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Analysis of the Effect of Corporate Social Responsibility Towards Investment Efficiency of Oil and Gas Companies in Indonesia

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Abstract:

Investment efficiency in any business sector is absolute. Investment efficiency in this study was investigated using the prevailing cash flow approach through which we examined its effect on the six dimensions of upstream oil and gas corporate social responsibility (CSR)/community development program (CDP) expenditures in Indonesia. This study aimed to provide information on the most important CSR/CDP expenditures that needed to be prioritized, as the expenditure had a broad impact on the company's investment efficiency and was a part of the license-to-operate strategy. Descriptive analysis with panel data regression was used as the research method. The novelty of the research was on CSR activities and the forms of CSR, which included donation, social, and economic, in the Indonesian upstream oil and gas industry. The use of the company age as an additional control variable in the research also became a research novelty. The research samples were oil and gas companies in Indonesia at the exploitation stage, which already have gross revenue and equity to be split and reported CSR activities, with research observation conducted from 2018 to 2021. The results of the study concluded that CSR on education and the profit before interest and tax control variable had a significant and positive effect on investment efficiency, while the company age and sales growth control variables had a significant and negative effect on investment efficiency. As an implication, the CSR implemented by the contractors must be carried out holistically, accompanied by accurate, precise, and careful calculations in CSR/CDP funds realizations. Additionally, the Special Task Force for Upstream Oil and Gas Business Activities (Satuan Kerja Khusus Pelaksana Kegiatan Usaha Hulu Minyak dan Gas Bumi; SKK Migas), as the contractor management, must provide CSR/CPD contributions evidence as part of the upstream oil and gas social investment. Our recommendation for future studies is to change dependent variables into social investment results, the result of the monitoring and evaluation program, and other factors.

Keywords: cash flow, CSR, investment efficiency, oil and gas companies, community development program

1. Introduction

Companies, including oil and gas companies in Indonesia, have social responsibilities towards society and the environment through corporate social responsibility (CSR) activities. The CSR of upstream oil and gas is also known as the community development program (CDP), which is regulated in the Procedural Guidelines 017 Third Book regarding community development. CDP is a program implemented by contractors in a systematic and planned manner in the operational activities areas of the upstream oil and gas business. This activity acts as a social, economic, and cultural mitigation measure to support operational activities so that the activities can run well without any social, security, and environmental disturbances. The CDP also promotes the community's independence through planned and strategic empowerment programs (SKK Migas, 2018).

CSR/CDP of upstream oil and gas companies is closely related to their strategy in carrying out the license to operate. Arrangements for the fund allocation of upstream oil and gas companies CSR/CDP are carried out through a budgeting mechanism that must be approved by the Special Task Force for Upstream Oil and Gas Business Activities (Satuan Kerja Khusus Pelaksana Kegiatan Usaha Hulu Minyak dan Gas Bumi; SKK Migas), as the Indonesian government representative in supervising all upstream oil and gas activities. Also, the fund realizations must be discussed with and approved by SKK Migas and reported in the upstream oil and gas financial reports through Financial Quarterly Report (FQR). Realization of upstream oil and gas CSR/CDP expenditures can be charged as cost recovery or operating cost depending on the Production Sharing Contract (PSC) scheme that has been agreed upon by the contractor and the

government, which is applied after the contract is signed.

Upstream oil and gas CSR/CDP expenditures are divided into six dimensions, namely:

- Donations/natural disasters,
- Education,
- Social/infrastructure,
- Health,
- Environment, and
- Economy

Investment efficiency in this research was associated with costs, especially CSR costs. Thus, in this study, the six CSR expenditures, the dependent variables, were analyzed to investigate their effects on the company's investment efficiency, which was proxied by net cash flow (NCF) as the independent variable, as previously conducted by Ibrahim and Onyekachi (2021). In addition, this study also utilized control variables, such as company age, company size, sales growth, return on assets, and profit before interest and tax, to support research data processing. The control variables, the novelty aspect of this research, were the activities and forms of CSR consisted of CSR donations specifically for natural disasters, social CSR in the form of infrastructure development and/or rehabilitation, and specific CSR for economic improvement activities in the upstream oil and gas industry in Indonesia. Another novelty of the research is the use of the company age variable as an additional research control variable.

This study aimed to analyze the effect of CSR expenditures on donations, education, social/infrastructure, health, environment, and economy against company investment efficiency, thereby providing benefits to contractors and also *SKK Migas* about the most critical CSR expenditure that needs to be prioritized. The CSR had a broad impact on the company's investment efficiency and was a part of the license-to-operate strategy.

2. Literature Review

2.1. The Agency Theory

The agency theory was first proposed by Jensen and William H. Meckling in 1976. According to Jensen (Jensen et al., 1976) and Leon (2020), agency problems arise due to dissimilar views and goals that can come from the shareholders and the management because each party is motivated by their own desires, resulting in opinion differences and conflicts of interest. Research by Hendrawaty (2017) provided an additional clue that companies that were not constrained by funding yet withheld cash excessively could cause significant agency problems. Indeed, an optimal CSR implementation strategy for free cash flow limitation is indicated to reduce the potential for investment inefficiencies (Firmansyah & Triastie, 2021).

