

COMMERCIAL PERSPECTIVE OF INDIAN COAL INDUSTRY: A DESCRIPTIVE ANALYSIS

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Abstract

The paper discussed the financial performance and trade scenario of the coal industry in India. It has been found that India is traditionally a coal-producing country. India is a leading coal-producing and consuming country. Odisha, Chhattisgarh, Jharkhand, and Madhya Pradesh are the leading coal-producing states. Production of non-coking and coking coal has increased in the last ten years. Coal India Limited is the leading coal-producing company. Import and value of coking coal, non-coking coal, and coke & coal products are increasing continuously. India imports large quantities of coal due to the rising coal demand in the steel and power industries. Exports of non-coking and coking coal from India are not stable and declined in certain periods due to external factors. India exports coal to South Asian countries. Telangana, Jharkhand, Odisha, and Chhattisgarh are the highest royalty-receiving states from coal mining. The import quantity of non-coking and coking coal in India is higher than the export quantity. Therefore, the government should implement suitable policies for increasing the production of coal and reducing the dependence on imports of coal from other countries. It will increase the sustainability as well as the financial performance of coal-producing Indian companies.

Keywords: Coal industry, Export, Import, Revenue and Trade.

INTRODUCTION

Coal has long history in India. It is a part of our rural life. It is mostly made up of a dark mix of different polymers and organic materials. The youngest form of coal, known as Lignite, is brown in colour and has a relatively low energy content. As coal matures, it transforms into darker types like bituminous and anthracite coals, which are black in appearance (Mehta, 2019). Coal is generally classified into four main types: Lignite, Sub-bituminous, Bituminous, and Anthracite. Anthracite, often referred to as "hard coal," and is of particularly high quality due to its high fixed carbon content, making it one of the most energy-dense forms of coal (Jain, 2021). Among these types, bituminous coal is in higher demand for the electricity production because of its favourable heating properties, while sub-bituminous coal, which has a lower-to-moderate heating value, is primarily used in steam-electric power generation (Indhushree & Shiva, 2020).

Another important category of coal is metallurgical coal, also known as coking coal, which plays a critical role in steel production. Metallurgical coal is in high demand for steel plants due to the unique properties that enable it to form coke, a key material in the steel-making process. This type of coal is further classified into several categories based on its specific characteristics and applications: Pulverised coal for injection (PCI) coal, semi-soft coking coal, medium coking coal, and hard coking coal. Each subtype serves different purposes in metallurgical processes, with hard-coking coal being particularly valuable in the steel industry due to its superior strength and carbon content (Singh, 2022).

India's estimated coal reserve stands at approximately 378.21 billion tonnes, making it one of the largest reserves in the world (Pai & Zerriff, 2021). Jharkhand has the biggest coal deposits in the country, with Odisha and Chhattisgarh coming right after. These states play a pivotal role in meeting the nation's coal requirements, which is a critical input for both industrial operations and energy generation. On a global scale, countries such as Indonesia, Australia, Russia, the United States of America (USA), and South Africa dominate coal exports, supplying vast quantities of coal to meet the energy demands of various nations across the world (Sain, 2018).

Conversely, countries like Japan, India, China, Taiwan, and South Korea are leading coal-importers, relying heavily on imported coal to fuel their industries and power plants. Coal is essential to these nations for powering their industrial activities and ensuring energy security in their growing economies (Jain, 2008). However, despite its critical role in energy production, coal usage comes with severe environmental repercussions. The burning of coal for energy production is a major contributor to air and water pollution, as well as greenhouse gas emissions. These emissions significantly exacerbate climate change, contributing to some of the most devastating environmental impacts globally. Recognising these concerns, many countries have begun to impose strict regulations and restrictions on coal usage to mitigate the environmental footprint (Sharma, 2018). The shift toward cleaner and

more sustainable energy sources is becoming more prominent as nations strive to balance energy needs with environmental preservation.

