

Valuation of PT Adaro Energy Tbk By Forecasting of Indonesian Coal Index Using Geometric Brownian Motion and Fiscal Impact of Indonesian Law 3 Year 2020

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Abstract

The coal price index movement, mostly the Indonesian Coal Index 3 (ICI 3), varies from \$37.6/ton to \$74.9 per ton from Jan 2012 to Dec 2019. This volatility drives uncertainty in the future of coal mining companies. Recently, the House of Representative Indonesia has legalized Law 3 Year 2020, enabling the first generation holder of Coal Contract of Works (CCOW) or Perjanjian Kerja Pengusahaan Pertambangan Batubara (PKP2B) to extend their contract until 2 x 10 years in the form of Special Business Mining License/ Ijin Usaha Pertambangan Khusus (IUPK). Law 3 Year 2020 also impacts financial performance since the fiscal policy change in value-added tax, royalty, and corporate tax tends to raise the government's earnings. Law No 3 Year 2020 gives an additional 10% portion of earnings after-tax implemented as well.

This study aims to access the possibility of the Indonesian Coal Index (ICI3) movement in the next five years using Geometric Brownian Motion and compare the difference between before and after implementation of Law 3 Year 2020. The authors have simulated one thousand scenarios of five years' movements with the random normal distribution. The result shows that the enterprise value of ADRO is reduced by 12.4% from \$5,680 million to \$4,976 million. This result implies that ADRO should anticipate enterprise value reduction by efficiency program or strategic business expansion.

Keywords

ADRO, Brownian, coal, ICI3, valuation

1. Introduction

The Coal mining company in Indonesia, especially first-generation holders of Coal Contract of Works (CCOW) or Perjanjian Karya Pengusahaan Pertambangan Batubara (PKP2B), faces two significant challenges in the future. First is the fluctuation of the coal price and the Law 3 Year 2020 impact.

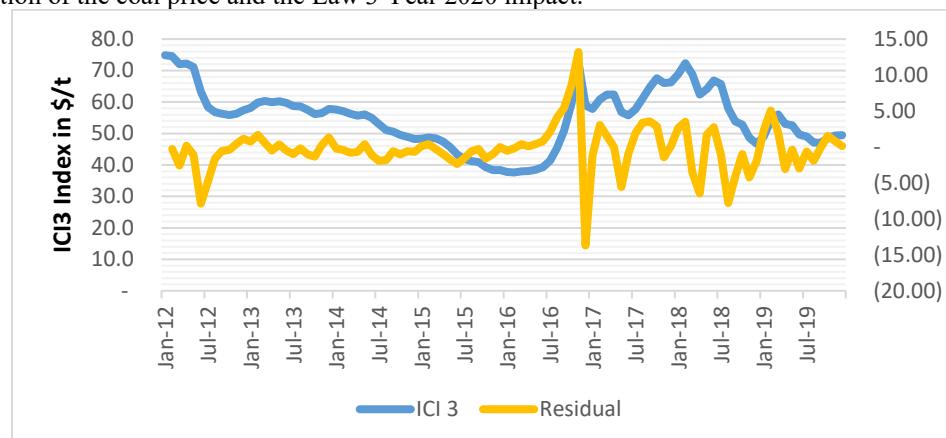


Figure 1 Historical Indonesia Coal 3 Index and % Change

PT Adaro Energy Tbk (ADRO) has pillar Adaro mining, which has subsidiary PT Adaro Indonesia. PT Adaro Indonesia is a first-generation holder CCOW that the contract will ends on 1 Oct 2022. According to Law 3 Year 2020 article 83 verse f statement that Metal Mineral or Coal Production activities can be granted a maximum period of 20 (twenty) years and guaranteed to get an extension of 2 (two) times each 10 (ten) years after fulfilling the requirements of Law and regulations. Of course, as the government's mission to increase the revenue of the government. Law 3 Year 2020 also gives financial impact that will increase government revenue and increase the coal company's cost. Base on the Directorate General of Mineral and Coal Performance Report 2019, the fiscal implications for the implementation of the Law 3 Year 2020 are:

Table 1 Law 3 Year 2020 fiscal impact

No	Description	Before	After
1	Royalty/DHPB	13.5%	15.0%
2	Property and regional tax	lump sum	prevailing
3	PBBKB 7.5%	Reimburse	Not Applicable
4	Sales Tax	max 5%	PPN Prevailing 10%
5	Corporate Tax	45.0%	Prevailing 25%
6	10% EAT	Not Applicable	10% EAT applied

This research aims to determine how is the impact of coal price fluctuation and Law 3 Year 2020 influences the business valuation of ADRO both in enterprise value and intrinsic equity value per share. The authors take ADRO as a case study because 1) ADRO is through PT Adaro Indonesia is the holder of CCOW, 2) ADRO is a public listed company and member of LQ45 that state member of one of the most liquid companies in Indonesia 3) ADRO is vertically integrated energy producer in Indonesia. The valuation method uses a discounted cash flow model, and the forecast method uses a Geometric Brownian Motion.

