

Salehi, Mahdi; Zimon, Grzegorz; Arianpoor, Arash; Gholezoo, Fatemeh Eidi

Article

The impact of investment efficiency on firm value and moderating role of institutional ownership and board independence

Journal of Risk and Financial Management

Provided in Cooperation with:

MDPI – Multidisciplinary Digital Publishing Institute, Basel

Suggested Citation: Salehi, Mahdi; Zimon, Grzegorz; Arianpoor, Arash; Gholezoo, Fatemeh Eidi (2022) : The impact of investment efficiency on firm value and moderating role of institutional ownership and board independence, Journal of Risk and Financial Management, ISSN 1911-8074, MDPI, Basel, Vol. 15, Iss. 4, pp. 1-13, <https://doi.org/10.3390/jrfm15040170>

This Version is available at:

<https://hdl.handle.net/10419/274692>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Article

The Impact of Investment Efficiency on Firm Value and Moderating Role of Institutional Ownership and Board Independence

Mahdi Salehi ^{1,*} , Grzegorz Zimon ^{2,*} , Arash Arianpoor ³  and Fatemeh Eidi Gholezoo ³

¹ Department of Economics and Administrative Sciences, Ferdowsi University of Mashhad, Mashhad 9177948974, Iran

² Department of Finance, Banking, and Accountancy, The Faculty of Management, Rzeszow University of Technology, 35-959 Rzeszow, Poland

³ Department of Accounting, Attar Institute of Higher Education, Mashhad 9177939579, Iran; arash.arianpoor@attar.ac.ir (A.A.); fateme.eidi1991@gmail.com (F.E.G.)

* Correspondence: mehdi.salehi@um.ac.ir (M.S.); gzimon@prz.edu.pl (G.Z.)

Abstract: This study investigates the impact of investment efficiency on firm value with a moderating role of institutional ownership and board independence for companies listed on the Tehran Stock Exchange (TSE). The information from 177 companies in 2014–2021 was examined. Tobin's Q is a common measure for firm value, and it is a market-based measure and provides a good tool of comparison. The results show that investment efficiency has an impact on firm value. In addition, institutional ownership and board independence moderate this impact. There is a gap between the impact of investment efficiency on firm value and the moderating role of institutional ownership and board independence. This gap creates an opportunity for carrying out in-depth research on those variables. Since the impact of investment efficiency on firm value emphasizing the role of institutional ownership and board independence has not been studied, the study's findings can show the importance and necessity of this study and fill the gap in this field.

Keywords: firm value; investment efficiency; institutional ownership; board independence



Citation: Salehi, Mahdi, Grzegorz Zimon, Arash Arianpoor, and Fatemeh Eidi Gholezoo. 2022. The Impact of Investment Efficiency on Firm Value and Moderating Role of Institutional Ownership and Board Independence. *Journal of Risk and Financial Management* 15: 170. <https://doi.org/10.3390/jrfm15040170>

Academic Editors: Cristina Raluca Gh. Popescu and Khaled Hussainey

Received: 24 January 2022

Accepted: 28 March 2022

Published: 7 April 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Valuation is a common feature of all financial activities and plays a significant role in optimal capital allocation. The valuation of companies is one of many countries' most essential and most complex economic concepts. In developed and developing countries with advanced capital markets, the value of companies is determined by investment banks and investment consultants using specific standards for each industry. Determining the value of a firm and identifying the factors affecting it in the capital markets has always been a challenging topic for investors and financial analysts, and they try to determine the factors affecting the value of the company in reality. One of the critical factors for measuring the value of any firm is investment efficiency. Investors' motive to invest in the stock market is to get dividends or capital gain and company ownership. Prior to investment, investors will take stock returns they will accept and firm value into account. Although higher stock price equals higher corporate value and the maximum firm value will increase profit for shareholders (Husnan 2012), the agency problem is an obstacle to achieving the goal (Suhadak et al. 2019).

Due to the information asymmetry between owners and managers and by Signaling theory, accounting can be defined as a mechanism for the transfer of relevant and valuable information from the inside of the organization to the outside of it, which results in signaling about competitive advantage, performance, and value of the company (Gumanti 2011) and lead to better decision-making by investors (Vu 2020).

Furthermore, improving investment efficiency minimizes investment distortion. Since all projects with a positive net present value are funded in a perfect market, they increase the company's value (Stein 2003). In addition, an under-invested firm with a CEO who has a higher level of managerial optimism can improve the firm's investment efficiency by reducing the degree of investment, which increases the firm's value. However, when companies intend to overinvest, there is insufficient evidence to show that a company with a lower level of CEO optimism can effectively improve its investment efficiency by reducing overinvestment and increasing its value (Chen and Lin 2013). In the real world, where micro-investors and institutional investors do not have the same information, the investment efficiency may be distorted by limiting companies' ability to finance a potential project or selecting an inferior project or expropriating resources by managers (Stein 2003).

When a distorted investment reduces the efficiency of a firm's investment, the firm's value may be affected by the managerial perspective (Chen and Lin 2013). Thus, the structure of the board and how firms are governed may distress financial performance in various ways and can even lead to corporate disaster (Majeed et al. 2020). This structure can manage the agency problems between shareholders and top management (Hermalin and Michael 1991). By changing management, a company is likely to improve the company's financial performance, and coherent board decisions also affect corporate governance. As a result, the firm's board structure can affect the firm's financial performance (Majeed et al. 2020).