RESEARCH OBJECTIVES:

The general objective of this article is to study the financial performance and trade scenario of the coal industry in India. The specific objectives of this paper are:

- (a) To study the growth and progress of coal production in India.
- (b) To examine the despatch of coal to thermal power and coal consumption in India.
- (c) To identify the import and export of coal, coke and other coal products of India.
- (d) To study the royalty of coal-producing states from coal mining in India, and
- (e) To analyse the production and revenue from coal of Coal India Limited.

MATERIALS AND METHODS:

The Study Area

India gained Independence from the United Kingdom (UK) on 15th August 1947. India has an international border with other SAARC countries. India is in the neighbourhood with Maldives and Sri Lanka in the Indian Ocean. Hindi and English are the official languages. The nation has 3,287,263 km² of geographical land and 1.21 billion populations according to the Census 2011. New Delhi is the capital and largest city. Hinduism is the largest religion followed by Islam and Christianity. It is a federal structure having territories and states. The Indian rupee is the currency of the country.

Hypothesis of the Study:

Based on the objectives of the paper, the following hypothesis has been prepared.

H₀₁: There is no relation between the production and revenue of Coal India Limited.

H_{1a}: There is a relation between production and revenue of Coal India Limited.

Designs and Approach:

It is a descriptive study utilising qualitative and quantitative approaches. Secondary data for the study has been collected from the website of the Ministry of Coal, Government of India, reports of international agencies, and research papers. To reveal the trade of coal products in India in general and export/import perspectives in particular, descriptive analysis, content text analysis, and regression analysis have been performed.

Method of Analysis:

There are two variables in a simple regression study between the production of coal by Coal India Limited (CIL) and its revenue. Its production is the dependent variable and its revenue is the independent variable. Regression analysis is calculated on information on the production and revenue of CIL during 2016-17 to 2023-24.

RESULTS AND DISCUSSIONS:

Coal mining generates income for the nation. The Indian Government earns through the District Mineral Foundation, National Mineral Exploration Trust, and Royalties. Coal India Limited is a state-running coal mining company. The Revenue of Coal India Limited was 839.48 billion Indian rupees ₹1502.93 billion Indian rupees in 2016 and 2024 respectively. India's import dependency on coal is decreasing, but still it is quite high (Indhushree & Shiva, 2020).

Table 1: Globally Leading Coal Producing Countries, 2023

Country	Quantity	Country	Quantity
China	4705	South Africa	222
India	1045	Kazakhstan	109
Indonesia	752	Germany	102
United States	528	Poland	89
Australia	439	Turkiye	66
Russia	429	Colombia	57

Source: World Energy and Climate Statistics- Yearbook 2024, Note: Quantity in Million Metric Tonnes,

Website: <https://yearbook.enerdata.net/coal-lignite/coal-production-data.html>

Table 1 talks about the top coal-producing countries. It's found that China, India, and Indonesia are the main producers. In China, the top coal-producing provinces are Shaanxi, Shanxi, and Inner Mongolia. In Indonesia, the main coal-producing areas are Kalimantan and Sumatra. In South Africa, the majority of coal mines are located in Limpopo, Mpumalanga, KwaZulu-Natal, and the Free State. In Kazakhstan, the largest coal mines are Bogatyr Komir, Vostochny, Shubarkol, Severny, and Molodezhny. In Germany, the Rhenish, Lusatian, and Central German districts are known for coal production. In Poland, coal mines are mainly found in Upper Silesia. In Turkiye, the Zonguldak basin, which is in the northwest on the Black Sea coast, is the main coal-producing area. In Colombia, the main coal-producing areas are Cesar and La Guajira.

Table 2: Coal Production in India by State in India, 2022-23

State	Coking	Non-coking	Total	State	Coking	Non-coking	Total
Maharashtra	0.000	63.620	63.620	Odisha	0.000	218.981	218.981
Chhattisgarh	0.248	184.647	184.895	West Beng.	0.000	32.834	32.834
J & K	0.000	0.010	0.010	Jharkhand	60.418	96.027	156.445
Telangana	0.000	69.637	69.637	Assam	0.000	0.200	0.200
Madhya Pradesh	0.094	145.934	146.028	Uttar Pradesh	0.000	20.540	20.540

Source: Provisional coal statistics 2022-23, p. 20. Ministry of Coal, Government of India.

