

STRUCTURE, CONDUCT, AND PERFORMANCE ANALYSIS IN INDOONESIAN COAL MINING

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Abstract

In this paper, we are going to analysis the structure, conduct and performance of Indonesian coal mining corporations. Industrial Structure is measured by Concentration Ratio (CR). The obstacles to entrance the market can be seen by the number of competitors in chasing the segment of market to reach the benefit goals that decided by Minimum Efficiency Scale (MES). The performance of industry is measured by using the average of Return on Sales (ROS) for industry. The influence of consentration ratio (CR) and Minimum Efficiency Scale (MES) to the performance of financial industry was not examined by econometric, but only explain the changes to those descriptive variables.. The result of the research show In 2006 the level of concentration is high at 0.73 which indicates that the structure of the coal mining industry approaches towards oligopoly. However, the level of industrial concentration has decreased. This is in line with a growing number of medium-sized companies are involved in the industry. the coal mining industry MES level, also decreased. This means that the barriers to entry for new players in the market increasingly loose coal industry. The analysis of the description of the relationship CR4 and Ratios Gross profit on sales shows that the relationship between concentration levels and corporate performance using a proxy ratio of gross profit on sales was not significant.

Keywords : Concentration Ratio, Minimum Efficiency Scale, Return on Sales

Introduction

In recent years, Coal consumption has risen rapidly. In 1990 total coal consumption reached 3.461 million tons, in 2007 increased to 5.522 million tonnes, an increase of 59,5 5 or 3,5 % per year. International Energi Agency (IEA) estimates that world coal consumption will grow an average of 1,7 % per year over the 2015 - 2030 (Miranti,2008)

Current world market condision indicate coal demand is much higher than the During 2007, global coal supply deficit of 156,5 million tons. It triggers the surge in

coal price more than tripled in the last two years, from US\$ 40 to US\$ 120 per ton (for reference some kind of high-calorie coal), in mid 2008. New York Mercantile Exchange in July 2008 recorded contract price of coal in the Asian market hit a record new high of US\$ 137 per ton. (Media Data Riset, Jakarta, 2009).

In the world coal trade, Indonesia plays an important function over the years as well as a manufacturer or exporter. In 2007, Indonesia was in a position to seventh largest world producer of coal with a contribution of 4.2% and a position as the second largest exporter with total exports volume of 202 million tons (Miranti, 2008) . In addition, the location of Indonesia lies in 3 collision (convergence) Earth's crustal plates, the Eurasian continental plate, continental India-Australia plate and the Pacific plate generated a geological structure that has a rich mining potential has been recognized in the world.

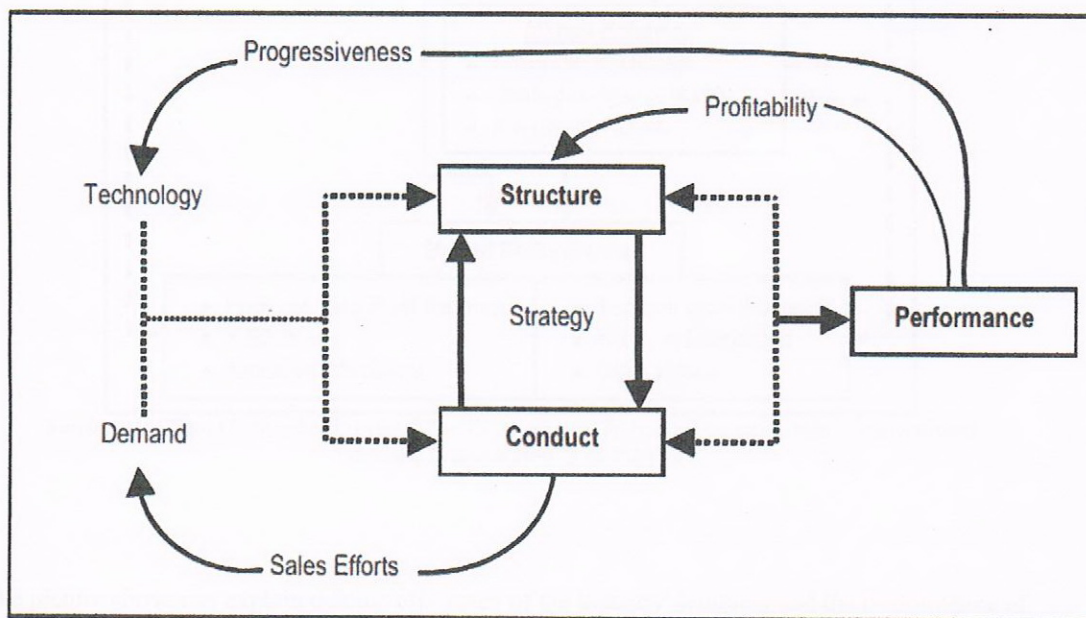
In recent years, the coal industry outlook is expected to remain fairly good market both domestic and global markets. This is due to the pivotal role played by coal power plants and the reduced role of oil as an energy source. Coal is an energy source for Power, and Coal is also great potential to become liquid fuel (diesel) and gas.

