सत्यमेव जयते

Azadi Ka Amrit Mahotsav

भारत 2023 INDIA

Fair Competition for Greater Good

MARKET STUDY ON DYNAMICS OF COMPETITION IN THE MINING SECTOR IN INDIA WITH A FOCUS ON IRON ORE

31.07.2023

Competition Commission of India

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Policy Research to Foster India's Industrial Transformation

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Abbreviations

ACCC	Australian Competition and Consumer Commission
AOD	Abuse of Dominance
BF-BOF	Blast Furnace-Basic Oxygen Furnace
C4 & C8	Four and Eight Firm Concentration Ratio
CBAM	Carbon Border Adjustment Mechanism
CCI/Commission	Competition Commission of India
CMIE	Centre for Monitoring Indian Economy
CPCB	Central Pollution Control Board
CR	Concentration Ratio
DGCI&S	Directorate General of Commercial Intelligence and Statistics
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
EU	European Union
FIMI	Federation of Indian Mineral Industries
GDP	Gross Domestic Product
GSI	Geological Survey of India
GVA	Gross Value Added
HHI	Herfindahl-Hirschman Index
IBM	Indian Bureau of Minerals
ITC-HS	Indian Trade Classification based on Harmonised System
LTL	Long-term Linkage
M&As	Mergers and Acquisitions
MCDR	Mineral Conservation Development Rules
MCR	Mineral Concession Rules
MEMC Rules	The Minerals (Evidence of Mineral Contents) Rules,
MMDR Act	Mines and Minerals (Development and Regulation) Act
MME	Ministry of Mines and Energy
NMDC	National Mineral Development Corporation
NMET	National Mineral Exploration Trust
NMP	National Mineral Policy
NSP	National Steel Policy
OMC	Odisha Mining Corporation
PBDITA	Profit before Depreciation, Interest, Taxes, and Amortisation
QCI-NABET	Quality Council of India-National Accreditation Board for Education and Training
RCA Index	Revealed Comparative Advantage Index
SITC	Standard International Trade Classification
UN Comtrade	United Nations Comtrade Database
WPI	Wholesale Price Index

Foreword

This report has been prepared by the Institute for Studies in Industrial Development (ISID) as a part of the advocacy initiative of the Competition Commission of India (CCI) aiming to unravel the competition issues prevailing in various markets. As economies develop, the ownership and control of various non-renewable mineral resources assume strategic dimension. Iron ore is particularly critical resource since it serves as the fundamental component in steel production. Given that steel is considered the 'mother' of all industries, iron ore deserves greater diligence and efficient utilisation, for which the collective effort from the regulatory agencies and various stakeholders involved is essential.

In the early post-independence period, major minerals were reserved exclusively for the public sector. After liberalization of 1991, although private investment including foreign investment was encouraged, the prominence of public sector companies has continued, partially due to the natural resource characteristic, and the consequent state intervention in the provisioning of mineral resources. Steel sector has seen a stringent regulatory regime during the early post-independent era leading to public sector dominance. Private investment was mainly engaged in the downstream finished steel production. Liberalisation resulted in removing regulatory barriers, resulting in capacity creation in private sector, making India as the second largest steel producer in the world.

Building a competitive steel industry has multiplier effects on the downstream sectors of the economy due to its strong vertical linkages. The competitiveness of steel sector has implications for the competitiveness of infrastructure, housing, automobile, machinery, heavy engineering, and aviation among many other sectors. In this context, the PLI scheme announced in the steel sector is a welcome step. Competitiveness in the steel sector is dependent on provisioning of iron ore at competitive prices. Though India has rich endowments of iron ore, allocation of iron ore resources is an important issue of concern for steel producers and other stakeholders.

ISID study has been conducted against this backdrop to identify bottlenecks that exist in the iron ore markets in India. To this objective, the study has comprehensively examined various issues including growth and production; regulatory context; status of competition along horizontal and vertical lines; profitability and cost decomposition; prices, among others.

I wish to express my deep appreciation to the members of the ISID study team that comprises Dr. Beena Saraswathy, Dr. Satyaki Roy, Dr. Sanjaya Kumar Malik, Dr. Rijesh R of ISID faculty and Prof. Vijay Kumar Singh, Dean, Faculty of Law, SRM University, who joined the team as an external consultant. Mr Benito Lyndon, Mr Krishan, and Ms Gayatree Sahoo provided the research and fieldwork support. I am thankful to Shri. Nilmadhab Mohanty (IAS Rtd.) and all others who helped the team during the academic and field interactions.

The Competition Commission of India has provided the critical substantive support and guidance to the ISID team, for which we are grateful especially to the concerned officers. I do hope the report helps in deepening the understanding on competition issues in the iron ore sector.

Prof. Nagesh Kumar
(Director, ISID)

Executive Summary

Mineral resources have directly and indirectly played a key role in the evolution and growth of human societies and led to the industrial revolution and modern living conditions. Due to the non-renewable characteristic of minerals and the limited supply of it, the countries with rich minerals are naturally gifted. Nevertheless, the demand for minerals such as iron ore is increasing tremendously due to the huge infrastructure and other development requirements in developing nations. India produces 87 types of metallic and non-metallic minerals which have strong forward linkage to industrial growth. Mining accounts for roughly 2.3 percent of India's Gross Domestic Product (GDP) in 2022−23. There are 1319 reporting mines. Of these, 97 percent mines are located in seven states, namely Odisha, Chhattisgarh, Rajasthan, Karnataka, Jharkhand, Madhya Pradesh and Maharashtra. India is the fourth largest producer of iron ore in the world after Australia, Brazil, and China. Public sector companies account for 39 percent of iron ore mining in terms of quantity produced while the private sector accounts for the majority of remaining 60.70 percent. India is self-sufficient in iron ore production, and contributes 7 percent of the global production (4th largest in the world). The value of iron ore export in recent years has been much higher than that of imports. India's export competitiveness (measured in terms of Revealed Comparative Advantage Index) in iron ore has increased post 2015, especially for value added products like pellets.

The allocation of mining leases has witnessed a significant decline after the implementation of the Mines and Minerals (Development and Regulation) Amendment Act (MMDR Act), 2015. The smaller miners in terms of land area, have a higher number of mining leases, however the larger players dominate in terms of the total allocated area. The effective tax rates and the royalty payments for iron ore in India are much higher than in most mineral-rich countries, namely Brazil, Australia, Canada, Chile, and South Africa. This consequentially results in increase in cost, which has a pass through effect in steel pricing. An analysis of the various provisions in the recent mining laws and their impact on competition outcomes reveals that various provisions of the MMDR Amendment, 2021 are pro-competitive. The Amendments in MMDR Act, over the years, have liberalised the licensing processes. However, extensive compliance requirements still remain, which create entry barriers and raise compliance cost, particularly for smaller players. For ease of doing business, the inter-state regulations may be further simplified to curtail the time of obtaining the permissions. Odisha has a competitive advantage in iron ore mining, backed by good infrastructure and an efficient administrative setup (as per field interaction). However, stakeholders have expressed that processing time can be further reduced through digitisation, and improvements in transport facilities to establish better connectivity.

To understand the forward and backward linkages in the sector, a vertical integration analysis is undertaken using the Supply Use Table. It is observed that, 95 percent of iron ore production is sold to the steel (and related) sector. Intermediate goods consumption constitute 55 percent of the total value of output in the iron ore sector. The iron ore sector is highly concentrated as revealed from the sales based four-firm concentration ratio of 80 percent and an HHI of 2370, which is moderate but close to being highly concentrated. Although the concentration levels have decreased (implying higher competition) compared to the 1990s, particularly after 2014, they are still relatively high. The top two players, i.e. central government owned National Mineral Development Corporation (NMDC) and state-owned Odisha Mining Cooperation (OMC) together account for 65 percent share in the iron ore sector, followed by Amba River Coke, which is a relatively new entrant in the market. High market shares are predominantly held by firms that entered the sector before 1990 and during the 1990s.

The study also found that the steel sector is dominated by business groups with over 51 percent market share, followed by standalone private firms. However, the iron ore sector is dominated by public sector companies which hold a significant market share. The public sector's presence in the steel industry is relatively limited, accounting for approximately 13 percent of the market. In the steel sector, in terms of size, mega firms are more profitable compared to other categories. In terms of ownership, business group-owned firms are found to be more profitable than other entities in the sector.

There has been a gradual increase in the share of captive iron ore mines in total number of iron ore mines over the years. This is indicative of large-scale producers gaining control over the critical raw material requirements, which puts them in a position of managing fluctuations in raw material prices better. This has created competition concerns due to differential cost structure amongst steel producers with and without captive mines. It is further observed that the iron ore blocks auctioned after 2015 are dominated by some companies like JSW, which accounts for nearly 47 percent of the total quantity of the reserves auctioned.

The raw material component (which includes iron ore consumption) accounts for 73 percent of the total expenses in the steel sector. This proportion has been steadily increasing over the past seven years, while the tax component has been declining during the same period. Sales value decomposition analysis shows the greater role of price as compared to quantity in increasing sale value of major iron ore producers. Thus, increase in iron ore prices may have led to larger share in raw material component of steel producer's costs.

Iron ore sector is characterised by presence of few sellers and many buyers. On the other hand, steel sector features large number of sellers and buyers. Further, price in iron ore is not completely market determined, unlike the steel industry. Steel industry is also more integrated with the global market, with significant imports and exports, while iron ore does not feature very high trade volumes. This asymmetry in market structure and characteristics implies that while in the steel market, the increase in prices of inputs like iron ore cannot be fully passed on to the consumer, in iron ore market, price increases are feasible. It is to be recalled that several steel plants are integrated and have captive mines, with the majority of such mines being affiliated with top players and business groups. This presence of captive mines seems to contribute to the profitability of bigger players in the steel sector. On the other side, smaller plants tend to face losses, while medium-sized firms show relatively lower profitability. High prices of iron ore are adversely impacting the profitability of user industries such as pellets, sponge iron, and steel. The study has analysed the financial performance of a number of firms that revealed losses in recent years due to increase in raw material cost. It is observed that their expenditure on raw material purchase (of which iron ore is a key component) is increasing.

Iron ore production is highly concentrated in some states. Odisha alone accounts for 53.82 percent of the iron ore production in India, followed by Chhattisgarh (16.3 percent), Karnataka (15.9 percent), and Jharkhand (9.7 percent). The regional concentration of iron ore production also suggests high concentration among a few companies at the regional level. In this regard, the following observations are made specifically with regard to Odisha.

No shortage of iron ore reported from Odisha. Steel firms can purchase iron ore through any of the following three routes: (i) participating in the auction process of the iron ore producers like Odisha Mining Corporation (OMC), (ii) engaging in Long-Term Linkage (LTL) with OMC, or (iii) purchasing from private merchant mines. One of the significant challenges faced by steel firms participating in the auction is the high base prices set by OMC for iron ore auctions. Field interaction revealed that high prices were causing losses and closure of small steel producers in recent years.

OMC follows an LTL policy with selected buyer plants, with 80 percent of the iron ore being sold through this arrangement (which is the upper limit under the regulations), leaving only the remaining 20 percent open for auction (The Odisha Gazette, 2023). This distribution strategy raises concerns from a competition perspective, as OMC allocates iron ore supply to specific segments of buyers who meet prescribed eligibility conditions. Smaller players are left with choice of auction, where the price is normally higher. High base price in auction also leads to high prices in LTL, since a weighted average price of auction is used to determine LTL price. Further, under the LTL policy, firms are obligated to purchase a minimum quantity of iron ore, leading to situations where they have to buy regardless of prices and quality to meet the quota. High base price in auction might also increase the possibility of collusion among buyers to avoid further increase in the price through auction.

Same auction is applicable to various types of iron ore buyers, including integrated plants, pellet manufacturers, sponge iron, pig iron, etc., creating problems as bid price hikes affect all firms equally. All these factors imply that iron ore is available to different steel producers at different prices, i.e., those with captive mines, those procuring through LTL, those buying through auction and those purchasing from merchant miners. This price differential is not market determined and creates concerns from a fair competition perspective.

The following observation is made with regard to the iron ore market in Karnataka. The respondents pointed out that the entry fee for participating in auctions is very high. Unlike Odisha, shortage of iron ore was reported from Karnataka including both high-quality iron ore and low-quality fines. The NMDC is the major supplier in Karnataka. According to respondents from Karnataka, the introduction of the auction system has led to an increase in the number of players in the market. The issue of 'royalty on royalty' has also been highlighted.

The study makes the following recommendations:

(i). From a competition perspective, it is imperative to avoid the concentration of critical iron ore reserves in only a few firms or business groups, given that these contracts span an initial 50-year period. To prevent excessive control over ownership and prices and to ensure responsible utilisation of finite non-renewable resources, a suitable maximum limit on iron ore ownership in terms of reserves by a steel producer should be determined while auctioning iron ore mines;

(ii). A transition towards clean technology for sustainable mining in a phased manner needs to be integrated with the regulatory structure. Ease of implementing regulations may be ensured to reduce high cost of compliance;

(iii). Exports of iron ore should be discouraged while simultaneously encouraging high value-added activities, including domestic production of steel, which will control the prices.

Specifically with regard to Odisha:

(iv). While allocating iron ore through the LTL route, producers without captive mines may be given preference;

(v). To increase transparency in fixing iron ore prices and ensure competitive neutrality, both public and private companies, including merchant miners beyond a threshold size, should be integrated into a single e-auction system. The surplus produced by captive mines can also brought into this.

(vi). Increase the frequency of e-auctions;

(vii). Fixing of the base price of iron ore auction should be linked to an appropriate price index in order to avoid abnormal rise in input prices and bring about transparency;

(viii). Either, there should be separate auction process for different end users ranging from steel to pellet producers, or specific mines could be allotted, particularly to small manufacturers;

(ix). The upper limit to allocate iron ore through LTL route by OMC may be reduced from the present 80 percent to create a competitive enviornment.

Chapter I
The Context

1.1 Introduction

India is endowed with rich mineral resources, both metallic and non-metallic. Mining and quarrying roughly make up approximately 2.3 percent of India's GDP. Besides direct contribution to GDP, minerals play an important role in facilitating industrial output through backward linkages. Minerals are necessary for a variety of industries including steel, chemicals, heavy metals, and engineering. Historically, countries rich in minerals have enjoyed an advantage in terms of industrial growth, as many early industrialising countries came into existence in mineral-rich regions. However, as transportation costs decreased due to the development of road, railway, and waterway networks, industrial growth became concentrated around cities with access to large markets. Hence, the availability of basic and critical minerals had been the backbone of industrial growth in many countries. One significant contribution of mining to the economy is its potential to generate employment opportunities for unskilled or low-skilled workers. The mining industry employs a considerable number of low-skilled workers, especially in India, where mining operations are often located near forests or remote areas. Consequently, mining can serve as a source of livelihood for many tribal communities and underprivileged sections in our country.

During the post-independence era in India, mining activities required substantial initial investments and had long turnover times. Consequently, heavy industries, including mining, were predominantly owned by the public sector. This approach was necessary because big businesses showed little interest in investing in large-scale heavy industries due to their low profitability. Therefore, the responsibility of building such industries and developing infrastructure fell upon the public sector. Additionally, for newly independent countries, ensuring state control over critical resources was seen as a prerequisite for achieving self-reliance. However, with the growth of private sector over time and as a result of liberalisation, market determined resource allocation and efficiency concerns gained primacy in policy discourse. It became important to ensure competitive prices for minerals, given the changed scenario of liberalised international trade. India has a large number of small mines but big-sized lease areas are owned by big corporates, whether private or public. These entities have greater influence over mineral production and market. Over the years, the average size of mines in India increased, and the government's focus shifted from mere regulation to broader developmental goals. The National Mineral Policies introduced in 1993 and subsequently revised in 2008 and 2019 emphasised on the rational utilisation of minerals and the conservation of natural resources for future generations. Under the new regulatory regime, transparency of pricing, technological development, better regulation, and sustainable development became primary objectives.

To achieve the aforementioned goals, it becomes imperative to establish transparent competitive practices, which are essential for an effective regulatory regime. India has allowed 100 percent foreign equity participation in the mining sector since 1994. In the context of liberalisation, the purpose of these policies was to ensure supply of inputs at a competitive price and to enable domestic producers to face global competition. While India has not heavily relied on imports for major minerals, there has been an overall trade deficit in the mining sector over the years. It is important to produce useable minerals of the required quality to enable Indian producers to withstand global competition. This of course requires downstream development of processing industry to produce high quality minerals for domestic and global markets. In the recent period, there has been a rise in prices of commodities across the world, with mineral prices experiencing a surge in the recent past. Such trends create inflationary pressures within the economy as mineral prices have a substantial impact on several sectors of the economy, leading to cascading effects on consumer prices.

The current regulatory regime aims to ensure transparent and competitive practices, despite the fact that larger players hold greater control over mining activities. Hence, it is necessary to prevent the ‘abuse’ of dominant positions by these major players to avoid their control over the market. The other aspect is the privileged position of public sector companies over private players. Historically, the public sector has played an important role in the development of mining in India. While having public control over critical minerals is crucial for achieving self-reliant domestic industries, it is essential to address the potential issue of granting privileges that may give rise to rents that can raise input prices. Hence, it is important to establish competitive neutrality between public and private players engaging in the same economic activity. The complexity of the problem, however, is that monopoly positions, whether held by private or public entities, in different markets, may lead to welfare loss as they make production costlier. The regulations need to focus on these aspects and make the auction procedure more transparent and accessible to smaller players. Another issue, which creates structural disparities in operation, is the presence of captive[1] and non-captive users of iron ore. It is important to identify and address any form of anti-competitive practices at various stages of operations in the iron ore sector. This will enable the regulatory authorities to monitor the smooth functioning of the market.

Given this background, the Competition Commission of India commissioned a market study to comprehensively examine competition issues in the mining sector in India, with a focus on iron ore. The Institute for Studies in Industrial Development (ISID) has been given the responsibility to undertake this study. Based on the Terms of Reference issued by the Commission, the following objectives have been framed for the study.

1.2 Objectives of the Study

The specific objectives of the study based on the Terms of Reference issued by the Commission are to:

(i) examine the growth and development of Indian mining sector with focus on iron ore industry vis-à-vis global industry;

(ii) portray legal and regulatory framework governing the iron ore market and its submarkets in India, with a focus on understanding whether the regulatory structure is giving rise to any kind of competition concerns in the iron ore sector;

(iii) analyse the structure and dynamics of competition in the iron ore market; and,

(iv) unravel competition issues in the iron ore sector and its vertically linked value chain from the field interactions.

1.3 Data and Methodology

The study has made use of both primary and secondary data sources. Data for various financial performance indicators are obtained from PROWESS IQ Database provided by the Centre for Monitoring Indian Economy (CMIE); trade indicators are sourced from United Nations Comtrade Database (UN Comtrade); and, data on mergers and

[1] Unless otherwise mentioned, captive mines in this study refer to the currently running captive mines and non-captive refers to those firms who do not have their own iron ore mines.

acquisitions are sourced from the Venture Intelligence Database, Supply and Use Tables (previously known as Input Output Transaction Tables) published by the Central Statistical Organisation (CSO) under the Ministry of Statistics and Programme Implementation, and various publications of Indian Bureau of Mines, Ministry of Mines. Relevant secondary data and information for the study are obtained from various websites of state mineral departments and other reliable sources.

In addition to the aforementioned data sources, obtaining information directly from the field is crucial to gain insights into competition-related issues across the value chain and understanding the specific dynamics of the sector. For this purpose, we have conducted field interactions with multiple stakeholders in the sector, using a semi-structured questionnaire. We have interacted with various stakeholders including producers, buyers, buyer and seller association representatives, academia, and regulators. Field interactions were primarily conducted in Odisha and Delhi, with a few online field meetings conducted for stakeholders from the states of Karnataka and Chhattisgarh. Details regarding the field interactions and the sample used are discussed in the relevant chapter of the study.

1.4 Chapter Scheme

This report consists of six chapters. The second chapter identifies the macro trends in the mining industry in general and the iron ore sector in particular. It focuses on major trends of production, lease distribution, international trade, and trade competitiveness. The third chapter delineates the legal architecture relevant to the mining industry and the way it has evolved over time. Additionally, the chapter explores the issues that arise when mining laws interact with competition laws. The fourth chapter critically reviews the nature of market concentration in the iron ore industry and the regional concentration of iron ore resources. The fifth chapter highlights the share of public sector companies, Indian business groups, and standalone companies in the iron ore sector as well as how concentration and profitability in this sector affects cost structure and profitability in the steel industry. Also, it presents insights from field surveys undertaken in select iron ore and steel firms. Additionally, it empirically examines some of the issues highlighted by the respondents. The sixth chapter concludes with major observations. The seventh chapter provides policy recommendations.

CHAPTER II

Growth, Regional Distribution, and Trade in Minerals with Focus on Iron Ore

2.1 Status of Production of Iron Ore and Other Minerals

Mining plays a very important role in a country's industrial development, particularly because industries are heavily dependent on metallic and non-metallic minerals. A country endowed with critical minerals always has an advantage over others because of the easy availability of cheap raw material required in basic and heavy industries. India produces 87 types of metallic and non-metallic minerals which have strong forward linkage to industrial growth. Of these, non-metallic minerals account for a larger share of the total mineral production. Mining accounts for roughly 2.3 percent of India's GDP in 2022–23. In India, there are 1319 reporting mines largely concentrated in 7 major states in 2021-22. Of these, 97.04 percent mines are located in seven states, namely Odisha, Chhattisgarh, Rajasthan, Karnataka, Jharkhand, Madhya Pradesh and Maharashtra. In terms of economic value, iron ore accounts for 79 percent of valuable minerals produced in India[1], followed by zinc concentrate (6.7 percent) and chromite (4 percent). India is the fourth largest producer of iron ore in the world after Australia, Brazil, and China. Public sector companies account for 39 percent of iron ore mining in terms of quantity produced while the private sector accounts for the majority of remaining 60.7 percent. Based on this, the top public sector companies are, NMDC (16 percent), SAIL (13.31 percent) and OMC (9 percent). Top private companies are JSW Steel (12.5 percent), Tata Steel (11.5 percent), Rungta Mines (5.6 percent), and Vedanta and Arcelor Mittal India Pvt. Ltd with 2 percent share each (Ministry of Mines, 2023). Many of these companies have steel production and thereby use iron ore for captive consumption.

India has a relatively high share of global output in many of the metallic minerals and metals (Table 1). In chromite (9 percent), iron ore (6.8 percent), bauxite (5.5), aluminium primary (5.78), and steel crude (5.9), India contributes a sizeable share of the global output. India ranks second in the world in the production of steel

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[1] The total value of metallic minerals production is Rs. 122142 crores, out of which iron ore accounts for Rs. 96381 crore during the year 2021-22.

(crude/liquid), third in aluminium (primary), lead and zinc; and fourth in iron ore and chromium.

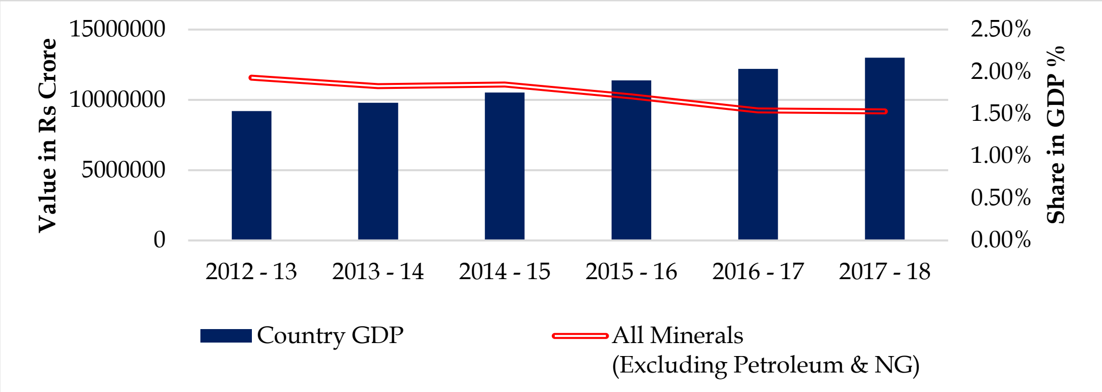
Table 1: Global Profile of India in the Metallic Minerals Sector

Sector	Unit of Commodity	Production (quantity)		Contribution	
		World	India*	India's share (percentage)	Rank Globally
Metallic minerals					
Bauxite	'000 tonnes	368600	20368	5.5	6th
Chromite	'000 tonnes	31000	2863	9.2	4th
Iron ore	million tonnes	3016	204	6.8	4th
Manganese ore	'000 tonnes	49600	2688	5.4	5th
Industrial Minerals **					
Magnesite	'000 tonnes	28300	78	0.3	17th
Apatite & rock phosphate	'000 tonnes	221000	1455	0.7	15th
Metals					
Aluminium (Primary)	'000 tonnes	65400	3619	5.5	3rd
Copper (refined)	'000 tonnes	24900	364	1.5	7th
Steel (Crude/Liquid)	million tonnes	1857	104	5.6	2nd
Lead (refined)	'000 tonnes	12500	214	1.7	3rd
Zinc (slab)	'000 tonnes	13800	715	5.2	3rd

Source: World Mineral Production, 2016-2020, British Geological Survey for World mineral production and MCDR returns & individual plants for production with respect to India, As in Ministry of Mines (2023), *Annual Report 2022-23.*
Note: * Figures relates to 2021-22; ** ** Minerals declared as minor minerals vide Government of India Notification S.O. 423(E) dated 10th February, 2015 are not included due to non-availability of production with respect to India

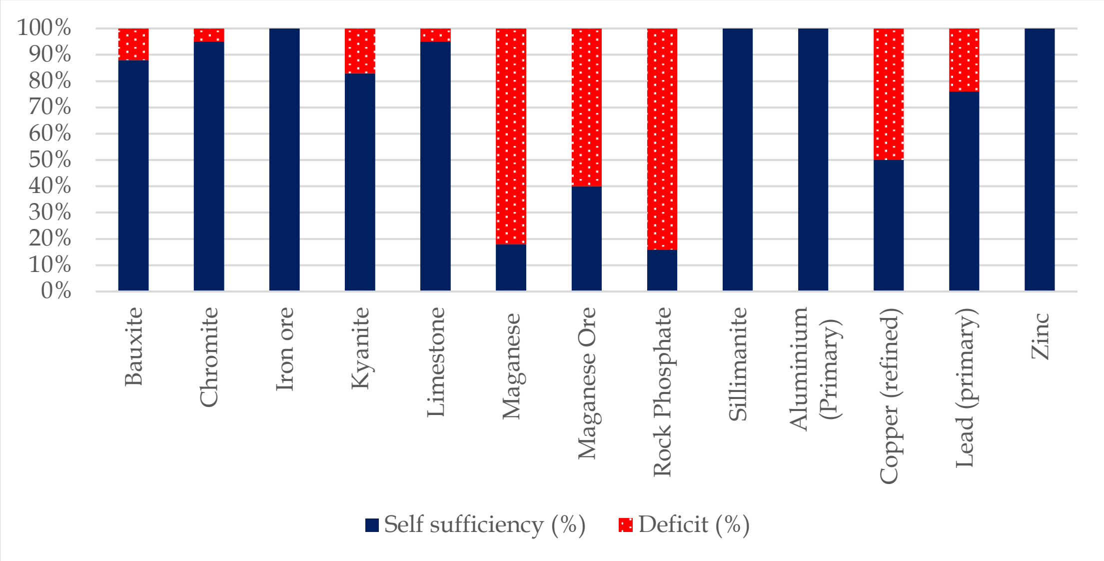
Figure 1 indicates the contribution of minerals to India's GDP, which has declined since 2014–15. India is self-sufficient in most metallic minerals and produces 6.8 percent of the world's iron ore in 2021-22. Figure 2 shows India's self-sufficiency in metals and minerals. It is evident from the figure that, with the exception of copper, rock phosphate, and manganese, magnesite, India is almost self-sufficient in most minerals.

Figure 1: Contribution of Minerals to the Country's GDP (Excluding Petroleum & Natural Gas)



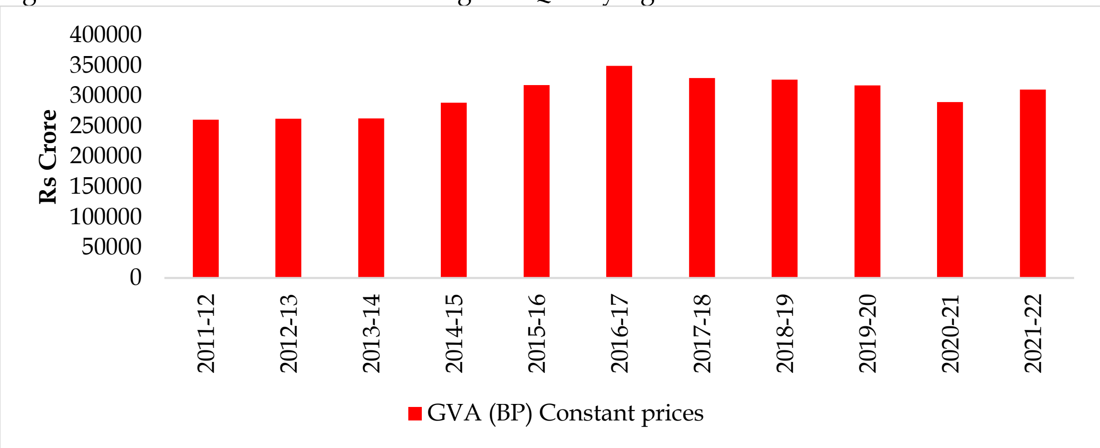
Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 2: India's Self-sufficiency in Minerals and Metals (2020-21 (P))



Source: Adapted based on Annual Report 2022-23, Ministry of Mines, Government of India.
Note: Self-sufficiency is the percentage of domestic demand met by domestic supply.

Figure 3: Gross Value Added of Mining and Quarrying Sector



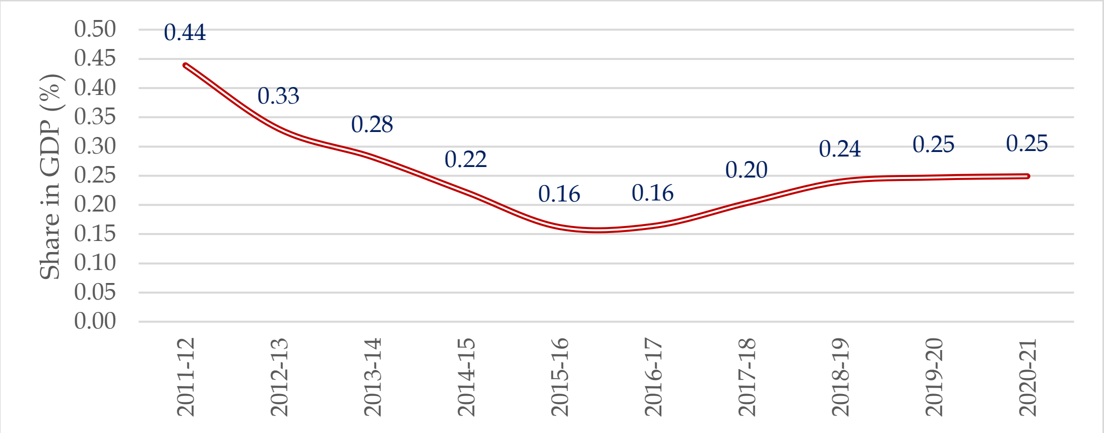
Source: National Accounts Statistics, various years, Government of India.

The mining and quarrying sector's gross value added increased until 2016–17, after which it declined, possibly as a result of the pandemic. The growth of value added was particularly constant from 2013–14 to 2016–17; however, the growth of mineral GVA slowed sharply in 2017–18, remained negative until 2020–21, but recorded a sharp rise once again in 2021–22 (Figure 3). Hence, the decline in the case of minerals is not because of the pandemic; rather, it slowly recovered from the dip between 2016–17 and 2019–20 and then sharply fell as a result of the pandemic effect.

Iron Ore Production

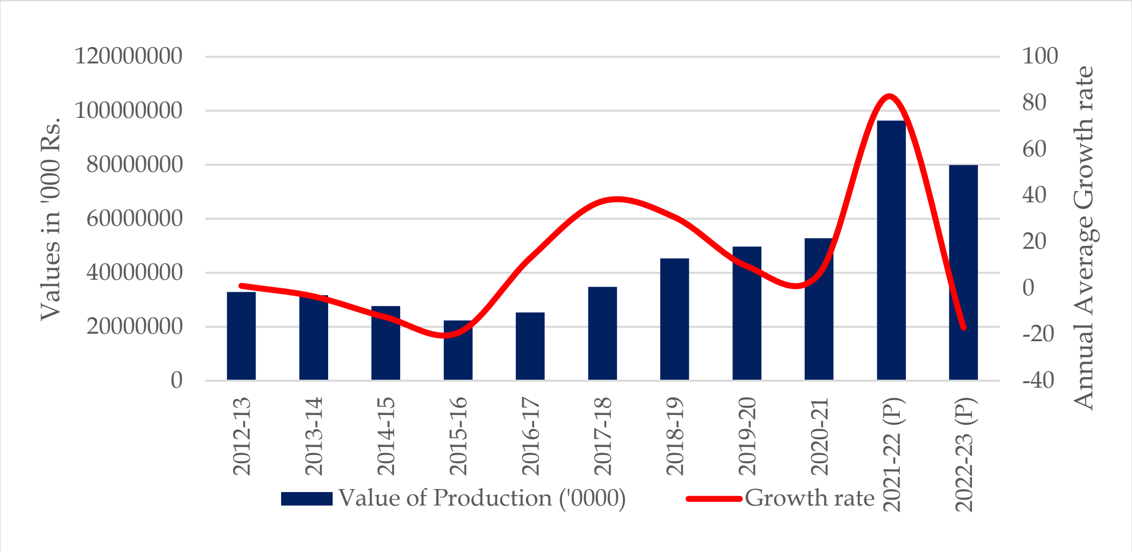
The share of iron ore production in India's GDP was around 0.44 percent in the year 2011–12, which gradually declined to 0.16 percent in 2015–16 (Figure 4). Following the implementation of the Mines and Minerals (Development and Regulation) (MMDR) Amendment Act, 2015 in January 2015, it is visible that the share of iron ore sector in GDP gradually rose, reaching around 0.25 percent in 2020–21. Figure 5 shows the value of production and the annual average growth rate of production. It is visible that the value of production declined until 2015–16, but then gradually increased until the current year (2022–23), when provisional figures show a decline.

Figure 4: Share of Iron Ore Production in India's GDP



Source: Calculated using (i) National Accounts Statistics and (ii) *Indian Minerals Yearbook* from the Ministry of Mines, Government of India, various years.

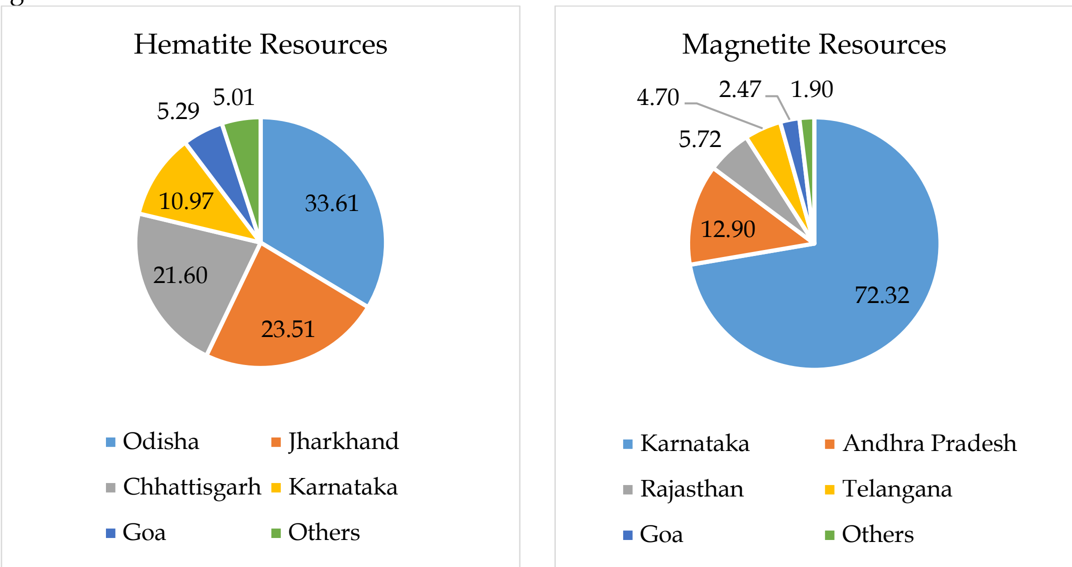
Figure 5: Growth and Value of Production of Iron Ore



Source: Calculated using *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

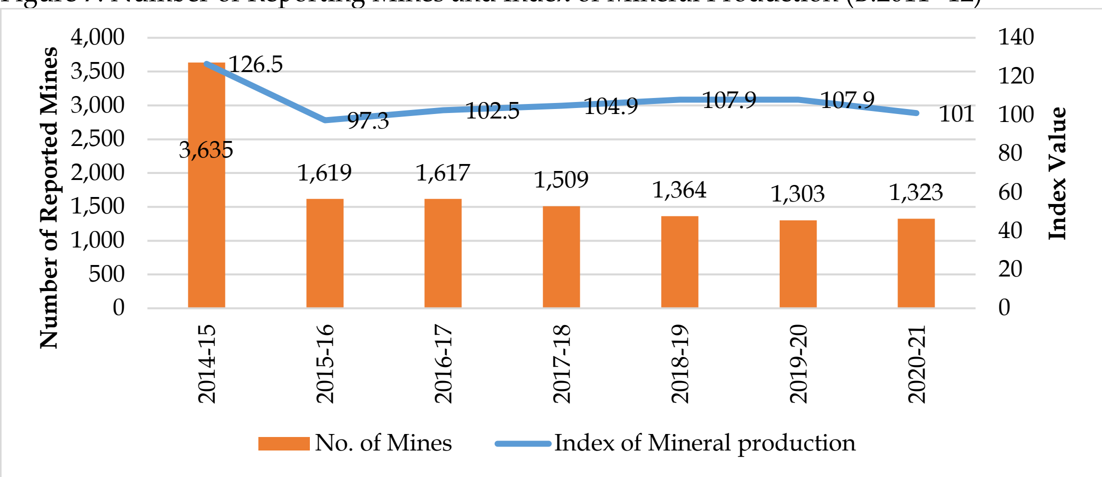
Figure 6 shows the state-wise iron ore reserves as of 2015. Odisha, Jharkhand, and Chhattisgarh have the highest concentrations of hematite reserves, while Karnataka and Andhra Pradesh have 72 percent and 13 percent of magnetite reserves respectively. It is important to note that the number of reporting mines has decreased over the last five years (Figure 7). The number of reporting mines declined to 1323 in 2020–21 from 3635 in 2014–15, which is less than a third of the initial figure. At the same time, the index of mineral production shows a rising trend since 2016–17, after suffering a sharp fall in 2015–16. Chapter 4 presents the state level findings in detail.

Figure 6: Total Iron Ore Reserves as of 2015



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 7: Number of Reporting Mines and Index of Mineral Production (B:2011–12)

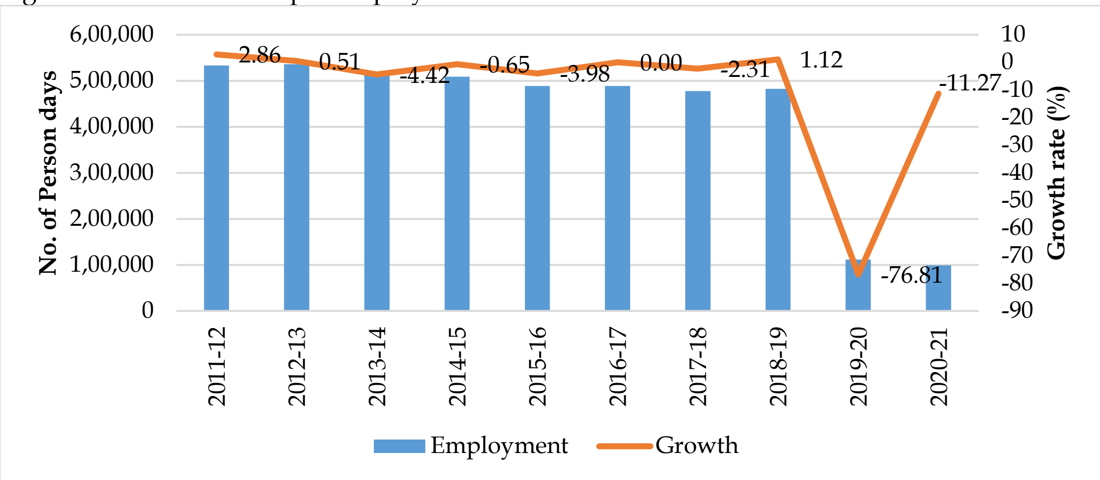


Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Employment

Since 2011–12, the mining sector has witnessed a decline in employment growth rate (Figure 8). The decline in absolute terms is also reflected in employment growth rate. Notable is the fact that, prior to the pandemic, employment growth in the mining sector was negative in 2014–15, 2016–17, and 2018–19; hence, the sharp fall in employment during pandemic years is understandable. Mining is a labour-intensive sector that employs a large number of skilled and unskilled workers. The decline in employment growth rate in mining may be due to higher capital intensity in mining or a decrease in production in absolute terms, as shown in the previous figure.

