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ORIGINAL RESEARCH

CEO power and post-merger performance in the UK: the moderating effects of corporate governance mechanisms

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Abstract
This study examines the effects of Chief Executive Officer (CEO) power and the moderating role of corporate governance mechanisms on mergers and acquisitions (M&A) performance. Our results indicate that CEO power is negatively associated with post-merger performance. Further tests show that corporate governance mechanisms, namely—board size, board independence, and board gender diversity—moderate the negative effects of CEO power on M&A performance. These results imply that internal corporate governance mechanisms may be effective in curtailing CEO power but do not curb it completely. The results are robust across alternative model specifications and alternative measures of post-merger performance.

Keywords Chief executive officer · CEO power · Mergers and acquisitions · Event study

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1 Introduction

Chief executive officers (CEOs), as the chief decision makers of their organizations, often grab news headlines for their leadership styles, personal attributes, and governance practices (Hambrick and Mason 1984; Finkelstein 1992). For example, in 2021 Elon Musk—CEO of Tesla and X, and founder and CEO of SpaceX—was nominated by Time magazine as their "Person of the Year". Given CEOs' ability to "set the tone for the entire corporation" (Wheelen and Hunger 1990: 69), how personal traits of CEOs influence firms' economic

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outcomes is of immense interest to practitioners and academics (Hambrick and Mason 1984). However, despite the interests, the net effects of CEO power on the firm value of mergers and acquisitions (M&A) remain less understood. Prior research has documented that M&As fail financially yet attract trillions of dollars in investments worldwide, with the UK being one of the top acquiring countries in this market. For example, a recent survey by Ernst and Young reported that £347 billion of M&A deals were completed by UK firms in 2020[1]. However, empirical studies on the effect of CEO power on M&A outcomes appear scant. In a recent study, Zhou et al. (2024) find that powerful CEOs tend to engage in cross-border M&A to move their assets overseas in the face of adverse political shocks. A meta-analysis by Wang (2022) on the relationship between CEO power and acquisitions reveals that most of the prior studies on CEO power and M&A examine announcement period returns except Datta et al. (2020) who investigate post-merger performance but have produced mixed results.

Against the above backdrop, examining CEO power in the context of M&A performance is significant for two reasons. First, M&As are discrete events, often seen as the most readily observable forms of risky investments in which the CEO is directly involved from initiation through negotiation to completion of the deals (Boateng et al. 2017). Highlighting the critical role played by CEOs in M&A decisions, Roll (1986: 199) observed that such decisions "reflect individual decisions"; hence, CEOs may exert their individual preferences, personalities and prejudices in M&A decisions. This argument is in line with the upper echelons theory, which contends that a firm's strategic choices and subsequent performance are shaped and influenced by the personal attributes of top management team (TMT) (Hambrick and Mason 1984). It is therefore important to understand how the most prominent member of TMT, i.e., the CEO, uses their power to influence risky investment decisions and performance. Second, Malmendier and Tate (2005) argue that CEO power may lead to distortions in corporate investment policies, and such distortions, which have been explained through the lens of agency theory, are more pronounced in M&A activities (Boateng et al. 2017). For example, studies contend that M&A deals are more prone to agency conflicts as most acquisitions are motivated by managerial empire-building (Morck et al. 1990). Consequently, how CEOs are monitored is crucial in limiting the extent to which they can pursue self-interested, risky investments.

Grounded in the above, we draw on upper echelons and agency theories to explore the effects of CEO power and the moderating role of corporate governance mechanisms on M&A performance. We believe that combining insights from these two theoretical perspectives will allow us to gain deeper insights into how CEO power affects the performance of risky investments such as M&A and the moderating role of corporate governance mechanisms on post-acquisition performance. We select three key corporate governance mechanisms, namely board size, board independence, and board gender diversity as the UK Corporate Governance Code considers these important for effective monitoring of the board (Davis 2011)[2]. Thus, prior evidence suggests that board size could play a crucial role and large boards would possess greater knowledge, skills, and expertise that could lead to effective decision making (Guest 2009; Cheng et al. 2008). Large boards also moderate the negative effect of CEO power on firm performance (Pugliese et al. 2014). Board independence is

[1] https://www.ey.com/en_uk/ccb/united-kingdom-mergers-acquisitions.

[2] The Higgs Report and regularly updated versions of the UK Combined Corporate Governance Code emphasizes the importance of board size, board independence, and board gender diversity.

an important mechanism for board monitoring (Fama and Jensen 1983). Studies report that board independence is an essential tool to moderate the negative effect of powerful CEOs (Combs et al. 2007) and it can positively moderate the adverse effect of CEO power on firm performance (Duru et al. 2016). The theoretical argument of gender diversity is embedded in the human capital theory (Becker 1964) that suggests that female directors bring diverse skills and knowledge into the boardroom. Existing research on gender diversity documents that female directors are better monitors and are more likely to improve firm performance and managerial accountability (Singh et al. 2008; Adams and Ferreira 2009; Brahma et al. 2021). In line with this, we argue that gender diversity positively moderates the relationship between CEO power and M&A outcome.

Building on prior studies, we take the view that CEO power is best measured by considering a range of different attributes they possess, rather than focusing on just one or two dimensions (Veprauskaitė and Adams 2013). We construct the CEO power index based on eight power-related variables by drawing on Finkelstein's (1992) framework of CEO power, which encompasses structural, ownership, expert, and prestige power. Due to potential conceptual and statistical overlap that may be associated with power-related variables, we use the data reduction technique - principal component analysis (PCA) to construct the CEO power index using the eight power-related variables. This is in line with other studies that have taken similar power-related variables to capture CEO power (Daily and Johnson 1997; Veprauskaitė and Adams 2013; Mollah and Liljeblom 2016). We believe our measure of CEO power is not only comprehensive but also objective and captures all dimensions of CEO power (Brahma and Economou 2024).

This study makes two important contributions to the literature. First, this study adds to our understanding of the role of CEO power in shaping long-term post-merger performance. Surprisingly, only a few studies have examined the role of CEO power in the context of M&A. For instance, Fralich and Papadopoulos (2018) focus on the CEO power and the premiums paid by the acquirers. Their research documents that powerful CEOs could reduce acquisition premiums either through their risk-aversion or improved appraisal of target quality. However, the role of CEO power in the context of post-merger performance has not received systematic research attention in the extant literature. To address this gap, our results provide evidence that CEO power leads to poor post-merger performance, suggesting that M&A decisions by powerful CEOs may be driven by managerial motives rather than shareholder wealth maximisation. Second, we focus on board size, board independence, and board gender diversity to examine the effect of the interaction between CEO power with these key internal corporate governance mechanisms. In doing so, we draw on a theoretical framework that integrates agency and upper echelons theories (Hillman and Dalziel 2003). We find that board size, board independence, and board gender diversity positively moderate the effects of CEO power on M&A performance, implying that internal corporate governance mechanisms act as effective monitoring mechanisms and reduce the adverse impact of CEO power but do not remove it completely.

The rest of the paper is structured as follows. Section 2 provides the theoretical discussions and presents testable hypotheses. Section 3 outlines the research design and the research model while Sect. 4 presents the results and discussion. Section 5 presents the robustness test. Sect. 6 concludes the paper with discussion on theoretical and managerial implications, and limitations of the study.

2 Theory and hypotheses development

2.1 CEO power and M&A performance

Upper echelons theory shows how TMT determines and influences corporate strategy, innovation, and performance (Hambrick and Mason 1984). The central premise of upper echelons theory is that top executive managers' experience, values, and power greatly influence their interpretations of the situations they confront and, in turn, influence their strategic choices and performance outcomes (Daily and Johnson 1997). In other words, the power exerted by the TMT helps set the strategic direction and economic outcomes of a firm. As the most powerful member of a firm (Daily and Johnson 1997), there is consensus in the literature that CEOs play a crucial role in a firm's realisation of its strategic goals and performance (Hambrick 2007). From this standpoint, CEOs with more power enhance their ability to act forcefully and without compromising with key stakeholders or board members and take more risk that has negative implications for firm performance. In M&A transactions where CEOs are deeply involved and have been documented to reflect individual CEO decisions (Roll 1986), a powerful CEO may have a considerable latitude in exercising their subjective influences based on their individual preferences and prejudices in the decision-making process and negatively influence M&A performance.

Agency theory contends that CEO power may engender managerial entrenchment and increase agency conflicts, with detrimental consequences for corporate value (Jensen and Meckling 1976). Thus, powerful CEOs are essentially opportunistic leverage information asymmetry (Fama 1980), and have personal goals divergent from the shareholders. In the context of an M&A, where managerialism or empire-building is often seen as a major motivation for managers, it may be argued that CEOs' power and M&A relationship constitutes a classic agency problem. For instance, powerful CEOs reduce the risk profile of acquiring banks in the context of bank M&As (Sghaier and Hamza 2024). Grounded in the above discussion, it could be argued that powerful CEOs have more discretion in decision-making and are more likely to reduce the monitoring effectiveness of the board of directors, facilitating the pursuit of M&As that are attractive to themselves but detrimental to firm value. Based on these arguments, we present the following hypothesis.

Hypothesis $_{1a}$ CEO power is negatively associated with post-merger performance.

While CEOs with more power can exert a negative influence on firm performance, as discussed above, upper echelons theory also indicates that CEOs can play a valuable positive role in directing the firm's efforts towards achieving a high performance (Hambrick and Mason 1984). In this context, the existing literature suggests that in situations where CEOs are powerful, they could use their discretion to sway firms' decisions (Adams et al. 2005). Adams et al. (2005) assert that dominant CEOs have the capacity and managerial discretion to pursue risky strategies, increasing the variability in firms' accounting earnings. Moreover, powerful CEOs can reduce the risk of delays often associated with democratic board-level decision-making and increase firm value in a competitive business environment where quick decisions are important for organisational success (Sah and Stiglitz 1991). Indeed, anecdotal observations by Tang and Crossan (2017) point out that recent notable and successful firms such as IBM, Microsoft, General Electric, and Apple were once led by domi-

nant and powerful CEOs such as Louis Gerstner, Bill Gates, Jack Welch, and Steve Jobs respectively. Powerful CEOs bring unity of command, leading to faster decision-making for firms tackling financial distress. CEO power, as measured by tenure and duality, positively impacts the tone of earnings announcements (DeBoskey et al. 2019). The above findings indicate that powerful CEOs are likely to be innovative and tend to undertake risky entrepreneurial projects that improve a firm's profitability. In the context of M&A, a study finds that powerful CEOs, with their expertise, network, and control, tend to reduce acquisition premiums (Fralich and Papadopoulos 2018). Deng et al. (2025) find that M&A outcome are better for family firms that are run by family CEOs than those run by non-family CEOs. In M&A investments, where timely decisions could help the acquirer avoid the deal becoming hostile and costly, a powerful CEO could offer direction and faster decisions to stem possible cost escalation. In light of the above discussion, we present the following hypothesis.

