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The Effect of Market Structure on Sales of Coal Companies Listed on the Indonesia Stock Exchange (IDX) for the Period 2018 - 2022

Said Nur Octavianto[a,1*], Amin Pujiati[a,2], Sucihatiningsih Dian Wisika Prajanti[a,3]

[a] Semarang State University, Sekaran, Kec. Gn. Pati, Semarang City, Jawa Tengah 50229 Indonesia
[1] saidnuroctavianto05@students.unnes.ac.id*; [2] amin.pujiati@mail.unnes.ac.id; [3]dianwisika@mail.unnes.ac.id
* corresponding author

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ABSTRACT

The limited product diversification of the Indonesian coal mining industry underscores the imperative for the formulation of strategic business plans to navigate the intensifying market competition. This study aims to examine the market structure, the factors influencing sales, and the impact of market structure on the sales performance of coal mining companies in Indonesia. This study employs a quantitative method and utilizes a range of analytical techniques, including CR4, HHI, MES, CLR, PCM, and multiple linear regression. The CR4 and HHI analysis revealed that the market structure of coal mining companies in Indonesia is classified as a highly concentrated tight oligopoly. The MES analysis yielded the conclusion that new companies in the sector face significant barriers to market entry. The findings of the CLR analysis, which indicates that the coal mining sector is a capital-intensive industry, suggest that equity and capital factors are the primary contributors to the challenges faced by new companies attempting to enter the market. The results of the multiple linear regression analysis indicate that equity factors and production volume have a positive and significant effect on company sales. This finding is corroborated by the PCM analysis, which suggests that companies with low market share tend to set higher margins to obtain greater profits. Increasing investment levels may serve as a viable business strategy, particularly when supported by government policies aimed at fostering a secure and stable investment environment to enhance company equity and capital.

1. Introduction

It is anticipated that the consumption of coal, both domestically and internationally, will increase in conjunction with the enhanced productivity of the processing industry and the necessity of supplying trading partner countries with the requisite energy to support their rapidly evolving technological requirements (Aprilia et al., 2020; Ratoko et al., 2022; Wen et al., 2024). The increasing demand for coal can be met by the high supply of these mining commodities in Indonesia (Fahmi et al., 2022; Komalasari & Wulandari, 2022). As documented in the Indonesia Mineral, Coal and Geothermal Resources and Reserves Balance Report 2022, published by the Ministry of Energy and Mineral Resources, the country's coal reserves reached 35,054.07 million tons in 2022, with estimated coal resources at 99,193.11 million tons. The production output of domestic coal companies is primarily intended to meet the fuel needs of power plants, the paper industry, the cement industry, and the textile industry, as well as to support the growth of business activities in these sectors (A. P. Afin & Kiono, 2021; H. Nugroho, 2017; A. Setiawan & Horman, 2019; Situmeang & Setiawan, 2022). Furthermore, international market share remains strong for producers due to competitive bid prices based on the quality classification of Indonesian coal mining commodities and their influence on foreign exchange earnings (A. P. Afin & Kiono, 2021; Brahmam, 2020; Gaspar, 2020).

However, Indonesia's coal commodity production growth tends to be unstable on an annual basis, due to a number of factors including the influence of renewable energy utilization, trade wars between trading partner countries, domestic and foreign demand, substitute commodity prices, product quality, exchange rates, and fluctuating inflation (Azizah & Soelistyo, 2022; Carolina & Aminata, 2019; Kumbayana & Swara, 2015; Majid & Sukim, 2021; Nurcahyaningsih et al., 2022; D. Pratama et al., 2016; Wijayanti et al., 2016). This undoubtedly affects the issuer's stock price, company financial performance, and decision-making processes regarding demand anomalies in the forthcoming year (Priambodo & Kurniasih, 2021). Furthermore, fluctuations in the production and sales of Indonesian coal commodities are also influenced by the productivity of the commodity mining companies in producing production output (Istiadi, 2017; Ramadhan et al., 2023).

Table 1. Performance of Indonesian Coal Mining Companies 2018 - 2022

Year	Production Volume (Million Tons)	Sales (Billion Rupiah)
2018	244,3	230,338
2019	264,9	216,850
2020	237,0	168,510
2021	250,4	276,278
2022	281,7	519,099

Source: Company Annual Report, processed (2024)

Table 1 illustrates that the productivity of Indonesian coal companies exhibits fluctuations over time, with an increase in the last 5-year period (2018-2022). These fluctuations are characterized by gaps and disparities in production output. The disparity in production output levels and the scale of each company is sufficient to exert dominance in the market, with a greater product distribution and sales volume compared to other producers. Such shifts impact the evolution of market schemes and structures, and consequently, the impact on business activities within the sector (Fidayani & Wisudawati, 2020; Imronah, 2022; P. Nugroho & Puspitarini, 2022; Rumallang et al., 2020). The transformation of a market structure within an industry is contingent upon a number of factors, including: (1) Sales concentration; (2) Purchase concentration; (3) Product diversification; and (4) The level of difficulty for producers to enter the industrial market (Sumarni, 2022). The discrepancy in a

company's production capabilities not only influences alterations in the market structure of an industrial sector but also impacts the company's performance and its capacity to sustain business activities (Csiki et al., 2023; Mutunga & Owino, 2017; Salah et al., 2023). Furthermore, the high level of market competition in the economic structure affects company decisions and financial conditions due to changes in performance patterns (Adji & Kusumadewi, 2023; Christ & Surjadi, 2021).

The availability of supportive resources, high production capacity, and the use of high-technology automation are the primary factors contributing to the observed productivity gap in the company (Abu Jadayil et al., 2017; R. Afin et al., 2024; Andriana et al., 2023; Heredia et al., 2022; Tyulin et al., 2017). This affects the company's capacity to produce a greater volume of goods and its ability to offer a greater number of products in the trade market, both domestically and abroad (Mutunga & Owino, 2017). The discrepancy in production, sales, and success indicators among coal companies in their business activities is also a primary factor contributing to financial distress. This is evidenced by the company's inability to effectively compete in the market, a decline in profits, and a reduction in overall company performance (Chrisantha & Suhartono, 2022; Fajriati et al., 2023; Hanum et al., 2024; Maronrong et al., 2022). The contribution of Indonesian coal mining companies to international demand and the influence of exports on the success of business activities are of particular importance in this context. Adji & Kusumadewi (2023) and Xuan Ha & Thi Tran, (2022) posit that high product market competition will affect company performance. This is undoubtedly a significant concern for the coal mining sector, as it pertains to the determination of company performance through the analysis of an appropriate market structure.