Figure 8: Number of People Employed and Its Growth Rate



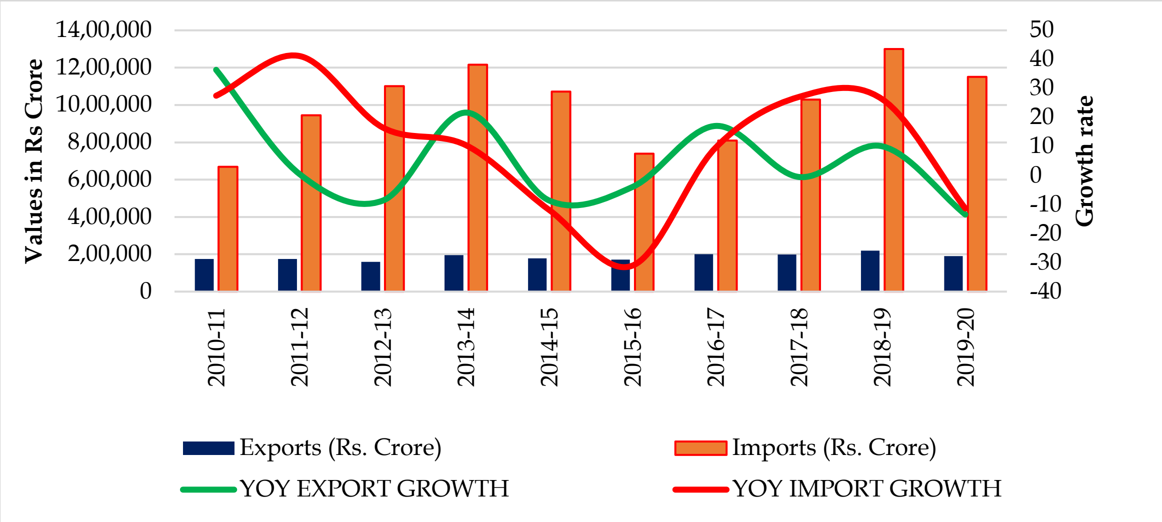
Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

2.2. Trade in Iron Ore and Minerals

The study has used UN Comtrade data and data from the Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce and Industry to bring out the detailed trade characteristics. For UN Comtrade data, product code 2601 is followed, which includes iron ore and concentrates, including roasted iron pyrites. Figure 9 shows India's trade in ***overall minerals*** over the years. Mineral imports fell between 2011–12 and 2015–16, then rose between 2016–17 and 2018–19, before falling sharply again. Exports also show a declining trend by and large, with the year-over-year growth rate increasing in 2013–14, 2016–17, and 2018–19 respectively. It is clear from the figures that India's imports have been significantly higher than its exports, and the trade deficit in this sector has increased over the years.

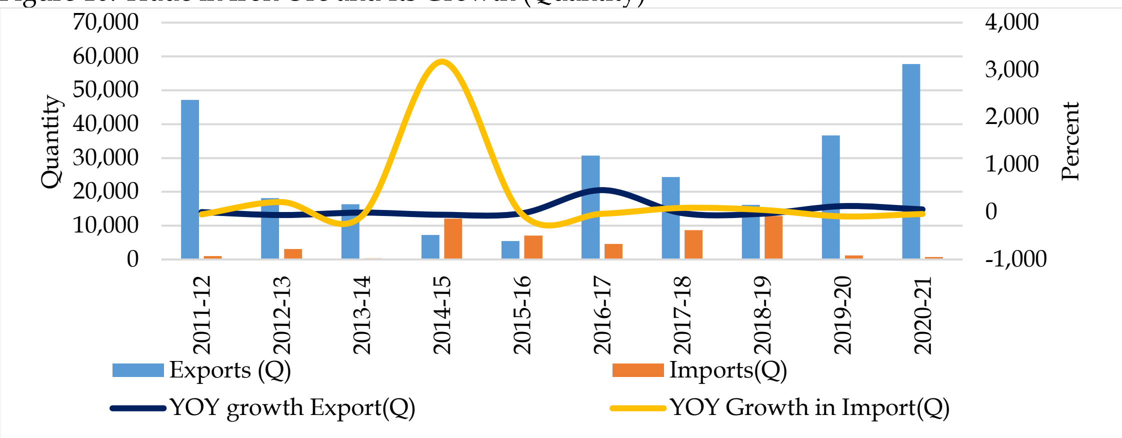
In the case of ***iron ore*,** trends in trade are different from those for the mining sector as a whole. With the exception of two years (2014–15 and 2015–16), India's exports have been significantly higher than its imports in both quantity and value (Figures 10 and 11). Iron ore exports declined during the period 2011–12 to 2015–16 but increased sharply thereafter, even though there was a dip in 2018–19 that could be attributed to the pandemic. But, essentially, both the quantity and the value of iron ore exports increased manifold between 2015–16 and 2020–21 (Figures 10 and 11).

Figure 9: Mineral Trade and Its Growth



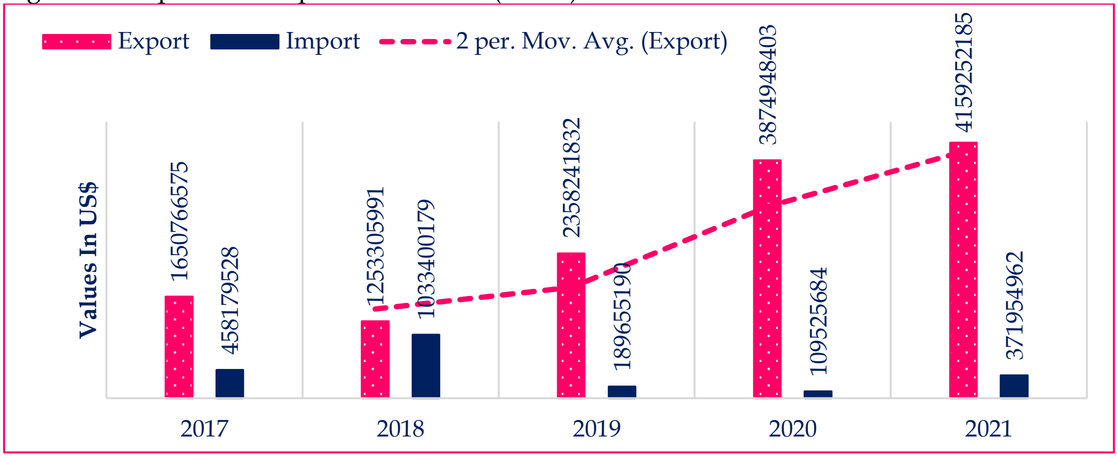
Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 10: Trade in Iron Ore and Its Growth (Quantity)



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 11: Export and Import of Iron Ore (Value)



Source: UN Comtrade Database.
Note: HS5, Commodity code 2601.

Table 2: Top Exporters of Iron Ore and Concentrates (Share, Percent)

S. No.	Nation	2017	2018	2019	2020	2021
1	Australia	33.0	29.8	35.4	37.4	41.9
2	Brazil	12.4	12.5	12.0	12.2	15.6
3	Chile	10.4	11.2	9.5	10.3	10.9
4	Canada	3.9	4.1	4.1	4.3	4.2
5	USA	3.3	3.6	3.4	2.8	2.7
6	Mexico	0.0	0.0	0.0	0.0	2.7
7	Russia	1.7	1.9	2.0	1.8	2.4
8	Ukraine	0.0	0.0	0.0	1.9	2.2
9	Indonesia	2.1	2.8	1.5	1.4	2.0
10	Sweden	1.7	1.6	1.5	1.5	1.7
11	China	0.4	0.6	0.8	0.8	1.5
12	India	1.1	0.9	1.4	1.8	1.4
	Sub Total	70.0	69.0	71.7	76.1	89.3
	Rest of the countries	30.0	31.0	28.3	23.9	10.7
	Top 3	55.8	53.4	57.0	59.9	68.4

Source: Calculated using UN Comtrade Database.
Note: HS 2017, Product code 2601, Iron ore and concentrates incl. roasted iron pyrites.

It is evident from Figure 11 that the value of iron ore exports in recent years is much higher than the value of imports. And, the value of imports remained very low at US$ 37.2 Mn in 2021. Table 2 shows the top twelve iron ore exporters in the world. Australia, Brazil, and Chile are the top three exporters, contributing around 68 percent of the total global exports. Australia is the world's biggest exporter, accounting for nearly 42 percent of global exports, and its share has increased over the years. The average share of the top three exporters was only 56 percent in 2017, which gradually increased to 68 percent in 2021. Canada, the fourth largest exporter, is likewise strengthening its export position, while USA, the fifth largest exporter, is witnessing a decline. The average share of USA was 3.3 percent in 2017, which declined to 2.7 percent in 2021. India's average share of global iron ore exports was 1.3

percent, which is higher than China's average share of 0.82 percent during the five-year reference period. This is despite China's export share being marginally higher than India's share in 2021.

China, Japan, and Germany are the top three importers of iron ore, with China alone accounting for 69 percent of imports in 2021. It is important to note that China's import share has risen over the years to 69 percent in 2021 from 57 percent in 2017, in addition to an increase in domestic production of iron ore. India ranked fifth among the importers of iron ore, slags, and ashes, accounting for 1.8 percent of all imports during the five-year reference period, and the share has only decreased over the period (Table 3).

Table 3: Top Importers of Iron Ore and Concentrates

S. No.	Country	2017	2018	2019	2020	2021
1	China	57.1	56.5	61.8	65.7	69.0
2	Japan	9.4	9.1	8.3	7.6	8.7
3	Germany	3.9	3.8	3.5	3.5	3.9
4	Spain	2.4	2.6	1.7	1.3	1.5
5	India	2.7	2.3	1.0	0.8	1.3
6	Canada	1.4	1.3	1.1	1.0	0.9
7	Netherlands	1.0	1.2	1.1	0.9	0.9
8	Finland	0.9	0.8	0.7	0.7	0.9
9	USA	1.2	1.3	1.2	0.8	0.8
10	Malaysia	0.8	1.0	1.0	0.8	0.8
	Sub Total	80.8	80.0	81.5	83.2	88.6
	Others	19.2	20.0	18.5	16.8	11.4

Source: Calculated using UN Comtrade Database.
Note: HS 2017, Product code 2601, Iron ore and concentrates incl. roasted iron pyrites.

Table 4: Export Share of Ores and Minerals in India

		(in US$ Mn.)	% Growth	Share (%)	
Commodity	**2021**	**2022 (P)**	**2022 (P)**	**2022 (P)**	**2021**
Ores & Minerals	788.6	697.0	-11.6	1.8	2.6
E8 Iron Ore	635.6	416.3	-34.5	1.1	2.1
E9 Mica	7.9	5.1	-35.2	0.0	0.0
F1 Coal, Coke and Briquittes Etc	31.7	76.8	142.2	0.2	0.1
F2 Bulk Minerals And Ores	19.4	39.8	104.7	0.1	0.1
F4 Processed Minerals	58.2	88.1	51.2	0.2	0.2
F5 Sulpher, Unroasted Iron Pyrite	13.1	36.0	175.1	0.1	0.0
F6 Other Crude Minerals	22.6	34.9	54.4	0.1	0.1

Source: Calculated using Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce and Industry, Government of India.

Table 4 shows the share of ores and minerals in a country's total exports. The share of ores and minerals in India's total export basket was 2.6 percent in 2021 and 1.8 percent in 2022. Iron ore accounts for the largest share in exports of ores and minerals, with other components of exports having a much smaller share in total exports. Other crude minerals account for 0.1 percent of the total exports. Of the total ores and minerals exports, iron ore accounts for more than 80 percent share, while processed minerals account for the second largest share at 7.4 percent.

It is evident from Table 5 that the share of ores and minerals in India's total import basket was 2.9 percent in 2021, which increased to 4.8 percent in 2022. Coal, coke, and briquittes etc. accounted for the highest share of 4.1 percent, followed by bulk minerals and ore that accounted for a 0.4 percent share. Hence, the two biggest components of India's mineral imports have been coal, coke, and bulk minerals, while the import share of iron ore has remained meagre at nearly zero percent.

Table 5: Import Share of Ores and Minerals in India

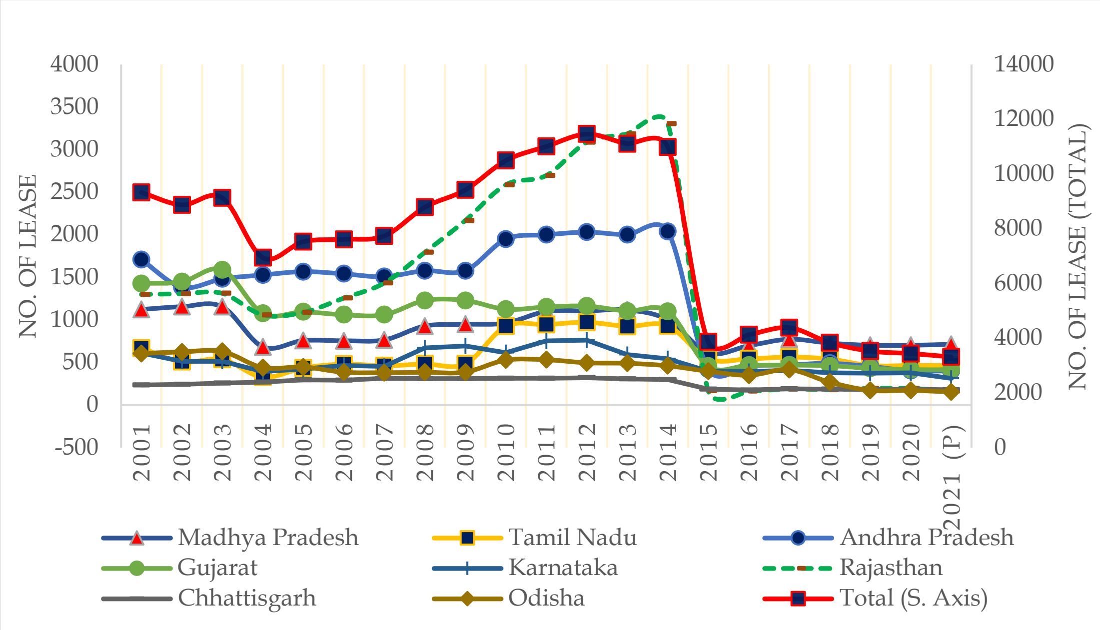
	(in US$ Mn.)		**Share (%)**	
Import share	**2021**	**2022 (P)**	**2021**	**2022 (P)**
O res & Minerals	2634.18	5745.6	2.9	4.8
E8 Iron Ore	0.1	1.5	0.0	0.0
E9 Mica	0.2	0.2	0.0	0.0
F1 Coal, Coke And Briquittes Etc	2005	4932	2.2	4.1
F2 Bulk Minerals and Ores	453	521	0.5	0.4
F4 Processed Minerals	124	198	0.1	0.2
F5 Sulpher, Unroasted Iron Pyrite	19	59	0.0	0.0
F6 Other Crude Minerals	34	34	0.0	0.0

Source: Calculated using Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce and Industry, Government of India.

2.3 Regional Distribution of Mining Lease

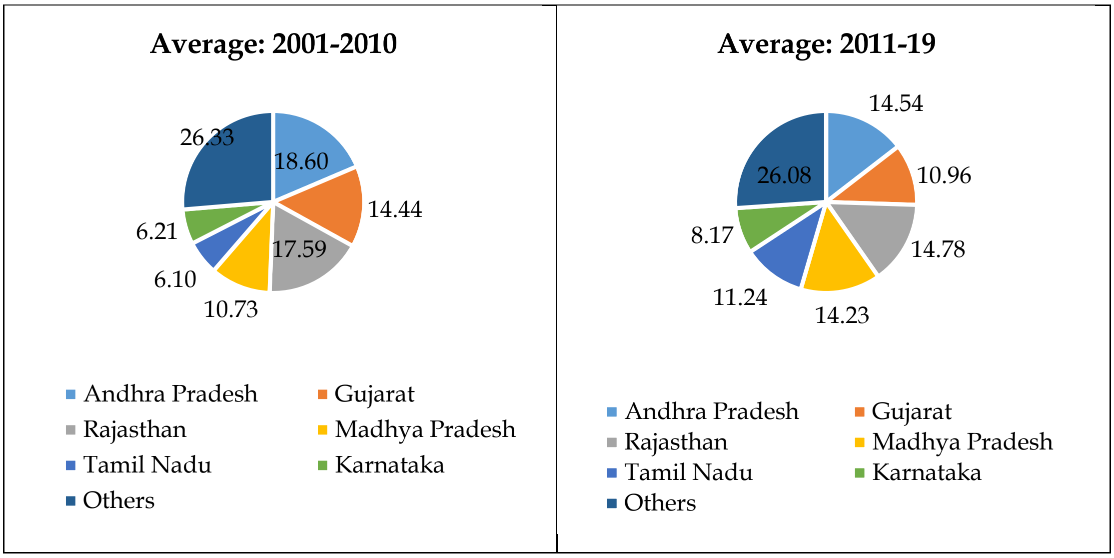
There has been a steep decline in the number of leases issued after 2015 for all major states (Figure 12). It may be linked to the MMDR Amendment ordinance that came into force from January 12, 2015, and, *inter alia*, made the auction of resources a prerequisite for the grant of prospecting license cum mining license (PL cum ML).

Figure 12: State-wise Distribution of Lease



Source: Compiled from *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

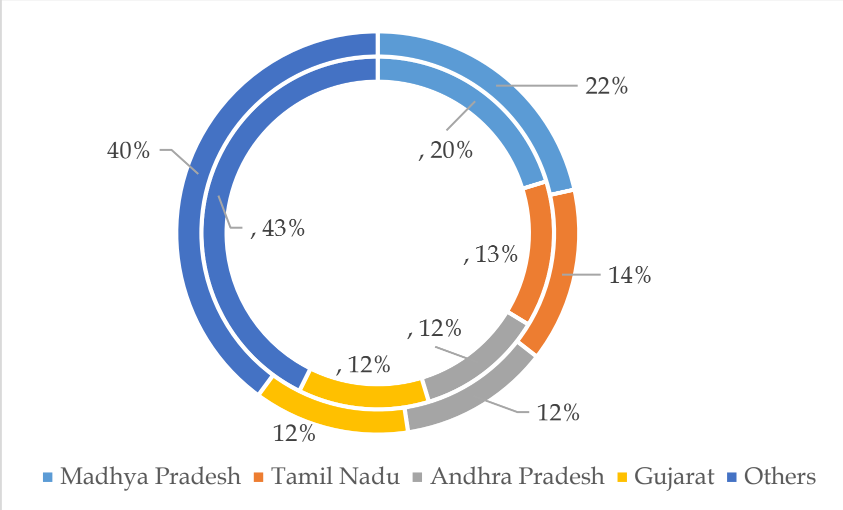
Figure 13: State-wise Distribution of Mining Lease



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

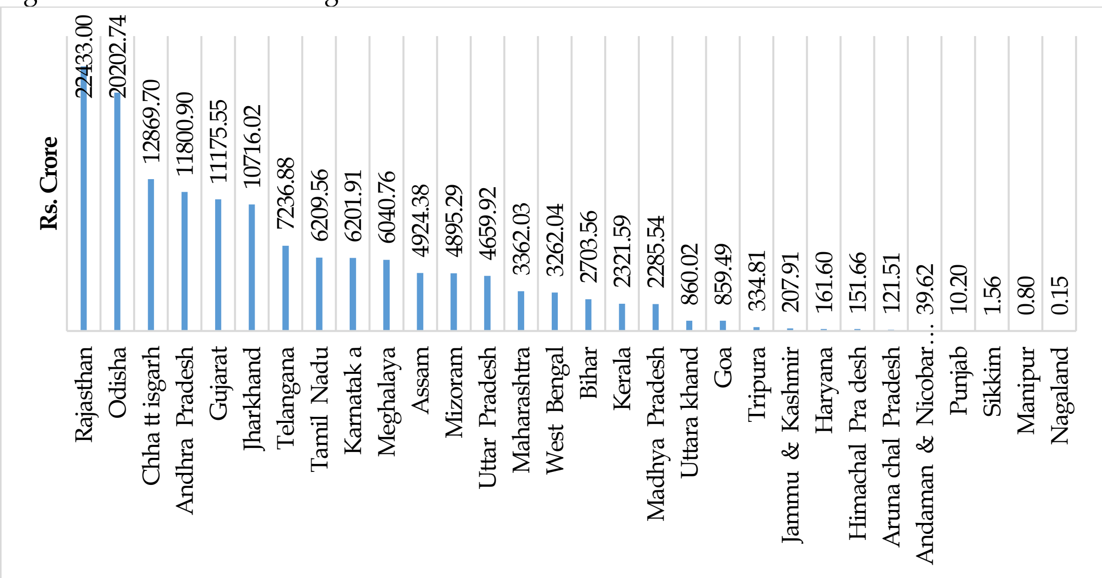
In India, mineral resources are concentrated in a few states. Andhra Pradesh, Gujarat, Rajasthan, Madhya Pradesh, Tamil Nadu, and Karnataka together account for 73.7 percent of the total mineral resources in India. Figure 13 shows that compared to the last decade, the shares of Andhra Pradesh, Gujarat, and Rajasthan have declined while that of Madhya Pradesh, Tamil Nadu, and Karnataka have increased. More recent figures for 2020 and 2021(P) show that Madhya Pradesh, Tamil Nadu, Andhra Pradesh, and Gujarat dominate the list of leases issued (Figure 14). In terms of average real value of production for the period 2011-2019, Rajasthan recorded the highest value of mineral production followed by Odisha, Chhattisgarh, and Andhra Pradesh (Figure 15).

Figure 14: Number of Leases Issued Across States: 2020 and 2021 (P)



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 15: State-wise Average Real Value of Production: 2011–19



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

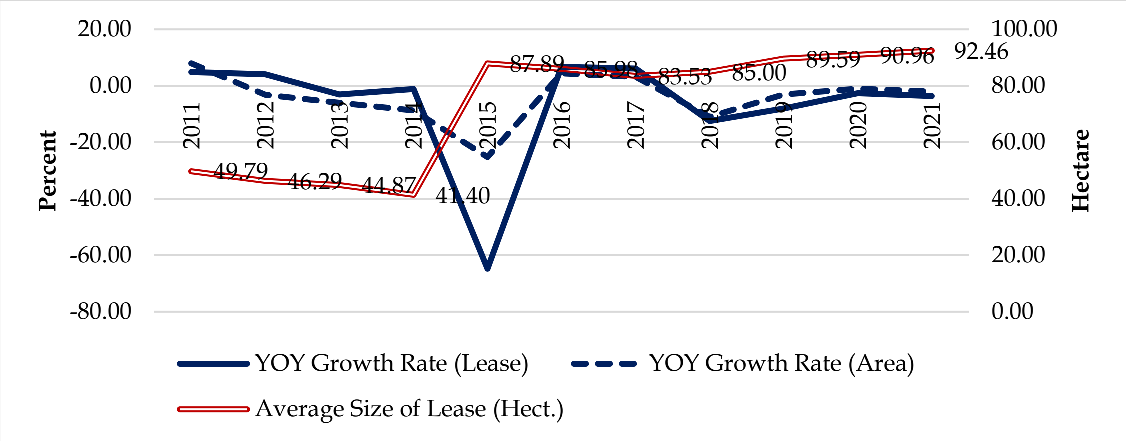
Smaller mines with less than 50 hectares account for 12 percent of the lease area and the larger mines with more than 500 hectares account for 56 percent of the total mining area (Ministry of Mines, Annual Report 2022-23). Table 6 shows the distribution and size of mining leases in India. It shows that areas larger than 200 hectares account for over 75 percent of the total mining lease areas, whereas areas larger than 500 hectares make up around 53 percent of lease areas and just 5.2 percent of the total mining lease areas. It shows that the big chunk of mining lease is concentrated in the hands of a few big players. Lease of areas less than 100 hectares account for 83 percent of the total number of mining leases, though their share in total lease area is only 15.2 percent. Out of the total of 3437 mining leases, only 179 lease units with lease areas above 500 hectares account for more than half of total area of mining lease. All these figures suggest that there is a significant number of small miners, but mining production is largely concentrated in the hands of a few big companies.

Table 6: All-India Area-wise Distribution of Mining Leases as on 31/03/2020 (P)

Frequency (Hectare)	**Number of Mining Leases**	**Percent of Total Leases**	**Lease Area (Hectare)**	**Percent of Total Area**
0to2	396	11.52	515.23	0.16
>2to5	898	26.13	3476.95	1.11
> 5 to 10	414	12.05	3045.1	0.97
> 10 to 20	388	11.29	5735.68	1.83
> 20 to 50	470	13.67	15319.63	4.90
>50to 100	274	7.97	19554.02	6.25
> 100 to 200	207	6.02	29914.08	9.57
> 200 to 500	211	6.14	69555.86	22.25
Above 500	179	5.21	165529.17	52.94
Total	3437	100.00	312645.72	100.00

Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 16: Average Size of Lease and Its Growth Over the Years



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Figure 16 shows the increase in mining leases over the years in terms of number and area, and the increase in average size of lease areas in mining. It is evident from the figure that mining is experiencing a downward trend in terms of lease area and number, and that the growth has been negative since 2018. The average size of lease area increased sharply in 2015. It actually more than doubled to 87.9 hectares in 2015 from an average size of 41.4 hectares in 2014, but then remained more or less stable, increasing marginally to 91 hectares in 2021. There may have been some consolidation in the mining sector, resulting in an increase in the average size of lease and a decrease in the number of mining leases in the recent past.

Table 7 shows the distribution of lease and area share of iron ore mines by company ownership for the period 2010–2019. In terms of leasing, the average share of public sector under central government is 5.5 percent, whereas in terms of area, it is 30 percent. The average share of public sector under state governments is 3.8 percent in terms of lease and 12.4 percent by lease area. Hence, the total publicly-owned lease in iron ore sector is 9.5 percent, and the percentage by area is 42.4 percent. On the other side, private sector accounts for 90 percent of leases and 58 percent of lease areas. Hence, the majority of iron ore leases and lease areas are owned by the private sector in India, though the public sector also owns a substantial share.

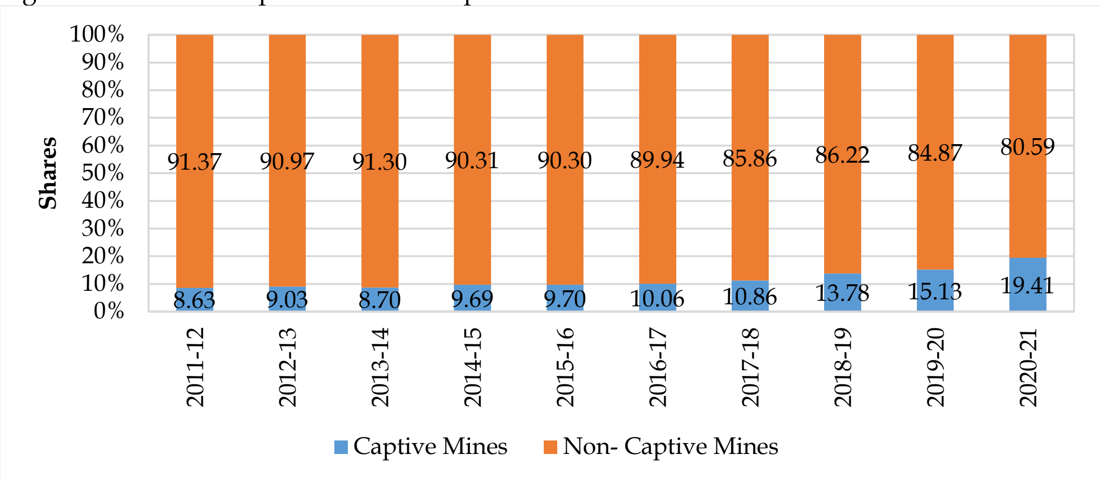
Table 7: Share in Lease and Area by Ownership Categorisation for Iron Ore

	Lease (Share)			**Area (Share)**		
	Central Govt.	**State Govt.**	**Private Sector**	**Central Govt.**	**State Govt.**	**Private Sector**
2010	4.42	3.64	91.94	24.11	10.87	65.02
2011	4.75	3.75	91.5	28.81	11.81	59.38
2012	4.76	3.38	91.85	28.94	10.95	60.1
2013	4.91	3.23	91.86	29.92	10.67	59.41
2014	5.72	3.31	90.96	32.5	11.17	56.33
2015	7.21	4.44	88.35	35.94	13.48	50.59
2016	5.19	3.37	91.44	27.92	12.44	59.64
2017	5.02	3.09	91.89	27.97	11.96	60.07
2019	7.51	6.1	86.38	31.96	18.23	49.81

Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

Captive and Non-captive Iron Ore Mines in India

Figure 17: Share of Captive and Non-captive Mines in Total Iron Ore Mines



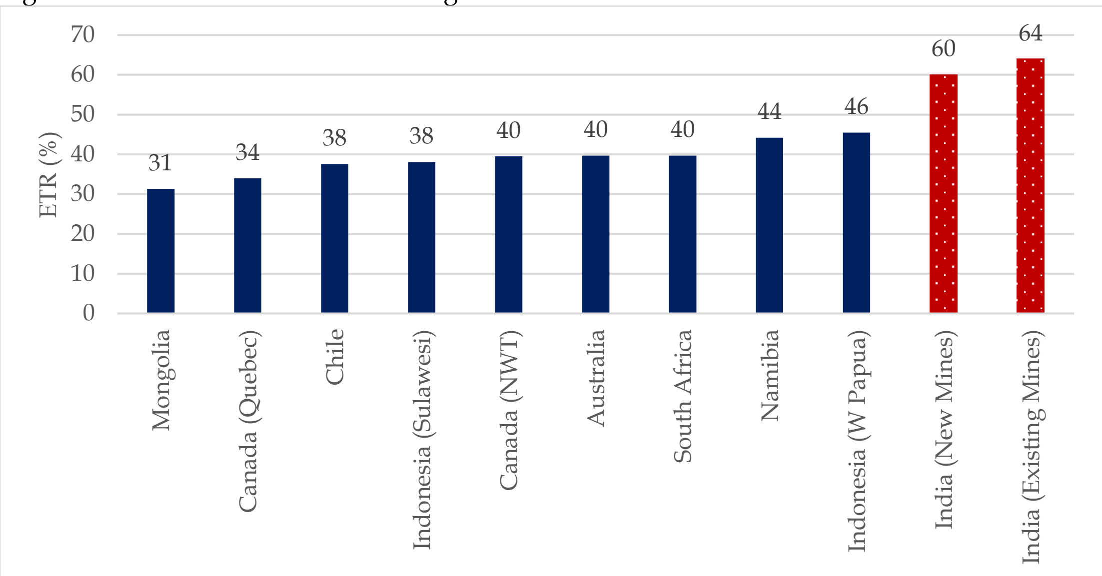
Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

In India, the share of non-captive mines is more than 80 percent, while the share of captive mines has gradually risen to 19.4 percent in 2020–21 from 8.6 percent in 2011–12 (Figure 17). It precisely indicates that big steel companies are increasingly acquiring captive iron ore mines to achieve vertical integration in production and to control fluctuations in raw material prices.

2.4 Taxes and Prices in Mining Sector

Taxes and pricing are important in determining the mining sector's production and profitability. If taxes are high, the prices of minerals increase, and producers in the forward linkage, such as those in steel and other related sectors, source minerals as raw materials from abroad. As illustrated in Figure 18, Indian mining companies face an effective tax rate that is much higher compared to other mineral-rich countries. In India, the effective tax rate for existing mines is 64 percent, whereas the rate for new mines is 60 percent. In comparison to countries like Chile, Canada, Indonesia, Australia, or South Africa, where effective tax rate is less than 40 percent, tax rates in India are significantly higher (Figure 18).

Figure 18: Effective Tax Rate in Mining Sector



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

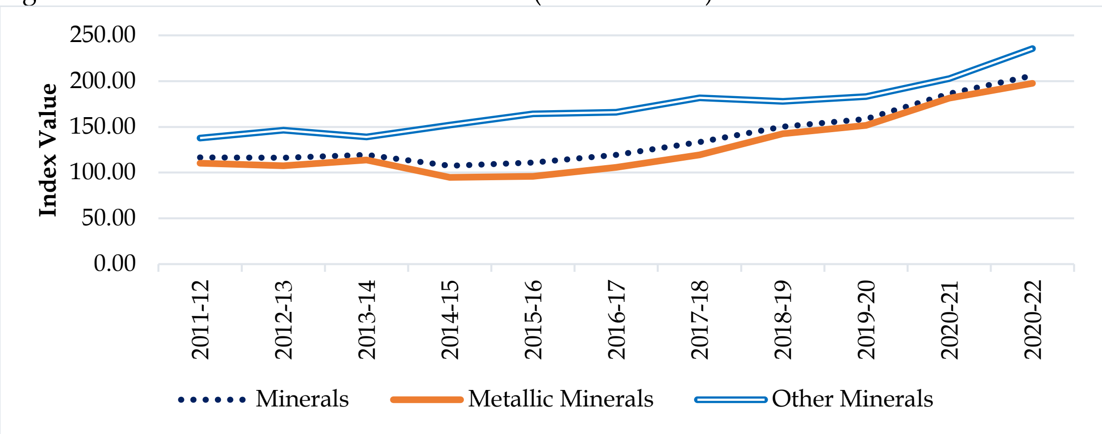
Table 8 shows the structure of corporate income tax and royalties in the mining sector, particularly in coal, gold, and iron ore. As seen, corporate income tax in mining is the second highest in India after USA, and royalties for the three aforementioned minerals are significantly higher than in the majority of mineral-producing countries, namely Brazil, Australia, Canada, Chile, and South Africa. The global average corporate income tax in mining is 24 percent, while in India it is much higher at 34 percent.

Table 8: Mining Taxes and Royalties

Country	Corporate Income Tax (in %)	Mining Taxes & Royalties			
		Method	Coal (in %)	Gold (in %)	Iron Ore (in %)
Australia	30	R	2.75 - 15	2.5 - 5	2.5 - 5
Brazil	25	R	2	1	2
Canada	25 - 31	P	2 - 16	2 - 16	2 - 16
Chile	20	P	0 - 14	0 - 14	0 - 20
China	25	R	0.5 - 4	0.5 - 4	0.5 - 4
Ghana	25	R	5	5	5
Indonesia	25	R	3 - 7	3.75	4
Mexico	30	P	7.5		
Mongolia	10 - 25	R	2.5 - 7.5	5 -7.5	5 - 30
Peru	30	P	1 - 12	6 - 21.5	6 - 21.5
South Africa	28	R	0.5 - 7	0.5 - 7	0.5 - 7
US	40	P/R	8 - 12.5	4 - 10	4 - 10
India	34	R	14	4 % of LME	15
Global Average 2014	23.57				

Source: Mining Matters for India, Federation of Indian Mineral Industries (FIMI), 2019.

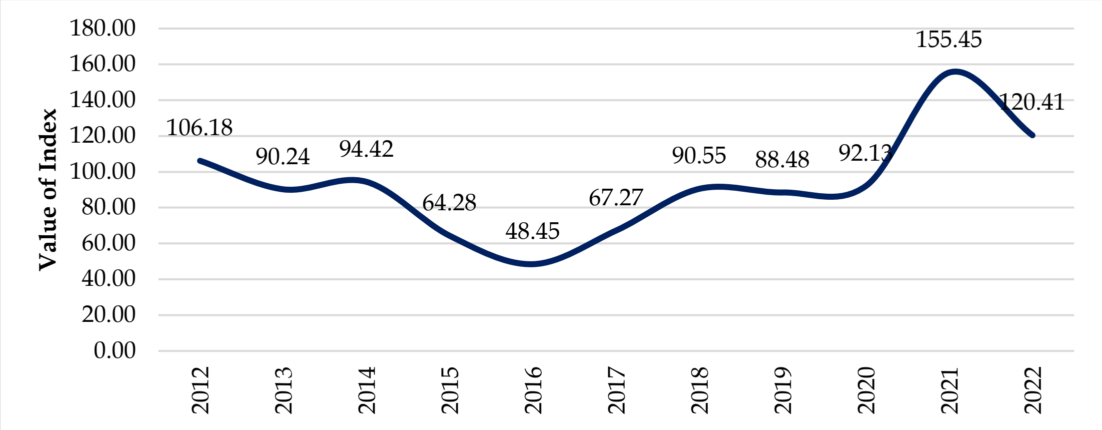
Figure 19: Wholesale Price Index of Minerals (Base: 2011–12)



Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

It is also important to take note of the movement of mineral prices over the past ten years. The prices of minerals affect prices in the forward linkages, particularly in sectors that source minerals as raw materials. The wholesale price index (WPI) has nearly doubled in the past decade. The increase has been more pronounced for other minerals, as their prices have consistently remained higher compared to the average prices in the mineral sector. The prices of metallic minerals have been lower than the mining sector's average prices, and they continue to be lower than that of other minerals. From 2015-16 to 2020-22, a steep rise has been observed in the WPI of different mineral categories (Figure 19). Since 2019, the prices have risen even more sharply because of the pandemic and the subsequent Russia-Ukraine war. The spike in prices was particularly notable during the period between September 2020 and January 2022, after which it started to decline. Figure 20 depicts the trends in iron ore prices from 2012 to 2022. Iron ore price fell to 48.45 from WPI 106.2 in 2016, but then rose sharply to 155.45 in 2021 (Figure 20). In fact, iron ore price rose sharply during the post-pandemic period because of an increase in commodity prices brought on by the war.

Figure 20: Wholesale Price Index of Iron Ore (Base: 2011-12)

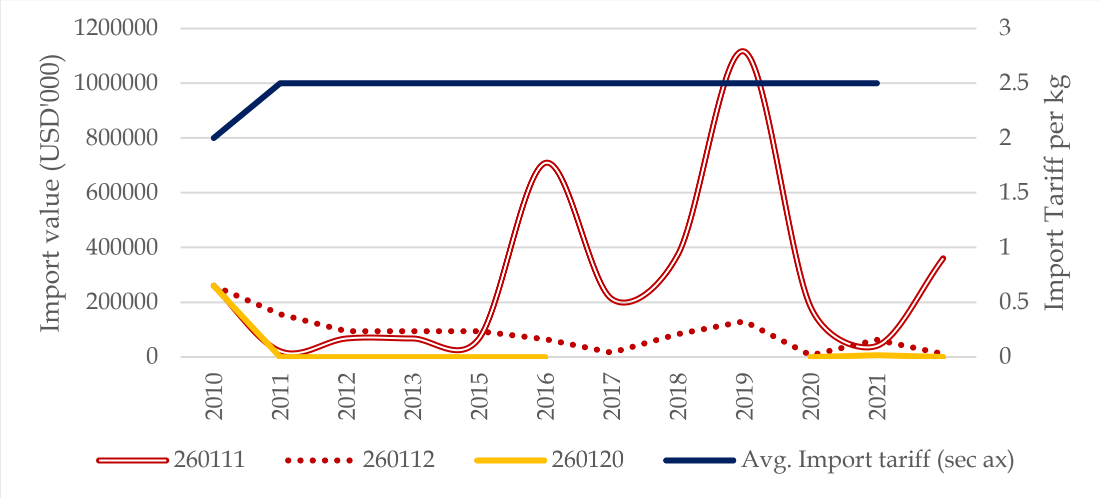


Source: *Indian Minerals Yearbook*, various years, Ministry of Mines, Government of India.

2.5 Domestic Industry Protection, Trade Tariffs and Trade Competitiveness

Iron ore minerals had been exclusively reserved for the public sector till the early 1990s. However, with the announcement of the National Mineral Development Policy in 1993, private and foreign investments were encouraged in the sector. Hence, prior to the 1990s, the domestic industry was fully protected from foreign investment. To ensure domestic availability of iron ore and related items and restrict their outflow, the government adjusts import and export duties from time to time. From 2010 to 2021, the average import tariff for all iron ore products at the six-digit level remained at 2.5 percent. As per the data from Central Board of Indirect Taxes and Customs, in 2022, the tariff rate for iron ore (product HS code 26011) hiked to ten percent, and that for agglomerated products such as pellets was kept at five percent, mainly to protect the domestic sector. However, from May 2022 onwards the rates decreased once more to 2.5 percent for all items. It is visible from Figure 21 that except for 2016 and 2019, the overall import remained very low. During those years, the absolute value was not as high. The trade data reveals that the import of iron ore in the sector is meagre owing to abundant domestic supply of iron ore resources. Further, the decision to import iron ore is influenced by transportation charges, as high transport costs can render importing raw materials economically unfeasible. Therefore, the iron ore sector in India doesn't face direct competition from external sources, as there is a guaranteed demand for it within the country. However, the downstream sectors are encountering market demand and supply challenges.

