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ANALYZING THE INFLUENCE OF THE COAL EXPORT BAN POLICY ON THE FINANCIAL PERFORMANCE OF PTBA INDONESIA: A CASE STUDY OF INDONESIA'S COAL COMPANY

Riza Syafitri, Dzikri Firmansyah Hakam
School of Business and Management, Institut Teknologi Bandung, Indonesia

Abstract

The demand for coal in Indonesia and globally has risen in response to global population growth. As the largest exporter of thermal coal globally, they exported around 434 Mts in 2021, with primary consumers including India, China, Japan, and South Korea. Indonesian coal mining companies are confronting a coal export prohibition due to insufficient domestic coal supply for PLN amidst the European energy crisis and the Ukraine-Russia crisis. The coal export ban may negatively impact the sales of coal mining companies, such as PTBA, and limit their potential to expand into Italy and Poland in 2022. This study aims to comprehensively analyze PTBA's fair value using internal and external analysis to assess PTBA's financial condition. PTBA shares were valued at US $0.226 or Rp 3,293 using the DCF method in early 2022. A Monte Carlo Simulation will be performed to assess the value at risk and measure potential investment losses. A Monte Carlo Simulation was conducted at a 95% certainty level to determine the valuation range of shares, which was between -US $0.04 and US $0.45. PTBA's current stock is undervalued based on DCF methods, indicating that investors who purchase at US $0.223 or Rp 3,923 may benefit.

Keywords: *DCF Method, Intrinsic Value, Monte Carlo Simulation, Stock Valuation*

INTRODUCTION

Coal is Indonesia's primary fossil fuel for energy; over 88% of (Kitt & Yates, 2020) is generated from coal (Hadityo, 2022). Indonesia's coal exports are projected to reach around 434 million tonnes in 2021 (IEA, 2021), making it the largest exporter of thermal coal globally. Major consumers of Indonesian coal include China, India, Japan, and South Korea (Arinaldo & Adiatma, 2019).

In early 2021, the Indonesian Government implemented a 30-day ban on coal exports to ensure domestic coal supply for the national electricity company and mitigate the risk of power outages that could impact 11 million households (Kementerian ESDM, 2022). The ban on coal exports significantly impacted Indonesian coal companies and created concern among investors in the stock market (Pahlevi, 2022).

Pandu Sjahrir, the head of the Indonesian Coal Mining Association (ICMA), expressed concerns that the ban on coal exports may have a negative impact on Indonesia's reputation as a reliable global coal supplier (Maguire, 2023; Smith & Connors, 2022). Sjahrir estimated that the ban could affect monthly coal production volumes of 38-40 million tonnes (FPA, 2022). The ban on coal exports led to a limited achievement of the planned coal production volume (Christina, 2022; Lee, 2019), with only a portion of the expected quantity achieved by the selected period (Simorangkir & Prabowo, 2022). It has raised concerns regarding Indonesia's consistency as a coal supplier and may have switched global demand for coal to other countries such as Australia, Mongolia, and Russia (Maguire, 2023; Lee, 2019).

The impact of the European energy crisis on the global coal market led Indonesian coal companies to adjust their approaches to align with new regulatory demands (Nabila, 2022; Tani, 2022). During the crisis, PT Bukit Asam Tbk (PTBA), a significant player,

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offered support to Italy and wanted to export coal to Italy, Poland, and Germany (Rosana, 2021). Reducing PTBA's coal export volumes could potentially create emerging markets for the company considering the continuing energy shortages in Europe (Kartikasari, 2022). The ban on coal exports created challenges for Indonesian coal companies, requiring strategic adjustments to maintain competitiveness in the global coal market (Hadityo, 2022). The company must investigate potential solutions to mitigate the impact of coal production volume disruptions and adapt to evolving market demands and global influences that impact business sustainability (Prakoso, 2022).

This research will determine the impact of the coal export ban on the stock valuation, specifically focusing on PTBA as one of the coal mining companies. While previous studies have explored other events related to the stock valuation, limited research has been dedicated to examining this coal export ban and determining the value at risk for the company. Therefore, this research fills a significant gap in the literature by providing the stock price value and value at risk of PTBA. This research is organized as follows: Section **Error! Reference source not found.** provides the background and company profile, S ection **Error! Reference source not found.** explains the previous literature related to the study, Section **Error! Reference source not found.** the data collected and research m ethod, Section **Error! Reference source not found.** provides the results of data analysis, and Section **Error! Reference source not found.** offers the study's conclusion.

