



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Thu, Sep 15, 2022 at 6:04 PM

Dear Juniarti Juniarti,

the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment, submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments:

Note, that the paper should be submitted in the format Microsoft Word or compatible (.DOC, .DOCX).

The author must take a close look at the manuscript requirements. They are not too rigid, but we recommend to meet them. Therefore, we ask the authors to make every effort to meet the requirements, as it will provide the quality of their materials and will make it easier for the editorial staff to set the manuscript for publication.

<https://www.businessperspectives.org/index.php/journals/investment-management-and-financial-innovations#submission-guidelines-for-authors>

Please, keep in mind that research paper, which is a final report on the finished original experimental study (the structure is Abstract, Introduction, Literature review, Method, Results, Discussion, Conclusion)

Check out what should be in this or that section and correctly distribute the material into sections. Do not introduce new sections. Do not divide sections into small subdivisions, including by introducing subheadings.

The number of words in the paper may vary from 4000 to 6000. Considering the issue concerning the calculation of the number of words in the paper, the information about the authors, title, abstract and keywords, list of references and appendices should not be included. The number of sources, in the list of references, should be determined by an author directly but be on average within 30-50. In the review articles, this number can be significantly higher. Supplementary materials should not exceed 5 pages.

Clearly and specifically formulate the purpose of the study (in one sentence) and the title of the article.

The Abstract (its volume is 150-250 words) should contain the following sequence of presentation of the material - relevance, purpose, result, conclusion. The result should be devoted to most of the Abstract volume. You should provide quantitative indicators of the demonstration of the research result.

The purpose of keywords is to provide the insight to the reader into the contents of the paper. They should reflect the area of the research. The number of keywords should be 5-10 in average. There should not be the sentences, but the words or word groups. If the object of the study is not mentioned in the title of the paper (including the country, the region), it should be added to the list of keywords. There is no need to replicate words from the title of the manuscript.

You need to clarify JEL codes. If earlier the author was not aware of this classification system, he/she should attentively look through it in order to have a common understanding of all the areas defined in

it http://www.aeaweb.org/jel/jel_class_system.php. The codes, indicated by the author should clearly reflect the research area. The author is welcome to use the codes from two or three areas, if they are covered in the research.

The Introduction (this is half a page-page of text) should be devoted to the relevance of the research topic and the formulation of the problem in general.

The Literature review also requires revision and consistency of the presentation of the material. It should be subordinated to the purpose of the study and should be completed with a statement of goal. The Literature review of the analyzed sources should be 40-50. If you assume hypotheses, then after that, give the hypotheses (all together and do not insert text between them).

Then the Methods should be presented.

The Result section is the main section of the article.

Then there should be a Discussion section. There should be a discussion of the study results, comparison with previous ones, a discussion of why the authors have exactly such results, determination of further prospects.

The Conclusion section is built incorrectly. There should be such logic - point out the purpose of the study, briefly demonstrate the result obtained, point out what conclusions should be drawn from it.

The deadline for revisions is 2022-09-22

To revise a manuscript please don't forget to log in to the system and to upload a revised manuscript!

Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Wed, Sep 28, 2022 at 2:26 PM

Dear Juniarti Juniarti,

the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment, submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments: The authors must once again carefully study the previous recommendations and editorial requirements for the design and semantic content of the article. Every requirement must be met.

<https://www.businessperspectives.org/index.php/journals/investment-management-and-financial-innovations#submission-guidelines-for-authors>

The text of the article should not be submitted in the first person (personified), but not in the same way as "The authors of the paper ...".

Personified - it means not "we" and not "authors". It means in the passive voice, for example-The paper explores.

The deadline for revisions is 2022-10-05

To revise a manuscript please don't forget to log in to the system and to upload a revised manuscript!

Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Thu, Oct 6, 2022 at 6:01 PM

Dear Juniarti Juniarti,

the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment, submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments:

The text of the article should not be submitted in the first person (personified), but not in the same way as "The authors of the paper ...".

Personified - it means not "we" and not "authors". It means in the passive voice, for example-The paper explores.

The Abstract does not indicate how many and which companies were investigated. The result of the study is practically not presented in the Abstract. For what is this here- "This study did not review the risk characteristics of each management that can significantly influence the decision to invest. This study has not specifically tested the motivation of management to over- or under-invest. Future research needs to examine the type of investment because each investment may vary in the time to produce investment returns..".

Follow the structure of the article - Introduction, Literature review, Method, Results, Discussion, and Conclusion.

The Introduction is structured incorrectly. It should be devoted to the relevance of the research topic and then (at the end) formulate a scientific problem. You write it like a Literature review.

This should be removed - "The remainder of this article is structured as follows. Section 1 discusses the literature review and hypothesis development. Section 2 describes research design. Section 3 presents results and discussion. The last part is the conclusion of this research."

Strange beginning of Literature review (This research hypothesis is based on the costly signaling theory and agency theory.). There should be 40-50 analyzed sources in the literature review. You should start with a few introductory sentences. It is necessary to devote oneself to examining exactly those studies conducted on the chosen topic. The review should also be completed with 2-3 general sentences. Then the purpose of the research should be formulated.

The Conclusion section should be concratized.

Such sentences should not be used - "The results of this study provide important findings to previous results, by showing that the market responds negatively to inefficient investments. ".

The deadline for revisions is 2022-10-13

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Kind regards,

4/12/23, 2:33 PM

Petra Christian University Mail - MA6639: Notification on Submission

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Tue, Oct 11, 2022 at 6:40 PM

Dear Juniarti Juniarti,

the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment, submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments: Please follow the recommendations. Even purely formal things are not executed by you. For example, an abstract cannot be less than 150 words, and you have 133 words!!!

Everything else should be carefully worked out.

Please read the entire text carefully. Read every sentence and every paragraph. It's about academics and logic. Please use clear, unambiguous, technically and grammatically correct English. The established standards for academic writing in your field should be observed.

The deadline for revisions is 2022-10-19

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Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Thu, Oct 20, 2022 at 1:50 PM

Dear Juniarti Juniarti,

the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment, submitted to Investment Management and Financial Innovations Journal, needs to be revised.

Comments:Once again, please return to our recommendations. Complete each one.

Write the Abstract correctly.

Don't start sections with subsections.

The Literature review should be strengthened.

The Discussion section is weak.

Do not cite sources in Conclusion. There should be such logic - point out the purpose of the study, briefly demonstrate the result obtained, and point out what conclusions should be drawn from it. The Abstract should not repeat sentences on Conclusion.

<https://www.businessperspectives.org/index.php/journals/investment-management-and-financial-innovations#submission-guidelines-for-authors>

The deadline for revisions is 2022-10-27

To revise a manuscript please don't forget to log in to the system and to upload a revised manuscript!

Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

MA6639: Notification on Submission

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Mon, Nov 7, 2022 at 3:20 PM

Dear Juniarti Juniarti,

The submitted manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment to Investment Management and Financial Innovations Journal has passed the review process and is waiting for your decision regarding the publishing.

Please log in to the system to start or decline the publishing process.

Thanks.

Kind regards,

Valeria Matiukhina
Managing Editor
Journal Investment Management and Financial Innovations



Juniarti . <yunie@petra.ac.id>

У відповідь: MA6639: Author's response to final decision2 messages

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: yunie@petra.ac.id

Mon, Nov 7, 2022 at 9:16 PM

Dear authors,

You have consented to the publication.

Therefore, I would like to inform you that your manuscript titled « Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment» has been accepted for publication, and will be published in issue 2022 of the journal "Investment Management and Financial Innovations".

Article processing charge (APC) for «Investment Management and Financial Innovations» for the authors with affiliation in lower middle-income countries 595 €.

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Kind regards,

Valeria Matiukhina

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Надіслано: 7 листопада 2022 р. 14:35

Кому: v.matiukhina@manuscript-adminsystem.com

Тема: MA6639: Author's response to final decision

The author has Agreed to publish the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment in the Investment Management and Financial Innovations Journal

Juniarti . <yunie@petra.ac.id>
To: v.matiukhina@manuscript-adminsystem.com

Mon, Nov 7, 2022 at 11:39 PM

Dear Valeria Matiukhina,

I am happy to hear from you that my paper has been accepted. According to the payment method, I choose online payment via credit card.

Thank you and best regards,

[Quoted text hidden]

--

Dr. Juniarti, M.Si., Ak., CA., CMA

Department of Accountancy

Petra Christian University

Jl. Siwalankerto 121-131

Surabaya 60236

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Juniarti . <yunie@petra.ac.id>

У відповідь: У відповідь: MA6639: Author's response to final decision

4 messages

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: "Juniarti ." <yunie@petra.ac.id>

Tue, Nov 8, 2022 at 4:35 PM

Dear Juniarti,

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Надіслано: 7 листопада 2022 р. 17:39
Кому: v.matiukhina@manuscript-adminsystem.com
Тема: Re: У відповідь: MA6639: Author's response to final decision

Dear Valeria Matiukhina,

I am happy to hear from you that my paper has been accepted. According to the payment method, I choose online payment via credit card.

Thank you and best regards,

On Mon, Nov 7, 2022 at 9:16 PM <v.matiukhina@manuscript-adminsystem.com> wrote:

Dear authors,

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I look forward to hearing from you soon.

Kind regards,

Valeria Matiukhina

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Кому: v.matiukhina@manuscript-adminsystem.com

Тема: MA6639: Author's response to final decision

The author has Agreed to publish the manuscript Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment in the Investment Management and Financial Innovations Journal

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Dr. Juniarti, M.Si., Ak., CA., CMA

Department of Accountancy

Petra Christian University

Jl. Siwalankerto 121-131

Surabaya 60236

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v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: "Juniarti ." <yunie@petra.ac.id>

Tue, Nov 8, 2022 at 5:27 PM

Dear authors,

I send you a publication agreement and acceptance letter. Please tick the box in points 1-8 of the agreement (in which Authors confirm that there is no conflict of interest to be declared), sign it and send me back.

[Quoted text hidden]

4 attachments

 **ACCEPTANCE LETTER.docx**
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Juniarti . <yunie@petra.ac.id>
To: v.matiukhina@manuscript-adminsystem.com

Wed, Nov 9, 2022 at 9:37 AM

Dear Valeria Matiukhina,

Please find the attached file is the completed document of the Publication Agreement.
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Best regards,

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2 attachments

 **Publication Agreement (open-access article).docx**
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Juniarti . <yunie@petra.ac.id>
To: v.matiukhina@manuscript-adminsystem.com

Thu, Nov 10, 2022 at 7:33 PM

Dear Valeria Matiukhina,

I have successfully paid the APC, the order number is 2766, I also attach the order detail for your reference.
Thank you and best regards

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Juniarti . <yunie@petra.ac.id>

MA6639: Author's response to final decision

1 message

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>

Thu, Nov 10, 2022 at 8:47 PM

To: "Juniarti ." <yunie@petra.ac.id>

Dear Juniarti,

I confirm the receipt of the APC payment.

I will send you the first proofreading asap.

Kind regards,

Valeria

Від: Juniarti . <yunie@petra.ac.id>**Надіслано:** 10 листопада 2022 р. 13:33**Кому:** v.matiukhina@manuscript-adminsystem.com**Тема:** Re: У відповідь: У відповідь: MA6639: Author's response to final decision

Dear Valeria Matiukhina,

I have successfully paid the APC, the order number is 2766, I also attach the order detail for your reference.

Thank you and best regards

On Tue, Nov 8, 2022 at 4:35 PM <v.matiukhina@manuscript-adminsystem.com> wrote:

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Kind regards,

Valeria

Від: Juniarti . <yunie@petra.ac.id>
Надіслано: 7 листопада 2022 р. 17:39
Кому: v.matiukhina@manuscript-adminsystem.com
Тема: Re: У відповідь: MA6639: Author's response to final decision

Dear Valeria Matiukhina,

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Thank you and best regards,

On Mon, Nov 7, 2022 at 9:16 PM <v.matiukhina@manuscript-adminsystem.com> wrote:

Dear authors,

You have consented to the publication.

Therefore, I would like to inform you that your manuscript titled « Market Response and Future Performance of Inefficient Investment-Overinvestment or Underinvestment» has been accepted for publication, and will be published in issue 2022 of the journal "Investment Management and Financial Innovations".

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Also please send figures in editable format. Graphic illustrations (flow charts, diagrams, graphs) must be built in the programs of MS OFFICE, and contain the built-in data file.

I look forward to hearing from you soon.

Kind regards,

Valeria Matiukhina

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Dr. Juniarti, M.Si., Ak., CA., CMA

Department of Accountancy

Petra Christian University

[Jl. Siwalankerto 121-131](#)

[Surabaya 60236](#)

[INDONESIA](#)



--

Dr. Juniarti, M.Si., Ak., CA., CMA

Department of Accountancy

Petra Christian University

[Jl. Siwalankerto 121-131](#)

[Surabaya 60236](#)

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Juniarti . <yunie@petra.ac.id>

У відповідь: У відповідь: У відповідь: MA6639: Author's response to final decision

2 messages

v.matiukhina@manuscript-adminsystem.com <v.matiukhina@manuscript-adminsystem.com>
To: "Juniarti ." <yunie@petra.ac.id>

Thu, Nov 10, 2022 at 8:52 PM

Dear Juniarti,

We ask you to sign the agreement and to send the scan back to us.

It is mandatory for us to confirm the source of money to tax authorities.

Have a nice day.

Kind regards,

Valeria

Від: Juniarti . <yunie@petra.ac.id>
Надіслано: 10 листопада 2022 р. 13:33
Кому: v.matiukhina@manuscript-adminsystem.com
Тема: Re: У відповідь: У відповідь: MA6639: Author's response to final decision

Dear Valeria Matiukhina,

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Valeria

Від: Juniarti . <yunie@petra.ac.id>

Надіслано: 7 листопада 2022 р. 17:39

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Тема: Re: У відповідь: MA6639: Author's response to final decision

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Also please send figures in editable format. Graphic illustrations (flow charts, diagrams, graphs) must be built in the programs of MS OFFICE, and contain the built-in data file.

I look forward to hearing from you soon.

Kind regards,

Valeria Matiukhina

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MARKET RESPONSE AND FUTURE PERFORMANCE OF INEFFICIENT INVESTMENT-OVERINVESTMENT OR UNDERINVESTMENT

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Abstract

The purpose of this study is to investigate the market response to overinvestment or underinvestment and the influence of overinvestment or underinvestment on future performance. This study uses a sample of large-cap companies whose corporate actions are more of a market concern than those of small companies. The sample was selected from go-public companies listed on the Indonesia Stock Exchange during the 2016-2021 period. Samples must have at least 120 active trading days for each year. There are 232 observations that meet the qualifications. This study adopts the investment inefficiency model developed by a number of previous studies to measure overinvestment or underinvestment. The results show that overinvestment or underinvestment responded negatively by the market. Furthermore, this study also finds that overinvestment or underinvestment has a negative effect on a company's future performance.