Hypothesis $_{1b}$ CEO power is positively associated with post-merger performance.

2.2 Moderating role of the board: CEO power and M&A performance

The board of directors fulfils two primary functions: counselling and monitoring executive management to prevent abuse of managerial power and reduce the pursuit of managerial self-interest at the expense of shareholders (Fama and Jensen 1983). Effective board monitoring and counselling tend to serve as mechanisms to balance the power between the CEO and the board with a positive influence on financial performance. The board of directors also increases transparency by claiming accountability, supporting sustainability, and stakeholders' interest. Hermalin and Weisbach (1998) state that board structure is an endogenous consequence of negotiation between the board and the CEO. CEOs normally prefer less monitoring, but the board supports monitoring, particularly in situations where there is uncertainty about the CEOs' ability. Nguyen et al. (2025) report that in M&A with board-CEO age similarity leads to lower level of earnings management which highlights the advisory role of the board. Agency theory suggests that the principal (that is, the boards in this case) would manage the agent (that is the CEOs in this case) by linking their current and future remuneration to performance (DeMarzo et al. 2012). In this study, we use three measures as indicators of effective board monitoring, which are board size, board independence, and board gender diversity. In the context of M&As, where managerialism or empire-building is often seen as a major motivation for senior managers, internal governance mechanisms such as board size, board independence, and board gender diversity are argued to be important corporate control systems that can moderate the behaviour of CEOs in that they strengthen the ability of the board to advise and monitor executive management. Grounded in the above reasoning, we briefly set out the following hypotheses.

2.3 Board size

Prior studies contend that large boards have the resources and expertise to monitor and advise executive management, which may improve performance (Adams and Ferreira 2007). This is because the effectiveness with which corporate boards perform their monitoring and advising roles is predicated on resources and expertise, which are the main advantage of large boards (Fama and Jensen 1983). Larger boards have greater collective knowledge,

skills, and expertise that would lead to better performance. In addition, large boards are also likely to have a higher number of non-executive directors, which would increase board monitoring (Guest 2009). Cheng et al. (2008) argue that large boards may moderate the extremity of board decisions since it would require more compromise and negotiation for large boards to arrive at the final decision. Hence, they conclude that large boards lead to less variability in firm performance. In the context of CEO power, it is reported that powerful CEOs could lead to extreme results, either big wins or big losses, as their strategies tend to differ from industry trends (Tang and Crossan 2017). To minimise these extremes, they found large and powerful boards to have a moderating effect on CEO power. In similar vein, another study finds that larger boards tend to increase the effectiveness of board monitoring and moderate the negative effect of CEO power on firm performance (Pugliese et al. 2014). Some studies argue that board size beyond a threshold could lead to inefficiencies that may offset the benefits. For example, Lipton and Lorsch (1992) suggest eight or nine directors as optimal. The average board size in our sample is 8.72 (see Table 2), which is near the optimal according to this study. We therefore hypothesized that:

Hypothesis $_{2a}$ Board size positively moderates the relationship between CEO power and post-M&A performance.

2.4 Board independence

Agency theory argues that independent directors play an important role in board monitoring and, thereby, in reducing agency costs (Fama and Jensen 1983). Hermalin and Weisbach (1998) advance that outside directors are responsible for eliminating poor managers, and their incentive to do so is to protect their reputation, as they face reputational risk if they are directors of failing companies. This study further contends that independent directors are likely to confront powerful CEOs in poorly performing firms to maintain their reputation in the market, whereas inside directors bound by their career prospects might avoid such confrontations. Hence, independent directors will ensure effective governance, which would certify their ability to the market. Board independence is a useful tool in decreasing contract rigging by powerful CEOs (Morse et al. 2011). In the context of CEO power, a study finds that outside director-dominated boards are required when the boards have powerful CEOs, but such outside director-dominated boards might constrain firms with less powerful CEOs (Combs et al. 2007). Another related study finds that CEO duality as a measure of CEO power is detrimental to firm performance, but this is positively moderated by the presence of independent directors (Duru et al. 2016). In the context of our study, M&As are risky and major investments that may change the strategic direction of a firm, and the presence of a board with a large proportion of independent directors is vital for resolving the potential conflicts of interest between executive management and shareholders (Boateng et al. 2017). They report a positive and significant association between the proportion of independent directors and the M&A operating performance of Chinese firms. From the above discussion, it could be argued that a higher proportion of independent directors are likely to moderate any adverse effect of CEO power on post-merger performance. Hence, we present the following hypothesis.

Hypothesis $_{b}$ Board independence positively moderates the relationship between CEO power and post-M&A performance.

2.5 Board gender diversity

The theoretical justifications for promoting gender diversity in the boardroom include social and ethical considerations, which promote equality and inclusion (Brammer et al. 2007), and Becker's (1964) human capital theory, which theorizes that gender diversity increases firm performance by pulling different skills, knowledge, and perspectives (Singh et al. 2008; Brahma et al. 2021). Past research on board gender diversity shows that female directors could impact firms' governance structures and enhance governance standards (Adams and Ferreira 2009). Studies also find that female directors are better monitors since they enhance managerial accountability, such as CEO accountability and attendance in board meetings (Adams and Ferreira 2009). Another study reports that gender diversity alleviates agency costs for businesses where there is a lack of external governance and in markets with lower competition (Jurkus et al. 2011). Female directors have also been reported to cause less aggressive corporate acquisitions (Levi et al. 2014). Cumming et al. (2015) find that gender diversity reduces both the risk, frequency, and magnitude of securities fraud, and a gender quota of 50% minimizes securities fraud. However, not all studies have found a positive effect of board gender diversity on firm governance and performance. Heubeck and Meckl (2024) find that board gender diversity is effective only to a certain threshold of gender diversity, 35%. They find that beyond this threshold, gender diversity positively moderates the effect of dynamic CEO capabilities on ESG performance. However, in our sample, the average percentage of female directors on the board is 10.6%, below the 35% threshold, as Heubeck and Meckl (2024) reported (see Table 2). Based on the other empirical evidence reviewed above, we argue that gender diversity will likely keep CEO power in check and alleviate its negative effect on firm performance. In light of the above argument, we present the following hypothesis.

Hypothesis $_{c}$ Gender diversity positively moderates the relationship between CEO power and post-M&A performance.

3 Research design

3.1 Data

Data for this study were collected from three sources. The M&A data have been obtained from Thomson One Banker and the Securities Data Corporation (SDC) database. M&A deals are included if they take the form of a merger (SDC deal form M), an acquisition of majority interest (AM), or an acquisition of assets (AA). The data relating to share prices, CEO duality, ROA, Tobin's Q, and CEO pay slice have been taken from Refinitiv Eikon. The corporate governance data, i.e., CEOs' time in the role, CEOs' appointment on other boards, CEOs' equity-linked compensation, CEOs' age, and CEOs' qualifications, were obtained from the BoardEx database. To be part of our sample, we have imposed the following sample selection criteria: (i) The acquirer firms are UK publicly traded firms listed

on the London Stock Exchange; (ii) The target firms are UK private and publicly listed firms. We include both public and private targets because, in the UK, 99% of M&A deals consist of private targets, consistent with the findings of Brahma et al. (2023). Criteria (i) and (ii) generated 1152 M&A within this period, 2002–2017; (iii) The acquirer should hold less than 51% of the target firms' shares before the M&A and acquire at least 51% of the target shares after the completion of the takeover deal. This criterion generated 395 M&A deals; (iv) The final sample comprises 270 firms after eliminating M&A deals with missing data; (v) The corporate governance data, i.e., CEO duality, CEOs' time in the role, CEOs' appointment on other boards, CEOs' equity-linked compensation, CEOs' age, and CEOs' qualification, have been collected on the merger effective date so that one-year post-merger analyses could be conducted.

Most of the studies on CEO power are based on US data, with little attention on the UK, EU, and Asia (Wang 2022). We focus on the UK market, where most target firms are private firms compared to the US market. In addition, UK M&As are mostly cash-financed, whereas the US M&As are mainly stock-financed (Brahma et al. 2023). Our focus on the UK market would also control for M&As driven by equity overvaluation. Finally, the CEO and board of directors' characteristics, such as duality, board independence, and gender diversity, are based on the principle of 'comply or explain,' and companies can deviate from the UK Corporate Governance Code. However, in the USA, companies must comply with the Sarbanes-Oxley Act requirements. Therefore, focusing on the UK market will provide new insights.

3.2 Measurement of dependent and independent variable

Our measures of performance consist of both stock market- and accounting-based performance, namely, BHARs, ROA, and Tobin's Q.

3.2.1 Buy and hold abnormal returns (BHARs)

Barber and Lyon (1997) and Lyon et al. (1999) advocate using the BHAR approach to estimate long-run abnormal returns because it truly measures investors' experience. Thus, BHAR estimates the average multiple-year return from an approach of buying all firms engaged in an event and selling at the end of a pre-specified holding period versus a similar strategy of investing in comparable non-event firms (Mitchell and Stafford 2000). The BHAR of security *i* for the holding period T is calculated as follows:

$$BHAR_{i,t} = \prod {}^{T}_{t=1}(1 + R_{i,t}) - \prod {}^{T}_{t=1}(1 + E(R_{i,t})) \tag{1}$$

where, $R_{i,t}$ is the return of security i at month T, and $E(R_{i,t})$ is the expected or normal monthly return based on a benchmark model. T is the number of months in the holding period that has been analyzed following the event month of completion. This study analyses 1-year holding period BHARs following the M&A completion. The average BHAR (ABHAR) for the sample of N firms for a particular holding period T is calculated as follows:

$$ABHAR_T = \frac{1}{N}\sum_{i=1}^{N} BHAR_{i,T} \tag{2}$$

Following Lyon et al. (1999) we use the following t-statistics to calculate the statistical significance of $ABHAR_T$

$$t_{ABHAR} = \frac{ABHAR_T\sqrt{N}}{\sigma_{BHAR}} \tag{3}$$

In Eq. 3, $ABHAR_T$ is the mean of sample BHAR and $ABHAR_T$ is the cross-sectional standard deviation of *BHARs* over the sample of N firms. The statistical significance of median *BHARs* between the sample of M&A and the control firm is measured by the Wilcoxon signed rank test.

3.2.2 Benchmark model used to calculate BHAR and operating performance

The benchmark model used in this study is the control firm approach following Barber and Lyon (1997). For each sample firm that completed an M&A, we identify a control firm that did not engage in M&A by matching the size (market capitalization) and market value to book value (MV/BV) ratio. We use size and MV/BV as, in combination, these act as good explanatory variables to determine the cross-sectional returns and proxy for the sensitivity of common risk factors in stock returns. Several studies that have evaluated long-run abnormal returns have used these two variables to match control firms (see Barber and Lyon 1997). In this approach, the sample is categorized into five portfolios depending on size (market capitalization), and then each of these five portfolios is further grouped into five portfolios based on their MV/BV ratio. This leads to the creation of 25 size and MV/BV control portfolios. The control portfolios are created in June of each year, and the returns are calculated in July of each year (Lyon et al. 1999). Out of these 25 size and MV/BV control portfolios, the firm whose size and MV/BV match closely to a sample firm's size and MV/BV on the M&A completion month is selected. $E(R_{i,t})$ is the expected normal benchmark return of the control firm for the corresponding sample firm.