PT Bukit Asam Tbk (PTBA) is a coal mining company the Indonesian Government owns. PTBA, a company founded in 1950 and publicly listed on the Indonesia Stock Exchange in 2002, focuses on coal mining and related services. The company includes mining concessions across several Indonesian provinces and works in coal exports to other countries (PTBA, 2022). PTBA has been positioned for new business opportunities and growth following its recent merger with PT Aneka Tambang and PT Timah Tbk under the BUMN Holding the Indonesian Mining Industry (MIND ID).

PTBA is a well-known coal mining company in Indonesia. PTBA has established its position as an industry leader since its founding in 1950. The company is listed on the Indonesia Stock Exchange and manages multiple coal mines in various provinces across Indonesia. The coal produced by PTBA is exported to multiple countries (Gumelar, 2017), thereby significantly contributing to Indonesia's coal export market. PTBA is about to begin a new phase of business expansion following its merger with MIND ID to expand its performance (PTBA, 2022).

Table 1. Literature review related stock valuation

	Variables	Country	Methodology	Period	Findings
(Neaime, 2015)	MENA stock price, forecast stock return	Saudi Arabia, Qatar, Tunisia, UAE, Morocco, Jordan, Oman, Egypt	Panel and time series econometric test, Monte Carlo simulation	2005 – 2014	The Monte Carlo observed that the stock markets in the MENA region exhibit mean reversion. It implies that the stock prices in these markets tend to revert to their long-term average values after experiencing a deviation from them.
(Jonek-Kowalska, 2018)	Value management, Risk management, Mining enterprise	Poland	Multiple regression, Real option, WACC	1985 – 2015	Certain risk factors, such as Europe and domestic coal consumption, commonly influence a company's book value. The structure of energy balance and consumption patterns have been found to show more significant fluctuations.

	Variables	Country	Methodology	Period	Findings
(Hoang et al., 2023)	Trading behavior, Economic policies	Global	Empirical findings, Univariate analysis, Regression analysis, Descriptive analysis	2020 – 2022	The effects of COVID-19 on trading behaviors across various industries while considering the influence of macro-environmental factors. The mining, minerals, oil & petroleum, and construction sectors show the lowest sales levels.
(Yin et al., 2023)	Stock market participation, Market risk	China	Difference-in-difference (DID Model), Heterogeneity analysis	2008 – 2018	The research indicates a reduction in households' stock market participation ratio and stock allocation in their financial ratio due to the impact of the UTPC policy in China.
(Ahmed et al., 2022)	Russian-Ukraine Crisis, European stock market	European Union	Event study methodology, Average Abnormal Returns, Cumulative Abnormal Returns	2022	Russia's recognition of regions in Ukraine has resulted in an adverse reaction from shareholders in the European stock market.
(Zubaidah, 2016)	Trading volume activity, Coal policy, Abnormal return	Indonesia	One-sample t-Test, Kolmogorov Smirnov Test	2010 – 2015	No statistically significant impact on abnormal return and trading volume activity before and after the policy implementation. The lack of market impact tends to result in a lack of response from investors toward specific issues.
(Breitenstein et al., 2022)	Energy transition policy, Coal phaseout, Stranded asset, Financial performance	German	Discounted cash flow model, Monte-Carlo Stimulation	2019 – 2022	The impact of declining renewable energy costs and the adoption of carbon pricing regulations on the competitiveness of coal and lignite power plants in German.
(Nerger et al., 2021)	Industrial stock market reactions, Environmental Policies	United States	Abnormal returns, Paired T-test, Cumulative abnormal returns	2016 – 2019	Coal experienced positive abnormal returns; most industries had mixed or adverse reactions. Interestingly, the reduction in environmental regulations in the US to align with global environmental awareness standards did not appear to be a significant concern for investors.
(Li, 2018)	Stock market reactions, News reactions, Xiong'an New Area Strategy, National plan	China	Sentiment analysis, iFinD high frequency, Ordinary Least Squares (OLS) mode	2016 – 2017	The positive news is released, and the stock market is declining. News originating from academia and scholars may have a more significant impact on investor behavior than news from Government and industries. This highlights the significance of expert perspectives and analyses in shaping investment decisions.