Commented [JM2]: Revised: content and number of words

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Keywords: inefficient investment, overinvestment, underinvestment, financial performance, market response, big-cap companies

JEL Classification M21, M41, G32

Commented [JM4]: Added JEL

INTRODUCTION

Paying attention to the optimum level of investment is important because the company's resources are limited, and the company cannot always easily fund capital expenditures. On the other hand, managers tend to overinvest to enlarge their business empire, which means achievement for managers but becomes a burden for the company (Chen et al., 2015). Excessive capital expenditure will cause idle capacity, on the other hand, too low capital expenditure will eliminate many opportunities for companies to create returns. Therefore, assessing the market response to capital expenditures, without assessing the level of efficiency, as many previous studies have done, can produce biased findings (Choi et al., 2020).

Commented [JM5]: Adjust content, according to guideline

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This study will examine the market response to over-investment and under-investment, and what impact these two inefficiencies on future performance. This study adopts the investment efficiency model used by a number of previous studies (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020), to measure overinvestment or underinvestment. In addition, this study was applied to large-cap companies listed on the Indonesia Stock Exchange. This is because investors are generally more concerned with the corporate actions of large companies than small companies (Botosan, 1997; Sengupta, 1998), the corporate actions of large companies will receive more attention from the market.

1. LITERATURE REVIEW

Capital expenditure activities carried out by management are signals sent by managers to the market to reduce the occurrence of information asymmetry (Karaman et al., 2020). The study of the market response to capital expenditure has been initiated by a number of previous studies. One of the phenomenal studies related to capital expenditure and market response is the research conducted by McConnell and Muscarella (1985). This study uses two sample groups, industrial companies and public utility companies. It is found that an unexpected increase in capital

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expenditure results in an increase in stock market prices and vice versa. Trueman (1986) considered the level of investment in a similar study, the findings of his research show that the level of investment provides perfect information about the true value of the firm.

Woolridge & Snow (1990) conducted a more specific study on the announcement of strategic investment decisions which include joint ventures, R&D projects, product/market diversification, and capital expenditures. Research findings support that strategic investment decisions increase cumulative abnormal returns. Tests per type of strategic decision show congruent results that the market responds positively. Additional capital expenditures affect income for the period which causes the market to respond positively (Kerstein & Kim (1995). Changes in capital expenditures that are higher or lower than the industry average provide positive or negative signals, respectively (Lev and Thiagarajan, 1989; Kerstein and Kim, 1995). Chung et al.(1998) added a variable quality of investment opportunities to provide an additional explanation for the results of previous studies, where an increase/decrease in capital expenditures had a positive/negative effect on market response. The results of this study were then followed by Jones et al.(2004) and Brailsford & Yeoh (2004) who found that investment opportunities, growth opportunities, cash flow conditions and their interactions are important variables in the relationship between capital expenditure announcements and market response.

Burton et al. (1999) and Vafeas & Shenoy (2005) have proven that managers succeeded in influencing the market through their actions of making capital expenditure. Investment projects undertaken by joint ventures surprised the market and increased market expectations of the prospects of participating companies, while investment projects undertaken by individual companies had no impact on abnormal returns (Burton et al., 1999). The management's actions to conduct capital expenditures aim to communicate the company's prospects to investors. Management attempts to influence the market's assessment of the company's future by demonstrating the company's commitment to continue to grow through a series of capital expenditures (Bae et al., 2018). However, some studies still show a negative response from the market (Akbar et al., 2008, Qhandari et al, 2016; Chen & Chang, 2020). The focus of the company, both single segment and multiple segments, turned out to be an important characteristic that needs attention. Announcements of new capital expenditures made by single-segment companies received a stronger positive response than those made by multi-segment companies (Chen, 2006; Bhanna (2008). Capital expenditure guidance factors are important and reduce information asymmetry and increase market response to investment decisions (Luo, 2016).

Kaur & Kaur (2019), adding evidence of market response to capital spending decisions in developing countries, capital expenditure decisions are strategic decisions and have been proven to be responded positively by the market. Capital expenditure decisions are operational and have a strategic focus for two reasons: first, because of its size and second, because of its long-term impact (Alkaraan and Northcott, 2006; Kim et al., 2020). The optimum amount of investment, which is an investment level that considers growth opportunities, financial constraints, and the ability to obtain funding if needed, is a crucial factor (Markopoulou & Papadopoulos, 2009; Choi et al., 2020). Therefore, this study will address the inefficiency investment in relation to market response.

The market response to capital expenditure shows expectations of future financial performance which should be in line with additional investment. A number of previous studies examine the efficiency of capital expenditures with financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013). Jiang et al (2006) found a significant positive relationship between capital expenditures and future corporate earnings after controlling for current year corporate earnings. Meanwhile, Kumar & Li (2013) found that capital expenditure has a positive effect on financial performance (five years after investment) in companies that have high R & D intensity, and vice versa in companies with low R & D intensity.

Ou (1990) and Abarbanell & Bushee, 1997 find a negative relationship between capital expenditures and future earnings. Bar-Yosef et al. (1987) find that investment spending does not provide information on past earnings when predicting future earnings. Burton (2005) examines the effect of capital expenditure on market reactions and finds that investors respond positively to new investments, especially those that are not part of alliance activities. Turner et al (2019) tested companies engaged in the hospitality sector and specifically observed that capital expenditures in the form of renovations had a significant impact on short-term performance, because they increased revenue and on the other hand reduced maintenance costs. Farooq et al (2015) examined overinvestment and underinvestment, their impact on corporate performance. By using a sample of 360 non-financial companies during

the period 2005 to 2011, it is found that both overinvestment and underinvestment have a negative effect on financial performance. Meanwhile, Trong et al (2020), specializes in his research on the overinvestment aspect only in non-financial companies in Hanoi and finds that overinvestment has a negative effect on financial performance. This study will complement previous findings by focusing on the inefficient investment, both under or over investment to future financial performance.

1.1. Hypothesis of the Study

This study aims to prove the market response to under or over investment and the impact of under or over investment on future financial performance. According to the aim of study and based on the theoretical framework and previous findings, the hypotheses of this study are:

H1: Market reacts negatively to the inefficient investment (over-invest or under-invest)

H2: Inefficient investment (over-invest or under-invest) negatively effect on long-term financial performance

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2. METHOD

2.1. Sample

The research sample comprised companies listed on the Indonesian Stock Exchange. The sampling period was 2016–2020. The sample is selected based on companies classified as having large capitalization because big cap companies are more of a concern to investors than companies with small capitalization. The shares of the sample companies must be actively traded and have daily stock data for at least 120 days per year. This study does not exclude sectors; therefore, all sectors are represented in the sample. A total of 230 observations met the sample criteria. Daily stock data and the composite stock price index used to measure market responses were obtained from Yahoo Finance

2.2. Main Variable

The main variables in this study consist of market response, market capitalization, market to book and investment inefficiency. The description of each main variable is as follows:

Market response

According to the efficient market hypothesis (EMH), all published information is quickly embedded in security prices (Fama, 1970). Stock prices that move up or down around certain published events reflect the market responses. Abnormal returns measure the evidence that the market responds to certain information. The market model is widely used to explain market factors and company-specific factors that affect stock returns (Chung et al, 1998; Perveen et al., 2020), with the following model:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (1)$$

R_{jt} and R_{mt} were obtained from Yahoo Finance, where the estimation period was -120 to -20 days before the publication date. The event period was 20 days before and after the publication date. Furthermore, abnormal returns (AR) were calculated using the following formula:

$$AR_{jt} = R_{i,j,t} - (\alpha_j + \beta_j R_{mt}) \quad (2)$$

The cumulative abnormal return for the following window (-20,0,+20) is obtained by summing the AR during the event window, as follows:

$$CAR = \sum_{t=1}^N AR_{i,t} \quad (3)$$

Market Capitalization

In addition to using abnormal returns as a market response, this study uses market capitalization as a proxy for market response. Market capitalization is the value of a company based on its current market prices. Market capitalization allows investors to measure companies based on how much the public perceives them to be valued (Reinganum, 1999). The higher the value, the greater is the market appreciation of the company. A measure of market capitalization can inform the level of risk an investor might expect when investing in a company's stock, as well as how much of the investment will return over time. The formula for market cap is the market price multiplied by the number of outstanding shares (Marito & Sjarif, 2020). This study uses market capitalization on the publication date.

Market to Book (MTB)

Market-to-book (MTB) is another indicator of market response because MTB reflects future return on equity (Penman, 1996). Market-to-book (MTB) is the ratio of market to book value of equity at the end of year t (Roychowdhury & Watts, 2007). [This study applied market equity at the publication date.]

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Investment inefficiency

Investment efficiency shows the level of investment that is not excessive but is also not too low. Investment must be proportional to investment opportunities owned by a company (Stulz, 1998; Thomas 2002; Choi, 2020). Investment efficiency is measured by estimating the extent to which investment deviates from the expected level of investment (Choi, 2020). This study adopts the investment efficiency model used in previous studies (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020), to measure investment inefficiency, using the following model:

$$INVEST_{i,t} = \beta_0 + \beta_1 \beta TQ_{i,t-1} + \beta_2 \beta CFO_{i,t-1} + \beta_3 \beta ASSETGR_{0i,t-1} + \beta_4 \beta INVEST_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

where $INVEST_{i,t}$ is the capital expenditure of company i in year t divided by net PPE at the beginning of year t ; $TOBINS Q_{i,t-1}$ is the market value of equity plus the book value of short-term debt and long-term debt divided by total assets measured at the end of year $t-1$; $CFO_{i,t}$ is the cash flow from operations in year t ; and $ASSET_GR_{i,t-1}$ is the percentage change in firm i 's assets between years $t-2$ and $t-1$. The model is estimated for each 2-digit SIC industry with at least 14 observations each year.

The residuals from the estimation model capture the extent to which a firm's investment deviates from the optimal level of investment and are thus used to measure investment inefficiency. In the year of observation, companies with positive residuals were classified as overinvesting companies, and those with negative residuals were classified as underinvesting companies. Companies classified as over-invested are given a score of 1, and under-investment is given a score of 0. This study uses both the residual and residual categories using a nominal scale to measure investment inefficiency.

2.3. Analysis Model

This study tested the hypothesis of market response to investment inefficiency, where market response was measured using three indicators representing market response: cumulative abnormal (CAR), market capitalization (MCAP), and market to book (MTB), which are represented by Models 1a to 1c. The next step is to examine the effect of CAPEX on financial performance for two years after the year of capital expenditure, when financial performance is measured by ROA and ROE (models 2a and 2b).

$$\begin{aligned} CAR_{i,t+1} = & \beta_0 + \beta_1 INEFF_{i,t} + \beta_2 DUMINEFF_{i,t} + \beta_3 CAPEX_{i,t} + \\ & \beta_4 LCAPEX_{i,t} + \beta_5 FSIZE_{i,t} + \beta_6 ASSGRT_{i,t} + \beta_7 DER_{i,t} + \\ & \beta_8 FCF_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} SALESIND_{i,t} + \\ & \beta_{11} PUBOWN_{i,t} + \beta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 1a}) \end{aligned}$$

$$\begin{aligned}
MCAP_{i,t+1} = & \delta_0 + \delta_1 INEFF_{i,t} + \delta_2 DUMINEFF_{i,t} + \delta_3 CAPEX_{i,t} + \\
& \delta_4 LCAPEX_{i,t} + \delta_5 FSIZE_{i,t} + \delta_6 ASSGRT_{i,t} + \delta_7 DER_{i,t} + \\
& \delta_8 FCF_{i,t} + \delta_9 ROA_{i,t} + \delta_{10} SALESIND_{i,t} + \\
& \delta_{11} PUBOWN_{i,t} + \delta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 1b})
\end{aligned}$$

$$\begin{aligned}
MTB_{i,t+1} = & \theta_0 + \theta_1 INEFF_{i,t} + \theta_2 DUMINEFF_{i,t} + \theta_3 CAPEX_{i,t} + \\
& \theta_4 LCAPEX_{i,t} + \theta_5 FSIZE_{i,t} + \theta_6 ASSGRT_{i,t} + \theta_7 DER_{i,t} + \\
& \theta_8 FCF_{i,t} + \theta_9 ROA_{i,t} + \theta_{10} SALESIND_{i,t} + \\
& \theta_{11} PUBOWN_{i,t} + \theta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 1c})
\end{aligned}$$

$$\begin{aligned}
ROA_{i,t+2} = & \lambda_0 + \lambda_1 INEFF_{i,t} + \lambda_2 DUMINEFF_{i,t} + \lambda_3 CAPEX_{i,t} + \\
& \lambda_4 LCAPEX_{i,t} + \lambda_5 FSIZE_{i,t} + \lambda_6 ASSGRT_{i,t} + \lambda_7 DER_{i,t} + \\
& \lambda_8 FCF_{i,t} + \lambda_9 ROA_{i,t} + \lambda_{10} SALESIND_{i,t} + \\
& \lambda_{11} PUBOWN_{i,t} + \lambda_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 2a})
\end{aligned}$$

$$\begin{aligned}
ROE_{i,t+2} = & \phi_0 + \phi_1 INEFF_{i,t} + \phi_2 DUMINEFF_{i,t} + \phi_3 CAPEX_{i,t} + \\
& \phi_4 LCAPEX_{i,t} + \phi_5 FSIZE_{i,t} + \phi_6 ASSGRT_{i,t} + \phi_7 DER_{i,t} + \\
& \phi_8 FCF_{i,t} + \phi_9 ROE_{i,t} + \phi_{10} SALESIND_{i,t} + \phi_{11} PUBOWN_{i,t} + \\
& \phi_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 2b})
\end{aligned}$$

The main independent variable is capital expenditure inefficiency (INEFF), which is the residual of the investment efficiency model, as explained in the investment efficiency in the previous section. DUMINEFF is a categorization of residuals into overinvestment and underinvestment. The analytical model includes CAPEX and LCAPEX, which are capital expenditures for the year of observation and before the year of observation as control variables, and several other control variables related to company- and industry-specific characteristics. Company-specific characteristics include firm size (FSIZE), leverage (DER), asset growth (ASSGRT), free cash flow (FCF), return on equity (ROE), return on assets (ROA), and public ownership (PUBOWN). Industry-specific companies include the company's sales to the sales sector (SALESIND) and industrial sector (INDUST). The complete definition of research variables is shown in Table 1 below.