3.3 Post-merger operating and financial performance

In this study, we define the excess or abnormal operating performance (AP) of each merged company as the difference between the operating performance of the merged firm and the operating performance of a benchmark control firm following Barber and Lyon (1997). Our accounting-based performance measure is ROA, and the market-based measure is Tobin's Q. ROA is calculated as earnings before interest and taxes divided by the average of the two most recent years' book value of total assets following Bhagat and Bolton (2008). Tobin's Q is defined as the book value of total assets minus the book value of common equity plus the market value of common equity divided by the book value of total assets (Adams and Ferreira 2009).

The abnormal performance (AP) was calculated for 12 and 24 months following the M&A. The estimation of statistical significance of the operating performance difference between sample M&A and control firm is examined by calculating the Wilcoxon signed-rank test. The AP is measured as follows:

$$AP_{i,t} = P_{i,t} - CF_{i,t} \tag{4}$$

where $AP_{i,t}$ is the abnormal operating performance (AP) measured by (ROA and Tobin's Q) of the sample M&A firm *i* for time period *t; $P_{i,t}$* is the performance (ROA and Tobin's Q) and $CF_{i,t}$ is the corresponding performance of the control firm *i* for time period *t*. The mean of $AP_{i,t}$ for the sample of N firms for a particular holding period T is calculated as follows:

$$AAP_T = \frac{1}{N} \sum {}^{N}_{i=1} AP_{i,T} \tag{5}$$

The statistical significance of mean AAP_T is calculated using t-statistics, as shown in the following equation.

$$t_{AAOP} = \frac{AAP\sqrt{N}}{\sigma_{AAP}} \tag{6}$$

The statistical significance of median AAP_T between the sample of M&A and control firm is measured by the Wilcoxon signed rank test.

3.4 Measurement of independent and control variables

3.4.1 CEO power variables

In this study, we draw upon Finkelstein's (1992) four dimensions of CEO power: structural, expert, ownership, and prestige to construct a composite measure of CEO power. Following prior studies, we have taken two variables: CEO duality (Daily and Johnson 1997; Veprauskaitė and Adams 2013; Duru et al. 2016) and CEO pay slice (Bebchuk et al. 2011) to constitute structural power. We have taken CEO tenure as the measure of expert power (Graham et al. 2020). Following Fralich and Papadopoulos (2018), we have taken the number of CEOs' directorships in other firms as the measure of prestige power. Following Finkelstein (1992) and Daily and Johnson (1997), we have taken CEO ownership power. In addition to these measures, we also employ CEO bonus pay following Veprauskaitė and Adams (2013), CEO age, and CEO education following Mollah and Liljeblom (2016). Using these measures, we have constructed our measure of CEO power. The different measures of CEO power are explained below.

3.4.1.1 CEO duality CEO duality is perceived as a 'structural' power in the empirical literature, and duality leads to unity of command and results in direct control of corporate strategies (Finkelstein 1992; Daily and Johnson 1997). CEO duality could also result in information asymmetry that could thwart informed decision-making (Fralich and Papadopoulos 2018). Duru et al. (2016) show that CEO duality negatively affects firm value, which is positively moderated by independent directors on the board. In similar vein, Bui et al. (2025) find that target CEO duality negatively affects most M&A except for cross-border

M&As. CEO duality is a dummy variable that takes a value of 1 if the CEO also serves as board chair and 0 if otherwise.

3.4.1.2 CEO tenure CEO tenure is a proxy for expert power (Finkelstein 1992). CEOs' power is likely to strengthen with their increase in tenure as they have firm-specific knowledge to help and persuade the board to make certain decisions. CEO tenure is measured by the number of years a CEO has been in the post.

3.4.1.3 CEO ownership CEO ownership aligns CEOs' economic interests with those of the shareholders, and greater equity ownership increases the CEOs' influence and discretionary power to make decisions (Finkelstein 1992). We use equity-linked compensation as a proportion of total compensation to proxy for CEO ownership.

3.4.1.4 CEO prestige power CEO prestige power refers to CEOs' social network and ties that could be valuable to the firm. CEO networks with external contacts may provide valuable information to the organisation. Prestige power gives CEOs more legitimacy, which helps sway the board in decision-making process (Veprauskaitė and Adams 2013; Fralich and Papadopoulos 2018). We measure CEO prestige as the number of directorship positions held by the CEO in other firms (Finkelstein 1992).

3.4.1.5 CEO pay slice Finkelstein (1992) points out that managers' compensation is a vital indicator of control derived from their structural position in the firm. The CEO pay slice reflects the relative importance of the CEO and the extent to which the CEO can extract rent (Bebchuk et al. 2011). CEO pay slice is the CEO's total compensation as a fraction of the total compensation of the top five directors on the board.

3.4.1.6 CEO bonus pay Bonuses are typically paid to executives with an additional cash payment on top of their base salary. Powerful CEOs are argued to obtain higher bonuses than less influential CEOs, and hence, we use CEO bonus pay as an indicator of structural power (Veprauskaitė and Adams 2013). CEO bonus pay is a dummy variable that takes the value of 1 if the CEO receives performance-related pay and 0 otherwise.

3.4.1.7 CEO qualification Bantel and Jackson (1989) argue that an individual's higher education augments cognitive skills essential for high-quality decision-making. Kesner (1988) advances that directors bring a unique and broad supply of human capital to the board. Hambrick and Mason (1984) suggest that education widens the knowledge base and intellectual ability and constitutes a source of power. Mollah and Liljeblom (2016) consider

CEO qualification as a source of prestige power. CEO qualification is taken as the number of qualifications held by the CEO.

3.4.1.8 CEO age Age is a useful indicator of knowledge and experience. Mollah and Liljeblom (2016) deem CEO age as a source of prestige power. Bertrand and Schoar (2003) argue that experience and knowledge gained with age allow CEOs to exercise significant power on the board of directors.

3.4.1.9 CEO founder CEO founder is a dummy variable that takes the value of 1 if the CEO is a founder. Founder CEOs are likely to have significant influence over firms' strategy, culture, and aspirations (Adams et al. 2005).

3.4.2 Board independence

A greater proportion of independent directors on the corporate board effectively mitigate agency problems, as a higher proportion of independent directors would lead to improved monitoring of boards' actions (Hillman and Dalziel 2003). We therefore explore whether board independence moderates the link between CEO power and post-merger performance.

3.4.3 Board size

The board of directors has two vital functions: advising and monitoring (Adams and Ferreira 2007). Given its importance, we investigate whether board size moderates the CEO power-post-merger performance relationship. Board size measures the total number of directors on the board.

3.4.4 Board gender diversity

Prior studies have found that board gender diversity positively affects firm performance and internal control weaknesses (Brahma et al. 2021). We therefore measure board gender diversity as the percentage of female directors on the board.

3.4.5 Control variables

Additionally, we include several deal-specific and firm-specific variables, such as deal size, method of payment, deal attitude, relatedness, board age, board affiliations, board education, board tenure, firm age, firm size, and leverage, as control variables. Several past studies have used these controls (see Combs et al. 2007; Brahma et al. 2021). Table 1 defines all the variables that have been applied in this study.

Table 1 Measurement of variables

Variables Names	Definition
BHAR	BHAR is the buy and hold abnormal return and it is the difference between buy and hold returns of the sample firm and the control firm, where the control firm has been matched by size and book to market ratio
AP	AP is the abnormal operating performance and it is the difference between the operating performance of the sample firm and the control firm, where the control firm has been matched by size and book to market ratio
ROA	It is calculated as earnings before interest and taxes divided by the average of the two most recent years' book value of total assets
Tobin's Q	It is defined as the book value of total assets minus the book value of common equity plus the market value of common equity divided by the book value of total assets
Power (1, 2)	Two composite variables derived after using principal component analysis
Alt Power	An alternative index of CEO power measured by taking the sum of eight categorical variables
CEO-Chair Duality	It is a dummy variable that takes the value of 1 if the CEO is also the Chair of the firm and zero otherwise
CEO-Tenure	It is the number of years the CEO has been in the current role
CEO-Ownership	This is measured as the ratio of CEO's equity linked compensation to CEO's total compensation
CEO-Prestige	It is the total number of other boards where the CEO has held positions to date.
CEO Bonus-pay	CEO-Bonus pay is a dummy variable that takes the value 1 if the CEO gets performance related pay and 0 otherwise
CEO Pay-slice	CEO's pay-slice is the ratio of CEO's compensation to total compensation of the top five directors on the board
CEO Qualification	It is the number of qualifications held by the CEO
CEO Age	The age of the CEO
Deal Size	The value of the deals in dollars
Method of payment	This is a dummy variable that takes the values of 1 if cash is used as the method of payment and 0 otherwise
Relatedness	The value of 1if the merger happened within the same sector and 0 otherwise
Board Tenure	The average tenure of the board of directors in their current board who were also directors in the pre-merged entities.
Board Age	The average age of the board of directors
Board Affiliations	The average number of other boards where the board of directors hold positions
Board Education	The average number of qualifications held by the board of directors
Board Independence	The number of independent directors on the board
Board Size	Board size is the total number of directors on the board
Gender Diversity	Percentage of female directors on the board
Deal Attitude	This is a dummy variable that is coded 1 for hostile deals and 0 for friendly deals
Acquisition Premium	This is measured as the percentage paid for a target firm over its market capitalization value. This market capitalization value is the value of the target firm before the deal announcement day.
Firm Age	This is measured by the number of years since the firm was established
Firm Size	The market value of the post-merger combined firm
Leverage	This is the ratio of total debt to total assets

Note: This tables shows the definitions of all the performance measures, CEO power measures and other independent

3.5 Model

We employ a pooled regression to examine the relationship between CEO power and the post-merger performance of the UK M&As and CEO power. Pooled regression has been used due to the cross-sectional nature of the data, as M&A events are discrete. Our main regression models are specified below:

$$\begin{aligned} &Performance_i = \alpha_{\ i} + \beta_{\ 1i} Power_i + \\ &\beta_{\ 2i} CEO\ Gender + \beta_{\ 3i} Board\ Independence + \\ &\beta_{4i} BoardSize + \beta_{\ 5i} GenderDiversity + Controls_i + \ _i \end{aligned} \tag{7}$$

$$\begin{aligned} &Performance_i = \alpha_{\ i} + \beta_{\ 1i} Power_i + \beta_{\ 2i} CEO\ Gender + \\ &\beta_{\ 3i} Board\ Independence + \beta_{\ 4i} BoardSize + \beta_{\ 5i} GenderDiversity + \\ &\beta_{\ 6i} Power_i x CEO\ Gender + \beta_{\ 7i} \end{aligned} \tag{8}$$

The dependent variable, "performance" in the above equations are 12- and 24-months post-merger BHARs and post-merger APs, measured by ROA and Tobin's Q. The independent variables are CEO power variables represented by Power 1 and Power 2. Controls represent the set of control variables.