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	Variables	Country	Methodology	Period	Findings
(Robinson et al., 2018)	Green industries, Stock price returns, Environmental issues, News reaction	China, Taiwan, Brazil, South Africa, and India	Econometric model, Baseline random effects regression	2015 – 2018	The potential growth of green industries in investor portfolios is being explored as countries aim to reduce their environmental impact and companies strive to enhance their market share and reduce expenses.

According to Ordonez, the energy policies of Indonesia have been mainly focused on expanding infrastructure growth and economic development (Mujiyanto & Tiess, 2013; Ordonez et al., 2021), with a tendency to emphasize these objectives over environmental considerations (Robinson et al., 2018). To effectively execute these policies, Indonesia must reduce the political influence of the coal industry, improve regulation, and offer benefits to entities to reduce their dependency on coal (Santi, 2023). The early stages of development offer a unique opportunity for the country to shape its energy production and supply policies (Breitenstein et al., 2022). A comprehensive approach that considers non-renewable and renewable energy sources can be implemented to drive the country's development beyond 2025 (Indriyanto, 2022). A forecast of coal production, operational expenses, and loss of reserves can provide important information in the development of national coal policies, including policies related to domestic coal marketing and export markets (Rosyid & Adachi, 2016).

Based on Table 1 of previous research examining the effects of several events, such as pandemics, policy implementation impacting behaviors, and investor sentiment in different industries (W. Daryanto & Giovani, 2020; Nerger et al., 2021; Zubaidah, 2016), while also considering the influence of macro-environmental factors (Utamaningsih, 2020). A study has found that insider sales in the mining, minerals, oil & petroleum, and construction sectors have significantly decreased (Digdowiseiso & Santika, 2022). It indicates that investors in these industries may reduce their exposure to the pandemic by selling stocks before the market prices reflect the impact (Li, 2018; Yin et al., 2023). Recent studies have shown that geopolitical events, such as Russia's recognition of regions in Ukraine, can significantly impact the European stock market, leading to adverse reactions from shareholders (Ahmed et al., 2022; Jonek-Kowalska, 2018). It highlights the importance of investors taking issues seriously, as they can affect the global economy (Meini, 2022).

PTBA faced profitability challenges caused by decreased revenue and sales (Rosyid & Adachi, 2016). The profitability ratios of PTBA have been determined to be positive. PTBA can enhance its market and sales volume by maximizing efficient asset management and broadening its green energy operations to ensure long-term viability (W. M. Daryanto et al., 2022). The Domestic Market Obligation (DMO) policy has not significantly influenced companies' financial performance (Angelica & Sumirat, 2022; Rahman & Nainggolan, 2021; Rahadian & Sumirat, 2022).

RESEARCH METHOD

Data

This study utilized historical data of PTBA stock price from Yahoo Finance that covers the years 2017 to 2022, resulting in a total of 1322 observations. Moreover, a Microsoft Excel simulation assessed the stock price volatility. The methodology requires the calculation of daily stock returns, estimating their average and standard deviation, and

conducting a Monte Carlo simulation with 10,000 iterations using the estimated average and standard deviation as data. The implementation of a confidence level was a crucial element in the simulations (Aditya et al., 2023).

Research Method

The research utilized a combination of secondary data sources, including company reports, news articles related to PTBA, and quarterly financial reports for five years. The research employs quantitative methodologies such as absolute valuation, sensitivity analysis, and Monte Carlo Stimulation. Sensitivity analysis is commonly used for determining the key variables that might influence the value of a company's performance (Theodosiadou et al., 2016). A Monte Carlo Simulation will be utilized to assess the potential risks related to fluctuations in the PTBA stock price (Abad et al., 2014). Furthermore, to determine the financial condition of PTBA, financial ratio equations are as follows:

$$\textit{Cost of Equity} = \textit{Risk-Free Rate} + \textit{Beta Market (Market Rate of Return} - \textit{Risk-Free Rate)} \quad (1)$$

$$\textit{Cost of Debt} = \frac{Interest\ Expenses}{Total\ Debt}\ x\ tax\ rate \quad (2)$$

$$WACC = \textit{(Interest Expenses / (Short Term Debt} + \textit{Long Term Debt)) x (1} - \textit{tax rate)} \quad (3)$$

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_n}{(1+r)^n} \quad (4)$$

Where:
CF_1 = The cash flow for year one
CF_2 = The cash flow for year two
CF_n = The cash flow for additional years
r = The discount rate

Value at Risk (VaR) is a commonly utilized risk management metric that quantifies the potential financial loss of an investment or portfolio within a specified time frame at a particular level of confidence (Obadović et al., 2016). The objective of VaR is to identify the maximum possible loss that an investor or institution is prepared to tolerate under normal market circumstances (Ria & Susilo, 2023). The Monte Carlo simulation method is generally used in the corporate and finance sectors to assess and evaluate the value at risk of portfolios and investments (Susilo & Ria, 2022). It simulates various uncertain factors that impact the value (Ilić & Digkoglou, 2022).