2.2. The Stakeholders Theory

The stakeholder theory is defined by Freeman (1984) as a form of responsibility toward value creation and the emergence of ethical capital power and human perception, which is illustrated with stakeholders as a central circle that represents the company. Other circle variables surround the central circle with two-way arrows representing a group interest. In Freeman's original framework, companies influence and are influenced by internal and external stakeholders, comprising seven stakeholders:

- Government,
- Competitors,
- Customers,
- Employees,
- Communities,
- Suppliers, and
- Shareholders

Efforts to synergize all stakeholders are very important. The synergy between interests can be bridged through CSR activities because these activities have become an integral part of the company's strategy to accommodate the components of CSR to stakeholders. It is also the responsibility of the company to provide maximal benefits to the shareholders.

2.3. The Legitimacy Theory

The main idea of this theory is that organization or entity will continue to exist if the organization operates for a value system that is commensurate with the value system of the surrounding community. The legitimacy theory has recommended that an entity should provide confidence that the operational activities and resulting performance can be accepted by the community (Dowling & Pfeffer, 1975). The entity is required to make an annual report and a sustainability report to describe the form of the entity's responsibility and support for economic, environmental, and social aspects so that its existence can be accepted by the community. Based on this theory, it is essential for an entity to obtain community support, one of which can be done via CSR activities.

2.4. Investment Efficiency

Investment efficiency is measured using the cash flow approach, which was used as the dependent variable in this study. This approach is in accordance with the research by Lee (2020) and Benlemlih and Bitar (2018) that applied cash

flow only as a control variable that can affect investment efficiency. Similarly to this, other studies showed that the higher the company's CSR performance, the more efficient the investment was (Zhong & Gao, 2017; Samet & Jarboui, 2017). Measurement of NCF for oil and gas contractors/companies in Indonesia is derived from the sum of first trade petroleum (FTP), cost recoverable, equity to be split (ETBS), subtracted by domestic market obligation (DMO), added by the bonus and then subtracted by corporate income tax and capital and operations expenditures (Pudyantoro, 2014).

2.5. Upstream Oil and Gas CSR/CDP Expenditures

The CSR program is an investment for the company's growth and sustainability and is no longer seen as a cost center but instead as a profit center. CSR activities are important as efforts to build the company's image and reputation, which, in turn, increase the trust of both consumers and the company's business partners. The general research hypothesis was that CSR expenditures could affect investment efficiency. The implementation of corporate CSR can generate competitive advantages for the company, especially when the company pays attention to the environment with corporate information asymmetry problems as well as being part of the license-to-operate strategy. These conditions can reduce costs, which in turn will increase investment efficiency. Considering that CSR activities are numerous and the purposes varied, CSR expenditures were grouped into six CSR dimensions, as done by Ibrahim and Onyekachi (2021). Further, the CSR classification per dimension was also adjusted to meet the Procedural Guidelines 017 (SKK Migas, 2018). The dimensions were used as independent variables in this study.

2.6. Firm Age (FAGE), Firm Size (FSIZE), Sales Growth (SLGH), Return on Asset (ROA), and Profit Before Interest and Tax (PBIT)

The results of Lee's research (2020) in Benlemlih and Bitar (2018) revealed that companies that have been established for a long time tend to be in a mature stage and have a lot of free cash flow, causing higher company inefficiencies. This phenomenon is closely related to firm age (FAGE). FAGE, or company age, is calculated on an annual scale from when the company was founded to the year of research (Ho et al., 2022). Firm size (FSIZE) is a company size calculated based on the total number of assets owned by the company (Lee, 2020). Sales growth (SLGH) is calculated based on the level of sales growth from year to year (Cook et al., 2019), while return on assets (ROA) is calculated based on the ratio of net profit after tax to the total number of assets owned by the company (Lee, 2020). Profit before interest and tax (PBIT) is the total sales subtracted from total costs but excluding expenses for tax and interest payments (James Ilaboya et al., 2016).

FAGE, FSIZE, SLGH, ROA, and PBIT are used as control variables in testing the significant effect between the dependent and independent variables in generating research hypotheses. The nature of the control variables is constant and was not changed during the investigation.

2.7. Previous Research

Ibrahim and Onyekachi (2021) conducted research to identify the effect of CSR expenditures on investment efficiency occurred in oil and gas companies listed on the Nigerian stock exchange from 2010 - 2019. The study results revealed differences in both positive and negative effects on each CSR expenditure variable in assessing the company's efficiency investments. Two CSR expenditures for donations and sports had a significant but negative effect on investment efficiency, while CSR expenditures for education and social activities had a significant positive effect on investment efficiency. In contrast, CSR expenditure for health and the environment did not affect investment efficiency. All control variables used in the research did not significantly affect investment efficiency.

Yazdani and Barzegar (2017) conducted research to assess the relationship between research variables, which were CSR disclosure and investment performance. The study reported a significant relationship between CSR disclosure and investment performance.