4 Results and discussion

4.1 Descriptive statistics

Panel A of Table 2 shows the summary statistics of the M&A sample in terms of private and public target firms across different methods of payments and related versus diversifying acquisitions. The data shows that 42% of the M&A deals have used cash as the method of payment, while 18.5% and 39% have used stock and mixed methods of payment, respectively. The data also shows that 33% of the M&A deals are related deals; that is, the acquirer and target firms are from the same sectors, and the rest are diversified M&A deals where the acquirer and target firms are from different sectors. The data also shows that most UK M&A deals involve privately owned target firms, 98%, while only 2% of M&As involve publicly traded target firms. This is consistent with the findings by Brahma et al. (2023).

Panel B of Table 2 presents the summary statistics of the CEO power variables and control variables. It documents that the average tenure of CEOs is five years, similar to that reported by Veprauskaitė and Adams (2013) for the UK sample but lower than that reported by non-UK studies (see Bhagat and Bolton 2008 for US study). Variations in CEO tenure range from 3 to 31 years. The mean of CEO ownership measured by equity-linked compensation as a proportion of total compensation is 0.43. CEO prestige indicates that the average CEO holds between two and three external corporate board positions. Regarding CEO age, the average age is 52; on average, CEOs have one qualification with a maximum of four. Each board has an average of five independent directors, with an average board size of 8.72, indicating that, on average, independent directors constitute 57% of the board. The mean percentage of female directors on the boards is around 11%, with a minimum of 0% and a maximum of 38%.

Table 2 Summary statistics

Panel A								
Type of acquisitions	Number of Acquisitions	Cash	Stock	Mixed	Related	Diversifying		
All deals	270	114	50	106	89	181		
Target firm: Private	264	111	49	104	87	177		
Target firm: Public	6	3	1	2	2	4		
Panel B								
CEO Power Variables		Mean	Min	Max	Median	Skewness	Kurtosis	Standard Deviation
CEO-Chair Duality	270	0.22	0	1	0	1.32	-0.25	0.48
CEO Tenure	270	5.07	3.2	31.2	3.9	2.19	7.9	4.27
CEO Ownership	270	0.43	0	1.26	0.46	-0.06	0.69	0.23
CEO Pay-slice	270	0.38	0.058	0.73	0.35	0	0.38	0.41
CEO Bonus	270	0.89	0	1	1	0	0.15	0.317
CEO Prestige	270	2.54	1	34	2	6.72	59.9	3.08
CEO Qualification	270	1.02	1	4	1	11.04	140	0.045
CEO Age	270	51.5	37	70	51	0.14	-0.53	6.28
CEO Founder	270	0	0	1	0	2.70	5.29	0.29
Board Independence	270	5.12	2	24	5	4.14	32.4	2.16
Board Size	270	8.72	6	15	9	0.65	0.46	1.75
Gender Diversity	270	10.6	0	37.5	11	4.13	18.19	5.27
Control Variables								
Deal Size	270	74.5	1	837.6	30.6	3.22	11.7	4.31
Method of Payment	270	0.47	0	1	1	0.13	-1.99	0.49
Deal Attitude	279	0.12	0	1	0	0.17	-1.82	0.54
Acquisition Premium	270	26.7	-10.43	75.5	22.4	0.21	1.32	0.82
Relatedness	270	0.16	0	1	1	0.28	-0.32	0.46
Board Tenure	270	6.9	0	37	5	2.30	6.69	7.49
Board Age	270	54	24	80	57	0.038	1.94	7.22
Board Affiliations	270	2.66	0	22	2	2.88	17.5	1.85
Board Education	270	1.43	0	3	1	1.02	0.063	0.60
Firm Age	270	45	1	250	26	2.81	0.77	3
Firm Size	270	0.98	-3.86	4.52	1.54	0	0.04	2.31
Leverage	270	21.6	0	85.4	34.8	0	0	5.42

Note: Panel A of this table shows the summary statistics of the M&A sample in terms of method of payment and related versus diversifying acquisitions. Panel A also shows the breakdown of the sample between private target firms and public target firms. Panel B shows the summary statistics of the CEO power variables, independent variables and control variables

4.2 Principal component analysis (PCA)

We use PCA to measure CEO power to provide a parsimonious set of variables to determine the underlying dimensions of CEO power. Our measure is closer to the studies of Morse et al. (2011) and Veprauskaitė and Adams (2013) but different as these studies have used a maximum of five power-related variables compared to eight variables employed in this study, thereby extending prior measures to a more comprehensive one. The use of PCA enables us to combine a number of interconnected CEO power variables, thereby reducing the breadth of the data set but at the same time preserving the variation in the data (Veprauskaitė and Adams 2013). Thus, PCA transforms the CEO power variables into a new variable (the principal component) that is uncorrelated and ordered. The main advantage of this approach is that PCA generates weights so that the CEO power index describes most of the variation present in the original variable. This helps to control for multicollinearity problems, which could be substantial when several power variables are independently incorporated into empirical models. In addition, we have conducted Bartlett's test to ensure that the intercorrelation matrix is non-collinear and the Kaiser-Meyer-Olkin test to check that the sample is adequate. The results of these tests suggest that the data have been factored properly.

Panel A of Table 3 reports the correlation coefficients of the eight CEO power variables, and these coefficients are relatively low. We have also calculated the variance inflation factor (VIF) of the independent variables, and none of the VIFs is above 2, suggesting no multicollinearity between the independent variables. Our PCA generates two factors, namely Power 1 and Power 2. Power 1 combines four variables: CEO-Chair duality, CEO tenure, CEO ownership, and CEO prestige. Power 2 includes four additional components of CEO power, i.e., CEO pay slice, CEO bonus pay, CEO qualification, and CEO age. Panel B shows the principal components' weights (loads) for the Power 1 and Power 2 indexes. The weights of the principal components maintain theoretically consistent signs, indicating increased CEO decision-making power. Panel B of Table 3 shows that in line with our expectation, all the CEO power variables contribute positively to the Power 1 and Power 2 proxies. Panel C of Table 3 reports the summary statistics of the CEO power indexes obtained from PCA.

4.3 Post-merger performance

Table 4 presents 12- and 24-months post-merger performance following the completion of the M&A deals. Panels A, B, and C of Table 4 present the results of BHAR, ROA, and Tobin's Q of the combined firms in the 12-month and 24-month post-merger periods. The results indicate that post-merger mean returns of the combined firms are negative across the 12- and 24-month post-merger periods. The mean and median returns are all significant at the 1% level for 12-month and 24-month BHAR, ROAs, and Tobin's Q, except the 24-month median Tobin's Q, which is significant at 10%. Overall, the results suggest that UK-acquiring firms experience negative returns in the long term for their acquisition activities.

Table 3 Principal component analysis

	1	2	3	4	5	6	7	8
A. Correlation Matrix								
1. CEO Duality	1.00							
2. CEO Tenure	0.26***	1.00						
3. CEO Ownership	0.17***	0.32***	1.00					
4. CEO Prestige	-0.06	0.26***	0.06	1.00				
5. CEO Bonus	-0.15***	-0.09**	0.22***	0.068***	1.00			
6. CEO Pay-slice	-0.0076	0.14***	0.072***	0.041	0.068***	1.00		
7. CEO Qualification	-0.05	0.63**	0.11*	0.17***	0.04	0.19**	1.00	
8. CEO Age	-0.12**	0.32***	-0.007	0.36**	-0.08	0.46***	0.001	1.00
B. Index Weights								
Power1	0.50	0.45	0.59	0.57	-	-	-	-
Power2	0.42	0.25	0.32	0.54	0.75	0.62	0.61	0.58
C. Descriptive Statistics for the Principal Components								
	Mean	Std.	Median	Min	Max	Skewness	Kurtosis	
Power1	0	1.31	0.32	-1.1	3.2	1.8	5.3	
Power2	0	1.12	0.18	-0.87	2.7	0.02	2.5	

Note: This table provides the results of principal component analysis that has been used to create the proxies for CEO power. Panel A reports the correlation coefficients of the CEO power variables. Panel B shows the weights of each of the power indexes. Finally, panel C shows the descriptive statistics of the power indexes. ***, ** and * indicate statistical significance at 1%, 5%, and 10% levels respectively

4.4 Univariate analysis

Table 5 presents the results of our univariate analyses for the three measures of performance by examining the subgroups of M&As categorized in terms of above and below the median values of the CEO power index. Using the *t*-test in panel A of Table 5, we test whether M&As with above median values differ from M&As with below median values in terms of BHARs. The results strongly support the notion that increased CEO power leads to poor M&A outcomes. Panel A shows that for both Power1 and Power2, the above median BHARs are significantly lower than the below median BHAR across the 12- and 24-month post-merger periods.

Panel B shows the results of above and below-median ROAs. The results show statistically significant differences in the above and below median values of ROA for the CEO power indexes, Power 1 and Power 2. Power 1 is significant at 1% levels and Power 2 is significant at 5% levels for 12- and 24-months post-merger period.

Table 4 Post-merger performance

Variables	Mean	t-statistic	Min	Max	Median	z-statistic
Panel A						
BHAR (0, +12-months)	-1.41***	-1.89	-3.21	0.95	-0.76***	-1.76
BHAR (0, +24-months)	-1.36***	-1.85	-3.09	0.87	-0.58***	-1.61
Panel B						
ROA (+12-months)	-5.12***	-5.59	-8.34	1.95	-4.86***	-4.98
ROA (+24-months)	-4.86***	-5.12	-8.09	1.55	-3.18***	-5.64
Panel C						
Tobin's Q (+12-months)	-3.24***	-3.41	-6.56	1.75	-3.07***	-3.78
Tobin's Q (+24-months)	-3.16***	-3.37	-6.41	1.72	-2.78*	-1.21

Note: This table shows the average difference in post-merger performance (BHAR, ROA and Tobin's Q) of the sample firms and control firms (controlled by size and B/M ratio). The post-merger performance has been calculated for the time period of 12- and 24-months following M&A completion. The statistical significance of mean performance is calculated using t-test and the statistical significance of median performance is measured by Wilcoxon signed rank test. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

Table 5 Univariate analysis

Panel A	Mean 12-months BHAR < variable median	Mean 12-months BHAR > variable median	t test	Mean 24-months BHAR < variable median	Mean 24-months BHAR > variable median	t test
Power1	-1.16	-2.62	-3.78***	-1.11	-2.57	-3.65***
Power2	-1.03	-2.57	-2.48**	-0.97	-2.47	-2.28**
Panel B	Mean 12-months ROA < variable median	Mean 12-months ROA > variable median	t test	Mean 24-months ROA < variable median	Mean 24-months ROA > variable median	t test
Power1	-2.35	-5.76	-3.89***	-2.28	-5.85	-3.77***
Power2	-2.86	-5.78	-2.63**	-2.76	-5.66	-2.41**
Panel C	Mean 12-months Tobin's Q < variable median	Mean 12-months Tobin's Q > variable median	t test	Mean 24-months Tobin's Q < variable median	Mean 24-months Tobin's Q > variable median	t test
Power1	-1.56	-6.02	-4.35***	-1.78	-5.92	-4.26***
Power2	-2.32	-5.97	-2.94**	-2.53	-5.82	-2.83**

Note: Panels A, B and C report the mean comparison of BHAR, ROA and Tobin's Q respectively by analysing high (above median) versus low (below median) of CEO power indexes, Power 1 and Power 2. ***, ** and * indicate that the mean difference is statistically significant at the 1%, 5%, and 10% levels, respectively

Similar to the results reported in panels A, and B, panel C indicates that the above median subgroup of M&As of both the CEO power measures have a relatively lower Tobin's Q than below median subgroups. For the CEO power index, Power 1, the results are statistically significant at 1%, whereas for Power 2, the results are significant at the 5% level. The results are largely consistent across the 12- and 24-month post-merger periods.