Note: Quantity in Million Tonnes (MT)

Table 2 discusses the coal-producing states in India. It's found that Odisha, Chhattisgarh, Jharkhand, and Madhya Pradesh are the top coal-producing states. Jharkhand and Chhattisgarh are leading producer of the cooking coal, followed by Chhattisgarh. Odisha is the leading producer of non-coking coal, followed by Chhattisgarh. The least amount of non-coking coal is produced in Jammu and Kashmir, followed by Assam and Uttar Pradesh. Coking coal is mainly used in steel industries, while non-coking coal is used in thermal power plants. It has been found that non-coking and caking coals properties are not same. Non-coking coal are more utilise in brick, chemical, paper, ceramic, glass, fertilizer, and cement manufacturing.

Table 3: Production of Coking Coal and Non-Coking Coal in India

Year	Coking Coal		Non-Coking Coal	
	Production (MT)	Growth(%)	Production (MT)	Growth(%)
2012-13	51.58	-	504.82	-
2013-14	56.82	10.15%	508.95	0.82%
2014-15	57.45	1.11%	551.73	8.41%
2015-16	60.89	5.99%	578.34	4.82%
2016-17	61.66	1.27%	596.21	3.09%
2017-18	40.15	-34.89%	635.25	6.55%
2018-19	41.13	2.45%	687.59	8.24%
2019-20	52.94	28.70%	677.94	-1.40%
2020-21	44.79	-15.39%	671.30	-0.98%
2021-22	51.70	15.44%	726.49	8.22%
2022-23	60.77	17.54%	832.31	14.57%

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>).

Note: Quantity in Million Tonnes (MT).

Table 3 discussed about the production of non-coking and coking coal in India. Over the past 10 years, the production of both types of coal has gone up. In 2022-23, coking coal production was 60.77 million tonnes, while in the previous year it was 51.58 million tonnes. Non-coking coal production was 832.31 million tonnes in 2022-23, compared to 504.82 million tonnes earlier. There was a drop in production during 2020-21 because of the COVID-19 pandemic. Coking coal is used to make coke, which is a key material in steelmaking. It is also known as metallurgical coal. Coking coal comes in different grades, including semi-soft, semi-hard, and hard. This type of coal is costlier. The demand for it is closely linked to the demand for steel.

Table 4: Company-Wise Production of Raw coal in India

Year	2012-13	2014-15	2016-17	2019-20	2020-21	2021-22	2022-23
CIL	452.20	494.23	554.14	602.13	596.22	622.63	703.22
SCCL	53.19	52.54	61.34	64.04	50.58	65.02	67.14
Others	51.01	62.41	42.39	64.70	69.29	90.53	122.72
Total	556.40	609.18	657.87	730.87	716.08	778.20	893.08

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>).

Note: Quantity in Million Tonnes (MT).

Table 4 covers the production of raw coal by different companies in India. It shows that production has been growing steadily. In 2012-13, Coal India Limited (CIL) produced 452.20 million tonnes, and by 2022-23, this had risen to 703.22 million tonnes. Singareni Collieries Company Limited (SCCL) produced 53.19 million tonnes in 2012-13 and increased to 67.14 million tonnes by 2022-23. Other companies produced 51.01 million tonnes in 2012-13 and 122.72 million tonnes in 2022-23. Coal India Limited is the top coal producer in India and is the world's largest coal-producing company.

Table 5: Production of Raw Coal and Lignite in India

Year	Raw Coal		Lignite	
	Production (MT)	Growth(%)	Production (MT)	Growth(%)
2012-13	556.40	-	46.45	-
2013-14	565.77	1.68%	44.27	-4.70%

2014-15	609.18	7.67%	48.27	9.03%
2015-16	639.23	4.93%	43.84	-9.17%
2016-17	657.87	2.92%	45.23	3.17%
2017-18	675.40	2.66%	46.64	3.13%
2018-19	728.72	7.89%	44.28	-5.06%
2019-20	730.87	0.30%	42.10	-4.94%
2020-21	716.08	-2.02%	37.90	-9.98%
2021-22	778.19	8.67%	47.37	25.00%
2022-23	893.08	14.76%	44.80	-5.43%

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>). Note: Quantity in Million Tonnes (MT).

