The moderating effects of corporate governance and investment efficiency on the nexus between financial flexibility and firm performance

Abstract

Purpose: Financial flexibility, investment efficiency and effective corporate governance mechanisms have been issues of concern to stakeholders. Yet, little empirical evidence on the combined moderating effects investment efficiency and corporate governance mechanisms on the nexus between financial flexibility and firm performance. This study attempts to address this gap and extend the extant literature by examining the moderating effects of corporate governance and investment efficiency on the nexus between financial flexibility and financial performance.

Design/methodology/ approach: Our analysis is based on a sample of 13,865 US-listed firms selected from BoardEx (WRDS) for the period (2010-2022) with 89,198 firm-year observations.

Findings: We find that financial flexibility improves firm value as well as accounting performance. Further, the results reveal that both investment efficiency and corporate governance moderate the effect of financial flexibility on firm performance.

Research limitations: Key limitations of this study refer to the characteristics of the sample selection; country specific context, proxies utilised by this study

Originality: We complement and extend the literature on the optimal investment strategies domain by showing that the combined impact of corporate governance mechanisms and investment efficiency strengthens the nexus between financial flexibility and firm performance.

Theoretical and managerial implications: Findings of this study have managerial and theoretical implications for firms' boardrooms, institutional and individual investors, regulators, academics and other stakeholders regarding behavioural aspects of investment decision-making.

Keywords: Financial flexibility, Investment efficiency, Corporate governance, Firm performance

Paper type: Research paper

1. Introduction

Investment efficiency and effective corporate governance mechanisms have been issues of concern to stakeholders including shareholders. Corporate governance mechanisms play a significant role in boardrooms' accountability and legitimacy (Al-ahdal et al., 2020). There is an increasing demand from stakeholders for firms' boardrooms to demonstrate responsibility and accountability for maintaining effective governance mechanisms regarding steering and leading organisational resources. Boardrooms commitment to effective governance mechanisms has been pushed to the forefront of strategic investment decision-making. The relationship between corporate governance mechanisms and firms' performance has been examined in different contexts and settings. Though, the extant literature reveals various perspectives on the relationship between corporate governance mechanisms and firms' performance (Abdoush et al., 2022; Alkaraan et al., 2022; Albitar et al., 2022; Hussainey et al., 2022, Alkaraan et al., 2023, a&b).

Strategic investment behaviours have a significant impact on firms long-term performance (see Alkaraan and Northcott, 2006; Northcott and Alkaraan, 2007; Adel and Alkaraan, 2019; Alkaraan, 2020). Financial flexibility is a key driver of resource allocation strategy (Oded, 2020), a

mirror of the company's financial health. Therefore, maintaining financial flexibility and investment efficiency remains a matter of concern in firms' boardrooms (Garmaise and Natividad, 2021). Financial flexibility enables boardrooms to mitigate the investment crowding out effect by mitigating financing constraints and responding rapidly to negative shocks that may arise from cash flow management such as the COVID-19 pandemic (Mahmood et., 2021; Chao and Huang, 2022). Financial flexibility is an effective policy adopted by firms to respond proactively to future investment opportunities or to mitigate the shortfall of cash flows when firms face investment shocks such as crises including the financial crisis and COVID-19 pandemic. There is a need for financial flexibility particularly when firms face contingencies including a shortfall of cash flows and investment shock (Byoun, 2021). Investment efficiency signals how well firms invest in their assets. Though, institutional investors play an effective role in firms' strategic choices. The study of Moradi et al. (2022) reveals that institutional owners have a positive impact on investment efficiency and mitigate the problem associated with investment inefficiency, under-investment or over-investment problems. Based on a sample selected from the Tehran Stock exchange, Salehi et al., (2022) explored the influence of investment efficiency on firm value with the moderating impact of institutional ownership and board independence. Results on their study indicate the moderating impact of institutional ownership and board impendence on the relationship between investment efficiency and firm value (using Tobin's Q measure). The relationship between investment efficiency, financial flexibility, investment scale and earning quality and firms' performance are widely evidenced in the literature (Ma and Jin, 2016; Raza et al, 2021; Tahat et al., 2021; Chao and Huang, 2022).

Yet, there is little empirical evidence regarding the combined impact of investment efficiency and corporate governance mechanisms on the relationship between financial flexibility and firms' performance. This study empirically examines the combined impact of investment efficiency and corporate governance mechanisms on the relationship between financial flexibility and firms' performance. The research question underlying this study:

RQ- What is the influence of the combined impact of investment efficiency and corporate governance mechanisms on the nexus between financial flexibility and firms' performance?

To answer the above research question, we use a sample of 13,865 US listed firms selected from BoardEx (WRDS) for the period (2010 - 2022) with a total of 89,198 firm-year observations. We examine the influence of corporate governance mechanisms on investment efficiency. Further, we examine the combined impact examine of investment efficiency and corporate governance mechanisms on nexus between financial flexibility and firms' performance. Findings of this study reveal that investment efficiency is positively associated with corporate governance mechanisms. We find positive relationship between the combined impact of investment efficiency and corporate governance mechanisms and nexus between investment efficiency and firms' performance. We argue that firms' performance are the outcomes of financial flexibility, investment efficiency and corporate governance mechanisms. Corporate governance mechanisms strengthen the nexus between financial flexibility, investment efficiency and firms' performance. The results of regression analysis models are robust to alternative measures for the main proxies examines by this study. Results of this study have managerial and theoretical implications for firms' boardrooms, institutional and individual investors, regulators, academics, and other stakeholders regarding behavioural aspects of investment decision-making.

This study contributes to the extant literature in several ways. First, to the best of our knowledge, this study is the first to examine the combined impact of investment efficiency and corporate governance mechanisms on nexus between investment efficiency and firms' performance.

The relationship between corporate governance mechanisms and firms' performance has been examined in different contexts and settings. The extant literature reveals various perspectives on the relationship between corporate governance mechanisms and firms' performance (Abdoush et

al., 2022; Amin et al, 2022; Alkaraan et al., 2022; Boulhaga et al., 2022; Albitar et al., 2022; Hussainey et al., 2022; Alkaraan 2023).

Second, we develop proxies for financial flexibility and investment efficiency based on the literate. Third, findings of this study reveal that firms' performance are the outcomes of financial flexibility, investment efficiency, and corporate governance mechanisms. Our results contribute to the literature and show that financial flexibility, investment efficiency and corporate governance mechanisms drive firms' performance. Further, corporate governance mechanisms have moderating effect on the relationship between financial flexibility, investment efficiency and firm' performance.

The remainder of the paper is structured as follows. Section 2 outlines literature and hypotheses development. Section 3 describes the research methodology employed by this study. Section 4 presents the results of the data analysis and discussion and is followed by conclusion in section 5

2. Conceptual framework and hypothesis development

2.1   *Financial flexibility, investment efficiency and financial performance*

Researchers adopted various theories (agency theory-resource based theory legitimacy theory and stakeholders' theory to examine the relationship between financial flexibility, investment efficiency and firms' performance. The reduction in agency problems due to strong corporate governance attributes and the alleviation of financial constraints (see Richardson, 2006; Campello et al., 2010) are related with more efficient investments (Rajkovik, 2020). From the agency theory lens, independent monitoring is crucial as CEO power leads to increase agency costs, thus independent oversight is instrumental for firms.