As a result, their value distribution is determined within the scope of the result outcomes (Obadović et al., 2016). The level of uncertainty tends to increase with an increase in sources of the problem when compared to other growth techniques (Maruddani & Purbowati, 2012). This simulation includes any statistical sampling technique used for similar solutions to quantitative problems by simulating the basic process for simulating the probability of a result based on probability distribution (Ria et al., 2022).

The process of generating random numbers between 0 and 1 is commonly accomplished by utilizing the =rand() function within Microsoft Excel. Implementing n simulations is a common practice in research models to enhance the utilization of this function (Lestari et al., 2022). These simulations usually comprise around 10,000 simulations. The simulation of PTBA stock values can be achieved through the use of the

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=norminv(probability, mean, standard_dev) function in Microsoft Excel, which randomizes the given values (Dukalang et al., 2021)

Stock value numbers can be generated using mean and standard deviation parameters for each value and a random probability between 0 and 1. The estimation of maximum loss at a given confidence level (1 - α) can be achieved by utilizing a formula that corresponds to the (α) quantile of the empirical distribution of stock values, denoted by R* (Campbell & Perron, 1991). This formula involves the utilization of an equation consisting of 6 components. The present study explores the application of the percentile function in determining the percentile rank of a specific value within a simulated array of stock prices. The array's generation involves utilizing the stock price and standard deviation parameters derived from the =norminv formula. The value at risk is calculated with this formula as follows:

$$VAR_{(1-\propto)} = W_0 R^* \sqrt{t} \quad (5)$$

Where:
W_0 = *asset or initial portfolio investment*
R^* = *the* $\propto$ *quantile value of the value distribution*
t = *period*

The estimate of the maximum potential loss an investor or company may experience can be assisted by calculating value at risk. The thesis suggests that investing an amount of W_0 would result in a maximum loss below the stock's average value (Ria & Digdowiseiso, 2023).

RESULTS AND DISCUSSION

Discounted Cash Flow (DCF)

The calculation of the cost of equity (COE) and cost of debt (COD) is an essential component of conducting a DCF analysis (Digdowiseiso & Ria, 2023). It allows investors to determine the expected return on investment in a company's equity. According to the World Government Bond Index (World Government Bonds, 2023), the yield of the Indonesia Government Bond for 2022 has been reported to be 6.57%. According to Damodaran's research the Risk-Free Rate of Indonesia is 6.75% (Damodaran, 2023). Based on the available data from Yahoo Finance and the Damodaran page on Stern NYU Page, it has been determined that the Beta Market for PTBA is 0.93, while the Market Return is 7.89% (Yahoo Finance, 2022).

COE = *Risk-Free Rate + Beta Market (Market Rate of Return – Risk-Free Rate)*
= *6.75% +0.93 x (7.89% - 6.75%)*
= *7.81%* *(6)*

COD = *Interest Expenses / ((Short Term Debt + Long Term Debt)) x (1 – tax rate))*
= *1.69 x (1 – 23.89%)*
= *14.96%* *(7)*

WACC = *(COD x Weight of Debt) x (COE x Weighted of Capital*
= *(14.97% x 31.98%) + (7.81% x 68.02%)*
= *10.10%* *(8)*

The DCF Analysis is a widely used valuation technique that estimates the intrinsic value of an investment by projecting its future cash flows. DCF analysis is a valuation method that aims to determine the present value of an investment by utilizing projections

of its cash flows in the future. The technique involves calculating the investment's potential returns in the future and discounting them to their present value. According to Yahoo Finance, the perpetual growth rate of PTBA is 7.70%, which is determined by a gap between Indonesia's GDP and inflation rate.