The objective of this study was to ascertain the market structure of coal mining companies in Indonesia and to examine its impact on the sales performance of companies within the sector. In a related study, Khansa (2022) employed the concentration ratio (CR) and Herfindahl-Hirschman Index (HHI) approaches to analyze the banking market structure in Indonesia. The study concluded that the CR calculation indicated that the banking sector was in a perfectly competitive structure, whereas the HHI suggested that the banking sector was in a loose oligopoly-monopolistic structure. In a related study, Aprilia et al. (2022) sought to analyze the market structure, behavior, and performance of the paving block industry in Pekanbaru City. The study employed the SCP approach, utilizing the CR (4), HHI, CLR, and PCM methods. The findings indicated that the paving block industry in Pekanbaru City is characterized by an oligopoly market structure. Nugroho (2020) conducted research with the objective of determining the effect of the market structure of the telecommunications industry in Indonesia on company performance through the SCP approach. The findings of this study indicate that the Advertising to Sales Ratio (ADV) exerts a notable negative influence on a company's Return on Assets (ROA) performance, whereas Market Share (MS) and X-efficiency (XEFF) demonstrate no discernible impact on ROA performance. Kurniawan et al. (2021) conducted an analysis of the market structure of copra farmers in Parigi-Moutong Regency, employing the Herfindahl-Hirschman Index (HHI) and CR4 analysis. The results of the analysis indicate that the commodity sector of copra sales at the farm level is characterized by perfect competition, whereas sales of the same commodity at the level of intermediary traders and markets are classified as monopolistic. This is exemplified by the impact of major traders on the pricing and supply of copra in the trading market. A review of the literature reveals that no prior research has examined the relationship between market structure and sales performance in the context of Indonesian coal mining companies. This provides a foundation for answering the critical question of how coal mining companies in Indonesia can

develop effective business strategies to compete in both global and domestic markets for the sale of the same commodity.

To provide further support for the research results related to the market structure of Indonesian coal mining companies, it is necessary to conduct an analysis to determine the impact of market structure linkages on the company's sales performance. This is due to the urgency of understanding the extent to which market structure affects company productivity in an industrial sector. The necessity for an analysis of the factors influencing Indonesia's coal sales performance is primarily due to the significant sales potential of these mining commodities to meet domestic demand or Domestic Market Obligation (DMO) and the demand of international trading partners. As stated by Fathony et al. (2023) and Safuan (2017), the total equity and production capacity or volume exert an influence on the company's profit and sales performance. The growth of the industrial sector is supported by a number of factors, including labor, capital, and the availability of raw materials (Nuraini et al., 2021). High equity ownership and production capacity are primarily responsible for influencing a company's sales performance due to the company's capacity to produce greater output (Ariputra & Sudiana, 2019; Ibrahim et al., 2021; Onegina et al., 2020; Valencia & Dermawan, 2024). In certain instances, the significance of equity considerations affects the distribution of capital allocated to the mining sector, which is substantial, resulting in the misallocation of natural resources. These resources should be allocated to productive economic activities in other sectors (Ardianto et al., 2018). Consequently, the distribution of products manufactured can influence the prevalence of trademarks in the diversification of analogous products within the trade market. The dominance of trademarks over the accumulation of product supply in the trade market can affect alterations in market structure, particularly in interrelated industrial sectors (Castaldi, 2023; Dinwoodie, 2024; Jiang, 2024).

This study employs supply theory to examine the factors influencing the sales performance of coal companies in Indonesia. In simple terms, the supply function demonstrates the relationship between the quantity of goods or services offered by producers and the price of these goods or services (Ethic et al., 2023; Venny & Asriati, 2022). In the law of supply, an increase in prices will result in an expansion of the goods and services offered, whereas a decrease in prices will lead to a contraction of the supply of these goods and services (Marlina & Ruhiat, 2018). Given the high dependence of mining companies on domestic and international markets, it is necessary to conduct an analysis to ascertain the extent to which the company exerts influence over the market, or conversely, to what extent the market exerts influence over the company's sales performance, given the inherent complexities (Erdogan et al., 2024). This dependence provides the foundation for an analysis of the factors that influence or stimulate the offering of Indonesian coal commodities by such companies. The diversification of supply through production output is undoubtedly influenced by the market structure, which in turn affects the discretion of companies with specific market shares in determining their business activity decisions (Pramono, 2022).

The primary objective of this research is to examine the market structure of coal mining companies in Indonesia, assess the strategies employed by these companies in the face of trade competition, and identify business strategies based on CR4, HHI, MES, CLR, PCM, and multiple linear regression analysis of factors that affect the company's sales performance. It is anticipated that the findings of this study will provide a comprehensive framework for business strategies that coal mining companies in Indonesia can adopt in order to navigate domestic and global trade competition. These strategies will be informed by a consideration of government policies that favour the industrial sector, with the aim of fostering sales

performance and a competitive business environment that is conducive to the well-being of all stakeholders.

The objective of this research is to: (1) to determine the market structure of coal mining companies in Indonesia; (2) to determine the factors that affect the sales performance of coal in Indonesia; and (3) to determine the effect of market structure on the sales performance of coal mining companies in Indonesia. The results of the analysis are expected to provide information related to the classification of the market structure of coal mining companies in Indonesia, serve as a reference for companies in setting strategies to face trade competition, and be able to suppress the influence of trade competition on the company's sales performance.