According to Modigliani and Miller (1963), a conservative leverage policy may be adopted by firms to maintain "substantial reserves of untapped borrowing power", which allow them to raise external funds. Financial flexibility can be viewed as firms accessing external financing at a low cost. Gamba and Triantis (2008) argued that firms facing contingencies should borrow and lend. Their study examines the influence of financial flexibility on firm value. They argued that the value of flexible financing depends on the cost of external financing, the level of the corporate tax rate that indicates the appropriate cost of cash holding, reversibility of capital and firms' growth potential.

Financial flexibility can be determined by leverage and cash holdings. Firms with financial flexibility are mainly judged by cash holdings, which is to maximize a firm's ability to face unexpected future shocks (Denis, 2012). Financial flexibility refers to firms' ability to access low-cost capital for unexpected needs. Basic cash holdings (cash and cash equivalents) and potential cash inflows are the two common sources of cash inflows. As cash holdings are costly due to agency problems, firms maintain relatively low cash balances and preserve unused financing capacity that can access sufficient cash when there is a need (see Ma and Jin, 2016). Firms reserve financial flexibility by making current financing, leverage, and cash-holding decisions to meet their firm's future financial requirements. Firms with more borrowing power can raise funds through the external capital markets (Arslan et al., 2014). Financial flexibility has a significant impact on corporate investment decisions, frims with high financial flexibility can directly call on cash reserves and residual debt capacity to provide needed funds for investment activities. The higher the financial flexibility, the stronger the firm's ability to pursue investment opportunities, and the more conducive to reducing the problem of insufficient investment (see Marchica and Mura, 2010; Ferrando et al., 2017). Ma and Jin (2016), based on a sample of firms listed on the Shanghai and Shenzhen Stock Exchange (SSSE), examine the influence of investment efficiency and investment

scale on financial flexibility and firms' performance. The findings of their study indicate that firms' performance seems to drive by investment scale rather than investment efficiency.

Financial flexibility is an effective policy adopted by firms to respond proactively to future investment opportunities or to mitigate the shortfall of cash flows when firms face investment shock such as crises including the financial crisis and the COVID-19 pandemic. There is a need for financial flexibility particularly when firms face contingencies including a shortfall of cash flows and investment shock. The study of Byoun (2021) develops a hypothesis predicting nonlinear patterns of leverage and cash holdings through firms' financial flexibility and financing patterns over the demand stage. Findings of the empirical results support the proposed hypothesis that flexibility-building firms maintain low leverage by issuing equity to raise cash, while flexibility-utilizing firms increase debt and rely on reserved cash to cope with investment options. Further, flexibility recharges firms to repay debt and increase cash using internal funds. Financial flexibility is maintained by an effective leverage policy that enables firms' boardrooms to undertake strategic investment projects.

Investment efficiency signals how well firms invest in their assets. Chen et al (2017) examined the influence of ownership structure on investment efficiency. They explore that ownership concentration has a negative effect on investment efficiency. They argued that for other types of institutional investors, mutual funds are more likely to exert a positive effect on investment efficiency. Raza et al., (2021) investigate the nexus between investment efficiency, investment scale, financial flexibility and firm performance in Pakistan. Tahat et al., (2021) explore the association between investment efficiency and earning quality using the conditional effects of legal origin. The findings of their study reveal how a country's legal environment affects investment efficiency. Investment efficiency is a key determinant of firms' growth and future cash flows, high level of investment efficiency indicates how firms use their assets effectively and can be used as an indicator of firms' performance (Chen et al., 2017; Moradi et al., 2022). The findings of Nguyen-Anh et al., (2022) reveal that intangible assets are a key driver of firms' performance. Firms can increment their intangible assets capabilities by investing in R&D activities and other innovation trajectories (Radicic and Alkaraan, 2022, Alkaraan, 2023; Alkaraan, et al, 2023, b) that improve firms' performance (Ferdaous and Rahman, 2019; Alkaraan et al., 2023).

It was argued that institutional investors play an effective role in firms' strategic choices, there is no empirical evidence clearly showing how they monitor managers and involve in investment decisions or not. The study of Moradi et al. (2022) reveals that institutional owners have a positive impact on investment efficiency and mitigate the problem associated with investment inefficiency, under-investment or over-investment problems. Chao and Huang (2022) explore how financial flexibility leverages firms' capability regarding raising capital at a lower cost, mitigating financial stress and quickly responding to investment opportunities, consequently improving organisational operational performance. Accordingly, we propose the following hypotheses:

H1: Financial flexibility has a significant effect on firm performance.

H2: Investment efficiency has moderating effect on the nexus between financial flexibility and firm performance.

2.2 *The influence of corporate governance mechanisms on strategic choices and firm performance*

From investment efficiency lenses, empowering CEOs without ensuring effective monitoring and controlling mechanisms could encourage investments in self-serving projects such as empire buildings (Jensen and Meckling, 1976; Jensen 1986) and diversifying acquisitions (see Morck et al., 1990). From upper echelons lenses, firms' performance is a function of boardroom

characteristics (Hambrick and Mason, 1984). Boardrooms' characteristics are adopted to predict organisational performance due to their influence on socio-cognitive capability and information processing in uncertain business environment (Hitt and Taylor, 1991). Hambrick and Mason (1984) have argued that's manger career experiences and familiarity with an industry influence their cognitive structures. Researchers have extended Hambrick and Mason perspective to examine strategic choices, such as investment and financing strategies, focusing on the role of top management teams as a driver of strategy and firms' performance. The literature articulates comprehensive debates the influence of top management team on firms' strategic choices and performance (Hambrick, 2007; Hambrick and Mason, 1984; Hambrick, Humphrey and Gupta, 2015).

Kim et al. (2009) theorized that board strategic control manifests in multiple forms and influences top management teams strategic capabilities. There is growing research focusing on the relationship between boardrooms' configuration and firms' performance. Researchers adopt upper echelons theory to examine how knowledge base grounded in heterogeneous-boards compared to homogenous-boards result in changing organisational strategic direction. Education is important at boardrooms because it increases information processing capabilities and enhances the cognitive base that support rational and creative solutions. Using combined lenses from upper echelon theory and institutional theory, Nielsen, and Nilsen (2013) articulated the equivocal relationships between boardrooms diversity and firm performance. Findings of their study show that nationality diversity is positively related to performance and the relationships is stronger in longer tenured teams, highly internationalized firms surrounded by munificent environment. It is widely recognized that demographic characteristics of boardrooms (age, tenure, education, and experience) as well as boardroom heterogeneousness/ homogeneousness determine the board's cognitive structure and thereby impact strategic posture firms' performance. Various studies have confirmed the role of social capital in strategic options. Findings of previous studies reveal that not only CEO attributes, but also board compositions affect organisational outcomes. Boards are imprinted with tacit knowledge and conventions specific to countries in which they bore and raised, it is believed board characteristics boosts boardrooms human and capital that influence boardrooms dynamics, initiatives and innovation strategy and ultimately firms' financial performance (Boone et al., 2018; Richard et al., 2019; Firoozi and Keddie, 2021).

