)	120 firms on the Amman stock exchange (2009–2013)	Financial performance (ROA and Tobin's q)	Number of interlocks	Panel data analysis	Agency theory. steward theory, and socioemotional wealth theory	Negative due to the family moderating effect
Sánchez & Barroso-Castro (2015)	88 Spanish firms (2005–2008)	Financial performance (ROA)	Number of interlocks	Dynamic panel data analysis (GMM).	Agency theory and resource dependence theory	Curvilinear (inverted-U)
Kiel & Nicholson (2006)	1326 Australian companies (June 2003)	Firm performance	Director interlock	multiple regression	Resource dependence theory	No effect
Rommens et al. (2007)	286 companies (business group) and 2,136 stand-alone firms, Belgian	Profitability	Director interlock	Binomial regression model	Resource dependence theory	No effect
Lamb (2017)	10 samples (n = 12,519)	Financial performance (ROA and ROE)	Number of interlocks	Meta-analyses	Resource dependence theory. social network theory, and contingency theory	No influence

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TABLE 2
Variable Definitions and Measurements

This table presents our research variables, their symbols, and measurements used in the panel data analyses. The two dependent variables are Tobin's q (TQ) and return on assets (ROA). The main explanatory variables are interlocking directorates and busy directors. We incorporate two moderating variables: the board diversity index and changes in board diversity. Further, our regression analysis includes various ownership variables and firm and board characteristics to address possible effects on interlocking firm performance relationships.

Variable	Code	Measurement method
Dependent Variables		
Tobin's q	TQ	The sum of the market value of the common stock, the book value of the preferred stock, and the book value of long-term debt divided by the book value of total assets
Return on Assets	ROA	Net income divided by total assets
Independent Variables		
Interlocking Directorships	B.Interlocks	Total interlocked directors minus board size divided by board size
Busy Board	Busy	A dummy code 1 if the average board member interlocked is above 3
Moderating Variables		
Board diversity		
Gender	FemBrd	Female directors/total directors
Nationality	Foreign	Foreign directors/total directors
Expertise	DivExp	Index of diversity for director expertise with five categories: (1) financial, (2) consulting, (3) legal, (4) management (executives), and (5) other expertise (e.g., research, technology, and medical). Calculations use the Blau index (1977).
Education Level	EduDiv	(1) intermediate degree, (2) bachelor's degree, (3) master's degree, and (4) doctoral degree. Calculations use the Blau index (1977).

Tenure	TenDiv	Director's tenure: the number of years a director served on the board. Level 1: less than 1 year; Level 2: 1–5 years; Level 3: 6–10 years; Level 4: 11–15 years; Level 5: 16–20 years; and Level 6: > 20 years. Calculations use the Blau index (1977).
Age	AgeDiv	Level 1: less than 40 years; Level 2: 40–49 years; Level 3: 50–59 years; Level 4: 60–69 years; Level 5: 70–79 years; and Level 6: > 80 years. Calculations use the Blau index (1977).
Demographic Board Diversity Index	BDI	Summation of Blau values diversity attributes: gender, nationality, experience, educational background, tenure, and age.
Total Board Diversity Index	TBDI	Summation of BDI and independent director ratio: the sum of demographic and structural board diversity.
Control Variables		
Ownership structure		
Institutional Ownership	InstOwn	Percent of institutional owners.
Family	Family	Dummy variable, 1 if family, spouse, and children own shares $\geq 10\%$
Closely-held Ownership	Closely-held	percent of a closely held owner.
Firm Characteristics		
Firm Size	FSize	The logarithm of total assets.
Firm Age	Fage	The number of years since establishment until the current year.
Corporate governance variables		
Board Size	BSize	The total number of board directors.
Board Independence	BIndep	The ratio of independent (outside) board members to total board members.
CEO Duality	Duality	A dummy variable, which is 1 if a CEO is a board member, 0 otherwise.
Financial Leverage	Lev	The ratio of total debt to total assets.

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TABLE 3
Descriptive Statistics, Pearson correlation matrix, and variance inflation factors