2. Literature Review

This study employs the Structure, Conduct, and Performance (SCP) approach, as originally developed by Mason (1959) and subsequently refined by Bain (1956). The Structure, Conduct, and Performance (SCP) approach is designed to ascertain the extent of competition within an industry sector and to identify the structural characteristics of a particular industry sector. This is done in order to construct an analysis of the interrelationships between industry structure, firm behavior, and firm performance (Abbas & Sheikh, 2021; Giovanno, 2022). The SCP analysis employs five interrelated focus forces, namely the difficulty of firms to enter the market, the power of input suppliers, the power of buyers, industry competition, and substitute/complementary products offered (Arif & Awwaliyah, 2019; Chen & Lin, 2015). In this sense, the SCP approach implies a relationship between market share and firm profitability. Abbas & Sheikh (2022) employed the SCP approach to examine the manufacturing sector in Pakistan. Their findings indicated a correlation between market structure and firm performance, consumer behavior and firm performance, and consumer behavior and market structure. The structural approach, or SCP, places emphasis on the number of producers who can influence the intense competition in the market to achieve optimal results. This approach suggests that prices will be set close to marginal costs, and profits will be close to normal profits (Mulyaningsih, 2015).

The results of the SCP analysis can be classified into the following categories: (1) Structure, this analysis is employed to ascertain the degree of market concentration in the Indonesian coal mining sector. The analysis can be conducted through the calculation of the Concentration Ratio (CR), the Herfindahl-Hirschman Index (HHI), the Minimum Efficient Scale (MES), and the Capital to Labor Ratio (CLR). The results of the structure analysis will be utilized to determine the market structure, market concentration, barriers for companies to enter and compete in the market, as well as the classification of industrial sectors (capital intensive/labor intensive); (2) Conduct, the company's efforts to compete in a particular industry sector can be evaluated by examining the relevant information. An analysis of the factors affecting sales performance can be conducted, including equity or capital ownership and high production volume. To assess the company's ability to meet capital needs and increase production volume, a Price-Cost-Margin (PCM) calculation can be performed; and (3) Performance, performance analysis is a tool used to assess the effectiveness of a company's decisions in improving its business performance. One area of focus for performance analysis is sales performance, whereby the percentage growth of this aspect over a specified period of years is calculated. In this case, performance analysis is employed to evaluate the impact of PCM determination on the company margin and the growth of sales performance in the coal industry. The SCP approach model is illustrated in Figure 1.

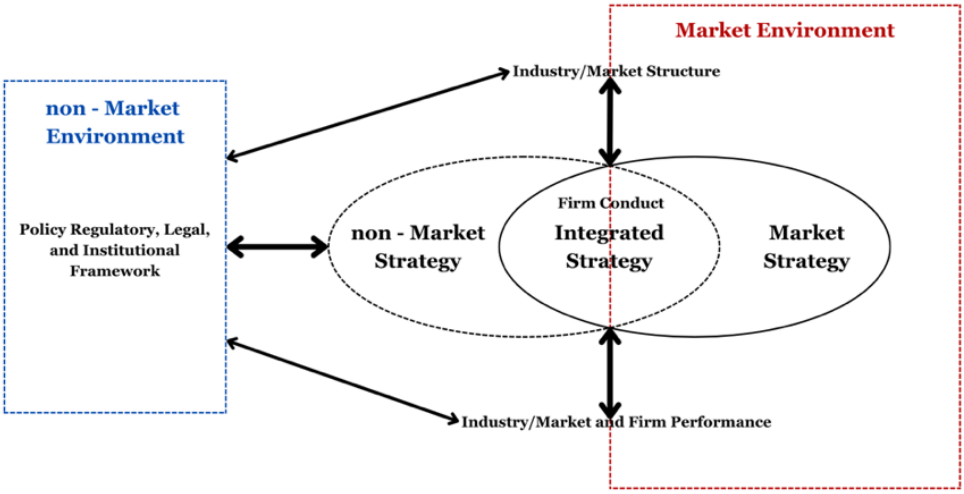

Figure 1. Structure, Conduct, and Performance (SCP) Approach
Source: Wood et al. (2021)

In a study conducted by Kadir et al. (2020), the structure, conduct, and performance of the coffee processing industry in Palembang City and Pagar Alam, Indonesia, were analyzed. The study employed the Structure, Conduct, and Performance (SCP) approach, calculating the concentration ratio (CR) of four companies (CR4). The analysis demonstrated that the market structure of the coffee processing industry in the area is classified as a monopolistically competitive market. The strategies employed are primarily focused on product quality, price, and promotion, while the company's performance is evaluated based on key indicators of productivity, efficiency, and profitability.

Pawłowska (2016) employed the Structure, Conduct, and Performance (SCP) approach to examine the impact of banking market structure and macroeconomic fluctuations on profitability. The findings of this study will demonstrate the impact of market structure and macroeconomic fluctuations on the financial advancement and business cycle of banking profitability (performance) in Poland. The findings of the analysis indicate that increased foreign ownership and intermediation have a positive impact on banking profitability in Poland. Pujiharto & Wahyuni (2020) employed the Structure, Conduct, and Performance (SCP) approach to examine potato trade in the trade center of Central Java Province. The Herfindahl-Hirschman Index (HHI) and concentration ratio (CR) of the four companies (CR4) were employed to analyze the SCP. The findings indicate that the market structure of potato trade in Central Java Province is classified as an oligopsony, defined by a price level set by collectors who are directly integrated with farmers.

Sun et al. (2017) employed the Structure, Conduct, and Performance (SCP) approach to analyze the market structure of the internet industry in China. The analysis was conducted using the Herfindahl-Hirschman Index (HHI) and concentration ratio (CR) of four companies (CR4). The study's findings indicate that the Chinese internet industry has not yet achieved a robust trading scale, which in turn exerts an influence on the country's economic conditions. The industry's trading activities are oriented towards the presentation of product excellence in the context of high competition, which may be characterized as a perfect competition market. Sharma & Khurana (2019) employed the Structure, Conduct, and Performance (SCP) approach to examine the impact of the cement industry market structure in India on corporate performance. The indicators employed are return on assets (ROA) and concentration ratio (CR), with the findings indicating that the market structure of the cement industry in India exerts an influence on the performance of companies within the sector. In his research,

Setiawan (2023) sought to analyze the competition index of the manufacturing industry in Indonesia. The research was conducted using the Structure, Conduct, and Performance (SCP) approach, which yielded the conclusion that the Indonesian manufacturing industry is characterized by a relatively low level of competition. The business activities of the industrial sector are oriented towards the behavior and performance of companies with the objective of producing competitive products at competitive prices.