Effective corporate governance mechanisms reduced information asymmetry, improve boardrooms legitimacy, and significantly influence long-term organisational performance. Boardrooms are knowledgeable, know-how about industry and have capacity to increase value for stakeholders including shareholders (Alkaraan et al., 2022; Hussainey et al., 2022; Alkaraan et al., 2023). Firms' boardrooms diversity has gained substantial attention by stakeholders. Bernile at al., (2018) explore the impact of diversity on boardrooms practices by examining the impact of board diversity on firms' performance. Results of their study indicate that operating performance and assets valuations multiples increase with board diversity. Their study shows greater board diversity improver firms' performance. They indicate that boardrooms diversity leads to lower financial risk taking and more efficient investment in innovation. Their study shows that firms with greater boardrooms diversity invest persistently in R&D and have more innovation processes. The study of Rajkovic (2020) examines the relationship between governance mechanisms, such as lead independent directors, and investment efficiency. Results of this study reveal that the presence of lead independent directors at firms' boardrooms are positively associated with investment efficiency and firms' performance. These results are more propounded for firms with ineffective governance mechanisms, less transparent financial disclosures, and firms with greater financial constraints. Also, it was reported by this study that director's presence are negatively associated with overinvestment or underinvestment for firms with large cash balance and lower leverage, high cash flow volatility. Rajkovic argued that the presence of independent directors at firms' boardrooms are associated with economically meaningful increase in investment efficiency. Lead

director presence are strengthening the information at firms' boardrooms as well as advising abilities of directors (Lamoreaux et al., 2019). Further, they liaise between CEO and independent directors and communicate with the major stakeholders including shareholders. They meet regularly without the CEO or other executives' presence to evaluate the performance of the CEO and other directors at board. Thus, corporate governance mechanisms presumably associated with more efficient investment policies at firms' boardrooms.

Based on the above debate, we postulate the following hypotheses regarding the influence of corporate governance mechanism, expressed in boardroom heterogeneity, on the nexus between financial flexibility and firm performance:

H3: Corporate governance mechanisms (boardroom heterogeneity) have moderating impact on the nexus between financial flexibility and firm performance.

H4: The combined impact of corporate governance mechanisms and investment efficiency strengthen the nexus between financial flexibility and firm performance.

3. Research method

3.1 Sample selection

Our study is based on a sample of 13,865 US-listed non-financial firms selected from BoardEx (WRDS) for the period (2010-2022) with 89,198 firm-year observations. The sample is selected through the following steps.

Step 1	We download the boardroom database from the BoardEX (WRDS) from2010-2022.
Step 2	We download the fundamental financial data from the compustat (WRDS) from 2010-2022.
Step 3	We firstly merge the Boardroom database and fundamental financial data by their unique identification(gvkey) and year.
Step 4	We download the boardroom database from the BoardEX (WRDS) from2010-2022.
Step 5	We merge the Boardroom database and fundamental financial data by their unique identification(gvkey) and year. Then the size of dataset is approximately 110,000.
Step 6	We excluded the heavily missing data, for example, this sample has more than 4 or more missing key variables used in the study, such as variables related to the calculation of ROA, financial flexibility, investment, and several other control variables. After deleting almost 20,000 samples with these missing variables, the other samples with less than 4 missing variables, we use mean value and median to fill out the missing data, depending on the data distribution
Step 7	We winsorize the financial data at the 1st and 99th percentile for each year, then we obtain 89,198 observations from 13,865 firms.

3.2 Variables definitions and measurement

i. Financial flexibility

We use cash holdings and financial leverage as a proxy of financial flexibility and define that financially flexible firms are those that rank top 20% cash-holdings and bottom 20% financial

leverage. This proxy of financial flexibility is consistent with prior research (e.g., DeAngelo and DeAngelo, 2007; Gamba and Triantis, 2008; Arslan et al., 2014).

ii. Investment efficiency

Biddle et al. (2009) used a model that predicts investment based on growth opportunities. Specifically, investment decision efficiency exists without deviating from the expected level of investment. However, firms that invest more than their optimum (a positive deviation from expected investment) overinvest, while those that do not execute all profitable projects (a negative deviation from expected investment) underinvest. Follow Biddle, Hilary et al. (2009), in order to estimate the expected investment level of firm i in year t, we specify a model that predicts the investment level based on growth opportunities (measured by sales growth). The model deviation, reflected in the error term of the investment model, represents the inefficiency of investment.

$$Investment_{i,t} = \beta_0 + \beta_1 SalesGrowth_{i,t-1} + \varepsilon_{i,t}$$

where $Investment_{i,t}$ is the total investment of firm i in year t, defined as the net increase in tangible and intangible assets and scaled by lagged total assets. $SalesGrowth_{i,t-1}$ is the rate of change in sales of firm i from t-1 to t. We estimate the investment model cross-sectionally for each year and industry. The residuals from the regression model reflect the deviation from the expected investment level, and we use these residuals as a firm-specific proxy for investment inefficiency.

iii. Firms' financial performance

Prior studies adopt various indicators as proxies for firms' financial performance including sales growth, return on investment (ROI), return on assets (ROA), earnings per share (EPS), return on equity (ROE) and Tobin's Q. In this study, we focus on both accounting and market performance and employ the widely adopted proxies of ROA, ROE, Tobin's Q (Hsu et al, 2019). Further, Tobin's Q (also known as Q ratio) is a significant indicator of firms future operating performance and can be viewed a proxy of future investment opportunities in the finance literature. Firms with higher Q ratio signal superior market performance as the market value is higher than the replacement value of firms' assets (Singhal et al., 2019).

iv. Corporate governance mechanisms

We use boardrooms heterogeneity indicators as proxy of corporate governance mechanisms. We incorporate the following indicators of corporate governance: percentage of female board to the board size, age diversity through variation in age, boardroom members qualifications, board committees, and Non-Executive Directors (NEDs). It widely documented in the literature that boardrooms heterogeneousness or homogeneousness determine the board's cognitive structure and thereby impact strategic posture firms' performance. Board configuration and characteristics boost boardrooms' human and capital that influence firms' dynamic capacities. Boardroom characterises have a significant impact on scanning and screening investment opportunities (Alkaraan et al., 2023), sensing, seizing, and configuring through a combination of new products, processes and services (Teece, 2007). Firms' boardroom heterogeneousness has a significant impact on firms' financial performance (Hsu et al., 2019; Firoozi and Keddie, 2021).

v. Control variables

To control for industry and firm characteristics, we use a set of control variables in our analysis including financial leverage, firm age and firm size, sales growth, tangible assets, asset

intangibility based on Bhatt and Bhattacharya (2017). It was argued that using a time-lag dependent variables can solve the reverse causality problem, and that this provides a solution to endogenous problems associated with board diversity and a firm's performance (Carter et al., 2010). Our fixed effect single equation model uses lagged variables since we hypothesize that the effects of board diversity will occur over time.