Ho et al. (2022) investigated whether corporate social performance (CSP) affects investment inefficiency (IE) with research subjects of companies that have been listed on the Chinese stock exchange. The study results found that if a company had a good social responsibility, it would have an impact on more 'proficient' investment management. The impact of CSP in reducing investment inefficiency would be more affected/significantly affected if the company was in a condition of over-investment (investment expenditures on various projects exceeded its capacity and financial capability). This study also strongly suggested and proved that CSP could significantly increase the IE of state-owned companies.

Cook et al. (2019) examined the dual role of social responsibility toward IE and innovation. Companies that spend more on CSR tend to be more fortunate and valued due to utilizing quality resources and innovation.

Lee (2020) tested the conflicting opinions about the relationship between CSR and investment efficiency in major Asian stock markets. The study results suggested that CSR could significantly reduce IE in Taiwanese companies while simultaneously strengthening the view of agency difficulties and lessening the information asymmetry in socially responsible companies, which had an impact on reducing IE. The empirical results also stated that CSR would have a strong impact on reducing investment inefficiencies by using more effective governance, considering that the wheels of government in Taiwan in 2014 - 2017 were very fragile. This study also provided recommendations to government agencies, corporate executives, and shareholders regarding CSR policy-making, CSR plans implementation and running investment portfolios.

Benlemlih dan Bitar (2018) assessed the relationship between CSR and investment efficiency in 3,000 companies in the United States from 1998 to 2012, whose research produced a positive and significant effect between CSR and investment efficiency. There were strong indications that large CSR participation could reduce IE, which was directly proportional to investment efficiency increase. The research also suggested that CSR components directly related to the

company's activities to reduce IE would be more pronounced in crises. Additionally, this study highlighted the vital role of CSR in investment behavior and efficiency modeling.

Zhong dan Gao (2017) examined the link of CSR disclosure that could affect investment efficiency, which led to a reduction in asymmetric information disclosure. In addition, the company's governance had an impact on better investment efficiency if there was CSR disclosure.

Bose et al. (2022) investigated the impact of interlocking chief executive officers (CEOs), namely the committee/board of commissioners, on the performance of CSR companies that have interlocked CEOs. CEO interlocking positively affected the CSR performance of the two companies with interlocked CEOs.

Sutisna et al. (2022) analyzed and explained the extent to which business sustainability through the implementation of CSR can transform a charity program into a CDP, with the research object consisting of oil and gas companies in Indonesia using qualitative methods. The study results proved that the CSR model of community development concept through mentoring and capacity building as a form of charity program transformation is relevant because it could encourage sustainable business practices.

Kowszyk dan Vanclay (2021) evaluated the impact of social investment quantitatively through the level of interest description, knowledge, and preferences related to the CSR program's impact evaluation by managers of companies and foundations in Latin America. The main challenges in increasing the use of impact evaluation were the lack of skills and knowledge of staff management and the complexity of evaluation methodology design. Acceptance for quantitative measurement of the social impact of CSR programs by the business sector would produce better results compared to the implemented social investment programs.

2.8. Conceptual Framework

The conceptual framework was designed based on the background and problem formulation to address research questions and referred to research conducted by Ibrahim & Onyekachi (2021). The value of CSR's contribution was measured based on the cost realizations with independent variable CSR expenditures, which were divided into six dimensions:

- Donations,
- Education,
- Social/infrastructure,
- Health,
- Environment, and
- Economy

This method was developed as a measurement tool for the dependent variable of this study, which was NCF, as a proxy for investment efficiency. The authors' decision to use company age as an additional control variable referred to the study of Ho et al., 2022 stating that companies with a more mature age and larger size tended to invest more, while companies with high profitability and PBIT would be more motivated to invest. The earning per share (EPS) control variable was not used in this study as it had been used in the study by Ibrahim & Onyekachi (2021). Further, this decision was made because oil and gas companies in Indonesia are non-public companies that are formed based on collaboration contracts between the government and contractors (in the form of business Entities/permanent business entities). The contractors perform oil and gas exploration and exploitation activities in a pre-determined and mutually agreed work area for a certain period.

Based on the explanation of the correlation between the independent, dependent, and control variables, as stated in the previous research above and the supporting literature on the relationship between the variables in this study, the hypotheses were formulated as follows:

- H₁: CSR Charitable Donation Expenditure (CSRCDE) significantly affects the efficiency of company investment.
- H₂: CSR expenditure on education (CSREDE) significantly affects the efficiency of company investment.
- H₃: CSR societal expenditure (CSRSE) has a significant effect on the efficiency of company investment.
- H₄: CSR health expenditure (CSRHE) significantly affects the efficiency of company investment.
- H₅: CSR environmental expenditure (CSREE) significantly affects the efficiency of company investment.
- H₆: CSR expenditure on economy (CSRECE) significantly affects the efficiency of company investment.
- H₇: Investment efficiency is affected by SLGH, FSIZE, ROA, PBIT, and FAGE.