2. Literature Review

2.1 Geometric Brownian Motion

Geometric Brownian Motion is the continuous-time stochastic process:

$$X(t) = z_0 \exp(\mu t + \sigma W(t)) \quad (1)$$

Where $W(t)$ is a standard Brownian Motion. Most economists prefer Geometric Brownian Motion (GBM). The relative change is a combination of a deterministic proportional growth term similar to inflation or interest rate growth or driver parameter plus a normally distributed random change.

$$\frac{dX}{X} = r dt + \sigma dW \quad (2)$$

A random variable X is said to have the lognormal distribution (with parameters μ and σ). If the primary object is the Geometric Brownian Motion stated in equation (21), then by Ito's formula, the Stochastic Differential Equation (SDE) satisfied by this stochastic process is (Dunbar, Steven R.,2009):

$$dX = \left(\mu + \left(\frac{1}{2} \right) \sigma^2 \right) X(t)dt + \sigma X(t)dW \quad (3)$$

2.2 Discounted Cash Flow

Discounted Cash Flow (DCF) Analysis is an intrinsic value approach where the value of asset is the present value of the expected cash flows on the asset, discounted back at a rate that reflects these cash flows' riskiness.

$$\text{Value of asset} = DCF \text{ for forecastable periods} + DCF \text{ of terminal value} \quad (4)$$

While DCF for a forecastable period can be expressed by:

$$DCF \text{ for forecastable periods} = \sum_{t=0}^{t=n} \frac{\text{Free Cash Flow } t}{(1+r)^t} \quad (5)$$

Where:

Free Cash Flow t	= Free cash flow base on t period
n	= number of forecastable periods
r	= discount rate/ WACC

For the DCF of terminal value author can calculate with the formula below:

$$DCF \text{ for terminal value} = \frac{Free \text{ Cash Flow } n \times (1 + g)}{(r - g)} \quad (6)$$

Where:

Free Cash Flow n = Free cash flow base on period n
n = terminal year of the projection period
g = perpetuity of growth rate
r = discount rate/ WACC

Author can obtain Free Cash Flow by formula below:

$$\begin{aligned} Free \text{ Cash Flow} = & EBIT \times (1 - Tax \text{ Rate}) \\ & + Depreciation \text{ and Ammortization} \\ & - Changes \text{ in Working Capital} \\ & - Capital \text{ Expenditure} \end{aligned} \quad (7)$$

Discount rate/ WACC formula can be expressed as below:

$$WACC = (Wd \times rd(1 - T)) + (We \times re) \quad (8)$$

Where:

Wd = Proportion of debt
rd = Cost of debt
T = Tax rate
We = Proportion of Equity
Re = Cost of Equity

3. Methodology

In this study, Indonesian coal index 3 (ICI3) is forecasted using geometric Brownian motion. One thousand five years' movement of ICI 3 is simulated and entered into financial model both before implementing the Law and after implementation of the Law to determine the business valuation. The simulations represent all possible scenarios that may happen in the future. There will be one thousand results of the business valuation, and authors do the histogram to determine the results' probability.

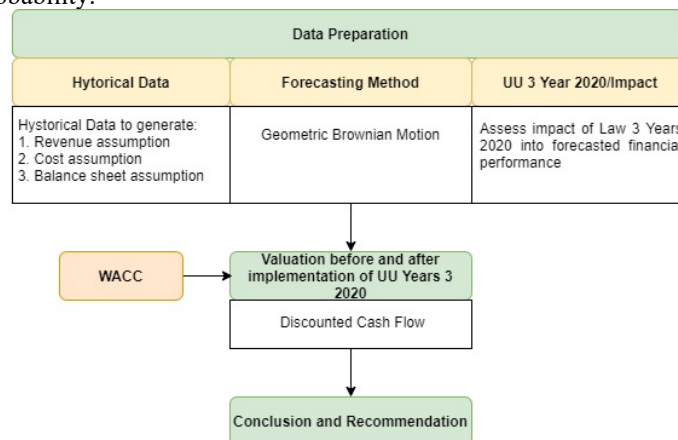


Figure 2 Research Method

4. Data Collection

The historical data was taken from ADRO annual report (Appendix 1 & 2). A general assumption was generated in cost, Capex, dividend, interest, and other assumptions. Table 2 shows the general assumption used for the valuation model with the difference between before implementation and after implementation of Law 3 Year 2020 (red highlighted assumption).