Overall, the univariate results suggest that increased CEO power leads to poor post-merger performance across all three measures: BHAR, ROA, and Tobin's Q. These uni-

variate results are consistent with other studies on CEO power and firm performance (see Veprauskaitė and Adams 2013).

4.5 Regression results and discussion

4.5.1 Effect of CEO power on post-merger performance

Table 6 shows the regression results of the effect of CEO power (Power 1 and Power 2) on various performance measures (i.e., BHAR, ROA, and Tobin's Q). Columns 1 to 6 show the BHAR, ROA, and Tobin's Q results of post-merger performance for 12 and 24 months in relation to Power 1, while columns 7 to 12 report the regression results of post-merger performance with regard to Power 2. Regarding the BHAR results, we find the coefficients for Power 1 and Power 2 to be negative and significant at the 1% and 5% levels for 12-month and 24-month post-merger periods except for the 24-month BHAR with respect to Power 2, which is not statistically significant. Similarly, the results for ROA and Tobin's Q also show that Power 1 and Power 2 have negative coefficients that are significant at 1% and 5% levels across the 12- and 24-month post-merger periods. Our regression analyses using three different performance measures indicate that CEO power leads to poor post-merger performance and supports hypothesis 1a. However, hypothesis 1b is not supported. The findings appear interesting because they suggest that CEO power tends to engender managerial entrenchment and exacerbate agency conflicts, leading to decreased corporate value (see Veprauskaitė and Adams 2013). Thus, our results provide unequivocal support for the pessimistic view of CEO power, indicating that powerful CEOs use M&As as a vehicle to build their empire, thereby negatively affecting strategic decision-making and corporate performance, rather than to gain competitive advantage as suggested by Adams et al. (2005). From a theoretical standpoint, our results suggest that CEO power not only influences corporate investment choices but also heightens the pursuit of personal goals of the CEOs to the detriment of shareholders' value creation through M&A, thereby supporting both upper echelons and agency theories. The findings imply that CEOs hold a prominent structural position in the upper echelons and play a critical role in choosing corporate M&A strategies and their subsequent outcomes.

4.5.2 Moderating role of internal corporate governance mechanisms

The results reported above do not consider that other factors, such as board characteristics, may balance CEO power. However, Jensen and Meckling (1976), and Malmendier and Tate (2005) argue that CEO power leads to investment distortions due to the misalignment of managerial and shareholders' interests and that such distortions may be reduced through effective monitoring. To determine the extent to which CEO power may be constrained by balancing forces of corporate board function, we examine the moderating role of board size, board independence, and board gender diversity as internal corporate governance mechanisms. The interaction effects of CEO power and the three corporate governance variables are reported in Table 7. The coefficients of the interaction terms (i.e., Power 1 x corporate governance variables and Power 2 x corporate governance variables) are negative and statistically significant at 1%, 5%, or 10% levels across all three measures: BHAR, ROA, and Tobin's Q. However, it is important to point out that the negative coefficients of the interac-

tion terms appear lower relative to the coefficients for Power 1 and Power 2, indicating that board size, board independence, and gender diversity reduce the effect of CEO power on post-merger performance. Hypotheses 2a, 2b, and 2c are therefore supported. Overall, the results suggest that board size, the proportion of independent directors, and gender diversity are important for effective board monitoring and tend to balance the adverse effect of CEO power but do not curb it completely. The results on board size reinforce the arguments that larger boards have the resources and expertise for effective monitoring (Fama and Jensen 1983). It also supports the findings by Pugliese et al. (2014) that adverse effects of CEO power could be curbed by effective monitoring in firms with larger boards. These findings support agency theory and highlight the importance of the monitoring and advising role of the board of directors in curtailing CEOs' power. The findings on board independence support the case for the need for independent directors as effective monitors to curb CEO power and reduce contract rigging by powerful CEOs (Adams et al. 2010). This also supports the findings by Duru et al. (2016). The results further indicate that gender diversity should be promoted in the boardroom for social and ethical considerations to alleviate agency costs and improve governance standards. It also supports the findings of past studies that female directors could improve managerial accountability (Adams and Ferreira 2009).

4.6 Robustness tests

4.6.1 Alternative measure of CEO power index

To test the robustness of our indexes, Power 1 and Power 2, obtained from PCA, we have constructed an alternative index of CEO power (denoted by "Alt Power"), taking the eight measures of power discussed earlier. We follow the approach of Mollah and Liljeblom (2016) and create an alternative index by taking the sum of eight categorical variables. The variables consider (i) if there is CEO-Chair duality (ii) if the CEO tenure surpasses median tenure (iii) if the equity-linked compensation as a proportion of the total compensation of the CEO is greater than the median value (iv) if the number of director roles held by the CEO is more than the median value (v) if CEO pay slice exceeds the median CEO pay slice (vi) if the CEO receives bonus pay (vii) if CEO age exceeds median CEO age (viii) if CEO qualification is higher that median CEO qualifications. For each condition, the categorical variable equals one and zero otherwise. The regression results in Table 8 using the alternative CEO power index are consistent with the results reported in Table 6. Taken together, the results confirm our main findings that CEO power tends to affect post-merger performance negatively.

We also examined the effect of the interaction of alternative measures of the CEO power index on corporate governance mechanisms proxied by board independence, board size, and board gender diversity and the results are similar to those reported in Table 7.

4.6.2 Addressing endogeneity concerns

To address endogeneity concerns, we have used two approaches: the Heckman two-stage model to address sample selection bias and propensity score matching (PSM) to address sample selection bias on observable firm characteristics, following Jensen-Vinstrup et al. (2018). In the first approach, as recommended by Heckman (1976; 1979), we estimate the

Table 6 Effect of CEO power on post-merger performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q12	Tobin's Q24	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q12	Tobin's Q24
Constant	-1.31**	-1.21**	-1.79***	-1.42***	-1.69***	-1.62***	-1.25**	-1.25**	-1.84***	-1.75***	-1.56*	-1.53
	(-2.34)	(-2.26)	(-2.82)	(-2.52)	(-2.65)	(-2.53)	(-2.32)	(-2.32)	(-2.83)	(-2.83)	(-1.67)	(-1.47)
Power1	-2.35***	-2.77**	-3.89***	-3.78***	-4.31***	-3.95***						
	(-2.40)	(-2.25)	(-3.96)	(-3.87)	(-4.42)	(-4.09)						
Power2							-1.72***	-1.66	-1.83***	-1.62**	-2.29**	-2.18***
							(-2.79)	(-1.24)	(-2.54)	(-2.13)	(-2.15)	(-2.84)
CEO Founder	0.016*	0.057	0.021**	0.005**	0.035*	0.041*	0.002**	0.061	0.024**	0.013**	0.003**	0.027*
	(1.93)	(1.30)	(2.14)	(2.46)	(1.84)	(1.85)	(2.43)	(1.42)	(2.16)	(2.34)	(2.46)	(1.86)
Board Independence	2.52**	2.41	2.75*	2.62*	4.19***	4.16***	2.46**	2.55***	2.63	2.51	3.86***	4.01***
	(2.27)	(0.88)	(1.68)	(1.85)	(4.35)	(4.27)	(2.14)	(2.88)	(1.59)	(1.44)	(2.71)	(3.15)
Board Size	1.42*	1.24*	1.22	1.14	1.24*	1.32**	2.25***	1.78	2.43***	2.21	1.36	1.54**
	(1.49)	(1.88)	(1.35)	(1.27)	(1.78)	(2.25)	(2.57)	(1.43)	(2.56)	(1.36)	(1.47)	(2.38)
Gender Diversity	1.36*	1.33*	1.67*	1.55*	1.45**	1.32**	2.91***	2.88***	1.57**	1.66***	1.46**	1.32**
	(1.62)	(1.62)	(1.78)	(1.63)	(2.14)	(2.25)	(2.68)	(2.67)	(2.46)	(2.58)	(2.37)	(2.38)
Control Variables												
Deal size	3.24**	3.07**	3.94*	3.75	2.65**	2.26**	2.84**	2.84**	3.66	3.66	2.57**	2.19**
	(2.25)	(2.15)	(1.57)	(1.46)	(2.27)	(2.24)	(2.27)	(2.42)	(1.46)	(1.47)	(2.39)	(2.32)
Method of payment	-2.31***	2.44***	-2.45***	-2.33***	-2.22***	-2.14***	-2.22***	-2.33***	-2.37**	-2.47***	-2.35***	-2.13***
	(-3.53)	(-3.45)	(-3.58)	(-3.49)	(-3.35)	(-3.26)	(-3.34)	(-3.46)	(-2.48)	(-2.50)	(-3.27)	(-3.26)
Deal Attitude	2.39***	2.34***	2.82***	3.10***	3.66***	3.82***	2.95**	2.11***	2.82**	2.16**	1.86	2.12**
	(3.66)	(3.07)	(3.83)	(3.12)	(3.43)	(3.26)	(2.45)	(2.54)	(2.47)	(2.36)	(0.78)	(2.45)
Acquisition Premium	-2.17***	-2.39***	-1.73**	-1.88**	-2.63***	-2.64***	1.06	1.23	-1.72**	-1.77**	-2.61***	-2.74***
	(-3.64)	(-3.67)	(-2.34)	(-2.16)	(-3.77)	(-3.62)	(0.77)	(0.57)	(-2.29)	(-2.15)	(-2.99)	(-3.75)
Relatedness	0.36***	0.26***	0.19***	0.15**	0.36***	0.86**	0.66*	0.76	0.88**	0.94***	0.78**	0.35
	(3.54)	(3.57)	(3.43)	(2.41)	(3.47)	(2.34)	(1.94)	(1.36)	(2.49)	(2.57)	(2.42)	(1.26)
Board Tenure	0.012	0.026	0.024	0.018	0.046**	0.053**	0.003	0.018	0.087**	0.002	0.044**	0.018
	(0.88)	(0.95)	(0.75)	(1.11)	(2.17)	(2.36)	(0.66)	(1.44)	(2.14)	(0.49)	(2.32)	(1.25)