Figure 21: Import Tariff and Value of Import



Source: Based on UN Comtrade Database accessed through WITS.
Note: This data is available till 2021 only.

The Government of India has been making changes to both the export duty structure and import tariff measures to regulate the domestic availability and prices of iron ore and steel products. In May 2022, to manage the steeply rising prices of iron ore and finished steel products, Government of India raised the export duty on iron ore lumps (>58% Fe content) to 50 percent from the then existing 30 percent. Similarly, an export duty ad valorem of 50 percent was levied on iron ore with a Fe content below 58%, and a 45 percent export duty was imposed on pellets. Additionally, for alloy and non-alloy steel including pig iron,[2] 15% ad valorem was imposed. Simultaneously, import duty exemptions were granted for certain raw materials, such as Anthracite/PCI coal, coking coal & semi coke and ferronickel (Ministry of Finance, 2022).[3] As of November 19, 2022, the Government of India has revoked the export duty on these items, reverting to the pre-May 22, 2022 status. Currently, there is no export duty for lumps and fines with less than 58% Fe content, and a 30 percent duty is applicable for those with more than 58% Fe content. There is no export duty for pellets and selected pig iron and steel product categories. However, the government has imposed a 2.5 percent import duty on anthracite/PCI coal, coking coal, semi-coke, and ferronickel. The import duty for coke and semi-coke stands at five percent.

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[2] HS codes 7201, 7208, 7209, 7213, 7214, 7219, 7222, 7227.

[3] Ministry of Finance (2022), Press Release November 19. Available at: https://pib.gov.in/PressReleasePage.aspx?PRID=1877232; accessed on July , 21023.

India's Export Competitiveness in Iron Ore and Concentrates: RCA Analysis

This section analyses the export competitiveness of India's iron ore and concentrates in recent periods. As per the Indian Trade Classification (ITC) based on the Harmonised System of Coding (ITC-HS 2002), iron ore and concentrates are classified under the code heading 2601. This category comprises three 6-digit codes: (a) ITC-HS 260111: Non-Agglomerated Iron ore and concentrates like lumps, fines, and concentrates; (b) ITC-HS 260112: Agglomerated Iron ore and concentrates like pellets and sinters; and, (c) ITC-HS 260120: Roasted iron pyrites.

To assess the export competitiveness of iron ore, the study has used the Revealed Comparative Advantage (RCA) index, as commonly found in the empirical literature on trade (Rijesh, 2022). The RCA index, which was originally developed by Balassa, is an economic indicator that assesses a country's relative advantage or disadvantage in a particular product, industry, or sector. The RCA index is calculated by comparing a country's share of exports in a particular product or industry to its relative share of world exports. Specifically, the RCA of India's iron ore and concentrates can be expressed as follows:

$$RCA_{ij} = \frac{\left({EX_{ij}}/{EX_{it}}\right)}{\left({EX_{wj}}/{EX_{wt}}\right)} \quad -----------(1)$$

where

EX_{ij} is India's export of iron ore & concentrates (HS code 2601)
EX_{it} is India's total export of ore, slag, and ash (HS code 26)
EX_{wj} is the world export of iron ore & concentrates (HS code 2601)
EX_{wt} is the world's total export of ore, slag, and ash (HS code 26)

An RCA index greater than unity indicates that the country has a revealed comparative advantage in that product, while an RCA index less than unity reveals that the country has a revealed comparative disadvantage in that product. Consequently, RCA analysis allows for an understanding of a country's product specialisation and competitiveness in the global market. In this section, RCA analysis is undertaken for the entire category of iron ore and concentrates, including its three sub-components, for the period 2005 to 2022. Additionally, the study assesses India's export specialisation relative to major global producers such as Australia, Brazil, Russia, and China.

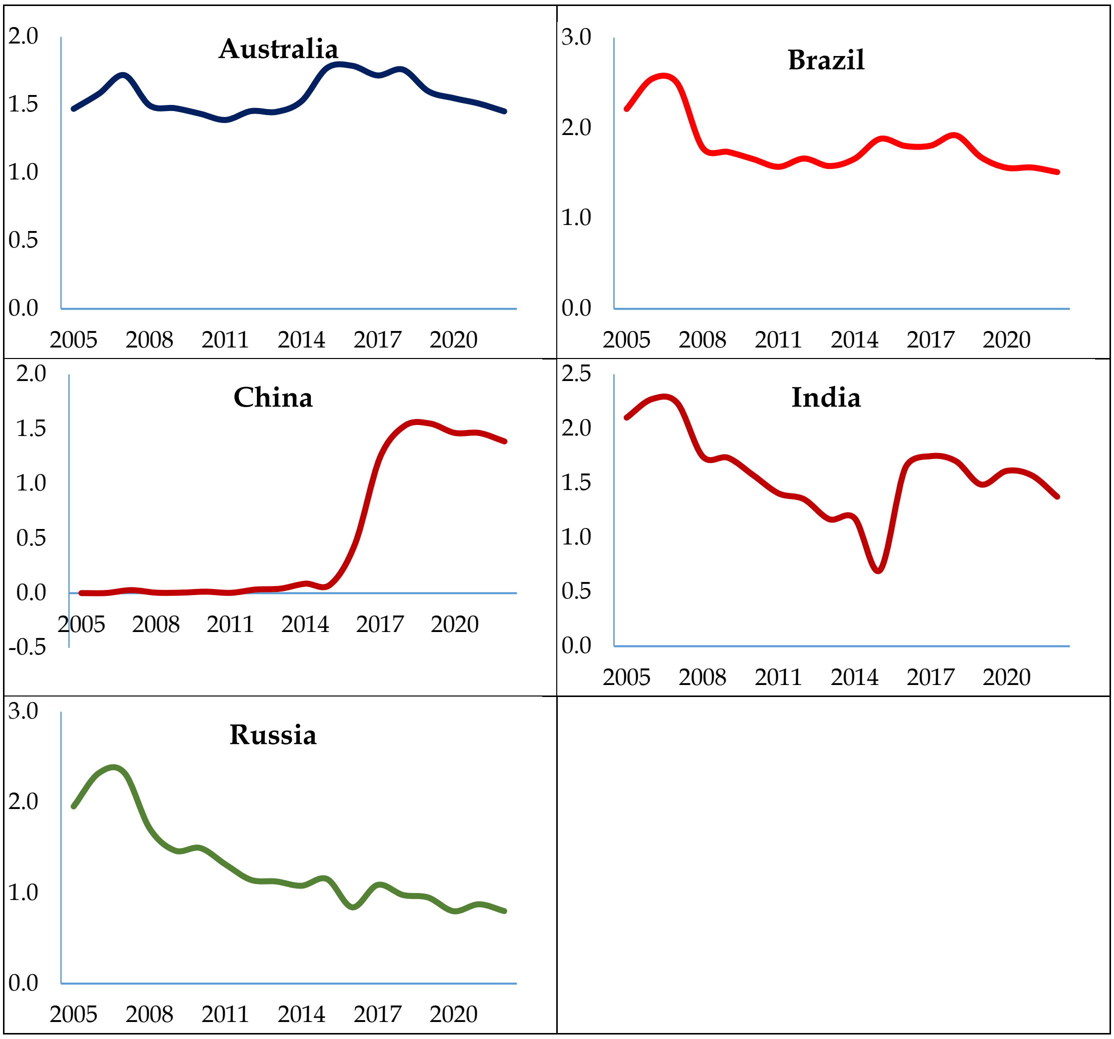
Table 9 and Figure 22 shows the result of Revealed Comparative Advantage (RCA) Indices for India's exports of iron ore and concentrates, including three sub-categories, from 2005 to 2022. It is evident that India's exports of iron ore and concentrates was globally competitive for the entire period, as the value of RCA was greater than unity throughout except in 2015. Although the RCA value was positive, it has continuously declined over time. This trend got reversed in 2015. Looking at the sub-category of iron ore, it is evident that the non-agglomerated iron ore and concentrates (includes lumps and fines, 260111) is India's major competitive item. However, it should be noted that since 2018, the export of this category has been largely uncompetitive (RCA<1). On the other side, after being largely uncompetitive in 2013, the export of agglomerated iron ore and concentrates (which include pellets, etc., 260112) has become competitive and is able to sustain its competitive position throughout the study period. Finally, in the case of roasted iron pyrites (260120), the export was uncompetitive throughout except in 2020.

Table 9: Export Competitiveness of Iron Ore and Concentrates: RCA Analysis (2005–2022)

Year	**ITC-HS (2002)**			
	2601	**260111**	**260112**	**260120**
2005	2.1	2.8	0.7	0.0
2006	2.3	3.1	0.1	0.0
2007	2.2	3.0	0.4	0.0
2008	1.7	2.3	0.4	0.0
2009	1.7	2.2	0.1	0.0
2010	1.6	2.0	0.0	0.0
2011	1.4	1.8	0.0	0.0
2012	1.4	1.7	0.0	0.0
2013	1.2	1.2	0.9	0.0
2014	1.2	1.1	1.4	0.0
2015	0.7	0.5	1.6	0.0
2016	1.6	1.0	4.7	0.0
2017	1.7	1.0	5.2	0.0
2018	1.7	0.6	6.4	0.0
2019	1.5	0.8	5.4	0.0
2020	1.6	1.1	4.9	1.1
2021	1.6	0.9	5.6	0.0
2022	1.4	0.4	7.4	0.0
India's Export to the World (Million US$)				
2005	4192.7	3775.9	416.8	0.0
2010	6146.9	6134.3	12.6	0.0
2015	210.7	113.9	96.7	0.0
2020	3874.9	2390.7	1483.9	0.3
2022	1574.0	410.3	1163.7	0.0

Source: Calculation based on HS data collected from UN Comtrade (WITS).

Figure 22: Trends in RCA Indices of Iron Ore and Concentrates by Select Countries (2005–22)



Source: Calculation based on HS data collected from UN Comtrade (WITS).

The study has also assessed the relative position of India's export performance in iron ore vis-à-vis some of the major producers in the global market. Figure 22 shows the trend in export competitiveness of iron ore and concentrates based on RCA for Australia, Brazil, Russia, and China. It is visible that Australia, Brazil, and India were able to maintain their competitiveness during the entire study period as they maintained an RCA value of more than one. In India till 2015, the RCA is showing a declining trend, thereafter the performance is improving[4]. In contrast, Russia's export competitiveness has gradually declined over time, and it has been uncompetitive in the world market since 2016. On the other side, China's exports of iron ore, which were virtually non-existent before 2016, have seen a major upward movement as the RCA index has been greater than unity since then. Although the competitive position of

[4] It is to be mentioned that the export performance also depends on the trade policies followed, as part of maintaining domestic availability of iron ore.

most countries has fluctuated over time, Australia's export competitiveness has remained largely stable from 2005 to 2022.

2.6 Green Technologies in the Mining Sector and Carbon Tax Proposal by EU

Mining activities often lead to environmental degradation; hence, there is a need for sustainable mining coupled with necessary regulations and technology interventions to address environment related issues. Because the majority of mines are located in forested regions, mining activities often lead to large-scale deforestation. The loss of forests can have several negative impacts on the environment, including soil erosion, loss of biodiversity, and changes in the local climate. Iron ore mining and processing operations can generate significant amounts of dust and other particulate matter, resulting in air pollution and associated health problems for people living in nearby regions. Mining activities can contaminate water sources with chemicals such as cyanide and mercury, causing water pollution and harming aquatic life. Mining activities such as open-pit mining can lead to soil erosion and land degradation, making it difficult to restore the land to its original state. Iron ore mining generates significant quantities of waste, including tailings and waste rock, which can pose a threat to the environment if not managed properly. Production of steel involves high energy consumption and greenhouse gas emissions that have a significant impact on the environment. Steel production largely involves the use of coal-fired power plants that release high levels of pollutants, including sulphur dioxide and nitrogen oxide, which contribute to smog, acid rain, and other environmental problems. Moreover, obsolete technologies such as blast furnaces consume large amounts of energy and emit significant amounts of carbon dioxide into the atmosphere. Mining and steel plants need to transform their existing production process to lessen environmental degradation and negative externalities they cause to the neighbourhood and the local ecology.

Some select initiatives of the government

Setting Emission Standards: The government has set emission standards for the steel industry to regulate the amount of pollutants released into the air. The Central Pollution Control Board (CPCB) monitors compliance with these standards and takes action against non-compliant facilities.

National Steel Policy: The National Steel Policy (NSP) 2017 aims to increase domestic steel production capacity to 300 million tonnes by 2030, while reducing carbon emissions and promoting the use of green technologies. The policy highlights the need to adopt energy-efficient technologies such as waste heat recovery, use of alternative fuels, and recycling of steel scrap. The policy also aims to promote the use of renewable energy sources, including wind and solar power, in the iron and steel industry.

Promoting Clean Energy: The government has launched several initiatives to promote the use of clean energy in the steel sector, including the National Solar Mission and the National Wind Mission. In addition, the government has announced its plan to raise the installed renewable energy capacity to 175 GW by 2022.

Clean Energy Fund: The Indian government has established a Clean Energy Fund to support the development and adoption of clean energy technologies in various sectors, including the iron ore sector. The fund provides financial support for research in and development of clean energy technologies, in addition to aiding in the deployment of renewable energy projects.

Green Energy Corridor: The Green Energy Corridor project aims to enable the integration of renewable energy into the national grid. The project includes the development of infrastructure such as high voltage transmission lines, substations, and grid management systems to enable the integration of renewable energy sources. The iron ore sector can benefit from this project by using renewable energy sources such as wind and solar power to power its operations.

Waste Heat Recovery Programme: The Indian government has launched the Waste Heat Recovery (WHR) programme to promote the use of waste heat recovery technologies in the iron and steel sectors. The programme provides financial incentives to companies that install waste heat recovery systems, which can help reduce energy consumption and lower carbon emissions. The programme aims to reduce energy consumption in the iron and steel sectors by up to seven percent.

Encouraging Energy Efficiency: The government has launched several initiatives to encourage energy efficiency in the steel sector, including the Perform, Achieve and Trade (PAT) scheme, which incentivises companies to improve energy efficiency through the sale of energy saving certificates.

Supporting Research and Development: The government has supported research and development efforts in the steel sector to promote the development of cleaner and more efficient technologies. The Ministry of Steel has established the Steel Research and Technology Mission of India (SRTMI) to coordinate and fund research and development activities in the sector.

Direct Reduced Iron Technology: Direct Reduced Iron (DRI) technology is a process that uses natural gas or hydrogen to transform iron ore into a high-purity, high-iron-content product. This process significantly reduces greenhouse gas emissions compared to traditional blast furnace technology. The government has incentivised the adoption of DRI technology in the steel sector through NSP.

Waste-to-Energy: The government has encouraged the development of waste-to-energy projects in the steel sector. These projects convert waste into energy through various processes such as combustion or gasification. This helps in reducing the amount of waste generated by the steel industry, while also generating clean energy.

Coal Gasification and Liquefaction: The government has launched the Coal Gasification and Liquefaction scheme to encourage the production of clean energy from coal. This technology converts coal into syngas, which can be used as a fuel for power generation or for the production of chemicals and synthetic fuels.

Steel Scrap Recycling: The government has launched the Steel Scrap Recycling Policy, which aims to increase the recycling of steel scrap in the country. Steel scrap recycling conserves natural resources, reduces energy consumption, and minimises the environmental impact of the steel industry.

Carbon Capture and Storage: The government has initiated a Carbon Capture and Storage (CCS) project to develop carbon capture and storage technology in the steel sector. This technology prevents carbon dioxide emissions from the steel production process from entering the atmosphere and causing climate change by storing them in underground geological formations.

Green Buildings: The government has encouraged the construction of green buildings in the steel sector. Green buildings are designed to be energy-efficient and environment-friendly, and may include features such as solar panels, rainwater harvesting systems, and energy-efficient lighting.

Environmental Auditing: The government has mandated that all steel plants undergo regular environmental audits to ensure compliance with environmental regulations and to identify areas for improvement. The audits assess the environmental impact of steel production processes and recommend measures to reduce the impact.

Sustainable Mining: The Sustainable Mining initiative aims to promote sustainable and responsible mining practices in the iron ore sector. The initiative encourages the use of modern technologies such as drone surveys, real-time monitoring, and automation to minimise the impact of mining activities on the environment.

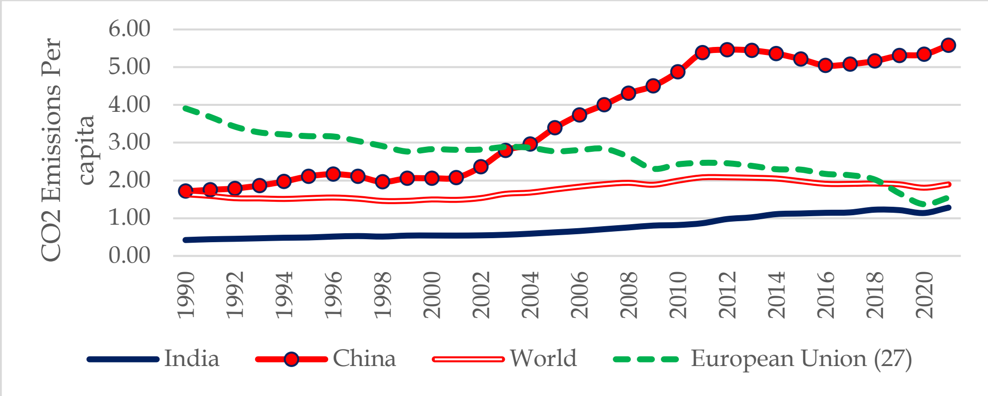
Carbon Border Adjustment Mechanism (CBAM) by the European Union

As part of its green economy efforts, the European Union has proposed to introduce Carbon Border Adjustment Mechanism (CBAM), a proposed tax on items imported from countries outside the EU. This tax will be based on the estimated amount of carbon dioxide emissions generated during their production process, and will be equivalent to the price that EU-made products already pay for similar emissions under the Emissions Trading Scheme (ETS). The idea behind this is to prevent 'carbon leakage,' which refers to the situation where the heavily pollutive industries tend to be located in countries with lower carbon pricing (Davis, 2023). The proposed CBAM is applied as an import tax to be paid by the importer when the products enter the EU, through the purchase of an embedded emission certificate. The cost of the certificate will be based on the price of carbon emissions in the EU ETS.

The EU aims to create a level playing field by taxing products from other countries with less stringent carbon emission regulations. The CBAM will be applied to a set of carbon-intensive and hard-to-abate products which includes items like iron and steel, aluminium, cement, and fertilisers. The European Commission has proposed a transition period from October 2023 to December 2025, and from January 2026 onwards importers will be required to comply with CBAM regulations (Benson, *et al*., 2023).

This proposal has generated apprehensions in developing countries with less stringent environmental regulations. For India, it is an important concern since the EU is an important trade partner. As illustrated in Figure 22, per capita carbon emissions from coal in India have increased over the years, although they are still below the world average.

Figure 22: Per capita Carbon Emission from Coal



Source: Calculated using Our World in Data, https://ourworldindata.org/co2/country/india.

In 2022, India's export of iron ore and concentrates to the EU was around US$ Mn 0.33, a significant increase compared to the previous years (Table 10). India's concern regarding CBAM may not be related to the direct export of iron ore, but rather from exporting value-added products that involve higher carbon emissions. The forthcoming chapters of this report discuss why exporting iron ore is not an ideal solution. It is acknowledged that mineral extraction is considered to have a lower environmental impact compared to steel production. Among the techniques of steel production, the blast furnace production route results in higher carbon emissions. In contrast, the direct reduced iron (DRI) process (where natural gas can be used instead of coal) and the electric air furnace (EAF) route (where steel scrap is used) are characterised by lower carbon intensity compared to the blast furnace-basic oxygen furnace (BF-BoF) route. The use of pellets as an intermediary good is also an effective way to reduce carbon emissions. As mentioned earlier, the Steel Ministry has introduced various measures to reduce carbon emissions from steel production. As a result, the CO2 emissions in the steel industry in India have decreased to approximately 2.5 Tonne/tonne of crude steel in 2020 from 3.1 Tonne/tonne of crude steel in 2005 (Minsitry of Steel, Undated). However, this value is still higher than the global average CO2 emissions of 1.4 tonnes to 1.85 tonnes per ton of steel produced (International Energy Agency, 2022). The steel industry is responsible for around 242 mt of CO2 emissions annually (Borah, 2022). According to a recent study by ICRA, in 2023, India exported around 3 to 5 million tonnes of finished steel to Europe, out of the total production of 122 million tonnes of finished steel (Narayan and Anand, 2023). In this regard, India needs to adopt measures to tackle CBAM such as the introduction of a carbon tax within India that companies can claim when exporting to the EU. Such a measure will incentivize the adoption of green technologies in a timely manner. Beyond these short-term measures, India needs to transform its steel production techniques to be more environmentally sustainable. Nevertheless, these green measures will significantly increase the cost of production, which will have a more pronounced effect on various sectors including automobile, infrastructure, and housing, given that steel is a key component in several crucial sectors.

Table 10: India's Iron Ore Export to EU Countries

India's Export of Iron Ore to EU27 (1000 US$)				India to world (1000 US$)			Share of EU exports to the world (percent)		
Year	2601	260111	260112	2601	260111	260112	2601	260111	260112
2015	0	0	0	210670	113931	96739	0.000	0.000	0.000
2016	11	0	11	1005314	537278	468037	0.001	0.000	0.002
2017	12	0	12	1650767	763281	887485	0.001	0.000	0.001
2018	31	0	31	1252527	355502	897025	0.002	0.000	0.003
2019	53	0	53	2358242	1020338	1337903	0.002	0.000	0.004
2020	8	0	8	3874948	2390703	1483900	0.000	0.000	0.001
2021	75	0	75	4159252	2109250	2050003	0.002	0.000	0.004
2022	333	0	333	1574004	410326	1163675	0.021	0.000	0.029

Source: Calculated using UN Comtrade Data accessed through WITS.
Note: HS code 4 is used here; 2601 refers to the Iron ore and concentrates; 260111 refers to non-agglomerated which includes iron ore lumps of various grades and 260112 refers to agglomerated, which includes iron ore pellets.

2.7 Concluding Observations

Mining sector in India has an important role in the country's industrial growth. India is endowed with metallic and non-metallic natural resources that can contribute to economic growth. In the recent past, the GDP from mining in India has declined, which is reflective of the fact that mining has not been able to keep pace with other sectors of the economy. However, the share of iron ore production in India's GDP is increasing from post 2015-16. It is important to note that India's import dependency on most of the minerals has been minimal, but the mining sector continues to be net deficit in terms of international trade. Nevertheless, India is hundred percent self-sufficient in iron ore production. The quality of minerals for domestic use in its forward linkage has been an issue because low quality minerals, even if produced, remain unused. Steel plants increasingly use imported raw materials as high quality minerals are available at lower prices through imports. On the other side, in India, mining has become uncompetitive in comparison to other mineral producing countries due to export duties imposed on mining products and high rates of effective income tax. However, India is increasing its export competitiveness for iron ore and related products from 2015 onwards. It is evident from the size distribution of leases that big companies control the production while relatively smaller miners face asymmetric access to market. Mining, however, involves huge start-up costs, and efficient production and return on investment depend on the scale of operation. Hence, big monopolies, whether publicly or privately owned, are likely to enjoy considerable influence over the market. More importantly, in the twenty-first century, countries cannot ignore sustainable modes of mining. Mining-related environmental degradation and ecological imbalance are major issues. The regulatory framework needs to prioritise the use of clean technology, and the conversion of existing production processes to sustainable modes of mineral production. The government has come up with various policy instruments to effect such changes, but these come at a cost to existing structures. How to balance the costs of necessary transformation while enhancing competitiveness in various segments of mining activities appears to be the real challenge ahead.

Chapter III
Legal and Regulatory Framework with Focus on Competition Issues

3.1 An Overview of Mining Laws in India

This chapter covers the legal and regulatory framework of mining of iron ore with focus on competition law. Mining laws comprise of a set of different laws and policies which govern multiple dimensions of mining activity. Primarily, the mining laws, rules and regulations are concerned with (i) the protection of labour rights and ensuring the safety of workers engaged in mining activity,[1] (ii) licensing and regulation of mining activity[2] to ensure efficient use of natural resources, (iii) ensuring the rights of local people, especially the tribal populations, displaced due to mining activity,[3] and (iv) the protection of environment.[4] Various countries are devising their own Critical Minerals Strategy as a response to the considerable dependence of numerous industries on minerals as essential raw materials[5]. Iron Ore comes under a two-stage supply risk assessment in the Critical Mineral Strategy Report of the European Union.[6]

MMDR Amendment Act of 2023 introduces the exploration license for deep-seated and critical minerals. A new Part D is introduced in the MMDR Act, 1957 to list critical minerals which were indispensable for the growth of economy. This Amendment also

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[1] For e.g., the Mines Act, 1952 provides with "the law relating to the regulation of labour and safety in mines." The Mines Rules, 1955; The Mines Rescue Rules and many such legislations government payment of wages, maternity benefit, etc. of the labour engaged in various mining activities. The Mines Act, 1952 has now been substituted with 'the Occupational Safety, Health and Working Conditions Code, 2020' by MMDR Act Amendment Act of 2021.

[2] The MMDR Act, 1957 with latest amendments of 2021, The Mineral Concession Rules, 1960, and the Mineral Conservation and Development Rules, 2017 are the basic legislations to govern this dimension.

[3] A number of cases from the mining sector are brought to the consideration of High Courts and Supreme Court under Article 21 of the Constitution of India, affecting lives of people in and around a mining activity. See Banerjee (2020).

[4] Mining projects fall under Schedule-I of EIA Notification 1994 and are required to obtain environmental clearance from the Ministry of Environment and Forests (MoEF) as per the screening criterion. Forest clearance under Forest (Conservation) Act is also specifically required if the project involves forest land. Being site specific, mining projects will also have to obtain separate site clearance from the government as specified in the EIA Notification.

[5] Grohol and Veeh (2023) Study on the Critical Raw Materials for the EU 2023: Final Report. P. O. o. t. E. Union. https://single-market-economy.ec.europa.eu/publications/study-critical-raw-materials-eu-2023-finalreport_en, accessed August 1, 2023.

[6] Id. The extraction stage covers the production of ores and concentrates. The processing stage covers the separation, refining, chemical, and metallurgical modification of raw materials.

de-notifies 12 atomic minerals specified in Part B for exploration by private companies. Critical minerals have gained significance in view of India's commitment towards energy transition and achieving net-zero emission by 2070 (MMDR Amendment Act, 2023)

The history of mineral development in India is as old as its civilisation[7]. Mineral mining and trade have been a state monopoly since the time of Kautilya[8]. During the early years of India's independence, the mining sector was recognised as a sector of 'basic and strategic' importance for the country. Accordingly, the country's Industrial Policy Resolution of 1948 recognised coal and minerals as two of the six strategic industries where only public sector was permitted to establish new undertakings.[9] Later, the Industrial Policy Resolution of 1956 included major minerals, including iron ore, into Schedule A, which is exclusively reserved for the public sector. And, the minor minerals were included in Schedule B, permitting participation from the private and state sectors. Following that, the Mines and Minerals (Development and Regulation) Act of 1957, commonly referred to as the MMDR Act, 1957, was enacted to oversee the development and regulation of mines and minerals under the purview of the Union.[10] In accordance with these provisions, the Mineral Concession Rules (MCR), 1960 and the Mineral Conservation Development Rules (MCDR), 1988 were framed.

The MMDR Act, 1957 serves as the primary legislation for the regulation of mines and development of minerals other than petroleum and gas. Over time, the MMDR Act has undergone several amendments to accommodate various modifications. Pre-1990 amendments were basically intended to increase government control on mining, whereas during the post 1990s, amendments were mainly associated with liberalising the procedures for granting mineral concessions and for facilitating private investment, including foreign investment. The MCDR, 1988 underwent a revision to incorporate the Indian Bureau of

[7] India is home to 1,531 operating mines. Production of as many as 95 minerals is undertaken in India, including four fuel minerals, ten metallic minerals, 23 non-metallic minerals, three atomic minerals, and 55 minor minerals (including building and other materials). See GoI (Undated), *National Mineral Scenario*.

[8] GoI (2006), *Mineral Royalties*.

[9] The Planning Commission (2012) study on the mining sector gives detailed information on the changes in the regulations. The study was subsequently published as *Political Economy of Mining in India* by Mohanty (2018).

[10] The Mines and Minerals (Regulation and Development) Act, 1948 underwent significant revisions in 1957, and subsequent major reviews of the legislation occurred in 1958, 1972, 1986, 1999, 2010, and 2021.

Mines (IBM), a technical agency under the central government, in the regulation of mining activities (Mohanty, 2018). The foundation of present-day mining laws can be traced back to the British era when the Mine Act of 1901 was enacted. However, it's important to note that fuel minerals (petroleum, natural gas, coal, and lignite) are governed by separate legislation and regulatory bodies.[11] While the Atomic Minerals are included in Part B of The MMDR Act, 1957, they are subject to a distinct regulatory framework due to their sensitive and strategically significant nature.[12] The MMDR Act, 1957 governs the minerals that are under the jurisdiction of both the Union and the States. According to Section 2 of the MMDR Act, the Union assumed responsibility for regulating mines and developing minerals in the interest of the public. However, it may be noted that the state governments possess ownership rights over minerals found within their respective boundaries, while the union government retains ownership over minerals lying beneath the ocean within the territorial waters of India's Exclusive Economic Zone. In the *Monnet Ispat Case*[13], the Supreme Court had clarified that "although word 'regulation' must in the context receive wide interpretation, but the extent of control by the Union as specified in 1957 Act is to be construed strictly." As a result of the regulations, the mining sector saw a significant presence of public sector enterprises during the post-independence era. In the case of Coal, in 1973, the sector was nationalised.[14] Post liberalisation, the scenario changed with the National Mineral Policy, 1993, wherein the participation of private sector including foreign direct investment (FDI) was encouraged. However, the licensing system that operated on a first-come-first-serve basis proved ineffective in driving this critical sector. Between 1994 and 2000, a series of evaluations were conducted to assess private and foreign involvement in mining activities, aiming to grant more decision-making authority to state governments without requiring central government intervention. The MMDR Act, 1957, MCR, 1960, and MCDR, 1988 were amended from time to time. The iron ore sector, which was reserved exclusively for the public sector, was gradually opened to the private sector. Also, the role of state governments expanded to granting permission/concessions (without consulting the

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[11] Directorate General of Hydrocarbons under the Ministry of Petroleum and Natural Gas (MoPNG) administers The Oilfields (Regulation and Development) Act 1948. The Petroleum and Natural Gas Regulatory Board (PNGRB) adjudicates the disputes in the sector. Matter in appeal goes to Appellate Tribunal for Electricity (APTEL).

[12] Atomic Energy Act regulates the overall sector and the Atomic Energy (Working of the Mines, Minerals and Handling of Prescribed Substances) Rules, 1984 and the Atomic Minerals Concession Rules 2016. The Atomic Minerals Directorate for Exploration and Research administers these legislations under the overall supervision of Atomic Energy Regulatory Board (AERB).

[13] *Monnet Ispat & Energy Ltd. vs. Union of India*, (2012) 11 SCC 1

[14] See The Coal Mines Nationalisation Act, 1973

central government) in non-fuel and non-atomic minerals, renewal of lapsed prospecting licenses and mining leases, transfer of mining lease, etc.[15]

National Mineral Policies of India

The National Mineral Policy (NMP) outlines the framework for the development of the mineral sector (Indian Bureau of Mines, 2015). The policy was first introduced in 1993 and revised in 2008 and 2019. The NMP was designed to ensure sustainable development of mineral resources, while protecting the environment and promoting social welfare. The policy covers non-fuel and non-coal minerals.

National Mineral Policy, 1993: Despite the economic reforms launched in the country in 1991, the Statement on Industrial Policy, 1991 continued to reserve major minerals for the public sector. The idea of private investment, including foreign participation, was first introduced in NMP, 1993. The main objective of this policy was to encourage private investment in exploration and mining of minerals, while ensuring conservation of mineral resources, environmental protection, and socioeconomic development. It laid emphasis on the rational utilisation of minerals and the need to conserve them for future generations[16].

National Mineral Policy, 2008: In September 2005, the Planning Commission appointed a high-level Committee under the Chairmanship of Shri Anwarul Hoda to review the existing policies and procedures and to make recommendations for potential reforms. The report suggested various policy changes to bring in more private investment and to attract FDI. The NMP 2008 was announced based on these recommendations. The primary objective of this policy was to ensure that the mineral sector contributes to the national economy in a sustainable and inclusive manner, aiming to maximise benefits for the country and its citizens.[17] NMP 2008 stressed the importance of striking a balance between mineral production and environmental & social considerations. It also highlighted the importance of creating a level playing field for both private and public sector players.[18] The Supreme Court of India directed the Government to have

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[15] See Mohanty (2018) for a detailed discussion.
[16] *Id*.
[17] See GoI (2006), *National Mineral Policy – Report of the High Level Committee* (Anwarul Hoda Committee Report).
[18]GoI (2008), *National Mineral Policy, 2008: For Non-fuel and Non-coal Minerals*.

a fresh look at this policy in *Common Cause Case*[19]. In May 2014, MMDR Act, 1957 was amended and replaced with the MMDR Amendment Act, 2015, which came into force in January 2015.

National Mineral Policy, 2019: The latest policy was introduced with the aim of bringing transparency, better regulation, and sustainable development to the mineral sector. It emphasised the need to explore and develop the country's mineral resources, while ensuring intergenerational equity, social welfare, and environmental protection. It also laid down provisions for creation of a National Mineral Index, establishment of the District Mineral Foundation, and the rationalisation of mineral taxes and levies[20].

The changes in National Mineral Policies over time has been directed towards promoting greater private involvement in the mining sector. These policies also prioritise the adoption of scientific mining techniques and the implementation of sustainable practices. Another important aim of these policies has been to establish a dedicated fund to aid the rehabilitation of communities impacted by mining activities. In recent years, there have been considerable transformation in mining laws and regulations, with a strong emphasis on enhancing ease of doing business and recognising the sector's potential to generate employment and contribute to the economic development of the country.[21] There are new policy initiatives, which have removed several bottlenecks with an aim to increase competitiveness in the sector. MMDR amendments from 2015 to 2021 were undertaken in this direction. [22]

MMDR Amendments (2015)

During the pre-2015 period, mines were granted on a 'first come first serve' approach, which was deemed discretionary and non-transparent. The policies relating to renewal of mining lease were also found to be an obstacle in attracting private investment. Further, it was found that the allocation of mineral concession was not generating any revenue to the government other than royalty. This led to delays in granting new concessions and renewal of existing licenses, ultimately causing a decline in

[19] *Common Cause vs. Union of India*, Decided on August 2, 2017, (2017) 9 SCC 499

[20] GoI (2019), *National Mineral Policy, 2019*.

[21] GoI (2021), "Year End Review – 2021 – Ministry of Mines."

[22] GoI (2021), "The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2021 Notified: New Rules Provide for Sale of 50% of Mineral Produced from Captive Leases."

production and affecting the supply to the downstream manufacturing sector (GoI (2021). A series of reforms were announced to comprehensively revise the regulatory issues in the mining sector. The 2015 amendment of MMDR introduced (i) mandatory auction system for mineral concession to improve transparency in the system, (ii) establishment of District Mineral Foundation (DMF) and National Mineral Exploration Trust, and (iii) stringent penalties for illegal mining, with fines increased to Rs 5 lakhs per hectare (from Rs. 25 thousand) and the possibility of up to five years of imprisonment (increased from 2 years).[23]

Mineral Laws (Amendment) Act, 2020

As of March 2020, around 334 mines had licenses that were expiring (of which 46 were non-captive working mines). While certain states initiated the auction process, commencing mining operations necessitated obtaining around 23 clearances from various agencies. Needless to say, this resulted in significant delays in mining activities, subsequently impacting production in downstream industries. To address this issue, the MMDR Act of 1957 was amended through the Mineral Laws (Amendment) Act, 2020, aiming to facilitate the smooth transition of these mines, and ensure a steady supply of minerals. This Act allowed the state government to auction the mining lease before expiry. Before this, government did not have power to initiate auction before the expiry of the mining lease period. Further, this Act enabled the transfer of all statutory clearance to the new bidder for two years. During this two-year period, the successful new bidder is required to acquire all necessary clearances before commencing operations, while also having the option to undertake mining activities (Government of India, 2021).

MMDR Amendment Act (2021)

The MMDR Act, 2021 aims to introduce significant structural changes in the functioning of the mineral sector. The policy targeted the implementation of the following major changes.

(i) Increase Production and Revitalise the sector

The main objectives of the policy are to enhance the availability of iron ore by redefining the distinction between captive and merchant mines, resolving pending

[23] MMDR amendments 2016 and 2020 aimed at addressing issues concerning the transfer of non-auctioned captive mines and the challenges related to leases getting expired in March 2020.

license cases by incorporating them into the new auction system, and reallocating non-producing iron ore blocks owned by government companies. Additionally, under this policy, captive mines are permitted to sell up to 50 percent of their surplus iron ore annually, while end-use restrictions have been eliminated for future allocations. Furthermore, there were approximately 500 pending cases under section 10A(2)b.

Regarding captive mines, a report (Bhandari, 2009) submitted on the Indian Steel Industry commissioned by the Competition Commission of India (CCI) in January 2009 sheds light on the disadvantages of captive mining and subsidies within the Indian Steel Industry (which will be alluded to further in this report, particularly in the Iron Ore context, building upon the arguments outlined in the said report). The report has highlighted the following observations: (i) Several of the government's policies such as the priority allocation of mineral resource assets for captive use, exports tax, and tax sops to attract investment to specific regions have in-built non-competitive elements. (ii) The recent introduction of captive mining and prioritisation of mining leases for end-user industries, along with the implementation of export taxes on steel and iron ore, has raised significant concerns about their adverse implications on market competition. (iii) The commission shall monitor price announcements made by major players and look for potential cartels. (iv) The mergers and amalgamations in the sector require a closer scrutiny. (v) State-level subsidies may affect the competitiveness of firms in the industry and create an uneven playing field. In this regard in the MMDR Amendment Act, 2021 made a substantial reform by eliminating the distinction between captive and non-captive mines, which in the long run may help reduce the unequal cost advantage enjoyed by some companies.

(ii) Promote Ease of Doing Business

This Act further simplified the administrative procedures for mineral operations. Even after the expiry or termination of the mining lease, the validity of the statutory clearance will persist and it shall be transferred to the next lessee, ensuring uninterrupted mining operations.

(iii) Other Structural Reforms

The amendment also granted the central government the authority to conduct auction in situations where the state faces challenges in conducting the auction or fails to do so within the prescribed timeframe, after consultation with the state government.

3.2 Regulations and Regulators on Mining Operations

Mining is a scientific activity and requires a number of resources. Following a well-planned scientific process is a must for obtaining maximum benefit from mining activity, not only for the mine owners but also for the community at large. The United Nations Framework Classification (UNFCC) of Mineral Reserves/Resources provides for a three-dimensional system that includes geological assessment, feasibility assessment, and economic viability[24]. A typical successive stage of geological assessment comprises four stages, i.e., reconnaissance survey (G4)[25], prospecting or preliminary exploration (G3)[26], general exploration (G2), and detailed exploration (G1)[27]. A mining operation[28] follows the aforesaid stages which are based on the feasibility assessment and economic viability of the project[29]. The recent amendment to MMDR Act in 2021 has introduced the concept of a 'composite license'[30]. Composite license includes a twined prospecting license and mining lease, which is a two-stage concession, that allows for a smooth and uninterrupted transition from prospecting operations to mining operations. *The Minerals (Evidence of Mineral Contents) Rules, 2015*

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[24] See Guidelines Under MCDR for United Nations Framework Classification of Mineral Reserves/Resources (See Rule 45 (1) (c) and Forms H-1 to H-8 and H-9). Available at: https://ibm.gov.in/writereaddata/files/07042014175101unfc.pdf

[25] Section 3(ha) - 'Reconnaissance operations' means any operations undertaken for preliminary prospecting of a mineral through regional, aerial, geophysical or geochemical surveys and geological mapping, but does not include pitting, trenching, drilling (except drilling of boreholes on a grid specified from time to time by the central government) or sub-surface excavation. Included vide Amendment of 1999 to facilitate investment through deployment of state-of-the-art exploration technologies and accelerate exploration of mineral resources.