Table 2 General Assumption

Description	Units	2020E	2021E	2022E	2023E	2024E	Remarks
Impact of Law 3 Year 2020							
Difference between sales tax and VAT	%	0.0%	0.0%	0.0%	7.5%	7.5%	Law 3 Year 2020 impact, start 2023
PKP2B Tax	%	45.0%	45.0%	45.0%	25.0%	25.0%	Law 3 Year 2020 impact, start 2023
Corporate Tax	%	25.0%	25.0%	25.0%	25.0%	25.0%	Law 3 Year 2020 impact, start 2023
ADRO Effective Tax Rate	%	34.0%	34.0%	34.0%	25.0%	25.0%	Effective Tax Rate 2019
Royalty	%	13.5%	13.5%	13.5%	15.0%	15.0%	Law 3 Year 2020 impact, start 2023
Effective Royalty	%	12.1%	12.1%	12.1%	13.4%	13.4%	Law 3 Year 2020 impact, start 2023
Royalty Performance	%	89.5%	89.5%	89.5%	89.5%	89.5%	Effective Royalty 2019
10% EAT Portion	%	0.0%	0.0%	0.0%	10.00%	10.0%	Law 3 Year 2020 impact, start 2023
Operation Parameter							
Coal Production	million tons	56.0	57.6	59.2	60.8	62.5	-
Coal Sales	million tons	56.0	57.6	59.2	60.8	62.5	ADRO 2019 Annual Report p 36
OB	million bcm	240.8	247.5	254.5	261.6	268.9	-
SR	x	4.3	4.3	4.3	4.3	4.3	ADRO 2019 Annual Report p 36
Coal Assumption							
ICI3 Index	\$/t	48.8	45.8	42.7	39.6	36.5	Geometric Brownian Motion
Average Selling Price	\$/t	51.9	48.6	45.4	42.1	38.8	calculation
ASP to ICI3 Index	%	106.3%	106.3%	106.3%	106.3%	106.3%	2019 price recovery
Income Statement							
Sales Growth	%	2.8%	2.8%	2.8%	2.8%	2.8%	Inflation based
Adaro Portion	%	97.2%	97.2%	97.2%	97.2%	97.2%	Average 5 years
Mining Service Revenue Growth	%	6.1%	6.1%	6.1%	6.1%	6.1%	Actual 2019 y-0-y growth
Other Revenue Growth	%	4.9%	4.9%	4.9%	4.9%	4.9%	Actual 2019 y-0-y growth

From the table 2, we see that difference between sales tax (2.5% on assumption) with value added tax (10%) is 7.5% as assumption on cost escalation., Corporate tax will be reduced from 45% to 25%, royalty will increase from 13.5% to 15.0%. Since the royalty calculation is based on:

$$\text{Royalty} = (\text{sales} - \text{transportation cost after its last owned facility}) \times 15\% \quad (9)$$

And in 2019, the effective royalty is 12.1%, we can assume the ratio is 12.1% /13.5% which is equal to 89.5%. Using this 89.5% multiplied by new royalty tariff 15.0%, the result is 13.4% for new effective royalty.

Coal Production and coal sales are assumed in same number, while stripping ratio is assumed well maintained base on ADRO 2019 annual report in 4.3 bcm/ton.

5. Results and Discussion

5.1 Geometric Brownian Motion Forecast

Using a spreadsheet, the authors generated 1000 scenarios of 5 years forecasted ICI 3 that determine the revenue and cash flow of the ADRO in the future.

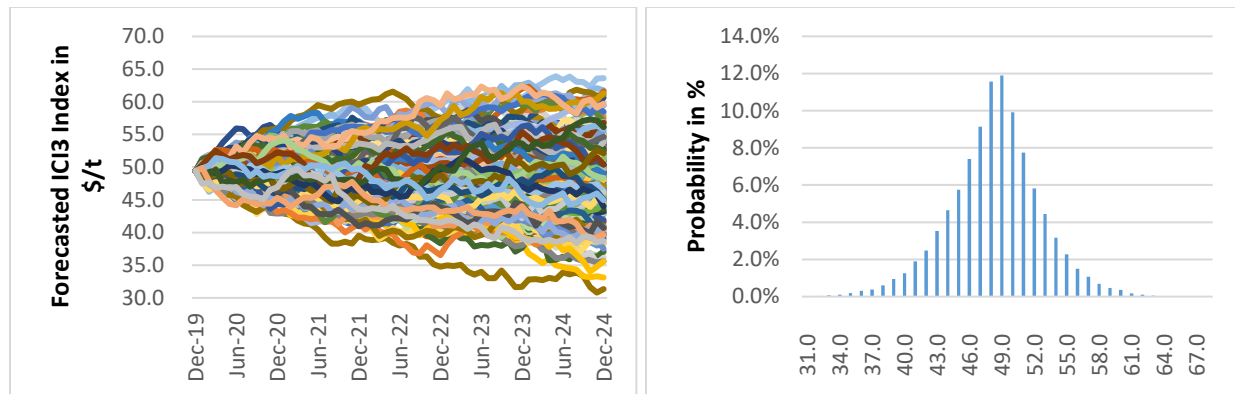


Figure 3 Forecast simulation using Geometric Brownian Motion (left) and its histogram (right)