The impact of the ongoing pandemic, ongoing conflicts between trading partners, and the significant international market dependence of Indonesian coal mining companies introduces an anomaly to the observed changes in sales dominance and market structure within the Indonesian commodity industry. The analysis of market structure is of great importance as it allows for the determination of the dominance of companies within an industry, the assessment of their performance, and the formulation of potential business strategies by competing companies. The classification of market structure is primarily attributed to discrepancies in the number of sellers and buyers (Imronah, 2022). In essence, market structures can be classified into three main categories: perfect competition, oligopoly, and monopoly (Teece, 2018). A market analysis can assist producers, consumers, governments, and economists in comprehending market dynamics and formulating policies that enhance efficiency and economic welfare. Each market structure is underpinned by a theoretical framework that guides market positioning in economic activities. This framework facilitates interactions between sellers and buyers through bargaining activities, enabling the establishment of price agreements (Aminursita & Abdullah, 2018).

3. Research Method

Research Design

This study employs a quantitative methodology based on panel data, which has been collected by combining time series and cross-sectional data. The data utilized in this study are derived from the annual reports of coal mining companies listed on the Indonesia Stock Exchange (IDX) for the period spanning 2018 to 2022. The data encompass accumulated sales (IDR/RP), production volume (tons), and equity (IDR/RP). The data indicate a notable discrepancy in the company's sales and production volume over the specified period. This is corroborated by discrepancies in the accumulated equity of each company, which serves as a foundation for examining market structure and its impact on the sales performance of coal mining companies in Indonesia.

In this study, the sampling technique employed was purposive sampling, with the inclusion of coal mining companies listed on the Indonesia Stock Exchange (IDX) and releasing financial information reports during the 2018-2022 period. Based on these criteria, 14 companies were selected, exhibiting the specified characteristics.

Table 3. Coal Mining Companies on the Indonesia Stock Exchange

No.	Company Code	Company Name
1.	TOBA	PT TBS Energi Utama Tbk
2.	SMMT	PT Golden Eagle Energy Tbk
3.	PTBA	PT Bukit Asam Tbk
4.	KKGI	PT Resource Alam Indonesia Tbk
5.	MBAP	PT Mitrabara Adiperdana Tbk
6.	ITMG	PT Indo Tambangraya Megah Tbk
7.	DSSA	PT Dian Swastatika Sentosa Tbk
8.	BYAN	PT Bayan Resources Tbk

No.	Company Code	Company Name
9.	BUMI	PT Bumi Resources Tbk
10.	BSSR	PT Baramulti Suksessarana Tbk
11.	ARII	PT Atlas Resources Tbk
12.	ADRO	PT Adaro Energy Tbk
13.	HRUM	PT Harum Energy Tbk
14.	INDY	PT Indika Energy Tbk

Source: Indonesia Stock Exchange, processed (2024)

Type of Data and Research Variables

This research project is concerned with the analysis of accumulated sales data, production volume, and accumulated company equity during the period 2018-2022. The objective is to obtain information regarding the market structure and its influence on company sales performance. The independent variable (influence) is based on previous research indicating that it can affect a company's sales performance. It serves as a supporting factor in the market structure analysis results, which are also included in this study. The independent (influence) and dependent variables are listed in Table 4.

Table 4. Independent (Influence) and Dependent Variables

No.	Variables	Source	Description
1.	Equity - (IDR/Rp) (X1)	Aulia et al. (2018); Deb et al. (2023); Himelda & Imelda (2021); Mukaro et al. (2023); Singh & Bagga (2019)	The term "equity" is defined as assets or capital that can be returned when a company has been liquidated or all of its obligations have been fulfilled (Franky, 2022; Askiah et al., 2022; Khoiriyah, 2020).
2.	Production Volume - (Ton) (X2)	Chotima et al. (2023); Effendi (2020); Hana Pratiwi (2020); Mutunga & Owino (2017); Rachman & Basyirudin (2020)	The term "production volume" is defined as the total quantity of goods produced through a series of activities within the production process (Astutik & Prabowo, 2014).
3.	Sales - (IDR/Rp) (Y)	Kaicker & Aggarwal (2023); Nagata & Matsuo (2024); Park et al. (2018); Vila et al. (2015); Ye et al. (2013); Zhu et al. (2009)	The term "sales" is defined as a managerial social process that facilitates the acquisition of products or services by individuals or groups, with the objective of obtaining something that they require, at a specific level of value, in exchange for other products or services (Arisandy, 2018).

Source: Authors analysis, processed (2024)

Data Analysis Method

This study employs a structural approach to analysis, utilizing the Structure Conduct Performance (SCP) hypothesis. The SCP hypothesis allows for the estimation of the positive relationship between market concentration and firm performance (Zhou et al., 2024). Gomes et al. (2022) asserted that the SCP hypothesis concentrates on the performance of an industry stream and the consequences of the segmentation and market structure selected by the company. In order to ascertain these consequences, the SCP hypothesis in this study employs two ratios. The first is the concentration ratio (CR), which is used to gauge the company's market share through the use of indicators pertaining to the company's production or sales output over a specified period. The second is the Herfindahl-Hirschman Index (HHI), which is utilized to determine the proportion of market share within a particular sector (Wibowo, 2019). In this study, the ratios employed include CR (4) and HHI, with the following calculation formula:

$$CR_4 = \frac{\text{Number of the Four Largest Companies Observed}}{\text{Total Number of Companies in the Industry Sector Under Observation}} x\ 100\% \quad \text{.....(1)}$$

$$HHI = S_1^2 + S_2^2 + S_3^2 + S_3^2 + \ldots + S_N^2 = \sum_{i=1}^{N} S_i^2 \quad \text{.....(2)}$$