Definitions of variables are depicted in Table (1) and descriptive statistics of variables are summarised in Table (2). Accordingly, ROA and ROE both have negative min value of -4.081 and -.82, respectively, suggesting that some firms suffered losses during the studied period. TobinQ has a mean value of 1.867, implying that on average market value of firms in our sample is around 1.9 of their book value. Around 3.5% of firms in our data sample is classified as financially flexible firms and most firms suffer investment efficiency as the mean value is -2.377. Regarding corporate governance, board size and age have average values of 7.88 and 7.29, respectively. Around 12.6% of Board members are female showing a significant gender bias.

Please insert Tables 1 and 2 here

3.3 Empirical model and control variables

We formulate the following empirical models to examine the above four articulated hypotheses underpinning this study:

$$Performance_{i,t} = \beta_0 + \beta_1 FF_{i,t} + \sum_j \beta_j \, \Omega_{i,t-1} + \sum_k \beta_k \, Industry\,dummies + \varepsilon_{i,t}^1 \quad (1)$$

where: Performance represents a firm's account and market performance captured by ROA, ROE and TobinQ; FF is financial flexibility proxy; Ω represents a set of control variables explained in Section 3.2 (v); Industry dummies include dummy variables representing different industries classified by SEC; $\varepsilon_{i,t}$ *is error term.*

Model 1 aims to test the effect of financial flexibility on firm performance controlling for firm-specific characteristics and industry effects. The moderating effect of investment efficiency on the nexus of financial flexibility and firm performance will be tested with model 2, such that:

$$Performance_{i,t} = \delta_0 + \delta_1 FF_{i,t} + \delta_2 Inv_{i,t} + \delta_3 FF_{i,t} * Inv_{i,t} + \sum_j \delta_j \, \Omega_{i,t-1} + \sum_k \delta_k Industry\,dummies + \varepsilon_{i,t}^2 \quad (2)$$

where: $Inv_{i,t}$ *is a proxy for investment efficiency,* $FF_{i,t} * Inv_{i,t}$ *is the interactive term between investment efficiency and financial flexibility*

In model 3, we aim to test the moderating effect of corporate governance the nexus between financial flexibility and firm performance.

$$Performance_{i,t} = \gamma_0 + \gamma_1 FF_{i,t} + \gamma_2 CG_{i,t} + \gamma_3 FF_{i,t} * CG_{i,t} + \sum_j \gamma_j \, \Omega_{i,t-1} + \sum_k \gamma_k Industry\,dummies + \varepsilon_{i,t}^3 \quad (3)$$

where: $CG_{i,t}$ is proxy for corporate governance captured by board size, gender diversity, age diversity, boardroom members qualifications, board committees, and NEDs; $FF_{i,t} * CG_{i,t}$ is the interactive term between corporate governance and financial flexibility.

The combined effect of corporate governance and investment efficiency on firm performance will be tested in model 4 formulated as follows:

$$Performance_{i,t} = \pi_0 + \pi_1 FF_{i,t} + \pi_2 CG_{i,t} + \pi_3 Inv_{i,t} + \pi_4 Inv_{i,t} * CG_{i,t} + \sum_j \pi_j \, \Omega_{i,t-1} + \sum_k \pi_k Industry\,dummies + \varepsilon_{i,t}^4 \quad (4)$$

4. Empirical results and regression analysis

We estimate models (1) – (4) using panel data regression and rely on the Hausman tests to select between random and fixed effects. The Hausman tests results summarized in Appendix 1 suggest that fixed effects are more suitable for our models and specifications, therefore we proceed the tests of hypotheses (1) – (4) using fixed effect estimation. The similarity in R2 values may be due to the statistical significance of my independent variable in explaining the dependent variable. This means that the independent variable has a similar degree of influence on the dependent variable, that is, they have similar contributions in the regression model. This may indicate that the independent variable has similar influence or importance in the model. This situation is normal because the control variables of the six models I test the impact of corporate governance mechanisms, investment efficiency, and financial flexibility on firm performance are the same (age, size, sales growth, tangibility, intangibility), where only some of the moderating variables have changed. The moderating variables related to the governance mechanisms of the firm are also centred around some characteristics of the firm's governance structure. Therefore, the results of the basic R2 are similar, so its goodness-of-fit results will not have too much change, and the second important reason is that the sample size of this paper is also relatively large, there are more than 80,000 sample size, this sample size is larger, its goodness-of-fit will not change particularly significantly. In sum, our model, variables, and sample size have not changed much, so R2 is more similar.

4.1. *The impact of financial flexibility on firm performance*

Table (4) reveals the impact of financial flexibility on firm performance. Accordingly, there is a positive association between financial flexibility and firms' ROA, ROE, Tobin's Q with coefficients of 0.034, 0.02, and 0.31, respectively. As shown in Table (3), the results are significant across all specifications of accounting and market performance. This result lends support to our hypothesis 1.

Please insert Table 3 here

4.2. *The moderating effect of investment efficiency on the nexus between financial flexibility and firm performance*

The regression results regarding the moderating effect of investment efficiency on the association between financial flexibility and firm performance is summarised in Table 5. As being observed from Table 4, all coefficients associated with FF, Inveff and the interactive term FF*Inveff are positive and significant across different proxies of firm performance. Noticeably, the direct effect of investment efficiency is humble, but investment efficiency plays as a significant role as a moderator to strengthen the relationship between financial flexibility and firm performance.

Please insert Table 4 here

4.3. *The moderating effect of corporate governance on the nexus between financial flexibility and firm performance*

Table (5) shows the results of regression analysis regarding the moderating effect of corporate governance on the nexus between financial flexibility and firm performance. As touched by Table 6, FF*B_gen, FF*B_ten and FF*B_size is negative and significant across ROA proxy of firm performance, which is opposite to our hypothesis. However, FF*B_comm and B_ned are showing positive and significant. As we proxy the firm performance by ROE,

FF*B_comm is positive and significant result. The third proxy of TobinQ revealed that FF*B_ned positively and significantly has effect on the relationship between FF and firm performance.

Please insert Table 5 here

4.4. *The combined effect of investment efficiency and corporate governance on the nexus between financial flexibility and firm performance*

Table 6 summarizes the estimated result on the combined effect of corporate governance and investment efficiency on firm performance. The parameter associated with the interaction term between corporate governance and financial flexibility show that the combined effect strengthens the relationship between financial flexibility and firm performance. This result supports our hypothesis 4.

Please insert Table 6 here

4.5. Robustness check of the results

Findings of this study hold up under alternative estimation techniques. To address potential endogeneities issues, Results of robustness check of the models employed by this study are depicted in Table 7 and Table 8.