A strong board of directors can increase company transparency, leading to a growing reputation and reducing the asymmetric information gap among shareholders (Lokuwaduge and Heenetigala 2017). Stock prices respond to variables such as board independence, and in major economies, regulations are in place to improve the independence and qualification of board members (Yermack 2006). In Iran, issues related to creating a competitive environment and eliminating monopolies in the Iranian economy are controversial. The implementation of No. 44 of the Constitution on privatization and the relative change in the government's approach to the economy changed the ownership structure of companies. In emerging markets and in developing countries such as Iran, which has its own ownership structure, economic status, legal system, government policies, culture, and especially its corporate governance system and is facing economic sanctions, the norms in it, especially corporate governance issues, can be different from other countries and have different results on financial performance and firm's value (Arianpoor 2019), which is a reason for conducting the present study. Various corporate governance mechanisms, such as the composition of the board of directors and ownership structures, can protect the interests of shareholders during the corporate decision-making process (Ashfaq and Rui 2019). Institutional ownership can also address agency problems because of its ability to be advantageous, economical, and diversified (Habib et al. 2015). Based on previous studies, it can be argued that there is a gap in the impact of investment efficiency on company value and the moderating role of institutional ownership and board independence. This discrepancy creates an opportunity for conducting an in-depth study on those variables. Since the impact of investment efficiency on firm value with an emphasis on the role of institutional ownership and board independence has not been studied, the findings of this research can show the importance and necessity of this study, and so this research can fill a research gap in this field. Given the importance of investment efficiency and a company's financial performance in the development of the Iranian economy, this study can help investors in financial analysis and identify the investment behavior of companies in the Iranian economic environment. Moreover, by allowing the country's economic sector policymakers, a practical step can be taken to strengthen the country's economy.

In the following sections, the literature review and development of hypotheses are explained first. The research methodology is described in the third section. Then, the research findings are presented in the fourth section. Finally, the discussion and conclusion are presented.

2. Literature Review and Development of Hypotheses

One of the main goals of economic policies and decisions of countries is economic development, and efficient investment has an essential impact on sustainable economic growth and development (Hall and Lerner 2010). On the other hand, competitiveness is a central issue considered for achieving optimal economic growth and sustainable development. Competitive power is one of the characteristics of a successful company. Market competition is an influential factor in corporate investment and financial performance that can lead to increased investment and business efficiency and affects corporate value and agency costs (Nugroho and Stoffers 2020). The agency problem is derived from the separation between corporate ownership and corporate management, and it is an obstacle to achieving the goal. Professional managers are responsible for running most large companies, and they feel they have the authority to run companies without taking shareholder's interests into account (Suhadak et al. 2019).

Since the competitive environment plays an important informational role, a strong competitive environment creates an effective corporate governance culture and leads to improved oversight of management decisions about investment and efficiency. This can be accompanied by increased managerial efficiency and transparency in decision making and improves their level of accountability, which reduces the risk of incorrect investment decisions (Paniagua et al. 2018). Under competition, managers are encouraged to carry out their duties in maintaining the company's sustainability (Alimov 2014). When stock price information improves, capital allocation is done more efficiently in companies with more market power, increasing the company's investment efficiency and financial performance (Peress 2010). Thus, according to the presented theoretical foundations, Hypothesis 1 is presented as follows:

Hypothesis 1 (H1). *Investment efficiency has an impact on firm value.*

On the other hand, corporate governance includes various types of agreements, organizational mechanisms, and procedures for balancing the power and responsibility of company shareholders, management, board of directors, and employees (Zafar et al. 2008), and competition plays a role in corporate governance, in which market competition increases investment and a company's financial performance through management discipline and strengthens corporate governance (Laksmana and Yang 2015). Corporate governance occurs mainly through internal mechanisms such as ownership structure (Mnasri and Ellouze 2015).

It is one of the most critical factors affecting the proper implementation of corporate governance and increases the reliability of corporate activities and management policies regarding investment and protecting stakeholders' interests (Chen 2013). In today's world, rapid and continuous changes occur in the economic environment, resulting in intense competition in the global economy. Since competitiveness provides economic success in various industries, it has increased attention.

Institutional ownership has a crucial supervisory role in reducing agency costs, controlling the directors, and improving current financial performance and investment efficiency (Rashed et al. 2018) and could pressure managers into a short-term focus (Bushee 2001). Therefore, Hypothesis 2 is presented as follows:

Hypothesis 2 (H2). *Institutional ownership moderates the impact of investment efficiency on firm value.*

Another central corporate governance mechanism is independent directors who might increase or reduce the firm performance. Independent directors are one of the primary debates in corporate governance concerns, and they can control top management and reduce agency problems, particularly the problem of information asymmetry. Monks and Minow (2004) showed that independent directors play an important role in influencing firm

performance and are likely to protect stakeholders against managerial self-serving behavior from an agency theory perspective. Belkhir (2009) showed that independent directors could reduce the risk of moral risks through an oversight role. These directors should mediate the conflict between minority and majority shareholders and improve managers’ performance through the monitoring role of managers, which ultimately leads to improved company performance (De Andres et al. 2005).

However, the literature in emerging markets is mixed concerning the impact of independent directors on firm performance (e.g., Black et al. 2012; Mahadeo et al. 2012; Marashdeh 2014; Ramdani and Witteloostuijn 2010). Although different studies show mixed results on the relationship between board independence and firm performance, the evidence supports independent directors’ impact on firm performance (Abdullah 2004). Independent managers are motivated to perform their monitoring duties and do not collude with CEOs because they are more independent and more likely to protect their reputation in the external market (Fama 1980; Fama and Jensen 1983). In addition, due to information asymmetry between managers and investors, managers tend to make short-term decisions when the capital market is under pressure to increase investment value and stock prices and avoid buying stocks (Salehi et al. 2021). Because the manager attempts to use the investment made to distort the financial statements presented to the stock market to increase the stock price (Nyman 2005), the board’s independence significantly increases the company’s risk, which can also affect firm value (Zhang et al. 2018). Based on the above discussion, Hypothesis 3 is presented as follows:

Hypothesis 3 (H3). *Board independence moderates the effect of investment efficiency and firm value.*

3. Research Methodology

The statistical population of this paper is all listed firms on the Tehran Stock Exchange. This paper assesses the listed firms for 8 years, from 2014 to 2021. In Iran, the guidelines of internal controls, the audit committee, and internal audit activity have been used since nearly 2014. Therefore, the beginning of the research period, 2014, was considered to access more appropriate information. Moreover, for the present research, the required information is available until 2021.

In this paper, the firms under study were selected based on the following criteria:

1. They should not be affiliated with investment firms, financial intermediaries, holdings, banks, and leasing; and,
2. They should have a change in the fiscal year or a change in the activity.

A total of 177 companies were selected to test the hypotheses according to the mentioned criteria.