The industry classification, as determined by the concentration ratio (CR) and the Herfindahl-Hirschman Index (HHI), is as follows:

Table 4. CR classification (4)

CR (%)	Category	Market Structure Interpretation
CR = 0	Minimum	Perfect competition
0 < CR (4) < 40	Low	Effective competition or monopolistic competition
40 ≤ CR (4) < 60	Middle to Lower	Loose oligopoly or monopolistic competition
60 ≤ CR (4) < 90	Middle to Upper	Tight oligopoly or dominant firm with several small competitors
CR (4) ≥ 90	High	Effective monopoly (near monopoly) or few dominant firms
CR (4) = 100	Maximum	Perfect monopoly

Source: Gwin (2001)

Table 5. Herfindahl-Hirschman Index (HHI) Classification

HHI	Market Structure Interpretation
HHI < 1.000	Unconcentrated
1.000 < HHI < 1.800	Moderately Concentrated
1800 > HHI	Highly concentrated

Source: Gwin (2001)

In order to provide further support for the SCP hypothesis, the Minimum Efficient Scale (MES) is also employed, as this can furnish information regarding the magnitude of market entry barriers. An MES percentage in excess of 10% is indicative of high market entry barriers.

$$\text{MES} = \frac{\text{Largest Company Output}}{\text{Total Output of All Companies}} x\ 100\% \quad \text{.....(3)}$$

Additionally, an analysis related to the capital-to-labor ratio (CLR) was conducted. In this case, the CLR analysis aimed to compare the company's expenditure on capital (capital cost/expenditure) with labor (labor cost) (Hafiz et al., 2021).

$$\text{CLR} = \frac{\text{Share Cost of Capital}}{\text{Labor Cost Share}} \quad \text{.....(4)}$$

$$\text{Share Cost of Capital} = \frac{\text{Capital Costs}}{\text{Total Expenses/Costs}} \quad \text{.....(5)}$$

$$\text{Labor Cost Share} = \frac{\text{Labor Cost}}{\text{Total Expenses/Costs}} \quad \text{.....(6)}$$

To ascertain the relationship between market structure and company performance, a Price-Cost-Margin (PCM) analysis was also conducted on Indonesian coal companies. PCM analysis is a method of measuring profit margins to determine a company's capacity to increase prices above production costs (Rinandi et al., 2021). The formula used is:

$$\text{PCM} = \frac{\text{Added Value} - \text{Labor Cost}}{\text{Output Value}} x\ 100\% \quad \text{.....(7)}$$

To corroborate these findings, multiple linear regression tests were conducted to examine the relationship between equity (X1) and production volume (X2) and firm sales performance (Y). The analysis was conducted to corroborate the findings of MES calculations of market entry barriers through SCP analysis previously conducted on CLR results related to capital concentration. This was done to illustrate the primary obstacles faced by new companies attempting to enter the market due to capital conditions. The analysis examined

the relationship between capital, production volume, and equity ownership and their impact on the sales performance of coal mining companies in Indonesia.

Linear Regression Analysis

$$Y = f(X_1, X_2, X_3, X_4, X_5) \quad \text{.....(8)}$$

Multiple Linear Regression Analysis:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + B_4X_4 + b_5X_5 + e \quad \text{.....(9)}$$

4. Results and Discussion

Market Structure of Coal Mining Companies in Indonesia

In the period between 2018 and 2022, there were 14 coal sub-sector mining companies listed on the Indonesia Stock Exchange (IDX). The results of the calculation of market share in the coal mining sector demonstrate the existence of several companies that exert a dominant influence over the sector.

Table 6. CR (4) Coal Mining Companies

Company Name	2018	2019	2020	2021	2022
PT Indo Tambangraya Megah Tbk	12,42%	11,19%			
PT Dian Swastatika Sentosa Tbk	10,94%	10,87%	13,04%	11,22%	17,00%
PT Bayan Resources Tbk			12,04%	14,79%	13,43%
PT Adaro Energy Tbk	22,39%	22,55%	22,55%	20,70%	23,13%
PT Indika Energy Tbk	18,33%	18,15%	18,15%	15,91%	12,37%
Total	64,07%	62,77%	62,70%	62,62%	65,93%

Source: Company Financial Statements, processed (2024)

Table 6 illustrates that the percentage of total calculations for CR (4) coal mining companies in Indonesia falls within the range of 60% to 90%. This suggests that the company is situated within a tight oligopoly market structure, or alternatively, that there is a dominant company that competes with several smaller companies. An oligopoly market is defined by a small number of companies with moderate to low levels of business activity. Additionally, there are several differentiated and diversified companies, as well as a few companies operating at a high level of business activity, which are subject to intense competition (Jing et al., 2022). The analysis of CR (4) reveals that the five companies with the largest market share are capable of controlling over 50% of the accumulated market share in the Indonesian coal mining industry. The Herfindahl-Hirschman Index (HHI) analysis serves to reinforce the conclusions drawn regarding the market structure of coal mining companies in Indonesia.

Table 7. HHI of Coal Mining Company

Company Name	2018	2019	2020	2021	2022
PT TBS Energi Utama Tbk	7	12	8	6	3
PT Golden Eagle Energy Tbk	0	0	0	0	0
PT Bukit Asam Tbk	84	101	106	112	68
PT Resource Alam Indonesia Tbk	0	1	0	0	1
PT Mitrabara Adiperdana Tbk	3	3	3	3	2
PT Indo Tambangraya Megah Tbk	154	125	105	116	108
PT Dian Swastatika Sentosa Tbk	120	118	170	126	289
PT Bayan Resources Tbk	108	82	145	219	180
PT Bumi Resources Tbk	47	53	47	27	27
PT Baramulti Suksessarana Tbk	8	7	8	13	9
PT Atlas Resources Tbk	0	0	0	0	0
PT Adaro Energy Tbk	501	509	481	428	535
PT Harum Energy Tbk	4	3	2	3	7
PT Indika Energy Tbk	336	330	246	253	153
Total	1372	1343	1321	1307	1381

Source: Company Financial Statements, processed (2024)

As illustrated in Table 7, the Herfindahl-Hirschman Index (HHI) analysis reveals that the market structure of Indonesian coal companies is characterized by a relatively high degree of concentration. This corroborates the findings of the concentration ratio (CR) analysis, which previously yielded comparable results (tight oligopoly, moderately concentrated). Moreover, the results of the minimum efficient scale (MES) analysis, which focuses on company output data, indicate that PT Adaro Energy Tbk is a leading Indonesian coal mining company, with an average production output of 22.16% during the period from 2018 to 2022. The percentage of the company's largest output exceeds 10%, indicating that new companies face significant barriers to entry.