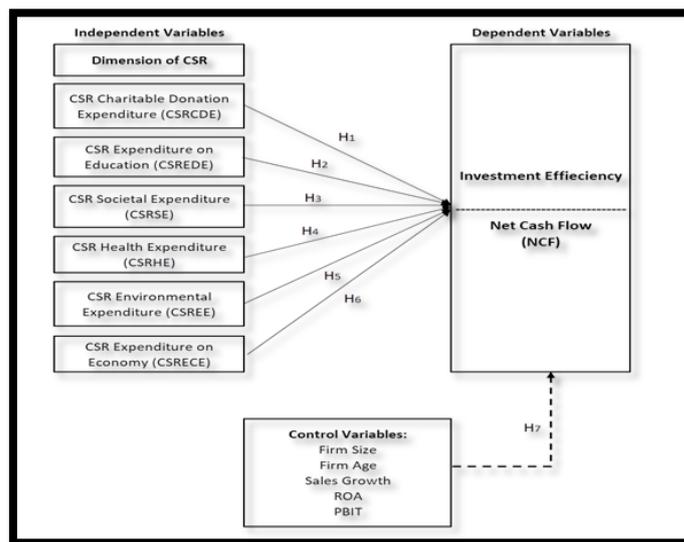


Figure 1: Conceptual Framework (adapted from Ibrahim and Onyekachi (2021) with revision)

3. Research Method

3.1. Data Collection

In this research, secondary data were collected through a literature study in the form of data from *SKK Migas*, Ministry of Energy and Mineral Resources Republic of Indonesia, official websites of oil and gas companies related to CDP, CSR, or sustainability as well as companies' internal data that were the objects of the research. The authors also employed the library research method, which consisted of collecting data by studying, researching, reviewing, and assessing books, journals, regulations, and previous studies related to the research problem. The purpose of this library research was to obtain as much theory as possible to support data processing in this research.

3.2. Sampling Method

The samples of this study were oil and gas companies in Indonesia that were already in the exploitation stage, had gross revenue and equity to be split, and reported CSR/CDP activities to *SKK Migas* within four years of research observation from 2018 to 2021. The purposive sampling technique was used to determine the sample number, with a total sample of 45 companies for four years, making up a total observation of 180 research objects. The analysis technique used was multiple linear regression panel data consisting of three models:

- The common effect model,
- Fixed effect model, and
- Random effect model

The data analysis was performed using E-Views 9 software.

The multiple linear regression panel data was used because this study aimed to examine the effect of the six dimensions of CSR expenditures, along with FSIZE, FAGE, SLGH, PBIT, and ROA, against NCF, which was a measure of investment efficiency in companies in the upstream oil and gas sector in Indonesia from 2018 to 2021.

All the variables mentioned above are practically summarized and presented as follows:

Variable	Measurement	Reference
Dependent Variable		
Investment Efficiency = Net Cash Flow (NCF)	NCF = First Trance Petroleum + Cost Recoverable + Equity to Be Split – Domestic Market Obligation + Bonus – Institutional Tax Income – Capital and Operational Expenditure	Pudyantoro (2014)
Independent Variable		
CSR Charitable Donation Expenditure (CSR CDE)	CSR CDE = CSR CDE Total Realization	Ibrahim & Onyekachi (2021)
CSR Expenditure on Education (CSREDE)	CSREDE = CSREDE Total Realization	
CSR Societal Expenditure (CSRSE)	CSRSE = CSRSE Total Realization	
CSR Health Expenditure (CSRHE)	CSRHE = CSRHE Total Realization	
CSR Environmental Expenditure (CSREE)	CSREE = CSREE Total Realization	

Variable	Measurement	Reference
CSR Economic Expenditure (CSRECE)	CSRCE = CSRCE Total Realization	
Control Variable		
Firm Size (FSIZE)	FSIZE = Total Assets	Lee (2020)
Firm Age (FAGE)	FAGE = Current year – Year when the company was established	Ho et al. (2022)
Sales Growth (SLGH)	$SLGH = \frac{Sales_n - Sales_{n-1}}{Sales_{n-1}}$	Cook et al. (2019) and Leon (2020)
Profit Before Interest and Tax (PBIT)	PBIT = Total Sales – Total Cost (excluding expenses to pay tax and interest)	James Ilaboya et al. (2016)
Return on Asset (ROA)	ROA = $\frac{Net\ Profit\ After\ Tax}{Total\ Asset}$	Lee (2020) and Leon (2020)

Table 1: Variables and Measurements

3.3. Panel Regression Method Selection

The hypotheses in this study were evaluated using multiple linear regression panel data. The panel model consisted of common effect (pool least-square: PLS), fixed effect (least squares dummy variable: LSDV) or fixed effect model, and random effect (generalized least squares: GLS) or random effect model. Selection of the best panel model among the four models was carried out using several tests, as shown in table 2, namely the Chow test, Hausman test, and the Breusch-Pagan Lagrange multiplier test (LM test). Specifically, the best panel model selection was achieved based on the conclusion-drawing indicators or criteria for each type of test using the following stages:

No	Stages	Hypothesis	Outcome
1	Chow test	H ₀ : Pooled least square as the chosen model. H ₁ : Fixed effect as the chosen model.	The output of chow test for NCF variable showed a probability value of chi-squared of 0.0000, which was smaller than α = 0.05. Consequently, H ₀ was rejected, and H ₁ was accepted, meaning that the accepted NCF variable was the fixed effect model. Then, the selection method was continued using Hausman test.
2	Hausman test	H ₀ : Random effect as the chosen model. H ₁ : Fixed effect as the chosen model.	The output of the Hausman test for the NCF variable showed a random cross-section probability value of 0.0000, which was smaller than α = 0.05. Thus, H ₀ was rejected, and H ₁ was accepted, meaning that the accepted NCF variable was the fixed effect model. Since the fixed effect model was accepted in the Chow and Hausman tests, The LM test was not performed.
3	Normality test	H ₀ : Normality assumption is fulfilled H ₁ : Normality assumption is not fulfilled	The Jarque Bera probability output for the NCF variable was 0.0000, which was smaller than α = 0.05. Therefore, H ₀ was rejected, meaning that the NCF model of normality assumption was not fulfilled.
4	Multicollinearity test	<ul style="list-style-type: none"> • There is a strong correlation between the independent variables indicates multicollinearity problem exists • There is no strong correlation between the independent variables indicates good model • if the correlation value is more than 0.7, it shows that there is a multicollinearity 	Table 3 shows that the correlation value between the independent variables (CSRDE, CSRECE, CSREDE, CSRHE) was above the cut-off value of 0.7. Thus, it can be concluded that there was no multicollinearity in the four independent variables used to predict the NCF dependent variable. Based on this result, the problem of multicollinearity was resolved because the type of data used in this study was panel data.
5	Autocorrelation test	The test was tested using the Durbin Watson (DW) test. The five areas of DW value that of a concern were: <ol style="list-style-type: none"> 1. < DW₁: positive autocorrelation problem exists 2. Between DW₁ and DW_u: inconclusive 3. Between DW_u and 4 – DW_u: autocorrelation does not exist 4. Between 4 - DW_u and 4 – DW₁: inconclusive 5. > 4 – DW₁: negative autocorrelation problem exists 	Referring to table 4, the NCF variable had a calculated DW value of 2.334724, which existed in the inconclusive area (conclusion could not be made).
6	Heteroscedasticity test	H ₀ : Heteroscedasticity does not exist H ₁ : Heteroscedasticity exists	The results of the heteroscedasticity test for the NCF variable suggested that the Prob. Chi-Squared was smaller than α = 0.05. Therefore, it can be concluded that in the NCF variable above, there was a violation of the classical heteroscedasticity assumption. If the panel data model was proven to have heteroscedasticity and autocorrelation problems, it was necessary to perform calculations using the panel corrected standard error (PCSE).
7	Goodness of Fit test	Adjusted R-Squared value is 0.705031 or 70.5031%.	The NCF variable value of 70.5031% can be interpreted that there were variations in the independent variables, which were CSRDE, CSREDE, CSRSE, CSRHE, CSREE, CSRECE, CSRECE, FSIZE, FAGE, ROA, SLGH, and PBIT. Additionally, this result maybe explained by other factors that were not included in the model using ceteris paribus assumption.

Table 2: Panel Regression Method Selection

	CSRCDE	CSRECE	CSREDE	CSREE	CSRHE	CSRSE	FAGE	FSIZE	PBIT	ROA	SLGH
CSRCDE	1.00000	0.136880	0.138940	0.145522	0.133971	0.335441	0.146356	0.491568	0.179846	-0.029387	-0.060526
CSRECE	0.136880	1.000000	0.942177	-0.019949	0.724697	0.312575	0.075088	0.045174	0.435276	-0.033121	-0.054737
CSREDE	0.138940	0.942177	1.000000	0.000428	0.816606	0.390752	0.040751	0.064066	0.548960	-0.020921	-0.052212
CSREE	0.145522	-0.019949	0.000428	1.000000	0.088630	0.030265	-0.317228	0.372141	0.019309	0.105004	-0.056258
CSRHE	0.133971	0.724697	0.816606	0.088630	1.000000	0.385777	-0.054310	0.180802	0.534774	-0.029492	-0.048022
CSRSE	0.335441	0.312575	0.390752	0.030265	0.385777	1.000000	0.048431	0.115129	0.373358	-0.005909	-0.041781
FAGE	0.146356	0.075088	0.040751	-0.317228	-0.054310	0.048431	1.000000	0.071851	0.056111	-0.047407	-0.115626
FSIZE	0.491568	0.045174	0.064066	0.372141	0.180802	0.115129	0.071851	1.000000	0.401011	-0.034531	-0.069039
PBIT	0.179846	0.435276	0.548960	0.019309	0.534774	0.373358	0.056111	0.401011	1.000000	-0.049485	-0.087593
ROA	-0.029387	-0.033121	-0.020921	0.105004	-0.029492	-0.005909	-0.047407	-0.034531	-0.049485	1.000000	-0.013598
SLGH	-0.060526	-0.054737	-0.052212	-0.056258	-0.048022	-0.041781	-0.115626	-0.069039	-0.087593	-0.013598	1.000000

Table 3: Matrix Correlation

Variable	DW Statistics	K'	N	DI	DU	4-DU	4-DL	DW Value Area	Conclusion
NCF	2.334724	11	136	1.5491	1.8970	2,103	2,4059	Between 4 – DW _u and 4 – DW _l	Inconclusive

Table 4: Autocorrelation Test Result

4. Result and Discussion

4.1. Descriptive Statistics Result

The descriptive statistics result of 45 oil and gas companies from 2018 to 2021 used in this study according to the sampling criteria are presented in table 5.