According to the Directorate of Energy and Mineral Resources (ESDM) Indonesia, and 2003 listed 251 companies that carry out coal mining in Indonesia, of which 71.7% (216 firms) of which is a private company and the rest are foreign companies. However, about 85% of coal production is produced by 9 major companies including Bumi Resources, Adaro, Kideco Jaya Agung, Berau Coal, Indomico Mandiri and PT Bukit Asam. Based on data from the 2007 directorate ESDM PT Kaltim prime Coal and PT Arutmin (PT Bumi Resources) a market share of 54.2 million tonnes (30.3%), PT Adaro 36.1 million tonnes (20.2%), PT Kideco Jaya General 18.9 million tonnes (10.6%), PT Berau Coal 11.8 million tonnes (6.6%), PT Mandiri Indomico 10.5 million tonnes (5.8%) PTBA 8.6 million tonnes (4.8%) and the rest other companies (Miranti,

2008). It may have a direct impact on the structure and performance of the coal mining industry in Indonesia. Based on this phenomenon, this study will analyze the structure, conduct and performance of the coal industry in Indonesia.

THEORETICAL

One of the basic framework of economic analysis is the relationship between the structure of the industry-Conduct-Performance or Structure-Conduct-Performance (SCP). The simplest relationship of these three variables is a linear relationship in which the structure affects the behavior then the behavior affect performance. In relation SCP three components including the interplay of other factors such as technology, progression, strategies and efforts to boost sales (Martin, 2002).