This study also employed a capital-to-labor ratio (CLR) analysis to assess the concentration of the burden of coal sub-sector mining companies in Indonesia. The CLR analysis was conducted based on the results of the CR4 analysis with five companies that control the majority of the market share in the sector.

Table 8. Capital to Labor Ratio (CLR)

Company Name	Share Cost of Capital	Labor Cost Share	CLR (%)
PT Indo Tambangraya Megah Tbk	0,021	0,030	0,69
PT Dian Swastatika Sentosa Tbk	0,080	0,061	1,32
PT Bayan Resources Tbk	0,162	0,031	5,23
PT Adaro Energy Tbk	0,144	0,069	2,09
PT Indika Energy Tbk	0,063	0,030	2,14
Total	0,470	0,221	11,63

Source: Company Financial Statements, processed (2024)

The results of the CLR analysis, as presented in Table 8, indicate that the accumulated share of capital costs exceeds that of labor costs for the five companies with the largest market share in the Indonesian coal mining sector. In addition to CLR, PCM calculations are employed to corroborate the findings of the preceding market structure analysis. Price-Cost-Margin (PCM) analysis furnishes insights pertaining to the company's capacity to raise prices above production costs.

Table 9. PCM Analysis of Indonesian Coal Mining Companies

Company Name	2018	2019	2020	2021	2022	Avg.
PT TBS Energi Utama Tbk	1,39	1,21	1,12	1,20	1,27	1,24
PT Golden Eagle Energy Tbk	3,12	4,48	3,36	8,08	14,64	6,74
PT Bukit Asam Tbk	1,68	1,54	1,36	1,85	1,73	1,63
PT Resource Alam Indonesia Tbk	4,76	14,61	8,73	17,97	18,86	12,98
PT Mitrabara Adiperdana Tbk	1,64	1,54	1,50	2,18	2,45	1,86
PT Indo Tambangraya Megah Tbk	1,41	1,24	1,20	1,79	2,09	1,54
PT Dian Swastatika Sentosa Tbk	1,55	1,53	1,54	1,71	1,80	1,63
PT Bayan Resources Tbk	2,87	1,54	1,50	2,58	3,05	2,31
PT Bumi Resources Tbk	1,15	1,10	1,13	1,25	12,35	3,40
PT Baramulti Suksessarana Tbk	1,55	1,36	1,43	2,03	1,82	1,64
PT Atlas Resources Tbk	1,06	1,00	0,89	1,23	1,30	1,10
PT Adaro Energy Tbk	1,50	1,39	1,29	1,80	2,35	1,67
PT Harum Energy Tbk	1,43	1,35	1,38	2,08	2,49	1,75
PT Indika Energy Tbk	1,28	1,18	1,11	1,43	1,50	1,30

Source: Company Financial Statements, processed (2024)

The results of the PCM analysis of Indonesian coal mining companies listed in Table 9 demonstrate a tendency for fluctuations to increase. PCM analysis can be employed as a means of gauging the profitability of a company. A high percentage of PCM may indicate that the company is also highly profitable (Baltussen et al., 2019; Symeonidis, 2024).

The preceding CR (4) and HHI analyses have revealed that the coal mining companies in Indonesia are situated within a highly concentrated oligopoly market structure. An

oligopoly market structure tends to confer greater power to a limited number of companies within a specific industry sector (Rosenberg & O'Halloran, 2014). This is corroborated by the CR (4) and HHI analysis, which reveals a pronounced disparity between firms in the coal mining sector. This sector encompasses five companies over the 2018-2022 period: PT Adaro Energy Tbk, PT Indika Energy Tbk, PT Indo Tambangraya Megah Tbk, PT Dian Swastatika Sentosa Tbk, and PT Bayan Resources Tbk. These companies collectively control more than 50% of the market share of the 14 coal mining companies in Indonesia. This evidence substantiates the assertion that in a tight oligopoly market, a limited number of companies possess the capacity to exert control over the market. The considerable influence exerted by major corporations in an oligopoly market structure compels firms with modest market shares to contend with their reliance on larger market players. This underscores the necessity for firms to adopt effective and well-considered business strategies in order to navigate the competitive landscape (Rosenberg & O'Halloran, 2014). In an oligopoly market structure, the scalability of a company is of greater importance than the quantity of production. Consequently, the dominance of a particular brand or product from a specific company can have a significant impact on the market structure of a given commodity (Bos & Marini, 2022). This phenomenon can also be observed in the context of the coal mining sector, where the difficulty of substituting products that can replace these mining commodities is a notable factor.

The same results are also obtained in the MES analysis by examining the company with the highest production output in the coal mining sector. This analysis reveals that the largest company's production output represents a minimum of 10% of the total production of companies in the sector. In the coal mining sector, PT Adaro Energy Tbk is identified as the company with the largest production output during the period spanning 2018 to 2022. This is evidenced by the sales results of domestic coal companies, which are dominated by PT Adaro Energy Tbk, during the same period. The company's production output constituted 22.16% of the total output of companies in the same sector during the period between 2018 and 2022. This suggests that the coal mining market sector in Indonesia presents significant barriers to entry for new companies. The existence of high market entry barriers has an impact on the limited opportunities available to new companies seeking to enter the market or industry (Putriana et al., 2023).