[26] Section 3 (h) MMDR Act– 'Prospecting operations' means any operations undertaken for the purpose of exploring, locating or proving mineral deposit.

[27] These stages of exploration lead to four resource categories, namely Reconnaissance Mineral Resource, Inferred Mineral Resource, Indicated Mineral Resource, and Measured Mineral Resource respectively, reflecting the degree of geological assurance.

[28] Section 3(d) MMDR Act- 'Mining operations' means any operations undertaken for the purpose of winning any mineral."

[29] Reconnaissance Mineral Resource (334), Inferred Mineral Resource (333), Indicated Mineral Resource (332), Measured Mineral Resource (331), Probable Mineral Reserve (121 and 122), Proved Mineral Reserve (111), Feasibility Mineral Resource (211), Pre-Feasibility Mineral Resource (221 and 222), Modifying Factors, Geological Study (F3), Pre-Feasibility Study (F2), Feasibility Study (F1), Intrinsically Economic (E3), Potentially Economic (E2) and Economic (E1) are defined in Schedule I of the Minerals (Evidence of Mineral Contents) Rules, 2015.

[30] Section 3(a) - 'Composite license' means the prospecting license-cum-mining lease which is a two-stage concession granted for the purpose of undertaking prospecting operations followed by mining operations in a seamless manner.

(MEMC Rules) lay down the mineral exploration rules and reporting framework as per international standards[31] for determining the threshold value of minerals[32].

Mines are classified either as Category A or Category B based on the following two parameters: (i) fully mechanised mines where work involves the use of heavy mining machinery for tasks like deep hole drilling, excavation, loading, and transportation, or (ii) mines with an average employment exceeding one hundred and fifty in total or seventy-five workers underground, or mines where any of the mining operations, such as deep hole drilling, excavation, loading, and transportation is carried out with the help of heavy machinery[33]. Mines that meet any of the aforementioned criteria are categorised under Category A mines, while the rest fall under Category B. Depending on the category, compliance requirements differ; for instance, Category A mines must appoint whole-time geologists and mining engineers as a necessary measure.

Regulation of 'Mining Operations'

Any operation undertaken for the purpose of winning any mineral requires a license or lease from the government[34]. Primary legislations that govern the technical dimensions of licensing and regulation of the mining sector in India are:

A. The MMDR Act, 1957[35]
B. The Mineral Concession Rules, 1960 *replaced with* Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2015[36]

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31 Drawn from UNFC and Committee for Mineral Resources International Reporting Standards (CRIRSCO) Template.

32 Section 3(e) – "…means the limits prescribed by the Indian Bureau of Mines from time to time based on the beneficiability and marketability of a mineral for a given region and given time, below which the material obtained after mining can be discarded as waste."

33 Rule 55 of the Mineral Conservation and Development Rules, 2017.

34 Section 4 of MMDRA – Prospecting or mining operations to be under license or lease.

35 The MMDR Act, 1957 was enacted to regulate the mining and development of minerals in India and to bring minerals under the control of the central government (Union). The act was introduced to ensure systematic and scientific mining, prevention of illegal mining, conservation of minerals, and the promotion of mineral development in the country. It covers grant of mineral concessions, regulation of mining operations, establishment of regulatory bodies, and management of mineral resources. It empowers the central government to formulate rules and regulations related to mineral exploration, mining leases, and mineral conservation. Entry 53 of the Union List of the Constitution empowers the Union for 'regulation and development of oilfields and mineral oil resources; petroleum and petroleum products; other liquids and substances declared by Parliament by law to be dangerously inflammable.

36 Rule 55 - the Mineral Concession Rules, 1960 shall cease to be in force with respect to all minerals for which the Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2015 are applicable, except for actions taken or omitted before the new rules come into effect.

C. The Mineral Conservation and Development Rules, 2017[37]
D. The Minerals (Evidence of Mineral Contents) Rules, 2015
E. The Mineral (Auction) Rules, 2015

The Constitution of India in Union List entry 54 provides for "regulation of mines and minerals development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest." Subject to the overarching power of the Union mentioned above, the state governments have power of 'regulation of mines and mineral development' under Entry 23 of the State List. In 1999, the scope of the MMDR Act changed from '*regulation of mines and the development of minerals*' to '*development and regulation of mines and minerals under the control of the Union*.' This move reflects a more liberal approach to the mineral sector, focusing on development first and then regulation. MMDR Act comprises of provisions enforcing mineral conservation legislation, conducting systematic and scientific mining, supporting domestic mineral development, and ensuring environmental preservation.

The First Schedule of MMDR Act classifies 'specified minerals' into three parts: Part A (hydrocarbons/energy minerals), Part B (atomic minerals), and Part C (metallic and non-metallic minerals)[38] (MMDR 2023 Amendment introduces Part D to the first schedule listing 24 critical and strategic minerals). The central government exercises control over the minerals listed in Part A and B through an approval mechanism for grant of leases on these minerals[39]. Lease for Part C minerals are granted by the state government, subject to compliance of rules framed by the central government. 'Iron ore' features in Part C along with copper, gold, bauxite, manganese, etc. State government has complete sovereignty and ownership over the minerals within its jurisdiction, unless denied to it expressly by an appropriate law passed by the

[37] The central government has framed the Mineral Concession Rules, 1960 (MCR) for regulating grant of reconnaissance permits (RP), prospecting licenses (PL) and mining leases (ML) in respect of all minerals other than atomic minerals and minor minerals. The state governments have framed the rules in regard to minor minerals. The central government has also framed the Mineral Conservation and Development Rules, 1988 (MCDR), for conservation and systematic development of minerals. These are applicable to all minerals except coal, atomic minerals, and minor minerals.

[38] Metallic and non-metallic minerals, i.e. asbestos, bauxite, chrome ore, iron ore, lead, etc.

[39] For example, no prospecting license granted in respect of a mineral included in Part A and Part B to the First Schedule shall be renewed except with the previous approval of the central government – Section 7(2) second proviso MMDRA 1957.

Parliament[40]. For example, central government is empowered to conduct auction in cases where the states face challenges in conduct of auction or fail to conduct auction within the prescribed time fixed[41] in consultation with state government[42]. However, the revenue from auctions will accrue to the state government[43].

The Mining Regulators

Mining is a regulated activity as it cuts across several dimensions of sustainability and utilisation of natural resources. The regulation of mining sector has traditionally followed conventional methods, involving a strict regime of approvals and compliances. As the regulatory space in mining sector is concurrent, shared by central and state governments, it has led to certain ambiguities and uncertainties, which were brought to light during the *Shah Commission Inquiry*[44].

Public Interest Litigations and Constitutional Courts – The Supreme Court of India has significantly contributed to the transformation of the mining sector in India through groundbreaking rulings and the use of judicial review invoking Article 21 of the Constitution of India, which empowers the court to pronounce judgements on life and liberty.[45] The *Shah Commission report* on illegal mining and subsequent Supreme Court rulings had put a hold on mining activity, particularly in Goa and Telangana. The decision had also affected other mining states, given the stringent compliance requirements by the Supreme Court, especially with reference to environmental concerns.

Ministry of Mines is responsible for survey and exploration of all minerals (except coal and lignite, natural gas, petroleum, and atomic minerals); for mining and metallurgy of non-ferrous metals like aluminium, copper, zinc, lead, gold, and nickel; and, for administration of the Mines and Minerals (Regulation and Development) Act, 1957 in

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[40] *Monnet Ispat & Energy Ltd. vs. Union of India*, (2012) 11 SCC 1.

[41] Prior to auction regime in India, 66,477 applications were pending with both central and state governments, including 43,025 mining lease applications as on 05.05.2014, see FIMI (2021) para 1.6.

[42] Rules 9A and 17A of the Mineral (Auction) Rules, 2015.

[43] GoI (2021), Year End Review – 2021 – Ministry of Mines.

[44] The central government constituted Justice M B Shah Commission of Inquiry (Commission) to inquire into large scale illegal mining of iron ore and manganese ore in the country vide notification No. S.O. 2817(E) dated November 22, 2010. These inquiries were conducted with respect to the states of Odisha, Jharkhand, Chhattisgarh, Karnataka, Andhra Pradesh, Goa, and Madhya Pradesh. Available at: https://www.mines.gov.in/ViewData/OldArchives?mid=1333

[45] *Samaj Parivartan Samudaya & Ors. vs. State of Karnataka and Ors*. (Writ Petition (Civil) No. 562 of 2009).

respect of all mines and minerals other than coal, natural gas, and petroleum.[46] Each state government has its own department (by whatever name they are called) that is responsible for regulating the mines and mineral sector as per MMDR Act and the respective Mineral Concession Rules. The MMDR Amendment 2015 introduced mandatory auction for the grant of mineral concession by the state governments[47] and the period of mining lease was increased to 50 years from 30 years [48]. Prior to the 2015 amendment to the Act, mining lease were granted for a maximum period of 30 years, with the provision for further renewal at the discretion of the authorities. This discretionary approach often led to uncertainty for the lease holders, as governed by Section 8A of MMDR Act, 1957. Further information regarding the reforms in the Mining Sector can be found in subsequent sections of this report.

Geological Survey of India – Set up in 1851, the main functions of GSI relate to creation and updation of national geoscientific information and mineral resource assessment[49]. Under MMDR Act, the central government may empower GSI to carry out certain functions/investigations relating to mineral development[50]. GSI is also empowered to carry out prospecting operations without a prospecting license[51].

Indian Bureau of Mines – The primary mission of Indian Bureau of Mines (IBM) is to promote systematic and scientific development of mineral resources of the country (both onshore and offshore), through regulatory inspections of the mines, approval of mining plans, and environment management plans to ensure minimal adverse impact on environment (Indian Bureau of Mines, Undated). The IBM acts as a conduit between the central and the state governments in regulation of mining activities, and operates through its 4 zonal and 13 regional offices(Indian Bureau of Mines, 2012).

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46 See Ministry of Mines website https://mines.gov.in/

47 Basis of this decision were the judgments of the Supreme Court in the 2G Case, Coal Block Allocation Case and the opinion on Presidential reference, see https://www.mines.gov.in/writereaddata/UploadFile/agendanotes090617.pdf

48 Before amendment to the Act in 2015, mining lease was granted for a maximum period of 30 years, with the provision for further renewal, which was discretionary, resulting in uncertainty for the lease holder - Section 8A of MMDR Act, 1957.

49 These objectives are achieved through ground surveys, air-borne and marine surveys, mineral prospecting and investigations, multi-disciplinary geoscientific, geo-technical, geo-environmental and natural hazards studies, glaciology, seismotectonic study, and carrying out fundamental research.

50 Section 18A of MMDR Act.

51 Proviso to Section 4 of MMDR Act.

National Mineral Exploration Trust – The central government[52] established National Mineral Exploration Trust (NMET) with the objective of expediting mineral exploration in the country. The Trust receives contribution from Mining Lease and Prospecting License-cum-Mining Lease holders, who contribute two percent of the royalty for minerals listed under the second schedule. These contributions are made to NMET alongside their regular royalty payments. Out of the 169 mineral exploration projects approved by NMET, 17 projects pertain to iron ore[53].

Having discussed the major regulations at the central level, the following section gives a brief idea on the state level regulations.

3.3 Issues from the State Level Mineral Laws and Policies

As discussed earlier, state governments are the actual owners of minerals; however, they are required to adhere to the regulations set by the central government under MMDR Act and associated rules listed above. However, the state governments play an important role in implementing the central government laws and policies on mining in their respective jurisdictions. Each state government has its own dedicated department to deal with two dimensions, i.e. mining exploration and mining administration (including checks on illegal mining). State governments also have full autonomy over minor minerals, which are regulated through their respective minor mineral concession rules[54].

Table 1: State Departments dealing with Mines

State	***State Department Dealing with Mines***
Odisha	The Steel and Mines Department[55] and the Directorate of Mines, the Directorate of Geology and Odisha Mining Corporation Ltd.
Karnataka	Department of Mines and Geology[56]
Chhattisgarh	Mineral Resources Department[57] and Directorate of Geology and Mining
Jharkhand	Department of Industries, Mines and Geology[58] having separate Directorates for Mining and Geology.

52 Vide Gazette Notification G.S.R.633(E) of 14th August 2015, in pursuance of subsection (1) of Section 9C of the MMDR Act, 1957

53 See https://nmet.gov.in/

54 For example, see Orissa Minor Mineral Concession Rules, 1990; Karnataka Minor Mineral Concession Rules, 1994.

55 See https://steelmines.odisha.gov.in/about-us/about-department. Also see https://www.odishaminerals.gov.in/

56 See https://dmg.karnataka.gov.in/en

57 See https://khanijonline.cgstate.gov.in/

58 See https://minerals.jharkhand.gov.in/#

State	State Department Dealing with Mines
Madhya Pradesh	Mineral Resources Department[59] and the Directorate of Geology and Mining and the Madhya Pradesh State Mining Corporation as a public sector enterprise.

Source: Compiled

The aforesaid five states have been examined on the basis of their production of iron ore. A model State Mineral Policy was circulated (October 2009) by the central government to the state governments requiring them to develop suitable mineral policies for their respective states within the framework of the National Mineral Policy while keeping in mind their local requirements[60]. The objective of the Mineral Policy of the state governments is to support mineral based industries and promote scientific and systematic mining.

After examining the State Mineral Policies and legislations from the five states, it becomes evident that the primary emphasis of these policies is on facilitating ease of doing business, promoting private sector involvement, and bolstering state infrastructure to efficiently exploit scattered mineral resources using scientific methods and mechanisation processes. This is in the spirit of 'cooperative' and 'competitive federalism' (Datt *et al*., 2009; Niti Aayog, Undated). State governments have instituted reforms in auction and grant of mining leases through the online Mineral Concession Portals, and transparency in information provision through the District Mineral Foundation Trust.

Auction Process of Iron Ore Blocks

The auction of iron ore blocks for mining purposes is conducted by the respective state governments as per the MMDR Act, 1957 and the Mineral Auction Rules, 2015. The general process of conducting an auction is as follows:

(i) Declaration of Blocks for Auction – State governments identify and declare iron ore blocks available for auction. Typically, these blocks are either not leased or have been relinquished by previous leaseholders.

(ii). Notice Inviting Tenders (NIT) – State government issues NIT inviting tenders through the online portal. The tendering process is undertaken through MMTC

[59] See https://ekhanij.mp.gov.in/appPrevious/about.aspx

[60] See https://cag.gov.in/uploads/download_audit_report/2010/Rajasthan_mining_2010_Chapter_2.pdf

Limited (Metals and Minerals Trading Corporation of India). As an e-Auction facilitator, MMTC manages all the stages of the e-Auction, for example, bid submission and management, collection of earnest money, and bid evaluation and opening.

(iii) The sample tender document, mineral block summary, etc., are all provided to the applicants through the website.

(iv) The blocks are assigned to the successful bidders following a successful bidding process.

It may be noted that grant of a mineral block does not end the compliances. After obtaining the grant, there are various additional statutory license, permits, permissions, concessions, approvals, and consents are required to conduct mining operations. The successful bidder must obtain 13 major clearances to fulfill these requirements: (i) forest clearance, (ii) wild life clearance (sanctuary, reserve or special zone clearances), (iii) environmental clearance consent to establish, (iv) explosive license, (v) permission for mines opening, (vii) permission of installation, trial operation of equipment, (viii) ground water clearance (centre/state), (ix) railway siding approval, (x) approval of diesel storage, (xi) power line from state DISCOM, (xii) clearance relating to work under an existing transmission line or shifting of the transmission line, and (xiii) gram sabha consent.

Auction with pre-embedded clearances:

In order to promote mining by private players, the concept of auction with pre-embedded clearances have also been introduced by the Government of India since June 2020. In this reform, the auction of mining block is done with the requisite clearances in place. However, this method has so far only been used as a pilot (Kumar and Sinha, 2020).

***Curb on Illegal Mining*:**

As highlighted in several decisions of the Supreme Court, illegal mining is a major concern, not only from the perspective of revenue loss, but also from the competition angle. Illegal mining creates a huge unorganised sector characterised by information asymmetry, preventing legitimate players from entering the sector. State governments have enacted Rules for preventing theft, smuggling, and illegal mining. For example:

- Orissa Minerals (Prevention of Theft, Smuggling & Illegal Mining and Regulation of Possession, Storage, Trading and Transportation) Rules, 2007
- Jharkhand Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2017
- Karnataka (Prevention of Illegal Mining Transportation and Storage) Rules, 2011

Considering that iron ore is classified into different categories based on its 'Fe' content, there is a possibility of misrepresenting high-grade iron ore – such as that falling within the 62-65 percent Fe category – as low-grade iron ore so as to depress the average sale price (ASP) determined by IBM. This gives rise to a competition concern since the companies engaging in such practices may gain an unfair advantage that genuine firms would not have obtained. This scenario could potentially lead to a Margin Squeeze (particularly in the cases where captive iron ore mines play a role in steel manufacturing). The Odisha government has imposed penalties worth ₹ 341 crore on three mining leaseholders in the state, including ₹ 298.54 crore to steel giant JSW, ₹ 37.1 crore to Patnaik Minerals, and ₹ 5.42 crore to Yazdani Steel and Power Limited for allegedly downgrading iron ore quality (*Hindustan Times*, 2023).

Reserving Minerals for the State

State governments through their long-term linkage (LTL) policies tried to ensure sustained supply of raw material (ores and minerals) for their industries. For example, the State of Odisha established an LTL of iron, chrome ore, and other minerals to the eligible state-based end-user industries within the state through its PSU M/s Odisha Mining Corporation Ltd. (OMC) (The Odisha Gazette, 2022). For example, under the *Iron Ore Linkage Policy of Odisha*, not less than 50 percent and not more than 80 percent of saleable stock will be placed under the LTL. Quantities offered but not lifted by the allotees may be disposed through the national e-auction. The exact percentage of saleable stock is earmarked by OMC taking into account its production and the demand from the state-based end users. Within end-user industries, priority is accorded to Blast Furnace-Basic Oxygen Furnace (BF-BOF) based and Direct Reduced Iron (DRI) in the Electric Arc Furnace (EAF) based Integrated Steel Plants (ISP's)[61] over others. Similarly, priority is granted to end-user industries that are already operational over those that are yet to be commissioned. Long-term linkage pricing of iron ore is

[61] Blast Furnace-Basic Oxygen Furnace (BF-BOF) and Direct Reduced Iron (DRI) in the Electric Arc Furnace (EAF).

determined on the basis of weighted average price derived from the national e-auction[62]. Long-term linkage is granted for a period of five years and subject to annual review based on performance; it is also eligible for renewal for an additional period of five years. As stated in chapter 2, Odisha is the largest Iron ore producing state in India, having 54 percent share in iron ore production. Additionally, the state of Odisha is the exclusive source for nearly 100 percent of chrome ore production in India. An exclusion of up to 80 percent of the ore only for one state under the LTL Policy raises some concern from Competition Impact Assessment principles.

Rule 6(3) of the Mineral (Auction) Rules, 2015 – Amendment 2021 – w.e.f. 18.06.2021

The State Government shall not reserve any mine for captive purpose or any specific end use or partial specific end use in the auction. This Rule is made applicable in all cases of auction, notwithstanding any order or direction to the contrary, passed by any court or authority, prior to the commencement of the Mines and Mineral (Development and Regulation) Amendment Act, 2021.

This provision is intended to provide a level-playing field for all other states of India. Mineral resources are present in some states while not in others, and if the states are permitted to reserve a large percentage of iron ore for themselves, it may affect the industry dependent upon the iron ore in other parts of the country. This will cause competitiveness issue. For example, Odisha is the largest Iron ore producing State in India having more than 55 percent share in iron ore production and almost 100 percent of chrome ore is being produced in the state of Odisha only.

The 2023 Gazette notification of Odisha[63] has given up the 'not less than 50 percent' criteria, allowing up to 80 percent of the saleable stock to be placed under the long-term linkage quantities. However, if not lifted by the allottees, the stock will be disposed of through national e-auction. As the price under LTL is derived through the "Weighted average price derived from the National e-auction," there is no discrimination on price front. Slight price difference may occur between iron ore provided through auction and LTL route, as the highest bidder will be selected in the first case, while in second both highest and lowest price of bid will be taken into account. However, reserving up to 80 percent of the ore for the LTL may raise competition issues.

[62] Pricing Setting Tenders (PST) issue – "Based on PST method a very small quantity, which is not representative of the overall production, is tendered for sale. As a result, a few unknown companies, whose lifting of chrome ore is less than 2% of OMC"s total sale, quote abnormally high price and become H1 in the tender and such price becomes the benchmark for all plants including the members of the Informant Association who account for around 70% of the OMC"s total sales volume of chrome ore." See In Re Odisha Steel Federation and Odisha Mining Corporation Limited, Case No. 12 of 2012, decided on September 19, 2013.

[63] The Odisha Gazette, 2023.

Interstate Movement of Minerals:

To ensure availability of natural resources in developing areas, the transfer of minerals from one state to another is a common sight in India. However, the rules and regulations for transport of minerals and collection charges vary from state to state. For example, interstate transportation in Maharashtra necessitates registration and payment through the *mahakhanij* system of the Revenue Department (Government of Maharashtra, Undated). However, any regulation cannot be contrary to Article 301 of the Constitution which mandates a free trade and commerce throughout the territory of India (Krishnan, Undated). The Government of Karnataka attempted to levy fees on the transportation of minerals extracted from other states and brought into Karnataka by amending the state's Mineral Concession Rules. However, the High Court of Karnataka[64] ruled that this measure could not be deemed constitutionally valid. The High Court ruled that "the provisions of both Section 15 and Section 23-C do not authorise the State Government to make rules for regulating the minerals lawfully excavated in other state."

3.4 Competition, Trade, and Foreign Direct Investment: From the Legal Perspective

In 2021, Iron ore ranked as the 13th most traded product globally, with a total trade value of $220 billion, accounting for only 1.05 percent of the total world trade[65]. The Standard International Trade Classification (SITC) states that iron must be upgraded and converted into lump or pelletised forms, known as 'ores and concentrates,' before being traded[66]. Thus, having access to the natural resource is not enough to facilitate trade. It is important to have a supportive legislative framework, social license, and adequate natural or man-made infrastructure, such as roads and ports, to transform resource stock into production and exports [Hummels and Skiba (2004), as cited in Davis (2015)]. Studies have shown that mineral-rich countries like South Africa have not been able to raise their economy by merely exporting raw minerals. It is important to focus on the downstream sector associated with these minerals and also ramping

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64 *Sai Keshava Enterprise, Tamil Nadu and others vs. State of Karnataka*, AIR 2021, Karnataka 79, Vol.108, Part 1289, May, 2021 (Rule 42(7) of the Karnataka Minor Mineral Concession Rules, 1994 which was incorporated by the Karnataka Minor Mineral Concession (Amendment) Rules, 2020).

65 See OEC, Iron Ore Data, https://oec.world/en/profile/hs/iron-ore

66 Commodities that are sent to neighbouring countries for processing may be shipped in concentrate form, while commodities sent further afield may be processed into a final metal form to conserve on transportation costs. One exception is iron ore, which is exported independently of iron and steel exports (Section 67). Iron and steel exports are instead correlated with capital-intensive goods exports.

up the beneficiation capacity for converting low grade iron to higher grade to unlock the full potential of the sector[67]. Some countries have successfully created clusters around their mining sectors. In Australia, the mining services sector, which encompasses engineering, mapping, geological analysis, and specialised equipment and technologies for extraction and processing, has grown five-fold in the last 15 years. This sector now accounts for seven percent of Australian employment, surpassing the employment figures in the mining industry itself (OECD, 2021).

Various governments imposed export restrictions in the metals and minerals markets. In 2010, at least 35 countries made use of one or more export restrictions on metal and mineral raw materials, while the OECD identified almost 1,400 restrictions at the tariff code level. The most common instruments include export duties, including a variety of other trade restrictions such as export licensing requirements, quotas, or even outright export bans[68].

Foreign Direct Investment in Mining Sector

As discussed earlier, the Indian mining sector was opened up to foreign direct investment (FDI) in 1993 after the announcement of the New Mineral Policy. In 1994, the earlier restriction of 40 percent on foreign equity was removed, permitting even 100 percent foreign equity.[69] The only requirement was that the company should be registered in India under India's corporate laws. In 1997, an 'automatic route' for foreign equity participation up to 50 percent was introduced for companies involved in mining certain minerals. Under this route, investors are only required to obtain approval from the Reserve Bank of India and are exempt from seeking any additional government approvals. The government has further liberalised its FDI policy in the mining sector, which allows foreign equity holding up to 100 percent, under the automatic route, for all non-fuel and non-atomic minerals except diamonds and precious stones. This includes exploration, mining, mineral processing and metallurgy including iron ore[70].

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[67] Due to the absence of cost-effective beneficiation, producers of low-grade ores are dependent on foreign markets, as domestic industry prefers high grade ore.

[68] Id.

[69] See https://dipp.gov.in/sites/default/files/FDI-PolicyCircular-2020-29October2020_1.pdf

[70] Consolidated FDI Policy 2020, Department for Promotion of Industry and Internal Trade, Para 5.2.3

The Government of India has introduced production-linked incentive (PLI) scheme in Specialty Steel for enhancing India's manufacturing capabilities and enhancing exports leading to *Atmanirbhar Bharat* (Invest India, 2021). Moreover, India has decided against renewing a long-term agreement (LTA) to supply iron ore to Japanese steel mills and South Korean major Posco. This decision was prompted by the uncertainty surrounding investment plans of steel mills of these countries in India and the shortage of raw materials (Ray, 2021).

Anti-dumping Dispute at the World Trade Organisation

Competition and non-discrimination are fundamental principles of World Trade Organisation (WTO) that guide its operations and policies. The principle of competition is aimed at promoting fair and open competition in international trade, while non-discrimination is aimed at ensuring that all WTO members are treated equally, regardless of their size or economic power. This is achieved through two main rules: the most-favoured-nation (MFN) rule[71] and the national treatment[72] rule. Trade restrictions may take several forms like export tax, indiscriminate subsidies, safeguards and antidumping duties, and other measures[73]. In India, cross border trade in the iron ore sector is regulated by way of imposition of export tax and antidumping measures. This is done to help meet the local requirements.

One of such measures was challenged by Japan at WTO. It complained against India, expressing its concerns regarding certain measures[74] imposed by India on the imports

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[71] The MFN rule requires WTO members to treat all other members equally, without discrimination or favouritism. This means that any trade agreement or concession granted to one member must be extended to all other members.

[72] The national treatment rule requires WTO members to treat foreign goods and services in the same way that they treat domestic goods and services. This means that once foreign goods and services have entered a domestic market, they must be treated in the same way as domestic goods and services. See Principles of the Trading System, https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm

[73] For example, Indian Railways had a dual-freight policy categorising transportation of iron ore into two classes based on its end use, i.e. 'domestic consumption' and 'other than domestic consumption.' Domestic Rail Freight for Iron Ore was charged at lower class (170 class) as compared to iron ore for export (200x). See Study on Transportation of Iron Ore Over Indian Railways, Report TFC 101, RDSO (July 2021). Available at: https://rdso.indianrailways.gov.in/uploads/TFC-101-IronOre_Report.pdf

[74] Safeguard measure imposed by India following a safeguard investigation – In August 2016, India's Directorate General of Safeguards initiated an investigation into the import of hot-rolled steel products, after the domestic industry claimed that imports from certain countries were causing serious injury to their business. In September 2016, India imposed a provisional safeguard duty of 20 percent on certain categories of hot-rolled flat products, which was later extended to include additional products. The duty was imposed on imports from several countries, including China, Japan, Korea, and Russia. In February 2017, after concluding the investigation, the Indian

of iron and steel products.[75] This resulted in the formation of WTO panel in *DS518 – India – Certain Measures on Imports of Iron and Steel Products*[76]. The WTO Panel gave a finding against India on the ground of non-examination of price competition between imported and domestic products so as to demonstrate the existence of a causal link between the increased imports and the serious injury suffered by the domestic industry. The panel report is under appeal since December 2018, and as the Appellate Body of WTO is unable to hear appeals, given its ongoing vacancies, the matter is pending. In the meantime, the Government of India has already withdrawn these duties[77]. Import and export restrictions on iron ore play a significant role in influencing competition within the sector, as they impact the domestic market availability and the prices.

International Consolidation in Mining Sector

The iron ore industry is consolidating more or less continuously since the 1970s. A 2007 Industry Report states "the three largest companies, CVRD, Rio Tinto and BHP Billiton, together control 35% of the global market."[78] The European Commission (EC) has examined the consolidation of iron ore producers from Brazil as "*a major portion of the iron ore imported into Europe each year comes from Brazil and Canada, and the EC was concerned that, without the divestiture of QCM, the transaction would create or strengthen a dominant position by Caemi in the iron ore market*." However, the EC declared the concentration to be compatible with the common market and the functioning of the EEA Agreement[79].

government announced that it would impose a final safeguard duty of 10-20 percent on imports of certain hot-rolled steel products for a period of three years. The duty was imposed in a bid to protect the domestic industry and provide them with a level playing field. The safeguard duty on hot-rolled steel products was eventually phased out and expired in September 2020, after the three-year period.

[75] Hot-rolled flat products of non-alloy and other alloy steel in coil form with a width of 600 mm or more. Third parties joining this case are Australia, China, European Union, Indonesia, Kazakhstan, Korea, Oman, Qatar, Russia; Singapore, Chinese Taipei, Ukraine, United States, and Vietnam.

[76] See https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds518_e.htm

[77] PIB, *Government withdraws export duty on Steel*, Ministry of Finance, November 19, 2022 12:54PM

[78] Central Pollution Control Board, Comprehensive Industry Document on Iron Ore Mining (August 2007). Available at https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvTmV3SXRlbV8xMDVfaXJvbl9vcmVfbWluaW5nXzMxLjA3LjA4LnBkZg==

[79] See Case No COMP/M.2420 - Mitsui/CVRD/Caemi

Mineral Security

The National Mineral Policy 2019 highlighted that "mineral resources security is an important issue with strategic as well as economic significance. Securing access to sufficient, reliable, affordable, and sustainable supplies of minerals is increasingly becoming an important factor for functioning of downstream industries and the overall economy. Hence, ensuring long-term mineral security for the nation shall be taken up with utmost priority. To ensure adequate supply of minerals which are not available locally, downstream regulations shall be aligned for their exploration and development and for facilitating acquisition of mineral assets in other countries by public as well private Indian business entities" (National Mineral Policy, 2019). Although India has abundant reserves of iron ore and coal, it has negligible reserves of coking coal. The National Steel Policy envisages that India will reach 300 million tonnes of steel-making capacity, and 68 percent of that will be through the blast furnace route, which requires coking coal (PWC, 2019). India largely fulfils its coking coal requirements through imports from *Australia*. As indicated in a report, the steel industry's dynamics have a direct impact on the iron ore sector. The surge in steel demand and prices has led to increased pressure on the supply of iron ore. Last year, the raw material prices experienced a remarkable increase of 140 percent, reaching a ten-year high. In India, iron ore touched INR 6,560 per tonne in April 2021, a 156 percent jump from INR 2,560 a year ago. With prices soaring, India's iron ore exports grew by 66 percent between January 2021 and April 2021, with 90 percent of the shipments bound for China (the world's largest importer of the mineral). The record prices and export growth led to a raw material shortage in India, resulting in a fall in steel production (LSI Financial Services, 2021).

3.5 Interaction between Mining Laws and Competition

As previously mentioned, the mining and metals industry is core to the global economy (Deloitte, 2023) and provides the essential inputs for various other sectors. For example, iron ore forms the base raw material for production of steel, which is crucial for several other industries (Climate Change, 2011). A competitive mining sector not only promotes cost efficiency within the industry, but also fosters better control of emissions and environmental protection, leading to improved livelihoods for local communities by ensuring efficient use of natural resources. Mechanisation at different stages of mining operations can also enhance overall efficiency. Mitchell (2022) observed that mining companies face significant challenges relating to the environmental, social and governance (ESG) clearances; rising costs and productivity issues; geopolitical conflicts; and, supply chain disruptions. These challenges are more pressing than concerns relating to competition law and policy violations (Mitchell, 2022).

Use of market forces and economic instruments to pursue public policy has emerged as an important alternative to market-based regulation (Barton, 2006). Competition assessment of laws and policies in the mining sector could be one such market-based regulation. Competition Assessment[80] process involves evaluating potential distortions in the supply and demand sides of the market. This section analyses different aspects of competition issues that directly or indirectly affect market competition concerning regulations in the context of iron ore from a legal perspective.

Issues in the Relevant Product Market Identification from the Legal Side

Iron ore is an essential raw material for the Iron and Steel Industry. Iron and steel are important driving forces behind the industrial development of any country and influences its economic status.[81] The primary use of iron ore (98 percent) is to make steel. The remaining two percent is used in various other applications[82]. Iron ore as product may be differentiated on the basis of its grade (low, medium, high, unclassified or metallurgical, coal washery, foundry, and others) or its size (lump, fines, dust, etc.)[83]. *Haematite* (Fe_2O_3) and *magnetite* (Fe_3O_4) are the most important iron ores in India. *Haematite* is considered to be superior because of its higher grade. Iron ore grades have been classified into the following heads under the MCD Rules for Annual Returns[84]:

Table 2: Grades of Iron Ore for Reporting in Annual Return

"@Grades of ROM ore dispatched:"	Iron Ore – Lumps	Iron Ore – Fines	(iv) Calibrated Lump Ore (CLO) (*Quantity already reported in Lumps should not be reported against CLO*)
Form F1 and Form G1	Form F1, Form G1, Form L and Form M		

[80] See GoI (2018), Competition Assessment Toolkit.

[81] GoI (2021), *Indian Minerals Yearbook 2019*: Iron Ore.

[82] Such as powdered iron for certain types of steel, auto parts and catalysts; radioactive iron for medicine; and iron blue in paints, inks, cosmetics, and plastics.

[83] GoI (2021), *Indian Minerals Yearbook 2020: Iron Ore*, Chapter 16.

[84] Vide April 11, 2022: Notification - The Gazette of India; G.S.R. 294 (E) - Mineral Conservation and Development (Amendment) Rules, 2022.

(a) Below 45% Fe ROM (For Magnetite Ore only) (b) 45% to below 51% Fe ROM (c) 51% to below 55% Fe ROM (d) 55% to below 58% Fe ROM (e) 58% to below 60% Fe ROM (f) 60% to below 62% Fe ROM (g) 62% to below 65% Fe ROM (h) 65% and above Fe ROM";	(a) Below 45% Fe (For Magnetite Ore only) (b) 45% to below 51% Fe (c) 51% to below 55% Fe (d) 55% to below 58% Fe (e) 58% to below 60% Fe (f) 60% to below 62% Fe (g) 62% to below 65% Fe (h) 65% and above Fe	(a) Below 45% Fe (For Magnetite Ore only) (b) 45% to below 51% Fe (c) 51% to below 55% Fe (d) 55% to below 58% Fe (e) 58% to below 60% Fe (f) 60% to below 62% Fe (g) 62% to below 65% Fe (h) 65% and above Fe (iii) Concentrates	(a) Below 62% Fe (CLO any size) (b) 62% to below 65% Fe (5-18 mm size CLO) (c) 62% to below 65% Fe (10-40 mm size CLO) (d) 62% to below 65% Fe (CLO others) (e) 65% and above Fe (5-18 mm size CLO) (f) 65% and above Fe (10-40 mm size CLO) (g) 65% and above Fe (CLO others)".
Any kind of Hematite Iron Ore below 45% Fe, but above threshold value, shall be included in the grade slab of "45% to below 51% Fe"			

The aforesaid classification shows that iron ore as a relevant product has complicated classification and within the broad classification of ROM, Lumps, Fines, Concentrates, and Calibrated Lump Ore, there are several sub-classifications as well. While it might be a common practice within the mining sector, disputes related to the mining industry can make the interpretation of this categorisation challenging in a court of law. One such example emerged in the case of *Sarda Mines*[85], wherein the question arose whether *Sarda Mines* was entitled to extract iron ore (lump) or mineral iron ore (ROM) as per the environmental clearance. The Court referred to its previous ruling in a similar case[86] to explain the process of iron ore mining to distinguish between the run of mines and lump. In this case, the Court did not agree with the argument of *Sarda Mines* that environmental clearance permitted extraction of Iron ore (Lump) rather than ROM.

Iron Ore as an input to Steel Industry and its classification – Iron ore is the basic raw material used for making pig iron, sponge iron, and finished steel[87]. Iron is an important constituent of ferro-alloys, like ferromanganese (high carbon, medium carbon and low carbon). Ferroalloys are used in the steel industry to impart some special qualities in steel making process[88]. Iron ore lumps and powder containing

[85] *Common Cause Vs. Union of India & Ors. (In Re: Sarda Mines Pvt. Ltd.)* [I.A. No. 40 of 2015, I.A.No.42 of 2015, IA No.61 of 2015 in IA No.40 of 2015 and IA No.111989 of 2018 IN Writ Petition (C) NO. 114 of 2014].

[86] *National Mineral Development Corporation Ltd. v. State of M.P.* (2004) 6 SCC 281. Also see *Tata Steel Limited v. Union of India* (2015) 6 SCC 193 [it was observed that in the process of mining, iron ore is extracted (that is ROM) and separated into ore lumps, fines, and waste material, which is commonly known as slime].

[87] Id.

[88] Iron ore is part of the Ferrous group of associated minerals like manganese, titanium, vanadium

+58% Fe are normally used in the Cement industry as they improve burning properties, impart colour, and balance the composition of the mix. Thus, a holistic development of the mineral sector on a sustainable basis is very important to meet the demands of downstream industries dependent upon on mineral/ore supply[89].

For the purposes of international trade, iron and steel segment is categorised under one segment. Iron and steel segment offers a product mix which includes hot rolled parallel flange beams and columns rails, plates, coils, wire rods, and continuously cast products such as billets, blooms, beam, blank, rounds and slab, and metallics and ferro alloy. When filling out Form M under the MCD Rules, detailed information regarding the iron and steel industry must be provided, which includes specifying the capacity and production of the following products:

Table 3: Information Regarding Iron and Steel Industry to be Provided in Form M

Iron Ore related	*Steel*	*Coal*	*Others*
Pellets, pig iron – hot metal (for own consumption and for sale), sponge iron, hot briquetted iron	Liquid steel – crude steel and total saleable steel (semi-finished and finished), tin plates	Clean coal Coke (own production) Separate report for coke purchased	Sinter – (i) self fluxing (ii) ordinary Sulphuric acid Refractories bricks Fertilisers and any other by product

The aforesaid categorisation clearly demonstrates that relevant market determination would involve analysis of this overwhelming classification and different players operating in these sectors. However, there is a glimmer of hope as IBM collects this data, and conducting a big-data analysis of the information available with IBM could offer valuable strategic insights to this sector. Simplifying these sub-classifications further could make it easier for a layperson to comprehend this industry.

Standards of Steel – Ministry of Steel in consultation with the Bureau of Indian Standards (BIS)[90] releases the categories of steel and steel products[91]. Table 1 of this order enlists 113 Indian Standards (IS). For example, IS 9516:1980 is for 'heat resisting steel.' The producers of this variety of steel have to get BIS (Bureau of Indian

and nickel, under Rule 69 of the Mineral Concession Rules, 1960. For determining the maximum area for which a prospecting license or mining lease may be granted under section 6 of MMDR Act.

89 GoI (2019), "National Mineral Policy 2019."

90 In exercise of the powers conferred by Section 16 of the Bureau of Indian Standards Act, 2016 (11 of 2016).

91 Steel and Steel Products (Quality Control) Order, 2020. Available at: https://steel.gov.in/sites/default/files/Quality%20Control%20Order.pdf

Standards) certification for producing standard quality product. While standards are crucial for maintaining product quality, excessive standardisation may create barriers to entry from a competition perspective.[92] Competition Commission of India has held that BIS does not come under the purview of the definition of 'enterprise' as it is not engaged in any 'economic activity' and it is merely discharging its statutory function under the BIS Act[93]. In a particular case concerning iron ore, the CCI established the relevant market to encompass all forms of iron ore, combining them into a broader category. Additionally, the geographical market was determined to be the State of Karnataka, with consideration of transportation costs (NMDC Case 69 of 2012).

In this section, issues relating to the product market identification have been discussed from the legal perspective. In Chapter 4, the various types of iron ore products and their vertical linkages are discussed in detail.

Pricing of Iron Ore

Iron ore is a deregulated sector since the prices are not administered by any government agency except that the prices have to be reported periodically to IBM. Prices of iron ore are fixed by mining companies based on the quality of ore, commercial prudence, and general market situation[94]. The government has no direct role in fixation of iron ore prices. However, to improve availability of iron ore to domestic iron and steel industry at affordable prices, the government increases/decreases the export/import duty on iron ore[95]. The increase/decrease in the duties impacts competitiveness in the iron ore market. With effect from November 19, 2022 exports of iron ore lumps and fines > 58% Fe attracts lower export duty of 30 percent. NMDC periodically declared the iron ore prices on its website as follows:

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92 Standardisation & Quality Control of Iron & Steel, https://steel.gov.in/en/standardization-quality-control-iron-steel

93 See *Ravindra Badgaiyan vs. M/s Bureau of Indian Standards*, CCI Case No. 71 of 2010 order dated April 7, 2011; *Prem Prakash vs. Bureau of Indian Standards & Ors.*, Competition Appeal (AT) No. 16 of 2017 order dated May 2, 2019.