This table shows the descriptive statistics, Pearson's correlation matrix, and variance inflation factors (VIFs) for the multivariate analysis variables. The panel dataset (balanced) includes the 100 largest firms between 2014 and 2018 from Turkey's BIST based on market capitalization and liquidity but excludes financial and utility firms.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	VIF
1. Tobin's q	2.02	3.07	1.00													
2. Board interlocks	9.83	5.01	−0.20	1.00												1.81
3. Busy board	0.93	0.26	−0.30	0.39	1.00											1.24
4. Institutional investors	0.21	0.26	−0.18	0.32	0.13	1.00										2.76
5. Family	0.74	0.44	0.14	−0.10	−0.17	−0.45	1.00									1.50
6. Closely-held	0.05	0.29	0.27	−0.18	−0.29	−0.76	0.49	1.00								2.92
7. Fage	37.11	19.07	−0.06	0.26	0.18	−0.06	−0.02	0.11	1.00							1.21
8. FSize	6.28	0.97	−0.34	0.40	0.29	0.21	−0.03	−0.15	0.16	1.00						1.37
9. BSize	2.04	0.33	−0.28	0.55	0.25	0.29	−0.16	−0.25	0.21	0.41	1.00					1.80
10. Independent directors	0.30	0.16	−0.15	0.13	0.10	0.22	−0.04	−0.27	−0.02	0.10	0.15	1.00				1.38
11. Leverage	27.13	18.05	−0.16	0.21	0.06	0.11	−0.06	0.01	−0.03	0.18	0.17	0.05	1.00			1.14
12. CEO duality	0.82	0.39	0.06	−0.25	−0.05	0.09	0.14	−0.14	−0.11	−0.09	−0.11	−0.01	−0.01	1.00		1.16
13. Board diversity (BD)	2.54	0.52	−0.20	0.39	0.26	0.15	0.01	−0.08	0.16	0.34	0.48	0.42	0.19	−0.13	1.00	2.89

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TABLE 4

Random effect regression estimates: Panel Turkish sample firms with the dependent variable Tobin's q

This table reports the estimated random effect coefficients with the robust standard errors adjusted for heteroscedasticity shown in parentheses. The dependent variable is Tobin's q (TQ). The p-values are below the coefficients in parentheses.

Independent Variables	Dependent variables: Tobin's q									
	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Board interlocks	0.042	0.03	0.042	0.03	−0.180	0.14	0.040	0.03	−0.200	0.14
	(0.208)		(0.210)		(0.209)		(0.220)		(0.231)	
Busy board	−2.459	0.53	−2.331	0.53	−2.060	0.55	−2.300	0.53	−2.030	0.55
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Institutional investors	2.103	0.79	2.880	0.80	2.881	0.80	2.880	0.80	2.870	0.79
	(0.008)		(0.000)		(0.000)		(0.000)		(0.000)	
Family	0.003	0.34	0.090	0.34	0.080	0.34	0.081	0.34	0.070	0.34
	(0.992)		(0.891)		(0.879)		(0.877)		(0.874)	
Closely-held	3.498	0.71	3.870	0.71	3.830	0.71	3.920	0.70	3.860	0.71
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Fage	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01
	(0.977)		(0.978)		(0.976)		(0.970)		(0.967)	
FSize	−0.716	0.15	−0.750	0.15	−0.760	0.15	−0.740	0.15	−0.760	0.15
	(0.000)		(0.000)		(0.001)		(0.001)		(0.001)	
BSize	−0.989	0.47	−0.900	0.49	−0.920	0.49	−0.701	0.49	−0.730	0.49
	(0.036)		(0.056)		(0.076)		(0.134)		(0.137)	
Independent directors	−0.836	0.89	−0.130	0.90	−0.010	0.90	0.030	0.97	0.130	0.97
	(0.351)		(0.353)		(0.350)		(0.345)		(0.344)	
Leverage	−0.023	0.01	−0.020	0.01	−0.020	0.01	−0.020	0.01	−0.020	0.01
	(0.002)		(0.034)		(0.045)		(0.035)		(0.034)	
CEO duality	0.458	0.34	0.680	0.34	0.590	0.34	0.650	0.34	0.560	0.34
	(0.176)		(0.092)		(0.078)		(0.089)		(0.456)	
BDI			−1.430	0.44	−2.150	0.62				
			(0.000)		(0.000)					
B.Interlocks*BDI					0.091	0.05				
					(0.087)					
TBDI							−1.380	0.41	−2.049	0.56

									(0.000)	
B.Interlocks*TBDI									0.089	0.05
									(0.056)	
Constant	8.91	1.27	10.80	1.33	12.48	1.67	10.57	1.30	12.38	1.65
Wald Chi^2	148.88		173.68		177.09		180.24		184.26	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Number of observations	500		500		500		500		500	
Number of firms	100		100		100		100		100	

Source: Created by authors

TABLE 5
Fixed effect regression estimates: Panel Turkish sample firms with the dependent variable ROA

This table reports the estimated fixed effect coefficients with robust standard errors adjusted for heteroscedasticity shown in parentheses. The dependent variable is the return on assets (ROA). The p-values are below the coefficients in parentheses.