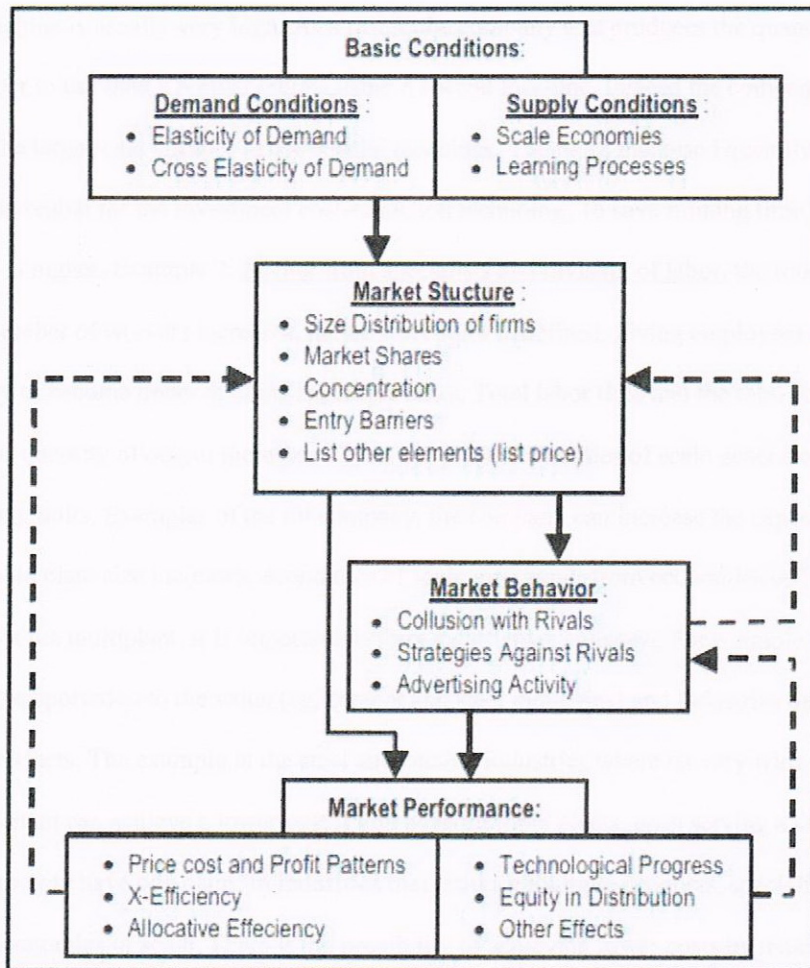


Sumber: Stephen Martin (1994, 7)

The structure of the market will affect the behavior of firms in a market that jointly determine the overall performance of the market system. Performance of an industry is measured, among others, the degree of innovation, efficiency and profitability. In this market structure, there are three main elements, namely market share (market share), market concentration (market concentration) and barriers to market entry (barrier to entry)

Relations Structure - Conduct - performance is also described as follows (Chris Britton and William G. Shepherd,

1990)



Sumber: William G. Shepherd, 1990, "The Economics of Industrial Organization", International Editions, Prentice Hall, 3rd Ed, p.6.

The picture above can explain that the efficiency of the industry demonstrated the performance of the industry. The growth of the coal mining industry in Indonesia should be accompanied by performance, as indicated by the efficiency of the industry. Industrial efficiency can be measured by the ability of the industry to optimize input costs incurred to produce the output. The more efficient an industry, the ratio between the input and the output will be smaller.

Economies of scale (Sawyer, 1991) may be at the level of products, factories and multiplant. 1) At the product level, specialization is a source of economies of scale is very important. Example 1. Using a special machine, companies can reduce the time required to

produce one unit of output with the use of a special machine, but the time required to set up a special machine is usually very high. As a result, the company that produces the quantity of output bit 1, cheaper to use than a regular engine using a special machine. Instead the company that produces the large scale cheaper to use special machines. The more increased quantity of output, the more favorable for the investment cost-reduction technology to save running time, although the setup time is higher. Example 2: Saving from specialists and division of labor, the time to produce a certain number of workers increases, the task becomes is defined, giving employees the opportunity to become better at doing repetitive tasks. Total labor time and the total cost will come down as the quantity of output increases. 2) At the plant, economies of scale generated by the size of processing units. Examples of the oil company, the company can increase the capacity of the unit to double plant size increases, economies of scale may result from economies off masses revers. 3) At the multiplant, it is important to form a particular industry., For example in industrial high-cost transportation to the value (eg, cement and steel industries) and industries that produce multiple products. The example in the steel and cement industries where its very wide geographic market the plant can achieve a lower cost if you have multiple plants, each serving a single region, compared to only have one plant. In industries that produce multiple products, specialization is a source of economies of scale. There is the possibility of achieving lower costs by making each plant is specialized in producing a particular product line.

Industry behavior can be defined by how an industry struggling to gain market share. That is how the pattern of behavior and adjustment of the company in achieving its goals and maintain continuity in the competition. Industry behavior are difficult to measure quantitatively. Thus, in this study, the behavior of the industry is not measured. In accordance with the correlation structure of the performance behavior described by Chris Britton and William G. Shepherd (1990) above, the structure also has a direct influence on the performance of the industry.

Industry performance can be measured by increasing the effectiveness and efficiency of the company, the ability to influence / determine the price and the increasing technologi, increased technical inefficiency and productivity improvement. Overall, increased efficiency and productivity will generate profit (profit / profitability) for the company.