Var.	Obs.	Mean	Std. Dev	Max.	Min.
InvEff/ NCF	180	98897.01	260393.3	1693764	-356486
CSRCDE	180	16.23710	33.03673	286.1220	0.0000
CSREDE	180	77.04389	175.0321	1238.199	0.0000
CSRSE	180	102.8278	261.8765	2132.483	0.0000
CSRHE	180	40.11103	93.14984	607.1226	0.0000
CSREE	180	23.09595	55.34736	410.6900	0.0000
CSRECE	180	126.9285	331.0533	2597.678	0.0000
FSIZE	180	1133933	1991392	9735744	233.00
FAGE	180	318.3750	201.1226	699.000	13.000
ROA	180	0.782947	5.469424	65.0000	0.0000
SLGH	180	0.20196	0.858526	6.39711	-0.9018
PBIT	180	194269.2	305945.4	1358958.	0.0000

Table 5: Descriptive Statistics of the Research

NCF data during the observation year showed varying values or heterogeneity. Similar to this, the CSREDE, CSREDE, CSRSE, CSRHE, CSREE, and CSRECE also had varying values or heterogeneity over the observation year. During the observation year, SIZE, ROA, SLGH, and PBIT showed varying values or heterogeneity, while FAGE did not have variability or was considered homogenous.

4.2. Discussion

The results of the study showed that the CSRCDE had no significant effect, either positive or negative, on cash flow, which was a proxy for the efficiency of company investment. This situation indicated that regardless of the amount of CSR donations given by the company, it would not affect its cash flow. The result contradicted the research of Ibrahim and Onyekachi (2021), which stated that there was a negative effect of CSR donations expenditure on investment efficiency. The distinct results can be because CSR donations in Indonesian oil and gas companies are incidental in nature, specific for natural disaster relief, have no long-term implications for investment, and the proportion of the value is not significant compared to CSR expenditure in other fields. Meanwhile, CSR donations in oil and gas companies in Nigeria tend to be misused because there is a high possibility that their value is significant, hence it has a negative effect on the company's cash flow.

Our result suggested that CSREDE had a significant and positive effect on cash flow. The company maximizes CSREDE to support its smooth operation. This result supported previous research conducted by Ibrahim & Onyekachi (2021), which reported that CSREDE had a significant and positive value for the investment efficiency of oil and gas companies in Nigeria. CSREDE is used as a company strategy to change mindsets, which will indirectly increase community belief and also the company's value. This is in line with the legitimacy theory (Dowling & Pfeffer, 1975), which encourages

companies to ensure that their activities and performance can be accepted by the community. This will, in turn, provide value commensurate with the value system owned by the community itself.

Meanwhile, this study showed that CSRSE had no significant positive or negative effect on cash flow. This finding was in contrast to the results of Ibrahim and Onyekachi's research (2021), which revealed that CSRSE had a positive influence on investment efficiency. The observation of the comprehensive data source of CSR expenditure suggested that the realization of CSRSE for upstream oil and gas CSR/CDP activities had quite a large portion compared to the other CSR/CDP dimensions. Although this CSRSE can be recognized as an operating cost and/or can be cost-recovered in the collaboration contract model, this research showed that CSRSE had no effect on investment efficiency because the realized value of CSRSE was not consistent each year. Another reason was that the activities were incidental, depending on the needs and demands of the stakeholders in the operational area. Initially, infrastructure development aimed to smooth upstream oil and gas exploration and exploitation. Usually, however, this CSRSE is triggered by a request for development support from the local government.

The results of the study suggested that CSRHE had no influence or no significant effect, either positive or negative, on cash flow. This finding is in line with the results of Ibrahim and Onyekachi's research (2021), which showed that CSRHE had no effect on investment efficiency. CSRHE had no effect on investment efficiency because health CSR in the upstream oil and gas sector is used only as a support for the government's program to improve the health of the surrounding community. The realization of SCRHE is quite small and insignificant compared to the overall total investment in oil and gas. Not all contractors allocate funds regularly for this activity. Even though most of the communities around the upstream oil and gas industry area are still in poverty, upstream oil and gas companies still do not have specific policies related to programs dedicated to public health.