Table 5 represents the production of raw coal and lignite in India. It has been found that the total production of raw coal was 556.40 million tonnes in 2012-13 and 893.08 million tonnes in 2022-23. The total collection of Lignite was 46.45 million tonnes in 2012-13 and was 44.80 million tonnes in 2022-23. Raw coal is the un-wash coal which is directly extracted from the soil. They are used more in electricity generation, process heating and fuel. Lignite coal is the lowest grade of coal. They have the least concentration of carbon. They have high moisture content and low heating value. They are mainly used in electricity generation. Such type of coal is more affordable for poor people. Price movements of Lignite are measured by the National Lignite Index.

Table 6: Despatch of Coal to Thermal Power and Coal Consumption in India

Year	Power (Captive)	Growth (%)	Power (Utility)	Growth (%)	Total	Growth
2013-14	54.423	-	394.529	-	572.06	-
2014-15	62.263	14%	435.438	10%	603.772	6%
2015-16	34.645	-44%	483.124	11%	632.442	5%
2016-17	44.057	27%	490.987	2%	645.978	2%
2017-18	65.906	50%	519.582	6%	690.003	7%
2018-19	76.780	16%	567.645	9%	732.794	6%
2019-20	77.153	0%	534.256	-6%	707.176	-3%
2020-21	45.786	-41%	528.945	-1%	690.884	-2%
2021-22	38.158	-17%	671.702	27%	819.213	19%
2022-23	52.647	38%	732.480	9%	877.369	7%

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>).

Note: Quantity in Million Tonnes (MT).

Table 6 represents the despatch of coal to thermal power and coal consumption in India. It has been found that the supply of coal in industrial plants fluctuated in the last 10 years, but the supply of coal for domestic uses increased during the period. The supply of coal for industrial plants was 54.423 million tonnes in 2013-14 and 52.647 million tonnes in 2022-23. The supply of coal for domestic uses was 394.52 million tonnes in 2013-14 and 732.48 million tonnes in 2022-23. Supply of coal for industrial and domestic uses declined in 2020-21 due to the COVID-19 pandemic. Such coal has a high carbon content. Such coal burns slowly, having high heating value, no ash and no smoke. Coal is used in cement production, synthetic petroleum-based fuels, medicines, tars, carbon fibres, foams and others.

Table 7: Import of Coal, Coke and Other Coal Products in India

Year	Non- Coking Coal		Coking Coal		Coke & Coal Products	
	Qty	Value (Rs.)	Qty	Value (Rs.)	Qty	Value (Rs.)
2013-14	129.98	574973.16	36.87	348318.65	3.08	56918.82
2014-15	168.38	707585.71	43.71	337655.59	4.17	67994.89
2015-16	159.38	577818.53	44.56	282519.09	3.29	43806.15
2016-17	149.36	590772.69	41.64	412300.61	3.07	32683.54
2017-18	161.24	789543.41	47.00	595226.36	4.35	54019.35
2018-19	183.51	988707.26	51.83	720497.64	4.58	91524.74
2019-20	196.70	914652.23	51.83	612668.32	4.93	120644.85
2020-21	164.05	706688.44	51.19	453552.10	2.45	44688.59
2021-22	151.50	1259932.89	57.12	1027908.35	2.50	81031.26
2022-23	181.61	2297444.02	56.05	1538399.74	3.62	135750.18

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>).

Note: Quantity in Million Tonnes (MT) and value in Million Rs.

Table 7 discusses the import of coal, coke and other coal products in India. It has been found that the import and its value of coking coal, non- coking coal, and coke & coal products are increasing continuously, but declined in 2020-22 due to the COVID-19 pandemic. The import quantity of cooking coal was 36.87 million tonnes in 2013-14 and 56.05 million tonnes in 2022-23.

Import quantity of non-coking coal was 129.98 million tonnes in 2013-14 and was 181.61 million tonnes in 2022-23. The import quantity of coke & coal products was 3.08 million tonnes in 2013-14 and 3.62 million tonnes in 2022-23. Therefore, the import quantity of non-coking coal is three times higher than the import of coking coal and 50 times higher than the coke & coal products.