PREVIOUS RESEARCH

There are few studies that examine the relationship between structure, conduct and performance of the industry, but more empirical studies only examined the association directly between structure and performance including; Qayyum and Khan (2006) which examined the empirical x-efficiency, economies of scale, and increased technologies commercial bank operating in Pakistan. The results suggest that the domestic bank is less efficient than foreign banks, Economies of scale for small banks, especially foreign banks higher. The results also show the market share of five large banks declined during the study period. Mergers between small banks with foreign banks will reduce cost due to economies of scale the same thing with x efficiency (because foreign banks are relatively x-efficient than small banks). If mergers between small banks and large banks, the cost will be reduced without compromising the bank's monopoly power.

The results of Fraquelly and Moiso research (2005) shows the link cost efficiency in the sands industrial-economies scale in Italy. The average value of inefficiency about 28% was explained by the characteristics of the network and 72 % relevant to economies of scale. In general, economic efficiency is the concept of utility resources, which describes the production of goods and services from a number of resources. Labor efficiency is a measure of labor productivity per unit of labor costs. Hypothesis of previous studies (Fombrun 1996, Podolny, 1993) states that "good reputation is valuable, among other benefits, it can create labor source efficiency advantages.

Stuebs and Sun (2010) examined the effect of reputation on the performance of the industry, It's measured by labor efficiency, productivity and cost, the research results showed that "Good reputation" can attract and motivate good employees in accordance with the results of Roberts and Dowling (in Stuebs and Sun 2010).The Employee interested can make the lower labor costs. When good employees interested in a reputable company, they may expect to receive less compensation for work opportunity in a reputable company. Economically said, "high-

reputation firms" led to greater labor supply to work on a "high-reputation firms, the increase in labor supply push up wages (wages) down. Employee motivation produced a "productivity benefit" When employees are motivated by a reputable company ', they may work harder for a company that has a reputation. So the hypothesis of this study turned out to be: "in lower labor costs and higher labor productivity should result an increasing labor efficiency."

Prasetyo (2000) investigated the relationship of market structure and market behavior and its effect on market performance. This study used survey (questionnaire) to small craft industries of the population of 625 bamboo small bamboo handicraft industry in Yogyakarta. In determinant results showed a positive R2 value of 0.9826. This means that there is a strong relationship between the positive and the market structure and market behavior on market performance, the relationship in the real level of 5% is significant. The increase in production capacity in small bamboo craft industry are influenced by internal factors such as production factors labor, capital, marketing, education, technology, and business management which is reflected in the cost of transportation. Simultaneously, market structure and market behavior has a positive influence and significant of 96.55%, with R2 values of 0.9655 and F test 1526.969.

Muslim and Glory (2008) in his research on the analysis of hypermarkets industry in Indonesia with the flow Structure Conduct Performance. The market structure is measured using the concentration ratio CR4 Hypermarket Indonesia's largest companies based on the market share (value of sales or total assets) and Herfindal-Hirschaman Index, and measures the market entry barriers using the Minimum Efficiency of scale (MES), using the average output of biggest companies than 50% Output industry. Analyzed market behavior only descriptive, because it is difficult to quatified. Performance is measured using the ratio of the profitability of the industry in the form of income ratio and the ratio of sales income on operating funds. This study did not examine the relationship between the two is econometric, but only explain the changes to four descriptive variables. The descriptive results showed no effect of changing the value of CR4 , income sales ratio and the ratio of operating income on funds. The conclusion is that the hypermarket industry structure oligopoly structure with an average value of CR 4 for 5 years at

91.23% and the average HHI value of 2363.99. Barriers to entry into the market is also quite high at 25.65%. Corporate behavior in the face of very rapid hypermarket industry is done by selecting the strategic location of stores, advanced technology, lower prices, promotion through print and electronic media, trade-in programs, shopping card, private label, and terms of trade. Performance of the industry demonstrated profitability and the company's ability to meet its short-term debt is very small.

RESEARCH METHODS

In accordance with the correlation structure of the performance behavior described by Chris Britton and William G. Shepherd (1990) above, the structure also has a direct influence on the performance of the industry. So this study only examined the relationship structure with organizational performance.