Figure 3 left picture shows one thousand normal distributed random generated forecasts of ICI 3 price. The proof of normal distributed random is expressed in figure 3 right picture with highest probability at \$49.0 per ton for 11.9%. Each of scenario are then simulated into model and the result will be discussed in next session.

5.2 Enterprise Value and Intrinsic Equity Value Per Share

The simulation shows that after the implementation of Law 3 Year 2020, the enterprise value and intrinsic value of equity experience reduction compare to before elimination.

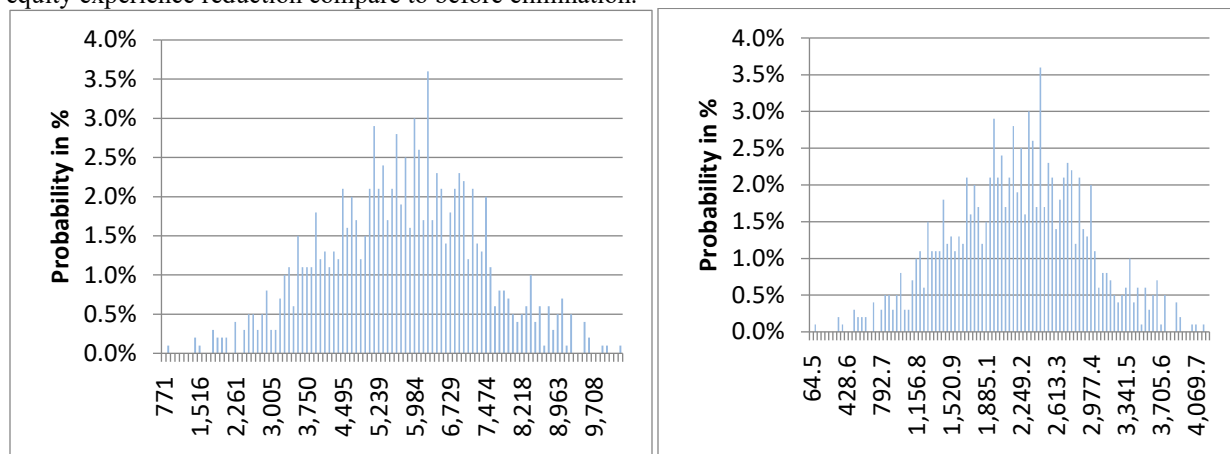


Figure 4 Value distribution before the implementation of Law 3 Year 2020 : (a) left: the enterprise value in \$ million
(b) right: the intrinsic value of equity per share in IDR/share

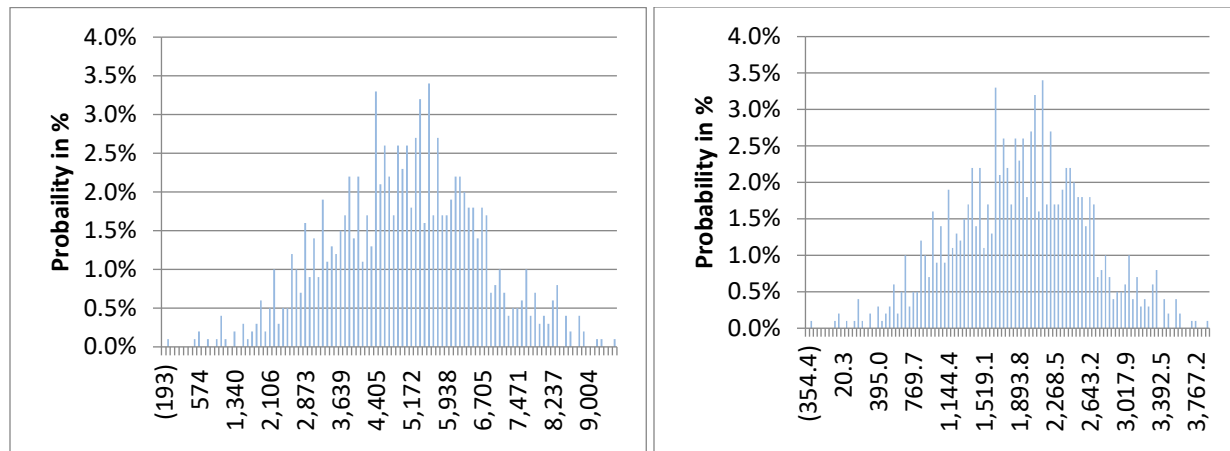


Figure 5 Value distribution after implementation of Law 3 Year 2020 : (a) left: the enterprise value in \$ million (b) right: the intrinsic value of equity per share in IDR/share