Furthermore, the CLR analysis, conducted to support the calculation of MES, revealed that capital is the primary factor impeding new companies' ability to enter the market. This indicates that coal mining sector companies in Indonesia are classified as capital-intensive industries. The main constraint of the capital-intensive industry is the high initial investment requirement to run the industry's business activities (Djunaidi & Alfitri, 2022). This supports the aspect of the market structure of Indonesian coal mining companies that are included in a tight oligopoly, with one of the causes of the difficulty of new companies entering the market due to the high initial capital required.

Additionally, a PCM analysis is conducted to evaluate the operational performance of coal mining companies in Indonesia. The highest average PCM percentage among coal mining companies in Indonesia for the period 2018-2022 is that of PT Resource Alam Indonesia Tbk, which is recorded at 12.98%. Subsequently, PT Golden Eagle Energy Tbk and PT Bumi Resources Tbk are in the second and third positions, respectively, with PCM percentages of 6.74% and 3.40%. However, the elevated PCM of each company is not reflected in the control of market share in the industrial sector. This finding aligns with the conclusions of Pratama et al. (2017), who also determined that the magnitude of the PCM influence is not contingent on the company's market share. PT Adaro Energy Tbk, which holds the highest market share,

nevertheless recorded a PCM percentage of only 1.67%. In addition to providing insight into a company's overall performance, the PCM percentage also serves as a basis for estimating the company's profit margin. A higher PCM percentage indicates a greater profit margin for the company.

Factors Affecting the Sales Performance of Coal Companies

The development of market structure is linearly related to market behavior and firm performance. This is evidenced by the suitability of the results of concentration ratio (CR) and minimum efficient scale (MES) analysis (Soeharjoto & Ratnawati, 2023). The magnitude of the influence of market structure also has an impact on the stimulus of company performance with respect to various factors that must be considered. Thus, further research is needed to support the results of the CR4, HHI, MES, CLR, and PCM analyses that have previously been conducted. The variables in the study to be analyzed with respect to sales performance include: (1) Company equity (X1); (2) Production volume (X2); and (3) Sales (Y).

Table 10. Test Coefficient of Determination (R^2)

Model	R Square	Adjusted R Square
1	0,733	0,725
	Independent Variable	Sales

Source: SPSS data, processed (2024)

Table 10, which presents the results of the coefficient of determination (R^2) test, indicates that the R^2 value is 0.733. This suggests that the independent variables employed are capable of describing the majority of the information required to estimate the dependent variable. In addition, it can be inferred that company equity and production volume are capable of explaining 73.3% of the variation in the coal sales variable. However, the remaining 26.7% is attributed to other independent variables that were not included in this study.

Table 11. F test (ANOVA)

Model	F Count	F Table	Sig.
1	91,863	3,134	0,000

Source: SPSS data, processed (2024)

The F-test provides information regarding the ability of all independent variables to exert an influence on the dependent variable. The results of the F-test yielded a significance value of 0.000 and an F-count of 91.863, indicating that the observed effect is statistically significant. The p-value is less than 0.05 (0.000 < 0.05) and the F-count is greater than the F-table value (91.863 > 3.134). This indicates that the company equity variable (X1) and production volume (X2) may exert an influence on the coal sales variable (Y).

Table 12. t Test (Partial)

Variables	t Count	t Table	Sig.	Desc.	Classification
Equity (X1)	2,708	1,996	0,009	<	Significant Effect
Production Volume (X2)	11,205	1,996	0,000	<	Significant Effect

Source: SPSS data, processed (2024)

Table 12 presents the results of the t (Partial) test. The objective of the t (Partial) test is to ascertain the extent to which the independent variables contribute to the explanation of the dependent variable (Ariyani & Febriyanto, 2021). The results of the test indicate that company equity has a positive and statistically significant impact on the sales performance of coal mining companies in Indonesia. It can be posited that the level of equity or capital is capable of fostering a high level of sales performance within a company. Yuliani (2021) findings also corroborate these results, indicating that the company's capital structure exerts a partial

influence on the company's financial performance. As the company's business activities increase, so too does the equity or capital. As a company develops, the capital required to fulfill its operational activities will increase (Aulia et al., 2018). The results of the t-test (partial) also demonstrate a positive and significant effect of production volume on the sales performance of coal mining companies in Indonesia. High production output has an impact on the high quantity of products or services purchased and increases the number of offers of these products or services in the market. Safuan (2017) findings also indicate that production volume is able to affect the company's revenue (sales).

The Effect of Market Structure on Sales Performance of Mining Companies in Indonesia

The analysis conducted with the Structure Conduct Performance (SCP) approach through CR4 and HHI revealed that the coal mining companies in Indonesia are situated within a tight oligopoly market structure that is highly concentrated. This suggests that a small number of companies exert significant control over the market for coal sales, both domestically and internationally. The size of a company's market share is largely contingent upon its ability to control a significant volume of production, which in turn enables it to meet existing demands and needs. A greater number of product offerings than those of competitors may impact a company's capacity to control market share within a specific industrial sector.

One strategy that companies with a relatively small market share may wish to consider is an increase in production volume. In this instance, an increase in production volume can be achieved by augmenting the equity or capital of the company. An increase in capital structure will have an impact on a company's development (Aulia et al., 2018). However, the MES analysis reveals that the Indonesian coal mining sector presents considerable barriers to new entrants or competitors. This is corroborated by the CLR results, which categorize the Indonesian coal mining sector as capital-intensive. Consequently, the growth of company performance is predominantly influenced by the amount of capital owned.

The results of the multiple linear regression analysis demonstrate that equity ownership, company capital, and production volume exert a significant influence on sales performance. The partial and simultaneous t-test results indicate that equity and production volume variables exert a positive and significant influence on the sales performance of coal mining companies in Indonesia. These findings substantiate the significance of capital ownership and high production volume, in conjunction with the company's objective to enhance its sales performance. Furthermore, the growth of company performance has been demonstrated to increase the value of the company (Wijayanti et al., 2016).

