FISCAL MODERATING EFFECT FOR SUSTAINING THE UPSTREAM PETROLEUM FIELD ECONOMICS AND PROFITABILITY: INVENTORY AND PURCHASING PERFORMANCE

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ABSTRACT

Introduction: The study literature's obvious limits with a complete fiscal term model for moderating variables are crucial to our investigation. In order to preserve petroleum field economics and profitability in Indonesia's petroleum business context, this study examines the relationship between material inventory performance, purchasing performance, and fiscal term moderating influence with an agglomeration approach.

Theoretical Framework: Industry character strongly influences the inventory and purchasing performance relationship (Basu & Wang, 2011); Hofer et al., 2012); (Priniotakis & Argyropoulos, 2018). Despite circumstances and fiscal terms that were not adaptive to environmental dynamism (Acquah-Andoh et al., 2019), Production Sharing Contract (PSC) Contractors’ upstream field economics deteriorated compared to the initial (Paramita, 2022). Financial term in fossil sector draws investors, ensuring fair economic performance and cost balance (Mardiana et al., 2019; Yun et al., 2020).

Methodology: Cross-sectional time series data were collected over five years from 26 Production Sharing Contract (PSC) Contractors from Indonesia's upstream oil industry in the preliminary Plan of Development (POD) phase. Econometric analysis using multivariate structural equation modeling will test the model.

Results and Discussions: The results showed that different financial performance agglomerations showed an inconsistent relationship between inventory performance, petroleum field economics, and profitability, but purchasing performance showed a positive relationship in any scheme, and fiscal terms significantly strengthened the relationship between variables.

Conclusion: This study sheds light on whether fiscal term strengthening variables in the upstream petroleum company affect decision-making.

Keywords: material inventory performance, purchasing performance, petroleum field economics, profitability performance, upstream petroleum industry, petroleum firm agglomeration.

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EFEITO DE MODERAÇÃO ORÇAMENTAL PARA SUSTENTAR A ECONOMIA E A RENDIBILIDADE A MONTANTE DO SETOR PETROLÍFERO: DESEMPENHO EM MATÉRIA DE INVENTÁRIO E DE AQUISIÇÃO

RESUMO

Introdução: Os limites óbvios da literatura de estudo com um modelo de termo fiscal completo para moderar variáveis são cruciais para nossa investigação. A fim de preservar a economia do campo petrolífero e a rentabilidade no contexto empresarial petrolífero da Indonésia, este estudo examina a relação entre o desempenho do inventário de materiais, o desempenho de compra e a influência moderadora do termo fiscal com uma abordagem de aglomeração.

Estrutura Teórica: O caráter industrial influencia fortemente a relação de inventário e desempenho de compra (Basu & Wang, 2011; Hofer et al., 2012); (Priniotakis & Argyropoulos, 2018). Apesar das circunstâncias e termos fiscais que não foram adaptáveis ao dinamismo ambiental (Acquah-Andoh et al., 2019), a economia de campo a montante dos contratantes do contrato de partilha de produção (PSC) deteriorou-se em comparação com a inicial (Paramita, 2022). Termo financeiro no setor fóssil atrai investidores, garantindo um desempenho econômico justo e equilíbrio de custos (Mardiana et al., 2019; Yun et al., 2020).

Metodologia: Os dados transversais das séries cronológicas foram recolhidos ao longo de cinco anos a partir de 26 contratantes do contrato de partilha de produção (PSC) da indústria petrolífera a montante da Indonésia na fase preliminar do plano de desenvolvimento (POD). A análise econômétrica usando modelagem de equações estruturais multivariadas testará o modelo.

Resultados e Discussões: Os resultados mostraram que diferentes aglomerações de desempenho financeiro mostraram uma relação inconsistente entre desempenho de inventário, economia de campo petrolífero e rentabilidade, mas o desempenho de compra mostrou uma relação positiva em qualquer esquema, e os termos fiscais fortaleceram significativamente a relação entre as variáveis.

Conclusão: Este estudo esclarece se as variáveis de fortalecimento do termo fiscal na empresa de petróleo a montante afetam a tomada de decisões.