Table 2. Free Cash Flow of PTBA (in thousand US Dollars)

Year	Q1 2022	Q1 2023F	Q1 2024F	Q1 2025	Q1 2026	Q1 2027
FCF (Free Cash Flow)	USD 136.96	USD 147.51	USD 158.87	USD 171.10	USD 184.27	USD 198.46
Terminal Value						USD 3,756.04
Total		USD 147.51	USD 158.87	USD 171.10	USD 184.27	USD 3,954.51

The terminal value applies to a company's valuation projections beyond the expected period. According to Table 2, the projected terminal value of PTBA in the first quarter of 2027 is US $3,756.04 million. The projected cash flow of PTBA in 2027 is estimated to have a present value of US $3,954.51.

Table 3. DCF Valuation of PTBA Calculation

DCF Valuation		
Enterprise Value	USD	2,019.23
(+) Cash & Marketable	USD	1,440.71
(-) Debt	USD	857.52
Equity Value	USD	2,602.42
Shares Outstanding	USD	0.79
Intrinsic Value (Per Share)	USD	0.23
Current Price	USD	0.22
Upside		0.40%
BUY/SELL		**BUY**

According to the DCF Valuation analysis in Table 3, the intrinsic value per share is US $0.22 or Rp 3,923, higher than the current market price of us $0.28 or Rp 3,280 per share. Based on the analysis, a buying opportunity is possible as the estimated intrinsic value exceeds the current market price. The potential gain or upside is estimated to be around 0.40%. The calculation analysis leads to the conclusion that investing in PTBA is recommended.

Sensitivity Analysis

According to Theodosiadou, sensitivity analysis is a practical approach to demonstrating the effect of driving on intrinsic value outcomes (Theodosiadou et al., 2016). This method will provide adjustments for future circumstances related to the valuation of PTBA. This research examines the significance of sensitivity analysis in various financial scenarios, covering assessing risks, decision-making, variable influence assessment, and enhancement of model transparency (Higgins, 2019). According to Huang, sensitivity analysis is a methodology that can be utilized to effectively demonstrate the impact of driving on intrinsic value outcomes (Huang, 2019).

The proposed methodology provides a basis for adjusting to potential future PTBA valuation changes.

Table ***4***, Table 5, Table 6, and Table 7 give a calculation of equity values using four variables: risk-free Rate, WACC rate, coal price growth, and perpetual growth rate.

Table 4. Sensitivity Analysis: WACC – Perpetual Growth Rate

		WACC				
USD	0.23	9.10%	9.60%	10.10%	10.60%	11.10%

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Perpetual Growth Rate	0.10%	USD	0.232	USD	0.244	USD	0.244	USD	0.232	USD	0.213
	0.60%	USD	0.240	USD	0.253	USD	0.253	USD	0.240	USD	0.220
	1.10%	USD	0.249	USD	0.263	USD	0.263	USD	0.249	USD	0.226
	1.60%	USD	0.259	USD	0.275	USD	0.275	USD	0.259	USD	0.234
	2.10%	USD	0.271	USD	0.288	USD	0.288	USD	0.271	USD	0.243

Table 5. Sensitivity Analysis: WACC – Growth Rate of PTBA

		WACC									
	USD 0.23	9.10%		9.60%		10.10%		10.60%		11.10%	
Growth Rate	6.70%	USD	0.241	USD	0.230	USD	0.220	USD	0.210	USD	0.202
	7.20%	USD	0.237	USD	0.226	USD	0.216	USD	0.207	USD	0.199
	7.70%	USD	0.237	USD	0.226	USD	0.216	USD	0.207	USD	0.199
	8.20%	USD	0.241	USD	0.230	USD	0.220	USD	0.210	USD	0.203
	8.70%	USD	0.249	USD	0.237	USD	0.227	USD	0.217	USD	0.208

Table 6. Sensitivity Analysis: Perpetual Growth Rate – Growth Rate of PTBA

		Perpetual Growth Rate									
	USD 0.23	9.10%		9.60%		10.10%		10.60%		11.10%	
Coal Price Growth	0.20%	USD	0.171	USD	0.175	USD	0.180	USD	0.185	USD	0.191
	0.70%	USD	0.173	USD	0.178	USD	0.182	USD	0.188	USD	0.194
	1.20%	USD	0.176	USD	0.180	USD	0.185	USD	0.191	USD	0.197
	1.70%	USD	0.178	USD	0.183	USD	0.188	USD	0.194	USD	0.200
	2.20%	USD	0.181	USD	0.186	USD	0.191	USD	0.197	USD	0.204