Please insert Table 7 here

Please insert Table 8 here

Results of robustness check of the models employed by this study are depicted in Table. We adopt ROA and other techniques (GMM) as additional analysis to articulate protentional endogeneities issues. In Table (7), When the firm performance tested by ROA, the interactive terms of FF*B_ten, FF*B_gen, FF*B_ned, FF*B_size shows the negative and significant result. Next proxy of ROE, the result of FF*B_comm reveal the positive and significant result. All interactive terms of Inv does not make sense to the moderating effect. However, the proxy of TobinQ shows all interactive terms, except Inv*B_ned and Inv*B_size, have significant and positive effect on the nexus between FF and firm performance. The impact of financial flexibility on corporate performance is a dynamic process, i.e., it depends not only on current factors but also on past factors, and has a certain path dependence, so it is necessary to consider its dynamic changes, so the lagged terms of the explanatory variables are added to the explanatory variables. However, since the lagged term of the explanatory variable serves as the explanatory variable after completing such a change, which can make the problem of endogeneity of the explanatory variable in the econometric estimation more serious, and the assumption that the explanatory variable and the disturbing term are uncorrelated cannot be satisfied, the use of a fixed-effects or random-effects model may result in insufficient evidence to solve the problem of endogeneity.

We chose the FF lag and difference terms of the explanatory variables as instrumental variables, as well as the control variables as exogenous instrumental variables. From the above table, it is seen that AR (1) of the systematic GMM model significantly rejects the original hypothesis at the 1% level, i.e., it indicates the existence of first-order autocorrelation in the model, whereas the original hypothesis is passed in AR (2), indicating the absence of second-order

autocorrelation. Hansen's test indicates that the original hypothesis that neither model can be rejected and that all the instrumental variables are valid is not rejected by either model.

4.6 Discussion of the results

In Table (3), we used ROA,ROE,TobinQ to measure the performance of firms, and also used cash and debt ratio to measure whether a firm has financial flexibility or not, when a firm has financial flexibility, the dummy variable takes 1, otherwise 0. The results show that financial flexibility has a positive and significant correlation with the firm performance, and the results are in line with our hypothesis 1, financial flexibility has an impact on the firm performance. This is also in line with the findings of many previous studies (Arslana, Florackisb et al., Ma and Jin 2016, Mahmood, Rizwan et al. 2018, Topaloglu and Ege 2021, Chao and Huang 2022). The main reason is that financial flexibility gives firms stronger adaptability and survivability in an uncertain and turbulent economic environment, enabling them to better cope with challenges, seize opportunities, and lay a solid foundation for long-term sound operation and development.

When we test there about hypothesis 2, we add investment efficiency as a mediator in Table (4) to the relationship between financial flexibility on firm performance, and from the results we can see that investment efficiency strengthens the positive and significant correlation of financial flexibility on firm performance. This point also validates Ma and Jin (2016)'s claim that investment efficiency has a moderating effect on financial flexibility. Firms with high investment efficiency are more resilient in the face of challenges and are better able to cope with change and uncertainty, thus enhancing the financial flexibility of the firm. High investment efficiency contributes to higher profitability, lower risk, flexible deployment of resources and higher competitiveness, and lays a good foundation for long-term growth.

We tested hypothesis 3 in the results of Table (5). The same corporate governance mechanisms have a strengthening effect on the impact of financial flexibility and firm performance to some extent, especially management qualification, gender, ned, and their coefficients or significance have been obviously increased. In a previous study, Alkaraan, Elmarzouky et al. (2023) proposed the configuration and characteristics of the board of directors enhance the board's manpower and capital, which affects the firm's dynamic capabilities. This is because effective corporate management mechanisms play an important role in improving strategy execution, optimizing operational efficiency, establishing a monitoring and incentive system, controlling risk, promoting innovation, and learning, and optimizing resource allocation, which strengthens the performance of firms and improves their competitiveness and sustainability.

Based on Tables (6-8), we test the hypothesis 4. the combination of corporate governance mechanisms and investment efficiency strengthens the impact of financial flexibility on firm performance, especially the factors of gender, age, and ned of the firm's management. Teece (2007) mentioned that the heterogeneity of the firm's management strengthens the firm's financial performance, and moreover, the investment efficiency, on the other hand, strengthens the financial flexibility (Raza, Hamid et al. 2021). The following are some of the factors that are important for the financial performance of a firm. Efficient corporate management mechanism can help firms to better capitalize and invest limited funds in projects with high return on investment, thus increasing the efficiency of capital utilization and return on investment. Such capital optimization can enhance the financial flexibility of enterprises and enable them to maintain a sound financial position despite economic uncertainties.

5. Conclusion

This study examines the moderating effects of investment efficiency, corporate governance, and the combined effects of both factors on the nexus between financial flexibility and firm performance. Data analysis is based on a sample of 13,865 US listed firms selected from BoardEx (WRDS) for the period (2010-2022) with a final panel consists of 89,198 firm-year observations. We find the positive association between financial flexibility and firm performance which is largely consistent with the extensive literature. Furthermore, we find evidence about the role of investment efficiency and corporate governance as moderators for the effect of financial flexibility on financial performance. We also identify that the combined effects of corporate governance and investment efficiency strengthen the nexus between financial flexibility and performance. Results of our study complement and extend the literature on optimal investment strategies.

Also, our results highlight the importance of financial flexibility as a mirror of firms' financial health and as a key driver of organisational resource allocation and long-term performance. This result is consistent with the view of previous studies such as (Oded, 2020). Therefore, unsurprisingly that financial flexibility and investment efficiency remain a matter of concern in strategic investment decisions in firms' boardrooms. Our findings are consistent with more recent research (Garmaise and Natividad, 2021; Mahmood et.,2021; Reza et., 2021; Chao and Huang, 2022). On the other hand, the findings of this study are not consistent with the view of Ma and Jin (2016) who argued that investment scale rather than investment efficiency drives firm performance. This contradiction in results may refer to the contextual factors surrounding boardroom practices of Chinees firms, or due to the difference in sample selection or proxies adopted by scholars to measure financial flexibility and investment efficiency.

Our novel contribution to the extant literature is articulated by the conceptual framework underlying this study and by the new evidence regarding exploring the combined effects of corporate governance mechanisms and investment efficiency on the nexus between financial flexibility and performance. This result indicates that effective governance mechanisms strengthen the relationship between financial flexibility, investment efficiency and firm performance. This result also fits with (Bernile 2018)'s study that the presence of lead independent directors on corporate boards is positively associated with investment efficiency and firm performance. For firms with imperfect governance mechanisms, lower transparency in financial disclosure, and stronger financial constraints. In addition, the study states that the presence of the lead director is negatively associated with overinvestment or underinvestment for firms with larger cash balances, lower leverage, and higher cash flow volatility. Our results confirm the hypotheses underlying this study. Corporate governance mechanisms strengthen the relationship between financial flexibility and firm performance. (Rajkovic 2020)'s view is also in line with our findings that operating performance and asset valuation multiples increase with board diversity, in other words board diversity improves firm performance, mainly since board diversity reduces financial risk and increases the efficiency of investment in innovation. Boardroom's heterogeneity facilitates knowledge exchange regarding various innovation strategies. Findings confirm the theoretical perspective of Hambrick and Mason regarding boardrooms strategic choices, such as investment and financing strategies, focusing on the role of top management teams as a driver of strategy and firms' performance. The literature articulates comprehensive debates the influence of top management team on firms' strategic choices and performance (Hambrick, 2007; Hambrick and Mason, 1984; Hambrick, Humphrey and Gupta, 2015). Boardroom's diversity fosters heterogeneity towards more effective strategic choices (Salehi et al., 2022; Alkaraan et al, 2022; Hussainey et al, 2022).