Table 8: Country-wise Coal Import in India, 2022-23

Country	Quantity	Share %	Country	Quantity	Share %
Indonesia	109.828	46.21	Australia	47.498	19.98
Russia	21.342	8.98	USA	13.692	5.76
South Africa	17.445	7.34	Mozambique	9.174	3.86
Singapore	10.074	4.24	Total	237.668	100.00
Others	8.615	3.63			

Source: Provisional coal statistics 2022-23, p. 24. Ministry of Coal, Government of India.

Note: Quantity in Million Tonnes (MT).

Table 8 discusses the country-wide import of coal to India. It has been found that Indonesia supplies the largest quantities of coal in India followed by Australia, Russia, and the USA. India imports large quantities of coal due to the rising demand for coal in industries, especially the power and power industries. The share of coal in major imports reached 5.2 per cent in 2022. India is not self-sufficient in coal production. Coal India Limited which produces 80 per cent of domestic production also increases domestic production to minimising import burden. Coal India Limited (CIL) is the leading coal producer in India. It is totally controlled by the Central Government.

Table 9: Import of Coking Coal to India, 2022-23

Country	Quantity	Share %	Country	Quantity	Share %
Australia	30.1	53.7	Indonesia	2.234	3.99
USA	7.274	12.98	Mozambique	2.081	3.71
Singapore	5.399	9.63	Others	1.588	2.83
Russia	4.481	7.99	TOTAL	56.053	100
Canada	2.896	5.17			

Source: Provisional coal statistics 2022-23, p. 24. Ministry of Coal, Government of India.

Note: Quantity in Million Tonnes (MT).

Table 9 discusses the import of coking coal to India. It has been found that India imports the highest quantity of coking coal from Australia, followed by the United States, Singapore and Russia. Import of coking coal was 51.83 million tonnes in the 2019-20 financial year, increased to 57.16 million tonnes in 2021-22, and further rose to 57.89 million tonnes in 2023-24. Australia contributes nearly 70 per cent of the total supply. There is a huge demand for coking coal in the steel industry. The gap between domestic availability and demand for coking coal is high. India is the second-biggest crude steel producer. It imports approximately 85 per cent of its annual coking coal consumption.

Table 10: Import of Non-Coking Coal to India, 2022-23

Country	Quantity	Share %	Country	Quantity	Share %
Indonesia	107.594	59.24	Australia	17.398	9.58
Mozambique	7.092	3.91	South Africa	17.445	9.61
USA	6.418	3.53	Others	8.807	4.85
Russia	16.861	9.28	TOTAL	181.615	100

Source: Provisional coal statistics 2022-23, p. 24. Ministry of Coal, Government of India.

Note: Quantity in Million Tonnes (MT).

Table 10 discusses the status of the import of non-coking coal to India. India imports the highest quantity of non-coking coal from Indonesia followed by Australia and South Africa. Non-coking coal has more demand in thermal power generation and injection in blast furnaces. Such coking coal is hard and resolidified during carbonization. It has a higher ash content. It is also used in coal-based DRI plants and thermal power plants. Jharkhand produces the highest quantity of non-coking coal. It does not have any caking properties. It has a lower carbon content. It can form a solid residue. It organises around 85 per cent of the coal reserves of India.

Table 11: Export of Coal, Coke and Other Coal Products from India

Year	Non- Coking Coal		Coking Coal		Coke & Coal Products	
	Qty	Value (Rs.)	Qty	Value (Rs.)	Qty	Value (Rs.)
2013-14	2.18	10805.12	0.008	34.94	0.15	1521.38
2014-15	1.19	6784.24	0.04	413.03	0.10	1140.32
2015-16	1.51	8348.06	0.06	650.37	0.15	1493.51
2016-17	1.74	9554.72	0.03	114.53	0.09	1063.43
2017-18	1.43	8388.62	0.06	394.41	0.10	1726.21

2018-19	1.24	858798.	0.06	911.89	0.02	228.09
2019-20	1.02	5818.65	0.002	13.43	0.02	224.42
2020-21	2.94	5712.93	0.003	23.09	0.02	311.91
2021-22	1.31	11224.64	0.001	07.37	0.50	16148.01
2022-23	1.13	14125.39	0.02	770.98	0.04	847.66

Source: Website of Ministry of Coal, Government of India (<https://coal.nic.in/>).