Table 1. Variable definition

Main variables	
INEFF	The inefficiency score obtained from the residual efficiency investment model. This measurement is adopted from the investment efficiency model that has been used by previous research (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020)).
DUMINEFF	Dummy variables for over-invest and under-invest. Over-invest if the residual is positive and vice versa, if the residual is negative, it is categorized as under-invest. Over-invest is given a score of 1 and 0 for under-invest

Control Variables	
CAPEX	Capital expenditures for the current year scaled by total assets of the previous year
LCAPEX	CAPEX for the previous period
DER	Long-term liabilities divided by equity (Stulz, 1990)
FCF	is cash flow in excess of what is needed to fund investments (Jensen, 1986). Free cash flow is a manifestation of agency problems because excess cash cannot be returned to shareholders (Brailsford & Yeoh, 2004). Free Cash flow is calculated using the approach of Lang et al. (1991) and as follows: FCF= EBIT+ DEPR-TAX-DIV-INT-INV EBIT is earning before interest and tax; DPR is depreciation expense, TAX is tax paid; DIV is dividend paid for ordinary share; INT is interest expense; INV is current year investment.
SALESIND	Firm sales to subsector sales
PUBOWN	Share owned by public
INDUST	Industrial sector of firm sample
Market response variables	
CAR	Cumulative abnormal return in the period of 20 days before and after the publication date of the financial statements
MCAP	Market capitalization value at the date of publication of financial statements
MTB	Market value of equity at the publication date of the financial statements divided by the book value of equity
Financial performance	
ROA	Earning after tax divided by total assets
ROE	Earning after tax divided by total equities

3. RESULTS

3.1. Descriptive Analysis

Table 2. shows the mean value of each variable for the over- and under-investment sample groups. The mean CAPEX for the over-invested sample group was higher than that of the under-invested group, and was significant at < 0.01. There is a significant difference in the size of companies in the overinvestment and underinvestment groups. The performance of the overinvest sample group companies is better than that of the underinvest group, as can be seen from the mean ROA, FCF, and SALESIND values of the overinvestment sample group, which are significantly different from the mean performance of the underinvestment sample group.

Table 2. Mean-Difference for Over-Invest and Under-Invest

	Over- Invest (N=40)	Under-invest (N=192)	t	Sig (2- tailed)	
CAR	31.9000	-5.7917	1.561	0.1200	
MCAP	10.3000	10.3299	-0.999	0.905	
MTB	1.3320	1.3342	-0.0215	0.9829	
CAPEX	0.7716	0.5982	4.2426	0.0000	***
FSIZE	10.4873	10.7742	-2.9190	0.0039	***
ASSGRT	0.1059	0.1060	-0.0033	0.9974	
DER	0.4285	0.4655	-0.3420	0.7327	

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FCF	-9.6849	-52.6638	4.2426	0.0000	***
ROA	0.0873	0.0611	1.6837	0.0936	*
SALESIND	0.1822	0.1704	2.3775	0.0182	**
PUBOWN	0.6835	0.6911	-0.3028	0.7623	

The analysis of variables per sector (Table 3) shows that the technology sector has the highest asset growth compared to the other sectors. This is in line with the rapid development of technology, which requires this sector to conduct aggressive capital expenditure. On average, each sector has a safe risk, as seen from the DER, which is only about 0.50 of equity funded with debt. Some sectors have a negative FCF, which means that funding and investment needs cannot be facilitated internally, while consumer cycle and healthcare sectors have a positive FCF. These two sectors have stable FCFs and even increased during the pandemic, so they have healthy operating cash flows. The basic materials, industry, property, and energy sectors have a high ROA of around 8%-9% per year, while the ROA of other sectors is around 4%-7%. In terms of ROE, basic materials provided the highest ROE of 21%, followed by energy and industry. The highest public ownership (PUBOWN) is above 30% in the basic materials, consumer cyclical, financial, industry, and infrastructure sectors, whereas in other sectors, the average ownership is in the range of 20%. The average individual sales per sector were below 10%, indicating that the level of competition was quite high. Sectors with an average sales of 50% are the consumer cyclical sector and the industrial sector.

Companies that underinvest seem to have cash flow problems, because the average free cash flow is more negative than that of companies that overinvest. Choi et al. (2020) describe that companies are in a situation of financial constraints and tend to underinvest.

Table 3. Descriptive Statistic by Sector

SECTORID	N		CAR	MCAP	MTB	CAPEX	INVEFF
Basic Material	36	Mean	-				-
			1.611	10.417	1.485	0.614	3.413
		Std. Deviation	46.108	0.604	0.895	0.273	19.959
Consumer Cyc	8	Mean	-				-
			23.750	10.125	1.234	0.653	0.189
		Std. Deviation	89.596	0.354	0.336	0.239	0.574
Consumer NY	44	Mean	-				-
			37.591	10.591	1.310	0.651	8.457
		Std. Deviation	201.343	0.542	0.575	0.225	40.953
Energy	32	Mean	-				-
			7.063	10.313	1.317	0.626	23.457
		Std. Deviation	15.937	0.592	0.391	0.238	108.250
Financial	56	Mean	-				-
			37.214	10.018	1.356	0.623	12.553
		Std. Deviation	205.793	2.004	0.644	0.257	66.059
Healthcare	4	Mean	-				-
			25.750	10.000	1.207	0.852	0.047
		Std. Deviation	23.880	-	0.247	0.113	1.373
Industry	6	Mean	-				-
			8.625	10.375	1.356	0.552	23.207
		Std. Deviation	14.774	0.518	0.480	0.259	65.292

Infrastructure	24	Mean	-	10.500	1.337	0.638	-
		Std. Deviation	10.417	0.511	0.291	0.274	17.633
Property	16	Mean	-	10.188	1.134	0.612	-
		Std. Deviation	3.875	0.403	0.223	0.167	168.035
Technology	4	Mean	-	10.750	1.110	0.477	-
		Std. Deviation	12.500	0.500	0.314	0.190	34.340
Total	230	Mean	-	10.319	1.334	0.628	-
		Std. Deviation	0.707	1.102	0.578	0.244	72.117

Table 3. Descriptive Statistic by Sector-Cont'd

SECTORID	N		FSIZE	ASSGRT	DER	FCF	ROA
Basic Material	36	Mean	-	10.808	0.135	0.584	-
		Std. Deviation	10.417	0.744	0.197	0.911	30.850
Consumer Cyc	8	Mean	-	10.549	0.067	0.479	0.444
		Std. Deviation	3.875	0.402	0.051	0.758	0.506
Consumer NY	44	Mean	-	10.830	0.100	0.388	-
		Std. Deviation	12.500	0.558	0.135	0.594	106.344
Energy	32	Mean	-	10.590	0.068	0.454	-
		Std. Deviation	10.417	0.576	0.117	0.520	157.551
Financial	56	Mean	-	10.718	0.146	0.516	-
		Std. Deviation	10.417	0.469	0.311	0.658	374.223
Healthcare	4	Mean	-	10.416	0.067	0.260	0.198
		Std. Deviation	10.416	0.159	0.052	0.229	0.223
Industry	6	Mean	-	10.798	0.084	0.475	-
		Std. Deviation	10.417	0.949	0.127	0.513	34.242
Infrastructure	24	Mean	-	10.770	0.022	0.438	-
		Std. Deviation	10.417	10.770	0.022	0.438	23.164

		Std. Deviation	0.514	0.096	0.361	77.442	0.071
Property	16	Mean	10.557	0.140	0.296	66.696	0.092
		Std. Deviation	0.518	0.189	0.367	268.230	0.138
Technology	4	Mean	10.908	0.189	0.264	57.836	0.041
		Std. Deviation	0.560	0.379	0.174	115.980	0.034
Total	230	Mean	10.725	0.106	0.459	45.254	0.066
		Std. Deviation	0.575	0.204	0.622	213.495	0.090

Table 3. Descriptive Statistic by Sector-Cont'd-2

SECTORID	N		ROE	PUBOWN	SALESIC
Basic Material	36	Mean	0.210	0.310	0.111
		Std. Deviation	0.328	0.159	0.063
Consumer Cyc	8	Mean	0.154	0.279	0.500
		Std. Deviation	0.235	0.151	0.050
Consumer NC	44	Mean	0.118	0.348	0.091
		Std. Deviation	0.092	0.138	0.064
Energy	32	Mean	0.191	0.289	0.125
		Std. Deviation	0.302	0.144	0.065
Financial	56	Mean	0.104	0.308	0.071
		Std. Deviation	0.100	0.145	0.074
Healthcare	4	Mean	0.078	0.280	1.000
		Std. Deviation	0.044	0.184	-
Industry	6	Mean	0.177	0.374	0.500
		Std. Deviation	0.255	0.096	0.258
Infrastructure	24	Mean	0.112	0.305	0.167
		Std. Deviation	0.276	0.140	0.108

Property	16	Mean	0.150	0.289	0.250
		Std. Deviation	0.190	0.135	0.117
Technology	4	Mean	0.083	0.218	1.000
		Std. Deviation	0.034	0.198	-
Total	230	Mean	0.142	0.311	0.172
		Std. Deviation	0.219	0.145	0.209

3.2. Empirical Results

This study aims to complement previous research on the market response to capital expenditure by examining the inefficiency of capital expenditure. Investment inefficiency is characterized by either over- or under-investment, both of which harm investors because companies finance capital expenditures are more than or less than the required amount. Inefficient investment has an impact on non-optimal investment returns. Hypothesis 1 predicts that the market responds negatively to over- and under-investment information, and the test results show that INEFF has a negative coefficient for all market response indicators (CAR, MCAP, and MTB), and is significantly negative at the <0.05 level for market response as measured by CAR. DUMINEFF, which is the categorization of overinvestment and underinvestment, shows the same results, where the DUMINEFF coefficient is negative for all market response indicators and significantly negative at the <0.01 level for market response as measured by MTB. Table 4 also shows that the market response to CAPEX information is positive and significant at levels <0.05 and <0.01, for market response indicators using MCAP and MTB, and significant negative for market response as measured by CAR. LCAPEX, which is the CAPEX of the previous period, is still in the market's attention and has a significant positive response at the <0.05-level for market response as measured by MCAP. Hypothesis 1, which predicts that overinvestment and underinvestment will respond negatively to the market, is proven especially for market response as measured by CAR and MTB.

Table 4. Market Response to Inefficient Investment

	CAR		MCAP		MTB	
	Coefficient		Coefficient		Coefficient	
	t-stat		t-stat		t-stat	
INEFF	-0.2452	**	-0.030		-0.005	
	(-2.31)		(-0.44)		(-0.20)	
DUMINEFF	-0.1155		-0.015		-0.355	***
	(-1.51)		(-0.26)		(-3.55)	
CAPEX	0.3286	**	0.440	***	0.073	***
	(2.44)		(4.65)		(2.49)	
LAGCAPEX	-0.0141		0.152	**	0.020	
	(-0.12)		(1.83)		(0.82)	
FSIZE	0.1320		0.764	***	0.083	***

	(1.17)	(8.97)	(3.30)
ASSGRT	-0.1777 **	-0.055	-0.460 **
	(-2.39)	(-0.94)	(-2.06)
DER	-0.0249	0.055	0.807 ***
	(-0.32)	(0.90)	(19.77)
FCF	0.417 ***	-0.003	0.003
	(4.00)	(-0.05)	(0.21)
ROA	0.0873	0.115 *	0.050 ***
	(1.05)	(1.71)	(2.67)
SALESIC	-0.065	0.054	0.005
	(-0.89)	(0.94)	(0.31)
PUBOWN	-0.090	-0.139 **	0.938
	(-1.18)	(-2.31)	(0.86)
Industrial-fixed effect	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year-fixed effect	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Adj R-sq	0.105	0.255	0.738

The second hypothesis predicts that investment that is excessive or under the target will not produce optimal performance and tends to reduce performance. This is because part of the investment is idle because it is more than necessary; conversely, an investment that is too low reduces the chances of achieving the expected returns, thereby reducing the overall potential to generate positive returns. It is proven that over- and under-investment have a negative effect on financial performance two years after the investment. The DUMINEFF coefficient is negative and significant for all the performance measures, both ROA and ROE, at a significance level of <0.1. Meanwhile, if viewed from CAPEX, it shows the opposite that capital expenditure results in increased performance in the future. The test results support Hypothesis 2.

Table 5. Future Financial Performance of Investment inefficiency

	ROA_{t+2}	ROE_{t+2}
	Coefficient	Coefficient
	t-stat	t-stat
INEFF	0.018	-0.036
	(0.16)	(-0.32)
DUMINEFF	-0.710 *	-0.650 *
	(-1.89)	(-1.75)
CAPEX	0.630 *	0.564
	(1.658)	(1.503)
LAGCAPEX1	0.011	-0.005
	(0.13)	(-0.05)
FSIZE	0.250 ***	0.197 **

	(2.62)	(2.11)
ASSGRT	0.125 *	0.114 *
	(1.92)	(1.81)
DER	0.084	-0.135 **
	(1.26)	(-2.14)
FCF	-0.119 **	-0.067
	(-1.88)	(-1.09)
ROA	0.366 ***	
	(4.95)	
ROE		0.338 ***
		(5.03)
SALESIC	0.004	0.065
	(0.06)	(1.00)
PUBOWN	-6.454	-4.356
	(-1.51)	(-1.05)
Industrial-fixed effect	<i>Yes</i>	<i>Yes</i>
Year-fixed effect	<i>Yes</i>	<i>Yes</i>
Adj R-sq	0.140	0.163

As shown in table 4, that the size and ability of the company to generate profits (ROA) have a positive influence on the 3 market response indicators, especially the significant effect on the MCAP and MTB market response indicators. This shows that MCAP and MTB increase when the size of the company and the company's ability to generate profits are getting bigger. However, the market responded otherwise to an increase in asset growth (ASSGRT). In addition, the amount of debt level (DER) is proven to cause an increase in MTB, the size of the FCF is proven to cause an increase in CAR, and the number of shares owned by the public (PUBOWN) is proven to reduce MCAP. Regarding the characteristics of the industry, this study did not succeed in proving the effect of SALESIND on the three market response indicators, but it did prove the effect of the type of research on the three market response indicators.

As shown in Table 5, that company size (FSIZE), asset growth (ASSGRT), and profitability (ROA and ROE) currently have a positive influence on the company's ability to generate profits as measured by ROA and ROE for the next two years. This shows that FSIZE, ASSGRT, ROA and ROE are currently good predictors of ROA and ROE in the next two years. DER and FCF have been shown to have a negative effect on ROE and ROA in the future, while public ownership has no effect on ROA and ROE in the future. Regarding the characteristics of the industry, this study did not succeed in proving the effect of SALESIND on the company's ability to generate profits (ROA and ROE) in the future, but this study succeeded in proving the influence of the type of industry on the company's ability to generate profits in the future.