Table 6 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Board Age	-0.019*	-0.025*	0.026	-0.014**	-0.017*	-0.023**	0.016	-0.93*	0.077	-0.006**	-0.65*	-0.051*
	(-1.95)	(-1.77)	(1.15)	(-2.48)	(-1.85)	(-2.34)	(1.14)	(-1.73)	(1.38)	(-2.19)	(-1.83)	(-1.91)
Board Affiliations	1.04	1.15	2.28**	2.16**	2.26**	2.21**	1.12	1.15	2.16**	2.26**	2.17*	2.04*
	(0.87)	(0.92)	(2.33)	(2.25)	(2.27)	(2.36)	(0.88)	(0.97)	(2.14)	(2.19)	(1.95)	(1.95)
Board Education	0.026	0.025	0.058**	0.059*	0.022	0.033**	0.057*	0.023	0.062*	0.026	0.036*	0.054*
	(1.12)	(1.18)	(2.16)	(1.81)	(1.13)	(2.42)	(1.74)	(0.89)	(1.89)	(1.25)	(1.95)	(1.97)
Firm Age	-0.39**	-0.64**	-1.04***	0.77	-0.94*	-0.25***	0.056	-1.36***	-0.55***	-0.69***	-1.04*	-0.83**
	(-2.45)	(-2.31)	(-3.94)	(1.35)	(-1.88)	(-2.81)	(1.15)	(-3.62)	(-4.46)	(-3.47)	(-1.98)	(-2.15)
Firm Size	0.67	0.55	0.83	0.81	0.74	0.53	0.68	0.63	0.78	0.86	0.76	0.67
	(0.77)	(0.59)	(0.96)	(0.87)	(0.86)	(0.66)	(0.75)	(0.73)	(0.91)	(0.88)	(0.82)	(0.74)
Leverage	-2.16**	-1.98**	-2.54*	-2.51*	-2.98*	-2.85*	-2.29**	-1.91**	-2.48*	-2.43*	-2.95	-2.81
	(-2.27)	(-2.02)	(-1.65)	(-1.90)	(-1.61)	(-1.69)	(-2.51)	(-2.15)	(-1.56)	(-1.51)	(-1.31)	(-1.36)
Durbin-Watson stat	2.0031	2.0035	2.0037	2.0042	2.0032	2.0045	1.9952	1.9553	2.0039	2.0043	2.0037	

Note: This table presents the post-merger regression results for 12 months and 24 months BHAR, ROA and Tobin's Q as dependent variables. Panels 1 to 6 present the regression results with respect to Power (1) Panels 7 to 12 present the regression results with respect to Power (2) Standard errors are shown in the parentheses. ***, ** and * indicate statistical significance at 1%, 5%, and 10% levels respectively

Table 7 The moderating effect of corporate governance mechanisms: board independence, board size, and board gender diversity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q12	Tobin's Q24	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q12	Tobin's Q24
Constant	-1.31**	-1.30**	-1.77***	-1.48**	-1.65***	-1.59***	-1.17**	-1.26**	-1.77***	-1.67***	-1.49*	-1.45
	(-2.36)	(-2.26)	(-2.76)	(-2.59)	(-2.59)	(-2.64)	(-2.24)	(-2.34)	(-2.84)	(-2.76)	(-1.65)	(-1.48)
Power1	-2.35**	-2.76***	-3.83***	-3.67***	-4.28***	-4.09***						
	(-2.36)	(-2.84)	(-3.96)	(-3.65)	(-4.37)	(-3.88)						
Power2							-2.75**	-2.61	-1.82**	-1.59**	-2.24***	-2.16**
							(-2.29)	(-1.18)	(-2.47)	(-2.43)	(-2.52)	(-2.34)
CEO Founder	0.013*	0.054	0.025**	0.007**	0.037*	0.044*	0.003**	0.064	0.024**	0.013**	0.003**	0.027*
	(1.91)	(1.27)	(2.16)	(2.48)	(1.83)	(1.87)	(2.46)	(1.40)	(2.16)	(2.34)	(2.46)	(1.86)
Board Independence	2.53**	2.36	2.65	2.45	4.25***	4.08***	2.43**	2.38***	2.59*	2.52	3.88***	4.09**
	(2.24)	(1.15)	(1.51)	(1.38)	(4.48)	(4.16)	(2.11)	(2.89)	(1.67)	(1.33)	(2.75)	(3.25)
Board Size	1.46	1.19	1.27	1.25	1.32	1.26**	2.16***	1.71	2.31***	2.12	1.42	1.62**
	(1.48)	(1.24)	(1.44)	(1.36)	(1.44)	(2.49)	(2.51)	(1.34)	(2.55)	(1.27)	(1.55)	(2.47)
Gender Diversity	1.36*	1.38	1.66*	1.59*	1.45***	1.32**	2.88***	2.77***	1.51**	1.56**	1.44**	1.19**
	(1.52)	(1.42)	(1.79)	(1.65)	(2.57)	(2.46)	(2.60)	(2.56)	(2.37)	(2.44)	(2.37)	(2.22)
Power1*Board Independence	-1.24**	-1.19	-1.22***	-1.24***	-1.19***	-1.11***						
	(-2.37)	(-1.45)	(-2.58)	(-2.58)	(-2.66)	(-2.65)						
Power1*Board Size	-1.22**	-1.20**	-1.16	-1.22*	-1.15	-1.17*						
	(-2.36)	(-2.28)	(-1.47)	(-1.56)	(-1.38)	(-1.64)						
Power1*Gender Diversity	-0.96**	-0.98***	-1.06***	-0.99**	-0.89**	-1.04**						
	(-2.31)	(-2.76)	(-2.88)	(-2.26)	(-2.36)	(-2.36)						
Power2*Board Independence							-1.15**	-1.05**	-1.14**	-1.22*	-1.18*	-1.04**
							(-2.26)	(-2.22)	(-2.44)	(-1.69)	(-1.74)	(-2.26)
Power2*Board Size							-1.24**	-1.16***	-1.17***	-1.13	-1.12**	-1.11
							(-2.32)	(-2.78)	(-2.94)	(-1.41)	(-2.40)	(-1.42)
Power2*Gender Diversity							-1.03**	-0.96**	-1.01**	-0.99***	-1.09**	-1.08***
							(-2.36)	(-2.28)	(-2.45)	(-2.68)	(-2.46)	(-2.75)
Control Variables												

Table 7 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Deal size	3.18**	3.16**	3.78*	3.76	2.61**	2.22**	2.67**	2.87**	3.65	3.63	2.58**	2.16**
	(2.35)	(2.29)	(1.72)	(0.84)	(2.37)	(2.33)	(2.24)	(2.31)	(1.49)	(1.44)	(2.34)	(2.29)
Method of payment	-2.38***	-2.21***	-2.39***	-2.48***	-2.23***	-2.09***	-2.20***	-2.35***	-2.42**	-2.39**	-2.32***	-2.11***
	(-2.64)	(-3.37)	(-3.53)	(-3.51)	(-3.26)	(-3.26)	(-3.33)	(-3.48)	(-2.47)	(-2.45)	(-3.28)	(-3.14)
Deal Attitude	3.26**	3.13**	3.89	3.75	2.67**	2.25**	2.84**	2.79**	3.64	3.68	2.53**	2.21**
	(2.24)	(2.16)	(1.55)	(1.45)	(2.25)	(2.24)	(2.31)	(2.45)	(1.48)	(1.42)	(2.36)	(2.33)
Acquisition Premium	-2.33***	-2.45***	-2.46***	-2.33***	-2.24***	-2.10***	-2.27***	-2.36***	-2.37**	-2.49***	-2.35***	-2.14***
	(-3.56)	(-3.44)	(-3.57)	(-3.52)	(-3.36)	(-3.25)	(-3.40)	(-3.43)	(-2.43)	(-2.52)	(-3.24)	(-3.23)
Relatedness	2.42***	2.31***	2.83***	3.14***	3.65***	3.77***	2.98**	2.17***	2.84**	2.15**	1.96	2.16**
	(3.65)	(3.04)	(3.85)	(3.24)	(3.43)	(3.21)	(2.42)	(2.59)	(2.45)	(2.37)	(0.74)	(2.47)
Board Tenure	2.14***	2.35***	1.75**	1.78**	2.66***	2.74***	1.12	1.19	1.67**	1.85**	2.53***	2.71***
	(3.65)	(3.64)	(2.31)	(2.13)	(3.75)	(3.68)	(0.77)	(0.57)	(2.29)	(2.13)	(2.96)	(3.73)
Board Age	0.36***	0.31***	0.18***	0.16**	0.41***	0.85**	0.65*	0.79	0.91**	0.94***	0.82**	0.26
	(3.58)	(3.57)	(3.38)	(2.47)	(3.48)	(2.32)	(1.96)	(1.37)	(2.46)	(2.55)	(2.44)	(1.21)
Board Affiliations	0.009	0.023	0.027	0.012	0.045**	0.053**	0.017	0.015	0.083**	0.011	0.042**	0.011
	(0.82)	(0.98)	(0.76)	(1.07)	(2.16)	(2.36)	(0.59)	(1.44)	(2.12)	(0.53)	(2.31)	(1.17)
Board Education	-0.017*	-0.024*	0.024	-0.016**	-0.016*	-0.026**	0.015	-0.98*	0.075	-0.015**	-0.56*	-0.055*
	(-1.95)	(-1.78)	(1.15)	(-2.49)	(-1.82)	(-2.35)	(1.14)	(-1.75)	(1.34)	(-2.29)	(-1.82)	(-1.89)
Firm Age	1.04	1.15	2.27**	2.13**	2.28**	2.21**	1.02	1.19	2.21**	2.29**	2.12*	2.09*
	(0.86)	(0.96)	(2.34)	(2.26)	(2.25)	(2.32)	(0.86)	(0.96)	(2.13)	(2.16)	(1.96)	(1.94)
Firm Size	0.026	0.025	0.058**	0.062*	0.024	0.029**	0.059*	0.018	0.064*	0.031	0.032*	0.048*
	(1.17)	(1.16)	(2.21)	(1.84)	(1.18)	(2.44)	(1.75)	(0.84)	(1.86)	(1.19)	(1.95)	(1.91)
Leverage	-0.43**	-0.71**	-1.06***	0.78	-0.94*	-0.25***	0.052	-1.36***	-0.59***	-0.71***	-1.04*	-0.84**
	(-2.42)	(-2.35)	(-3.99)	(1.35)	(-1.84)	(-2.82)	(1.18)	(-3.58)	(-4.43)	(-3.49)	(-1.92)	(-2.16)
Durbin-Watson stat	2.0042	2.0037	2.0031	2.0002	2.0045	2.0036	2.0037	2.0028	2.0041	2.0026	2.0038	