Note: Quantity in Million Tonnes (MT) and value in Million Rupees.

Table 11 discusses the export of coal, coke and other coal products from India. It has been found that exports of non-coking and coking coal are not stable and decline in certain periods due to external factors. Export of coking coal was 0.008 million tonnes in 2013-14 and rose slightly to 0.02 million tonnes in 2022-23. Export of coking coal was 2.18 million tonnes in 2013-14, increased to 2.94 million tonnes in 2020-21, and then dropped to 1.13 million tonnes in 2022-23. Export of coke and coal products was 0.15 million tonnes in 2013-14, fell to 0.02 million tonnes in 2020-21, and then slightly increased to 0.04 million tonnes in 2022-23. The government earned a higher amount of revenue from exporting the non-coking coal.

Table 12: Export of Coal by India to Different Countries, 2022-23

Country	Quantity	Share %	Country	Quantity	Share %
Nepal	0.833	71.61	Bangladesh	0.245	21.04
Bhutan	0.053	4.56	TOTAL	1.163	100.00
Others	0.032	2.79			

Source: Provisional coal statistics 2022-23, p. 25. Ministry of Coal, Government of India.

Note: Quantity in Million Tonnes (MT).

Table 12 discusses the export of coal from India to other countries. It has been found that India exports coal to the neighbouring countries. The highest quantity of coal in India was exported to Nepal (71.61%) followed by Bangladesh (21.04%), and Bhutan (4.56%). In Nepal, the amount of coal is not very high. The total coal deposits in the country are almost five million tons. These coal deposits are found in the districts of Palpa, Pyuthan, Rolpa, Salyan, and Dang. Bangladesh has coal reserves of about 323 million tons. The first coal mining operation in the country began in Jamalganj in 1962. The biggest coal mine in Bangladesh is the Barapukuria Coal Mine, which is located in Dinajpur. The coal production in Bangladesh has changed from year to year. In Bhutan, the largest coal mines are Rishore Coal Mine and Habrang Coal Mine. Both of these mines are owned by the State Mining Corporation Limited.

Table 13: Royalty of States from Coal Mining in India, 2022-23

State	Royalty	Share %	State	Royalty	Share %
Telangana	4845.66	21.57	Jharkhand	4707.14	20.95
Chhattisgarh	3342.21	14.88	Madhya Pr.	2914.72	12.97
Odisha	4137.88	18.42	TOTAL	22465.09	100.00
Others	2517.48	11.21			

Source: Provisional coal statistics 2022-23, p. 25. Ministry of Coal, Government of India.

Note: Royalty in Crores INR.

Table 13 discusses the royalty of the State from coal mining in India. It has found that Telangana state (21.57%) received the highest amount of royalty from coal mining followed by Jharkhand (20.95%), Odisha (18.42%), Chhattisgarh (14.88%), and Madhya Pradesh (12.97%). Coal is found in the Khammam and Bhadrachalam districts of Telangana. In Jharkhand, major coalfields are located in Rajmahal, Deoghar, Daltonganj, Auranga, Hutur, Karanpura, Bokaro, and Jharia. Talcher, which is the main coal mining area in Odisha, is located in the Angul district and is also known as the "City of Black Diamond." Chhattisgarh holds 16 per cent of India's total coal deposits. The well-known places of coal in Chhattisgarh are Korba, Koriya, Surguja, and Raigarh. On the other hand, popular coal places in Madhya Pradesh are Panch Kanhan, Sohagpur, Muhpani, Satpura, and Singrauli.