Model and Variables under Study for Hypotheses Testing

Equation (1) was used to test Hypothesis 1, and Equation (2) tested Hypotheses 2 and 3.

$$\text{Value}_{it} = \beta_0 + \beta_1\text{INV}_{it} + \beta_2\text{SIZE}_{it} + \beta_3\text{LEV}_{it} + \beta_4\text{ROA}_{it} + \text{End Year} + \text{Year} + \text{Industry} + \varepsilon_{it} \quad (1)$$

$$\begin{aligned} \text{Value}_{it} = & \beta_0 + \beta_1\text{INV}_{it} + \beta_2\text{INSOWN}_{i,t} + \beta_3\text{BOARD}_{it} + \beta_4\text{INSOWN}_{i,t} \times \text{INV}_{it} \\ & + \beta_5\text{BOARD}_{it} \times \text{INV}_{it} + \beta_6\text{SIZE}_{it} + \beta_7\text{LEV}_{it} + \beta_8\text{ROA}_{it} + \text{End Year} + \text{Year} + \text{Industry} + \varepsilon_{it} \end{aligned} \quad (2)$$

The dependent variable:

Value_{it}: Tobin’s Q is a common measure for firm value. This measure is market-based and is considered a principal dependent variable. It has a forward-looking nature and can capture the company’s value (Gerged et al. 2021). Tobin’s Q is calculated as the ratio of total assets minus the book value of equity plus the market value of equity to total assets. This measure performs better than other accounting ratios and is less affected by accounting practices (Banos-Caballero et al. 2014). It also considers firm risk based on the company’s

capital market valuation (Smirlock et al. 1984). However, the use of this measure might be inflated by underinvestment if companies have access to debt financing (Dybvig and Warachka 2015; Kose and Litov 2010). Since this measure considers the market value of companies, it provides a good comparison tool (Abdi et al. 2020; Xie et al. 2019).

Independent variable:

$INV_{i,t}$ is the investment efficiency. According to Biddle et al. (2009) and Houcine (2017), this study used Equation (3) to calculate investment efficiency. Investment efficiency is a company undertaking project with a positive net present value under no market frictions. Underinvestment and overinvestment show investment inefficiency. Underinvestment represents passing up investment opportunities with a positive net present value, while overinvestment represents investing in projects with negative value (Houcine 2017).

$$INV_{i,t+1} = \beta_0 + \beta_1 sales_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

$INV_{i,t+1}$ is the total investment. It is proxied by the difference between capital expenditures and asset sales for firm i at year t , scaled by capital stock at the beginning of the period. $Sales_{i,t}$ is the change in sales from year $t - 1$ to year t for firm i scaled by prior sales. $\varepsilon_{i,t+1}$ is residuals raised from Equation (3) to proxy for investment inefficiency for firm i at year $t + 1$. The reason for using the model is that according to the neo-classical framework (Hayashi 1982), the marginal Q ratio should describe solely corporate investment when markets are perfect (Houcine 2017).

However, as it is difficult to build the Q ratio, sales growth is a proxy for investment opportunities (Biddle et al. 2009). Unlike the Q ratio, sales growth has no theoretical basis as a proxy for investment opportunities. Nonetheless, it can be justified by the following intuition: an increase in sales indicates a future increase in demand for a company's products (Morck et al. 1990), and to meet the growing demand, increasing production facilities may be necessary, and investment is needed to achieve this expansion (Houcine 2013). In Equation (3), the residuals are used as a firm-specific proxy for investment inefficiency because it shows the deviation of the company's actual investment level from the expected investment. The value of this deviation indicates an inverse indicator of investment efficiency. Positive residuals or positive deviation from expected investment indicates over-investing, and negative residuals indicate under-investing. Investment efficiency is measured as the absolute value of this error component multiplied by a negative one. Therefore, the larger the amount, the greater the investment efficiency (Richardson 2006).

Modifier variables:

$INSOWN_{i,t}$: Institutional ownership is measured by the percentage of shares held by an institutional owner (Alqatamin et al. 2017; Rashed et al. 2018).

$Board_{i,t}$: The number of unaffiliated independent boards divided by the total number of board members (Bhagat and Bolton 2019).

Control variables:

$SIZE_{i,t}$: Firm size is calculated as the natural logarithm of total assets. Several previous studies have used firm size (Al-Matari et al. 2012; Cassar and Holmes 2003). The firm size is likely to affect corporate performance positively. The log of total assets calculates this variable. The logarithm mitigates heteroscedasticity problems (Aliani and Zarai 2012).

$LEV_{i,t}$: Leverage is calculated as total debt divided by the total assets. The relationship between leverage and corporate performance is complicated. A positive impact on corporate performance might occur due to lenders' monitoring (Saidat et al. 2019). Leverage is used as a proxy for financial risk (Shahwan 2015).

$ROA_{i,t}$: Return on assets is defined as the net profit divided by the total assets. Companies with higher ROA are expected to perform better and riskless (Aktaş and Unal 2015). A high level of profitability ratios means a low level of financial liquidity. In turn, the liquidity ratios are at a high level (Banos-Caballero et al. 2014; Zimon and Zimon 2019; Zimon et al. 2022).

EndYear is the control variable of the financial year-end. If the end of financial year-end of the firm in March, it is 1, otherwise, 0.

4. Empirical Results

4.1. Data on Descriptive Statistics

Descriptive statistics of the main variables of this research are presented in Table 1. Tobin’s Q can be interpreted as a score above 1, meaning that the firm is creating value and a score below 1, meaning that the firm is destroying wealth. The mean value variable (Tobin’s Q) in this study is 2.573, which shows that the companies create value.

Table 1. Descriptive statistics of main variables.

Variable	Mean	Standard Deviation	Minimum	Maximum
Value	2.573	2.310	0.515	20.758
INV	−0.036	0.689	−0.618	7.974
SIZE	28.231	1.558	24.133	34.579
LEV	0.554	0.216	0.013	1.567
ROA	0.134	0.153	−0.404	0.830
INSOWN	0.602	0.271	0.000	0.989
BOARD	0.670	0.186	0.200	1.000

Resource: Research findings.

4.2. Data Analysis and Main Results

Table 2 shows the correlation analysis of research variables. The results show a positive correlation between investment efficiency and a firm value at the 99% confidence level (coefficient: 0.001).

Table 2. Correlation analysis of research variables.