Economic Implications

Findings of this study have managerial and theoretical implications for firms' boardrooms, institutional and individual investors, regulators, academics, and other stakeholders regarding behavioural aspects of investment decision-making. Results of this study reveal that corporate governance mechanisms and investment efficiency have a positive impact on financial flexibility, then firms may be able to respond more effectively to changing economic conditions. This would enable them to seize growth opportunities, withstand financial crises and allocate resources more efficiently. A positive correlation between financial flexibility and firm performance suggests that firms with higher financial flexibility can achieve higher profitability, productivity, and long-term sustainability. Financial flexibility-building firms maintain low leverage by issuing equity to raise cash, while flexibility-utilizing firms increase debt and rely on reserved cash to cope with investment options. Further, flexibility recharges firms to repay debt and increase cash using internal funds. Financial flexibility is maintained by an effective leverage policy that enables firms' boardrooms to undertake strategic investment projects. Investment efficiency signals how well firms invest in their assets. Consistent with the view of Chen et al., (2017) and Moradi et al., 2022, the findings of their study have managerial implications and show how a country's legal environment affects investment efficiency. Investment efficiency is a key determinant of firms' growth and future cash flows, high level of investment efficiency indicates how firms use their assets effectively and can be used as an indicator of firms' performance.

Academic Implications

By exploring the impact of corporate governance mechanisms on the relationship between financial flexibility and firm performance, our findings can contribute to the existing body of knowledge on corporate governance. Our findings can contribute to the existing body of knowledge on corporate governance and provide insights into the mechanisms by which corporate governance practices influence financial decisions and ultimately firm performance.

We fill an existing gap in the literature by revealing the link between investment efficiency and financial flexibility, and that effective investment decisions are better able to strengthen a firm's financial position and overall performance with the addition of financial flexibility and corporate governance institutions.

Policy Implications

Corporate governance mechanisms or policies are associated with improved financial flexibility and firm performance, and policymakers may consider implementing or strengthening regulations that promote these practices. This may involve encouraging transparency, accountability and effective board oversight to raise governance standards and promote better financial decision-making.

If the results highlight the importance of investment efficiency in promoting financial flexibility for firm performance, policymakers could focus on creating an enabling environment that encourages firms to allocate resources efficiently, promote innovation and support productive investment.

Key limitations of this study refer to the characteristics of the sample selection; country specific context, proxies utilised by this study. Future studies may adopt our conceptual framework or adopt other theoretical lenses to examine the influence of corporate governance mechanisms on investment efficiency, financial flexibility and firms' performance in other context and settings.

Future studies may examine the influence of other governance mechanisms such as ESG performance on the relationship between financial flexibility, investment efficiency, investment scale and firms' performance.

Declaration of competing interest

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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Table (1) Definition of variables	
Dependent variables	The research and development expense for the preceding year.
ROA	Net income / average total assets
ROE	Net income / equity
TobinQ	Market value / total assets
Independent variables	
FF	The research and development expense for the preceding year.
Cash holding	This item represents any immediately negotiable medium of exchange, or any instruments normally accepted by banks for deposit and immediate credit to a customer's account
Lev	Total debt/Total asset
Inveff	represents the investment efficiency: negative absolute residual value from regression between investment and sales growth
Tang	PPE/Total asset
Intang	the amount of intangible assets/Total asset
B_qual	The number of each director's qualifications in company
B_age	The standard deviation of the age of board members in each sample company.
B_ten	The standard deviation of the tenure of board members in each sample company
B_comm	The standard deviation of the number of quoted committees
B_size	The numbers of boardroom members
B_ned	An indicator showing if the record is an executive position (dummy=0) or a supervisory position (dummy=1).
B_gen	the number of female board members divided by the total number of board members
Control variables	
Age	Since the date of incorporate
Size	Log of total assets
Lev	Total debt/Total asset
S_growth	Log of net sales growth
Tang	PPE divided by total asset
Intang	Intangible asset divided by total asset

Table (2): Descriptive Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	89198	-.12	.548	-4.081	.291
ROE	89198	.174	.243	-.82	1.097
TobinQ	89198	1.867	4.971	0	43.194
FF	89198	.035	.183	0	1
Inveff	89198	-2.377	8.272	-89.742	-.001
B_qual	89198	2.182	1.346	0	6
B_gen	89198	.126	.141	0	.667
B_ten	89198	4.548	3.828	0	16
B_comm	89198	1.848	1.435	0	7.8
- Definition of variables are depicted in Table 1					
- Source: Authors own creation					

Table (3) The impact of financial flexibility on firm performance (H1)			
	(1)	(2)	(3)
VARIABLES	ROA	ROE	TobinQ
FF	0.0340***	0.0247***	0.318***
	(0.00453)	(0.00445)	(0.0624)
age	-0.00410***	-0.00244***	0.0577***
	(0.000946)	(0.000536)	(0.0103)
Size	0.0436***	-0.0121***	-0.839***
	(0.00715)	(0.00204)	(0.0756)
Lev	-0.00187	0.00124	0.0435
	(0.00647)	(0.000924)	(0.0474)
S_growth	8.74e-05*	1.30e-05*	-0.000648
	(4.65e-05)	(7.87e-06)	(0.000422)
Tangibility	-0.00107	3.81e-05	-0.0870***
	(0.00102)	(0.000687)	(0.0200)
Intangibility	-0.00818	-0.000903	0.0319
	(0.00558)	(0.000875)	(0.0235)
Constant	-0.337***	0.283***	6.334***
	(0.0379)	(0.0128)	(0.402)
Industry	YES	YES	YES
Observations	89,198	89,198	89,198
R-squared	0.007	0.007	0.027

Number of id	13,865	13,865	13,865
- Definition of variables are depicted in Table 1			
- Source: Authors own creation			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4- The moderating impact of investment efficiency on the nexus between financial flexibility and firm performance (H2).			
	(1)	(2)	(3)
VARIABLES	ROA	ROE	TobinQ
FF	0.0692***	0.142***	1.683***
	(0.0171)	(0.0482)	(0.563)
Inveff	0.00110**	0.000373	0.0120**
	(0.000554)	(0.000276)	(0.00541)
FFinv	0.0404*	0.135**	1.569**
	(0.0216)	(0.0644)	(0.750)
Age	-0.00372***	-0.00162***	0.0683***
	(0.000956)	(0.000585)	(0.0109)
Size	0.0385***	-0.0225***	-0.975***
	(0.00746)	(0.00509)	(0.0945)
Lev	-0.00180	0.00140*	0.0455
	(0.00652)	(0.000804)	(0.0450)
S_growth	8.89e-05*	1.04e-05	-0.000661
	(4.58e-05)	(7.40e-06)	(0.000420)
Tang	-0.00109	0.000265	-0.0851***
	(0.000990)	(0.000705)	(0.0194)
Intang	-0.00837	-0.00113	0.0284
	(0.00554)	(0.000837)	(0.0223)
Constant	-0.292***	0.390***	7.688***
	(0.0429)	(0.0525)	(0.728)
Industry	YES	YES	YES
Observations	89,198	89,198	89,198
R-squared	0.009	0.190	0.062
Number of id	13,865	13,865	13,865
- Definition of variables are depicted in Table 1			
- Source: Authors own creation			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5- The moderating impact of corporate governance mechanisms on the nexus between financial flexibility and firm performance (H3).