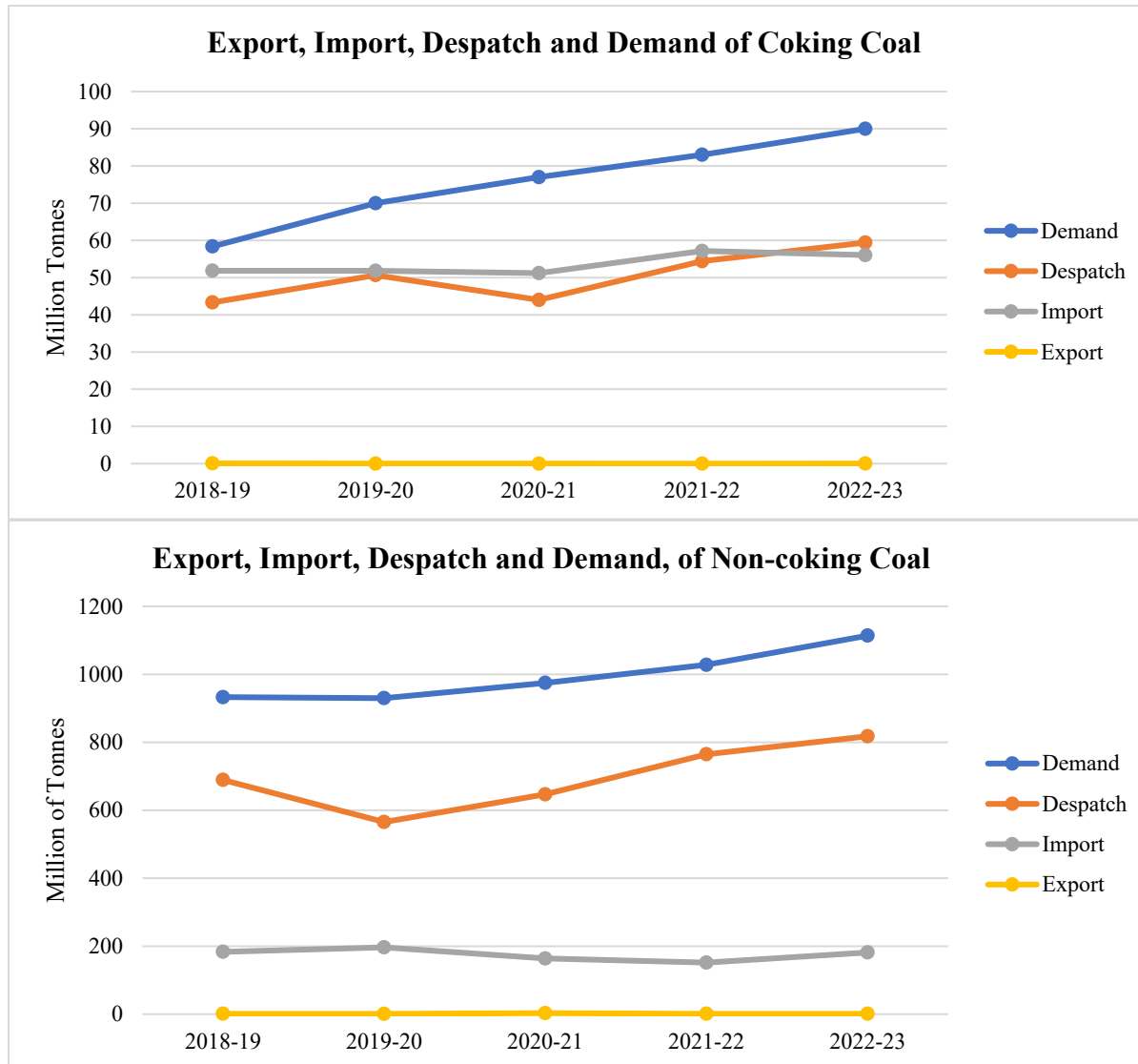


Figure 1 & 2: Export, Import, Despatch and Demand of Non-Coking and Coking Coal in India

The above graphs show similar trends in demand, despatch, import and export of cooking, and non-cooking coals. Demand for coking coal was increased between 2018-19 to 2022-23. Demand for coking coal was 58.37 million tonnes in 2018-19 and 90.000 million tonnes in 2022-23. Despatch of coking coal was far behind the demand for coal. The import of coking coal is far higher than the export quantity. Import of coking coal was 43.318 million tonnes in 2018-19 and 56.053 million tonnes in 2022-23. On the other hand, the export of coking coal was 0.060 million tonnes in 2018-19 and 0.027 million tonnes in 2022-23.