As we see in figure 4, before implementation, the enterprise value has an average at \$ 5,680 million, maximum value \$ 10,173 million, and minimum value \$ 864 million. While, after implementation, the enterprise value has an average at \$ 4,976 million, maximum value \$ 9,483 million, and minimum value \$ -97 million.

In figure 5, before implementation, the ADRO's intrinsic value of equity has an average at IDR 2,197.9 per share, maximum value IDR 4,150.6 per share, and minimum value IDR 105.0 per share. While, after implementation, the intrinsic value of equity has an average at IDR 1,892.0 per share, maximum value IDR 3,850.5 per share, and negative minimum value.

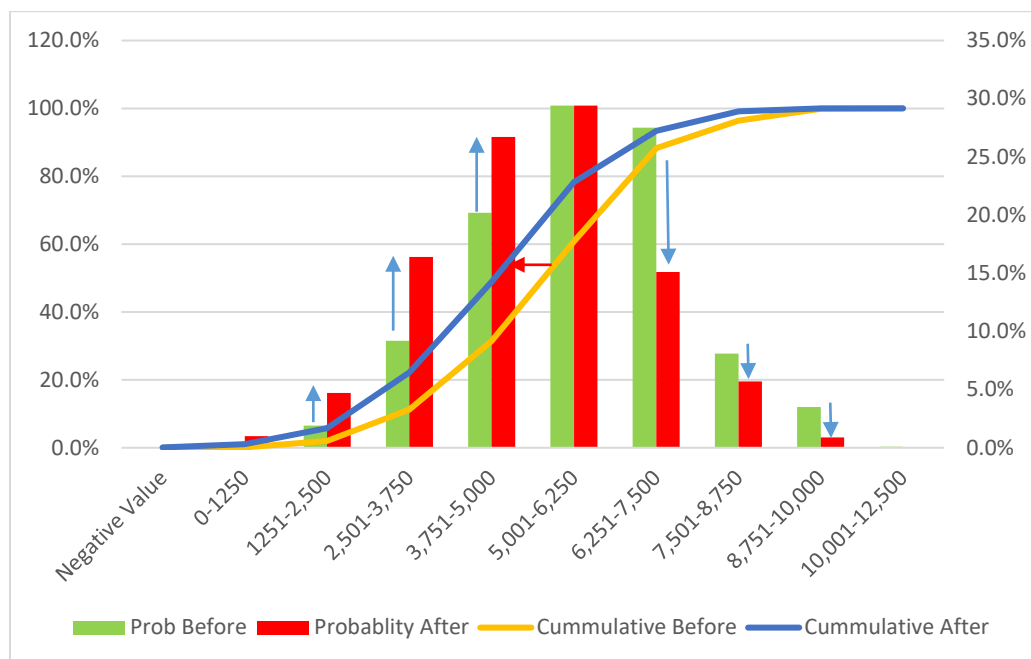


Figure 6 Percentile (right axis) and cumulative (left axis) probability Enterprise value of ADRO