	Value	INV	SIZE	LEV	ROA	INSOWN	BOARD
Value	1						
INV	0.001 ***	1					
SIZE	0.226 **	0.336 **	1				
LEV	−0.283 **	0.021	0.031	1			
ROA	0.130 **	0.043 *	0.228 **	−0.097 ***	1		
INSOWN	0.116 **	−0.011	0.131 **	0.219 **	0.162 **	1	
BOARD	0.009 **	0.211 *	0.021	−0.004 ***	0.021 *	0.043 *	1

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Resource: Research findings.

This study used the Durbin and Wu–Hausman test to test endogeneity. The results of this test for research equations are presented in Table 3. Since the *p*-value is more than 0.05, there is no endogeneity.

Table 3. Results of Durbin–Wu–Hausman test.

Equation	Test	χ^2 Statistic	<i>p</i> -Value	Result
(1)	Durbin	$\chi^2 = 0.142$	0.791	H0 is not rejected (there is no endogeneity)
	Wu–Hausman	F = 0.173	0.724	H0 is not rejected (there is no endogeneity)
(2)	Durbin	$\chi^2 = 0.788$	0.274	H0 is not rejected (there is no endogeneity)
	Wu–Hausman	F = 0.963	0.298	H0 is not rejected (there is no endogeneity)

Resource: Research findings.

According to Table 4, based on Equation (1), the investment efficiency has a positive and significant effect on the firm value with 99% confidence (sig < 0.01 and coefficient = 0.298). Thus, Hypothesis 1 is confirmed. Among the control variables in Equation (1), the leverage

has a negative effect on firm value (sig < 0.01 and coefficient = -0.321) while firm size has a positive effect on firm value (sig < 0.01 and coefficient = 0.267).

Table 4. GLS for the impact of investment efficiency, institutional ownership, and board independence on firm value.

Dependent Variable: Firm Value (Value _{i,t})		
	Equation (1): Coefficient (t-Stat.)	Equation (2): Coefficient (t-Stat.)
INV _{i,t}	0.298 *** (4.210)	0.432 *** (3.870)
INSOWN _{i,t}		0.301 (0.830)
BOARD _{i,t}		0.220 (0.980)
INSOWN _{i,t} × INV _{i,t}		0.120 ** (2.210)
BOARD _{i,t} × INV _{i,t}		0.712 ** (2.150)
SIZE _{i,t}	0.267 *** (6.750)	0.470 *** (4.320)
LEV _{i,t}	-0.321 *** (-3.110)	-0.198 *** (-3.980)
ROA _{i,t}	0.225 (1.120)	0.065 (1.130)
_cons	2.341 *** (4.220)	2.320 *** (5.170)
END YEAR fixed effect	Yes	Yes
YEAR fixed effect	Yes	Yes
INDUSTRY fixed effect	Yes	Yes
N	1416	1416
χ ² statistic	489.27 (0.000)	460.62 (0.000)
R ²	0.564	0.551
Adjusted R ²	0.558	0.548
Durbin-Watson statistic	1.867	1.851

** and *** indicate statistical significance at the 5%, and 1% levels, respectively. Note for Equations (1) and (2): Based on the Levin–Lin–Chu unit-root test, the findings show that all variables are stationary. F-Limer (Chow) results show that at the 95% confidence level, the hypothesis of panel data was accepted. Consequently, the Hausman test was used for selecting random or fixed-effects models. The results of the Hausman test show that the fixed effects method should be used for hypothesis testing. The Durbin–Watson statistics show no severe autocorrelation of the error term. The results indicate there was no variance heterogeneity. Based on the results of the Wooldridge test, there was autocorrelation in the research model. The GLS test was used to estimate the model’s coefficients to deal with the issue and the problem of variance heterogeneity. Resource: Research findings.

A modified multiple regression method was used to investigate the moderating role of institutional ownership and board independence. According to Equation (2) in Table 4, institutional ownership moderates the relationship between investment efficiency and firm value (sig < 0.05 and Coefficient = 0.120). Therefore, Hypothesis 2 is also confirmed. The board independence positively affects the relationship between investment efficiency and firm value (sig < 0.05 and coefficient = 0.712), confirming Hypothesis 3. According to Equation (2), the leverage has a negative effect on the firm value (sig < 0.01 and coefficient = -0.198), while firm size has a positive effect on firm value (sig < 0.01 and Coefficient = 0.470).

4.3. Additional Analysis

Table 5 shows the statistical results of testing the hypotheses based on the robust regression. According to robust regression, the investment efficiency has a positive and significant effect on the firm value, and the size of this effect is 0.410 (sig < 0.01). In addition, leverage has a negative effect on firm value (sig < 0.01 and coefficient = -0.190) and firm size has a positive effect on firm value (sig < 0.01 and coefficient = 0.460). According to Equation (2), institutional ownership and board independence have a moderating role in the relationship between investment efficiency and firm value. The effect of institutional ownership on the relationship between investment efficiency and firm value is 0.155 (sig < 0.01). The size of the effect of board independence on the relationship between investment efficiency and firm value is 0.433 (sig < 0.05). Therefore, the results of this test are consistent with the results of GLS.

The summary of statistical results of Equations (1) and (2) tests based on t + 1 test (value_{it+1}) is presented in Table 6. According to Equation (1), the investment efficiency has a positive and significant effect on firm value (sig < 0.05 and coefficient = 0.321). Among the control variables in Equation (1), the leverage has a negative effect on firm value

(sig < 0.05 and coefficient = −0.196), while firm size (sig < 0.01 and coefficient = 0.220) and ROA (sig < 0.1 and coefficient = 0.425) have a positive effect on firm value. According to Equation (2) in Table 6, the institutional ownership moderates the relationship between investment efficiency and firm value (sig < 0.05 and coefficient = 0.345). The board independence also has a positive effect on the relationship between investment efficiency and firm value (sig < 0.05 and coefficient = 0.434). Leverage has a negative effect on firm value (sig < 0.05 and coefficient = −0.233), while firm size (sig < 0.01 and coefficient = 0.318) and ROA (sig < 0.1 and coefficient = 0.322) have a positive effect on firm value.

Table 5. Robust regression for the impact of investment efficiency, institutional ownership, and board independence on firm value.