Note: This table shows the effect of the interaction of Power 1 and Power 2 with board size, board independence and gender diversity on post-merger performance. Standard errors are shown in the parentheses. ***, ** and * indicate statistical significance at 1%, 5%, and 10% levels respectively

Table 8 Robustness test: alternative measure of CEO power index

Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24
Constant	-1.11*	-0.96	-1.18*	-1.25	-1.17*	-1.26*
	(-1.77)	(-0.85)	(-1.52)	(-0.72)	(-1.73)	(-1.68)
Alt Power	-1.42**	-1.56**	-1.67***	-1.75**	-2.16***	-1.78**
	(-2.26)	(-2.32)	(-3.32)	(-2.38)	(-3.14)	(-2.31)
CEO Founder	0.017*	0.052	0.032**	0.011**	0.034*	0.039*
	(1.87)	(1.24)	(2.18)	(2.53)	(1.78)	(1.92)
Board Independence	1.74***	1.87***	2.20*	2.18	1.99*	2.16*
	(2.62)	(2.78)	(1.81)	(0.84)	(1.75)	(1.89)
Board Size	2.15	2.24	1.24*	1.34*	2.52*	2.24***
	(1.36)	(1.32)	(1.73)	(1.72)	(1.73)	(2.54)
Gender Diversity	1.77***	1.64*	1.76**	2.01***	2.24**	1.62**
	(2.94)	(1.75)	(2.45)	(2.93)	(2.46)	(2.27)
Control Variables						
Deal size	2.74	2.66	2.32	2.48	1.65*	1.99**
	(1.08)	(0.96)	(1.17)	(1.18)	(1.79)	(2.44)
Method of payment	-1.51**	-1.63	-1.74*	-1.60**	-1.92*	-2.29***
	(-1.95)	(-1.24)	(-1.68)	(-2.34)	(-1.83)	(-2.55)
Deal Attitude	3.24**	2.64**	2.31*	3.56*	2.17	1.76**
	(2.23)	(2.36)	(1.83)	(1.84)	(1.24)	(2.31)
Acquisition Premium	-2.37***	-2.34***	-2.45***	-1.96***	-1.75***	-1.84**
	(-2.86)	(-2.49)	(-3.48)	(-2.68)	(-2.64)	(-2.37)
Relatedness	2.33***	2.26***	1.69***	1.92***	1.85***	1.65**
	(2.74)	(2.91)	(2.64)	(3.68)	(2.98)	(2.17)
Board Tenure	2.31***	2.16***	1.68**	2.31**	2.47***	2.55***
	(2.58)	(2.70)	(2.24)	(2.44)	(2.78)	(2.81)
Board Age	1.25**	1.26***	1.04**	1.25**	1.17***	1.68*
	(2.04)	(2.74)	(2.43)	(2.34)	(2.89)	(2.09)
Board Affiliations	1.06*	1.34*	0.81	2.14**	1.61**	1.49*
	(1.90)	(1.76)	(0.68)	(2.26)	(2.26)	(1.97)
Board Education	-0.042*	-0.034**	-1.19**	-1.83***	-1.77**	-1.14**
	(-1.86)	(-2.12)	(-2.30)	(-3.62)	(-2.49)	(-2.18)
Firm Age	1.64*	1.64**	1.75**	1.97	1.74**	1.96**
	(1.72)	(2.07)	(2.27)	(1.08)	(2.05)	(2.36)
Firm Size	0.87	0.79**	0.64	1.01	1.28	1.37
	(0.90)	(2.05)	(0.79)	(0.97)	(1.22)	(1.18)
Leverage	1.65	1.67	-1.88*	1.58***	-2.34***	-2.42*
	(1.17)	(1.28)	(-1.76)	(-2.69)	(-2.67)	(-1.75)
Durbin-Watson stat	2.0027	2.0038	2.0009	2.0008	2.0021	2.0035

Note: This Table shows the regression results with respect to alternative measure of CEO power. Standard errors are shown in the parentheses. ***, ** and * indicate statistical significance at 1%, 5%, and 10% levels respectively

probability of firms' acquisition decision based on firm size, book-to-market ratio, leverage, and method of payment to obtain the fitted value which is the Inverse Mill's ratio (Lambda). We use this Lambda to conduct the second stage regression where the dependent, independent, and control variables are the same as in our original regression model shown in Table 6. The results are shown in columns 1 to 6 and 8 to 13 of Table 9.

Table 9 Endogeneity test: Heckman sample selection model and propensity score matching (PSM)

	Heckman	Heckman	Heckman	Heckman	Heckman	Heck-man	PSM	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	PSM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12
Constant	-1.31***	-1.14**	-1.81***	-1.58***	-1.77***	-1.58**	-2.36*	-1.34**	-1.32**	-1.79***	-1.64***	-1.73*	-1.45	-2.37
	(-2.55)	(-2.08)	(-2.88)	(-2.97)	(-2.82)	(-2.47)	(-1.83)	(-2.42)	(-2.41)	(-2.82)	(-2.73)	(-1.79)	(-1.19)	(-1.11)
Power1	-2.25***	-2.73***	-3.85***	-3.69***	-4.52***	-4.21***	-1.82**							
	(-2.76)	(-2.75)	(-3.94)	(-3.54)	(-4.49)	(-3.86)	(-2.38)							
Power2								-1.64**	-1.81	-1.86***	-1.67**	-2.18**	-2.33***	-2.52**
								(-2.29)	(-1.36)	(-2.51)	(-2.53)	(-2.43)	(-2.52)	(-2.46)
CEO Founder	0.007*	0.056	0.038**	0.027**	0.036*	0.048*	0.018**	0.016*	0.054	0.023**	0.009**	0.025*	0.053*	0.43*
	(1.72)	(1.33)	(2.25)	(2.64)	(1.79)	(1.93)	(2.15)	(1.84)	(1.32)	(2.09)	(2.52)	(1.69)	(1.96)	(1.76)
Board Independence	2.37**	2.52	2.72*	2.68**	4.36***	3.84***	1.95*	2.71**	2.49***	2.73*	2.59*	3.89***	3.79***	3.28*
	(2.48)	(1.39)	(1.95)	(1.97)	(4.55)	(3.92)	(1.87)	(2.26)	(2.98)	(1.87)	(1.72)	(2.77)	(3.18)	(1.97)
Board Size	1.41**	1.33	1.34*	1.22*	1.48*	1.38***	2.23	2.38**	1.69**	2.42***	2.23*	1.49*	1.41**	1.65*
	(2.47)	(1.38)	(1.86)	(1.97)	(1.89)	(2.56)	(1.05)	(2.51)	(2.31)	(2.71)	(1.88)	(1.72)	(2.35)	(1.97)
Gender Diversity	1.15**	1.35*	1.65*	1.46*	1.38**	1.67***	1.62	2.76***	2.76***	1.65*	1.63**	1.53***	1.45**	1.66
	(1.98)	(1.94)	(1.96)	(1.71)	(2.41)	(2.72)	(1.58)	(2.45)	(2.59)	(1.94)	(2.55)	(3.49)	(2.48)	(1.03)
Power1*Board Independence	-1.26**	-1.12*	-1.38***	-1.19**	-1.36***	-1.27***	-1.04*							
	(-2.37)	(-1.68)	(-2.79)	(-2.47)	(-2.87)	(-2.83)	(-1.72)							
Power1*Board Size	-1.22*	-1.27**	-1.27*	-1.43*	-1.26*	-1.37*	-1.34							
	(-1.43)	(-2.41)	(-1.86)	(-1.84)	(-1.83)	(-1.96)	(1.49)							

Table 9 (continued)

	Heckman	Heckman	Heckman	Heckman	Heckman	Heck-man	PSM	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	PSM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12
Power1*Gender Diversity	-0.91	-1.87**	-1.03***	-1.23**	-1.29***	-1.17***	-1.42**							
	(-0.97)	(-2.21)	(-2.72)	(-2.47)	(-2.61)	(-3.45)	(-2.14)							
Power2*Board Independence								-1.06**	-1.16**	-1.27**	-1.13*	-1.23**	-1.25**	-1.25*
								(-2.33)	(-2.28)	(-2.53)	(-1.69)	(-2.48)	(-2.43)	(-1.98)
Power2*Board Size								-1.18***	-1.22***	-1.18**	-1.25*	-1.21*	-1.17**	-1.08*
								(-3.27)	(-3.34)	(-2.42)	(-1.92)	(-1.92)	(-2.38)	(-1.73)
Power2*Gender Diversity								-1.05***	-0.88*	-1.11**	-1.19**	-1.19***	-1.24**	-0.98*
								(-2.55)	(-1.69)	(-2.48)	(2.38)	(-2.57)	(-2.56)	(-1.96)
Lambda	-0.094*	-0.096	0.27	-0.08*	-0.019	-0.109**		-0.127	-0.21	-0.108	-0.19	-0.019*	0.17	
	(-1.71)	(-1.27)	(0.65)	(-1.69)	(0.64)	(-2.44)		(-1.45)	(-1.04)	(-1.12)	(-0.75)	(-1.83)	(0.68)	
Deal size	2.88	3.13	3.77*	3.92	2.45**	2.48**	2.11**	2.73**	2.87**	3.64**	3.69*	2.61**	2.32**	2.68***
	(1.15)	(1.19)	(1.91)	(0.98)	(2.22)	(2.37)	(-2.07)	(2.21)	(2.39)	(2.49)	(1.92)	(2.42)	(2.41)	(2.64)
Method of payment	-2.13*	-2.46**	-2.46***	-2.46***	-2.27	-1.86	-2.48**	-2.37	-2.41	-2.44	-2.48**	-2.08	-2.13	-1.87*
	(-1.76)	(-2.03)	(-2.55)	(-2.66)	(-0.96)	(-0.77)	(-2.37)	(-1.41)	(-1.46)	(-1.23)	(-1.99)	(-0.76)	(-0.91)	(-1.75)
Deal Attitude	3.13**	2.56**	1.76*	3.37*	2.53*	1.75**	2.51**	2.35**	2.12***	2.31***	2.17	1.75	1.12*	1.73**
	(2.24)	(2.48)	(1.85)	(1.69)	(1.71)	(2.46)	(2.26)	(2.14)	(2.58)	(3.28)	(1.25)	(1.31)	(1.87)	(2.39)
Acquisition Premium	-2.26***	-1.59	-2.69**	-2.52***	-1.56***	-1.84**	-2.78**	-2.68**	-2.12***	-2.24**	-2.64**	-2.07	-1.59**	-2.42**
	(-2.77)	(-1.52)	(-2.07)	(-2.87)	(-2.61)	(-2.07)	(-2.32)	(-2.19)	(-3.11)	(-2.42)	(-2.33)	(-1.52)	(-2.08)	(-2.31)

Table 9 (continued)