4. DISCUSSION

As described in the analysis section, this study finds that the market responds negatively to inefficient capital expenditures, over or under investment is read by the market as a risk that the company cannot provide optimal results. These results seem to contradict previous research, where the average market responds positively to capital expenditure activities (Burton et al., 1999; Vafeas & Shenoy, 2005). However, these results actually address the inconsistency of previous studies regarding market response on capital expenditure (Akbar et al., 2008; Qhandari et al, 2016; Chen & Chang, 2020). The market does not always respond negatively because of inefficient investments,

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thus doubting the company's ability to return optimal investment returns. Investment inefficiency whether measured using the residual value of the efficiency model or using a dummy variable, both of them consistently received negative responses from the market. This finding proves that the market captures the risk of inefficient investment, not just the amount of capital expenditure. So that inefficient investments will be caught by the market as a negative signal, because investments cannot produce optimal results.

Besides examining how the market responds to inefficient investments, this study also examines the impact of inefficient investments on company performance. As hypothesized, inefficient investment either over or under investment has a negative effect on the company's performance in the future. By using ROA and ROE two years after the year of investment, it is found that over or under investment has a negative effect. This finding is in line with the results of previous studies that prove a negative relationship between capital expenditure and future earnings (Bar-Yosef et al., 1987; Abarbanell; Bushee, 1997; Burton, 2005). Other research findings also prove that the efficiency of capital expenditures has an effect on financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013, Michael & Herword, 2019). The results of this study provide an explanation that inefficient capital expenditure reduces the company's ability to improve financial performance, because expensive investment costs actually burden financial performance and reduce company productivity. The company bears an expensive investment cost that is not commensurate with the revenue earned from the additional new investment.

CONCLUSION

This study aims to examine the market response and future financial performance of companies related to over or under investment. The sample is devoted to large-cap companies, which are listed on the Indonesia Stock Exchange for the period 2016-2021, and obtained 232 samples that meet the requirements. Over or under-investment was measured using the residual investment inefficiency model developed by (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020). This study yielded two important findings. First, inefficient investment, either over or under investment, responded negatively by the market. This finding answers the diversity of the results of previous research on investment spending which is not always responded positively by the market. Second, this study finds that over or under-investment has a negative effect on future financial performance. This finding is in line with Farooq et al (2015) and Tromng et al (2020), and complements the results of these studies by examining the effect of over or under-investment on future financial performance rather than current year performance.

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“Market response and future performance of inefficient investment: Over-investment or under-investment”

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MARKET RESPONSE AND FUTURE PERFORMANCE OF INEFFICIENT INVESTMENT: OVER-INVESTMENT OR UNDER-INVESTMENT

Abstract

There have been many studies on the market response to investment spending, but only a few have examined the market response to the issue of over-investment or under-investment. This study examines the effect of the issue on market response and future financial performance. The sample includes large-cap companies listed on the Indonesia Stock Exchange (IDX) for 2016–2021. Samples must have at least 120 active trading days for each year. Two hundred and thirty-two observations meet the qualifications. This study adopts the investment inefficiency model developed by previous studies to measure over-investment or under-investment. Residual inefficient investment models are used as over-investment or under-investment scores, in addition to the dummy of the residual category. Market response is measured by cumulative abnormal returns (CAR), market capitalization (MCAP), and market-to-book value (MTB).

Meanwhile, a firm's performance uses return on assets (ROA) and return on equity (ROE). The results show that the coefficient of the inefficient investment variable, using both the residual value and the dummy variable, shows a negative direction, which means the market responds negatively to over-investment or under-investment. However, the value of t is significant at the <0.01 level on the market response variable as measured by MTB, but not significant for the other two proxies. Thus, hypothesis 1 is supported, although not for all market response proxies. The value of the inefficient investment coefficient also shows a negative direction when testing hypothesis 2 and is significant at the <0.1 level. These results are consistent with future performance variables measured by ROA and ROE.

Keywords

inefficient investment, over-investment, under-investment, financial performance, market response, big-cap companies

JEL Classification

M21, M41, G32

INTRODUCTION

Capital expenditure decisions are operational and have a strategic focus for two reasons: first, because of its size, and second, because of its long-term impact (Alkaraan & Northcott, 2006; Kim et al., 2020). In addition, the optimum amount of investment, which is an investment level considering growth opportunities, financial constraints, and the ability to obtain funding if needed, is another crucial factor (Choi et al., 2020). To date, previous studies have focused more on the sources of investment inefficiency, such as the quality of capital expenditure forecasts by analysts and female commissioners in the composition of the board of commissioners, good governance, managerial ability, and business strategy (Choi et al., 2020; Shin et al., 2020; Naeem & Li, 2019; Gan, 2018; Navissi et al., 2017; Goodman et al., 2014).

Paying attention to the optimum level of investment is essential because a company's resources are limited, and the company cannot al-

ways easily fund capital expenditures. On the other hand, managers tend to overinvest to enlarge their business empire, which means achievement for managers but becomes a burden for the company (Chen et al., 2015). Moreover, excessive capital expenditure will cause idle capacity, while too low capital expenditure will eliminate many opportunities for companies to create returns. Therefore, assessing the market response to capital expenditures without assessing the level of efficiency, as many previous studies have done, can produce biased findings (Choi et al., 2020).

This study will examine the market's response to both over-investment and under-investment issues and the impact of inefficient investment on future performance. This study adopts the investment efficiency model to measure over-investment and under-investment (McNichols & Stubben, 2008; Biddle et al., 2009; Goodman et al., 2014; Shroff, 2017; Choi et al., 2020). In addition, this study was applied to large-cap companies listed on the Indonesia Stock Exchange, considering that the market is generally more concerned with the corporate actions of large companies. Thus the big-cap's corporate actions will get more attention from the market than the small-cap actions (Botosan, 1997; Sengupta, 1998). The present study will contribute to the previous results that the quality of information plays a vital role in guiding the market response to information. This study was conducted in Indonesia, a developing country where law enforcement is generally still low and information asymmetry is much higher. Therefore, it provides greater opportunities for management to over or under-invest in particular interests.

1. LITERATURE REVIEW

Capital expenditure activities carried out by management are signals sent by managers to the market to reduce the occurrence of information asymmetry (Karaman et al., 2020). Several previous studies have studied the market response to capital expenditure. One of the phenomenal studies related to capital expenditure and the market response is the research conducted by McConnell and Muscarella (1985). This study uses two sample groups: industrial and public utility companies. It is found that an unexpected increase in capital expenditure results in an increase in stock market prices and vice versa. Trueman (1986) considered the level of investment in a similar study. His research findings show that the level of investment provides perfect information about the firm's actual value.

Woolridge and Snow (1990) conducted a more specific study on the announcement of strategic investment decisions, which include joint ventures, R&D projects, product/market diversification, and capital expenditures. Research findings support that strategic investment decisions increase cumulative abnormal returns – tests per type of strategic decision show congruent results that the market responds positively. Additional capital expenditures affect income for the period, which causes the market to respond positively (Kerstein & Kim, 1995). Changes in capital ex-

penditures that are higher or lower than the industry average provide positive or negative signals, respectively (Lev & Thiagarajan, 1989; Kerstein & Kim, 1995). Chung et al. (1998) added a variable quality of investment opportunities to provide an additional explanation for the results of previous studies, where an increase/decrease in capital expenditures had a positive/negative effect on market response. The results of this study were then followed by Jones et al. (2004) and Brailsford and Yeoh (2004). They found that investment opportunities, growth opportunities, cash flow conditions, and their interactions are essential variables in the relationship between capital expenditure announcements and market response.

Other studies prove the success of companies influencing market valuations through a series of capital expenditure measures (Burton et al., 1999; Vafeas & Shenoy, 2005; Bae et al., 2018; Luo, 2016; Chen, 2006; Bhanna, 2008). However, some studies still show a negative market response to investment spending (Akbar et al., 2008; Qhandari et al., 2016; Chen & Chang, 2020). The optimum amount of investment, which is an investment level considering growth opportunities, financial constraints, and the ability to obtain funding if needed, turned out to be an essential factor (Markopoulou & Papadoupoulos, 2009; Choi et al., 2020). Excessive capital expenditure will cause idle capacity; otherwise, too low capital expenditure will eliminate

many opportunities for companies to create returns. Overinvestment and under-investment lead to a non-optimal allocation of resources and increase agency costs and risks for investors (Choi et al., 2020). Investors are at high risk when the investment is not optimal because this kind of investment will impact investment returns that are also not optimal.

To date, previous research has focused more on the sources of inefficiency. Choi et al. (2020) found that the higher the quality of the investment analyst, the more efficient the investment. Shin et al. (2020) revealed that the composition of the board of commissioners that involves women in the team is less likely to overinvest than a board without women in its management structure. Intense monitoring prevents management from investing excessively (Naeem & Li, 2019). Gan (2018) and Goodman et al. (2014) find that managerial ability can overcome two sources of inefficiency: over- or under-investment. Companies with a prospector strategy tend to overinvest, and vice versa, those with a defender strategy (Navissi et al., 2017). Attention to the sources of investment efficiency is essential, and previous research has revealed it. However, the ex-post effect of investment inefficiency on market response and long-term performance is urgently addressed for the following reasons. First, in the signaling approach, capital investment is a signal that managers use to show that the company has high-profit prospects in the future. This signal is important in the capital market, characterized by information asymmetry (John & Nachman, 1985; Miller & Rock, 1985; Ambaris et al., 1987). Efficient investment spending can provide a reliable signal of a company's cash flow and provide good potential returns for investors (Kerstein & Kim, 1995).

On the other hand, if a company invests efficiently, the market will catch the red flag of investment risk that the investment does not provide the expected results. First, over-investment or under-investment prevents a company from achieving optimal investment returns. Second, from the agency perspective, management tends to increase investments to improve reputation (Chen et al., 2015) at the principal's expense. Therefore, this study will address the inefficiency of investment to market response, which needs more evidence.

The market response to investment spending represents how much the market believes that the investment will generate future returns (Yen & Lee, 2008). According to the decision usefulness approach, investors are assumed to be rational and risk-averse (Cartney, 2004; Dandago & Hassan, 2013), so when they judge investment inefficiency, investors will respond negatively. Therefore, confirming the market's expectations and whether future financial performance aligns with the market's assessment of inefficient investments is important. Many previous studies examine the efficiency of capital expenditures with financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013). For example, after controlling for current-year corporate earnings, Jiang et al. (2006) found a significant positive relationship between capital expenditures and future corporate earnings. Meanwhile, Kumar and Li (2013) found that capital expenditure positively affects financial performance (five years after investment) in companies with high R&D intensity, and vice versa in companies with low R&D intensity.

Ou (1990) and Abarbanell and Bushee (1997) find a negative relationship between capital expenditures and future earnings. Bar-Yosef et al. (1987) find that investment spending does not provide information on past earnings when predicting future earnings. Burton (2005) examines the effect of capital expenditure on market reactions and finds that investors respond positively to new investments, especially those not part of alliance activities. Turner et al. (2019) tested companies engaged in the hospitality sector. They observed explicitly that capital expenditures in the form of renovations significantly impacted short-term performance because they increased revenue and, on the other hand, reduced maintenance costs. Finally, Farooq et al. (2015) examined over-investment and under-investment and their impact on corporate performance. Using a sample of 360 non-financial companies from 2005 to 2011, it is found that both over-investment and under-investment harm financial performance.

Meanwhile, Trong et al. (2020) specialize in their study on the over-investment aspect only in non-financial companies in Hanoi and find that over-investment harms financial performance. In contrast to previous studies, this one does not merely

examine the effect of inefficient investments on future performance but wants to confirm market expectations of inefficient investments with future financial performance. If market expectations are correct, i.e., the market responds negatively to inefficient investments, this will be in line with the results of testing the effect of these inefficient investments on future performance.

1.1. The hypothesis of the study

This study aims to prove the market response to under or over-investment and the impact of under or over-investment on future financial performance. According to the aim of the study and theoretical framework and previous findings, the hypotheses of this study are:

H1: The market reacts negatively to over-investment or under-investment.

H2: Over-investment or under-investment negatively affect long-term financial performance.

2. METHOD

This study is applied to large-cap companies listed on the Indonesia Stock Exchange. The sample selection criteria, the primary and control variables, the analysis model, and the definition of operational variables are explained in the following sections.

2.1. Sample

The research sample comprised companies listed on the Indonesia Stock Exchange. The sampling period was 2016–2020. The sample is selected based on companies classified as having large capitalization because big-cap companies are more concerned with investors than companies with small capitalization. In addition, the shares of the sample companies must be actively traded and have daily stock data for at least 120 days per year. This study does not exclude sectors; therefore, all sectors are represented in the sample. A total of 230 observations met the sample criteria. Daily stock data and the composite stock price index used to measure market responses were obtained from Yahoo Finance.

2.2. Main variable

The main variables in this study consist of market response, market capitalization, market-to-book, and investment inefficiency. Below is a description of each main variable.

2.2.1. Market response

According to the efficient market hypothesis (EMH), all published information is quickly embedded in security prices (Fama, 1970). Stock prices that move up or down around certain published events reflect the market responses. Abnormal returns measure the evidence that the market responds to specific information. The market model is widely used to explain market factors and company-specific factors that affect stock returns (Chung et al., 1998; Perveen et al., 2020) with the following model:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (1)$$

R_{jt} and R_{mt} were obtained from Yahoo Finance, where the estimation period was –120 to –20 days before the publication date. Therefore, the event period was 20 days before and after publication. Furthermore, abnormal returns (AR) were calculated using the following formula:

$$AR_{jt} = R_{i,t} - (\alpha_j + \beta_j R_{mt}). \quad (2)$$

The cumulative abnormal return for the following window (–20, +20) is obtained by summing the AR during the event window as follows:

$$CAR = \sum_{i=1}^N AR_{i,t}. \quad (3)$$

2.2.2. Market capitalization

In addition to using abnormal returns as a market response, this study uses market capitalization as a proxy for a market response. Market capitalization is the value of a company based on its current market prices. Market capitalization allows investors to measure companies based on how much the public perceives them to be valued (Reinganum, 1999). The higher the value, the greater the company's market appreciation. A measure of market capitalization can inform the level of risk an investor might expect when investing in a company's stock, as well as how much the investment will return over time. The formula for the market cap is the market price multiplied by the number of outstanding shares

(Marito & Sharif, 2020). This study uses market capitalization on the publication date.