VARIABLES	(1) TobinQ	(2) TobinQ	(3) TobinQ	(4) TobinQ	(5) TobinQ	(6) TobinQ
FF	0.280***	0.225**	0.193*	0.177*	0.187**	0.263***
	(0.0650)	(0.0966)	(0.100)	(0.107)	(0.0908)	(0.0640)
B_qual	0.00820					
	(0.00841)					
FFB_qual	0.0177**					
	(0.00871)					
Age	0.0587***	0.0571***	0.0603***	0.0603***	0.0585***	0.0577***
	(0.0102)	(0.0103)	(0.0103)	(0.0103)	(0.0102)	(0.0103)
Size	-0.839***	-0.840***	-0.839***	-0.831***	-0.839***	-0.840***
	(0.0756)	(0.0757)	(0.0756)	(0.0750)	(0.0756)	(0.0756)
Lev	0.0436	0.0434	0.0435	0.0436	0.0435	0.0434
	(0.0474)	(0.0474)	(0.0473)	(0.0470)	(0.0473)	(0.0473)
S_growth	-0.000648	-0.000648	-0.000649	-0.000654	-0.000648	-0.000648
	(0.000422)	(0.000422)	(0.000423)	(0.000420)	(0.000422)	(0.000422)
Tang	-0.0870***	-0.0871***	-0.0870***	-0.0870***	-0.0871***	-0.0871***
	(0.0200)	(0.0200)	(0.0200)	(0.0198)	(0.0200)	(0.0200)
Intang	0.0318	0.0319	0.0318	0.0323	0.0317	0.0319
	(0.0235)	(0.0235)	(0.0235)	(0.0236)	(0.0233)	(0.0235)
B_size	0.00411	0.00420	0.00770*	0.00506	0.00531	0.00437
	(0.00426)	(0.00439)	(0.00437)	(0.00423)	(0.00426)	(0.00424)
B_gen		0.0151				
		(0.110)				
FFB_gen		0.671*				
		(0.379)				
B_ten			-0.0163***			
			(0.00476)			
FFB_ten			0.0233*			
			(0.0125)			
B_comm				-0.236***		
				(0.0171)		
FFB_comm				0.0720*		
				(0.0413)		
B_age					-0.00668	
					(0.00575)	

	(1)	(2)	(3)	(4)	(5)	(6)
FFB_age					0.0180**	
					(0.00900)	
B_ned						-0.0142
						(0.0226)
FFB_ned						0.0997**
						(0.0505)
Constant	6.264***	6.316***	6.314***	6.650***	6.327***	6.312***
	(0.405)	(0.407)	(0.404)	(0.407)	(0.410)	(0.404)
Industry	YES	YES	YES	YES	YES	YES
Observations	89,198	89,198	89,198	89,198	89,198	89,198
R-squared	0.027	0.027	0.027	0.033	0.027	0.027
Number of id	13,865	13,865	13,865	13,865	13,865	13,865
-Definition of variables are depicted in Table 1						
- Source: Authors own creation						

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: The combined effect of investment efficiency and corporate governance on the nexus between financial flexibility and firm performance (H4)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TobinQ	TobinQ	TobinQ	TobinQ	TobinQ	TobinQ
FF	0.281***	0.231**	0.196**	0.185*	0.186**	0.264***
	(0.0652)	(0.0966)	(0.100)	(0.107)	(0.0909)	(0.0640)
Inveff	0.0118**	0.0135***	0.0138***	0.0120**	0.0113**	0.0103*
	(0.00474)	(0.00475)	(0.00487)	(0.00480)	(0.00470)	(0.00597)
B_qual	0.00785					
	(0.00849)					
FFB_qual	0.0173**					
	(0.00873)					
InvB_qual	0.00575**					
	(0.00280)					
Age	0.0601***	0.0582***	0.0615***	0.0616***	0.0601***	0.0593***
	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0102)	(0.0103)
Size	-0.862***	-0.865***	-0.861***	-0.854***	-0.861***	-0.863***
	(0.0768)	(0.0769)	(0.0767)	(0.0761)	(0.0767)	(0.0767)
Lev	0.0435	0.0434	0.0441	0.0435	0.0443	0.0437
	(0.0474)	(0.0474)	(0.0475)	(0.0470)	(0.0473)	(0.0474)
S_growth	-0.000598	-0.000610	-0.000636	-0.000632	-0.000618	-0.000623
	(0.000434)	(0.000440)	(0.000430)	(0.000425)	(0.000426)	(0.000425)
Tang	-0.0877***	-0.0878***	-0.0876***	-0.0881***	-0.0886***	-0.0880***
	(0.0201)	(0.0200)	(0.0199)	(0.0197)	(0.0201)	(0.0200)

Intang	0.0321	0.0310	0.0307	0.0304	0.0309	0.0307
	(0.0236)	(0.0238)	(0.0238)	(0.0239)	(0.0240)	(0.0239)
B_size	0.00428	0.00429	0.00795*	0.00518	0.00543	0.00444
	(0.00425)	(0.00439)	(0.00437)	(0.00423)	(0.00426)	(0.00424)
B_gen		0.0162				
		(0.110)				
FF B_gen		0.641*				
		(0.379)				
InvB_gen		0.0536**				
		(0.0239)				
B_ten			-0.0166***			
			(0.00479)			
FFB_ten			0.0230*			
			(0.0125)			
InvB_ten			0.00234**			
			(0.00117)			
B_comm				-0.235***		
				(0.0170)		
FFB_comm				0.0681*		
				(0.0413)		
InvB_comm				0.00439*		
				(0.00264)		
B_age					-0.00637	
					(0.00567)	
FFB_age					0.0181**	
					(0.00899)	
InvB_age					0.00193*	
					(0.00114)	
B_ned						-0.0145
						(0.0225)
FFB_ned						0.0987**
						(0.0498)
InvB_ned						0.00237
						(0.00643)
Constant	6.420***	6.486***	6.463***	6.798***	6.466***	6.461***
	(0.413)	(0.415)	(0.411)	(0.415)	(0.417)	(0.412)
Observations	89,198	89,198	89,198	89,198	89,198	89,198
R-squared	0.028	0.028	0.028	0.034	0.028	0.027
Number of id	13,865	13,865	13,865	13,865	13,865	13,865
-Definition of variables are depicted in Table 1						
-Source: Authors own creation						