Coal Mining structure is measured by a measuring instrument industry concentration ratio 4 (CR 4). CR is the percentage of the total industry output or sales revenue. Formula Concentration Ratio (CR) is as follows:

$$CR_{4i} = \sum_{j=1}^4 S_{ij}$$

Where:

S_{ij} = a market share of 4 companies with the largest market share

CR_{4i} = total market share of 4 companies with the largest market share

Market entry barriers can be seen by the number of competitors in taking market share to achieve the desired profit target. This limitation can be analyzed by measuring the economies of scale are approximated by the output (output) firms. Output value is then divided by the total industrial output. This calculation is called the Minimum Efficiency Scale (MES).

$$MES = \frac{\text{average output of 4 companies that produce 50\% of industrial out put}}{\text{Total output}}$$

After recognize the market structure of an Industry especially the market concentration level, the market characteristic can be indentified whether it is monopoly, oligopoly, monopopistic ar perrfect market. A market can be called; monopopy if the CR4 valu is greater than 70% and Oligopoly if the CR4 value is greater than 40% but less than 70%.(Muslim at all, 2008)

Performance measurement is used a proxy for the ratio of profit to sales gains / Return on Sales (ROS)

$$\text{ROS} = \frac{\text{Operating Margin}}{\text{Net Sales}}$$

RESULTS AND DISCUSSION

Market Structure

Analysis of market structure in the coal mining industry is measured using the ratio of the concentration of 4 largest firms (CR \$). The following table shows the number of coal mining production volumes in the Indonesian Coal Mining Association (APBI/ICMA).

Tabl1 1. Coal Sales and Production 2006 - 2007

No	Company	2006 (\$ 000)	2007 (ton)	2008 (ton)	2009 (ton)	2010 (\$000)
1	PT Bumi resources, Tbk (kaltim prima coal, Aritmin Indonesia)	1.851.550	53 848 625	50 847 664	59 276 022	4.333.504

2	PT Adaro Indonesia	1.072.287***	33 043 091	38 482 461	39 977 559	2.718.000.
3	PT Indika Energi, Tbk (Kideko Jaya Agung)	Na	18.889.931	19 852 402	24 692 299	1.646.540***
4	PT Indo tambang raya (Indominco Mandiri, kitadin, dan Jorong baru tama greston	726.022	13 074 606	13 192 641	15 514 256	1.974.817
5	PT Berau Coal	n/a	11 811 462	12 924 312	14 343 893	n/a
6	PTBA	388.682,804	n/a	12 119 723	11 422 723	870.006,949
total production/sale in Indonesia		Na	162 294 657*	188 663 068**	228 806 887**	23.101.891**

process by/sourcer: Aosiasi pertambangan Batubara Indonesia (www.icma) (in ton)

Note, *source bps (www.bps.go.id)

** source r bps (www.bps.go.id) times selling price per ton for the year

In us \$, soure: annual report audited on the JSE

*** estimation

Using the data provided in the table above descriptive Measurement Market structure and market entry barriers, coal mining can be presented in the following table:

Table 2. CR 4 and MES Ratio

Year	CR4	MES
2006	n/a	n/a
2007	0,73	0,1825
2008	0,65	0,1625
2009	0,60	0.150
2010	0.46	0.116

Descriptive results of the calculation in the table above were obtained by dividing the number of high output (in tonnes and sales) of the four group companies with the largest amount of output (in tons / sales) industry. In 2007 the level of concentration is high at 0.73 which indicates that the structure of the coal mining industry approaches towards monopoly. However, Since 2008 the level of industrial concentration has decreased. The CR 4 value is above 40% but below 70%. It means the structure of the coal mining market structure is an Oligopoly one. This is in line with a growing number of medium-sized companies are involved in the industry.

One factor makes high levels of concentration of the market is the factor of market entry barriers. This indicates that in 2007, 2008, 2009 and 2010, a growing number of new mining companies enter the market. It illustrates the looseness of the barriers to entry into the market .

From the descriptive analysis above, the coal mining industry MES level, also decreased. This means that the barriers to entry for new players in the market increasingly loose coal industry. However, because the cost of capital required to enter the industrial market is very high, then the value of MES is still above 10%, or more than 0.10.

Profitability

Performance measurement results using coal mining industry financial ratio Return on Sales is seen that the profitability of the four largest coal mining company (Bumi Resources, Adaro Indonesia, Indika Energy, Indo Tambang raya) have increased every year. This suggests that the ability of companies produce better profits.