2.2.3. Market-to-book (MTB)

Market-to-book (MTB) is another indicator of market response because MTB reflects the future return on equity (Penman, 1996). Market-to-book (MTB) is the ratio of market to book value of equity at the end of year t (Roychowdhury & Watts, 2007). This study applied market equity at the publication date.

2.2.4. Investment inefficiency

Investment efficiency shows the level of investment that is reasonable. The investment must be proportional to investment opportunities owned by a company (Stulz, 1998; Thomas, 2002; Choi, 2020). Investment efficiency is measured by estimating the extent to which investment deviates from the expected level of investment (Choi, 2020). This study adopts the investment efficiency model used in previous studies (McNichols & Stubben, 2008; Biddle et al., 2009; Goodman et al., 2014; Shroff, 2017; Choi et al., 2020) to measure investment inefficiency, using the following model:

$$\begin{aligned} INVEST_{i,t} = & \beta_0 + \beta_1 \beta TQ_{i,t-1} + \\ & + \beta_2 \beta CFO_{i,t-1} + \beta_3 ASSETGR_{0i,t-1} + \\ & + \beta_4 INVEST_{i,t-1} + \varepsilon_{i,t}, \end{aligned} \quad (4)$$

where $INVEST_{i,t}$ is the capital expenditure of company i in year t divided by net PPE at the beginning of year t ; $TOBIN'S Q_{i,t-1}$ is the market value of equity plus the book value of short-term debt and long-term debt divided by total assets measured at the end of year $t1$; $CFO_{i,t}$ is the cash flow from operations in year t ; and $ASSET_GR_{i,t-1}$ is the percentage change in firm i 's assets between years $t2$ and $t1$. The model is estimated for each 2-digit SIC industry with at least 14 observations each year.

The residuals from the estimation model capture the extent to which a firm's investment deviates from the optimal level of investment and are thus used to measure investment inefficiency. In the year of observation, companies with positive residuals were classified as overinvesting companies, and those with negative residuals were classified

as underinvesting companies. Companies classified as over-invested are given a score of 1 and an under-investment score of 0. This measurement uses both the residual and residual categories.

2.3. Analysis model

This study tested the hypothesis of market response to investment inefficiency, where the market response was measured using three indicators representing market response: cumulative abnormal (CAR), market capitalization (MCAP), and market to book (MTB), which Models 1a represents to 1c. The next step is to examine the effect of CAPEX on financial performance for two years after the year of capital expenditure when financial performance is measured by ROA and ROE (models 2a and 2b).

Model 1a

$$\begin{aligned} CAR_{i,t+1} = & \beta_0 + \beta_1 INEFF_{i,t} + \\ & + \beta_2 DUMINEFF_{i,t} + \beta_3 CAPEX_{i,t} + \\ & + \beta_4 LCAPEX_{i,t} + \beta_5 FSIZE_{i,t} + \\ & + \beta_6 ASSGRT_{i,t} + \beta_7 DER_{i,t} + \beta_8 FCF_{i,t} + \\ & + \beta_9 ROA_{i,t} + \beta_{10} SALESIND_{i,t} + \\ & + \beta_{11} PUBOWN_{i,t} + \beta_{12} INDUST_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (5)$$

Model 1b

$$\begin{aligned} MCAP_{i,t+1} = & \delta_0 + \delta_1 INEFF_{i,t} + \\ & + \delta_2 DUMINEFF_{i,t} + \delta_3 CAPEX_{i,t} + \\ & + \delta_4 LCAPEX_{i,t} + \delta_5 FSIZE_{i,t} + \\ & + \delta_6 ASSGRT_{i,t} + \delta_7 DER_{i,t} + \delta_8 FCF_{i,t} + \\ & + \delta_9 ROA_{i,t} + \delta_{10} SALESIND_{i,t} + \\ & + \delta_{11} PUBOWN_{i,t} + \delta_{12} INDUST_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (6)$$

Model 1c

$$\begin{aligned} MTB_{i,t+1} = & \theta_0 + \theta_1 INEFF_{i,t} + \\ & + \theta_2 DUMINEFF_{i,t} + \theta_3 CAPEX_{i,t} + \\ & + \lambda_4 LCAPEX_{i,t} + \lambda_5 FSIZE_{i,t} + \\ & + \lambda_6 ASSGRT_{i,t} + \lambda_7 DER_{i,t} + \lambda_8 FCF_{i,t} + \\ & + \lambda_9 ROA_{i,t} + \lambda_{10} SALESIND_{i,t} + \\ & + \lambda_{11} PUBOWN_{i,t} + \lambda_{12} INDUST_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (7)$$

Model 2a

$$\begin{aligned}
 ROA_{i,t+2} = & \lambda_0 + \lambda_1 INEFF_{i,t} + \\
 & + \lambda_2 DUMINEFF_{i,t} + \lambda_3 CAPEX_{i,t} + \\
 & + \lambda_4 LCAPEX_{i,t} + \lambda_5 FSIZE_{i,t} + \\
 & + \lambda_6 ASSGRT_{i,t} + \lambda_7 DER_{i,t} + \lambda_8 FCF_{i,t} + \\
 & + \lambda_9 ROA_{i,t} + \lambda_{10} SALESIND_{i,t} + \\
 & + \lambda_{11} PUBOWN_{i,t} + \lambda_{12} INDUST_{i,t} + \varepsilon_{i,t},
 \end{aligned}
 \tag{8}$$

Model 2b

$$\begin{aligned}
 ROE_{i,t+2} = & \phi_0 + \phi_1 INEFF_{i,t} + \\
 & + \phi_2 DUMINEFF_{i,t} + \phi_3 CAPEX_{i,t} + \\
 & + \phi_4 LCAPEX_{i,t} + \phi_5 FSIZE_{i,t} + \\
 & + \phi_6 ASSGRT_{i,t} + \phi_7 DER_{i,t} + \phi_8 FCF_{i,t} + \\
 & + \phi_9 ROE_{i,t} + \phi_{10} SALESIND_{i,t} + \\
 & + \phi_{11} PUBOWN_{i,t} + \phi_{12} INDUST_{i,t} + \varepsilon_{i,t}.
 \end{aligned}
 \tag{9}$$

The main independent variable is capital expenditure inefficiency (INEFF), which is the residual of the investment efficiency model, as explained in the investment efficiency in the previous section.

DUMINEFF is a categorization of residuals into over-investment and under-investment. In addition, the analytical model includes CAPEX and LCAPEX, which are capital expenditures for the year of observation and before the year of observation as control variables, and several other control variables related to the company- and industry-specific characteristics. Company-specific characteristics include firm size (FSIZE), leverage (DER), asset growth (ASSGRT), free cash flow (FCF), return on equity (ROE), return on assets (ROA), and public ownership (PUBOWN). Industry-specific companies include the company's sales to the sales sector (SALESIND) and industrial sector (INDUST). The complete definition of research variables is shown in Table 1.

3. RESULTS

The data were processed and analyzed descriptively to describe the variable profile briefly, and then the results of hypothesis testing were analyzed. Tables of descriptive analysis and tables of hypothesis testing results, respectively, are presented in Table 2 and Table 3.

Table 1. Variable definition

Main variables	Measurement
INEFF	The inefficiency score was obtained from the residual efficiency investment model. This measurement is adopted from the investment efficiency model used by previous research (McNichols & Stubben, 2008; Biddle et al., 2009; Goodman et al., 2014; Shroff, 2017; Choi et al., 2020)
DUMINEFF	Dummy variables for over-invest and under-invest. Over-invest if the residual is positive, and vice versa; if the residual is negative, it is categorized as under-invest. Over-invest is given a score of 1 and 0 for under-invest
Control Variables	
CAPEX	Capital expenditures for the current year are scaled by the total assets of the previous year
LCAPEX	CAPEX for the previous period
DER	Long-term liabilities divided by equity (Stulz, 1990)
FCF	Is cash flow in excess of what is needed to fund investments (Jensen, 1986). Free cash flow manifests agency problems because excess cash cannot be returned to shareholders (Brailsford & Yeoh, 2004). Free Cash flow is calculated using the approach of Lang et al. (1991) and as follows: FCF= EBIT+ DEPR-TAX-DIV-INT-INV EBIT is earning before interest and tax; DPR is depreciation expense; TAX is tax paid; DIV is the dividend paid for ordinary shares; INT is interest expense; INV is a current-year investment
SALESIND	Firm sales to subsector sales
PUBOWN	Share owned by public
INDUST	The industrial sector of firm sample
Market response variables	
CAR	Cumulative abnormal return in 20 days before and after the publication date of the financial statements
MCAP	Market capitalization value at the date of publication of financial statements
MTB	The market value of equity at the publication date of the financial statements divided by the book value of equity
Financial performance	
ROA	Earning after tax divided by total assets
ROE	Earning after tax divided by total equities

3.1. Descriptive analysis

Table 2 shows the mean value of each variable for the over- and under-investment sample groups. The mean CAPEX for the over-invested sample group was higher than that of the under-invested group and was significant at < 0.01 . There is a significant difference in the size of companies in the overinvest and underinvest groups. The performance of the overinvest sample group companies is better than that of the underinvest group, as can be seen from the mean ROA, FCF, and SALESIND values of the overinvest sample group, which are significantly different from the mean performance of the underinvest sample group.

The analysis of variables per sector (Table 3) shows that the technology sector has the highest asset growth compared to the other sectors. It is in line with the rapid development of technology, which requires this sector to conduct aggressive capital expenditure. Each sector has a safety risk, as seen from the DER, which is only about 0.50 of equity funded with debt. Some sectors have a negative FCF, meaning funding and investment needs cannot be facilitated in-

ternally, while consumer cycle and healthcare sectors have a positive FCF. These two sectors have stable FCFs and even increased during the pandemic, so they have healthy operating cash flows. The basic materials, industry, property, and energy sectors have a high ROA of around 8%-9% per year, while the ROA of other sectors is around 4%-7%.

Regarding ROE, basic materials provided the highest ROE of 21%, followed by energy and industry. The highest public ownership (PUBOWN) is above 30% in the basic materials, consumer cyclical, financial, industry, and infrastructure sectors, whereas the average ownership is 20% in other sectors. The average individual sales per sector were below 10%, indicating that the level of competition was relatively high. Sectors with an average sales of 50% are the cyclical consumer sector and the industrial sector.

Companies that underinvest seem to have cash flow problems because the average free cash flow is more negative than those that overinvest. Choi et al. (2020) describe that companies are under financial constraints and tend to underinvest.

Table 2. Mean-difference between over-invest and under-invest

Variables	Over-Invest (N = 40)	Under-invest (N = 192)	t	Sig (2-tailed)
CAR	31.9000	-5.7917	1.561	0.1200
MCAP	10.3000	10.3299	-0.999	0.905
MTB	1.3320	1.3342	-0.0215	0.9829
CAPEX	0.7716	0.5982	4.2426	0.0000***
FSIZE	10.4873	10.7742	-2.9190	0.0039***
ASSGRT	0.1059	0.1060	-0.0033	0.9974
DER	0.4285	0.4655	-0.3420	0.7327
FCF	-9.6849	-52.6638	4.2426	0.0000***
ROA	0.0873	0.0611	1.6837	0.0936*
SALESIND	0.1822	0.1704	2.3775	0.0182**
PUBOWN	0.6835	0.6911	-0.3028	0.7623

Table 3. Descriptive statistics (CAR, MCAP, MTB, CAPEX, INVEFF) by sector

SECTORID	N	Mean	CAR	MCAP	MTB	CAPEX	INVEFF
Basic Material	36	Mean	-1.611	10.417	1.485	0.614	-3.413
		Std. Deviation	46.108	0.604	0.895	0.273	19.959
Consumer Cyc	8	Mean	23.750	10.125	1.234	0.653	-0.189
		Std. Deviation	89.596	0.354	0.336	0.239	0.574
Consumer NY	44	Mean	-37.591	10.591	1.310	0.651	-8.457
		Std. Deviation	201.343	0.542	0.575	0.225	40.953
Energy	32	Mean	-7.063	10.313	1.317	0.626	-23.457
		Std. Deviation	15.937	0.592	0.391	0.238	108.250

Table 3 (cont.). Descriptive statistics (CAR, MCAP, MTB, CAPEX, INVEFF) by sector

SECTORID	N	Mean	CAR	MCAP	MTB	CAPEX	INVEFF
Financial	56	Mean	37.214	10.018	1.356	0.623	-12.553
		Std. Deviation	205.793	2.004	0.644	0.257	66.059
Healthcare	4	Mean	-25.750	10.000	1.207	0.852	-0.047
		Std. Deviation	23.880	-	0.247	0.113	1.373
Industry	6	Mean	8.625	10.375	1.356	0.552	-23.207
		Std. Deviation	14.774	0.518	0.480	0.259	65.292
Infrastructure	24	Mean	-10.417	10.500	1.337	0.638	-1.485
		Std. Deviation	65.273	0.511	0.291	0.274	17.633
Property	16	Mean	3.875	10.188	1.134	0.612	-59.321
		Std. Deviation	35.293	0.403	0.223	0.167	168.035
Technology	4	Mean	12.500	10.750	1.110	0.477	-17.427
		Std. Deviation	18.212	0.500	0.314	0.190	34.340
Total	230	Mean	0.707	10.319	1.334	0.628	13.752
		Std. Deviation	139.33	1.102	0.578	0.244	72.117

Table 4. Descriptive statistics (FSIZE, ASSGRT, DER, FCF, ROA) by sector

SECTORID	N	Mean	FSIZE	ASSGRT	DER	FCF	ROA
Basic Material	36	Mean	10.808	0.135	0.584	-7.971	0.084
		Std. Deviation	0.744	0.197	0.911	30.850	0.114
Consumer Cyc	8	Mean	10.549	0.067	0.479	0.444	0.064
		Std. Deviation	0.402	0.051	0.758	0.506	0.073
Consumer NY	44	Mean	10.830	0.100	0.388	-24.733	0.061
		Std. Deviation	0.558	0.135	0.594	106.344	0.064
Energy	32	Mean	10.590	0.068	0.454	-55.787	0.081
		Std. Deviation	0.576	0.117	0.520	157.551	0.101
Financial	56	Mean	10.718	0.146	0.516	-96.323	0.052
		Std. Deviation	0.469	0.311	0.658	374.223	0.066
Healthcare	4	Mean	10.416	0.067	0.260	0.198	0.052
		Std. Deviation	0.159	0.052	0.229	0.223	0.034
Industry	6	Mean	10.798	0.084	0.475	-11.788	0.088
		Std. Deviation	0.949	0.127	0.513	34.242	0.160
Infrastructure	24	Mean	10.770	0.022	0.438	-23.164	0.040
		Std. Deviation	0.514	0.096	0.361	77.442	0.071
Property	16	Mean	10.557	0.140	0.296	-66.696	0.092
		Std. Deviation	0.518	0.189	0.367	268.230	0.138
Technology	4	Mean	10.908	0.189	0.264	-57.836	0.041
		Std. Deviation	0.560	0.379	0.174	115.980	0.034
Total	230	Mean	10.725	0.106	0.459	-45.254	0.066
		Std. Deviation	0.575	0.204	0.622	213.495	0.090