Palavras-chave: desempenho de inventário de materiais, desempenho de compra, economia do campo petrolífero, desempenho de rentabilidade, indústria petrolífera a montante, aglomeração de empresas petrolíferas.

1 INTRODUCTION

Energy demand, especially fossil-based, is increasingly linked to global economic growth (Alshubiri et al., 2020), especially in countries with rising population density and industrialization (Shahbaz et al., 2021). Indonesia, among other emerging nations, needs energy to maintain energy security and sovereignty (Proskuryakova, 2018). However, Indonesia's fossil sector faces difficulties such improving oil and gas recovery
(Mwakipunda et al., 2023) fluctuating crude oil prices (Choi & Kim, 2018; Ansari & Kaufmann, 2019), aging production facilities (Paramita, 2022), and decarbonization programs (Becker et al., 2020). Its issues affect upstream oil and gas capital and operating costs (Attia et al., 2019).

Despite circumstances and fiscal terms that were not adaptive to environmental dynamism (Acquah-Andoh et al., 2019), Production Sharing Contract (PSC) Contractors' upstream field economics deteriorated compared to the initial (Paramita, 2022). Financial term in fossil sector draws investors, ensuring fair economic performance and cost balance (Mardiana et al., 2019; Yun et al., 2020). This includes oil and gas exploration, production, and distribution laws, terms, and taxes (Swe & Emodi, 2018; Ghosh et al., 2020).

Modern firms survive on cost efficiency (Cavaleri & Kareem, 2018). Cost optimization requires efficient purchasing and inventory material management (Shashi et al., 2020). Many research show that material inventory and procurement performance optimization boost corporate performance (Yook et al., 2018). Material inventory affects firm performance and high-cost operations (Lin et al., 2018; LI, 2019; Ali, 2020). Hançerlioğulları et al. (2016), Folinas & Fotiadis (2016), Kim et al. (2020), and Mahajan et al. (2023) found no convincing evidence for this Yook et al. (2018), Akin Ateş et al. (2018), LI (2019), Schütz et al. (2020), and Arora et al. (2020) discovered a strong relation between purchasing performance and firm performance. The internal role of a firm plays a important function in obtaining optimal financial performance and determining value of a mining company (Abas et al., 2023).

The precursory work in this study's critical path is obtaining research that comprehensively examines fiscal terms' moderating role in the relationship between material inventory performance, purchasing performance, and financial project performance, particularly in Indonesia's upstream petroleum industry and fossil industry agglomeration. It is unclear how the fiscal term moderates’ variables and company performance because inventories and purchases are dynamic processes (LI, 2019).

Inadequate data access prevented thorough SCM study in the upstream petroleum business (Alnaqbi et al., 2022). This study summarizes the fiscal term-modified nexus between inventory performance, purchasing performance, and business performance to help policymakers, industry practitioners, and Indonesian oil and gas stakeholders understand these interactions. This study’s uniqueness is to construct, rectify, and improve
concepts/models to provide a comprehensive framework by describing Indonesia's upstream petroleum industry's factors. The literature review will address theoretical and empirical data on research variable relationships, clustering techniques, hypothesis generation, sample and variable measurements, and research findings.

2 THEORETICAL FRAMEWORK

According to Bush & Johnston (1998), upstream petroleum investors analyze their investments from a financial, fiscal, operational, and ease of business perspective. Thematically or in combination, this section of the literature review investigates the correlations between all factors pertinent to this study, making it easier to understand and represent the research evidence more accurately. This study uses the background to build agglomeration based on the economic level and profit the company will generate in field development projects in upstream petroleum. Industry character strongly influences the inventory and purchasing performance relationship (Basu & Wang, 2011); Hofer et al., (2012); (Priniotakis & Argyropoulos, 2018). practices for risk management and financial performance had a direct and huge effect on financial performance (Mustapha et al., 2023).