Table 7. Sensitivity Analysis: Perpetual Growth Rate – Coal Price Growth

		WACC									
	USD 0.23	9.10%		9.60%		10.10%		10.60%		11.10%	
Coal Price Growth	0.20%	USD	0.241	USD	0.230	USD	0.220	USD	0.210	USD	0.202
	0.70%	USD	0.237	USD	0.226	USD	0.216	USD	0.207	USD	0.199
	1.20%	USD	0.237	USD	0.226	USD	0.216	USD	0.207	USD	0.199
	1.70%	USD	0.241	USD	0.230	USD	0.220	USD	0.210	USD	0.203
	2.20%	USD	0.249	USD	0.237	USD	0.227	USD	0.217	USD	0.208

Table 8. Sensitivity Analysis Result Calculation

	Minimum		Actual		Maximum		Decrease		Increase	
Growth Rate of PTBA	USD	0.199	USD	0.226	USD	0.249	USD	0.027	USD	0.023
Perpetual Growth Rate	USD	0.212	USD	0.226	USD	0.288	USD	0.013	USD	0.062
WACC	USD	0.199	USD	0.226	USD	0.249	USD	0.027	USD	0.023
Coal Price Growth	USD	0.199	USD	0.226	USD	0.249	USD	0.027	USD	0.023

By describing the potential range and influence of the variables, Table 8 provides the necessary details for evaluating the variables. This includes minimum and maximum values and also increase and decrease values. The minimal value provides insight into the worst-case scenario or the most cautious prediction by representing the lowest possible value for a variable. On the other hand, the maximum value represents the upper limit of the variable, indicating the most significant value it can influence. Decreased values illustrate the variable's potential reduction or downside from its current value. Individuals may build strategies and make informed choices by completely understanding these variables, which enhances the analysis's use.

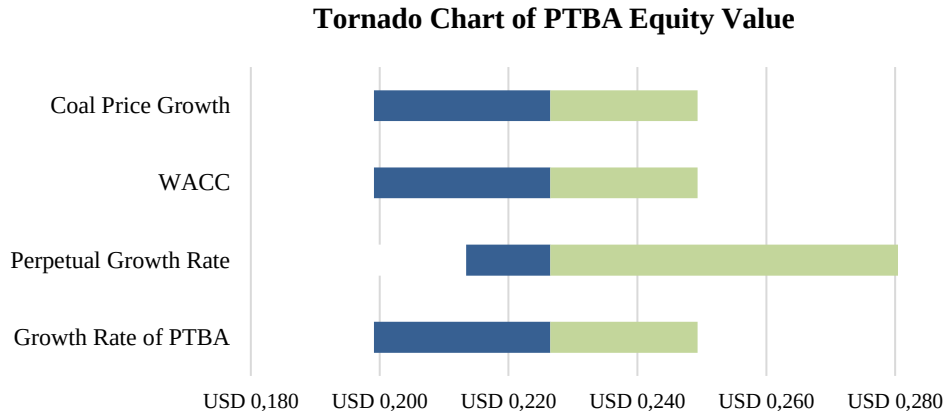

Figure 1. Tornado Chart of PTBA Equity Value

The sensitivity analysis of the equity value of PTBA is shown in Figure 1. The results show that the perpetual growth rate has the most effect, followed by coal price growth WACC and PTBA rate growth. The PTBA growth rate is less sensitive to the valuation of the PTBA company's performance. The perpetual growth reflects the rise and fall in the price of coal in specific periods. This rate represents the sustainable long-term growth a company is expected to maintain continuously. This rate for PTBA is closely linked to several factors, including global energy demand, regulatory changes, technological advances, and market dynamics.

Monte Carlo Simulations

The coal mining company has a risk mitigation challenge due to the policy's coal export ban, which took effect in January 2022. Monte Carlo simulation is the recommended methodology for this study's risk valuation of PTBA's stock price. Monte Carlo simulation is chosen for the ability to estimate various exposure sequences and risks, including non-linear price risk, volatility risk, and fixed model risk (Benito & Lopez, 2014).

This study uses the purposive sampling method to assess a selected number of historical data on PTBA stock prices between 2017 and 2022. The selection of the companies is based on a set of needs, such as the accessibility of stock prices and financial statements for the period in question. The primary dataset for this study is the PTBA daily stock price data, which consists of 1,322 observations gathered from January 2, 2017, to December 30, 2022.