| Independent | Dependent variables: ROA | | | | | | | | | |
| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
Variables	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Board interlocks	0.100	0.14	0.380	0.20	−1.810	0.71	0.380	0.20	−1.970	0.74
	(0.775)		(0.770)		(0.756)		(0.747)		(0.741)	
Busy board	−4.520	1.97	−1.450	2.71	0.130	1.45	2.710	0.53	0.080	2.77
	(0.035)		(0.040)		(0.039)		(0.027)		(0.022)	
Institutional investors	−1.545	3.55	−1.510	3.88	−1.070	3.86	−1.370	3.88	−0.450	3.87
	(0.455)		(0.442)		(0.437)		(0.429)		(0.420)	
Family	−1.660	1.53	−3.530	1.95	−3.780	1.94	−3.450	1.96	−3.490	1.95
	(0.078)		(0.077)		(0.089)		(0.081)		(0.078)	
Closely−held	1.568	3.68	0.010	4.22	0.300	4.19	0.090	4.22	0.850	2.20
	(0.787)		(0.776)		(0.770)		(0.768)		(0.759)	
Fage	−0.020	0.14	−0.120	0.17	−0.040	0.17	−0.130	0.17	−0.030	0.17
	(0.345)		(0.341)		(0.337)		(0.329)		(0.321)	
FSize	7.100	1.61	9.820	2.15	9.540	2.13	9.900	2.14	9.640	2.13
	(0.000)		(0.000)		(0.000)		(0.001)		(0.000)	
BSize	1.550	2.71	−0.400	3.11	−0.680	3.09	−0.410	3.11	−0.970	3.10
	(0.657)		(0.665)		(0.667)		(0.656)		(0.651)	
Independent directors	−5.200	3.61	−6.050	4.10	−0.010	7.29	−6.680	4.54	−8.160	4.55
	(0.435)		(0.431)		(0.429)		(0.431)		(0.089)	
Leverage	−0.120	0.03	−0.140	0.04	−0.160	0.04	−0.140	0.04	−0.160	0.04
	(0.000)		(0.001)		(0.002)		(0.000)		(0.001)	
CEO duality	−1.070	1.24	−0.980	1.40	−1.130	1.41	−0.980	1.40	−1.110	1.41
	(0.568)		(0.554)		(0.547)		(0.539)		(0.528)	
BDI			−0.300	1.89	−6.000	3.33				
			(0.780)		(0.098)					
B.Interlocks*BDI					0.550	0.26				
					(0.043)					
TBDI							−0.320	1.88	−5.900	3.12
							(0.235)		(0.231)	
B.Interlocks*TBDI									0.530	3.12

										(0.034)
Constant	−31.88	10.49	−35.56	14.35	−22.67	15.55	−35.86	14.25	−21.72	15.50
F-statistic	4.950		3.751		3.850		3.760		3.910	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Number of observations	500		500		500		500		500	
Number of firms	100		100		100		100		100	

Source: Created by authors

TABLE 6

Summary of hypotheses

Hypothesis	Variable Codes	Expected Sign	Actual Sign	Degree of Support
H1: The average number of interlocking directorates on the board is positively associated with firm performance.	B.Interlocks	(+)	(+)	Not supported
H2: The condition of a busy board is negatively associated with firm performance.	Busy	(−)	(−) (0.000)	Supported
H3: The level of board diversity positively moderates the relationship between interlocking directorates and firm performance.	BDI/TBDI	(+)	(+) (0.078)	Supported
Ownership structure				
Institutional ownership	InstOwn	(+)	(+) (0.000)	
Closely-held ownership	Closely-held	(−)	(+) (0.001)	
Firm characteristics				
Firm size	FSize	(+)	(−) (0.000)	
Corporate governance variables				
Financial leverage	Lev	(−)	(−) (0.000)	
Board size	BSize	(+)	(−) (0.000)	
Demographic board diversity index/Total board diversity index	BDI/TBDI	(+)	(−) (0.000)	

Source: Created by authors;
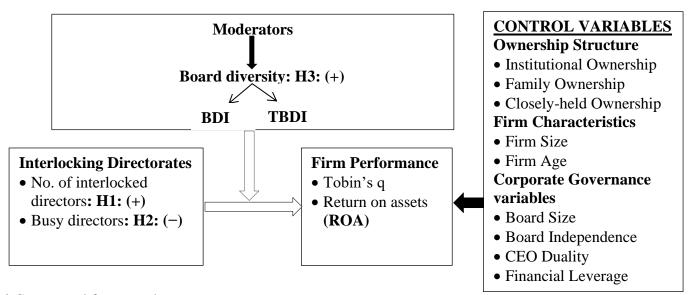Note: The p-values are below the signs in parentheses.

FIGURE 1 Conceptual framework

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This figure shows the interlocking directorates-firm performance relationship in the presence of board diversity and changes in board diversity. H1 and H2 indicate a negative association between interlocking directorates and firm performance, while H3 shows a positive moderating effect between interlocking directorates and firm performance.