Table 5. Descriptive statistics (ROE, PUBOWN, SALESIC) by sector

SECTORID	N	Mean	ROE	PUBOWN	SALESIC
Basic Material	36	Mean	0.210	0.310	0.111
		Std. Deviation	0.328	0.159	0.063
Consumer Cyc	8	Mean	0.154	0.279	0.500
		Std. Deviation	0.235	0.151	0.050
Consumer NC	44	Mean	0.118	0.348	0.091
		Std. Deviation	0.092	0.138	0.064
Energy	32	Mean	0.191	0.289	0.125
		Std. Deviation	0.302	0.144	0.065
Financial	56	Mean	0.104	0.308	0.071
		Std. Deviation	0.100	0.145	0.074

Table 5 (cont.). Descriptive statistics (ROE, PUBOWN, SALESIC) by sector

SECTORID	N	Mean	ROE	PUBOWN	SALESIC
Healthcare	4	Mean	0.078	0.280	1.000
		Std. Deviation	0.044	0.184	–
Industry	6	Mean	0.177	0.374	0.500
		Std. Deviation	0.255	0.096	0.258
Infrastructure	24	Mean	0.112	0.305	0.167
		Std. Deviation	0.276	0.140	0.108
Property	16	Mean	0.150	0.289	0.250
		Std. Deviation	0.190	0.135	0.117
Technology	4	Mean	0.083	0.218	1.000
		Std. Deviation	0.034	0.198	–
Total	230	Mean	0.142	0.311	0.172
		Std. Deviation	0.219	0.145	0.209

3.2. Empirical results

This study aims to complement previous research on the market response to capital expenditure by examining the inefficiency of capital expenditure. Investment inefficiency is characterized by either over- or under-investment, which harms investors because companies finance capital expenditures more than or less than the required amount. Inefficient investment has an impact on non-optimal investment returns. Hypothesis 1 predicts that the market responds negatively to over- and under-investment information, and the test results show that INEFF has a negative coefficient for all market response indicators (CAR, MCAP, and MTB) and is significantly negative at the <0.05 level for the market response as measured by CAR. DUMINEFF, which is the categorization of over-investment and under-investment, shows the same results, where the DUMINEFF coefficient is negative for all market response indicators and significantly negative at the <0.01 level for a market response as measured by MTB. Table 6 also shows that the market response to CAPEX information is positive and significant at levels <0.05 and <0.01 for market response indicators using MCAP and MTB and significant negative for a market response as measured by CAR. LCAPEX, the CAPEX of the previous period, is still in the market's attention and has a significant positive response at the <0.05-level for a market response as measured by MCAP. Hypothesis 1, which predicts that over-investment and under-investment will respond negatively to the market, is proven especially for a market response measured by CAR and MTB.

Table 6. Market response to inefficient investment

Variables	CAR	MCAP	MTB
	Coefficient	Coefficient	Coefficient
	t-stat	t-stat	t-stat
INEFF	-0.2452** (-2.31)	-0.030 (-0.44)	-0.005 (-0.20)
DUMINEFF	-0.1155 (-1.51)	-0.015 (-0.26)	-0.355*** (-3.55)
CAPEX	0.3286** (2.44)	0.440*** (4.65)	0.073*** (2.49)
LAGCAPEX	-0.0141 (-0.12)	0.152** (1.83)	0.020 (0.82)
FSIZE	0.1320 (1.17)	0.764*** (8.97)	0.083*** (3.30)
ASSGRT	-0.1777** (-2.39)	-0.055 (-0.94)	-0.460** (-2.06)
DER	-0.0249 (-0.32)	0.055 (0.90)	0.807*** (19.77)
FCF	0.417*** (4.00)	-0.003 (-0.05)	0.003 (0.21)
ROA	0.0873 (1.05)	0.115* (1.71)	0.050*** (2.67)
SALESIC	-0.065 (-0.89)	0.054 (0.94)	0.005 (0.31)
PUBOWN	-0.090 (-1.18)	-0.139** (-2.31)	0.938 (0.86)
Industrial-fixed effect	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Adj R-sq	0.105	0.255	0.738

The second hypothesis predicts that excessive or under-target investment will not produce optimal performance and tends to reduce performance. After all, it is more than necessary; conversely, an investment that is too low reduces the chances of achieving the expected returns, thereby reducing the overall potential to generate positive returns. It is proven that over- and under-investment hurt

financial performance two years after the investment. The DUMINEFF coefficient is negative and significant for all the performance measures, both ROA and ROE, at a significance level of <0.1. Meanwhile, if viewed from CAPEX, it shows the opposite: capital expenditure results in increased performance in the future. The test results support Hypothesis 2.

Table 7. Future financial performance of investment inefficiency

Variables	ROA _{t+2}	ROE _{t+2}
	Coefficient	Coefficient
	t-stat	t-stat
INEFF	0.018 (0.16)	-0.036 (-0.32)
DUMINEFF	-0.710* (-1.89)	-0.650* (-1.75)
CAPEX	0.630* (1.658)	0.564- (1.503)
LAGCAPEX1	0.011 (0.13)	-0.005 (0.05)
FSIZE	0.250*** (2.62)	0.197** (2.11)
ASSGRT	0.125* (1.92)	0.114* (1.81)
DER	0.084 (1.26)	-0.135** (-2.14)
FCF	-0.119** (-1.88)	-0.067 (-1.09)
ROA	0.366*** (4.95)	
ROE		0.338 (5.03)
SALESIC	0.004 (0.06)	0.065 (1.00)
PUBOWN	-6.454 (-1.51)	4.356 (-1.05)
Industrial-fixed effect	Yes	Yes
Year-fixed effect	Yes	Yes
Adj R-sq	0.140	0.163

As shown in Table 6, the size and ability of a company to generate profits (ROA) have a positive influence on the three market response indicators, primarily the significant effect on the MCAP and MTB market response indicators. MCAP and MTB increase when the company's size and ability to generate profits are growing. However, the market responded differently to an increase in asset growth (ASSGRT). In addition, the amount of debt level (DER) is proven to cause an increase in MTB, the size of the FCF is proven to cause an increase in CAR, and the number of shares owned by

the public (PUBOWN) is proven to reduce MCAP. Regarding the characteristics of the industry, this study did not prove the effect of SALESIND on the three market response indicators. However, it did prove the effect of the type of research on the three market response indicators.

As shown in Table 7, that company size (FSIZE), asset growth (ASSGRT), and profitability (ROA and ROE) currently have a positive influence on the company's ability to generate profits as measured by ROA and ROE for the next two years. FSIZE, ASSGRT, ROA, and ROE are good predictors of ROA and ROE in the next two years. DER and FCF have been shown to negatively affect ROE and ROE in the future, while public ownership does not affect ROA and ROE. Regarding the characteristics of the industry, this study did not succeed in proving the effect of SALESIND on the company's ability to generate future profits (ROA and ROE). However, this study proved the influence of the type of industry on the company's ability to generate profits in the future.

4. DISCUSSION

An *inefficient investment* is an investment that is excessive or below a company's capacity, which will potentially bring losses to interested parties, including investors. As described in the analysis section, this study finds that the market responds negatively to inefficient capital expenditures; over or under-investment is read by the market as a risk that the company cannot provide optimal results. These results contradict previous research, where the average market responds positively to capital expenditure activities (Burton et al., 1999; Vafeas & Shenoy, 2005). However, these results address the inconsistency of previous studies regarding market response to capital expenditure (Akbar et al., 2008; Qhandari et al., 2016; Chen & Chang, 2020). The market only sometimes responds positively due to inefficient investments that make investors doubt the company's ability to achieve optimal investment returns.

This study uses the investment efficiency model following several previous studies (McNichols & Stubben, 2008; Biddle et al., 2009; Goodman et al., 2014; Shroff, 2017; Choi et al., 2020). The residual

value of the investment efficiency model and the dummy variable of the residual, which is used as a proxy for investment efficiency, both show consistent results that investment inefficiency is responded to negatively by the market. This finding implies that the market considers the risk of inefficient investment, which has the potential to prevent investors from obtaining optimal yields. This finding narrows the differences in the results of previous studies by highlighting the inefficiency aspect of investment decisions.

One of the objectives of capital expenditure is to improve future financial performance, but the inefficient investment is counterproductive to that goal. Management is at high risk when investing over what is required or, conversely, when investing lower than the efficient level of investment. As hypothesized, inefficient investment, either over or under-investment, negatively affects the company's future performance. Using ROA and ROE two years after the year of investment, it is found that over or under-investment has a negative effect. This finding is in line with the results of previous studies that prove a negative relation-

ship between capital expenditure and future earnings (Bar-Yosef et al., 1987; Abarbanell & Bushee, 1997; Burton, 2005). Other research findings also prove that the efficiency of capital expenditures affects financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013; Michael & Herword, 2019).

The results of this study explain that inefficient capital expenditure reduces a company's ability to improve financial performance because expensive investment costs burden financial performance and reduce company productivity. A company bears an expensive investment cost that needs to be commensurate with the revenue earned from the additional new investment. The optimal use of investment is crucial for the company, given its limited resources (Biddle et al., 2009; Bae et al., 2018). Consistent with the agency perspective, managers tend to reinvest excess funds rather than return them to shareholders, which has proven risky (Brailsford & Yeoh, 2004). Managers pay for it through a negative response from the market and suboptimal financial performance, as evidenced by current research.

CONCLUSION

This study examines the market response and future firm financial performance related to over-investment or under-investment. The sample is devoted to large-cap companies listed on the Indonesia Stock Exchange for 2016–2021 and obtained 232 samples that meet the requirements. Over or under-investment was measured using the residual investment inefficiency model. The results of testing hypothesis 1 show that the coefficient of the dummy variable over-invest or under-invest (DUMINEFF) is negative and consistent for all market response measurements using cumulative abnormal returns (CAR), market capitalization (MCAP), and market-to-book (MTB). However, the DUMINEFF coefficient is significant for the market response measured using MTB.

Furthermore, the results of testing hypothesis 2 found that the DUMINEFF coefficient is negative and significant to future performance, both as measured by ROA and ROE. Thus, this study yielded two critical findings. First, the market responded negatively by inefficient investment, either over or under-investment. This finding answers the diversity of previous research on investment spending, which is only sometimes responded positively by the market. Second, this study shows that over-investment or under-investment harms future financial performance. This result complements the previous studies by examining the effect of over or under-investment on future financial performance rather than current-year performance.

Apart from the above results, this study needs to discuss the motivation of management to over-invest or under-invest, which would be interesting to disclose. Theoretically, there is an explanation for the behavior of managers to over-invest or under-invest, either because of cash shortage problems or other agency problems that prevent management from investing at an efficient level. Therefore, this provides an opportunity for future research to uncover aspects of management motivation regarding inefficient investments.

AUTHOR CONTRIBUTIONS

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MARKET RESPONSE AND FUTURE PERFORMANCE OF INEFFICIENT INVESTMENT-OVERINVESTMENT OR UNDERINVESTMENT

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Abstract

The purpose of this study is to investigate the market response to overinvestment or underinvestment and the influence of overinvestment or underinvestment on future performance. This study uses a sample of large-cap companies whose corporate actions are more of a market concern than those of small companies. The sample was selected from go-public companies listed on the Indonesia Stock Exchange during the 2016-2021 period. Samples must have at least 120 active trading days for each year. There are 232 observations that meet the qualifications. This study adopts the investment inefficiency model developed by a number of previous studies to measure overinvestment or underinvestment. The results show that overinvestment or underinvestment responded negatively by the market. Furthermore, this study also finds that overinvestment or underinvestment has a negative effect on a company's future performance.

Commented [JM2]: Revised: content and number of words

Keywords: inefficient investment, overinvestment, underinvestment, financial performance, market response, big-cap companies

JEL Classification M21, M41, G32

Commented [JM3]: Added JEL

INTRODUCTION

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Paying attention to the optimum level of investment is important because the company's resources are limited, and the company cannot always easily fund capital expenditures. On the other hand, managers tend to overinvest to enlarge their business empire, which means achievement for managers but becomes a burden for the company (Chen et al., 2015). Excessive capital expenditure will cause idle capacity, on the other hand, too low capital expenditure will eliminate many opportunities for companies to create returns. Therefore, assessing the market response to capital expenditures, without assessing the level of efficiency, as many previous studies have done, can produce biased findings (Choi et al., 2020).

This study will examine the market response to over-investment and under-investment, and what impact these two inefficiencies have on future performance. This study adopts the investment efficiency model used by a number of previous studies (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020), to measure overinvestment or underinvestment. In addition, this study was applied to large-cap companies listed on the Indonesia Stock Exchange. This is because investors are generally more concerned with the corporate actions of large companies than small companies (Botosan, 1997; Sengupta, 1998), the corporate actions of large companies will receive more attention from the market.

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1. LITERATURE REVIEW

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Capital expenditure activities carried out by management are signals sent by managers to the market to reduce the occurrence of information asymmetry (Karaman et al., 2020). The study of the market response to capital expenditure has been initiated by a number of previous studies. One of the phenomenal studies related to capital expenditure and market response is the research conducted by McConnell and Muscarella (1985). This study uses two sample groups, industrial companies and public utility companies. It is found that an unexpected increase in capital

expenditure results in an increase in stock market prices and vice versa. Trueman (1986) considered the level of investment in a similar study, the findings of his research show that the level of investment provides perfect information about the true value of the firm.

Woolridge & Snow (1990) conducted a more specific study on the announcement of strategic investment decisions which include joint ventures, R&D projects, product/market diversification, and capital expenditures. Research findings support that strategic investment decisions increase cumulative abnormal returns. Tests per type of strategic decision show congruent results that the market responds positively. Additional capital expenditures affect income for the period which causes the market to respond positively (Kerstein & Kim (1995)). Changes in capital expenditures that are higher or lower than the industry average provide positive or negative signals, respectively (Lev and Thiagarajan, 1989; Kerstein and Kim, 1995). Chung et al.(1998) added a variable quality of investment opportunities to provide an additional explanation for the results of previous studies, where an increase/decrease in capital expenditures had a positive/negative effect on market response. The results of this study were then followed by Jones et al.(2004) and Brailsford & Yeoh (2004) who found that investment opportunities, growth opportunities, cash flow conditions and their interactions are important variables in the relationship between capital expenditure announcements and market response.