Similarly, our result also found that CSREE had no influence or no significant effect, either positive or negative, on cash flow. This result corroborates the results of Ibrahim and Onyekachi's research (2021), stating that CSREE had no effect on investment efficiency. Environmental compliance in the upstream oil and gas industry has actually been regulated separately, and the budget is separated from CSR/CDP activities. It has become a key performance indicator for health, safety, and environment (KPI HSE), which places it as the most important activity in the management of oil and gas natural resources over the level of production and sales of oil and gas. The company's HSE KPI performance is also disclosed in the sustainability report (Ho et al., 2022). Based on this explanation, environmental preservation is a crucial factor and has become a part of the HSE obligation fulfillment, not as upstream oil and gas CSR/CDP activities, which are voluntary. Even though there is an environmental dimension for upstream oil and gas CSR/CDP activities, the value is not comparable to the environmental focus on HSE activities.

In this study, CSRCE was used as an independent variable in line with the CSR dimension regulated in Procedural Guidelines 017, which replaced the CSR sport expenditure variable in Ibrahim and Onyekachi's research (2021). The absence of CSRCE's influence on investment efficiency further proves that the objective of upstream oil and gas CSR/CDP activities is to smooth the operation and mitigate social, security, and environmental disturbances (SKK Migas, 2018). CSRCE cannot be associated with investment efficiency even though the contribution of realized CSRCE is the highest compared to other dimensions of CSR realization. Economic CSR/CDP expenditure in the upstream oil and gas industry aims to build partnerships and reduce poverty by increasing the community's income. Its activities include mentoring programs that have an impact on the welfare and independence of the community, especially if later the oil and gas contracts are terminated or the oil and gas reserves run out.

The study result showed that there was no significant effect between the asset number variable control as a proxy of the FSIZE and the investment efficiency. This result is not in line with research by Lee (2020), which suggested that the FSIZE had an effect and positive toward investment efficiency for public companies listed on Taiwan Stock Market. No effect of FSIZE found in this study may occur because of the purchase or additional new production facility in the current year, which was reported as an asset addition. The result may not always be linear with the production increase. Asset addition does not necessarily result in production increases like other industries because there is a lag period in the upstream oil and gas activities. This is in line with the operational stages in the upstream oil and gas companies, which consist of exploration and exploitation phases. In addition, the funds used by the contractors to purchase assets and/or build production facilities will be claimed and owned by the country. The study result on FSIZE, which was measured with an asset number, is similar to the study result of ROA variable control, which also did not affect investment efficiency. This result is supported by asset number variable control testing as a proxy of FSIZE, which also did not show the effect on investment efficiency. The value of oil and gas companies is really high, and since the investment values are high, the return period was also long; the required production facilities were also many. However, one thing that needs to be remembered is that the management of oil and gas natural resources is a state project, and all assets that have been invested by the contractor will become fully owned by the state. This is because the contractor has received another return in the form of recoverable costs in accordance with the collaboration model in the contract agreed upon between the contractor and the government.

This study found that the company age control variable, proxied by FAGE, had a negative and significant effect on investment efficiency. This result indicated that the longer the life of oil and gas companies, their influence on investment efficiency decreases. This phenomenon occurred because oil and gas companies have three phenomena. First, there are oil and gas companies that are old enough, which have positive cash flow since most of the companies have received full returns of the recoverable cost from the government. As a result, the cash inflows received by the contractors are greater than the cash outflows. Second, there are old companies that have negative currents because they still have new development projects related to fulfilling targets for exploration and exploitation activities. Thus, they still need a lot of costs, mainly related to adding production and supporting facilities, including the use of new technologies that are high

costs. Consequently, the cash inflows are still smaller than the cash outflows. Third, newly established or young companies have negative cash flow because they still need massive working capital while the growth rate is still lacking. This working capital is still essential to carry out field development commitments where the new fields may not immediately increase production. Nevertheless, along with age, growth will increase. This study included companies with these three age types, so the result of the age coefficient on investment efficiency is negative. With relatively high NCF fluctuations and the age of the companies, which also tend to be varied, the effect value is negative.

The results showed that the SLGH control variable had a significant and negative effect on investment efficiency, which suggested that if gross revenue growth increased, investment efficiency would decrease. The factors that shape the gross revenue equation, both in terms of volume and price, were uncertain and tended to fluctuate. This directly impacted the sales value, which also fluctuated and could even decrease, making the dependent factor in the study negative. The tendency of the investment efficiency value depicted on the negative company cash flow data, and also, the negative growth due to fluctuation led to a negative effect. This finding is different from the results on the PBIT control variable, which had a significant and positive effect on cash flow, which was a proxy for the company's investment efficiency. A positive PBIT allows the company to maximize its profit, manage cash flow and also support smooth operations. This is in line with the results of Cook et al. (2019), which reported that PBIT had a significant and positive effect on investment efficiency. PBIT was able to show the company's net cash flow and would provide more ability for the company to spend more CSR funds than under the reverse conditions.