Utilizing Microsoft Excel and Yahoo Finance quantitative data analysis techniques are used. The procedure entails calculating daily stock returns, their average and standard deviation, and then utilizing the computed parameters to run a Monte Carlo simulation 10,000 times. A confidence level for this study will use 95% for the simulation, which is important to the analysis.

Table 9. Monte Carlo Simulation Result

Expected		St. Dev.	
USD	0.19	USD	0.05
Simulation			
Stock Price		USD	0.12
Stock Price			
Mean		USD	0.19
St. Dev.		USD	0.05
Min		-USD	0.04
Max		USD	0.45
Skewness			0.01
Kurtosis			0.08

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Expected	St. Dev.	
Risk of Loss		0.30%
Value at Risk	USD	0.11
Value at Risk @100.000	USD	108.02

Table 9 shows the results of a Monte Carlo simulation used to determine the value of risk calculation. The study involved 10,000 simulations to determine the data's mean value and standard deviation. The results indicate that the mean value is US $0.19, with a standard deviation of US $0.05.

The calculation of volatility levels in stock prices can be achieved by using the standard deviation value. The research results indicate that greater volatility is related to increased price fluctuations and greater risk, as shown by the probability result. The analysis suggests significant fluctuations have distinguished the stock price's historical performance.

According to the results in Figure 2, the stock's performance can be measured by comparing its mean stock price of US $0.19 to its current stock price of US $0.12. A stock's potential upside or growth potential can be measured by examining the simulated mean price generated by simulations. If the simulated mean price rises above the current price, it indicates a potential increase in the stock's value. The data indicate the potential for a future increase in prices.

Risk assessment is essential to analyzing potential risks associated with stock prices. A common risk is the risk of loss and value at risk, which can provide valuable insights into the potential adverse risks. A value at risk (VaR) of US $0.11 indicates a 1% probability of having a loss more significant than this value. The analysis shows that the value at risk is significant, representing about 91.7% of the current stock price of US $0.12. It represents a significant proportion of the stock's overall value.

The research results indicate that the simulation stock prices show a diverse range of values, ranging from a minimum of -US $0.04 to a maximum of US $0.45. These values reflect the fluctuations in stock prices during the simulation period. The simulation revealed that the stock price reached a minimum of US $0.04, indicating a possible worst-case scenario. This information may be an essential reference point for further analysis. Assessing the root causes of low prices is essential for determining whether the value is short-term or warning signs of more significant issues.

The highest point of the stock price during the simulation was observed at the maximum value of US $0.45. The stock's growth potential and reach their highest price are influenced by favorable conditions, which can be analyzed through this value. Examining the variables contributing to a stock's upward trend can help investors assess the stock's potential for future expansion and the associated opportunities. Based on the simulation stock prices, the estimated maximum potential loss at a 95% confidence level is represented by the risk value of US $0.11. This metric indicates the hypothetical amount of financial loss that would be suffered if the initial investment were precisely US $100. The present study estimates the value at risk to be US $108.02.