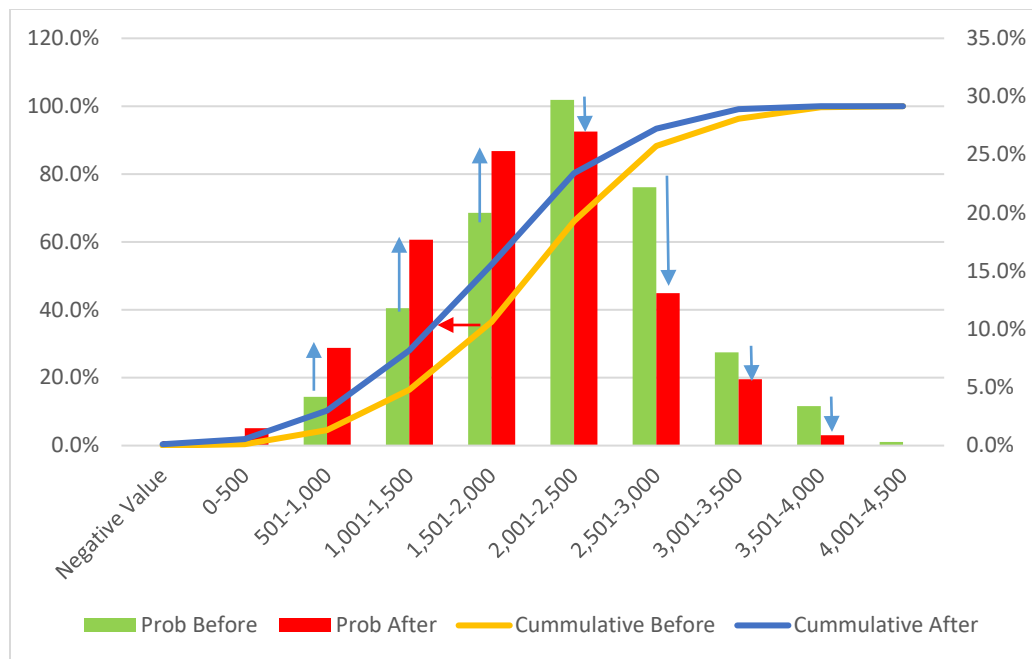


Figure 7 Percentile (right axis) and cumulative (left axis) probability intrinsic value per share of ADRO

Figure 6 and 7 show the movement from before implementation to after implementation. In the high tier value, the movement tends to low, and the low tier value, the movement tends to go high. It means overall, the impact of Law No 3 Year 2020 impact lower result both in the enterprise value and the intrinsic value of equity.

The summary of explanation can be expressed below :

Table 3 Summary of Valuation

No	Description	Units	Base Case	Best Case	Low Case
<u>Before Implementation of Law</u>					
1	Enterprise value	\$ million	5,680	10,173	864
2	Intrinsic value of equity / share	\$/share	2,197.9	4,150.6	105.0
<u>After Implementation of Law</u>					
1	Enterprise value	\$ million	4,976	9,483	(97)
2	Intrinsic value of equity / share	\$/share	1,892.0	3,850.5	(312.8)
<u>Variation</u>					
1	Enterprise value	%	-12.4%	-6.8%	-111.2%
2	Intrinsic value of equity / share	%	-13.9%	-7.2%	-397.9%

6. Conclusion

It is clear that the Law 3 Year 2020 impacts on value of coal mining Indonesia, but for Indonesian government, Law 3 Year 2020 impact on its national revenue. Based on analysis above, the enterprise value will reduce 12.4% for base case scenario, 6.8% for best case scenario, and 112.2% for low case scenario. While for intrinsic value of equity per share will reduced 13.9% for base case, 7.2% for best case, 397.9% for low case. Coal company in Indonesia, especially first holder of Coal Contract of Works (CCOW) such as ADRO as case study, should put attention while their contract will endt at year 2023. Efficiency program, operational excellence, and business expansion outside coal mining business is the alternatives long term solution to management to maintain its firm value or even maximize it.

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Biography

Idam Faisal Rahman is MBA candidate from School of Business and Management Institut Teknologi Bandung and financial planning professional who has experience for more than ten years. He earned undergraduate in Electrical Engineering Institut Teknologi Sepuluh Nopember Surabaya majoring in electronic engineering. After graduation, he worked as electrical engineering, maintenance planning, project planning, and recently as financial planning at PT Berau Coal. His interest is in financial, programming, automation, and forecasting. He also obtained designation as Professional Financial Modeller from International Financial Modelling Institute.

Yunieta Anny Nainggolan is Head of Master and Doctoral Science in Management Program School of Business & Management Institut Teknologi Bandung. Mrs. Nainggolan holds a Bachelor of Economics degree (majoring Finance) in University of Indonesia, a Master of Commerce in Finance from University of Melbourne, and PhD in Finance from Queensland University of Technology. Her research interest is in fund management, socially responsible investment, Islamic finance, disclosure and reporting, corporate finance.