<table>
<thead>
<tr>
<th>NO.</th>
<th>Relationship</th>
<th>Researchers</th>
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<tbody>
<tr>
<td>1 Material Inventory Performance and Firm Performance</td>
<td>Positive relationship</td>
<td>Basu &amp; Wang, (2011); Isaksson &amp; Seifert, (2014); Lee et al., (2015); Elkinga et al., (2017); Atanafu &amp; Balda, (2018); Tasdemira &amp; Hiziroglu (2019); Lin et al. (2018); LI (2019); Ali et al. (2020); Kim et al. (2020); Hofer et al. (2021); Mahajan et al. (2023).</td>
</tr>
<tr>
<td>2 Purchasing Performance and Firm Performance</td>
<td>Positive relationship</td>
<td>Dobrzykowski, Hong &amp; Park (2012); Sobhani et al., (2014); Caniato et al., (2014); (Foerstl et al., 2016); (González-Benito et al., 2016); Ateş &amp; Van Raaij (2017); Duangjan (2018); Kumar PM et al., (2018); Gualandris et al., (2018); Schütz, Kässera, Blome &amp; Foerst (2020); Yook et al., (2018); Akın Ateş et al. (2018); (Richter et al., 2019); LI (2019); Schütz et al. (2020); (Arora et al., 2020)</td>
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Table 1. Empirical Research.
3 METHODOLOGY

3.1 CLUSTERING ALGORITHMS BY FINANCIAL PERFORMANCE AGGLOMERATION.

Using a clustering technique to cluster data with the same characteristics helps researchers decrease group variation (Sharma et al., 2019). K-Means technique++, a popular clustering algorithm, groups data by group mean (centroid) based on similar qualities or attributes (Sharma et al., 2019). These phases comprise this study's K-Means++ clustering process: Establish two clusters to represent high and low financial performance; collect data using financial performance metrics such IRR, NPV, EBITDA/Gross, and Cost/Gross Sales; determine centroid values in each cluster; set calculations using the Euclidean algorithm; and publish the results.

\[
dist = \sqrt{\frac{1}{n} \sum_{k=1}^{n} (p_k - q_k)^2}
\]

To assess sample clustering quality from K-Means ++ results, compare how closely objects in the same group are connected to other groups. The next stage calculates each object's Silhouette value or the clustering average. K-Means++ clustering quality improves with Silhouette value (Shutaywi & Kachouie, 2021).

4 HYPOTHESIS DEVELOPMENT

Today's business climate is characterized by competitive rivalry, and poor procurement performance is a major barrier to business sustainability. Material Inventory Performance is anticipated to be optimal throughout any business organization because a lack of performance would affect cash flow. the resource-based theory states that organizations will outperform competitors and achieve earnings growth by owning, mastering, and using resources wisely. Material Inventory Performance is assumed to be influenced by procurement performance.

Improved procurement approach can reduce raw material inventory management costs. Through effective management and risk mitigation, it increases lean inventory and lowers target supply chain procurement costs, improving the company's financial performance (Khan & Siddiqui, 2019). Because purchasing performance affects savings and inventory performance when considering material purchase savings, an
organization's inventory value must diminish to improve performance. The preceding argument will be tested empirically through the following hypothesis:

**H1.** Purchasing and Material Inventory Performance are positively correlated.

**H2.** Material Inventory Performance and Petroleum field economics are negatively correlated.

**H3.** Material Inventory and Profitability Performance are negatively correlated.

**H4.** Material Inventory Performance and Economic Level are positively correlated with being moderated by the Fiscal Term.

**H5.** Material Inventory and Profitability Performance are positively correlated with being moderated by the Fiscal Term.

**H6.** Purchasing Performance and Economic Level are negatively correlated.

**H7.** Purchasing and Profitability Performance are negatively correlated.

This study explains quantitatively. The explanatory study attempts to understand and insight by demonstrating causal relationships between variables using conceptual models. The positivist approach is applied, which regards every reality/symptom/phenomenon as classifiable, reasonably stable, concrete, observable, and measurable, and the relationship between symptoms underpins quantitative research (Al-Ababneh, 2020; Zyphur & Pierides, 2020). Data was collected from specific samples or populations and analyzed quantitatively/statistically to test theories.