Dependent Variable: Firm Value (Value _{i,t})		
	Equation (1): Coefficient (t-Stat.)	Equation (2): Coefficient (t-Stat.)
INV _{i,t}	0.410 *** (4.720)	0.287 *** (3.430)
INSOWN _{i,t}		0.098 (0.260)
BOARD _{i,t}		0.142 (1.100)
INSOWN _{i,t} × INV _{i,t}		0.155 *** (4.220)
BOARD _{i,t} × INV _{i,t}		0.433 ** (2.240)
SIZE _{i,t}	0.460 *** (4.020)	0.755 *** (5.980)
LEV _{i,t}	−0.190 *** (−3.210)	−0.221 *** (−4.150)
ROA _{i,t}	0.114 (1.120)	0.080 (1.220)
_cons	4.080 *** (4.160)	3.592 *** (7.130)
END YEAR fixed effect	Yes	Yes
YEAR fixed effect	Yes	Yes
INDUSTRY fixed effect	Yes	Yes
N	1416	1416
χ ² statistic	185.65 (0.000)	210.67 (0.000)
R ²	0.518	0.533
Adjusted R ²	0.498	0.529
Durbin–Watson statistic	1.764	1.816

** and *** indicate statistical significance at the 5%, and 1% levels, respectively. Resource: Research findings.

Table 6. t + 1 regression for the impact of investment efficiency, institutional ownership, and board independence on firm value.

Dependent Variable: Firm Value (Value _{i,t+1})		
	Equation (1): Coefficient (t-Stat.)	Equation (2): Coefficient (t-Stat.)
INV _{i,t}	0.321 ** (2.210)	0.321 ** (2.120)
INSOWN _{i,t}		0.098 *** (3.320)
BOARD _{i,t}		0.324 ** (2.270)
INSOWN _{i,t} × INV _{i,t}		0.345 ** (2.110)
BOARD _{i,t} × INV _{i,t}		0.434 ** (2.150)
SIZE _{i,t}	0.220 *** (4.213)	0.318 *** (5.321)
LEV _{i,t}	−0.196 * (−1.880)	−0.233 ** (−2.150)
ROA _{i,t}	0.425 * (1.880)	0.322 * (1.920)
_cons	2.326 *** (4.120)	3.246 *** (5.320)
END YEAR fixed effect	Yes	Yes
YEAR fixed effect	Yes	Yes
INDUSTRY fixed effect	Yes	Yes
N	1416	1416
χ ² statistic	354.22 (0.000)	429.61 (0.000)
R ²	0.423	0.435
Adjusted R ²	0.402	0.427
Durbin–Watson statistic	1.825	1.812

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Resource: Research findings.

5. Discussion

In this study, investment efficiency has a positive and significant effect on the firm value. The company value is reflected in the price of the firm's shares. The higher the stock price, the higher the company value (Husnan 2012). When stock price information improves, capital allocation is done more efficiently, increasing the company's investment efficiency and then firm performance and firm value (Peress 2010). The theory also predicts this result.

The theoretical and empirical literature shows that ownership structure is an essential determinant for firm value (Mnasri and Ellouze 2015), and the degree of ownership and their relative effectiveness in disciplining and monitoring managers is likely different across countries, and prior studies also find mixed results (Lemma et al. 2018). However, this study indicated that institutional ownership and board independence lead to greater firm-specific investments that produce better long-term productivity and thus increase investment efficiency. Studies show that institutional investors have the opportunities, resources, and ability to monitor discipline and influence corporate managers (Chung et al. 2002). The presence of these investors with large share ownership has the opportunity to benefit from economies of scale in information collection and thus can directly bear the agency costs of separation of ownership and control (Koh 2003). Large institutional investors reduce information asymmetries between management and external stakeholders (Lev 1988) and have higher incentives to monitor management myopia (Pound 1992), and the incremental benefits from increased monitoring are likely to outweigh the incremental costs of monitoring (Jensen and Meckling 1976; Ramsay and Blair 1993; Shleifer and Vishny 1986). Furthermore, board independence is one of the indicators of corporate governance that is expected to minimize the discrepancy between manager and shareholders' interests, help managers get direct advantages from the decision they are making, and receive consequences from the decision (Suhadak et al. 2019), and these appropriate decisions can increase the welfare of shareholders and thus increase the firm value.

In line with this argument, Bushee (1998) indicated that institutional investors' high turnover and momentum trading encourages myopic investment behavior when such institutional investors have extremely high ownership levels in a firm; otherwise, institutional ownership reduces pressure on managers for the myopic investment behavior. Large shareholders can impose efficiency and productivity improvement upon management (Shleifer and Vishny 1986; Vintila and Gherghina 2014). The institutional shareholder can monitor the company's executive management due to their ability to deliver information to shareholders and monitor the organization's performance, leading to increased efficiency (Rashed et al. 2018). Elyasiani et al. (2010) supported this argument that management is observed efficiently, and institutional investors' performance is enhanced.

On the other hand, internal managers who are more motivated and efficient than external managers have led non-executive managers to trust the information and experience of internal managers (Riyadh et al. 2019). Therefore, due to the focus of non-executive managers on finance issues and corporate management activities (Uyar et al. 2020), they have placed suitable internal managers (Riyadh et al. 2019). However, the emerging-market literature is mixed concerning the impact of independent directors on firm performance. Black et al. (2012) and Marashdeh (2014) found a positive association between Korea's two variables, a negative association in Brazil and no association in India. Although the empirical findings on the relationship between board independence and firm value are mixed, the evidence supports outside directors' impact on firm value (Abdullah 2004). In general, the results of this study are predicted by the agency theory (Jensen and Meckling 1976), which states that supervision by owners through the independent board, institutional ownership, and public ownership should be used as a tool to check managerial behavior benefiting them to improve efficiency that can ultimately improve financial performance and firm value.

6. Conclusions

This paper showed the impact of investment efficiency on firm value, emphasizing the role of institutional ownership and board independence. Since Iran's economic environment and conditions as a developing country are different from other countries and have a unique ownership structure and corporate governance system, in these conditions, the impact of ownership and executive structure on firm value can have different results than in other countries. Therefore, it seems that ownership and executive structures following the conditions of Iran will be necessary. For this purpose, 177 companies' information in 2014–2021 was examined, and firm value was measured through the most critical accounting-based performance index.

The study found that investment efficiency impacts firm value. In addition, institutional ownership and board independence moderate this impact.