Appendix

Appendix 1 Historical Income Statment of PT Adaro Energy Tbk

Description	Units	2011A	2012A	2013A	2014A	2015A	2016A	2017A	2018A	2019A
Revenues	million \$	3,987.4	3,722.5	3,285.1	3,325.4	2,684.5	2,524.2	3,258.3	3,619.8	3,457.2
Cost of Goods Sold	million \$	(2,559.0)	(2,679.9)	(2,541.0)	(2,605.7)	(2,141.2)	(1,839.0)	(2,116.8)	(2,409.5)	(2,492.6)
Gross Profit	million \$	1,428.4	1,042.6	744.2	719.7	543.3	685.3	1,141.5	1,210.2	964.6
Operating Expense	million \$	(144.8)	(173.1)	(173.1)	(163.2)	(133.0)	(151.2)	(183.7)	(194.0)	(232.6)
Other Expense Net	million \$	(152.4)	(33.2)	(31.8)	(66.7)	(78.4)	53.5	(6.0)	(124.3)	(114.5)
EBIT (Operating Profit)	million \$	1,131.2	836.4	539.3	489.8	331.9	587.6	951.8	891.9	617.5
Interest	million \$	(119.8)	(118.3)	(116.6)	(189.7)	(60.8)	(50.0)	(53.0)	(65.1)	(66.3)
Finance income	million \$	6.7	11.1	16.1	25.3	11.9	9.1	18.7	23.6	28.3
Share in net profit/(loss) of joint venture	million \$	(15.6)	(15.4)	(14.6)	(3.7)	(3.0)	(0.2)	12.0	(29.4)	79.6
Income Before Taxes	million \$	1,002.6	713.7	424.3	321.6	280.0	546.5	929.5	821.0	659.1
Taxes	million \$	(450.5)	(330.4)	(192.3)	(138.4)	(129.0)	(205.8)	(393.1)	(343.5)	(224.1)
Net Income	million \$	552.1	383.3	232.0	183.2	151.0	340.7	536.4	477.5	435.0
Net Income after 10% EAT	million \$	552.1	383.3	232.0	183.2	151.0	340.7	536.4	477.5	435.0
Other Comprehensive Income/ (Loss)	million \$	7.40	(1.56)	(3.85)	(34.84)	25.39	41.08	(18.31)	(8.93)	(47.49)
Total Comprehensive Income	million \$	559.5	381.7	228.1	148.4	176.4	381.8	518.1	468.6	387.5
Profit For The Year attributable to:										
Owners of the parent entity	million \$	550.4	385.3	234.0	177.9	152.4	334.6	483.3	417.7	404.2
Non Controlling Interest	million \$	1.7	(2.0)	(2.0)	5.3	(1.4)	6.1	53.1	59.8	30.8
Net Income	million \$	552.1	383.3	232.0	183.2	151.0	340.7	536.4	477.5	435.0
Total Comprehensive Income For The Year attributable to:										
Owners of the parent entity	million \$	557.8	383.8	228.8	145.7	178.9	374.5	465.3	410.9	354.7
Non Controlling Interest	million \$	1.7	(2.0)	(0.7)	2.7	(2.5)	7.3	52.8	57.8	32.9
Total Comprehensive Income	million \$	559.5	381.7	228.1	148.4	176.4	381.8	518.1	468.6	387.5