This study uses statistical inferential analysis to draw broad findings. SEM PLS with WarpPLS 8.0 was used to assess inferential statistics in this study. This study uses the Fiscal term variable as a moderation variable to moderate the influence of Purchasing Performance and Material Inventory Performance with Petroleum field economics and Profitability, as illustrated in Figure 1, and the research model equation as follows:

\[ y_{(p=1)} = \Lambda_y y_{(p>x=n)} \eta_{(n=1)} + \varepsilon_{(p=1)} \]
\[ x_{(q=1)} = \Lambda_x x_{(q>x=n)} \xi_{(n=1)} + \delta_{(q=1)} \]

(2)
of exogenous latent variables, m: number of endogenous variable indicators, n: number of indicators of exogenous variables.

Figure 1. Conceptual Framework

Source: Developed by Author (Firera, 2023)

5 RESULTS AND DISCUSSIONS
5.1 DESCRIPTIVE STATISTICAL RESULTS

As previously stated, upstream petroleum sector clustering methods are scarce (Mansell et al., 2012), therefore this study should define the technique to group enterprises as research samples. Various scientific research employs science segmentation, sociological classifications, market segmentation, and database analysis. Table 2 displays the descriptive analysis (minimum, maximum mean, median, and std. deviation) from 26 PSC Contractors samples within five years using a data-forming clustering technique. The statistical results show that the clustering technique uses homogeneous and heterogeneous financial indicator data.

Designing the research model involves broadening the interdisciplinary concept of science or theory. This research theme emphasizes strategic management, particularly:

- Strategic Approach: Developing competitive advantages to increase revenue, reduce expenses, and maximize profits aligns with Profit-Maximizing and Competition-Based theory.
- Aspects of Cost-Based Activities (Activities-Based Costing); every business decision is based on the cost approach (Kohtamäki et al., 2019) according to Transaction Cost Economics, which affects company performance to maintain project profit growth by maintaining field economics (Rate of Return and Present Value) as stated in Sustainable Growth Rate (Babcock, 1970), Adaptive (Hunt & Morgan, 1996). It uses Contingency and Survival-Based Theory.
The Performance indicators make activities more transparent and quantitative (measurable). Performance measurement states that the organization gets what it measures and can only manage processes by measuring them.

It examines seven hypotheses stressed on the fact that inventory performance, purchasing performance, petroleum field economics, profitability performance, and fiscal term performance as moderators. The hypotheses were examined using 26 Indonesian upstream petroleum operators from 2017 through 2021. Algorithm clustering established sample homogeneity. The data panel was econometrically examined for seven hypotheses.

Experimental evidence indicates organizational performance impacts conflict. The impact of inventory on performance depends on business type (manufacturing, service), organizational life cycle stage, and firm size. To maintain output, the upstream petroleum business has a unique way of improving its material inventory management services. Inventory theory suggests material availability is crucial to organizational effectiveness and indirectly affects financial performance. Although purchasing oversees a company's large spending, its influence on financial performance is evident and proven by prior study. By cooperating to embrace a cost-based, long-term plan and adapting to environmental changes, purchasing helps organizations excel financially. Supply networks, notably upstream petroleum, are supported by that.

SCM aspects and organizational performance need further study. The dynamics of science on inventory and purchasing continue to evolve since it is one of the important success criteria for a company to be sustainable, and there is still much opportunity for enhancing study on the relationship between inventory and purchasing and firm performance. To develop the relationship between inventory and purchasing and organizational performance, dimensions, samples, and data must be re-explored from different aspects, such as other nations, industries, upstream petroleum contracts, and huge samples.

This research used secondary data to describe upstream petroleum sector production operations. The findings may impact management research and practice. This study should help build comprehensive and appropriate upstream petroleum sector policies. This research can help practitioners, notably in Indonesia's upstream petroleum business, with SCM. SCM practitioners should benefit from this research.
6 CONCLUSION

This study empirically proves the concept: first, the clustering algorithm's effect on financial performance indicators affects the relationship between inventory and project financial performance in determining the cycle period. In contrast, annual profitability matters. Second, the moderated fiscal term effect on the material link of inventory performance to project financial performance is insignificant. Third, purchasing strongly predicts organizational performance. We believe the innovative theoretical and empirical data has substantial implications for understanding inventory, purchasing, and performance organization in financial terms.
REFERENCES