This study provides empirical evidence of how institutional ownership and board independence can affect firm value. The findings have important implications for researchers, policymakers, and corporate boards such that in order to improve substantial value, they should focus on board members and institutional ownership. To achieve strategic goals and increase firm value, managers need to be accountable to their shareholders and effectively monitor the managers' behavior. Institutional shareholders may result in opportunistic behavior due to collusion between the board of directors and the management (Suhadak et al. 2019). This study was based on agency theory, which provides the theoretical foundations. This study's results can help practitioners design corporate financial strategies and increase firm value. According to the results, investors can be suggested to consider investment efficiency as a factor affecting the firm value. Companies can also minimize information asymmetry through greater board independence to increase firm value. However, this research does not consider the risks of Iran's economic sanctions. It is suggested that future research consider risk factors and macroeconomics dynamics to obtain more conclusive results, and a better understanding would be a highly desirable area for future research. Further research is recommended to develop observations with diverse industries and even compare companies with more/lower institutional ownership. There are three types of investors: investors who prefer stock with high dividend yield, investors who prefer return from dividend and capital gain, and investors who prefer stock with low dividend yield (Black and Scholes 1974). Thus, investors' behavior has an important role in investment. For this reason, it is suggested that psychological attributes and financial psychology should be considered in future studies.

This study provides new evidence of the Iranian environment, explains the results, enriches the relevant literature, and provides a relevant contribution to academic researchers in making strategic decisions.

This study has some time and space limitations; therefore, caution should be taken in generalizing the results to other times and other statistical populations. Since this study focuses on Iranian companies, the results reflect Iran's economic and business environment characteristics. The results are also limited to the selected variables. Many internal and external factors affect financial performance and firm value. Even market anomalies make differences in the interest rate that impact investor behavior (Natarajan et al. 2020). Hence, the firm value is also affected. In addition, because different studies have proposed various methods for measuring the firm value, we used the essential accounting-based performance index in this research. However, using other measures to calculate firm value can lead to different results.

Author Contributions: Conceptualization, M.S., G.Z., A.A. and F.E.G.; methodology, M.S., G.Z., A.A. and F.E.G.; validation, M.S., G.Z., A.A. and F.E.G.; formal analysis, M.S., G.Z., A.A. and F.E.G.; investigation, M.S., G.Z., A.A. and F.E.G.; resources, M.S., A.A. and F.E.G.; data curation, M.S., A.A. and F.E.G.; writing—original draft preparation, M.S., A.A. and F.E.G.; writing—review and editing, M.S., A.A. and F.E.G.; visualization, M.S., G.Z., A.A. and F.E.G. supervision, M.S., G.Z., A.A. and F.E.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Abdi, Yaghoub, Xiaoni Li, and Xavier Càmarà-Turull. 2020. Impact of Sustainability on Firm Value and Financial Performance in the Air Transport Industry. *Sustainability* 12: 9957. [CrossRef]
- Abdullah, Shamshul Nahar. 2004. Board composition, CEO duality, and performance among Malaysian listed companies. *Corporate Governance: The International Journal of Business in Society* 4: 47–61. [CrossRef]
- Aktaş, Rafet, and Seyfettin Unal. 2015. The relationship between financial efficiency ratios and stock prices: An empirical investigation on insurance companies listed in Borsa Istanbul. *Finansal Araştırmalar ve Çalışmalar Dergisi* 7: 1–16. [CrossRef]
- Aliani, Khaoula, and Mohamed Ali Zarai. 2012. Demographic diversity in the board and corporate tax planning. *Journal Business Management and Strategy* 3: 72–86.
- Alimov, Azizjon. 2014. Product market competition and the value of corporate cash: Evidence from trade liberalization. *Journal of Corporate Finance* 25: 122–39. [CrossRef]
- Al-Matari, Ebrahim Mohammed, Abdullah Kaid Al-Swidi, Faudziah Hanim Fadzil, and Yahaya Ali Al-Matari. 2012. The impact of board characteristics on firm performance: Evidence from non-financial listed companies in Kuwaiti stock exchange. *International Journal of Accounting and Financial Reporting* 2: 310–32. [CrossRef]
- Alqatamin, Rateb, Zakaria Ali Aribi, and Thankom Arun. 2017. The effect of CEOs' characteristics on forward-looking information. *Journal of Applied Accounting Research* 5: 126–61. [CrossRef]
- Arianpoor, Arash. 2019. Impact of Audit Report Lag, Institutional Ownership and Board Characteristics on Financial Performance. *Iranian Journal of Accounting, Auditing and Finance* 3: 83–97.
- Ashfaq, Khurram, and Zang Rui. 2019. Revisiting the relationship between corporate governance and corporate social and environmental disclosure practices in Pakistan. *Social Responsibility Journal* 15: 90–119. [CrossRef]
- Banos-Caballero, Sonia, Pedro Garcia-Teruel, and Pedro Martinez-Solano. 2014. Working capital management, corporate performance, and financial constraints. *Journal of Business Research* 67: 332–38. [CrossRef]
- Belkhir, Mohamed. 2009. Board of directors' size and performance in the banking industry. *International Journal of Managerial Finance* 5: 201–21. [CrossRef]
- Bhagat, Sanjaj, and Brion Bolton. 2019. Corporate governance and firm performance: The sequel. *Journal of Corporate Finance* 58: 142–68. [CrossRef]
- Biddle, Gary C., Gilles Hilary, and Rodrigo Verdi. 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48: 112–31. [CrossRef]
- Black, Bernard S., Antonio Gledson De Carvalho, and Erica Gorga. 2012. What matters and for which firms for corporate governance in emerging markets? Evidence from Brazil (and other BRIK countries). *Journal of Corporate Finance* 18: 934–52. [CrossRef]
- Black, Fischer, and Myron Scholes. 1974. The effects of dividend policy on common stock prices and returns. *Journal of Financial Economics* 1: 1–22. [CrossRef]
- Bushee, Brian J. 1998. The influence of institutional investors on myopic R&D investment behavior. *Accounting Review* 73: 305–33.
- Bushee, Brian J. 2001. Do institutional investors prefer near-term earnings over long-run value? *Contemporary Accounting Research* 18: 207–46. [CrossRef]
- Cassar, Gavin, and Scott Holmes. 2003. Capital structure and financing of SMEs: Australian evidence. *Accounting and Finance* 43: 123–47. [CrossRef]
- Chen, H. Ju, and Shing-Hung Lin. 2013. Managerial optimism, investment efficiency, and firm valuation. *Multinational Finance Journal* 17: 295–340. [CrossRef]
- Chen, Ming Yuan. 2013. Adjustments in managerial ownership and changes in firm value. *International Review of Economics and Finance* 25: 1–12. [CrossRef]
- Chung, Richard, Michael Firth, and Jeong Bon Kim. 2002. Institutional monitoring and opportunistic earnings management. *Journal of Corporate Finance* 8: 29–48. [CrossRef]
- De Andres, Pablo, Valentin Azofra, and Felix Lopez. 2005. Corporate boards in OECD countries: Size, composition, functioning and effectiveness. *Corporate Governance: An International Review* 13: 197–210. [CrossRef]
- Dybvig, Philip H., and Mitch Warachka. 2015. Tobin's q Does Not Measure Firm Performance: Theory, Empirics, and Alternatives. Available online: <http://ssrn.com/abstract=1562444> (accessed on 7 April 2015). [CrossRef]
- Elyasiani, Elyas, Jingyi Jane Jia, and Connie X. Mao. 2010. Institutional ownership stability and the cost of debt. *Journal of Financial Markets* 13: 475–500. [CrossRef]
- Fama, Eugene F. 1980. Agency Problems and the theory of the firm. *The Journal of Political Economy* 88: 288–307. [CrossRef]