94 PIB, Price of Iron Ore (March 2013), https://pib.gov.in/newsite/PrintRelease.aspx?relid=93902

95 PIB, *Government withdraws export duty on Steel*, Ministry of Finance, 19 NOV 2022 12:54PM
With effect from May 22, 2022, export duty on iron ore lumps with more than 58 percent Fe content was raised to 50 percent ad valorem from the previous rate of 30 percent; export duty of 50 percent was imposed on iron ore with Fe content below 58 percent; export duty of 45 percent was imposed on iron ore pellets; export duty of 15 percent ad valorem was imposed on different forms of alloy and non-alloy steel including pig iron (HS 7201,7208,7209, 7210, 7213, 7214, 7219, 7222, 7227) and import duty exemptions were given to Anthracite/PCI coal, coking coal, coke & semi coke and ferronickel.

Table 4: Last five Iron Ore Prices Notified by NMDC Limited

Price as per revision date	*(i) lump ore (65.5%, 6-40mm)*	*fines (64%, -10mm)*
w.e.f. 29.05.2023	@Rs.3,900/-ton	@Rs. 3, 560/- per ton
w.e.f. 29.04.2023	@Rs.4,200/-ton	@Rs. 4, 010/- per ton
w.e.f. 21.03.2023	@Rs.4,500/-ton	@Rs. 4, 110/- per ton
w.e.f. 28.01.2023	@Rs.4,400/-ton	@Rs. 3, 910/- per ton
w.e.f. 30.11.2022	@Rs.4,100/-ton	@Rs. 2, 910/- per ton

Source: Compiled from NMDC.
Note: Excluding the Royalty, DMF, NMET, Cess, Forest Permit Fee, and other taxes.

No similar declarations regarding prices were found on other iron ore producers' websites. This raises a competition concern as to whether these price declarations could be perceived as price signaling or an attempt to establish a price benchmark. The disclosure mentioned above is made by the Board of Directors of NMDC, considering it as material information. The IBM also releases the Average Sale Price of minerals by grades on a monthly basis[96]. Although the objective of these disclosures may be transparency, this practice of sharing of price sensitive information could also be seen as 'benchmarking' of prices. However, internationally, the process of negotiating and determining 'benchmark prices' appears to be the norm of this sector, as noticed by EC in its decision: "*Although contracts may last for several years, prices are revised on an annual basis following the results of price negotiations taking place in Western Europe and in East Asia (more specifically, in Japan) at the beginning of each year. The objective of those price negotiations is to set a reference price (the so-called "benchmark prices") for lump, sinter fines and pellets, respectively, in each of the two customer areas. The negotiations take place through a series of meetings between the large iron ore and steel producers, normally starting at the end of the previous year and continuing for several months. The negotiations are based principally on the perceived state of demand and supply for iron ore, the financial situation of ore producers and steel mills, as well as the long term needs of both industries*."

Though the pricing of iron ore is not regulated by the government, Rule 45 of the MCDR requires Monthly and Annual Reporting compliances[97] in a detailed format, in particular the following:

[96] Extracted from Monthly Statistics of Mineral Production, March 2023, Issue No. 6 (a). State-wise Average Sale Price of Minerals by Grades (see rules under MCDR, 2017 / Mineral (Auction) Rules, 2015 / Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016]. Aailable at: https://ibm.gov.in/IBMPortal/pages/Average_Sale_Price

[97] Notices and Returns under MCDR, 2017. Available at: https://ibm.gov.in/IBMPortal/pages/Notices_and_Returns_under_MCDR__2017

(i) Mine owners are required to substantiate domestic sale value/free on board (FOB) value for each grade of ore quoted above with copy of invoices (not to be submitted with the return; to be produced whenever required)

(ii) Give reasons for increase/decrease in production/nil production, if any, during the month compared to the previous month/previous year(iii) Give reasons for increase/decrease in grade wise ex-mine price, if any, during the month compared to the previous month/previous year

Data in relation to cost of production shall also be given as under (Part VII of Form G1 – MCDR Rules): (i) direct cost, a) exploration, (b) mining, (c) beneficiation (mechanical only), (ii) over-head cost, (iii) depreciation (iv) interest, (v) royalty, (vi) payments made to DMF, (vii) payments made to NMET, (viii) taxes, (ix) dead rent, and (x) others (specify)[98]. NITI Aayog estimates that Indian steel makers pay an additional amount, varying between US$ 15 and US$ 23, by way of taxes, duties, and cesses compared to their global peers (PWC, 2019). Chapter 4 discusses the cost analysis in detail.

In the *Odisha Mining Case*[99], CCI had observed that ascertaining the correct economic value of a mineral is a difficult task. In fact, the rising cost and royalty do not represent the intrinsic worth of the mineral or their market value (this was with reference to mineral Chromite). While upholding the economic freedom of OMC, the Commission said:

> The Commission is of the opinion that to protect its business interest OMC may adopt any methodology of price setting depending on the market conditions and set conditions in PSTs. On unfair pricing the Commission is of the view that *since chrome ore is a non-renewable natural resource, its pricing and supply cannot be determined by the market forces*. Chrome ore is not like any other commodity, which can be supplied to any extent, whose price can be determined on the free-market economy principle.

The aforesaid scenario has already changed in the mining sector due to several amendments in the MMDR Act, due to which now the OMC has to determine the price on the basis of national e-auction. One of the significant factors contributing to this reform has been the mining cases before Supreme Court of India and the push to introduce more transparency in mine allocation and the price at which it gets allocated.

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[98] Information given under Part VII will be kept confidential. The government, however, will be free to utilise the information for general studies without revealing the identity of the firm.

[99] *All Odisha Steel Federation and Odisha Mining Corporation Limited*, CCI Case No. 12 of 2012, order dated September 19, 2013, para 13.9.

Rates of Royalty on Iron Ore

Mineral royalty is the economic rent due to the sovereign owner (government) in exchange for the right to extract mineral substances. The mineral royalty rates are specified in the Second Schedule of the MMDR Act, 1957, enacted post-independence to regulate and develop the mining sector in India (Chadha and Kapoor, 2022). Over the last 50 years, India has gradually moved away from the tonnage system with more minerals being absorbed into the *ad-valorem* system. In 2015, only six minerals were classified into tonnage rates, including graphite, limestone, and tungsten (Indian Bureau of Mines, 2011).

Table 5: Rates of Royalty of Iron Ore under MMDR Act (2021)

Second Schedule	*Third Schedule*	*Fifth Schedule*	*Sixth Schedule*
Royalty payable – Iron Ore: (Calibrated Lumpy Ore - CLO[100], lumps, fines & concentrates all grades) Fifteen percent of average sale price on *ad valorem* basis.	Rates of Dead Rent[101] in Rupees per hectare per annum • From 2nd Year of Lease – 400 • From 3rd and 4th Year of Lease – 1000 • 5th Year onwards – 2000 Iron ore is a 'medium value mineral', thus two times the above rate is applicable	Additional amount for Mining lease extended other than auction Iron ore and chromite – Equivalent to one hundred and fifty percent of the royalty payable	Additional rates for extension of non-auctioned captive mines[102] Iron ore (i) Lumps, ROM (Run of Mine)[103] and concentrates Equivalent to two hundred and fifty percent. of the royalty payable (ii) Fines Equivalent to one hundred and fifty percent. of the royalty payable

Source: MMDR Act – Sections 9, 9A, 9B and Schedules.

Among developing nations that utilise the ad-valorem system for iron ore royalty rates, India holds the highest rate at 15 percent. Other developing countries like Angola, Mozambique, and South Africa have set their iron ore royalty rates between

[100] Calibrated lump ore means the sized ore that is obtained after crushing and screening of the ROM ore or lumps.

[101] This acts as a deterrent to discourage leaseholders from monopolising mining leases and leaving mineral resources unused. This strategy is deliberately employed to obstruct competitors from accessing the mineral-rich land, resulting in reduced mineral production and the creation of an artificial scarcity of minerals (IBM, 2011).

[102] For auctioned captive mines, the royalty rates are decided on the basis of sale of mineral, and if the sale is more than twenty-five percent and up to fifty percent of annual production, the additional amount payable is equivalent to 50 percent of the royalty payable. Below 25 percent, it is nil.

[103] Ore in its natural, unprocessed state.

three percent and seven percent. India is among the top five iron ore mining jurisdictions. Even among the top iron ore producing nations, India has the highest royalty rate. Over and above these royalties, India charges very high auction premiums along with the contributions to DMF and NMET.[104] The question of whether 'Royalty is a tax' is currently under consideration before a nine-judge bench of the Supreme Court of India for a final ruling.[105]

Competitive Neutrality

The mining sector in India has been dominated by public sector undertakings, especially due to the historical reasons of government having control over this sector through the MMDR Act, 1957. However, with the enactment of Competition Act, 2002, the principle of 'competitive neutrality' has set in, which does not differentiate between a government and private enterprise unless the enterprise in question is discharging specified sovereign function[106] or has been exempted from the application of Competition Law under Section 54 of the Act.

In a series of *Beach Sand Mineral cases*[107], the CCI had held *IREL (India) Ltd.* to be an 'enterprise' within the meaning of competition law and ordered for an investigation into the alleged abuse of dominant position. However, MMDR Act exempts the prospecting operations[108] undertaken by the Geological Survey of India, the IBM, the Atomic Minerals Directorate for Exploration and Research of the Department of Atomic Energy of the Central Government, the Directorates of Mining and Geology of

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[104] See Chadha (2022), supra note 144.

[105] In the case of *Mineral Area Development Authority etc. vs. Union of India & Ors*. (Civil Appeal Nos. 4056-4064 of 1999). As of now the *India Cement Ltd. Vs. State of Tamil Nadu and others*, AIR 1990 SC 85 – 7 judges held Royalty is a tax whereas a subsequent 5 judges' bench in *State of West Bengal vs. Kesoram Ltd. And others*, AIR 2005 SC 1646 opined that the majority in India Cement wanted to say "cess on royalty is a tax but not royalty is a tax." See Kedia (2022).

[106] Section 2(h) of the Competition Act, 2002. See *M/s Mineral Enterprises Limited vs. Ministry of Railways, Union of India*, CCI Case No. 47 of 2012 order dated December 13, 2012 (Matter related to fixing of tariff by Railways which was held to be a statutory function. Although the point is not directly related to the mining sector, the transportation of minerals from one place to another place is an important competitive constraint and is used in determining the relevant market.

[107] *Kalpit Sultania and IREL (India) Ltd.*, CCI Case No. 22 of 2021, order dated January 3, 2022 directing investigation under Section 26(1) – the relevant market in the instant case appears to be "mining and supply of beach sand Sillimanite in India." The Commission distinguished its order in Case No. 19 of 2019 (*Beach Mineral Producers Association & Another Vs Directorate General of Foreign Trade (DGFT) & Others*), wherein the Commission held that execution and implementation of DGFT's statutory duty and implementation thereof by IREL (India) Ltd. were not amenable for examination within the framework of Section 4 of the Act. *Beach Mineral Producers Association and IREL (India) Ltd.*, CCI Case No. 26 of 2021, order dated October 18, 2022 directing investigation under section 26(1) – relevant market delineated 'mining and supply of beach sand ilmenite in India.'

[108] Proviso to Section 4 of MMDR Act

any State Government (by whatever name called), and the Mineral Exploration Corporation Limited (MECL), a government Company. There are 25 government agencies notified for carrying out exploration activities without a prospecting license.[109]

The National Mineral Policy, 2008 emphasised competitive neutrality principles in the mining sector in the following words:

> "In mining activities, there shall be arm's length distance between State agencies (Public Sector Undertakings) that mine and those that regulate. There shall be transparency and fair play in the reservation of ore bodies to State agencies on such areas where private players are not holding or have not applied for exploration or mining, unless security considerations or specific public interests are involved."

Vide Amendment in 2021, now other entities including private entities may also be notified for exploration without a prospecting license, subject to the conditions as may be specified by the central government.[110] As per the Guidelines issues by the Ministry of Mines[111], a private agency that obtains accreditation from the Quality Council of India-National Accreditation Board for Education and Training (QCI-NABET) can be notified as a private agency eligible to conduct exploration activities without a prospecting license. There are 14 such private agencies.[112] The latest decision of the Supreme Court in Coal India case has further emphasised the principle of competitive neutrality, brushing aside the argument that "Coal India is a Monopoly created under Nationalisation Act and would thus be not covered under the Competition Act"[113].

Auction Process for Iron ore Blocks Allocation

The Government of India introduced a mandatory auction mechanism for grant of coal resources in 2010 and subsequently extended this process to all other minerals[114]. While the introduction of auction mechanism was to instill transparency and competitiveness in the mining sector, FIMI Report (FIMI, 2021) highlights that there

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[109] See GoI (Undated), "List of Notified Exploration Agency – Government Agency."
[110] Id.
[111] See Ministry of Mines Guidelines for notification of accredited private exploration agencies vide Notification M.VI-16/15/2021-Mines VI dated August 12, 2021.
[112] See GoI (Undated), "List of Notified Exploration Agency – Private Agency."
[113] *Coal India Limited and Anr. vs. Competition Commission of India and Anr*, 2023 LiveLaw (SC) 484.
[114] The MMDR Amendment Act, 2015, which became effective from 12 January, 2015 (not applicable to cases covered by section 10A or section 17A or to minerals specified in Part A or Part B of the First Schedule or to land in respect of which the minerals do not vest in the government).

has been a steep decline in the number of leases issued after 2015 for all major states. This is confirmed in our data analysis shown in Chapter II.

The FIMI report is very critical of the Auction Policy and provides case studies from Odisha and Karnataka to show how auction has become a winner's curse and it states that, "auction has neither served public good nor led to fair allocation of resources. The sole focus to maximize revenues for the States has adversely affected long-term mineral development in the country and socio-economic benefits in mining areas. Auction regime has put the nation back by one generation with uncertain future for the growth of country's mineral resources and continued dependence on ever-increasing imports. Auction did not also prove to be as transparent or fair as was thought."[115]

In another report (FIMI, 2020), the industry body FIMI criticised the concept of captive mines, expressing concerns that it diverts professional and dedicated miners away from the system. The report highlights that the role of a miner is specialised, and captive mine holders may not fully focus on exploring the complete potential of mining as their primary concern lies in steel production. This argument may not be true for India, because there is a tight regulation around production process and reporting mechanism by all lease holders, irrespective of the type of mines (captive or non-captive). The eligibility requirements and upfront payment somewhat limits the entry into the auction system.

A. Eligibility Requirements – A mineral concession may only be granted to an Indian citizen or a company under the Companies Act[116]. Auction Rules provide for the net worth requirement as an eligibility condition for mining leases which range from 0.5 percent to 2 percent of the value of estimated resources[117], subject to a maximum of Rs 200 crores[118]. In case of composite license, the net worth requirement ranges from 0.5 percent to 1 percent of the value of estimated resources, subject to the maximum of Rs 100 crores. However, where the estimation of value of resources is not possible[119], the net worth requirement is Rs 25 crores.

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[115] Id. Preface from Secretary General of FIMI.
[116] Section 5 of the MMDR Act.
[117] As arrived under the Mineral (Evidence of Mineral Concession) Rules, 2015.
[118] Schedule I of Mineral (Auction) Rules 2015.
[119] Mineral block having such type of deposit as specified in serial number I, II and III of Part III of

B. Upfront Payment and Performance Security – An amount equal to 0.50 percent of the value of estimated resources shall be the upfront payment payable to the state government in three instalments of 20 percent, 20 percent, and 60 percent. This amount shall be adjusted on the commencement of production of minerals. In addition, the preferred bidder is required to furnish a performance security equivalent to 0.5 percent of the estimated resources' value, which will be adjusted every five years to correspond with 0.5 percent of the reassessed value of the estimated resources.[120]

C. Reforms in Auction System[121] – In 2021, amendments to the Auction Rules were made to ensure broader participation in the auction of mineral blocks, facilitate state governments in identifying more blocks for auction, and increase the availability of minerals across the country.

Table 6: Auction Summary of Iron Ore (updated as on May 19, 2023)

	Iron Ore	**Iron Ore & Manganese**
2015-16	1	0
2016-17	7	0
2017-18	2	0
2018-19	9	0
2019-20	17	6
2020-21	1	0
2021-22	13*	1*
2022-23	**24**	**-**
Total	73	6

Source: Annual Report 2022–23, Ministry of Mines.

Information Asymmetry

Good quality, detailed geological information is key for mineral-rich countries exploring to attract investments. Such information is a public good and can enhance the efficiency of mining and prospecting operations (OECD, 2021). Any information asymmetry in the sector would cause competitive constraints and hence would be harmful for the sector. As part of the bidding process, the state government is required to provide detailed information on the identified and demarcated area, using total station and differential global positioning system. This information should be categorised into forest land, land owned by the state government, and land not owned

Schedule I to the Minerals (Evidence of Mineral Contents) Rules, 2015.

[120] See Rules 11, 12 and 13 of the Mineral (Auction) Rules 2015.

[121] Ministry of Mines has amended the Mineral (Auction) Rules, 2015 vide notifications dated March 17, 2021, June 18, 2021, November 2, 2021, December 14, 2021, and February 18, 2022 and the Minerals (Evidence of Mineral Contents) Rules, 2015 vide notifications dated June 18, 2021 and December 14, 2021. See https://pib.gov.in/PressReleasePage.aspx?PRID=1814233

by the state government. Additionally, the estimated mineral resources and evidence of mineral contents with respect to all minerals discovered during exploration should be included in the provided information.[122] As part of the 2021 reforms, the Geological Survey of India (GSI) has made the database of baseline geoscience data for geological potential areas freely accessible on the Online Core Business Integrated System Project (OCBIS) portal to support potential bidders and other stakeholders in obtaining a composite license. [123] Further, the use of global positioning system (GPS) is now permitted for identifying and delineating the area for which a composite license is proposed to be granted through auction.

Maximum Area and Period for Grant

Concerning a specific group of associated minerals, no person is allowed to acquire an area beyond the prescribed maximum for a prospecting license or mining lease in a state.

Table 7: Maximum Area and period of grant of mining licenses

License Type	*Maximum Area*[124]	*Period*[125]
One or more prospecting licenses	25 square kilometers	Not to exceed 3 years (may be extended up to 5 years)
One or more reconnaissance permit	10 thousand square kilometers	Not to exceed 3 years
Mining Lease	10 square kilometers	Granted for a period of 50 years[126]
Composite License[127]	As per rule 7 of the Minerals (Evidence of Mineral Contents) Rules, 2015	

Source: Compiled.
Note: Longer period of mining lease may not be a competitive concern, especially when the rules relating to transfer of mining lease have been relaxed and transfer of mines have become easy.

Anticompetitive Agreements – Cartelisation in mineral market, especially iron ore mining, may be tough because of tight regulations governing the allocation of mining

122 Rule 9 – Bidding Process, Mineral (Auction) Rules, 2015.
123 Amendment of the Minerals (Evidence of Mineral Contents) Rules, 2015 and the Mineral (Auction) Rules, 2015 to facilitate identification of mineral blocks for auction for grant of Composite License. Available at: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1782112
124 Section 6 of MMDR Act.
125 Section 7 and 8A of MMDR Act.
126 Before 2015 amendment to MMDR Act, a mining lease was granted for a maximum of 30 years and a minimum of 20 years and could be renewed for a period not exceeding 20 years. See https://prsindia.org/billtrack/the-mines-and-minerals-development-and-regulation-amendment-ordinance-2015
127 Section 11 of MMDR Act

leases and the determination of royalty rates. Internationally, cartelisation in mineral sector has not worked out[128], except the potash cartel.

A. Vertical Agreements – There are four major reasons to vertically integrate in the mining value chain: (i) to reduce the impact on a downstream position (e.g., refining or fabrication) from the market supply cycle (i.e. being caught short on raw materials input) or volatility of pricing in upstream raw materials, (ii) to take advantage of improved margins or mineral value in an adjacent sector of the value chain, (iii) to improve the channel to market for an upstream mining position through downstream integration, and (iv) to generate new or incremental demand in a commodity[129].

B. Role of Trade Associations – Trade associations play an important role for different sectors of the industry. In the mining sector, there were scattered associations representing regional association of mine operators and lease owners. Trade associations play a crucial role in the mining sector because while mining policies may have been liberalised to introduce reforms, proper execution of these regulations at the state level is vital. Trade Associations could play an important role here. The trade associations have to be cautious so that they do not become part of the conspiracies of monopolisation or cartelisation of its members and also deprecate their platforms to be used for any anticompetitive activities. The World Steel Association cautions its members to follow the rules:

(i) current or future steel prices are not discussed by members at world steel functions; and,

(ii) any discussions of present or future capacity or production must be monitored or approved by Legal Counsel. These principles apply both at world steel meetings and social events.[130]

A survey of the websites of Indian associations reveals that no mention of a competition compliance campaign or sensitisation to their members through any workshop, etc., is made. There are associations at the national, regional and state level

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[128] Iron Ore Association of Iron Ore Exporting Countries (APEF) 1975–1989 Australia, Algeria, India, Liberia, Mauritania, Peru, Sweden and Venezuela. APEF was unable to set iron ore export prices because Australia and Sweden were unwilling to participate, and because large iron ore exporters Brazil and Canada refused to join. The APEF was reduced to collecting statistics until 1989, when it was disbanded. See Chatham, infra note 196, and Radetzki (2012.

[129] Id.

[130] See https://worldsteel.org/about-us/antitrust/

operating in the iron ore and its vertically related areas. It is important for such organisations to set up robust competition awareness and compliance programmes and to sensitise their members on what is accepted and what is not accepted from the competition point of view.

Abuse of Dominant Position

Abuse of dominant position is the major anticompetitive concern in the mining sector. The presence of only a few players in the market gives them significant market strength. The Monopolies Inquiry Commission in 1965 discovered that while numerous enterprises were involved in iron ore mining, iron and steel companies had substantial market shares. For example, Hindustan Steel accounted for 22.3 percent, Tata Iron & Steel Company Ltd. 18.9 percent, Bolani Ores Limited 12.8 percent.[131] In *Odisha Steel Federation case*[132], Odisha Mining Corporation was held to be dominant in the "the market for friable chrome ore in the state of Odisha, which has been bestowed upon it by state action." However, OMC has not been found to have abused its dominant position[133]. In terms of dominance, certain Public Sector Undertakings (PSUs) hold substantial market shares and dominant positions, especially in markets with natural monopolies. For Example, NMDC is the largest iron ore producer.[134] SAIL: *The company has the distinction of being India's second largest producer of iron ore and of having the country's second largest mines network*[135]. CCI in *Coal India Case*[136] observed while concluding abuse of dominance by *Coal India*, "*…an imperative need to carry forward this reform momentum further by restructuring the sector by introducing more players so that it can reduce the dominance of any one player and can facilitate competition. Bringing the coal sector under the independent regulatory oversight would only help if there are enough*

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131 Report of the Monopolies Inquiry Commission, 1965, Volumes I and II. Available at: https://dspace.gipe.ac.in/xmlui/handle/10973/52457

132 *All Odisha Steel Federation and Odisha Mining Corporation Limited*, CCI Case No. 12 of 2012, order dated September 19, 2013.

133 Alleged restriction in supply of chrome ore by OMC it has been found by DG that the same was due to of lack of environmental clearance, clearance from forest diversion, clearance from the National Board of Wildlife and consent of the Ministry of Environment and Forest and other statutory clearance.

134 See https://www.nmdc.co.in/

135 See https://sail.co.in/en/page/captive-mines

136 Coal India Case (2013, 2017) *Maharashtra State Power Generation Company Limited against Mahanadi Coalfields Limited and Coal India Limited* – CCI Cases 3, 11 and 59 of 2012 decided on December 9, 2013 and revised order dated March 24, 2017.

players in the market."[137]. The dominant firms in this sector will be discussed in detail in the forthcoming chapters.

Failure to Maintain Minimum Dispatch

Creation of artificial scarcity by mine owners may amount to abuse of dominant position. To address this issue, the Mineral Concession Rules mandates license holders to maintain production levels so as to ensure minimum dispatch of 80 percent of the average annual production of the two immediately preceding years on pro rata basis[138].

Regulation of Combinations

There are no significant combinations happening in the domestic iron ore mining sector; however, combination activity can be seen in the steel sector which utilises 98 percent of the iron ore. Several steel companies have also undergone the Insolvency and Bankruptcy Code (IBC) process[139] and have been acquired by existing steel manufacturing companies through the corporate insolvency proceedings under the IBC (Parashar, 2018).

Based on a review of the current laws and regulations governing the iron ore sector (MMDR Act and Auction Rules) in light of the factors mentioned in the Competition Assessment Toolkit, the findings are summarised in Table 8:

Table 8: Interaction between Competition Regulation and Mining Sector Regulation

Factors	Assessment
Whether any provision(s) in policies /regulations / legislations	
A. Create Barriers to Entry by: I. Giving monopoly rights to a single enterprise for provisioning goods and services?	There is no barrier to entry; however, in every state there is a state-owned mining company, through which the state government keeps control over the captive mines. However, these companies are subject to the provisions of Competition Law. A substantial initial investment requirement makes the entry impossible for small players
II. Protecting existing firms in a market?	No evidence found as such. However, the state-owned mining companies have a natural advantage over its private counterpart, particularly for dealing with compliance requirements.

137 Also see Singh, 2019.

138 Section 12A of the Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2016.

139 Include Bhushan Steel Ltd (renamed as Tata Steel BSL Ltd), Essar Steel Ltd (renamed as Arcelor Mittal Nippon Steel India Ltd), Electrosteel Steels Ltd (now ESL Steel Ltd), Monnet Ispat & Energy Ltd (now JSW Ispat Special Products Ltd.) and Bhushan Power & Steel Ltd.

Factors	Assessment
Whether any provision(s) in policies /regulations / legislations	
III. Establishing excessive/unrelated minimum standards as a requirement for commencement of operation?	The requirements of net worth and other compliances are neutral; however, being a capital-intensive industry, small firms may face some constraints.
IV. Establishing Vertically Integrated Units?	Provisioning of mines for own use leads to vertically integrated units. Iron ore trading firms are at a disadvantage due to aggressive competition from the captive users. Even the open quota is taken away by higher bids from captive users.
B. Creates barriers to exit?	Following the 2021 amendment, there are no barriers to exit. The transfer of existing mining leases has become easy.
C. Gives advantage to one set of enterprises over the other?	Ownership of captive mines is a clear advantage over others. State-owned Enterprises' natural monopoly LTL Policy favours some firms over others
D. Affects the cost structure of the enterprise?	Those who are having captive mines are having cost advantage Cost structure of those who are beneficiaries of LTL and captive mines may be better positioned.
E. Create actual/potential conflict of interest situation for a Regulator by i. Giving it a dual role ii. Overlapping Jurisdiction	None
F. **Encourages/requires publication of sensitive information?**	NMDC's publication of iron ore prices may amount to price signaling. However, this information is required for bringing transparency.
G. Fixes/restricts output of product/service?	Surplus sales from captive mines encourages the output and further easing up of market to minerals mined through captive mines has opened up new sources of iron ore in open market. Restricts up to 80 percent sales of OMC within Odisha through LTL
H. Has outlived its utility?	Not Applicable
I. Causes interference in the pricing of goods/service via: **I. Price controls?** **II. Subsidies?** **III. Tax policies?**	Pricing of iron ore is unregulated in domestic market. In fact, the government intervenes to impose import/export restrictions whenever required. However, in OMC auctions, base price is fixed for iron ore, the criteria of which needs to be displayed for transparency.
J. Limit the ability of consumers to switch between suppliers?	LTL beneficiaries cannot switch easily as it influences their performance.

Factors	Assessment
Whether any provision(s) in policies /regulations / legislations	
K. Restrict flow of information to consumers?	This is possible in some situations of illegal mining

Source: Authors' analysis

It may be noted that several potential barriers to competition in the mining sector have been addressed through the Amendments to the MMDR Act and related rules in 2021. Table 9 assess the major reforms introduced, and how they are going to affect competition.

Table 9: MMDR Amendment (2021) and its impact on Competition

Sl. No.	Reform And Its Objectives	Objective of Reform	Impact on Competition through changes in market demand and supply:
1.	Removal of distinction between captive and merchant mines allowing captive mines to sell 50 percent of the minerals produced during the year after meeting the requirement of attached plant.	Increase the production and time bound operationalisation of mines, increase the pace of exploration and auction of mineral resources, etc.	The locked in resources in the captive mines are now open for the sector which increases the pace of exploration and auction of mineral resources and motivates the private players for further investment in mining sector.
2.	End-use restrictions have been removed	The allowance for sale of prescribed quantity of mineral shall also motivate the lessees to enhance the production from the captive mines	End use restrictions created a constraint on the mining sector as the minerals could only be utilised for the specific sanctioned purpose
3.	Grant of composite license in respect of areas where at least Reconnaissance Survey (G4) level has been completed or where mineral potentiality of the block has been identified based on the available geoscience data but resources are yet to be established[140].	Amendments are aimed at identifying more mineral blocks for auction and thereby increasing pace of exploration and production resulting in improving the availability of minerals in the country and increase employment in the sector.	Composite license would help bring investment in mining sector and thus tap the unused potential to increase competitiveness in the sector. State Governments have notified 40 mineral blocks of G4 level of exploration for grant of composite license, out of which 6 mineral blocks have been successfully auctioned
4.	Mineral (Auction) Rules, 2015	To remove unnecessary restrictions and compliance.	Amendment Focusses on more participation and

[140] See https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1782112 [Amendment to the Minerals (Evidence of Mineral Contents) Rules, 2015.]

Sl. No.	Reform And Its Objectives	Objective of Reform	Impact on Competition through changes in market demand and supply:
			competition, increasing production and mineral supply in the country.
5.	Minimum area for grant of mining lease has been revised from 5 ha to 4 ha For certain specific deposits, minimum 2 ha is provided[141]	To encourage small miners	More number of players in the sector would boost production and supply of minerals
6.	Surrender and transfer of mining lease; new rules inserted to provide for mutation of ML/ CL in favour legal heirs on death of the lessee or licensee	Restrictions have been removed including on part-transfer of mining lease. Also, the requirement of taking fresh lease by the transferee is not required[142].	Improving exit rules promotes entry of new firms, as they do not fear to enter the sector for the fear of being locked in
7.	Interest on delayed payments revised from existing 24 percent to 12 percent	Rationalise the penalty with current interest rates	Deterrent interest rates become too onerous. This rate also seems to be deterrent as current bank rate is about 6 percent
8.	Decriminalisation of offences[143]: *Major Violations*: Penalty of imprisonment, fine or both. *Minor Violations*: Penalty reduced. Penalty of only fine for such violations prescribed. Violation of other rules has been decriminalised.	Ease of doing business. Violation of 49 rules has been decriminalised	Criminal prosecution takes unusually long time to settle and thus creates a situation of uncertainty.
9.	Allows disposal of overburden/ waste rock/ mineral below the threshold value, which is generated during the course of mining or beneficiation of the mineral.	Enable ease of doing business for the miners	Additional cost incurred in maintaining the stock would be saved and increase efficiency
10.	Central Government to conduct auction when State Government fails to do so	Avoid the situations of mining lease lapse and legal complications associated with it	Timely conduct of auction removes the uncertainty of supply of iron ores

[141] The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules – Fourth Amendment. See https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1770242

[142] The statutory clearances issued to the previous lessee were transferred to the new lessee for a period of two years. The new lessee was required to obtain fresh clearances within these two years under the old law. The 2021 Amendment replaces this provision and instead provides that transferred statutory clearances will be valid throughout the lease period of the new lessee.

[143] Previously, imprisonment up to two years or fine up to 5 lakh rupees or both for violation of each and every rule irrespective of the severity of the violation.

Sl. No.	Reform And Its Objectives	Objective of Reform	Impact on Competition through changes in market demand and supply:
11.	Substituting "mining operations" with "production and dispatch"	will ensure time bound start and continuation of production and dispatch from mines	Boost availability of minerals in the market.
12.	Re-allocation of non-producing blocks of Government companies	Fixing a time frame for starting production will result in expediting production by the mines owned by PSUs	Competitive Neutrality

Source: Authors' compilation

3.6 Experience of Mineral Rich Countries

China and Australia are the two mining superpowers. Together they account for roughly half of global iron ore, coal, bauxite, zinc, lead, tin and phosphate mining, and a quarter of gold production (Kooroshy, Preston, and Bradley, 2014).

Mining Regulations in Australia

The Australian Commonwealth Government administers policy for mineral and petroleum exploration in Australia's offshore areas. However, the responsibility for onshore legislation lies with Australia's states and territories[144]. There are over 350 active mine sites across the country, with approximately one-third located in Western Australia (WA), one-quarter in Queensland (QLD), and one-fifth in New South Wales (NSW), making these three states the major contributors to the mining sector. By volume, Australia's two most important mineral commodities are iron ore (29 mines), of which 97 percent is mined in WA[145], and coal (over 90 mines), which is largely mined on the east coast, in the states of QLD and NSW. In contrast to most global production, the majority (around 75 percent) of black coal in Australia is produced from open-cut mines. This ratio of 3:1 open-cut/surface to underground mines also applies to the broader (i.e. non-coal) local mining sector[146].

The legislation that governs the grant of mining leases in Australia varies depending on the state or territory where the mining activity is proposed to take place. Each state and territory has its own specific mining legislation and regulations that outline the

[144] See https://www.australiaminerals.gov.au/legislation-regulations-and-guidelines
[145] See http://www.dmp.wa.gov.au/Minerals/Legislation-and-compliance-6224.aspx
[146] See https://www.trade.gov/country-commercial-guides/australia-mining

requirements and procedures for obtaining mining leases within its jurisdiction. For example, the main legislation governing mining leases in Western Australia is the Mining Act, 1978 and the associated Mining Regulations, 1981. The Department of Mines, Industry Regulation, and Safety (DMIRS) is responsible for administering mining leases in Western Australia. In Queensland, mining leases are governed by the Mineral Resources Act 1989 and the associated Mineral Resources Regulation 2013. There is no concept of captive mines and the mining leases are allocated on first-come-first-serve basis. A review of cases with reference to iron ore mining sector brought before the Australian Competition and Consumer Commission (ACCC) shows that there are two major issues:

Consolidation of major players: The proposed joint venture/merger/acquisition of top two players BHP Billiton Limited and Rio Tinto Limited was advised against and this was dropped by the players.[147] In this case, the market identification was as follows: the global seaborne supply of iron ore lump; the global seaborne supply of iron ore fines; the national (Australian) supply of iron ore lump; the national (Australian) supply of iron ore fines; the supply of rail services in the Pilbara, WA; the supply of port services in the Pilbara, WA; the acquisition of iron ore tenements in the Pilbara, WA; and, the acquisition of iron ore mining inputs in the Pilbara, WA.

Access to Railway Lines – Essential facility: Fortescue Metals Group Ltd (FMG) sought access to the rail facilities (the lines and associated infrastructure) which BHPB and RTIO employ to haul their ore to port. After doing a cost benefit analysis, the Australian Competition Tribunal accepted access to some lines but declined it for others in public interest.[148]

Mining Regulations in Brazil

The Ministry of Mines and Energy (MME) was created in 1960, the year after when mining and energy activities ceased to be the subject of the Ministry of Agriculture, Commerce and Public Works. The MME comprises four secretariats responsible for

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147 Statement of Issues — BHP Billiton Limited and Rio Tinto Limited — proposed iron ore production joint venture in Western Australia (25 March 2010), available at https://www.accc.gov.au/system/files/public-registers/documents/D10%2B3397775.pdf

148 In the matter of Fortescue Metals Group Limited [2010] ACompT 2, Australian Competition Tribunal.

proposing national guidelines and policies in their respective areas of activity.[149] The Brazilian mining sector is governed by the Mining Code from 1967, the Mining Regulations (which came into force in December 2017), and other regulations issued by the National Mining Agency ("**ANM**")[150] that was created in December 2017. Brazil has special provisions relating to mining permit for *garimpeiros* (small miners) or mining cooperatives (unions)[151]. Vale S.A., the world's largest iron ore producer, is based in Brazil. There are no significant cases before the Competition Authority with reference to iron ore mining sector. However, issues relating to corruption and environmental hazards could be noted.

Mining Regulations in China

The Mineral Resource Law is the national law governing the mining sector in China[152]. The Ministry of Natural Resources (MNR), along with its local bureaus, is responsible for administering this law. In January 2022, the Ministry of Industry and Information Technology (MIIT) and the Ministry of Ecology issued the Guidelines on the high-quality development of iron industry with a focus on stabilising iron ore supply.[153] A new central state-owned enterprise, China Mineral Resources Group Ltd., was established in July 2022 to augment the iron sector. China's Baowu Steel Group is exploring the possibility of establishing a joint venture with Rio Tinto in Pilbara region of Western Australia. As of now, there are no specific cases relating to iron ore mining and its issues with competition law that have been identified.

KABIL to ensure Supply of Critical Minerals in India

A joint venture company named *Khanij Bidesh India Ltd.* (KABIL), was established with the participation of three central public sector enterprises, namely, National Aluminium Company Ltd. (NALCO), Hindustan Copper Ltd. (HCL), and MECL. The

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149 the Secretariat of Petroleum, Natural Gas and Biofuel, the Secretariat of Geology, Mining and Mineral Transformation, the Secretariat of Electric Power, and the Secretariat of Planning and Energy Development. As its name indicates, the Secretariat of Geology, Mining and Mineral Transformation oversees the design and issuance of overarching policies of the mining sector that the ANM must subsequently implement. See OECD (Undated).

150 See https://www.gov.br/anm/pt-br

151 Resolution No. 178/2004 determines criteria and procedures for artisanal miners to require the mining permit from ANM (*Permissão de Lavra Garmpeira*, PLG). Under the garimpo mining permit, an individual miner is restricted to receive a maximum of 50 hectares of land, while a garimpeiro cooperative can be granted up to 1,000 hectares of land.

152 See http://www.npc.gov.cn/zgrdw/englishnpc/Law/2007-12/12/content_1383942.htm

153 See https://iclg.com/practice-areas/mining-laws-and-regulations/china

objective of constituting KABIL is to ensure a consistent supply of critical and strategic minerals[154] to the Indian domestic market[155]. KABIL's primary objective is to identify, explore, acquire, and develop strategic mineral assets abroad. The purpose is to supply these assets to meet India's domestic demands and also sell them to other countries for commercial purposes, with a specific emphasis on supporting the "Make in India" and *Atmanirbhar Bharat Abhiyaan* initiatives initiated by the Government of India. While iron ore may not be listed as a critical mineral, initiatives like KABIL still present an opportunity in this sector to benefit from the best practices employed by major iron ore suppliers worldwide.

3.7 The Indian Experience of Iron Ore and Related Competition Cases

The CCI had an occasion to deal with allegations of abuse of dominant position against National Mineral Development Corporation (NMDC) and it did not go into the details of the matter beyond the *prima facie* stage, observing that "The relevance of determining relevant market and dominance of an enterprise is only necessary in free markets. Since, in this case, the mining activities were being done as per the orders of the Supreme Court[156] and pricing was looked after by another Committee, determination of relevant market may not be appropriate"[157].

Over the years, the Commission has recommended procompetitive measures in case of mining of coal and several other sectors where regulatory vacuum has existed, for example real estate, sugar, etc. The mining sector previously faced challenges regarding captive mines and restrictions on the transfer of existing leases. However, the Government has also addressed some of these challenges through the Amendments in the MMDR Act and associated rules.

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[154] Through a commissioned study 12 such minerals have been mapped namely Lithium (Li), Cobalt (Co), Germanium (Ge), Indium (In), Beryllium (Be), Niobium (Nb), Selenium (Se), Gallium (Ga), Tantalum (Ta), Tungsten (W), Bismuth (Bi) and Tin (Sn). Out of the 12 minerals, two minerals viz. Lithium and Cobalt are identified as the most critical and strategic in nature. https://www.mecl.co.in/writereaddata/meclpdf/Corr_EOI_Kabil.pdf

[155] https://pib.gov.in/PressReleseDetailm.aspx?PRID=1581058

[156] *Samaj Parivartan Samudaya vs. State of Karnataka* (2013) 8 SCC 15 (Bellary Mining Case)

[157] *Sponge Iron Manufacturers Association vs. National Mineral Development Corporation and Ors.*, CCI Case No. 69/2012, order dated February 19, 2013. Also see *Association of Indian Mini Blast Furnaces and National Mineral Development Corporation Limited*, CCI Case 15 of 2013, order dated October 3, 2013.