Burton et al. (1999) and Vafeas & Shenoy (2005) have proven that managers succeeded in influencing the market through their actions of making capital expenditure. Investment projects undertaken by joint ventures surprised the market and increased market expectations of the prospects of participating companies, while investment projects undertaken by individual companies had no impact on abnormal returns (Burton et al., 1999). The management's actions to conduct capital expenditures aim to communicate the company's prospects to investors. Management attempts to influence the market's assessment of the company's future by demonstrating the company's commitment to continue to grow through a series of capital expenditures (Bae et al., 2018). However, some studies still show a negative response from the market (Akbar et al., 2008, Qhandari et al, 2016; Chen & Chang, 2020). The focus of the company, both single segment and multiple segments, turned out to be an important characteristic that needs attention. Announcements of new capital expenditures made by single-segment companies received a stronger positive response than those made by multi-segment companies (Chen, 2006; Bhanna (2008). Capital expenditure guidance factors are important and reduce information asymmetry and increase market response to investment decisions (Luo, 2016).

Kaur & Kaur (2019), adding evidence of market response to capital spending decisions in developing countries, capital expenditure decisions are strategic decisions and have been proven to be responded positively by the market. Capital expenditure decisions are operational and have a strategic focus for two reasons: first, because of its size and second, because of its long-term impact (Alkaraan and Northcott, 2006; Kim et al., 2020). The optimum amount of investment, which is an investment level that considers growth opportunities, financial constraints, and the ability to obtain funding if needed, is a crucial factor (Markopoulou & Papadopoulos, 2009; Choi et al., 2020). Therefore, this study will address the inefficiency investment in relation to market response.

The market response to capital expenditure shows expectations of future financial performance which should be in line with additional investment. A number of previous studies examine the efficiency of capital expenditures with financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013). Jiang et al (2006) found a significant positive relationship between capital expenditures and future corporate earnings after controlling for current year corporate earnings. Meanwhile, Kumar & Li (2013) found that capital expenditure has a positive effect on financial performance (five years after investment) in companies that have high R & D intensity, and vice versa in companies with low R & D intensity.

Ou (1990) and Abarbanell & Bushee, 1997 find a negative relationship between capital expenditures and future earnings. Bar-Yosef et al. (1987) find that investment spending does not provide information on past earnings when predicting future earnings. Burton (2005) examines the effect of capital expenditure on market reactions and finds that investors respond positively to new investments, especially those that are not part of alliance activities. Turner et al (2019) tested companies engaged in the hospitality sector and specifically observed that capital expenditures in the form of renovations had a significant impact on short-term performance, because they increased revenue and on the other hand reduced maintenance costs. Farooq et al (2015) examined overinvestment and underinvestment, their impact on corporate performance. By using a sample of 360 non-financial companies during

the period 2005 to 2011, it is found that both overinvestment and underinvestment have a negative effect on financial performance. Meanwhile, Trong et al (2020), specializes in his research on the overinvestment aspect only in non-financial companies in Hanoi and finds that overinvestment has a negative effect on financial performance. This study will complement previous findings by focusing on the inefficient investment, both under or over investment to future financial performance.

1.1. Hypothesis of the Study

This study aims to prove the market response to under or over investment and the impact of under or over investment on future financial performance. According to the aim of study and based on the theoretical framework and previous findings, the hypotheses of this study are:

H1: Market reacts negatively to the inefficient investment (over-invest or under-invest)

H2: Inefficient investment (over-invest or under-invest) negatively effect on long-term financial performance

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2. METHOD

2.1. Sample

The research sample comprised companies listed on the Indonesian Stock Exchange. The sampling period was 2016–2020. The sample is selected based on companies classified as having large capitalization because big cap companies are more of a concern to investors than companies with small capitalization. The shares of the sample companies must be actively traded and have daily stock data for at least 120 days per year. This study does not exclude sectors; therefore, all sectors are represented in the sample. A total of 230 observations met the sample criteria. Daily stock data and the composite stock price index used to measure market responses were obtained from Yahoo Finance

2.2. Main Variable

The main variables in this study consist of market response, market capitalization, market to book and investment inefficiency. The description of each main variable is as follows:

Market response

According to the efficient market hypothesis (EMH), all published information is quickly embedded in security prices (Fama, 1970). Stock prices that move up or down around certain published events reflect the market responses. Abnormal returns measure the evidence that the market responds to certain information. The market model is widely used to explain market factors and company-specific factors that affect stock returns (Chung et al, 1998; Perveen et al., 2020), with the following model:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (1)$$

R_{jt} and R_{mt} were obtained from Yahoo Finance, where the estimation period was -120 to -20 days before the publication date. The event period was 20 days before and after the publication date. Furthermore, abnormal returns (AR) were calculated using the following formula:

$$AR_{jt} = R_{i,j,t} - (\alpha_j + \beta_j R_{mt}) \quad (2)$$

The cumulative abnormal return for the following window (-20,0,+20) is obtained by summing the AR during the event window, as follows:

$$CAR = \sum_{t=1}^N AR_{i,t} \quad (3)$$

Market Capitalization

In addition to using abnormal returns as a market response, this study uses market capitalization as a proxy for market response. Market capitalization is the value of a company based on its current market prices. Market capitalization allows investors to measure companies based on how much the public perceives them to be valued (Reinganum, 1999). The higher the value, the greater is the market appreciation of the company. A measure of market capitalization can inform the level of risk an investor might expect when investing in a company's stock, as well as how much of the investment will return over time. The formula for market cap is the market price multiplied by the number of outstanding shares (Marito & Sjarif, 2020). This study uses market capitalization on the publication date.

Market to Book (MTB)

Market-to-book (MTB) is another indicator of market response because MTB reflects future return on equity (Penman, 1996). Market-to-book (MTB) is the ratio of market to book value of equity at the end of year t (Roychowdhury & Watts, 2007). [This study applied market equity at the publication date.]

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Investment inefficiency

Investment efficiency shows the level of investment that is not excessive but is also not too low. Investment must be proportional to investment opportunities owned by a company (Stulz, 1998; Thomas 2002; Choi, 2020). Investment efficiency is measured by estimating the extent to which investment deviates from the expected level of investment (Choi, 2020). This study adopts the investment efficiency model used in previous studies (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020), to measure investment inefficiency, using the following model:

$$INVEST_{i,t} = \beta_0 + \beta_1 \beta TQ_{i,t-1} + \beta_2 \beta CFO_{i,t-1} + \beta_3 \beta ASSETGR_{0i,t-1} + \beta_4 \beta INVEST_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

where $INVEST_{i,t}$ is the capital expenditure of company i in year t divided by net PPE at the beginning of year t ; $TOBINS Q_{i,t-1}$ is the market value of equity plus the book value of short-term debt and long-term debt divided by total assets measured at the end of year $t-1$; $CFO_{i,t}$ is the cash flow from operations in year t ; and $ASSET_GR_{i,t-1}$ is the percentage change in firm i 's assets between years $t-2$ and $t-1$. The model is estimated for each 2-digit SIC industry with at least 14 observations each year.

The residuals from the estimation model capture the extent to which a firm's investment deviates from the optimal level of investment and are thus used to measure investment inefficiency. In the year of observation, companies with positive residuals were classified as overinvesting companies, and those with negative residuals were classified as underinvesting companies. Companies classified as over-invested are given a score of 1, and under-investment is given a score of 0. This study uses both the residual and residual categories using a nominal scale to measure investment inefficiency.

2.3. Analysis Model

This study tested the hypothesis of market response to investment inefficiency, where market response was measured using three indicators representing market response: cumulative abnormal (CAR), market capitalization (MCAP), and market to book (MTB), which are represented by Models 1a to 1c. The next step is to examine the effect of CAPEX on financial performance for two years after the year of capital expenditure, when financial performance is measured by ROA and ROE (models 2a and 2b).

$$\begin{aligned} CAR_{i,t+1} = & \beta_0 + \beta_1 INEFF_{i,t} + \beta_2 DUMINEFF_{i,t} + \beta_3 CAPEX_{i,t} + \\ & \beta_4 LCAPEX_{i,t} + \beta_5 FSIZE_{i,t} + \beta_6 ASSGRT_{i,t} + \beta_7 DER_{i,t} + \\ & \beta_8 FCF_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} SALESIND_{i,t} + \\ & \beta_{11} PUBOWN_{i,t} + \beta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad (\text{model 1a}) \end{aligned}$$

$$\begin{aligned}
MCAP_{i,t+1} = & \delta_0 + \delta_1 INEFF_{i,t} + \delta_2 DUMINEFF_{i,t} + \delta_3 CAPEX_{i,t} + \\
& \delta_4 LCAPEX_{i,t} + \delta_5 FSIZE_{i,t} + \delta_6 ASSGRT_{i,t} + \delta_7 DER_{i,t} + \\
& \delta_8 FCF_{i,t} + \delta_9 ROA_{i,t} + \delta_{10} SALESIND_{i,t} + \\
& \delta_{11} PUBOWN_{i,t} + \delta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad \text{(model 1b)}
\end{aligned}$$

$$\begin{aligned}
MTB_{i,t+1} = & \theta_0 + \theta_1 INEFF_{i,t} + \theta_2 DUMINEFF_{i,t} + \theta_3 CAPEX_{i,t} + \\
& \theta_4 LCAPEX_{i,t} + \theta_5 FSIZE_{i,t} + \theta_6 ASSGRT_{i,t} + \theta_7 DER_{i,t} + \\
& \theta_8 FCF_{i,t} + \theta_9 ROA_{i,t} + \theta_{10} SALESIND_{i,t} + \\
& \theta_{11} PUBOWN_{i,t} + \theta_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad \text{(model 1c)}
\end{aligned}$$

$$\begin{aligned}
ROA_{i,t+2} = & \lambda_0 + \lambda_1 INEFF_{i,t} + \lambda_2 DUMINEFF_{i,t} + \lambda_3 CAPEX_{i,t} + \\
& \lambda_4 LCAPEX_{i,t} + \lambda_5 FSIZE_{i,t} + \lambda_6 ASSGRT_{i,t} + \lambda_7 DER_{i,t} + \\
& \lambda_8 FCF_{i,t} + \lambda_9 ROA_{i,t} + \lambda_{10} SALESIND_{i,t} + \\
& \lambda_{11} PUBOWN_{i,t} + \lambda_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad \text{(model 2a)}
\end{aligned}$$

$$\begin{aligned}
ROE_{i,t+2} = & \phi_0 + \phi_1 INEFF_{i,t} + \phi_2 DUMINEFF_{i,t} + \phi_3 CAPEX_{i,t} + \\
& \phi_4 LCAPEX_{i,t} + \phi_5 FSIZE_{i,t} + \phi_6 ASSGRT_{i,t} + \phi_7 DER_{i,t} + \\
& \phi_8 FCF_{i,t} + \phi_9 ROE_{i,t} + \phi_{10} SALESIND_{i,t} + \phi_{11} PUBOWN_{i,t} + \\
& \phi_{12} INDUST_{i,t} + \varepsilon_{i,t} \quad \text{(model 2b)}
\end{aligned}$$

The main independent variable is capital expenditure inefficiency (INEFF), which is the residual of the investment efficiency model, as explained in the investment efficiency in the previous section. DUMINEFF is a categorization of residuals into overinvestment and underinvestment. The analytical model includes CAPEX and LCAPEX, which are capital expenditures for the year of observation and before the year of observation as control variables, and several other control variables related to company- and industry-specific characteristics. Company-specific characteristics include firm size (FSIZE), leverage (DER), asset growth (ASSGRT), free cash flow (FCF), return on equity (ROE), return on assets (ROA), and public ownership (PUBOWN). Industry-specific companies include the company's sales to the sales sector (SALESIND) and industrial sector (INDUST). The complete definition of research variables is shown in Table 1 below.

Table 1. Variable definition

Main variables	
INEFF	The inefficiency score obtained from the residual efficiency investment model. This measurement is adopted from the investment efficiency model that has been used by previous research (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020)).
DUMINEFF	Dummy variables for over-invest and under-invest. Over-invest if the residual is positive and vice versa, if the residual is negative, it is categorized as under-invest. Over-invest is given a score of 1 and 0 for under-invest

Control Variables	
CAPEX	Capital expenditures for the current year scaled by total assets of the previous year
LCAPEX	CAPEX for the previous period
DER	Long-term liabilities divided by equity (Stulz, 1990)
FCF	is cash flow in excess of what is needed to fund investments (Jensen, 1986). Free cash flow is a manifestation of agency problems because excess cash cannot be returned to shareholders (Brailsford & Yeoh, 2004). Free Cash flow is calculated using the approach of Lang et al. (1991) and as follows: FCF= EBIT+ DEPR-TAX-DIV-INT-INV EBIT is earning before interest and tax; DPR is depreciation expense, TAX is tax paid; DIV is dividend paid for ordinary share; INT is interest expense; INV is current year investment.
SALESIND	Firm sales to subsector sales
PUBOWN	Share owned by public
INDUST	Industrial sector of firm sample
Market response variables	
CAR	Cumulative abnormal return in the period of 20 days before and after the publication date of the financial statements
MCAP	Market capitalization value at the date of publication of financial statements
MTB	Market value of equity at the publication date of the financial statements divided by the book value of equity
Financial performance	
ROA	Earning after tax divided by total assets
ROE	Earning after tax divided by total equities

3. RESULTS

3.1. Descriptive Analysis

Table 2. shows the mean value of each variable for the over- and under-investment sample groups. The mean CAPEX for the over-invested sample group was higher than that of the under-invested group, and was significant at < 0.01 . There is a significant difference in the size of companies in the overinvestment and underinvestment groups. The performance of the overinvest sample group companies is better than that of the underinvest group, as can be seen from the mean ROA, FCF, and SALESIND values of the overinvestment sample group, which are significantly different from the mean performance of the underinvestment sample group.