	Heckman	Heckman	Heckman	Heckman	Heckman	Heck-man	PSM	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	PSM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12
Relatedness	2.22***	2.64***	1.75***	2.14***	2.29***	0.91	2.07***	0.45	2.27***	1.98***	2.38**	1.83	1.26	1.24***
	(2.69)	(3.12)	(2.84)	(3.27)	(2.62)	(1.24)	(2.54)	(1.12)	(3.79)	(2.81)	(2.51)	(1.68)	(1.49)	(3.91)
Board Tenure	2.35***	3.52**	0.63**	1.73**	2.68**	0.61*	1.14	1.71***	2.22**	1.16**	2.68**	2.47**	1.33*	-1.77***
	(2.63)	(2.38)	(2.32)	(2.48)	(2.27)	(1.59)	(0.67)	(2.77)	(2.14)	(2.28)	(2.19)	(2.42)	(1.87)	(-3.49)
Board Age	1.49**	2.26***	1.26**	1.17***	2.46***	1.83*	2.21*	2.13**	1.81*	1.09	1.26***	1.69***	2.42***	1.82**
	(2.28)	(2.91)	(2.29)	(2.55)	(2.75)	(1.69)	(1.95)	(2.25)	(1.73)	(1.38)	(2.69)	(2.62)	(3.71)	(2.49)
Board Affiliations	2.09*	1.51*	1.34***	2.25**	2.15*	1.97**	2.27**	2.24	2.76**	0.93*	0.83	2.34*	2.12***	3.67***
	(2.10)	(1.78)	(2.96)	(2.15)	(1.78)	(2.21)	(2.31)	(1.18)	(2.11)	(1.86)	(1.58)	(1.98)	(3.41)	(2.69)
Board Education	-0.029*	-0.025**	-1.86**	-1.88***	-2.29***	-0.78	-1.18**	-0.065	-0.006**	-2.07**	-2.45***	-1.57***	-1.59*	-2.81**
	(-1.93)	(-2.45)	(-2.12)	(-3.37)	(-3.11)	(-1.16)	(-2.23)	(-1.17)	(-2.09)	(-2.42)	(-3.13)	(-2.78)	(-1.98)	(-1.67)
Firm Age	2.13	2.33**	2.49***	2.07	1.86**	2.94**	2.62***	2.49*	2.32*	1.94**	1.48	1.83**	1.86**	1.63
	(1.22)	(2.19)	(2.57)	(1.44)	(2.02)	(2.57)	(2.78)	(1.87)	(1.95)	(2.42)	(1.39)	(2.14)	(2.31)	(0.94)
Firm Size	0.42	0.62	0.96	0.77	0.75	0.95	1.27	0.69	0.69	0.84	0.97	0.73	0.67	1.17
	(0.83)	(0.73)	(1.10)	(0.82)	(0.86)	(0.88)	(1.14)	(0.86)	(0.82)	(0.96)	(1.21)	(0.79)	(0.63)	0.98
Leverage	-2.18	-1.99	-2.53*	-2.79*	-2.83*	-2.97*	-2.72***	-2.12	-1.83**	-2.48*	-2.52*	-2.59	-2.82**	-2.52**
	(-1.24)	(-1.17)	(-1.65)	(-1.93)	(-1.67)	(-1.81)	(-2.58)	(-1.09)	(-2.02)	(-1.69)	(-1.84)	(-1.13)	(-2.04)	(-2.46)
R square	0.63	0.58	0.69	0.53	0.74	0.86	0.73	0.71	0.68	0.81	0.71	0.74	0.72	0.65

Table 9 (continued)

	Heckman	Heckman	Heckman	Heckman	Heckman	Heck-man	PSM	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	Heck-man	PSM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dependent Variables	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12	BHAR 12	BHAR 24	ROA 12	ROA 24	Tobin's Q 12	Tobin's Q 24	BHAR 12
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results of the Heckman two-stage regression where the dependent variables are post-merger BHARs, ROAs and Tobin's Q and the inverse Mills ratio adjusted for potential sample-selection bias. Columns 7 and 14 show the robustness of the results with respect to propensity score matched 12-month BHAR. Standard errors are shown in the parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels respectively

In the second approach, we undertake a propensity score matching technique, where we first analyse the logit regression that estimates the probability of a firm undertaking an acquisition.

$$p(x) = \beta_0 + \beta_1 Momentum + \beta_2 Size + \beta_3 M/B + \beta_4 D/E + \varepsilon_i \quad (9)$$

In Eq. 9, $p(x)$ is a dummy variable that takes a value of 1 if the firm has undertaken M&A and 0 otherwise. Using the coefficients of the logit regression and the nominal values of the independent variable in Eq. 9, we calculate the propensity scores. For each firm in the sample we choose the control firm with the nearest propensity score to obtain the 12-months and 24-months BHAR. The regression results with PSM-matched BHAR are shown in columns 7 and 14 of Table 9. The results are consistent with the regression results in Table 6.

4.6.3 Granger causality

We used the following equation to analyse the causal relationship between CEO power and post-merger performance measured by BHAR, ROA, and Tobin's Q. We test both directions of causality, first from $Power_i$ to $Performance_i$, then from $Performance_i$ to $Power_i$.

$$Performance_i = \alpha + \beta_{1i} Power_i \quad (10)$$

The results of the Granger causality test are shown in Appendix 1. In the first column the Z statistics are significant for $Power_i$ to $Performance_i$ for all the three measures of performance, while in the second column the Z statistics for $Performance_i$ to $Power_i$ are not statistically significant.

5 Implications and conclusion

5.1 Discussion and theoretical implications

Drawing from two theoretical perspectives—namely, upper echelons theory and agency theory—this study examines the effects of CEO power and the moderating role of corporate governance mechanisms on M&A performance. Using PCA to create two proxies for CEO power from eight different sources of CEO power, we show that CEO power is negatively associated with post-merger market- and accounting-based performance measures. The finding that CEO power is negatively related to post-merger performance suggest that powerful CEOs are critical determinants of corporate investment choices and strongly influence the economic outcomes of these investments, thereby supporting the predictions of upper echelons theory. More specifically, we demonstrate that CEO power constitutes one of the key determinants influencing a firm's strategic choices and explaining poor M&A performance. Thus, exercising power may make it difficult for a powerful CEO to take the point of view of other senior managers, thereby negatively affecting M&A performance. We also find that board size, board independence, and board gender diversity positively moderate the link between CEO power and M&A performance, rendering some support to the study of Duru et al. (2016) and Adams and Ferreira (2009). The findings support agency theory,

suggesting that powerful CEOs are opportunistic and may pursue investment strategies to promote their self-interest and build their empires through M&A at the expense of shareholder value unless monitored (Jensen and Meckling 1976). Thus, the findings of this study highlight the combined effects of the interaction between internal corporate governance mechanisms and CEO power in reducing the deleterious effects of CEO power on M&A performance. Our results support the view that boards are effective monitors and tend to play a critical role in curbing the excessive power of CEOs, as suggested by agency scholars (Duru et al. 2016). Taken together, our study advances theory by combining upper echelons and agency theories to explain the effects of CEO power in risky investment decisions, offering evidence consistent with our theorizing that CEO power matters for firm performance. We, therefore, suggest that using only upper echelons theory to explain corporate investment choices and economic outcomes may not provide a full understanding and that a multi-theoretical approach involving both upper echelons and agency theories provides a more comprehensive understanding of how CEO power affects risky investment choices and subsequent performance.

5.2 Managerial implications

Our findings that board size, board independence, and board gender diversity positively moderate the relationship between CEO power on post-merger performance have important practical implications both for senior managers and regulators. These findings suggest that while CEO power unequivocally leads to higher risk-taking in investments and poor financial performance for acquirers, the effects of CEO power may still be somewhat constrained by strong internal corporate governance: namely board size, board independence, and board gender diversity. Our results imply that board independence is vital for reducing agency costs and improving board monitoring. Hence, policymakers should focus on building strong corporate governance mechanisms like increasing independent directors on boards and providing incentive contracts in terms of performance-based pay. Moreover, the findings of this study also imply that larger boards tend to bring greater knowledge, skills, and expertise to curb CEO power through an effective monitoring of acquisition investments. Thus, the adverse effects of CEO power on firm risk-taking and performance are reduced, thereby alleviating the agency costs associated with powerful CEOs. Our results also reinforce the debate of promoting gender diversity in the boardroom as this could be an important tool for board monitoring and efficiency. Overall, these results imply that increasing board gender diversity and board size could also help address agency issues as collective skills and group views of a diverse board are likely to improve firm governance and performance. Hence, firms hiring powerful CEOs should ensure an effective governance mechanism to channel CEO power toward positive outcomes.

5.3 Limitations and agenda for future research

Despite the significant contribution of this study, its limitations should be explicitly acknowledged. One limitation of this research is that it focuses only on the UK data. In terms of generalisability of the findings, we contend that while the UK is comparable to other developed economies, the results may not be applicable in the context of developing countries due to the differences in regulations and business environment. Therefore, we sug-

gest that future research could explore the effects of CEO on M&A performance in a cross-country context, covering both developed and developing countries. Whilst it is argued that CEO cultural traits can play an important role in the power dynamics of a CEO (Nguyen et al. 2018), due to incomplete data regarding the cultural traits of CEOs in our sample, our study did not explore this aspect of CEO traits. However, we suggest that future research on M&As involving cross-country/cultures should incorporate this important characteristic as one of the CEOs power dimensions. Another limitation of our study is related to the channels through which CEO power influences M&A performance. The channels through which CEO power affects performance are of great importance to senior managers, and further study should explore channels such as information asymmetry and appointment and selection of the board of directors. This study focused on the moderating role of selected internal corporate governance mechanisms in curbing the effects of CEO power on performance. We suggest that future studies should also look at the effects of external corporate governance mechanisms, such as institutional investors, external auditors, and analyst coverage, in curbing the impact of CEO power on acquisition performance. Lastly, future research could also incorporate other board attributes like board demographic diversity in terms of ethnicity, and whether that could moderate the CEO power-post merger relationship.

Appendix 1

Granger Causality Test

	Performance	*Power*$_i$ to *Performance*$_i$	*Performance*$_i$Performance$_i$ to *Power*$_i$
Chi-square	BHAR	2.216** (0.024)	0.143 (0.836)
Chi-square	ROA	1.793**(0.036)	0.218 (0.854)
Chi-square	Tobin's Q	2.119***(0.007)	0.324 (0.912)

Appendix 2

Variance Inflation Factor

Variables	VIF
Power1	1.65
Power2	1.03
CEO Founder	1.41
Board Independence	1.87
Board Size	1.65
Gender Diversity	1.09
Deal size	1.19
Method of payment	1.52
Deal Attitude	1.27
Acquisition Premium	1.43
Relatedness	1.34
Board Tenure	1.49
Board Age	1.42

Variables	VIF
Board Affiliations	1.16
Board Education	1.63
Firm Age	1.98
Firm Size	1.87
Leverage	1.74

Declarations

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

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