3.8 Sustainable Mining

MCD Rules requires mining lease holders to take all possible precautions for undertaking sustainable mining while conducting prospecting, mining, beneficiation, or metallurgical operations in the area[158]. Mining operators are required to complete the star rating template and attain a minimum 3-star rating within four years of commencing mining operations. Additionally, they must maintain this rating on a year-on-year basis (rating exercise undertaken by IBM in consultation with the Ministry of Mines). Sustainable mining practices further raise the cost of mining operations, and thus big firms already attuned to these practices have an advantage over the new and small firms trying to enter the mining sector.

3.9 Concluding Observations

This chapter provides the regulatory framework in which the mining sector in general and the iron ore sector in particular is operating. The purpose of these mining laws is to ensure a transparent and purposeful utilisation of resources, while also safeguarding the interests of future generations. The mining industry has been acknowledged as a crucial sector for strategic development, leading to the public sector playing a significant role in its growth. However, after the 1990s, there was a realisation of the importance of private and foreign investments, prompting a shift in policies to accommodate these changes. Two significant recent reforms were introduced with the objective of enhancing transparency in ore block allocations and eliminating the distinction between captive and merchant mines, as it had been causing structural challenges in the sector. The presence of captive mines raised concerns about competition as it led to varying cost structures for different firms.

The chapter also analysed various provisions in the recent mining laws and assessed their impact on competition outcomes. The recent MMDR amendments seem to align with the objectives of competition policy. However, further enhancements are necessary, particularly in streamlining interstate regulations and facilitating the acquisition of multiple permits within a shorter timeframe. The respective state governments have shown protectionism towards their mining resources, which is evident from the cases where they have reserved mines for their captive use. It is observed that even though the licensing processes have been liberalised, there still

[158] Rule 35 of the Mineral Conservation and Development Rules, 2017.

exist detailed compliances through multiple hierarchies, which creates a chilling effect on small players. A new small player may get intimidated by the procedures involved. There may be separate processes introduced if small miners want to explore the strayed deposits of iron ore. The public reporting of resources is crucial as it enhances transparency, making information readily accessible and beneficial.

A competitive environment fosters trust among all its stakeholders, i.e. the government, miners, local communities, and other stakeholders through openness, fairness, better regulation, responsiveness, inclusive policy-making[159]. Gaining the trust of stakeholders is crucial for the country to achieve sustained growth in the mining sector (Rai, Undated). The reforms ushered in by the 2021 amendment in the mining laws are slated to benefit the iron ore sector; however, actual implementation of these reforms at the ground level would be crucial. The National Mineral Policy 2019 and its implementation through central legislation is a right step; however, to ensure its full effectiveness, this approach needs to be strengthened and complemented at the state level as well.

[159] GoI (2019), "National Mineral Policy 2019."

Chapter IV

Vertical Linkages in the Iron Ore Sector and Competition

Competition issues in the minerals sector in general, and the iron ore sector in particular, are unique owing to the nature of mines as natural resources and the consequent natural dominance of public sector followed in our development strategies. In this chapter, the available secondary data sources are used to infer the status of competition in the sector. The first section deals with the channels of competition in the mining sector followed by identifying the relevant product markets in the horizontal and vertical line in the second section. Third section assess the extent of forward and backward linkages in the sector. The fourth section examines the regional concentration in the sector followed by the assessment of competition using various secondary data sources in the fifth section. The sixth section concludes the major observations.

4.1 Identifying the Channels of Competition in the Iron Ore Sector

A literature survey is undertaken to understand the various channels of competition prevailing in the iron ore sector. However, there has not been much relevant literature on this issue, which itself shows the novelty of our attempt in the study. In the absence of relevant literature, we have reviewed the cases submitted to the competition regulators to unravel the types of competition concerns that exist. Modern competition regulation is grounded in the notion that competition enhances welfare outcomes for both producers and consumers, i.e. the producer surplus and consumer surplus are optimally maximised. Competitive markets not only result in the lowest prices without quantity constraints and higher product quality but also bring about increased factor market efficiency through efficient use of resources, which leads to high technical and allocative efficiency[1] (Schwartzman, 1973).

Restricting competition in any manner may affect the free play of market mechanism of demand and supply, resulting in an imbalance in the consumer and producer surplus. This results in extra normal profit to one party at the cost of the other, which

[1] Technical efficiency refers to the ability of firms to obtain the maximum or potential level of output from the given inputs. Allocative efficiency is the ability of the firm to equate its marginal value of product to its marginal cost (Saraswathy, B, 2008).

is contrary to the market mechanism. Such hindrances to competition can arise due to the behaviour of firms and the existing structural barriers. For instance, the creation of cartels, collusion, etc., are directly related to firm behaviour, although many a time entry barriers may exist due to the natural course of business, including the presence of high sunk costs, which are mainly structural barriers unrelated to firm behaviour. Regardless of the cause of market imperfections, the outcome is harmful to the consumers, which necessitates the need for appropriate market regulation mechanisms to allow free functioning of demand and supply forces.

Motta (2004) and Dhall (2007) discussed various channels through which market mechanism is disrupted in the context of modern antitrust laws. We shall discuss some of the prominent channels of competition that are important from the point of view of iron ore production in India. Modern competition regulations, including those in India, recognise competition issues under three major channels: (i) anti-competitive agreements, (ii) abuse of dominance, and (iii) anti-competitive mergers and acquisitions[2].

(i) A***nti-competitive Agreements***

In India, Section 3 of the Competition Act, 2002 discusses the prohibition of anti-competitive agreements. As per the Act, "*No enterprise or association of enterprises or person or association of persons shall enter into any agreement in respect of production, supply, distribution, storage, acquisition or control of goods or provision of services, which causes or is likely to cause an appreciable adverse effect on competition within India*." The Act prohibits any kind of agreements including (a) tie-in arrangement, (b) exclusive supply and distribution agreement, (c) refusal to deal, and (d) resale price maintenance which causes or is likely to cause an appreciable adverse effect on competition in India.[3] This provision is applicable to different stages of production, including supply,

[2] M&As is observed to be less in this sector and thereby not much focused in this study

[3] Competition Act, 2002 defined each of the anti-competitive agreements. Tie-in arrangement occurs when the seller sets a precondition to purchase another product along with the main product, which may be often less important to the buyer. Exclusive supply agreement prohibits any kind of restrictions imposed by the seller to purchase/acquire goods other than that of the seller. Exclusive distribution agreement prohibits limiting supply of products, market sharing/allocation, etc. Refusal to deal includes any agreement which restricts or is likely to restrict by any method the persons or classes of persons to whom goods are sold or from whom goods are bought. Resale price maintenance involves an agreement to sell goods with a condition that the resale prices would stipulated by the seller unless it is clearly stated that prices lower than those prices will be charged.

distribution, and storage. The Act prohibits any of these kinds of agreements that result in directly or indirectly determining purchase/sale prices; limiting production and supply (including technical development and investment); market allocation in terms of area, type of goods/services, number of consumers, etc.; and bid rigging or collusive bidding. All these are likely to adversely affect competition.

Collusive agreements result in high prices often more or less equivalent to monopoly prices. Collusion can be classified into explicit collusion and tacit collusion. Explicit collusion occurs when firms act in an organised manner, like organised cartels.[4] Whish (2007) observed that despite the large number of competition laws existing across the world, all of which differ in various respects, one feature that unites them is that they all condemn hardcore cartel agreements, irrespective of how such agreements are punished. Often cartels are of international nature as they operate beyond the national boundaries. The Organisation for Economic Co-operation and Development (OECD) has long recognised cartels as a serious competition concern. The major issue faced by competition regulators has been to find appropriate evidence for cartelisation, because the indulging parties are aware of the risk of keeping incriminating documents with them.

Tacit collusion occurs when the firms act in a non-cooperative way. The attraction of explicit collusion has been to alter prices as per market conditions quickly whereas tacit collusion offers no such opportunities. Market allocation is another mode of such agreements. It involves either explicit or tacit sharing of certain regions or certain sections of the customers among sellers or top players. Collusion is more serious to industries with high concentration (as there are fewer firms involved, and it is relatively easy to sustain collusion here) and low barriers to entry (entry disrupts high pricing and high profitability). Therefore, in sectors with high barriers to entry, such as those with high sunk cost, collusion may exist for longer period of time than in other sectors. Iron ore mining involves a huge sunk cost as the first two stages of exploration (prospecting) are highly uncertain. If the exploration is unsuccessful, there is no question of return on investment, making mining exploration unattractive.[5]

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[4] Indian Competition Act (2002) defines cartel to include any attempt to limit or attempt to control production, distribution, prices or trade in goods and services by the associations.

[5] Applicable when each of these stages are not separated.

Similarly, buyer power has an important role in determining supply side competition. If the buyer is large enough, or if the buyers can collectively bargain together, the seller will be forced to supply at competitive prices. Otherwise, the buyers redirect the orders to other suppliers. It may be easy to find a potential seller as the buyer demands a vast quantity.[6] It is also possible that a buyer with high quantity requirement will enter into upstream production itself. In the event of products with inelastic demand, collusive pricing may persist. Iron ore is a critical input for steel production; hence, demand may be less elastic until it results in losses to the steel manufacturer. Nevertheless, the existence of captive iron ore mines may result in differential input (iron ore) prices for those with and without captive mines, which may adversely affect smaller steel producers more than large-scale producers who have more buyer power. Furthermore, captive plants are mainly owned by large-scale producers.

Rashtriya Ispat Nigam Ltd (RINL) and the Allocation of Captive Mines

Several media have emphasised that the primary cause of Rashtriya Ispat Nigam Ltd's (RINL) financial crisis is the lack of captive mines. As per media reports, RINL encountered a crisis after NMDC began charging market rates for the iron ore it supplied. Though RINL tried to acquire 51 percent shares in Odisha Mining Corporation (OMC) in 2011, with the goal of obtaining control over OMC's iron ore mines in Keonjhar and Sundargarh by paying Rs 341 crore as paid-up share capital, the deal ran into legal hurdles and remained unresolved for several years. RINL was utilising approximately 6.5 million metric tonnes of iron ore annually, which was notably higher than other steel plants. This high consumption of iron ore was causing an annual loss of Rs 800–1000 crore for the company (Rao, 2021). Because it lacked its own mines, RINL had to bear approximately 60 to 65 percent of its raw material expenses, which contrasted significantly with its competitors, who were only incurring costs ranging from 31 to 44 percent (*Economic Times*, 2015). In March 2021, the Union Minister for Steel also admitted that, "RINL procures iron ore from open market at the market price in the absence of allocation of any captive mine. This is one of the factors among other reasons for losses incurred by RINL" (*The Daily Gaurdian*, 2021).

[6] It may not be feasible in naturally dominated sectors.

(ii) Abuse of Dominance (AOD)

Competition Act, 2002 explained dominant position as "a position of strength, enjoyed by an enterprise, in a relevant market, in India, which enables it to operate independently of competitive forces or affect its competitors or consumers or the relevant market in its favour." After liberalisation, there has been a positive approach towards large-sized domestic firms, as it is essential to compete with dominant firms globally across a wide range of products. This was contrary to the ideological approach in our developmental agenda during the pre-liberalisation period when the concentration of economic power was viewed suspiciously. The Competition Act regulates only the abuse of dominance and not dominance per se. Section 4 of the Act clearly prohibits any enterprise or dominant firm from *abusing* its dominant position through directly or indirectly impose any kind of unfair or discriminatory *conditions* of sale/purchase of goods and services or price in purchase/sale (including predatory price). Similarly, the AoD further includes, (1) limiting or restricting: (i) production/provision of goods and services or market, (ii) technical/scientific development of goods and services to the prejudice of consumers, (2) practices leading to market access denial, (3) makes conclusion of contracts subject to acceptance by other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts, and (v) the use of dominance to enter or protect another relevant market.

Given this background, our attempt in this chapter is to identify whether or not the iron ore market in India is concentrated. If it is concentrated, then who are the top players in the market, is there any domination from business groups, and is there any regional concentration present?

4.2. Understanding the Relevant Product Market and Geographic Market

Stages of Iron Ore Mining and Ownership of Mines

Mineral exploration is considered as the lifeline of mining. It involves the systematic examination of licensed plots using scientific and knowledge-driven techniques to determine the potential presence of valuable mineral resources. The discovery of minerals transforms it into a commercial enterprise to generate profits and add value to various other sectors (FIMI, 2019). The following are the major stages of iron ore mining: (i) conceptualisation and selection of a target area to be explored, (ii) reconnaissance (exploration) prospecting, and (iii) pre-feasibility and feasibility studies for mining operations. The initial licensed area is referred to as Greenfield, encompassing a large block of land. Following this, there is the Brownfield (Prospect) area, which is smaller than the Greenfield. If the exploration proves fruitful, a mineable mineral deposit area is identified, which is even smaller in size (FIMI, 2019). Consequently, the initial two stages of mining exploration (prospecting) are characterised by high uncertainty until the third stage is reached, where value generation begins. Until the presence of mineable resources is explored and confirmed, their value remains zero. Therefore, it becomes imperative to promote mining activities in a manner that is legal, ethical, and environmentally sustainable, particularly given the relatively low success rate in the exploration process. Many countries consider the third stage of mining operation as separate from the first two, and the responsibility of resource development allocated on a first come first serve basis rather than through auction route (FIMI, 2019). In India, the mining sector adopts the auction route, with a licensing period of 50 years as per the recent regulatory changes discussed in Chapter 3.

Type of Iron Ore Products

Iron ore is mined and processed from iron ore minerals found in their natural state as iron ore mineral deposits. The basic classification of iron ore is based on the mineral composition of the ore. There are different varieties of iron ore such as hematite, magnetite, limonite, turgite, and siderite.

The two major categories of iron ores produced and marketed in India are (i) hematite (Fe_2O_3) and (ii) magnetite (Fe_3O_4) (GoI, 2007). These two types of iron ores can further differ in their iron content, that is based on the percentage of iron (Fe) content. The mined raw form of iron ore is processed (through crushing, screening, washing, beneficiation, and agglomeration) to produce marketable iron ore with standard physical and chemical properties (GoI, 2007). The various physical and chemical characteristics of marketed iron ores resulted from the end use of iron ore and the manufacturing processes in the industries that use them as input, as shown in Tables 1 to 3. Figure 1 shows the uses of various types of iron ore products. Typically, iron ore lumps of a standard size are utilised in blast furnaces. Any oversized lumps are crushed to achieve the suitable size, while fines (undersized particles) are separated by passing the material through sieves, causing the undersized fines to be collected below. Depending on the quality of the lumps, further processing may be carried out to advance to the next stage.[7] The fines undergo a sintering or palletisation process to agglomerate them into the desired size. Sintering is the process of creating a dense, solid substance (5–40 millimetre) by applying heat to materials without melting them completely into a liquid state. For the sintering process, a mixture of iron ore fines along with other iron bearing wastes and coke dust is blended and subjected to combustion. The heat causes the fines to merge and form larger lumps. Sinters can be used only in blast furnaces. Pelletisation is the process which enables converting iron ore fines into 'uniform sized iron ore pellets' (8–16 millimetre) that can be charged into the blast furnaces or used in the production of direct reduced iron (DRI). The pelletisation process involves the mixing of iron ore and the required limestone with water, which is later ground in ball mills to the desired size, from which green pellets are subsequently produced. These green pellets undergo additional processes of drying, heating, and firing to create iron ore pellets. The benefit of utilising pellets lies in their consistent size, well-defined composition, and strength. Using pellets leads to a reduction in slag formation and fuel consumption, subsequently enhancing the efficiency of blast furnaces, and sponge iron/DRI plants. Additionally, pellets exhibit a better tumbling index compared to iron ore, making them the preferred choice for steel producers (GoI, 2023 and PMAI, 2022). It is said that modern sintering plants are capable of producing around 25,000 tonnes per day.

Table 1: Classification Based on Physical Parameters (Approx. Size)

Type of the product	**Specification**
Lumps	6.3 mm to 31.5 mm
Fines	Less than 6.3 mm
Concentrates	Granular size ~ 0.075 mm
Pellets	5 mm to 20 mm*
Blue dust	1 mm to 20 mm

Source: Compiled from various sources.
Note: * For pellets, at least 90 percent of the pellets to be between 9 mm and 18 mm with minus 5 mm material of not more than five percent (Bhatnagar, 2017).

Table 2: Classification Based on Chemical Parameter: Hematite Ores

Type of the product	**Specification**
High grade	Hematite with high % of Fe (> 65%)

[7] Britannica gives a detailed discussion on the process of iron ore making. Available at: https://www.britannica.com/technology/iron-processing/Ores; accessed on March 23, 2023.

Type of the product	Specification
Medium grade	Hematite with medium % of Fe (> 62 to 65 %)
Low grade	Hematite with low % of Fe (60 to 62%)
Black iron ore	Hematite containing 10% manganese
Unclassified	Hematite ores with a wide range of specifications
Others	Hematite ores that do not fit into the above categories

Source: Based on Government of India (2007), Indian Bureau of Mines.

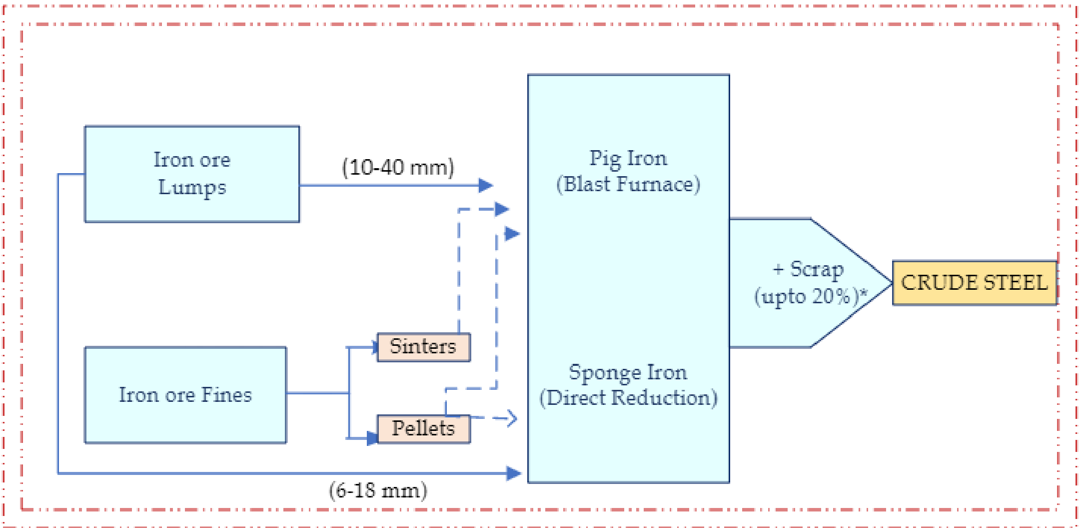
Table 3: Classification Based on Chemical Parameter: Magnetite Ores

Type of the product	Specification
Metallurgical	Magnetite ores for making concentrates (with an average 38% Fe oxidised)
Coal washery	Magnetite ores with Fe > 64%
Foundry	Magnetite ores utilised in the foundry industry
Unclassified	Magnetite ores with a wide range of specifications
Others	Magnetite ores that do not fit into the above category

Source: Based on Government of India (2007), Indian Bureau of Mines.

In certain instances, the iron content must be enhanced before melting, a process known as concentration. This involves reducing the silica content of the ore fractions and increasing the iron content by separating light minerals from the heavy ones. To achieve this, the ore is crushed and ground to release the ore minerals from the impurities. Nevertheless, because concentrates are very fine powder and cannot be agglomerated through the sintering process, they are not suited for physical use in the blast furnace. Concentrates undergo a pelletisation process.

Figure 1: Uses of Iron Ore Lumps and Fines



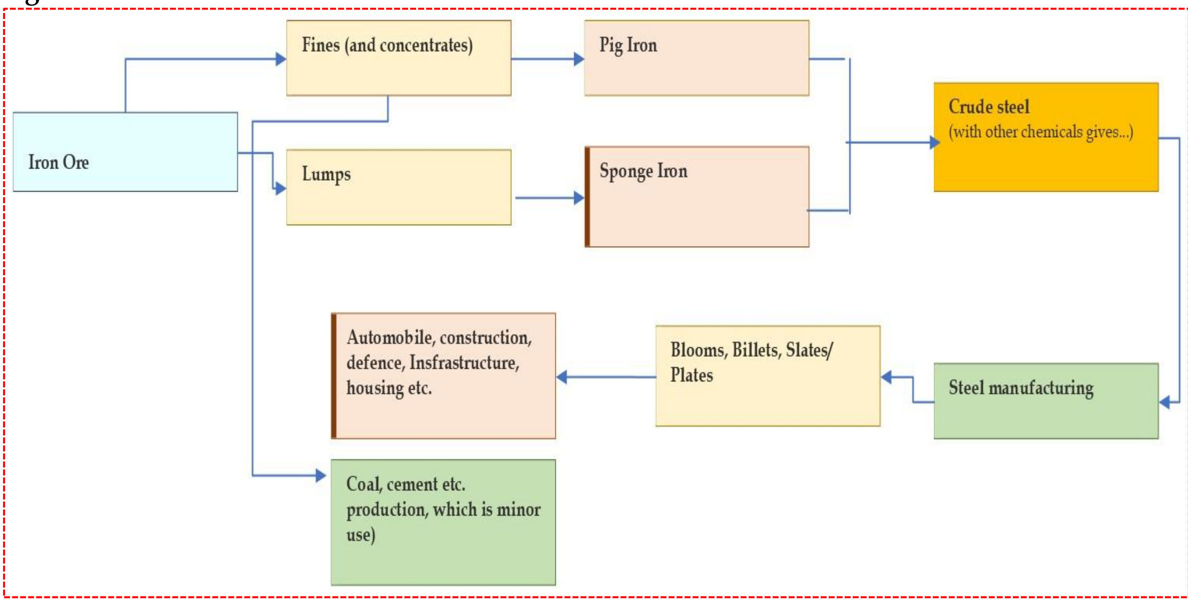
Source: Based on FIMI (2020).
Note: As per World Steel Association, the average steel scrap consumption per unit of crude steel produced through blast furnace route is 12.5 percent.

Iron making is done through either blast furnace (BF) route, direct reduction (DR) or smelting reduction (SR) method. The BF route is widely regarded as the most efficient method for iron production, and other alternative methods are relatively underutilised worldwide. The SR technique was developed in response to the scarcity and high cost of coking coal and offers the advantage of using a wide range of coal for iron making. However, this technique is still in a nascent stage and is not widely used.

Vertical Linkages of Iron Ore Sector: End Uses of Iron Ores

Within iron ore mining, there are backward and forward linkages. Backward linkages primarily refer to the local procurement of various inputs such as catering services, electricity, transportation, raw materials, and food. Forward linkages include the downstream processing of mineral ores or concentrates including smelting, refining, semi-fabrication, and manufacture of products (FIMI, 2019). Iron ore is the key raw material for steel plants, cement industry, and coal industry. Iron ore, along with appropriate other materials like manganese, chromite, ferro-alloys etc., undergoes a transformation process to produce crude steel/pig iron. (i.e. in the metal form) as well as various types of steel products such as blooms, billets, slabs, or plates. This procedure is done bymetallurgists. For a number of downstream industries in the value chain, such as rail, infrastructure, automobile, defence, machine components, water pumps and so on, crude steel is used as a raw material in the third stage (Figure 2).

Figure 2: Value Chains in the Iron Ore Sector



Source: Authors' compilation.

Substitutability between Iron Ore Products

Iron ore requirements cannot be substituted by any other product. Substitutability is possible within iron ore products, that is lumps, fines, pellets, etc. As was previously said, fines are mostly transformed into pellets and sinters before being used in the production process. Processing techniques like beneficiation are used to convert low iron ore grade ores into ones with high iron content. Specific marketed forms of iron ore fulfil the requirement of the required production purpose. For example, pig iron production requires high grade ore such that fuel cost and production cost can be kept at their optimal level. Cement production requires low-grade iron ore, not high-grade ores. The marketed forms have a degree of substitutability based on the end use and the production process. However, such substitution in certain cases (for example, pig iron production) affects the cost of production, making it less optimal. Here, the substitutability is mainly between high grade and low-grade iron ore products. Low grade can be substituted for high grade with the beneficiation process. However, the extent of such beneficiation depends on the technology available in India. Countries such as Japan and China have been implementing low-cost beneficiation procedures to upgrade low-quality iron ore to high-quality iron ore without raising production costs.[8] Lumps and fines are substitutable once the fines undergo the pelletisation process to achieve the desired size. Pellets are generally preferred over lumps as they have a higher iron content. Thus, pellets now serve as a substitute for lumps and sinters.

Structure of the Iron Ore Market: Captive and Non-Captive Mines

Understanding the competition issues in the sector requires examining the structure of mines, which are broadly categorised as captive and non-captive. Captive mines are used by steel sector companies for their own consumption. Non-captive mines, on the other hand, are further divided into two categories. The mining sector consists of publicly-owned companies that directly supply iron ore to end-users, and private miners, also known as merchant miners, who sell their iron ore output to the steel industry. Hence, for captive mines owners, competition issues may not be a significant concern as they procure iron ore from their own mines to meet their requirements. Firms without captive mines have the option to purchase iron ore from the public sector or the private sector. However, the demand for iron ore is not solely determined

[8] Based on the information received during field interaction.

by prices; it also depends on the availability of the required quality and the accessibility of the source to ensure reasonable transportation costs.

Having discussed the iron ore types, vertical linkages, and substitutability, we shall move to the empirical side to see the contribution from each of these categories and the extent of linkages.

4.3 Structure and Extent of Vertical Linkages in the Iron Ore Sector in India:

In order to understand the extent of forward and backward linkages, Supply and Use Table (SUT) provided by the Ministry of Statistics and Programme Implementation, Government of India is used.[9] The SUT is a part of the national accounting system and offers a comprehensive overview of production within the economy. It is equivalent to the input-output table and serves as an integration framework for the national accounts. The framework provides information on the interdependencies in production, the usage of various (or demand) industries' output, and the structure of supply. The products and industries in SUT are disaggregated into 140 products and 66 industries. The 140 product classifications are based on the National Product Classification for manufacturing sector used in the Annual Survey of Industries. The 66 industry classifications are based on the National Industrial Classification 2008 and 2004. 'Iron ore' is one of the 140 'products,' and 'Iron ore industry is one of the 66 'industries' in SUT. Different data sources are used to estimate the output and demand in different industries. Data for mining and quarrying is obtained from the MCA database and the Annual Reports of Non-departmental Enterprises. The distribution of the mining output into various SUT industries is estimated from the Indian Bureau of Mines' (IBM) data on minerals.

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[9] The supply-use equation for a product is given as, Output + Imports = Intermediate consumption + Final consumption + Gross Capital formation (including changes in stocks and valuables) + Exports. While the left-hand side includes the domestic and foreign supply of a product, the right-hand side includes the domestic and foreign demand of the same product. The Supply table is a product-industry matrix, which includes domestic production of products in various industries, import of products, and valuations of taxes, subsidies, trade margins and transport margins that add to the basic prices of products. The Use table is a product-industry matrix, which includes different uses to which the total supply goes. The uses are broadly classified as intermediate use and final use. Intermediate use is the consumption of a product in the production in different industries. Final use can be classified into Private Final Consumption Expenditure, Government Final Consumption Expenditure, Gross Fixed Capital Formation, and Change in Stocks and Exports.

Table 4 shows the supply and uses of iron ore and displays the use of iron ore as an input in different industries, i.e. the intermediate consumption of iron ore by other industries, which gives a clear picture of the vertical linkages of the sector with other sectors. Moreover, it clearly depicts which are the major sectors in which iron ore is consumed. It is seen from the table that iron and steel sector is the topmost consumer of iron ore in the country. Around 95 percent of iron ore demand comes from steel sector, and 1.6 percent is consumed in fabricated metal products, which is also directly connected with the iron and steel sector. The rest of the iron ore is used for export (1.4 percent), and some part is changes in stock.

Table 4: Uses of Iron Ore by Other Sectors

	Intermediate use (in various industries)			Final Use			Total use	
	Manufacture of Basic Iron and Steel + Casting of iron and steel	Manufacture of fabricated metal products, except machinery and equipments	Total Intermediate use	Change in Stocks	Export	Total Final Use	Total Use (Total intermediate + Total final use)	OP at PP
Amount (Rs. crores)	106231	1780	108010	2440	1550	3990	112001	112001
In percentage	94.8	1.6	96.4	2.2	1.4	3.6	100	100

Source: Calculated using Supply and Use Table 2015-16, Ministry of Statistics and Programme Implementation, Government of India.
Note: The use (or demand) of iron ore as a product in different industries (as intermediate use) and in other spheres (as final use) presents an overview of the forward linkage to the iron ore industry.

Table 5 shows the use of other products in the iron ore industry as intermediate goods, the total output, and the gross value added. The proportion of intermediate use of other products in the iron ore industry provides insights into the backward linkages between the iron ore sector and other sectors. As observed in Table 6, the principal intermediary goods used in the iron ore sector consist of various kinds of metal products, and organic and inorganic chemicals. Various kinds of tools, including machine tools and hand tools, are inevitable for the operation of the sector. Intermediary items contribute to 55 percent of the total value output, while the remaining 45 percent represents gross value produced by this sector.

Table 5: Intermediate Inputs used in Iron Ore Production

Product	Amount (Rs. crores)	Share (%)
Miscellaneous metal products	7834.5	13.2
Organic chemicals	6491.13	11.0
Hand tools, hardware	5438.57	9.2
Inorganic chemicals	4347.56	7.3
Petroleum products	4076.47	6.9
Electricity	1947.26	3.3
Machine tools	494.59	0.8
Rubber products	361.34	0.6
Other chemicals and chemical products	250.16	0.4
Construction and construction services	182.39	0.3
Ready-made garments	175.12	0.3
Land transport	172.64	0.3
Others	977.74	1.7
Total value of intermediate goods used	***32749.47***	***55.3***
Total output of the industry	59223	100
GVA by the industry	***26473.53***	***44.7***

Source: Calculated using Supply and Use Table 2015–16, Ministry of Statistics and Programme Implementation, Government of India.

4.4 Is there any Regional Concentration? State level Production of Iron Ore in India

According to the Loksabha Question-Answers (2022), Odisha is the largest contributor to India's total iron ore production, accounting for approximately 54 percent (as shown in Table 6). Karnataka follows with a production share of about 17 percent[10], while Chhattisgarh contributes around 16 percent. Jharkhand holds a production share of more than ten percent, and Madhya Pradesh's share is approximately three percent. Magnetite and hematite are the major two categories of iron ore, as explained earlier. Figure 3 shows the total magnetite-based iron ore resources in India across various states. It includes both reserves as well as remaining resources. In 2021–22 (P), Karnataka continues to hold the highest share of magnetite iron ore resources in India, making up 73 percent of the total. The second top state is Andhra Pradesh with a 14 percent share. In terms of hematite production, Odisha, Chhattisgarh, and Jharkhand are the top states (Figure 5).

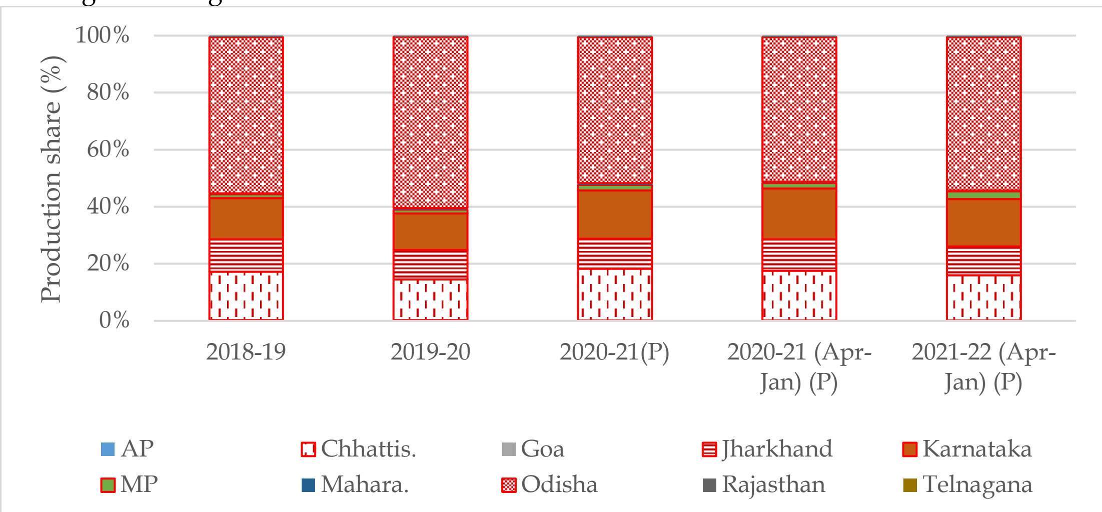
Table 6: Iron Ore Production across Various States

[10] As per the latest Annual Report of the Ministry of Mines (2023), Chattisgarh is having the second position with 16.3 percent iron ore production followed by Karnataka with 15.9 percent.

	(Qty in '000 tonnes)					Share (%)				
State	2018-19	2019-20	2020-21(P)	2020-21 (Apr-Jan) (P)	2021-22 (Apr-Jan) (P)	2018-19	2019-20	2020-21(P)	2020-21 (Apr-	2021-22 (Apr-
AP	654	825	360	315	266	0.3	0.3	0.2	0.2	0.1
Chhattis.	34,893	34,728	36,989	27,831	32,315	16.9	14.2	18.1	17.4	15.8
Goa	0	0	94	94	0	0.0	0.0	0.0	0.1	0.0
Jharkhand	23,433	25,015	21,434	17,573	20,680	11.3	10.2	10.5	11.0	10.1
Karnataka	29,823	31,392	34,542	28,544	33,911	14.4	12.9	16.9	17.8	16.6
Madhya	2,802	3,343	4,094	3,187	5,504	1.4	1.4	2.0	2.0	2.7
Mahara.	660	1,131	1,249	699	664	0.3	0.5	0.6	0.4	0.3
Odisha	1,13,119	1,46,637	1,04,631	81,226	1,09,675	54.8	60.1	51.2	50.7	53.8
Rajasthan	1,108	1,012	1,088	873	1,020	0.5	0.4	0.5	0.5	0.5
Telangana	2	0	0	0	0	0.0	0.0	0.0	0.0	0.0
All India	2,06,495	2,44,083	2,04,482	1,60,341	2,04,035	100.0	100.0	100.0	100.0	100.0

Source: Calculated using Press Release by the Press Information Bureau, based on the Lok Sabha Reply by Union Minister of Coal, Mines and Parliamentary Affairs, March 16, 2022. Available at: https://pib.gov.in/PressReleasePage.aspx?PRID=1806555; accessed on May 2, 2023.

Figure 3: Magnetite: State-wise Production Share of Iron re from 2018−19 to 2020−21



Source: Calculated using Press Release by the Press Information Bureau, based on the Lok Sabha Reply by Union Minister of Coal, Mines and Parliamentary Affairs, March 16, 2022. Available at: https://pib.gov.in/PressReleasePage.aspx?PRID=1806555; accessed on May 2, 2023.

Figure 4: Magnetite: Total Resources

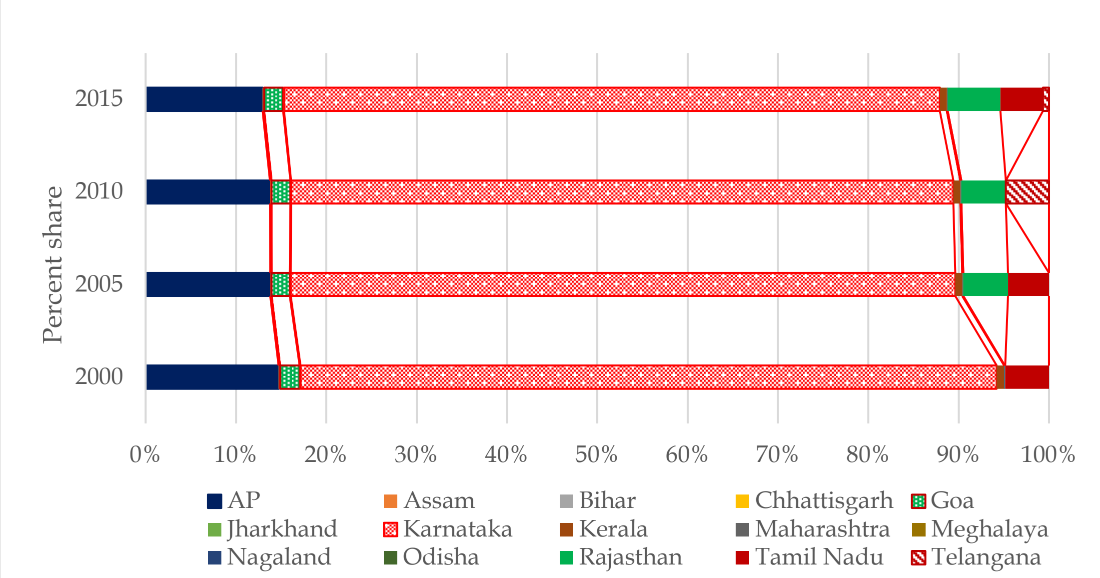


Figure 5: Hematite: Total Reserves across states (share)

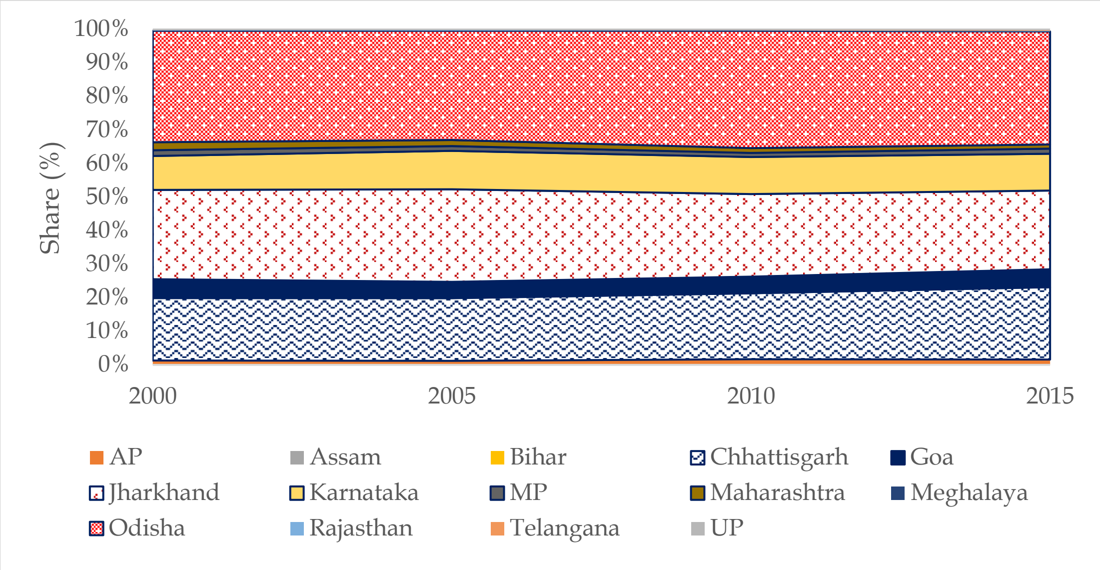


Table 7 presents three significant categories of iron ore production in various Indian states, both in terms of value and volume. The production of lumps is concentrated mainly in Odisha, Chhattisgarh, and Karnataka. Notably, in the fiscal year 2019–20 (P), Odisha contributed the highest share, accounting for 62 percent in value and 60 percent in volume of lumps production. Respective figures are 20 (value) and 16 (volume) for Chhattisgarh and 13 and 12 for Karnataka. In Odisha and Chhattisgarh, the value of iron ore production has been significantly higher compared to the volume, indicating differences in pricing. These price differentials may be indicative of the higher quality of lumps found in these states. Conversely, in the case of Jharkhand, the situation is opposite, likely reflecting lower quality iron ore lumps.