Table 3. Return ons Sales (ROS)

Company		2006	2007	2008	2009	2010
Bumi Resorces	ROS	0,29	0,18	0,33	0,30	0,37
Adaro Inonesia	ROS	0,20	0,21	0,20	0,41	0,31
Indika Energi	ROS		0,11	0,12	0,25	0,16
Indo Tambang raya	ROS	0,35	0,27	0,36	0,38	0,32

The Relationship between CR 4 and Profitability

Then the relationship between CR 4 and the probability of four large companies during 2006 to 2010 are as follows:

Table 4. The Relationship of CR 4 and ROS

Company/years		2006-2007	2007-2008	2008-2009	2009-2010
Bumi Resorces	CR4	na	(0,08)	(0,05)	(0,14)
	ROS	(0,11)	0,15	(0,03)	0,07
	relationship		Negative	Positive	Negative

Adaro Inonesia	CR4	na	(0,08)	(0,05)	(0,14)
	ROS	0,01	(0,01)	0,21	(0,10)
	relationship		Positip	negatip	Positip
Indika Energi	CR4	na	(0,08)	(0,05)	(0,14)
	ROS	Na	0,01	0,13	(0,09)
	relationship		Negative	negative	Positive
Indo Tambang raya	CR4	na	(0,08)	(0,05)	(0,14)
	ROS	(0,08)	0,09	0,02	(0,06)
	relationship		Negative	negative	Positive

From the analysis of the description of the relationship CR4 and Ratios Gross profit on sales above shows that the relationship between concentration levels and corporate performance using a proxy ratio of gross profit on sales was not significant. It a In 2007 the level of concentration is high at 0.73 which indicates that the structure of the coal mining industry approaches towards oligopoly. However, the level of industrial concentration has decreased. This is in line with a growing number of medium-sized companies are involved in the industry. That changes in the value of CR4 did not effect on operating income. This suggests that market concentration has no effect on the ability of the company to make a profit.

BIBLIOGRAPHY

- Mandal Sabuj Kumar and S Madheswaran (2009), *Technological Progress, Scale Effect and total Factor Productivity Growth in Indian Cement Industry: Panel Estimation of Stochastic Production Frontier*, The Institute for Socialm and Economic Change, Bangalore, working paper
- Martin Stephen (1994), *Industrial Economis; Economic Analysis and Public Policy*, second edition, New York
- Muslim Erlinda , Vivi Evertina, dan Rahmat Nurcahyo (2008), *Stucture, Conduct, and Performance Analysis in Palm Cooking Oil Industry in Indonesia Using Structure Conduct Performance Paradigm (SCP)*, Preceeding International Seminar on Industrial Engineering and Management
- Muslim Erlinda (2008), *Analisis Industry Hypermarket di Indonesia dengan Aliran Structure conduct Performance*, seminar on Application and Research in industrial technology, SMART, Yogyakarta
- LACHAAL LAssaad (1998), *Production Structure Characteristics and Adaptions of Productivity Growth Measures: A Survey*, Chhiers d'conomie et sociologie rules, n 48
- Prasetyo P Eko (2007), *Hubungan struktur pasar dan perilaku pasar serta pengaruhnya terhadap kinerja pasar*, Jurnal ekonomi Pembangunan

Rolf fare; Shawna Grosskopf, Mary Norris dan Zhongyang Zhang (1994), *Productivity growth, technical progress, and Efficiency Change in Industrialized countires*, The American Economic Review, Vol 84 No. 1

Stuebs Marty and Li Sun (2010), *Business Reputation and labor Efficiency, Productivity, and Cost*, Journal of Business Ethics, springer

Suryawati (2009), *Analisis Struktur, perilaku dan kinerja Industri tekstil dan pakaian jadi di Provinsi DIY*, Jurnal akuntansi dan Manajemen vol 20 no 1

Wei SI and Xiuqing Wang (2011), *Productivity growth, technical efficiency, and technical change in china's soybean production*, African Journal of agricultural Reasearch vol 6 (25)

Sheperd G William (1990), *The economic of Industrial Organization*, Prentice Hall, 3rd