Table 2. Mean-Difference for Over-Invest and Under-Invest

	Over- Invest (N=40)	Under-invest (N=192)	t	Sig (2- tailed)	
CAR	31.9000	-5.7917	1.561	0.1200	
MCAP	10.3000	10.3299	-0.999	0.905	
MTB	1.3320	1.3342	-0.0215	0.9829	
CAPEX	0.7716	0.5982	4.2426	0.0000	***
FSIZE	10.4873	10.7742	-2.9190	0.0039	***
ASSGRT	0.1059	0.1060	-0.0033	0.9974	
DER	0.4285	0.4655	-0.3420	0.7327	

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FCF	-9.6849	-52.6638	4.2426	0.0000	***
ROA	0.0873	0.0611	1.6837	0.0936	*
SALESIND	0.1822	0.1704	2.3775	0.0182	**
PUBOWN	0.6835	0.6911	-0.3028	0.7623	

The analysis of variables per sector (Table 3) shows that the technology sector has the highest asset growth compared to the other sectors. This is in line with the rapid development of technology, which requires this sector to conduct aggressive capital expenditure. On average, each sector has a safe risk, as seen from the DER, which is only about 0.50 of equity funded with debt. Some sectors have a negative FCF, which means that funding and investment needs cannot be facilitated internally, while consumer cycle and healthcare sectors have a positive FCF. These two sectors have stable FCFs and even increased during the pandemic, so they have healthy operating cash flows. The basic materials, industry, property, and energy sectors have a high ROA of around 8%-9% per year, while the ROA of other sectors is around 4%-7%. In terms of ROE, basic materials provided the highest ROE of 21%, followed by energy and industry. The highest public ownership (PUBOWN) is above 30% in the basic materials, consumer cyclical, financial, industry, and infrastructure sectors, whereas in other sectors, the average ownership is in the range of 20%. The average individual sales per sector were below 10%, indicating that the level of competition was quite high. Sectors with an average sales of 50% are the consumer cyclical sector and the industrial sector.

Companies that underinvest seem to have cash flow problems, because the average free cash flow is more negative than that of companies that overinvest. Choi et al. (2020) describe that companies are in a situation of financial constraints and tend to underinvest.

Table 3. Descriptive Statistic by Sector

SECTORID	N		CAR	MCAP	MTB	CAPEX	INVEFF
Basic Material	36	Mean	-				-
			1.611	10.417	1.485	0.614	3.413
		Std. Deviation	46.108	0.604	0.895	0.273	19.959
Consumer Cyc	8	Mean	-				-
			23.750	10.125	1.234	0.653	0.189
		Std. Deviation	89.596	0.354	0.336	0.239	0.574
Consumer NY	44	Mean	-				-
			37.591	10.591	1.310	0.651	8.457
		Std. Deviation	201.343	0.542	0.575	0.225	40.953
Energy	32	Mean	-				-
			7.063	10.313	1.317	0.626	23.457
		Std. Deviation	15.937	0.592	0.391	0.238	108.250
Financial	56	Mean	-				-
			37.214	10.018	1.356	0.623	12.553
		Std. Deviation	205.793	2.004	0.644	0.257	66.059
Healthcare	4	Mean	-				-
			25.750	10.000	1.207	0.852	0.047
		Std. Deviation	23.880	-	0.247	0.113	1.373
Industry	6	Mean	-				-
			8.625	10.375	1.356	0.552	23.207
		Std. Deviation	14.774	0.518	0.480	0.259	65.292

Infrastructure	24	Mean	-	10.500	1.337	0.638	-
		Std. Deviation	10.417	0.511	0.291	0.274	17.633
Property	16	Mean	-	10.188	1.134	0.612	-
		Std. Deviation	3.875	0.403	0.223	0.167	168.035
Technology	4	Mean	-	10.750	1.110	0.477	-
		Std. Deviation	12.500	0.500	0.314	0.190	34.340
Total	230	Mean	-	10.319	1.334	0.628	-
		Std. Deviation	0.707	1.102	0.578	0.244	72.117

Table 3. Descriptive Statistic by Sector-Cont'd

SECTORID	N		FSIZE	ASSGRT	DER	FCF	ROA
Basic Material	36	Mean	-	10.808	0.135	0.584	-
		Std. Deviation	10.417	0.744	0.197	0.911	30.850
Consumer Cyc	8	Mean	-	10.549	0.067	0.479	0.444
		Std. Deviation	3.875	0.402	0.051	0.758	0.506
Consumer NY	44	Mean	-	10.830	0.100	0.388	24.733
		Std. Deviation	12.500	0.558	0.135	0.594	106.344
Energy	32	Mean	-	10.590	0.068	0.454	55.787
		Std. Deviation	10.417	0.576	0.117	0.520	157.551
Financial	56	Mean	-	10.718	0.146	0.516	96.323
		Std. Deviation	0.469	0.311	0.658	0.374	223
Healthcare	4	Mean	-	10.416	0.067	0.260	0.198
		Std. Deviation	10.416	0.159	0.052	0.229	0.223
Industry	6	Mean	-	10.798	0.084	0.475	11.788
		Std. Deviation	0.949	0.127	0.513	0.34	242
Infrastructure	24	Mean	-	10.770	0.022	0.438	23.164
		Std. Deviation	0.707	1.102	0.578	0.244	72.117

		Std. Deviation	0.514	0.096	0.361	77.442	0.071
Property	16	Mean	10.557	0.140	0.296	-	0.092
		Std. Deviation	0.518	0.189	0.367	268.230	0.138
Technology	4	Mean	10.908	0.189	0.264	-	0.041
		Std. Deviation	0.560	0.379	0.174	115.980	0.034
Total	230	Mean	10.725	0.106	0.459	-	0.066
		Std. Deviation	0.575	0.204	0.622	213.495	0.090

Table 3. Descriptive Statistic by Sector-Cont'd-2

SECTORID	N		ROE	PUBOWN	SALESIC
Basic Material	36	Mean	0.210	0.310	0.111
		Std. Deviation	0.328	0.159	0.063
Consumer Cyc	8	Mean	0.154	0.279	0.500
		Std. Deviation	0.235	0.151	0.050
Consumer NC	44	Mean	0.118	0.348	0.091
		Std. Deviation	0.092	0.138	0.064
Energy	32	Mean	0.191	0.289	0.125
		Std. Deviation	0.302	0.144	0.065
Financial	56	Mean	0.104	0.308	0.071
		Std. Deviation	0.100	0.145	0.074
Healthcare	4	Mean	0.078	0.280	1.000
		Std. Deviation	0.044	0.184	-
Industry	6	Mean	0.177	0.374	0.500
		Std. Deviation	0.255	0.096	0.258
Infrastructure	24	Mean	0.112	0.305	0.167
		Std. Deviation	0.276	0.140	0.108

Property	16	Mean	0.150	0.289	0.250
		Std. Deviation	0.190	0.135	0.117
Technology	4	Mean	0.083	0.218	1.000
		Std. Deviation	0.034	0.198	-
Total	230	Mean	0.142	0.311	0.172
		Std. Deviation	0.219	0.145	0.209

3.2. Empirical Results

This study aims to complement previous research on the market response to capital expenditure by examining the inefficiency of capital expenditure. Investment inefficiency is characterized by either over- or under-investment, both of which harm investors because companies finance capital expenditures are more than or less than the required amount. Inefficient investment has an impact on non-optimal investment returns. Hypothesis 1 predicts that the market responds negatively to over- and under-investment information, and the test results show that INEFF has a negative coefficient for all market response indicators (CAR, MCAP, and MTB), and is significantly negative at the <0.05 level for market response as measured by CAR. DUMINEFF, which is the categorization of overinvestment and underinvestment, shows the same results, where the DUMINEFF coefficient is negative for all market response indicators and significantly negative at the <0.01 level for market response as measured by MTB. Table 4 also shows that the market response to CAPEX information is positive and significant at levels <0.05 and <0.01, for market response indicators using MCAP and MTB, and significant negative for market response as measured by CAR. LCAPEX, which is the CAPEX of the previous period, is still in the market's attention and has a significant positive response at the <0.05-level for market response as measured by MCAP. Hypothesis 1, which predicts that overinvestment and underinvestment will respond negatively to the market, is proven especially for market response as measured by CAR and MTB.

Table 4. Market Response to Inefficient Investment

	CAR	MCAP	MTB
	Coefficient	Coefficient	Coefficient
	t-stat	t-stat	t-stat
INEFF	-0.2452 ** (-2.31)	-0.030 (-0.44)	-0.005 (-0.20)
DUMINEFF	-0.1155 (-1.51)	-0.015 (-0.26)	-0.355 *** (-3.55)
CAPEX	0.3286 ** (2.44)	0.440 *** (4.65)	0.073 *** (2.49)
LAGCAPEX	-0.0141 (-0.12)	0.152 ** (1.83)	0.020 (0.82)
FSIZE	0.1320	0.764 ***	0.083 ***

	(1.17)	(8.97)	(3.30)
ASSGRT	-0.1777 **	-0.055	-0.460 **
	(-2.39)	(-0.94)	(-2.06)
DER	-0.0249	0.055	0.807 ***
	(-0.32)	(0.90)	(19.77)
FCF	0.417 ***	-0.003	0.003
	(4.00)	(-0.05)	(0.21)
ROA	0.0873	0.115 *	0.050 ***
	(1.05)	(1.71)	(2.67)
SALESIC	-0.065	0.054	0.005
	(-0.89)	(0.94)	(0.31)
PUBOWN	-0.090	-0.139 **	0.938
	(-1.18)	(-2.31)	(0.86)
Industrial-fixed effect	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year-fixed effect	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Adj R-sq	0.105	0.255	0.738

The second hypothesis predicts that investment that is excessive or under the target will not produce optimal performance and tends to reduce performance. This is because part of the investment is idle because it is more than necessary; conversely, an investment that is too low reduces the chances of achieving the expected returns, thereby reducing the overall potential to generate positive returns. It is proven that over- and under-investment have a negative effect on financial performance two years after the investment. The DUMINEFF coefficient is negative and significant for all the performance measures, both ROA and ROE, at a significance level of <0.1. Meanwhile, if viewed from CAPEX, it shows the opposite that capital expenditure results in increased performance in the future. The test results support Hypothesis 2.

Table 5. Future Financial Performance of Investment inefficiency

	ROA_{t+2}		ROE_{t+2}
	Coefficient		Coefficient
	t-stat		t-stat
INEFF	0.018		-0.036
	(0.16)		(-0.32)
DUMINEFF	-0.710 *		-0.650 *
	(-1.89)		(-1.75)
CAPEX	0.630 *		0.564
	(1.658)		(1.503)
LAGCAPEX1	0.011		-0.005
	(0.13)		(-0.05)
FSIZE	0.250 ***		0.197 **

	(2.62)	(2.11)
ASSGRT	0.125 *	0.114 *
	(1.92)	(1.81)
DER	0.084	-0.135 **
	(1.26)	(-2.14)
FCF	-0.119 **	-0.067
	(-1.88)	(-1.09)
ROA	0.366 ***	
	(4.95)	
ROE		0.338 ***
		(5.03)
SALESIC	0.004	0.065
	(0.06)	(1.00)
PUBOWN	-6.454	-4.356
	(-1.51)	(-1.05)
Industrial-fixed effect	<i>Yes</i>	<i>Yes</i>
Year-fixed effect	<i>Yes</i>	<i>Yes</i>
Adj R-sq	0.140	0.163

As shown in table 4, that the size and ability of the company to generate profits (ROA) have a positive influence on the 3 market response indicators, especially the significant effect on the MCAP and MTB market response indicators. This shows that MCAP and MTB increase when the size of the company and the company's ability to generate profits are getting bigger. However, the market responded otherwise to an increase in asset growth (ASSGRT). In addition, the amount of debt level (DER) is proven to cause an increase in MTB, the size of the FCF is proven to cause an increase in CAR, and the number of shares owned by the public (PUBOWN) is proven to reduce MCAP. Regarding the characteristics of the industry, this study did not succeed in proving the effect of SALESIND on the three market response indicators, but it did prove the effect of the type of research on the three market response indicators.

As shown in Table 5, that company size (FSIZE), asset growth (ASSGRT), and profitability (ROA and ROE) currently have a positive influence on the company's ability to generate profits as measured by ROA and ROE for the next two years. This shows that FSIZE, ASSGRT, ROA and ROE are currently good predictors of ROA and ROE in the next two years. DER and FCF have been shown to have a negative effect on ROE and ROA in the future, while public ownership has no effect on ROA and ROE in the future. Regarding the characteristics of the industry, this study did not succeed in proving the effect of SALESIND on the company's ability to generate profits (ROA and ROE) in the future, but this study succeeded in proving the influence of the type of industry on the company's ability to generate profits in the future.

4. DISCUSSION

As described in the analysis section, this study finds that the market responds negatively to inefficient capital expenditures, over or under investment is read by the market as a risk that the company cannot provide optimal results. These results seem to contradict previous research, where the average market responds positively to capital expenditure activities (Burton et al., 1999; Vafeas & Shenoy, 2005). However, these results actually address the inconsistency of previous studies regarding market response on capital expenditure (Akbar et al., 2008; Qhandari et al., 2016; Chen & Chang, 2020). The market does not always respond negatively because of inefficient investments,

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thus doubting the company's ability to return optimal investment returns. Investment inefficiency whether measured using the residual value of the efficiency model or using a dummy variable, both of them consistently received negative responses from the market. This finding proves that the market captures the risk of inefficient investment, not just the amount of capital expenditure. So that inefficient investments will be caught by the market as a negative signal, because investments cannot produce optimal results.

Besides examining how the market responds to inefficient investments, this study also examines the impact of inefficient investments on company performance. As hypothesized, inefficient investment either over or under investment has a negative effect on the company's performance in the future. By using ROA and ROE two years after the year of investment, it is found that over or under investment has a negative effect. This finding is in line with the results of previous studies that prove a negative relationship between capital expenditure and future earnings (Bar-Yosef et al., 1987; Abarbanell; Bushee, 1997; Burton, 2005). Other research findings also prove that the efficiency of capital expenditures has an effect on financial performance (Bryan, 1997; Jiang et al., 2006; Kumar & Li, 2013, Michael & Herword, 2019). The results of this study provide an explanation that inefficient capital expenditure reduces the company's ability to improve financial performance, because expensive investment costs actually burden financial performance and reduce company productivity. The company bears an expensive investment cost that is not commensurate with the revenue earned from the additional new investment.

CONCLUSION

This study aims to examine the market response and future financial performance of companies related to over or under investment. The sample is devoted to large-cap companies, which are listed on the Indonesia Stock Exchange for the period 2016-2021, and obtained 232 samples that meet the requirements. Over or under-investment was measured using the residual investment inefficiency model developed by (McNichols and Stubben 2008; Biddle et al. 2009; Goodman et al. 2014; Shroff 2017; Choi et al. 2020). This study yielded two important findings. First, inefficient investment, either over or under investment, responded negatively by the market. This finding answers the diversity of the results of previous research on investment spending which is not always responded positively by the market. Second, this study finds that over or under-investment has a negative effect on future financial performance. This finding is in line with Farooq et al (2015) and Tromng et al (2020), and complements the results of these studies by examining the effect of over or under-investment on future financial performance rather than current year performance.

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