The importance of capital ownership in the context of mining sector business activities is also demonstrated by the PCM analysis, which provides insight into the performance of coal mining companies in Indonesia. The results of the analysis indicate that the high or low determination of PCM is not contingent on the amount of market share controlled by a company. Rather, it is influenced by other factors, namely the profit margin that a company is able to project over a specified period of time. This is demonstrated by the discrepancy between firms that control the largest market share and those that have the highest PCM percentage. It can be inferred that the elevated PCM percentage in coal mining firms is influenced by the extent of production costs, in addition to a company's endeavors to enhance its business performance as a means of supporting the company's profit growth in the current period. This is undertaken by the company to achieve its ambitions in increasing production volume capacity, along with the substantial capital allocation required.

However, the company's efforts to set PCM in order to obtain maximum profit margins proved to be less effective, particularly in a market structure characterized by a high degree of

oligopoly and concentration. This is evidenced by the fluctuating percentage of sales growth observed in the sales performance of coal mining companies with the highest PCM. The issue is primarily shaped by the limited market share and low production volume that the company is able to achieve. The preceding analysis demonstrates how coal mining companies in Indonesia with low market share strive to compete in a tight oligopoly market structure that is quite concentrated by increasing production volume. In order to achieve this objective, the company sets PCM in order to obtain a higher profit margin, given the necessity for equity or capital to support the company's desire to increase production volume. This indicator can be utilized as a measure of the company's profitability with respect to its business activities (Wardani & Pricillia, 2019). Nevertheless, these endeavors have thus far proven ineffective in enhancing the sales performance of coal mining companies in Indonesia. This is primarily attributable to the dominance of a few companies that control market share in the sector. This is evidenced by the market structure of coal mining companies in Indonesia, which is classified as a tight oligopoly with high concentration. In essence, the market structure of the coal mining sector presents a challenge for companies with low market share, as it hinders their ability to enhance business performance. This is particularly evident in the context of low sales performance, which is a consequence of the company's lack of dominance in the coal trading market and the need for high equity or capital.

The strategy implemented by coal mining companies in Indonesia, whereby higher trading margins are set to support capital needs and production capacity is increased (thereby increasing scalability), is suboptimal. In this case, the company is engaged in a strategic review with the objective of establishing a strategy that will facilitate increased capital ownership and encourage enhanced scalability of the company through the attainment of greater production volume. One potential avenue for consideration is the augmentation of investment through collaboration with investors, whether through the Domestic Investment (PMDN) or Foreign Investment (PMA) scheme. This necessitates innovation in the form of ensuring accelerated company growth with effective and efficient production activities, along with the company's decision to provide greater returns to investors. The stability of a company's business activities and sales growth can also encourage an increase in the share price of each company on the stock exchange. This can support the company's capital, encouraging increased company performance through higher production volumes and scalability. The government can support these efforts by providing a safe and healthy investment climate for foreign and domestic investors, reducing administrative processes and bureaucracy that are too complicated, and ensuring legal protection or legal certainty for investors.

5. Conclusion

This study successfully analyzed the market structure of coal mining companies in Indonesia. The results of the concentration ratio (CR) analysis of the four companies with the largest market share (CR4) and the Herfindahl-Hirschman Index (HHI) indicate that the market structure of coal mining companies in Indonesia is classified as a tight oligopoly market. This is evidenced by the market's high level of concentration, with several dominant companies competing with several smaller companies. These findings are corroborated by the Minimum Efficient Scale (MES) value of the company with the largest market share, which reaches 22.16% or >10%. This suggests that the market is effectively protected from new entrants. Furthermore, the study employs a capital-to-labor ratio (CLR) analysis of the five companies with the largest market share. The results indicate that coal mining companies in Indonesia exhibit a greater capital cost share than a labor cost share, which is consistent with the characteristics of a capital-intensive industry. The results of the CR4, HHI, MES, and CLR

analyses provide evidence that supports the structure hypothesis in the SCP approach. They indicate that coal mining companies in Indonesia are classified in a tight oligopoly market structure that is quite concentrated, have high barriers for new companies to enter the market, and are included in the capital-intensive industry.

The conduct and performance hypotheses in the SCP approach are supported by the results of the Price-Cost-Margin (PCM) analysis and multiple linear regression, which examine the impact of equity ownership and production volume on company sales performance. The results of the PCM analysis indicated that the Indonesian coal mining companies with the highest profit margins did not necessarily possess the largest market share ownership. This is corroborated by the findings of the PCM analysis, which revealed that the highest values were concentrated among companies with relatively small market shares. The results of the multiple linear regression analysis indicate that both the company's equity and production volume have a positive and significant effect on the company's sales performance, both simultaneously and partially. The extent to which equity and production volume exert influence on coal mining companies in Indonesia with low market share encourages such companies to set higher margins in order to obtain greater profits. However, this strategy is less appropriate for companies operating in a tight oligopoly market structure, given that the profitability of coal trading activities is influenced more by sales volume than by the high selling price of the commodity. This is corroborated by the findings of the PCM analysis, which indicates that firms with high profit margins tend to have low market shares, resulting in diminished sales performance (in Rupiah/Rp) and sales volume (in tons). It is therefore important for companies to review their current strategies and consider whether increasing trading margins is the most appropriate course of action. Alternatively, they may wish to adopt a different strategy that supports an increase in equity and production volumes by attracting more investors. The government can facilitate these endeavors by ensuring a secure investment environment for investors who choose to invest through the PMDN and PMA schemes, particularly in the mining sector.

This study aims to analyze the market structure of coal mining companies listed on the Indonesia Stock Exchange (IDX) and the factors affecting their sales performance. To this end, the study employs a range of analytical techniques, including CR4, HHI, MES, CLR, PCM, and multiple linear regression analysis. The results of the analysis indicate differences when all coal mining companies in Indonesia, whether listed on the IDX or not, are considered collectively. Given the limitations of these results, recommendations are made for further research on this topic to enable the analysis of market structures in the coal mining sector or other sectors, with the aim of determining different influencing factors.

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