Table 7: Production of Various Categories of Iron Ore across States (Value and Volume)

	Volume			Value			Volume Share %			Value Share %		
	2017-18	2018-19	2019-20 (P)	2017-18	2018-19	2019-20 (P)	2017-18	2018-19	2019-20 (P)	2017-18	2018-19	2019-20 (P)
Lumps												
Odisha	34398	38238	45442	69584107	121963240	121557457	52.6	57.3	59.5	49.9	63.3	61.8
Chhatti	12222	11657	12175	31781088	34056295	38901080	18.7	17.5	15.9	22.8	17.7	19.8
Karnataka	9427	9175	9250	27966193	27209485	24977063	14.4	13.8	12.1	20.0	14.1	12.7
Jharkhand	6090	6272	7246	6984493	8506371	10051725	9.3	9.4	9.5	5.0	4.4	5.1
MP	359	535	1467	186400	272805	689247	0.5	0.8	1.9	0.1	0.1	0.4
AP	402	362	502	320091	269587	393190	0.6	0.5	0.7	0.2	0.1	0.2
Mahar	323	283	93	500406	447395	180171	0.5	0.4	0.1	0.4	0.2	0.1
Rajasthan	126	155	188	43505	45415	50739	0.2	0.2	0.2	0.0	0.0	0.0
Goa	2075			2149976			3.2	0.0	0.0	1.5	0.0	0.0
Telangana	4	2		3014	1290		0.0	0.0	0.0	0.0	0.0	0.0
India	65426	66679	76363	139519273	192771883	196800672	100.0	100.0	100.0	100.0	100.0	100.0
Fines												
Odisha	67504	74374	100973	80870647	128140568	156145292	50.2	53.8	59.9	39.8	50.1	55.8
Chhatti	22196	23236	22549	49765881	62929170	61184967	16.5	16.8	13.4	24.5	24.6	21.8
Karnataka	19264	20648	22152	46776633	43904765	41569302	14.3	14.9	13.1	23.0	17.2	14.8
Jharkhand	14079	17161	19642	13652480	19167149	18846139	10.5	12.4	11.7	6.7	7.5	6.7
Mahara	617	377	1038	528698	388627	1100506	0.5	0.3	0.6	0.3	0.2	0.4
MP	2384	2267	1866	1053312	1175398	1040728	1.8	1.6	1.1	0.5	0.5	0.4
AP	272	292	316	82801	133029	189511	0.2	0.2	0.2	0.0	0.1	0.1
Rajasthan	4	++	++	1091	89	49	0.0			0.0	0.0	0.0
Goa	8134			10386698			6.0	0.0	0.0	5.1	0.0	0.0
Telangana	2			1500			0.0		0.0	0.0		0.0
India	134456	138355	168536	203119742	255838795	280076494	100.0	100.0	100.0	100.0	100.0	100.0
Concentrates												
Rajasthan	1190	953	824	4021466	3847749	3576748	77.1	65.3	69.7	89.5	79.3	85.2
Odisha	284	507	358	390354	1007402	620182	18.4	34.7	30.3	8.7	20.7	14.8
Goa	70			80205			4.5	0.0	0.0	1.8	0.0	0.0
	MP						0.0	0.0	0.0	0.0	0.0	0.0
India	1544	1460	1182	4492024	4855151	4196930	100.0	100.0	100.0	100.0	100.0	100.0
												Total
Odisha	102186	113119	146773	150845108	251111210	278322931	50.7	54.8	59.6	43.5	55.4	57.9
Chhatti	34418	34893	34724	81546969	96985465	100086047	17.1	16.9	14.1	23.5	21.4	20.8
Karnataka	28691	29823	31402	74742826	71114250	66546365	14.2	14.4	12.8	21.5	15.7	13.8
Jharkhand	20169	23433	26888	20636973	27673520	28897864	10.0	11.3	10.9	5.9	6.1	6.0
Rajasthan	1320	1108	1012	4066062	3893253	3627536	0.7	0.5	0.4	1.2	0.9	0.8
MP	2743	2802	3333	1239712	1448203	1729975	1.4	1.4	1.4	0.4	0.3	0.4
Maharastra	940	660	1131	1029104	836022	1280677	0.5	0.3	0.5	0.3	0.2	0.3
AP	674	654	818	402892	402616	582701	0.3	0.3	0.3	0.1	0.1	0.1
Goa	10279			12616879			5.1		0.0	3.6	0.0	0.0
Telangana	6	2		4514	1290		0.0	0.0		0.0	0.0	0.0
India	201426	206494	246081	347131039	453465829	481074096	100	100	100	100	100	100

Source: Calculated using Indian Mineral Year Book, 2020, IBM

Jharkhand accounted for five percent in terms of value of production, while its volume-wise share was ten percent. In the case of fines, too, Odisha, Chhattisgarh and Karnataka are the leading states, accounting 56 percent, 22 percent, and 15 percent respectively in terms of value and 60 percent, 13 percent, and 13 percent in terms of volume for the year 2019–20 (P). Chhattisgarh and Karnataka had better value-based shares than volume-based shares. Jharkhand is the next major state for the production of fines. When it comes to concentrates, Rajasthan takes the lead, followed by Odisha. The bulk of the value generated from iron ore concentrates, approximately 85 percent, comes from Rajasthan, while Odisha contributes around 15 percent. In terms of volume, respective shares are, 70 and 30 percent, which indicates that Rajasthan based firms are generating higher value from the iron ore concentrates compared to firms in Odisha. From the analysis it is clear that the major four states in terms of various categories of iron ore are Odisha, Chhattisgarh, Karnataka, and Jharkhand. Rajasthan continues to hold the top position in concentrates, while Goa, which had a significant presence in the past, has seen a substantial decline in its production.

Table 8: Installed Capacity and Capacity Utilisation of Pellet Plants (in '000 tonnes)

	Annual installed capacity	Production		Iron ore fines consumed		Capacity utilisation (%)	
Plant		2018-19	2019-20 (P)	2018-19	2019-20 (P)	2018-19	2019-20 (P)
JSW Total	23700	10653	11297	4244	20416	64	68
Arcelor Mittal Total	14000						
Tata Steel Limited, Jamshedpur	6000	6330	5600		13208	34	47
KIOCL Ltd, Pambur, Mangaluru	3500	2238	2375	2173	2367	53	81
Total*	***69620***	***28526***	***28597***	***12292***	***49832***		
Share to total (%)							
JSW Total	34.0	37.3	39.5	34.5	41.0		
A Mittal	20.1	0.0	0.0	0.0	0.0		
Tata Steel Limited, Jamshedpur	8.6	22.2	19.6	0.0	26.5		
KIOCL Ltd, Pambur, Mangaluru, Kartaka	5.0	7.8	8.3	17.7	4.7		
Total sum	100.0	100.0	100.0	100.0	100.0		

Source: Compiled and Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, May 2023.

Notes: (i) JSW shows the combined capacity in five plants including that in Gujarat, Odisha, Amba Maharashtra and Rajasthan (ii) Total is the sum of 28 plants reported for pellets.

Based on the data in Table 8, the JSW plants hold a major share of the total installed capacity for pellets production. Based on the available data, JSW plants account for around 34 percent of the total capacities across major iron ore producing states. Among these, the plants in Karnataka and Odisha have the highest capacities, with 9200 and 9000 thousand tonnes respectively. Capacity utilisation for the latest year for

JSW is around 68 percent, which is less than the installed capacity for pellets. ArcelorMittal holds the next highest installed capacity, accounting for 20 percent of the total. However, the production figures for ArcelorMittal are not available. Tata plant is also producing much less than its installed capacity.

Table 9: Installed capacity and Capacity Utilisation of Sintering Plants (in '000 tonnes)

Sintering Plant	Annual installed capacity	Production	Production	Iron ore fines consumed	Iron ore fines consumed	Capacity utilisation		Capacity share (%)
		2018-19	2019-20 (P)	2018-19	2019-20 (P)	2018-19	2019-20 (P)	
JSW Total	22656	20232	19516	4832	24446	89	96	24
Tata	14278	8179	8611	18509	18032	57	105	15
Bokaro Steel Plant, Jharkhand	6900	5870	5681		3882	85	97	7
Bhushan Steel Ltd, Dhenkal, Odisha	6680	4951	4967	4449	4297	74	100	7
Bhilai Steel Plant, Bhilai, Durg, Chhattisgarh.	6334							7
Rourkela Steel Plant, Odisha	5300	6310	6020	3963	3802	119	95	6
RINL Total	8856	4240	3590	5317	4787	48	85	9
IISCO Steel Plant, SAIL, Burnpur, West Bengal	3880	3277	3709	398	462	84	113	4
Total sum	96131	63408	62638	45539	76155	66	99	100

Source: Compiled and Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, Ministry of Mines, May 2023.
Note: JSW, Tata and RINL are combined plant shares.

Based on the installed capacity of sintering plants also, JSW plants are much ahead of other facilities in the country. JSW capacities constitute around 24 percent of the capacities of 39 sintering plants reported (Table 9). Next is Tata with a 15 percent share of the total installed capacity. In 2019–20, the capacity utilisation of most of these plants remained high compared to the previous year. The JSW plant in Karnataka has the highest installed capacity among all plants. Based on the Indian Bureau of Mines data 2019–20 (P), fines are more prevalent in iron ore mines in India compared to lumps, both in terms of value and volume. In 2019–20, fines constituted 58 percent in terms of value and 68 percent in terms of volume of the total iron ore production. The high presence of fines also indicates the requirement for additional processing to convert them into usable form, which adds to the overall cost of production (Table 10).

Table 10: Lumps and Fines in the Production of Iron Ore, 2019–20 (P) (Quantity in '000 Tonnes; Value in Rs '000)

	Below 55% Fe	55% - below 58% Fe	58% - below 60% Fe	60% - below 62% Fe	62% - below 65% Fe	65% Fe - and above	Qty	Value
Lumps	3538	2996	4801	10671	35326	19031	76363	196800672
Fines	7881	14741	10617	28503	88026	18768	168536	280076494
Concentrates							1182	4196930
Total	11419	17737	15418	39174	123352	37799	246081	481074096
Share (%)								
Lumps	31	17	31	27	29	50	31	41
Fines	69	83	69	73	71	50	68	58
Concentrates*							0	1
	100	100	100	100	100	100	100	100

Source: Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, Ministry of Mines, May 2023.
Note: Data is not available for concentrates.

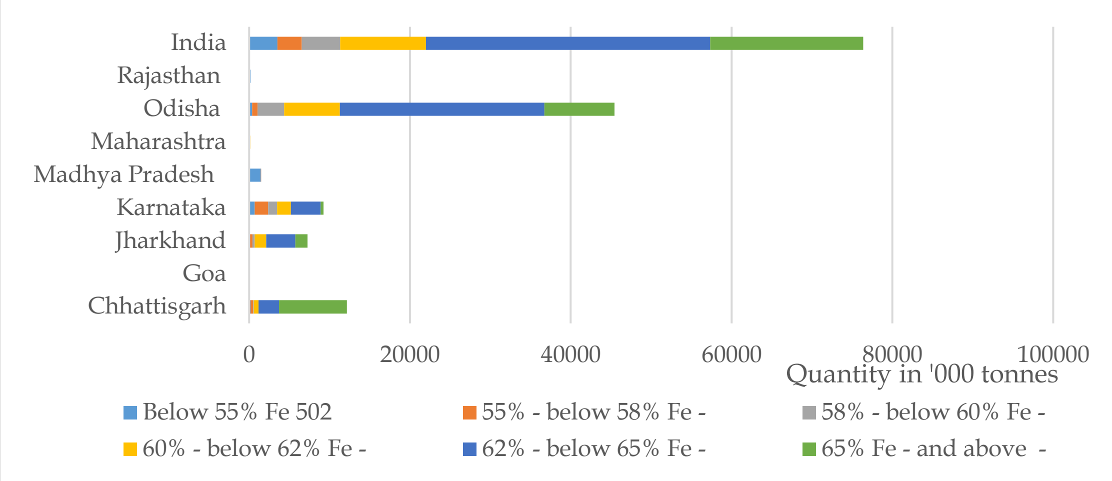
Table 11: Production of Iron Ore (2019–20, P)

(Share, Percent)				
	Lumps		Fines	
Iron Ore Grade	Public Sector	Private Sector	Public Sector	Private Sector
Below 55% Fe	0	100	5	95
55% - below 58% Fe	7	93	14	86
58% - below 60% Fe	27	73	40	60
60% - below 62% Fe	40	60	29	71
62% - below 65% Fe	51	49	39	61
65% Fe - and above	35	65	28	72
Qty	36	64	28	72
Value	4	96	32	68

Source: Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, Ministry of Mines, May 2023.
Note: Data is not available for concentrates.

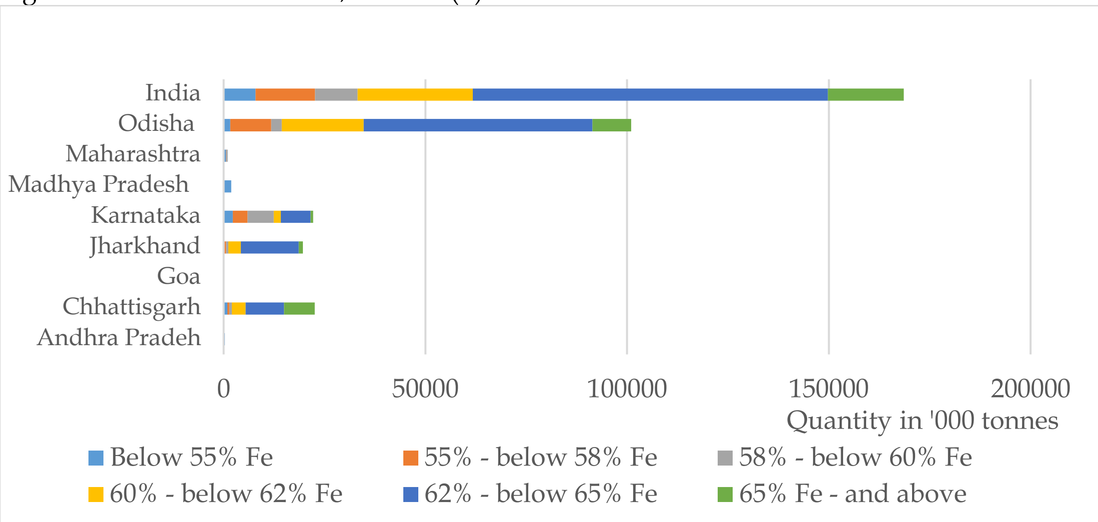
It is further observed that in the year 2019–20 (P) when iron ore was disaggregated into various grades and ownership categories, the private sector contributed around 64 percent of the overall production of lumps and 72 percent of fines in terms of quantity. Similarly, in terms of value, the private sector contributed around 96 percent of lumps and 68 percent of fines. It is further observed that the presence of private sector is more pronounced in the high-quality iron ore segment, that is, with high iron ore content (Table 11).[11] The states of Odisha and Chhattisgarh have a significant presence of high-grade iron ore, with Fe content exceeding 62 percent, particularly in the lumps category (Figure 6). With respect to the fines, Odisha, Jharkhand, and Chhattisgarh have the highest concentration of high-quality iron ore (Figure 7).

Figure 6: Production of Lumps, 2019-20 (P) Across Grades



Source: Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, Ministry of Mines, May 2023.

Figure 7: Production of Fines, 2019-20 (P) Across Grades



Source: Calculated from *Indian Minerals Yearbook*, 2021, 60th edition, Iron Ore (Advance Release), Indian Bureau of Mines, May 2023.

[11] These figures are based on IBM data. IBM did not mention whether captive mines are included. Looking at the values, this figure might include the captive mines owned by the private sector. Otherwise, public sector companies are the top sellers of iron ore in India.

4.5 Assessment of Competition in the Iron Ore Market in India

Data and Methodology

As discussed in Chapter I, competition assessment in the iron ore sector is done based on both secondary and primary data sources. This chapter deals with the analysis based on secondary data sources, while the findings based on field survey are covered in Chapter 5. Various competition indicators, encompassing both levels and changes in ratios/index, have been utilised in the study, drawing from the existing literature on competition. Following are the major indicators used: (i) C4, which is the four firm concentration ratio, (ii) C8, which is the eight firm concentration ratio, and (iii) Herfindahl-Hirschman Index (HHI) of competition. C4 and C8 are calculated sales-based market shares of the top four and eight firms for the period 1989–90 to 2021–22. Changes in concentration ratios are also calculated. HHI is defined as the "sum of the squares of market shares of competing firms in the relevant sector," which is denoted as,

$$HHI = \sum_{1}^{n} Si^2$$

where, 's' is the market share.

Table 12: Value of HHI and Market Structure

HHI	Range	Change in HHI	Range
Un-concentrated	<1500	Small change: Unlikely to have any adverse effect on concentration, and further analysis is normally not required	Increase of <100 points
Moderately concentrated	1500–2500	Moderately concentrated markets: In this, change in HHI above 100 points potentially increases significant competition concerns, necessitating scrutiny	Increase of >100 points
Highly concentrated	>2500	Highly concentrated markets: If the change in HHI is between 100 and 200 points, it creates significant competition concerns and often warrants scrutiny.	100–200 points
		Highly concentrated markets: If the change is above 200 points, it is presumed to enhance market power.	>200 points

Source: *Horizontal Merger Guidelines* (2010), US Department of Justice and the Federal Trade Commission. Available at: https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf, as in Saraswathy (2021).

Competition agencies normally use the Horizontal Merger Guidelines published by the US Department of Justice and the Federal Trade Commission to define market structure. According to this, the market is unconcentrated if the HHI is below 1500, moderately concentrated if it is between 1500 and 2500, and highly concentrated if the HHI is above 2500 (Table 12 and 13). The study period is the same as that of C4 and C8. Changes in the levels are also calculated. This interpretation is presented in the context of horizontal merger guidelines. However, the range can be used to explain market structures even in the absence of mergers and acquisitions (M&As).

Table 13: Competition Indicator: HHI

HHI		Change in HHI	
Range (%)	Outcome	*Range (%)*	Outcome
<1500	Unconcentrated	Increase of <100 points	Small
1500–2500	Moderately Concentrated	Increase of >100 points	Moderate
>2500	Highly Concentrated	100–200 points	High
>2500	Highly Concentrated	>200 points	Very High & presumed to increase concentration

Source: Based on Saraswathy (2021).

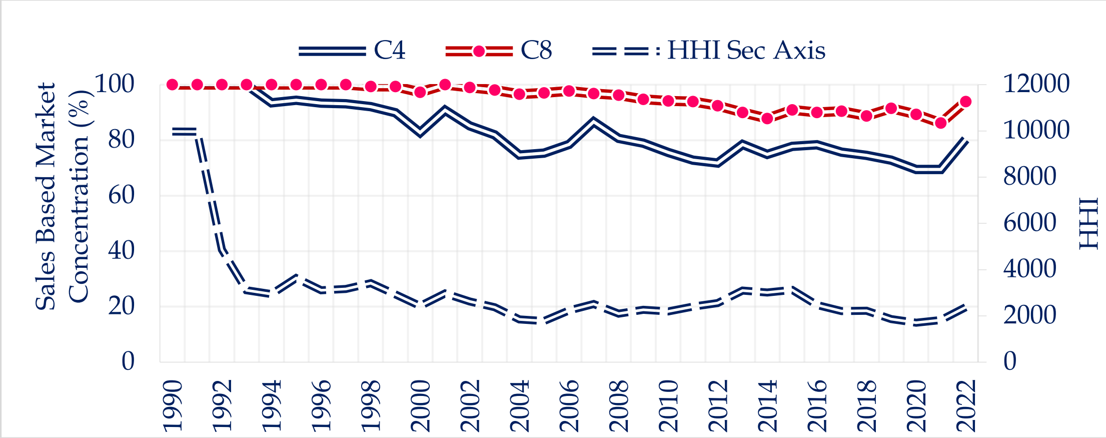
Competition Assessment: Empirical Results

Market shares, HHI and changes in the levels

It is observed that the market shares of the top companies are declining when we compare the results with the 1990s market scenario.[12] However, the concentration levels are still high. During the early 1990s, production was concentrated among very few companies like KIOCL Ltd and Mandovi Pellets Ltd, which gradually diversified to include other players such as National Mineral Development Corporation Limited (NMDC Ltd), Industrial Development Corporation of Odisha Ltd (IDCOL), Chowgule & Co Pvt Ltd, and others. Eight firm concentration ratio for the year 2021−2022 is 94 percent and four-firm concentration ratio is 80 percent, which itself indicates the highly concentrated market structure, unless with the presence of oligopolistic market competition. The HHI value is 2370 for 2021−22, which is moderate, but going closer to the highly concentrated segment. Like C4 and C8 values, HHI levels are declining, indicating the entry of other active players into the market (Figure 8). Similarly, when the changes in the levels of market shares and HHI is taken, it is seen that there has been a gradual decline in the values both in terms of concentration ratios and HHI. However, as seen in Figure 9, changes in HHI have not been very significant. Nevertheless, the fall in concentration ratios was substantial and flexible for many years. In the most recent year, i.e. 2021−22, the changes in HHI were +551, indicating a rise in concentration levels.

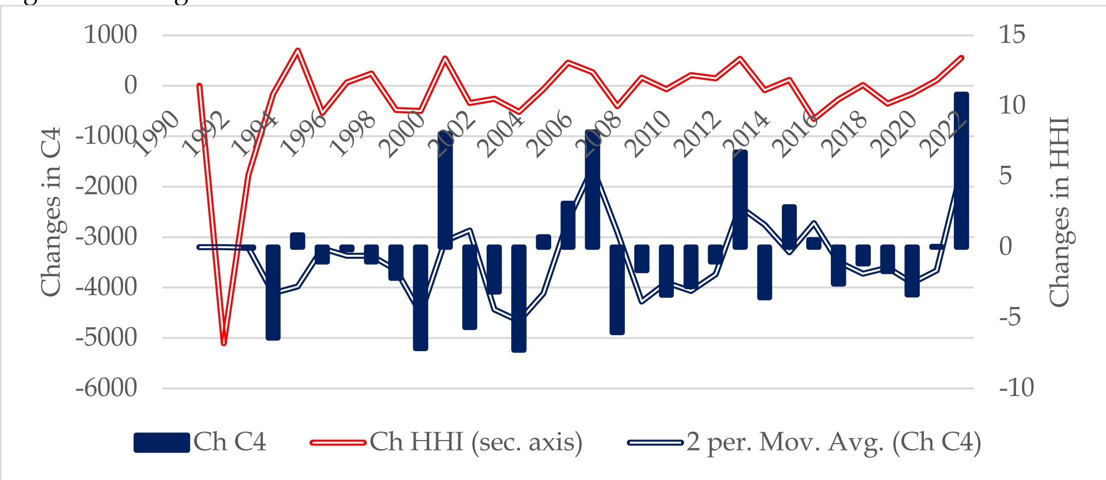
[12] High market concentration in the early 1990s could also be attributed to data reporting issues in CMIE database. Market share is calculated based on the value of sales.

Figure 8:Four and Eight Firm Concentration Ratio for Iron Ore 1990–2022



Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

Figure 9: Changes in the Levels of C4 and HHI



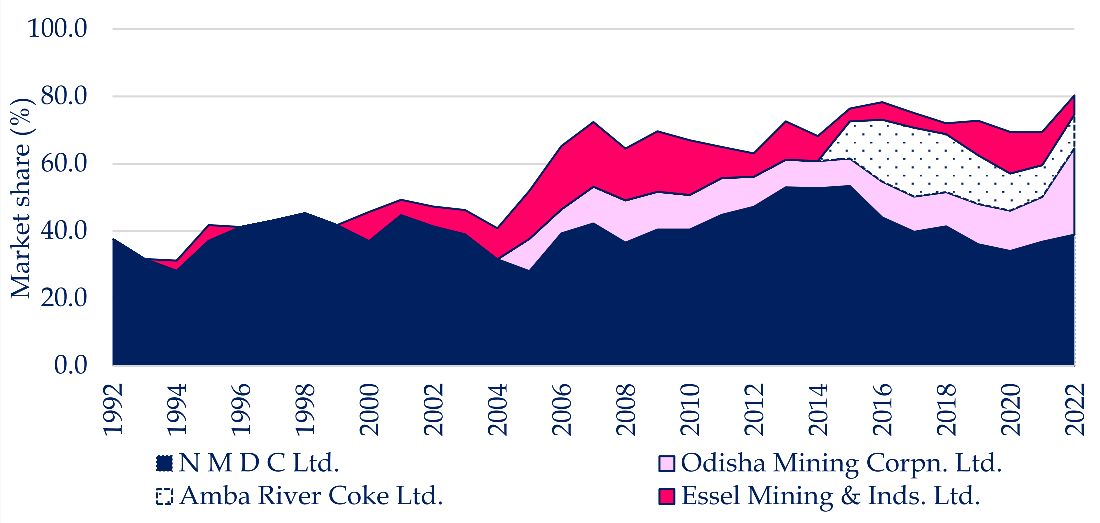
Source: Calculated using PROWESS IQ, CMIE.

The sales-based market shares of the top iron ore companies are shown in Appendix Table 1. With a market share of more than 38 percent in the early 1990s and 39 percent in 2022, NMDC, a central government company, has consistently been the top player in the iron ore sector. NMDC alone constituted more than half of the market share during three consecutive years, i.e. 2013, 2014, and 2015. Next comes Odisha Mining Corporation (OMC), which began with around ten percent shares in 2005, and has gradually increased its presence in the iron ore sector. In 2022, the company held a market share of 25.7 percent. OMC is a state-owned company. Hence the top two players, i.e. central government owned NMDC and state-owned OMC, together account for 65 percent of the shares in the iron ore sector followed by Amba River Coke[13], an OP Jindal group company, which is a relatively new entrant to the market.

[13] NDMC incorporated in 1958 and OMC in 1956.

Though incorporated in 1997, this company began to display high market potential from 2015 with a market share of 11 percent. In 2022, it held a market share of ten percent. In some years, like 2017, its share increased to more than 20 percent, indicating the presence of a strong competitor from the private sector. The fourth-largest company in the market is Essel Mining, an Aditya Birla group company. Although it was established in the 1950s, steady market shares only started to show in the post 2000s. From 2005 to 2010, the company's market share ranged between 14 percent and 19 percent. However, the share has declined in recent years. Current market share is around six percent. (Appendix Table 1, Figure 10).

Figure 10: Market Share of Top Iron Ore Companies



Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

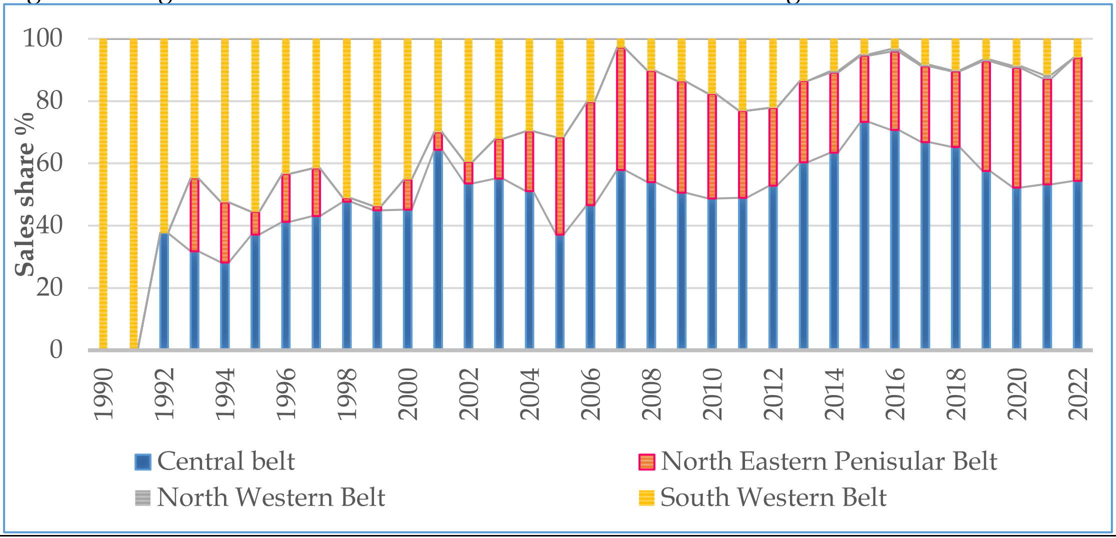
Geographic Concentration

Iron ore production is highly concentrated in a few states. As per the Annual Report of the Ministry of Mines, Odisha alone accounts for more than half of the iron ore production, followed by Chhattisgarh (16.3 percent), Karnataka (15.9 percent), and Jharkhand (9.7 percent) (Ministry of Mines, 2022--23). We have used (i) commonly used mineral belt classification based on the geographical features of mineral belts, and (ii) regional classification normally used in economic analysis, which is more useful to understand the locational features crucial for policy. The first one classifies the mineral belts into four plateaus: (i) Central Belt, which includes the states of Andhra Pradesh, Telangana, Chhattisgarh, Madhya Pradesh, and Maharashtra; (ii) North Eastern Peninsular Belt (NEP), which includes Odisha, Jharkhand, and West Bengal; (iii) North Western (NW) Belt, which includes Rajasthan and Gujarat; and, (iv)

South Western (SW) Belt, which includes Karnataka, Kerala, Tamil Nadu, and Goa. In the second classification, we have categorised firms into four categories based on the location, i.e. East, South, West, and Central zones.[14] The following are the major observations from this analysis.

According to the mining belt classification, iron ore production is concentrated in two major belts, i.e. (i) Central belt with more than 54 percent of production, and (ii) NEP with 40 percent production. It is further noticed that the contribution of Southern belt has declined over the years, mainly due to the decline in the share of Karnataka and Goa (Figure 11).

Figure 11: Region-wise Concentration: Sales Share Based on Mining Zones



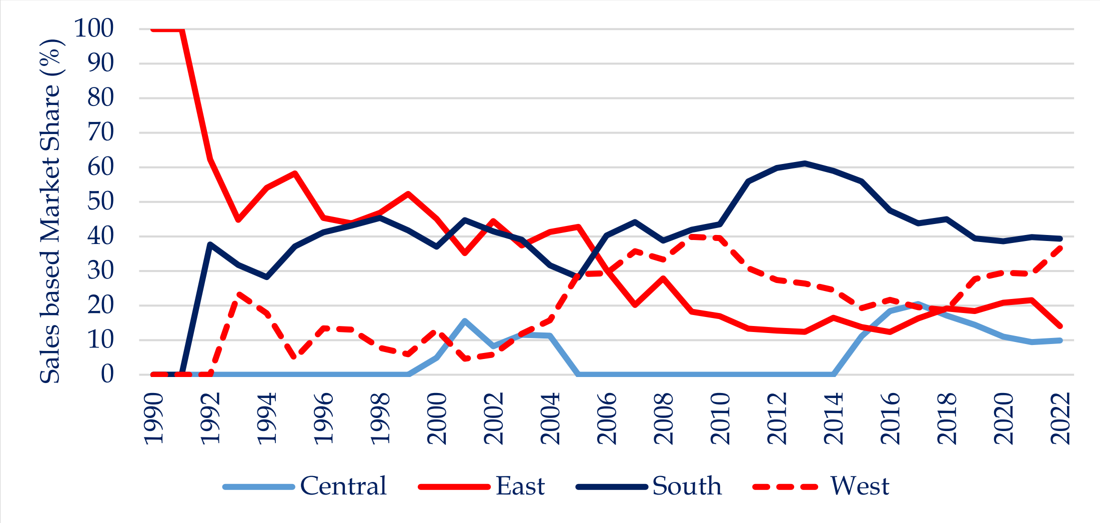
Source: Calculated using PROWESS IQ, CMIE using the commonly used mineral belt categorisation.
Note: Central Belt includes Andhra Pradesh, Telangana, Chhattisgarh, Madhya Pradesh, and Maharashtra; NEP includes Odisha, Jharkhand, and West Bengal; NW includes Rajasthan and Gujarat; SW includes Karnataka, Kerala, Tamil Nadu, and Goa.

The analysis based on the locational categorisation shows that in 2022, firms based in southern states contributed more to iron ore production as compared to those in western states (Figure 12). As per the estimations for 2022, southern states accounted for 39 percent of the total market share and western states for around 37 percent. As indicated by the earlier categorisation, there has been a decrease in the share of southern states, primarily due to the dip in the share of Karnataka and Goa. Up until

[14] In the North zone, there has not been any relevant company as per the data available from PROWESS, CMIE.

last year, eastern states' contributions were rising, with Odisha and Jharkhand accounting for the majority of growth.

Figure 12: Regional Concentration in Iron Ore



Source: Calculated using PROWESS IQ, CMIE using the normally accepted locational categorisation.

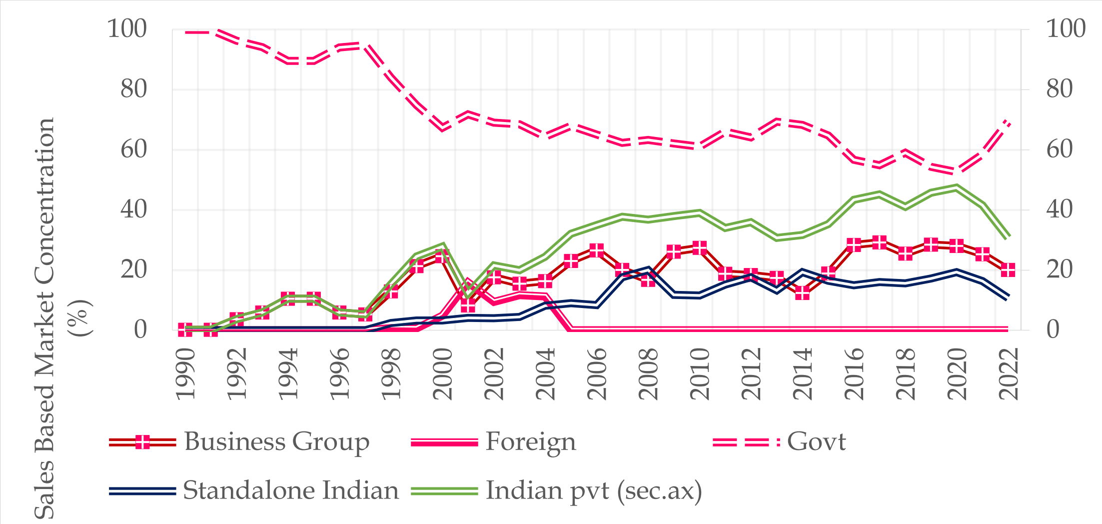
Public Sector Domination? Ownership Concentration

It is observed that the iron ore sector is dominated by public sector firms, including state-owned enterprises. The study examined the market shares owned by various ownership categories of firms, and the results are shown in Figure 13 and Appendix Table 2. Public sector firms have a substantially larger market share than private sector firms.[15] Though the market share was much higher in the early 1990s, it has dropped over the years, with the exception of 2022, which depicts the growth of private sector firms in the sector. In 2022, the share of public sector was 69 percent, while that of the private sector was 31 percent. Within the private sector, business group affiliated firms control around 20 percent share, while standalone firms hold around 11 percent. Except for a few years, i.e. 2000 to 2004, foreign presence remained meagre. The presence of business groups was 28 percent in 2019, which fell to 25 percent in 2021, and further to 20 percent in 2020. A similar trend is visible in the case of standalone private Indian firms. In 2022, the shares dropped to 11 from 16 percent. Except for the last year, business groups and standalone private sector firms have strengthened their

[15]Quantity based shares for public and private sector are covered in Chapter 2, which demonstrates the greater presence of the private sector. Here, the calculations are made using the sales value. The sales value based calculations won't include capative consumption data. This essentially depicts the iron ore traded in India.

position in the iron ore sector over the years. In 2020, Indian private sector firms had a combined share of 47 percent, which is now 31 percent.

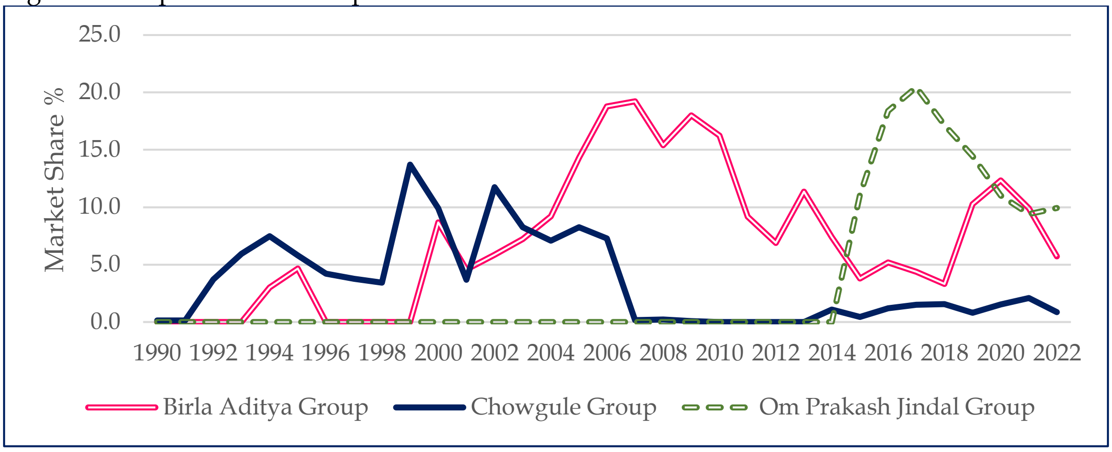
Figure 13: Ownership-wise Concentration



Source: Calculated using PROWESS IQ, CMIE.

The study has also examined the major business groups operating in India's iron ore sector. It is seen that, unlike other industries, iron ore mining has a relatively small number of business groups. In terms of the number of companies, Chowgule Group dominates with three companies, followed by OP Jindal and Vedanta with two each (Appendix Table 3). When market share is taken as the indicator, OP Jindal and Aditya Birla are the top business groups in the sector. In 2022, OP Jindal Group held the top spot with a ten percent share. From 2015 onward, OP Jindal has had a noticeable presence in the sector. In 2017, the group held a 20 percent share. Similarly, Aditya Birla group held around 20 percent share in the mid-2000s (Appendix Table 4). Now, Aditya Birla Group has only a six percent share. Chowgule Group has three companies operating, which had a greater presence till the mid-2000s, but currently have only a minimal presence (Figure 14).

Figure 14: Top Business Groups in Iron Ore

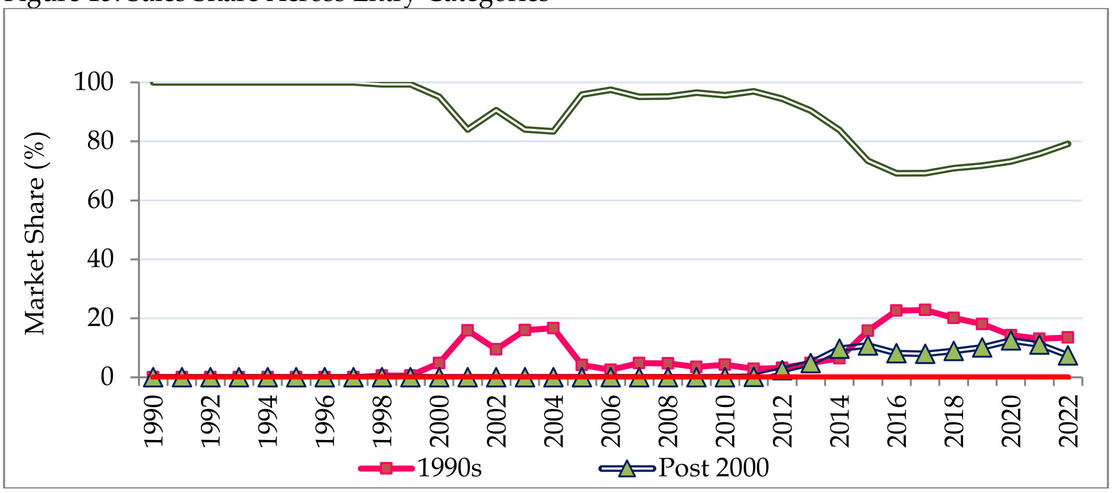


Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

Entry of New Firms in the Sector

Apart from captive mines, entry in the sector is governed through auction route. Successful bidder can own and operate mines by adhering to the environmental and other regulations. Table 18 shows that up until 1998, entry of new firms was almost nil.[16] More than half of the firms in operation entered the sector during the pre-1990 period, while 25 percent each entered during the 1990s and the 2000s. And, the post 2010 period witnessed the entry of two new firms. Currently, pre-1990 incorporated enterprises account for 79 percent of sales, with registered firms from the 1990s accounting for 13 percent. Nevertheless, the shares of 1990s firms have been dropping with the entry of new firms, albeit at a low pace (Figure 15).

Figure 15: Sales Share Across Entry Categories



Source: Calculated using PROWESS IQ, CMIE.

[16] This is based on the PROWESS, CMIE database.