Demand for non-coking coal increased between 2018-19 to 2022-23. Demand for non-coking coal was 932.98 million tonnes in 2018-19 and 1114 million tonnes in 2022-23. Despatch for non-coking coal was far behind the demand for coal. The despatch of non-coking coal was 689.476 million tonnes in 2018-19 and 817.956 million tonnes in 2022-23. The import of non-coking coal is far higher than the export quantity. The import of non-coking coal was 183.510 million tonnes in 2018-19 and 181.615 million tonnes in 2022-23. On the other hand, the export of non-coking coal was 1.247 million tonnes in 2018-19 and 1.136 million tonnes in 2022-23. Therefore, the export, import, despatch and demand of non-coking coal are higher than cooking coal. The import quantity of cooking and non-coking coal in India is higher than the export quantity.

Table 14: Production and Revenue from Coal of Coal India Limited.

Year	Production	Revenue
2016-17	538.75	839.48
2017-18	567.36	837.35
2019-20	602.13	1054.22
2021-22	622.63	937.68

2022-23	703.20	1135.97
2023-24	773.81	1448.12

Source: <https://www.statista.com/>, Note: Production in Million Tonnes, and Revenue in billion Indian rupees.

Table 14 (a): Summary Output

Regression Statistics	
Multiple R	0.949507948
R Square	0.901565343
Adjusted R Square	0.876956678
Standard Error	30.97621832
Observations	6

Source: Calculation of Authors.

Table 14 (b): ANOVA Analysis

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	35153.28853	35153.28853	36.6360941	0.003759808
Residual	4	3838.104406	959.5261015		
Total	5	38991.39293			

Source: Calculation of Authors

	Coefficients	Standard Error	t Stat	P-value
Intercept	256.9960226	63.66163289	4.036905918	0.015643954
Revenue	0.362381112	0.059870236	6.052775734	0.003759808

Source: Calculation of Authors

Table (14-a) shows that R^2 is found to be 0.901, showing that there is a strong degree of relation between the independent variable X, i.e. revenue of Coal India Limited (CIL), and the dependent variable Y, i.e. production of coal by Coal India Limited (CIL). Table (14-b) shows that the p value (0.003) is smaller than the critical value at a 5% level of significance ($p < 0.05$), therefore we will reject the null hypothesis-1. So, it is concluded that there is a relationship between the production of coal of Coal India Limited and the revenue of Coal India Limited (CIL).

CONCLUSION

China, India and Indonesia are leading coal-producing countries. Odisha, Chhattisgarh, Jharkhand and Madhya Pradesh are the foremost coal-producing states in India. Coking coals and non-coking coals are more used in steel industries and thermal power plants. Production of the non-coking and coking coal has increased in the last ten years. Coal India Limited (CIL) is the leading coal producer in India. The import and its value of non-coking coal, coking coal, and coke & coal products are increasing continuously, but declined in 2020-22 due to the COVID-19 pandemic. India imports large quantities of coal due to rising demand of coal in industries, especially the power and power-related industries. Indonesia, Australia, and Russia are the major suppliers of coal to India.

Exports of non-coking and coking coal are not stable and declined in certain periods due to external factors. The government earned a higher amount of revenue from exporting non-coking coal. India exports coal to neighbouring countries. The major importer of Indian coal are Nepal and Bangladesh. Jharkhand and Odisha receive higher amounts of royalty from coal mining. Export, import, despatch, and demand of non-coking coal are higher than coking coal. The import quantity of non-coking and coking coal in India are higher than the export quantity. There is a positive relationship between the production and revenue of Coal India Limited (CIL). Therefore, the financial performance of Coal India Limited and other coal-producing industries is not satisfactory. Although there are many constraints, but the future research has more scope for increasing the production of coal and raising the revenue for such industries. The Ministry of Coal may implement policies for promoting the financial viability of such affiliated industries.

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