- Fama, Eugene F., and Michael C. Jensen. 1983. Separation of ownership and control. *The Journal of Law and Economics* 26: 301–25. [[CrossRef](#)]
- Gerged, Ali Meftah, Eshani Beddewela, and Christopher J. Cowton. 2021. Is corporate environmental disclosure associated with firm value? A multicountry study of Gulf Cooperation Council firms. *Business Strategy and the Environment* 30: 185–203. [[CrossRef](#)]
- Gumanti, Tatang Ary. 2011. *Manajemen Investasi*. Bogor: Mitra Wacana Media.
- Habib, Ahsan, Hedy Jiang, and Donghua Zhou. 2015. Related party transactions and audit fees: Evidence from China. *Journal of International Accounting Research* 14: 19–83. [[CrossRef](#)]
- Hall, Bronwyn H., and Jesh Lerner. 2010. The financing of R&D and innovation. In *Handbook of the Economics of Innovation*. Amsterdam: Elsevier, vol. 1, pp. 609–39.
- Hayashi, Fumio. 1982. Tobin's marginal q and average q: A neoclassical interpretation. *Econometrica: Journal of the Econometric Society* 50: 213–24. [[CrossRef](#)]
- Hermalin, Benjamin, and Weisbach Michael. 1991. The Effects of Board Composition and Direct Incentives on Firm Performance. *Financial Management* 20: 101–12. [[CrossRef](#)]
- Houcine, Asma. 2013. Does accounting conservatism affect firm investment efficiency in an emerging market? Evidence from Tunisian context. *African Journal of Accounting, Auditing and Finance* 2: 209–32. [[CrossRef](#)]
- Houcine, Asma. 2017. The effect of financial reporting quality on corporate investment efficiency: Evidence from the Tunisian stock market. *Research in International Business and Finance* 42: 321–37. [[CrossRef](#)]
- Husnan, Suad. 2012. *Manajemen Keuangan Teori dan Penerapan (Keputusan Jangka Panjang)*, 4th ed. Yogyakarta: BPFE.
- Jensen, Michael C., and William H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3: 305–60. [[CrossRef](#)]
- Koh, Ping-Sheng. 2003. On the association between institutional ownership and aggressive corporate earnings management in Australia. *The British Accounting Review* 35: 105–28. [[CrossRef](#)]
- Kose, John, and Lubomir Litov. 2010. Managerial entrenchment and capital structure: New evidence. *Journal of Empirical Legal Studies* 7: 693–742.
- Laksmiana, Indrarini, and Ya-Wen Yang. 2015. Product Market Competition and Corporate Investment Decisions. *Review of Accounting and Finance* 14: 128–48. [[CrossRef](#)]
- Lemma, Tesfaye T., Minga Negash, Mthokozisi Mlilo, and Ayalew Lulseged. 2018. Institutional ownership, product market competition, and earnings management: Some evidence from international data. *Journal of Business Research* 90: 151–63. [[CrossRef](#)]
- Lev, Baruch. 1988. Toward a theory of equitable and efficient accounting policy. *Accounting Review* 63: 1–22.
- Lokuwaduge, Chitra Sryani Da Silva, and Kumudini Heenetigala. 2017. Integrating environmental, social and governance (ESG) disclosure for sustainable development: An Australian study. *Business Strategy and the Environment* 26: 438–50. [[CrossRef](#)]
- Mahadeo, Jyoti D., Teerooven Soobaroyen, and Vanisha Oogarah Hanuman. 2012. Board composition, and financial performance: Uncovering the effects of diversity in an emerging economy. *Journal of Business Ethics* 105: 375–88. [[CrossRef](#)]
- Majeed, Muhammed Kashif, Ji Cheng Jun, Muhammad Zia-Ur-Rehman, Muhammad Mohsin, and Zeshan Rafiq Muhammad. 2020. The Board Size and Board Composition Impact on Financial Performance: An Evidence from the Pakistani and Chinese's Listed Banking Sector. *Journal of Asian Finance, Economics and Business* 7: 81–95. [[CrossRef](#)]
- Marashdeh, Ziyad M. S. 2014. The Effect of Corporate Governance on Firm Performance in Jordan. Ph.D. dissertation, University of Central Lancashire, Preston, UK.
- Mnasri, Khadiija, and Dorra Ellouze. 2015. Ownership structure, product market competition and productivity. *Management Decision* 53: 1771–805. [[CrossRef](#)]
- Monks, Robert, and Neil Minow. 2004. *Corporate Governance*. Cambridge: Blackwell Business.
- Morck, Randall, Andrei Shleifer, and Robert W. Vishny. 1990. Do Managerial Objectives Drive Bad Acquisitions? *Journal of Finance* 45: 31–48. [[CrossRef](#)]
- Natarajan, Rengaraju, Sithambaram Sivakavitha, and Sankarkumar Amirdha Vasani. 2020. Relationship between Stock Return and Firms' Financial Performance in Bse Listed Companies. *European Journal of Molecular & Clinical Medicine* 7: 4553–59.
- Nugroho, Ahmad C., and Jo Stoffers. 2020. Market Competition and Agency Problem: A Study in Indonesian Manufacturing Companies. *Jurnal Dinamika Manajemen* 11: 65–77. [[CrossRef](#)]
- Nyman, Ingmar. 2005. Stock market speculation and managerial myopia. *Review of Financial Economics* 14: 61–79. [[CrossRef](#)]
- Paniagua, Jordi, Rafael Rivelles, and Juan Sapena. 2018. Corporate governance and financial performance: The role of ownership and board structure. *Journal of Business Research* 89: 229–34. [[CrossRef](#)]
- Peress, John. 2010. Product market competition, insider trading, and stock market efficiency. *The Journal of Finance* 65: 1–43. [[CrossRef](#)]
- Pound, Joel. 1992. Beyond takeovers: Politics comes to corporate control. *Harvard Business Review* 70: 83–93.
- Ramdani, Dendi, and Arjen van Witteloostuijn. 2010. The impact of board independence and CEO duality on firm performance: A quantile regression analysis for Indonesia, Malaysia, South Korea, and Thailand. *British Journal of Management* 21: 607–27. [[CrossRef](#)]
- Ramsay, Ian M., and Mark Blair. 1993. Ownership concentration, institutional investment and corporate governance: An empirical investigation of 100 Australian companies. *The Melbourne University Law Review* 19: 153–94.
- Rashed, Ahmed, Ebitihj Abd El-Rahman, Esraa Isamil, and Doaa Abd El-Samea. 2018. Ownership Structure and Investment Efficiency: Evidence from Egypt. *International Journal of Accounting and Financial Reporting* 8: 1–22. [[CrossRef](#)]