Variable	Lengthen Form	Coefficient	Probability	Result
C	Constant	396327.6	0.1900	Positive
CSRCDE	CSR Charitable Donation Expenditure	-332.4090	0.8553	Not significant
CSREDE	CSR Expenditure on Education	1106.937	0.0318	Significant and positive
CSRSE	CSR Societal Expenditure	22.71350	0.8129	Not significant
CSRHE	CSR Health Expenditure	-396.4671	0.4506	Not significant
CSREE	CSR Environmental Expenditure	-476.8464	0.2158	Not significant
CSRECE	CSR Economic Expenditure	-476.8464	0.1130	Not significant
FSIZE	Firm Size	0.221165	0.3298	Not significant
FAGE	Firm Age	-2336.818	0.0238	Significant and negative
ROA	Return on Asset	-8.98E-11	0.6271	Not significant
SLGH	Sales Growth	-1.63E-10	0.0211	Significant and negative
PBIT	Profit Before Interest and Tax	1.039880	0.0108	Significant and positive

Table 6: Result of Panel Regression Equation

4.3. Upstream Oil and Gas CSR/CDP Contribution with ISO 26000

Our result showcased that oil and gas companies under the management and supervision of *SKK Migas* in their fair business practices also pay attention to the aspects of sustainability, social responsibility, and governance through CSR programs proposed in the work program and budget (WP & B). Their realization has been reported transparently in the upstream oil and gas financial reports. ISO 26000 is a guideline for the implementation of CSR designed to assist organizations in contributing to sustainable development, encouraging organizations to go beyond basic legal compliance, and promoting standards of understanding in the field of social responsibility.

This research specifically observed the linkages between the upstream oil and gas CSR/CPD program with the first and seventh core subjects of ISO 26000, which are Governance and Community Engagement and Development, respectively. As a result, seven issues in the seven core subjects have been proactively addressed by the contractor and communicated to the stakeholders. According to the first core subject, *SKK Migas*, a partner and supervisor of natural resources management in Indonesia, has a close relationship with governance through leadership practices in the decision-making process. Further, the decision-making process must be approved in advance by *SKK Migas* via the mechanisms of budgeting, monitoring and evaluation, and reporting from the contractors (*SKK Migas*, 2018). *SKK Migas* and contractors already have processes, systems, and structures that enable them to apply social responsibility principles and practices. Other ISO 26000 subjects such as labor practices, human rights, fair operating practices, and consumer issues in this study have not become a concern for the implementation of upstream oil and gas CSR/CDP.

4.4. Research Results Related to SDGs

Our result revealed that oil and gas companies, in their business practices, pay attention to the fairness aspect in realizing CSR programs for smooth operational activities and sustainable performance. The link between this research and its support for SDGs are:

- CSRECE, through economic independence program assistance to increase income, supports goals 1, 8, 9, 10,
- CSRSE, CSREDE, CSRCDE, and CSRHE through community investment consisting of infrastructure development,

education, natural disaster relief, and health service assistance support goals 2, 3, 4, 6,

- CSREE, which includes contributions to environmental conservation, forest protection including animals and plants, and other environmental activities on land, sea, and air, supports goals 7, 12, 13, 14, 15, and
- Fair, transparent and accountable governance of upstream oil and gas management and their synergy with all stakeholders are implemented to support goals 16 and 17

5. Conclusion

The analysis result concluded that CSREDE had a significant and positive effect on investment efficiency, while FAGE and SKGH had an effect but negative on investment efficiency. PBIT had a positive effect on investment efficiency. CSRCDE, CSRSE, CSREE, and CSREE had no effect on investment efficiency. Likewise, FSIZE and ROA had no effect on investment efficiency.

There are valuable managerial implications for this research. First, when the contractor managers implement the upstream oil and gas CSR/CDP program proposal, they should not only consider their activities as a license to operate but also create a strategic decision for the company. The activities must be carried out holistically since CSR expenditures, especially on education, are considered to have broad impacts on companies, communities, and governments. The managers must apply accurate, precise, and careful calculations in realizing upstream oil and gas CSR/CDP funds as needed by continuously evaluating programs. Hence, the company's CSR expenditure can be used as evidence of a social investment where the benefits can be measured for the wider community. *SKK Migas*, as the contractor's management, must also have a calculation of social investment impact on upstream oil and gas CSR/CDP contributions and also have a CSR/CDP grand design program in accordance with the government's policy directions as stated in the National Action Plan for Sustainable Development Goals.

All the variables, including dependent, independent, and control variables, used in this study are limited to the variables used by Ibrahim and Onyekachi (2021), including investment efficiency of companies measurement that used the NCF approach. Another limitation of the study is the lack of analysis and availability of data on the distribution of realized CSR expenditure per dimension as disclosed by the company in previous studies. Our recommendation for further research is to utilize other dependent variables to analyze the effect of CSR expenditures through quantitative impact evaluation (Kowssyk & Vanclay, 2020). By utilizing other dependent variables, we can identify other variables that can be influenced by upstream oil and gas CSR/CDP expenditures, providing strong evidence in terms of informing the program's effectiveness, especially in supporting the smooth operation of upstream oil and gas. Quantitative impact evaluation can be associated with raising awareness about the proper understanding of the results of social investment, the benefits of evaluation, when impact evaluation is useful, the methods and strategies for preparing budget evaluations, and others. These factors can be used as a consideration for strategic CSR decision-making in informing design as well as detecting the success of the program that can be received directly or indirectly by the stakeholders.

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