Appendix 2 Historical Balance Sheet of PT Adaro Energy Tbk

Description	Units	2011A	2012A	2013A	2014A	2015A	2016A	2017A	2018A	2019A
ASSETS										
Current Assets:										
Cash	million \$	558.9	500.4	680.9	745.2	702.5	1,076.9	1,206.8	927.9	1,576.2
Restricted Time Deposit	million \$	0.1	-	0.4	-	0.4	0.0	0.0	0.0	-
Available For Sales Financial Asset	million \$	-	-	-	-	-	-	247.0	89.1	6.3
Trade and Other Receivables	million \$	471.3	474.0	309.6	285.6	195.7	300.7	314.7	370.9	310.3
Inventories	million \$	52.4	64.5	102.7	96.7	72.8	73.4	85.5	112.0	121.0
Other Current Asset	million \$	214.8	375.0	277.3	144.1	121.2	141.6	125.1	100.3	96.1
Total Current Assets	million \$	1,297.5	1,413.9	1,370.9	1,271.6	1,092.5	1,592.7	1,979.2	1,600.3	2,109.9
Non-Current Assets:										
Restricted Time Deposit	million \$	0.8	0.8	0.6	1.2	2.0	3.1	8.1	15.6	25.0
Available For Sales Financial Asset	million \$	65.7	-	-	-	-	-	6.8	14.9	45.4
Investment In Joint Venture	million \$	395.8	393.6	402.0	395.6	327.5	46.7	45.8	576.9	685.2
Mining Properties	million \$	1,255.0	1,927.5	2,186.8	2,098.6	2,027.0	2,436.6	2,355.3	2,296.7	1,534.2
Fixed Asset	million \$	1,432.3	1,769.0	1,705.8	1,616.6	1,467.1	1,544.2	1,506.6	1,609.7	1,722.4
Goodwill	million \$	1,005.5	1,022.2	920.3	903.6	903.6	793.6	793.6	793.6	776.9
Other Non Current Asset	million \$	206.4	165.3	109.6	126.7	139.1	105.4	118.8	153.0	318.0
Total Non Current Assets	million \$	4,361.4	5,278.4	5,325.1	5,142.2	4,866.1	4,929.5	4,835.0	5,460.5	5,107.2
TOTAL ASSETS	million \$	5,659.0	6,692.3	6,696.0	6,413.9	5,958.6	6,522.3	6,814.1	7,060.8	7,217.1
LIABILITIES AND SHAREHOLDERS' EQUITY										
Current Liabilities:										
Trade and Other Payables	million \$	388.3	352.7	327.0	351.1	196.4	207.8	279.2	341.8	335.5
Accrued Expense	million \$	39.2	35.5	44.8	24.9	28.4	29.0	37.4	52.2	60.7
Dividend Payable	million \$	-	35.2	40.0	30.1	35.2	70.9	111.8	83.8	158.4
Royalty Payable	million \$	132.4	128.4	117.0	44.8	43.4	42.0	31.3	8.5	39.6
Current Maturity of Long Term Borrowing	million \$	-	-	-	-	-	-	-	-	-
Finance Lease	million \$	35.7	31.6	32.3	32.2	29.3	30.9	35.6	37.4	42.9
Bank Loan	million \$	102.5	268.4	155.6	160.5	93.6	122.9	201.2	182.7	506.1
Income Taxes Payable	million \$	69.6	40.6	37.5	47.7	13.1	119.0	56.7	82.9	58.6
Other Current Liabilities	million \$	11.4	6.7	19.5	83.2	15.2	22.1	20.2	27.2	30.8
Total Current Liabilities:	million \$	779.2	899.2	773.7	774.6	454.5	644.6	773.3	816.4	1,232.6
Non-Current Liabilities:										
Loans From Third Party	million \$	-	-	47.5	-	15.5	15.5	15.9	13.4	9.0
Long Term Borrowing:	million \$	-	-	-	-	-	-	-	-	-
Finance Lease	million \$	39.6	58.8	789.9	74.3	45.4	39.2	49.6	125.3	111.0
Bank Loan	million \$	1,139.5	1,298.1	1,827.3	1,613.4	1,383.5	1,241.2	1,090.8	1,072.5	551.6
Senior Notes	million \$	787.3	788.5	-	-	-	-	-	-	734.0
Other Non Current Liabilities	million \$	471.2	652.5	83.4	692.0	706.6	795.9	792.9	730.4	595.4
Total Non Current Liabilities:	million \$	2,437.5	2,798.0	2,748.1	2,379.8	2,151.1	2,091.8	1,949.2	1,941.6	2,001.1
Shareholder's Equity:										
Common Stock	million \$	342.9	342.9	342.9	342.9	342.9	342.9	342.9	342.9	342.9
Additional Paid-In Capital	million \$	1,154.5	1,154.5	1,154.5	1,154.5	1,154.5	1,154.5	1,154.5	1,154.5	1,154.5
Others	million \$	-	-	-	-	-	7.1	4.1	0.5	0.6
Retained Earnings	million \$	942.0	1,066.7	1,196.8	1,310.9	1,387.0	1,627.6	1,966.7	2,161.3	2,288.6
Other Comprehensive Gain/(Loss)	million \$	(3.6)	(5.1)	(10.3)	(40.7)	(18.6)	14.3	0.0	(8.8)	(56.6)
Total Shareholders' Equity attributable to	million \$	2,435.9	2,559.0	2,684.0	2,767.6	2,865.9	3,146.5	3,468.3	3,650.4	3,730.1
Non Controlling Interest	million \$	6.4	436.1	490.2	491.9	487.2	639.4	623.4	652.3	253.3
Total Shareholders' Equity	million \$	2,442.2	2,995.1	3,174.2	3,259.5	3,353.0	3,785.9	4,091.6	4,302.7	3,983.4
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	million \$	5,659.0	6,692.3	6,696.0	6,413.9	5,958.6	6,522.3	6,814.1	7,060.8	7,217.1

Appendix 3 Historical Indonesian Coal Index 3 in \$/t

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	74.9	74.6	72.0	72.2	71.1	63.2	58.4	56.8	56.2	55.8	56.3	57.4
2013	58.1	59.8	60.4	59.9	60.2	59.7	58.8	58.6	57.5	56.2	56.5	57.8
2014	57.5	57.1	56.3	55.6	56.0	54.9	53.0	51.1	50.6	49.5	48.9	48.3
2015	48.4	48.8	48.4	47.5	45.7	43.3	41.8	41.2	40.9	39.3	38.3	38.3
2016	37.8	37.6	38.0	38.1	38.5	39.3	41.3	45.4	50.8	59.4	72.6	58.9
2017	57.8	60.8	62.3	62.3	56.8	55.8	57.7	61.1	64.7	67.5	66.1	66.2
2018	68.9	72.4	68.8	62.4	64.1	66.8	65.8	58.0	53.8	52.8	48.6	46.7
2019	49.0	54.1	56.1	53.0	52.6	49.6	49.0	47.1	47.0	48.5	49.3	49.4