- Richardson, Scott. 2006. Over-investment of free cash flow. *Review of Accounting Studies* 11: 159–89. [\[CrossRef\]](#)
- Riyadh, Hosam Alden, Eko Ganis Sukoharsono, and Salsabila Aisyah Alfaiza. 2019. The impact of corporate social responsibility disclosure and board characteristics on corporate performance. *Cogent Business & Management* 6: 1–18. [\[CrossRef\]](#)
- Saidat, Zaid, Mauricio Silva, and Claire Seaman. 2019. The relationship between corporate governance and financial performance: Evidence from Jordanian family and nonfamily firms. *Journal of Family Business Management* 9: 54–78. [\[CrossRef\]](#)
- Salehi, Mahdi, Aria Arianpoor, and Nader Naghshbandi. 2021. The relationship between managerial attributes and firm risk-taking. *The TQM Journal*. [\[CrossRef\]](#)
- Shahwan, Tamer Mohamed. 2015. The effects of corporate governance on financial performance and financial distress: Evidence from Egypt. *Corporate Governance* 15: 641–62. [\[CrossRef\]](#)
- Shleifer, Andrei, and Robert W. Vishny. 1986. Large shareholders and corporate control. *Journal of Political Economy* 94: 461–88. [\[CrossRef\]](#)
- Smirlock, Michael, Thomas Gilligan, and William Marshall. 1984. Tobin's q and the Structure-Performance Relationship. *The American Economic Review* 74: 1051–60.
- Stein, Jeremy C. 2003. Agency, Information and Corporate Investment. In *Handbook of the Economics of Finance*. Edited by George M. Constantinides, Milton Harris and René M. Stulz. Amsterdam: Elsevier, pp. 111–65.
- Suhadak, Kurniaty, Siti Ragil Handayani, and Sri Mangesti Rahayu. 2019. Stock return and financial performance as moderation variables in influence of good corporate governance towards corporate value. *Asian Journal of Accounting Research* 4: 18–34. [\[CrossRef\]](#)
- Uyar, Ali, Merve Kilic, Mehmet A. Koseoglu, Cemil Kuzey, and Abdullah S. Karaman. 2020. The link among board characteristics, corporate social responsibility performance, and financial performance: Evidence from the hospitality and tourism industry. *Tourism Management Perspectives* 35: 1–41. [\[CrossRef\]](#)
- Vintila, Georgeta, and Stefan Cristian Gherghina. 2014. The impact of ownership concentration on firm value. Empirical study of the Bucharest stock exchange listed companies. *Procedia Economics and Finance* 15: 271–79. [\[CrossRef\]](#)
- Vu, Thu Minth Thi. 2020. Stock price co-movement and firm's ownership structure in emerging market. *The Journal of Asian Finance, Economics, and Business* 7: 107–15. [\[CrossRef\]](#)
- Xie, Jun, Wataru Nozawa, Michiyuki Yagi, Hidemichi Fujii, and Shunshuke Managi. 2019. Do environmental, social, and governance activities improve corporate financial performance? *Business Strategy and the Environment* 28: 286–300. [\[CrossRef\]](#)
- Yermack, David. 2006. Board members and company value. *Financial Markets and Portfolio Management* 20: 33–47. [\[CrossRef\]](#)
- Zafar, Nousheen, Syeda Faiza Urooj, and Tahir Khan Durrani. 2008. Interest rate volatility and stock return and volatility. *European Journal of Economics, Finance and Administrative Sciences* 14: 135–40.
- Zhang, Cheng, Kee Cheok Cheong, and Rajah Rasiah. 2018. Board independence, state ownership and stock return volatility during Chinese state enterprise reform. *Corporate Governance* 18: 220–32. [\[CrossRef\]](#)
- Zimon, Dominik, and Grzegorz Zimon. 2019. The impact of implementation of standardized quality management systems on management of liabilities in group purchasing organizations. *Quality Innovation Prosperity* 23: 60–73. [\[CrossRef\]](#)
- Zimon, Grzegorz, Joanna Nakonieczny, Katarzyna Chudy-Laskowska, Magdalena Wójcik-Jurkiewicz, and Konrad Kochański. 2022. An Analysis of the Financial Liquidity Management Strategy in Construction Companies Operating in the Podkarpackie Province. *Risks* 10: 5. [\[CrossRef\]](#)