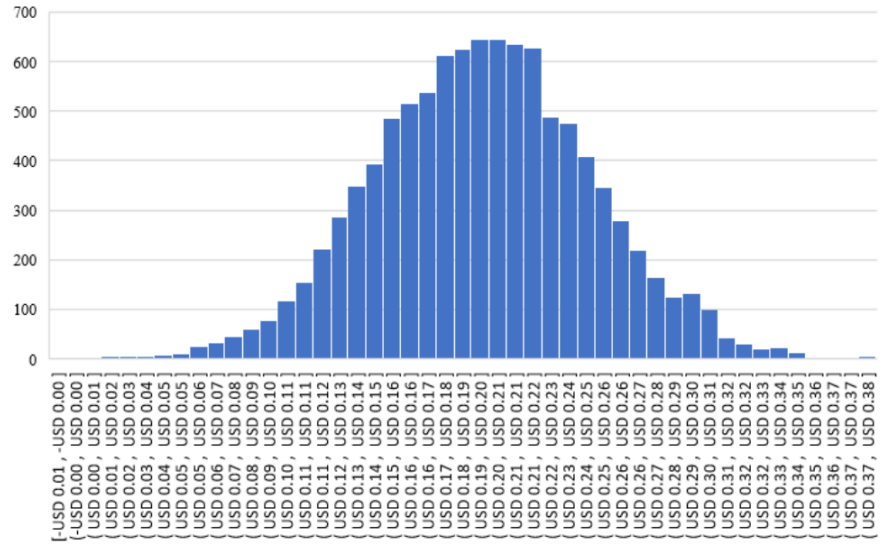

Figure 2. Frequency Distribution of Simulation Result

Based on the analysis of 10,000 simulations, a normal distribution with a bell-shaped curve was observed in the frequency distribution shown in Figure 2. According to the results, a skewness value of 0.01 can be utilized to identify a symmetrical distribution in stock prices. A skewness value close to 0 can define a relatively balanced distribution.

According to the simulation, a dataset showing a skewness value of zero indicates a comparatively symmetrical distribution. The balanced distribution with minimal skewness is indicated by the relatively spread-out data points around the mean, without a significant tendency for one tail to be longer or more substantial. Based on the simulation kurtosis value of 0.08, it can be concluded that the stock price distribution displays a slightly heightened peak compared to a standard normal distribution. According to the analysis, there is a greater probability of facing extreme price fluctuations than a standard distribution.

The calculation of value at risk with a mean of US $0.19 and maximum potential risk of US $0.45 investors may experience. Based on this calculation's result, it can be concluded that an investment of US $100 is associated with a maximum potential loss of $108.02 within 100 days, with a confidence level of 95%. The process of determining value at risk involves the assessment of potential losses that could be incurred throughout affecting market conditions or unanticipated events. The value at risk is often seen as a risk metric rather than an indicator of potential profit.

The coal mining industry faces considerable challenges due to implementation of the coal export ban policy in Indonesia. The restriction on coal export can potentially affect the growth and profitability of coal mining companies. Exploring alternative energy sources or developing into other sectors can help mitigate the risks of the coal export ban. In response to the challenges faced by the coal export ban in Indonesia, coal mining companies feel urged to explore new avenues and diversify their operations. The transition towards cleaner and more sustainable sectors can be helped by companies investing in alternative energy sources. The development of renewable energy conversion technology is essential to unlock the potential of clean energy sources and achieve the goal of zero carbon by 2050 (Kanugrahan et al., 2022).

Coal mining companies can adapt to the changing energy landscape and contribute to reducing greenhouse gas emissions by allocating resources toward developing renewable energy projects, such as solar, wind, geothermal, and hydro (Kanugrahan & Hakam, 2023).

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Investing in research and development for cleaner and more sustainable coal technologies can enable companies to adapt to changing regulations and market demands. The coal export ban in Indonesia requires that companies adapt and explore opportunities beyond coal. This emphasizes the importance of diversification and sustainable practices to mitigate risks and guarantee long-term growth.

CONCLUSION

The research aims to evaluate the intrinsic value of PTBA during the coal export ban in Indonesia and analyze the potential risks associated with the PTBA stock price. The equity value per share of PTBA is evaluated in this study using the DCF method. The research relies on specific assumptions, such as a growth rate of 7.70%, a perpetual growth rate of 1.10%, and a WACC rate of 10.10%. Based on the research results, it has been estimated that the equity value per share of PTBA is US $0.226 or Rp 3,293, with a margin of 0.40%.

The current PTBA stock valuation has been considered undervalued based on research analysis. The research findings suggest that the financial performance of PTBA is significantly impacted by the coal price growth, especially regarding stock valuation during specific events. Based on the Monte Carlo Simulation analysis results, it has been determined that the risk value of PTBA is US $0.12 with a 95% confidence level. The study conducted 10,000 simulations to determine the likelihood of experiencing a loss in which the investment price drops below its current value. The results indicate a calculated probability of 0.30%. The present study employed a hypothetical investment of US $100 thousand, with an initial value of US $108.02. According to the findings of the analysis, it appears that investing in PTBA stock may yield more significant benefits. The purchase of PTBA stock is suggested based on the company's current valuation.

To enhance and maintain the stock price of PTBA, which primarily owns by the Indonesian Government. Strengthening investor relations for PTBA can be accomplished through transparent communication and timely dissemination of information. The research indicates that maximizing environmental concerns can improve the company's reputation amidst climate change. The impact of a firm's stock price can be positively influenced by various factors such as strong financial performance, efficient operations, transparent corporate governance, and varied shareholder foundations.

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