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table (7) Robustness of the model (ROA)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	ROA	ROA	ROA	ROA	ROA
FF	0.0331***	0.0399***	0.0538***	0.0192***	0.0287***	0.0396***
	(0.00489)	(0.00638)	(0.00786)	(0.00701)	(0.00779)	(0.00508)
Inveff	0.00108**	0.00112**	0.000965*	0.00101*	0.00109**	0.00154**
	(0.000545)	(0.000566)	(0.000548)	(0.000550)	(0.000547)	(0.000676)
B_qual	9.35e-05					
	(0.000918)					
FFb_qual	0.000424					
	(0.000885)					
Invb_qual	-3.43e-05					
	(0.000313)					
Age	-0.00391***	-0.00387***	-0.00377***	-0.00397***	-0.00388***	-0.00402***
	(0.000942)	(0.000945)	(0.000953)	(0.000945)	(0.000944)	(0.000948)
Size	0.0415***	0.0415***	0.0415***	0.0413***	0.0415***	0.0414***
	(0.00716)	(0.00717)	(0.00716)	(0.00715)	(0.00715)	(0.00716)
Lev	-0.00183	-0.00184	-0.00184	-0.00180	-0.00185	-0.00184
	(0.00646)	(0.00646)	(0.00646)	(0.00644)	(0.00645)	(0.00646)
S_growth	8.98e-05*	9.01e-05**	9.05e-05**	9.04e-05**	8.99e-05*	9.04e-05**
	(4.59e-05)	(4.56e-05)	(4.59e-05)	(4.58e-05)	(4.60e-05)	(4.54e-05)
Tang	-0.00117	-0.00116	-0.00119	-0.00116	-0.00115	-0.00119
	(0.00103)	(0.00103)	(0.00103)	(0.00102)	(0.00104)	(0.00103)
Intang	-0.00832	-0.00830	-0.00832	-0.00827	-0.00834	-0.00839
	(0.00552)	(0.00552)	(0.00551)	(0.00550)	(0.00554)	(0.00551)
B_size	-0.000319	-0.000264	-0.000173	-0.000335	-0.000414	-0.000311
	(0.000397)	(0.000413)	(0.000413)	(0.000398)	(0.000401)	(0.000397)
B_gen		-0.00542				
		(0.0113)				
FFb_gen		-0.0427*				
		(0.0246)				

Invb_gen		0.00101				
		(0.00326)				
B_ten			-0.000670			
			(0.000511)			
FFb_ten			-0.00371***			
			(0.000876)			
Invb_ten			-0.000121			
			(0.000109)			
B_comm				0.00553***		
				(0.00136)		
FFb_comm				0.00744**		
				(0.00359)		
Invb_comm				-0.000389		
				(0.000383)		
B_age					0.000517	
					(0.000564)	
FFb_age					0.000727	
					(0.000900)	
Invb_age					-7.76e-05	
					(0.000118)	
B_ned						0.00545**
						(0.00244)
FFb_ned						-0.0104***
						(0.00386)
Inv_ned						-0.000974
						(0.000828)
Constant	-0.322***	-0.322***	-0.322***	-0.329***	-0.325***	-0.321***
	(0.0380)	(0.0383)	(0.0380)	(0.0381)	(0.0385)	(0.0380)
Industry	YES	YES	YES	YES	YES	YES
Observations	89,198	89,198	89,198	89,198	89,198	89,198
R-squared	0.007	0.007	0.008	0.008	0.007	0.008
Number of id	13,865	13,865	13,865	13,865	13,865	13,865
- Definition of variables are depicted in Table 1						
- Source: Authors own creation						

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table (8) Robustness of the model -GMM results						
	(1)	(2)	(3)	(4)	(5)	(6)
	TobinQ	TobinQ	TobinQ	TobinQ	TobinQ	TobinQ
L.TobinQ	0.518***	1.192***	1.121***	0.921***	1.187***	0.618***
	(3.890)	(14.401)	(11.963)	(7.049)	(15.129)	(7.144)
FF	0.255***	0.217	0.229	0.210	0.454	0.265**
	(2.839)	(1.226)	(0.428)	(0.610)	(1.423)	(2.215)
Inveff	0.570**	0.121***	0.215**	0.244**	0.103***	0.432
	(2.135)	(3.286)	(2.353)	(2.135)	(2.903)	(1.292)
B_qual	-0.889**					

	(-2.168)					
FFb_qual	0.049***					
	(2.682)					
Invb_qual	0.661**					
	(2.125)					
Age	0.061*	0.001	-0.036	-0.100	0.045***	0.031
	(1.813)	(0.018)	(-0.818)	(-1.625)	(3.068)	(1.346)
Size	-0.435**	0.182**	0.053	0.097	-0.181	-0.265**
	(-2.301)	(1.987)	(0.516)	(0.643)	(-1.304)	(-2.345)
Lev	0.980	3.472***	2.907***	3.583***	2.577***	0.316
	(1.147)	(5.944)	(4.477)	(4.243)	(5.014)	(0.483)
S_growth	-0.007	-0.020	-0.027	-0.016	-0.000	0.004
	(-0.463)	(-0.744)	(-0.981)	(-0.444)	(-0.236)	(0.426)
Tangibility	0.323	-0.500	0.067	-1.902	0.634	0.454
	(0.302)	(-0.462)	(0.057)	(-1.159)	(0.462)	(0.438)
Intangibility	2.333	3.488***	4.184***	5.876***	5.936***	4.191***
	(1.369)	(2.598)	(2.889)	(3.288)	(3.381)	(3.732)
B_size	-0.052	0.071	0.076	0.080	-0.036	0.018
	(-0.905)	(0.965)	(1.014)	(0.676)	(-0.362)	(0.294)
B_gen		-4.565***				
		(-2.903)				
FFb_gen		1.906**				
		(2.152)				
Invb_gen		1.462*				
		(1.681)				
B_ten			-0.189			
			(-1.147)			
FFb_ten			0.050			
			(0.502)			
Invb_ten			0.178*			
			(1.717)			
B_comm				-1.180*		
				(-1.744)		
FFb_comm				0.139		
				(1.123)		
Invb_comm				0.844*		
				(1.754)		
B_age					-0.295***	
					(-2.991)	
FFb_age					0.065**	
					(2.074)	
Invb_age					0.151**	
					(2.389)	
B_ned						0.472
						(0.826)
FFb_ned						0.290*
						(1.807)
Inv_ned						-0.501
						(-1.227)

Constant	5.761**	-2.583***	-0.848	1.447	1.252	1.888*
	(2.364)	(-4.099)	(-0.757)	(0.731)	(0.917)	(1.741)
N	74912	74912	74912	74912	74912	74912
ar1p	0.012	0.000	0.002	0.033	0.000	0.002
ar2p	0.171	0.204	0.994	0.572	0.088	0.661
hansenp	0.241	0.600	0.875	0.479	0.133	0.367
Source: Authors own creation						

$^{*} p < 0.1,$ $^{**} p < 0.05,$ $^{***} p < 0.01$