Mergers and Acquisitions in Iron Ore Sector

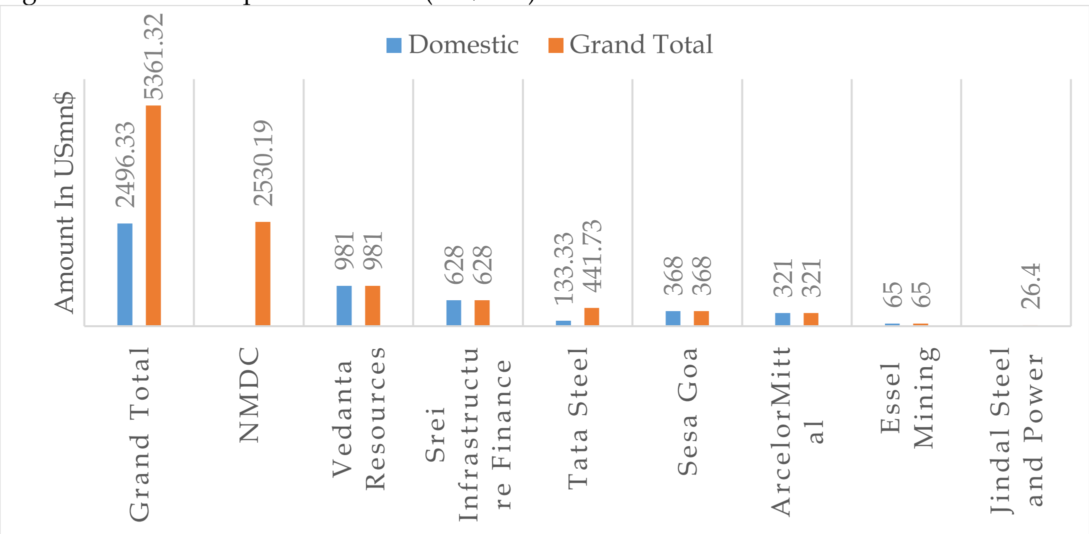
Table 14 shows the M&As that took place in the iron ore sector in India between January 2004 and February 2022. As the table depicts, half of the transactions involve Indian companies engaged in outbound activities in overseas markets, while the remaining half are domestic deals. Two domestic deals pertain to sale of assets. Hence, only six deals were actual M&As. National Mineral Development Corporation, Tata Steel, and Jindal Steel and Power Limited made overseas investment through acquisitions in iron ore. Iron ore M&As have a total deal value of around US$ 5362 million, of which 53 percent of transactions involved foreign acquisitions and the remaining were domestic deals. NMDC remained the largest acquirer in terms of the value of transactions, followed by Vedanta, Seri Infrastructure, and Tata Steel (Figure 16).

Table 14: M&As in Iron Ore (No.)

Type of Deal	Domestic	Outbound	Grand Total
Acquisitions	6	4	10
Sale of Assets	2	3	5
Grand Total	8	7	15

Source: Compiled from Venture Intelligence Database.

Figure 16: Amount Spent on M&As (US$ Mn)



Source: Compiled and calculated from Venture Intelligence Database.

4.6 Concluding Observations

Due to the natural resource characteristic of mines, and the ensuing public sector natural dominance followed in our development strategies, competition issues in the minerals in general, and the iron ore sector in particular is unique. In this chapter, we have used the available secondary data to infer the status of market competition using standard economic tools used in competition analysis. The following are the major observations from the analysis. Identifying the forward and backward linkages in the sector helps to understand which are the sectors using iron ore as their input and also which are the major raw materials used in iron ore production. The analysis based on SUT, which was previously Input Output Transaction table from the Ministry of Statistics and Programme Implementation (MoSPI) shows that iron and steel sector is the major consumer (95 percent) of iron ore in India. The proportion of intermediate use of other products in the iron ore industry gives a picture of the backward linkages of iron ore sector with other sectors. It is observed that Intermediate goods' demand constitutes only 55 percent of the total value ouput, while the remaining 45 percent represents the gross value added by this sector. This indicates a relatively lower cost component in the iron ore sector compared to many other sectors. Intermediate goods consumed include various kinds of tools including machine tools and hand tools, electricity, etc.

Indian mines often contain a higher proportion of fines compared to lumps, leading to increased production costs. The quality of iron ore varies, with high-grade ore having more than 62 percent Fe content, and such deposits are predominantly found in the states of Odisha and Chhattisgarh. Region-wise, it is clear that the major four states in terms of various categories of iron ore (including magnetite and hematite; lumps/fines/concentrates) are Odisha, Chhattisgarh, Karnataka and Jharkhand. Rajasthan is leading in concentrates. Goa had a good presence in the past, but its position has considerably declined. In Odisha, out of the 163 reported iron ore leases, only 61 are currently operational. Fifty-two leases have expired, and eight are temporarily suspended. Keonjhar, including Joda and Koira are regions with a significant concentration of mines. In the state, several companies like SAIL, OMC, Tata, and JSW possess substantial mining areas. Regarding pellet production capacity, JSW plants have a predominant share in the pellets segment, followed by Tata. Similarly, for sintering, JSW and Tata have relatively higher capacities.

The market share of public sector firms has been considerably higher than that of private sector firms; however, over time, the share of public sector firms has decreased, except for the year 2022, which indicates the growth of private sector firms in the sector. The presence of business group affiliated firms within the private sector is greater than that of standalone firms. OP Jindal and Aditya Birla are the top business groups in the sector in terms of market share. Apart from captive mines, entry of new firms into the mining sector is regulated through auctions. More than half of the firms in operation entered the sector during the pre-1990 period, while 25 percent each entered during the 1990s and the 2000s. In the current scenario, only firms with minimum moderate investment potential can enter this business as it involves high capital requirement. This is true even for the firms in downstream industries. It is good to see that Indian companies like NMDC, Tata Steel, and Jindal Steel and Power have made overseas investment through acquisitions in iron ore.

It is observed that the market shares of the top companies have been falling when we compare the results with the 1990s market scenario. However, concentration levels remain high. Eight firm concentration ratio for the year 2021–2022 is 94 percent, while four firm concentration ratio is 80 percent, indicating a highly concentrated market structure. The HHI value is 2370 for 2021–22, which is moderate, but going closer the highly concentrated segment. The top two players, i.e. NMDC owned by the central government and OMC owned by the state government, together account for 65 percent of the shares in the iron ore sector followed by Amba River Coke, an OP Jindal Group company, and Essel Mining, an Aditya Birla Group company. Iron ore production is highly concentrated in a few states. As per the Annual Report 2022--23 of the Ministry of Mines, Odisha alone accounts for more than half (53.82 percent) of the iron ore production, followed by Chhattisgarh (16.3 percent), Karnataka (15.9 percent), and Jharkhand (9.7 percent).

In short, this chapter examined the competition and profitability of the iron ore and steel firms wherever required and found that the iron ore sector is highly concentrated. The competition elements have, however, improved over time. Top players in the iron ore sector are mainly public sector firms, whose financial performance is found to be outstanding. Though the steel sector is profitable and sustainable for the top players (business group owned and standalone), small firms are incurring losses, and some of them have even closed down. This may be due to the rising iron ore prices, as the raw material component is found to be the top cost category. Top players are not dependent on market prices for iron ore as they own captive mines. In the next chapter, we will delve deeper into this topic through field interactions with multiple stakeholders in the iron ore sector.

Chapter V
Persistence of Profitability and Survival of Firms: Field Experience from Odisha

In a market driven economy with competitive elements, prices are determined on the basis of the interplay between demand and supply. Supply side factors are in turn influenced by the cost of intermediary goods and other factors of production. Ideally, it is expected that when the cost of production increases, the price of final output should also increase proportionately. This is necessary to ensure that the producer is able to generate a normal profit from selling the item. No rational producer will supply loss making products to the market. This leads to a decrease in the overall quantity supplied in the market. When supply is lowered without a decrease in demand, prices rise automatically via the market mechanism. However, when the firm faces natural monopoly in its raw material requirements, there are chances for higher cost of production and if the firm is unable to pass such price hike in cost to its end users, the firm will face losses. The increase in cost of the user firm's factors of production may be attributed to (i) natural factors and (ii) an artificial increase in prices of the factors of production. Artificial increase in prices cannot be tolerated in any regulated market economy as it is against the market principles.

Given this background, this chapter examines the ground realities of iron ore availability and affordability using field interactions. The field survey observations are discussed in the first section. In the second section, the study decomposes various cost components to see whether the raw material cost (a major component of which is iron ore consumption) is a significant component in the total cost incurred. The third section analyses the profitability in the iron ore sector as well as the steel sector. The fourth section examines the revenue generation, cost, and profitability of selected firms based on field interactions and the fifth section concludes the major observations.

5.1. Observation from Field Interaction with Multiple Stakeholders

Due to the intricate nature of the sector involving captive and non-captive mines, sales via auction and non-auction routes, and the diverse range of end products utilising iron ore, a field interaction was conducted to gain insights into the on-ground challenges and issues. It is evident from Chapter 2 and 4 that Odisha is the leading state in iron ore production across all major categories. Before delving into the sample, let us provide a concise overview of the iron ore production in Odisha.

Iron Ore Mining in Odisha

Out of the 163 iron ore leases reported, only 61 are currently operational, as indicated in Table 1. Of these, 52 leases have expired, and eight are temporarily discontinued. The primary region for the majority of mines is Keonjhar, which includes Joda, followed by Koira. For the entire mining sector in the state, the Department of Steel and Mines, Government of Odisha, has reported that 168 leases out of 774 have lapsed. When we compiled data for iron ore, it is clear that, out of the lapsed 168, 52 are iron ore leases, accounting for nearly 31 percent of the total lapsed leases. It is observed that the majority of lapses occurred in Joda area, specifically 36 out of the 52 iron ore lease lapses. Furthermore, five of the eight temporarily discontinued leases are also located within this area.

Table 1: Circle-wise Lease Status of Iron Ore Mines in Odisha

Circle	Determined	Lapse	Suspended	Temporarily discontinued	Working	NA*	Total
Joda	5	36		5	28	17	91
Koira	2	9		1	26	14	52
Baripada	1	6	1	1	3	1	13
Keonjhar		1		1	3	1	6
Jajpur Road					1		1
Grand Total	8	52	1	8	61	33	163

Source: Compiled from Department of Steel and Mines, Government of Odisha, https://www.odishaminerals.gov.in/MIS/LesseeReportDetails/LesseReportDetails accessed on May 11, 2023.

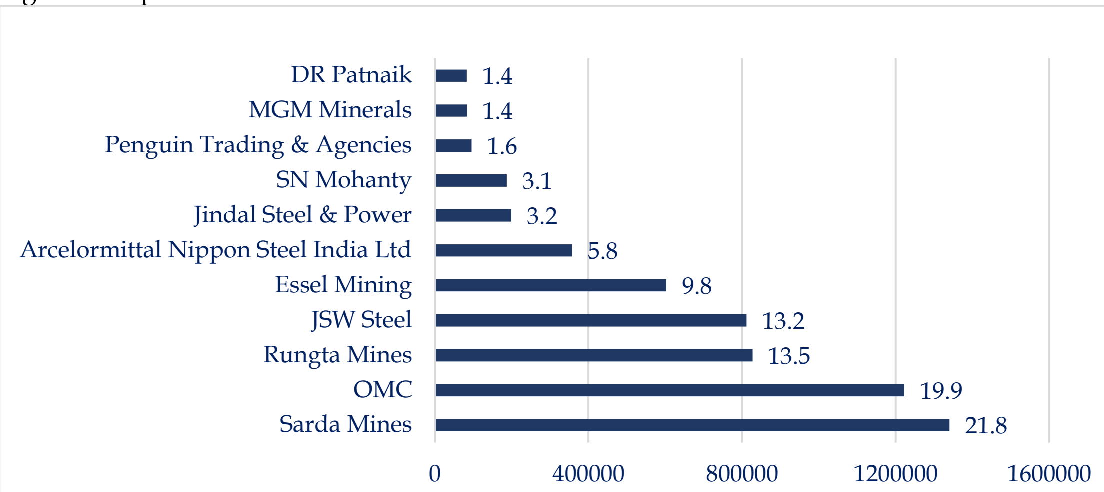
Table 2: Area-wise Operation of Top-10 Iron Ore Mining Lessees in Odisha

Rank	Name of Lessee	Working area	Non forest area of Tenant	Working share to all IO mines	Sum of Non Forest area of Tenant	Govt land (forest plus govt forest)
1	SAIL	8739	1369	42	60	40
2	OMC Ltd.	4643	235	22	10	90
3	Tata Steel Ltd.	1881	146	9	6	94
4	JSW Steel Ltd	1107	93	5	4	96
5	Neelachal Ispat Nigam Ltd	874	9	4	0	100
6	B. Dagara	618	178	3	8	92
7	Jindal Steel and Power Ltd	492	19	2	1	99
8	Ghanashyam Misra And Sons (P) Ltd.	350	121	2	5	95
9	Rungta Sons (P) Ltd.	230	5	1	0	100
10	ArcelorMittal	229	0	1	0	100

Source: Compiled and calculated from Department of Steel and Mines, Government of Odisha, https://www.odishaminerals.gov.in/MIS/LesseeReportDetails/LesseReportDetails; accessed on May 11, 2023.

By looking at the area of operation, the top 10 lessees in Odisha's iron ore mining sector are reported in Table 2. From the table it is clear that a few companies, namely Steel Authority of India Limited (SAIL), OMC, Tata, and JSW, own substantial portions of the mining areas in the state. These mines are primarily operated using forest land and government-owned land, with a minimal presence of tenant land except for SAIL. SAIL uses only 40 percent of the forest and government owned forest land for its mining operations in the state. The rest is tenant land. However, for all other iron ore miners in the state, the usage of government land exceeds 90 percent. As per the information available from SteelMint, Figure 1 presents the top ten iron ore producers in Odisha, ranked by the quantity of iron ore supplied in November 2020. The data reveals that Sarda Mines is the leading seller, accounting for 22 percent of the total supply, followed closely by OMC at 20 percent. Rungta and JSW each hold approximately 13 percent shares, while Essel holds ten percent, and Arcelor Mittal holds six percent. Among the 25 sellers reported by SteelMint, the bottom 15 companies contribute only around five percent of the total supply.

Figure 1: Top Iron ore sellers in Odisha: November 2020



Source: Calculated using SteelMint Data.

It is further noticed that the top seller, Sarda Mines[1], sold its entire quantity of iron ore to a single buyer, Jindal Steel and Power Ltd, during the reference period. When analysing the aggregate buyer profile, the combined purchases of Jindal and JSW

[1]Sarda Mines has been entangled in legal disputes concerning environmental clearance and excess production of mineral resources (*The New Indian Express*, 2022).

account for 34 percent of the iron ore consumed in the state during the reference period (as shown in Table 3), excluding the installed capacity in integrated iron ore plants.

Table 3: Iron Ore Purchase of JSW in Odisha, November, 2020

Buyer	Total (Qty)	Share (%)
Jindal Steel & Power	1604840	26.2
JSW Steel (Dolvi Works)	468560.2	7.6
JSW Steel (Vijayanagar)	5526.47	0.1
Jindal Saw	3313.73	0.1
Grand Total	6133691	33.9

Source: Calculated using SteelMint Data.

Sample Selection

The field interaction involved engaging with several stakeholders in the iron ore sector, encompassing both sellers and buyers of iron ore, as well as relevant associations. The primary objective was to identify competition issues that might impede the smooth functioning of the iron ore market in India. To achieve this, special attention was given to the iron ore using plants or experts located in six major locations in the state of Odisha, namely Keonjhar, Barbil, Joda, Jajpur, Bhubaneswar, and Cuttack, as these areas cover many iron ore mines and iron ore using plants. Additionally, we also interacted with the main offices/officers of firms and associations located in Delhi, which gave a comprehensive understanding of the issues pertaining to states other than Odisha too. We adopted a convenience sampling method due to the challenges in gathering information from plants and experts scattered across different regions in Odisha. Our approach involved engaging with various associations and their representatives, as they typically represent the issues faced by their respective members. For the interaction, semi-structured questionnaires were employed to identify market-related issues faced by the respondents. To accommodate the presence of multiple stakeholders, separate questionnaires were tailored for each category of stakeholders. In total, we conducted 25 stakeholder interactions and engaged with over 34 individual experts to gather comprehensive insights. Of these, 12 are members of iron ore consuming firms; 13 are consumer associations and firms; three are producer and producer associations, of which one is a public sector iron ore supplier; two regulators; and, one member from the academia. Out of these interactions, we engaged with 20 stakeholders in Odisha, ten in Delhi, three respondents from Karnataka, and one from Chhattisgarh via online mode. Like in Odisha and Delhi, those in Karnataka and Chhattisgarh are also association representatives. In terms of product coverage, these respondents are engaged in the production of iron ore, sponge iron, pellets, billets, pig iron, stainless steel, steel and power, TMT bars, and so on, with one respondent serving as a technology provider for the iron ore sector. This diversity allowed us to capture a broad spectrum of perspectives and views.

Major Observations from the Field Interaction

The field interactions yielded the following key viewpoints, which encompass perspectives, suggestions, and issues raised by the respondents primarily from Odisha and Delhi. Some of these responses require validation with data, which is carried out in the subsequent sections. Demand and supply side factors are not segregated separately since they are interconnected, involving both buyers and sellers in the discussions.

Supply and Demand Side Indicators: Response from Odisha

(i). Supply of Iron Ore: Shortage if any?

None of the respondents from Odisha raised any issue regarding the availability of iron ore in Odisha. Iron ore is available as per demand, except for the rainy seasons when mining becomes challenging. The mines are primarily situated in hilly and forested regions, which typically receive higher rainfall, causing water to directly flow into the mines. Consequently, during the rainy season, workers are unable to operate in the mines, leading to a temporary shortage in supply. Further, rain and moisture have an impact on the production cost of iron ore. These factors are natural and not directly linked to any artificial market imperfections. According to one sponge iron producer, pellet consumption is more favoured during the rainy season as processing fines becomes challenging. Respondents also noted instances of shortages in the required quality of iron ore at times.

(ii).Prices and Auction Process for Iron Ore Purchase

Price of iron ore has been the most cited issue in Odisha. Nearly all consumers and consumer associations of iron ore highlighted this as the primary concern affecting their operations. Respondents pointed out that the scarcity of iron ore in the state is primarily a result of high prices, despite the presence of abundant quantity of iron ore resources, which raises concerns regarding affordability rather than availability. As discussed earlier, there are two important types of iron ore consumers: (i) those with captive mines, mainly comprising integrated large-sized steel plants, and (ii) those without captive mines, generally engaged in the production of pellets, sponge iron, billets, etc.; the operations of the second category are not as extensive as those in the first category. For those with captive plants, the price issue is not a significant concern as they procure iron ore from their own mines. However, some of these plants also make purchases from the open market, especially to address shortages or to meet specific quality requirements. Additionally, transport cost considerations may also play a role; if their own mines are situated at a distance, it may be more profitable to rely on nearby mines for their iron ore needs. These firms have three major options for procuring iron ore: (i) participating in the auction process of public sector companies like OMC, (ii) entering into long-term contract with OMC, or (iii) purchasing from private merchant mines. However, most of the respondents reported issues in each of the three options available for non-captive purchasers.

(i) Participation in Auction Process

The majority of respondents indicated that the base price set by OMC during iron ore auctions is excessively high and does not adequately consider prevailing market conditions. Consequently, firms often end up purchasing iron ore at the base price, finding it economically unfeasible to consume iron ore at such inflated rates. As a result of these high prices, several pellet plants have temporarily suspended their operations and are facing financial losses. For example, Brahmani River Pellets Ltd, a pellet manufacturer, temporarily closed its operation due to the high cost of production, primarily driven by the high prices of iron ore fixed by OMC. Similarly, Arya Iron & Steel Ltd., another pellet plant, also closed its operation due to similar conditions. Maithan Ispat Ltd, another pellet plant, also closed due to the price issue. Ardent Steel, another pellet plant, also reported losses in its operation because of high iron ore prices. When input prices are very high and output prices are low, producers are unable to sustain production in the long run as it is beyond the financial capacity of many of these plants. Some of them reported that closing down operations is only a temporary solution, given the substantial sunk costs invested in the plant. Even when a plant is not operational, it still has to incur certain costs, including electricity payments, machinery maintenance and repair, salary payments, and so on, making it more vulnerable. The price issue affects all buyers of iron ore including pellets, sponge iron, and pig iron producers, excluding those who have captive mines.

The major concern reported is that the input prices are higher than the output prices. Input prices are partially fixed through the base price fixation in the auction process, whereas the output prices are purely market determined. One firm reported that the "*cost of producing one tonne of pellet will be around Rs 8500/- to Rs 9000/-, which includes the cost of iron ore Rs 6500/- (including transportation) plus conversion cost of Rs 2500/-. One tonne of pellet requires 1.2 tonnes of iron ore. And the market price of pellet is only around Rs. 7000/- per tonne.*" Another respondent, who is a consumer of pellets, said that "*they purchase pellets instead of iron ore lumps since the price of iron ore is much high*!" This observation reaffirms the challenges faced by pellet plants in terms of lower output prices. Even if the product faces low demand, and generates surplus stock, OMC does not lower prices, given its status as a public sector company, and buyers must wait for the next month's auction. Another respondent said that many small plants without captive mines are closing down, while larger plants with captive mines can manage to sustain production.

Pellets, sponge iron, and similar products serve as intermediary inputs in steel production, being essential raw materials for the manufacturing of ingots, billets, plates, and other steel products. If the prices of these intermediary inputs are not reasonable, it could lead to an increase in steel prices. Respondents have also raised concerns that the iron ore prices may have been intentionally kept high. The production cost per tonne of iron ore is less than Rs 1000/-, whereas it is being sold at approximately Rs 6000/- per tonne.

Another respondent from Odisha said that "*though the auction process brought transparency in the system, the smaller players in the market are disturbing the market through offering high bid prices.*" The base price fixed during the auction process is already high. For the smaller plants, offering a higher bid may not cost them as much, as the quantity consumed is less. However, when they offer a higher bid price, it becomes applicable to all firms, irrespective of the quantity consumed. In the process, firms that purchase larger quantities end up facing the adverse effects of these higher bid prices. Hence, the auction process of iron ore needs to be mindful of the end products. Many firms that participate in the auction process are captive mine owners, enjoying benefits from the states' mineral resources. Conversely, plants without captive mines are relatively smaller in size. Therefore, there is a need for an appropriate mechanism to cater to their iron ore resource requirement at a fair price.

Most of the respondents criticised OMC's pricing approach, as the criteria for determining the base price were unclear. During our discussion with the official of a relevant producer firm, their response was that "*we are not deciding the prices of iron ore, the auction decides the price of iron ore*." Further, some plants are actually making profits by evading government regulations and wrongfully blaming the producer. In the upcoming section, we will present an analysis of the income and profitability of both groups of companies to determine if there are any extraordinary profits or losses.

(ii) Engaging in Long-term Linkage Policy

Another iron ore purchase option is to engage in the long-term linkage (LTL) policy of the state of Odisha, which was implemented by the Odisha government to guarantee a continuous supply of raw materials to the mineral-based industries within the state (Odisha Gazette, 2023). This policy aligns with the Odisha government's initiative to convert primary metals to downstream finished products. Under this iron ore policy, OMC enters into a five-year initial contract with selected firms for LTL. Odisha Mining Corporation allocates up to 80 percent of the saleable stock under LTL. If the firms lift a quantity less than what was offered, OMC will dispose of the remaining stock through the e-auction route. Odisha Mining Corporation decides the exact quantity offered based on factors such as production, demand, and other relevant considerations. The pricing for LTL contracts is determined using the weighted average prices from the national e-auction. Moreover, the LTL policy includes an annual performance assessment for the engaged firms, which takes into account various factors such as off-take trends, plant capacity improvements, regularity of offtake, punctuality in making payments, and other relevant aspects.

It is observed that many non-captive plants are taking benefit from this option. However, a major point of criticism lies in OMC's practice of fixing only the quantity and not the prices for LTL. The participating firm is obligated to purchase a specific minimum quantity annually; failure to do so can negatively impact the firm's annual performance assessment. As a result, firms are compelled to make purchases through this option, even if the prices are high, in order to avail the benefits of LTL. Moreover, it is observed that occasionally the iron ore supplied by OMC may not meet the required quality standards, yet firms accept it to fulfil their regular intake and minimum purchase obligations. Further, LTL is only accessible to those who meet OMC's specified criteria. The relatively smaller sized firms may not get this opportunity, as the financial health of the company is assessed before entering into LTL. However, another significant concern arises from OMC's practice of selling approximately 80 percent of the quantity through the LTL route and the remaining 20 percent through the auction route. This raises questions about the relevance of conducting an auction if a substantial portion is already allocated through the LTL mechanism. Moreover, if a firm allocates quantity to its preferred buyers, it could have adverse effects on firms that are not on the LTL list and even on firms located outside Odisha. This is important since non-captive purchasers do not have any alternate supplier other than private mines, which also adhere to OMCs pricing pattern. The existence of LTLs may discourage firms from participating in the auction process, as it could lead to an increase in bid prices. The weighted average price for the LTL is determined based on the minimum and maximum bid prices in the auction. Consequently, auction prices may end up being higher than LTL prices, considering that the lowest bid prices are also taken into account. This situation could render smaller firms more vulnerable to price hikes, particularly since not all of them are eligible for the LTL option.

(iii) Demand for Iron Ore from Private Merchant Mines

This is the third option open to all firms. Respondents said that the number of private mines has decreased following the introduction of the auction system, with many of them being acquired by large integrated steel players and OMC. Many iron ore consumers expressed that the prices of iron ore were reasonable before the auction system was implemented through MMDR amendments, 2015. With the introduction of the auction system, private miners usually wait for the OMC auction process to determine the price. Afterward, they set their prices above OMC's price. The quality of iron ore from private mines may also exhibit slight variations. Non-captive customers generally believe that merchant mines would not have increased iron ore prices to such an extent if the auction system was not in place. As a result, there has been a significant surge in the prices of iron ore inputs. One firm reported that, "*the private miners act as 'monopoly' by forming group and charge high prices.*" Nevertheless, many firms reported that they purchase from both private mines and OMC. The reason for this is that OMC follows a fixed time period for supply, whereas private mines can be approached as and when iron ore is required. Additionally, the demand for private mines is also influenced by the location of the mine.

(iii). Conduct of Large Firms and Public Sector Firms

The next issue we discuss is the potential existence of 'organised behaviour' within any sections of the sector. In general, the majority of respondents asserted that there are no indications of such behaviour in the industry. Only one respondent expressed concerns about the presence of organised behaviour among private miners, as they tend to raise prices after OMC does. Apart from this, there were no suggestions of unfair conduct from larger firms towards smaller ones or from public sector companies towards others. The major issue reported was the high base price charged by OMC for iron ore.

(iv). Impact on Steel Sector's Sustainability

The respondents who are consumers of iron ore said that the current iron ore prices are not sustainable for the steel industry. Many firms, particularly those without captive mines, are facing losses due to high iron ore prices. Iron ore and coking coal are the two important components in steel production. While coking coal is being imported, the prices of iron ore are substantially high, making it challenging for the steel sector to thrive. Smaller firms are more affected by this.

(v). Regulatory Issues Constraining Demand and Supply Side

The study also sought to investigate if there were any regulatory concerns that might impede the fair operation of the market. Most of the respondents associated regulatory issues with the amendments to the MMDR Act and the implementation of the auction system for allocating iron ore mines. However, with the exception of a few, the majority of respondents believed that the auction process has brought more transparency to the system. Previously, a few private miners were benefiting from the mineral resources, but their presence has diminished now. In contrast, the state sector company, OMC, has gained more prominence. It has been reported that many private miners who invested in iron ore blocks could not have their leases renewed when the auction process was introduced. This resulted in significant losses for these private mine owners, as they had already invested substantial amounts in their mining operations. The implementation of auctions led to the entry of large players who secured ownership by offering high bid prices. Many of these players already possessed captive mines. The primary concern raised in this context is the regulatory intervention through auctions, which led to higher iron ore prices compared to previous years. Additionally, it was noted that the introduction of the auction system also resulted in increased royalty payments.

(vi). Provisioning of Infrastructure

It is generally observed that Odisha is better placed in terms of the infrastructure facilities such as roads, bridges, energy, transport, and water to the mine areas and plants. However, regardless of the firm's size, obtaining various permissions is still a time-consuming process, with respondents acknowledging that normal delays are part of the system, and they are understanding them. The Industry Department of Odisha is considered to be efficient, and many respondents appreciate the government's support. However, some suggested that the processing period could be further reduced, given that most offices are now digitalised. Respondents also mentioned that there are many inspections and documentation processes, which consume a significant amount of their business hours, and they believe streamlining these procedures is necessary.

Transportation is a major cost component in iron ore prices. Overall, Odisha is observed to have good infrastructure facilities, including roads, railways, and bridges, that efficiently connect the mine and plant locations, with only a few exceptions. Improving the road and rail systems is crucial for the efficient transportation of iron ore. Some plants highlighted that the truckers' association, which carries iron ore, occasionally goes on strike to demand higher charges and additional benefits from the companies, such as permanent jobs. While the railway goods carrying system is relatively well developed, further investments could enhance its effectiveness. While discussing the possibility of importing low-cost iron ore, many plants emphasised that it is not feasible due to the high transportation expenses.

Response from Karnataka:

Respondents from Karnataka indicated that there is a scarcity of iron ore in the state, including both high-quality iron ore and low-quality fines. The NMDC is the major supplier in Karnataka. However, there is a considerable demand for iron ore from numerous pellet manufacturers and other entities.

The introduction of the auction system has led to an increase in the number of players in the market. In the iron ore mine auction process, the average premium to be paid in

India is approximately 90 to 100 percent, often exceeding 100 percent. While this is advantageous from a raw materials perspective, it poses viability challenges for merchant miners. The royalties to be paid to the government amount to 20 percent, in addition to the GST payment of 18 percent. Respondents noted that digitalisation has helped in reducing many issues compared to previous times. They cited the example of Goa, where the entire process was digitalised and was functioning well. In Karnataka, the auction process did not bring significant transparency. Due to the high initial deposit of Rs 5 Lakhs required for participating in the auction, many choose to refrain from it. Direct selling, on the other hand, does not require such deposits.

Respondents said, the NMDC price serves as the benchmark price for iron ore. Iron ore can be sold through the Metal Scrap Trade Corporation Limited (MSTC) e-auction site or directly in the market. Private miners are not obligated to participate in auctions and can opt for direct sales. Direct sales are advantageous for firms with limited end users, as there is a higher possibility of forming a cartel. Additionally, direct sales offer an advantage because entering the auction process requires a significant initial deposit, which is usually refunded after a certain period. Small players find it challenging to afford such a deposit. The same firm, which is also a buyer of a different quality of iron ore, stated that NMDC Karnataka provides better pricing, and they face no price issue in the Karnataka market.

Response from Chhattisgarh:

According to the respondent[2], iron ore availability in Chhattisgarh is not satisfactory. During 2015 to 2018, there was a shortage. NMDC and OMC are the major suppliers of iron ore in Chhattisgarh, while NMDC only provides the highest grade of iron ore. Iron ore prices increase when export and import restrictions are lifted. Unlike Odisha, no firm has shut down its operation in Chattisgarh due to the high prices of iron ore. However, smaller companies are struggling to generate normal profits. After 2022, the big players possess many mines. After the introduction of the auction process for the allocation of iron ore mines, the premium paid to the government increased, which contributed to the high market price of iron ore. OMC pricing of iron ore is much more complex than that of NMDC. NMDC declares prices every month based on a rich database. Companies requested to reduce prices several times, which has been granted

[2] The respondent also serves as the Association's President.

by NMDC occasionally. Primary steel producers[3] are buying iron ore from all sources in addition to the captive mines. Hence, the respondent proposed, the OMC auction needs to be limited only to the secondary steel producers.

Ease of doing business is only on paper in the state. Business is becoming hard day by day. Irrespective of the size of ownership, obtaining the necessary environmental clearance for starting a new business takes very long time, for which a maximum time frame for approval needs to be fixed.

Other General Observations:

(i). Export, Import, and Domestic Consumption of Iron Ore

Nearly all respondents emphasised the need to 'stop' the export of iron ore from the country, expressing that '*it is our national wealth*.' Instead of exporting iron ore, we should make value-added products and sell it. In this context, one public sector integrated steel manufacturer with captive mine responded that "*though the policy allow us to sell surplus iron ore in India, why should we sell it? If we sell it today, tomorrow's production will be affected*." Some respondents suggested that pellets could still be considered for export. It was also highlighted that steel consumption serves as an indicator of a nation's level of development. Consequently, there were suggestions to encourage domestic use of iron ore through appropriate government interventions, which would facilitate cost-effective steel production.

Regarding the import of iron ore, the majority of respondents emphasised the abundance of iron ore within the country and advocated its utilisation instead of resorting to imports. Furthermore, even if iron ore were imported, its cost would be higher than current prices due to transportation expenses. Chapter 2 indicated that iron ore imports in the country are minimal, and the demand for it is contingent on the availability of good quality iron ore. It was also observed that the steel sector is more susceptible to the fluctuations in international market conditions compared to the iron ore sector. This disparity can be attributed to the stringent regulations and the logistical and transportation disadvantages that limit the involvement of iron ore in international trade, which is a right move from the point of preserving the rich iron ore resources.

[3] Primary steel producers are those with high capacities (eg. integrates steel plants), while the secondary steel producers are having less capacity and finance (eg. pellet, pig iron producers).

(ii).Royalty on Royalty

Some respondents raised the issue of "Royalty on Royalty" applicable in the sector. They pointed out that the average sales price declared by IBM includes the royalty component. The issue of double taxation arises because royalty payment is calculated based on the average sales prices, which already includes the royalty component. To avoid this, respondents suggested excluding the royalty component while calculating the average sales price.

(iii). Better Coordination among Government Agencies

Additionally, the process of land acquisition for operating steel plants and related facilities is identified as a significant challenge across India, leading to implications on production and supply. There is a call for more efficient and timely regulation in land acquisition processes. Better coordination between government agencies in different districts is crucial, especially for firms with multiple plants and offices across various districts. This coordination should extend to the state level as well. Additionally, improved cooperation among various agencies involved in mining regulations is needed, and digitalisation of offices has the potential to facilitate this coordination.

(iv). Entry of Small Firms in the Sector

Despite policy changes aimed at improving ease of doing business and enhancing transparency, both iron ore mining and value-added businesses remain challenging for small firms. The minimum capital requirements often exceed the limits set for small-scale enterprises, making it difficult for them to participate in the sector. Managing business uncertainties and losses is also a significant hurdle for smaller firms in the sector. For small-scale operations, a major issue is the reliance on a single product, leading to uncertainties in profits. In contrast, multi-product firms can balance profits and operations more effectively, which is difficult for smaller firms to achieve. One respondent suggested that smaller firms have the option to explore mergers and acquisitions, with top players acquiring many such plants, presenting an opportunity for smaller firms to consolidate and grow.

In short, a number of market related concerns exist in the iron ore and its vertically linked sectors. It includes issues like base price fixing of OMC and high prices of iron ore and the consequent market power; LTL sales; auction process and participation; differential input prices for different consumers of iron ore; regulated vs. market related input and output prices; and so on. Some of the information provided by the respondents needs to be empirically examined to determine whether these are empirically supported, or just allegations. In view of this, the study examined (i) the cost of production in the steel sector (ii) profitability of iron ore producers and steel sector (iii) income, profitability, and prices charged by OMC, NMDC and profitability of the selected small plants (user industry), which were reported to be facing losses or potential shutdowns due to the high iron ore prices. The subsequent sections present the findings derived from this analysis.

5.2 Cost Analysis in the Steel Sector

Data and Methodology

This analysis is based on data available in PROWESS IQ database of CMIE. In the steel sector, there are a total of 1380 firms operating. Major cost components reported are wages, capital, raw material, technology, marketing, taxes, power, and others. Of which, (i) wages include expenditure for compensation of employees, (ii) capital cost includes capital consumed viz. depreciation and repair & maintenance expenses, (iii) raw material cost includes expense on raw material and finished good used in the production process, (iv) technological cost includes expenses on R&D, royalties, and tech know-how fees, (v) marketing cost includes selling and distribution expenses, (vi) taxes includes all kind of direct and indirect taxes, (vii) cost mentioned on power includes expenses on power, fuels, and water, and (viii) others include all other expenses which are not included in these heads. Data covers recent seven years from 2015–16 to 2021–22. This analysis is undertaken for three major categories of firms including those based on (i) ownership structure[4], (ii) size of operation[5], and (iii) entry of firms.[6]

[4] Firms are classified based on their ownership as private standalone, Indian business groups, foreign and public sector. Standalone Indian firms are privately owned firms that are not part of any business group. Business group firms are ones owned by domestic business groups. Foreign firms include standalone foreign firms and the ones that are owned by foreign business groups. The public sector includes firms owned by the central government or state governments.

[5] Size of firms can be classified as mega, large, medium, and small, based on their size decile information given in Prowess database. Firms that belong to size decile one are classified as mega; firms that belong to deciles two to four are large; firms that belong to deciles five to seven are medium; and, firms that belong to deciles eight to ten are small.

[6] Entry based classification is done on the basis of the year of incorporation and divided into four categories: firms that entered (i) before 1990, (ii) between 1990-1999, (iii) 2000-2009, and (iv) after 2010.

Empirical Observations from the Analysis

It is observed that the highest expense component is on raw materials, with the percentage ranging from 60.67 percent in 2015–16 to 73.30 percent in 2021–22 (Table 4). It is important to mention that the cost of raw materials has risen drastically over the seven-year period, accounting for 73 percent of the total expenses incurred in 2021–22. Cost of inputs like iron ore is the major component of raw material expenses as power, fuel, water, etc., are included separately. It is also striking to note that the expense for technological upgradation in the industry is minimal at 0.3 percent in 2021–22. On the other hand, significant expenses are incurred for power, fuel, and water supply. Furthermore, the tax burden on the industry has decreased substantially over the years. The tax component exceeded seven percent in 2016–17, but it has now reduced significantly to approximately three percent.

Table 4: Cost Components in the Steel Industry (Share %)

Years	Wages	Capital*	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
2015-16	4.95	5.81	60.67	0.09	1.54	5.76	7.21	13.96	100.00
2016-17	5.04	5.65	59.57	0.11	1.51	7.22	7.46	13.44	100.00
2017-18	5.14	5.61	63.17	0.10	1.50	3.75	7.22	13.51	100.00
2018-19	4.75	4.27	66.68	0.10	1.45	3.14	6.80	12.81	100.00
2019-20	5.46	5.24	64.89	0.16	1.53	3.56	7.18	12.00	100.00
2020-21	5.60	5.03	65.07	0.47	1.65	2.84	6.63	12.71	100.00
2021-22	4.04	3.21	73.30	0.28	1.82	2.90	5.88	8.57	100.00

Source: Calculated using PROWESS IQ, CMIE.
Note: *Here, the cost of fixed investment is not considered as it is part of the initial investment. Expenses incurred on depreciation of fixed assets is included as it is part of the variable expenses of the companies.

Ownership Categorisation and Cost Structure

The next task is to see whether the cost component shows significant variation across various categories of firms. First, the study examined ownership categorisation such as private firms, which includes Indian standalone firms and business group owned firms; foreign owned firms; and, public sector firms. Within private sector firms, a clear difference is noticed for expenditure incurred for standalone firms and business group owned firms. The raw material component of standalone firms increased to 76 percent from 63 percent during the reference period, whereas that of business group owned firms was only 53 percent in the initial period, which increased to 66 percent in 2021–22 (Table 5). This may be due to the ownership of captive mines and the resulting cost reduction, or it could be due to the synergy creation within the business group owned firms as they are engaged in the same backward or forward production line, which drastically reduces the cost of materials. Other observations on wages and technology spending for private Indian firms are almost same. Business groups spend more on technology compared to standalone firms, though it is a meagre share. The most interesting observation is about the expenditure pattern of publicly-owned firms. The raw material cost for these firms is relatively lower when compared to the other three categories. However, the wage component is notably higher in comparison to the others. Additionally, these firms have incurred relatively higher expenses in other areas. Wage component may be higher due to the public sector characteristics of these companies. Further, public sector companies must be owning captive mines, which lowers the cost of procurement of iron ore. It is important to note that while standalone companies spend 76 percent of the cost component on raw materials, the public sector spends only 29 percent. Thus, it is clear from this analysis that raw material component is very important in the total expenditure incurred by firms; however, firms with captive mines are in a better position in terms of cost structure. Further, cost reduction, within business group affiliated firms can be attributed to both synergy creation and the ownership of captive mines.

Table 5: Cost Structure Across Ownership Categorisation in the Steel Industry

Years	Wages	Capital	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
Indian (Private)									
2015-16	4.60	5.60	62.61	0.08	1.45	5.74	7.37	12.55	100.00
2016-17	4.68	5.57	60.96	0.09	1.44	7.36	7.61	12.28	100.00
2017-18	4.70	5.53	64.85	0.09	1.42	3.91	7.29	12.21	100.00
2018-19	4.38	4.07	67.98	0.09	1.37	3.46	6.62	12.03	100.00
2019-20	5.06	4.71	66.86	0.14	1.44	3.87	7.10	10.83	100.00
2020-21	5.13	4.47	67.24	0.23	1.53	3.34	6.67	11.40	100.00
2021-22	3.76	2.60	75.80	0.11	1.58	3.12	5.78	7.24	100.00
Business Groups (Private)									
2015-16	5.73	7.05	52.65	0.16	1.88	5.69	6.48	20.36	100.00
2016-17	5.66	6.10	53.57	0.16	1.71	6.49	6.81	19.50	100.00
2017-18	6.54	6.02	55.89	0.15	1.89	3.11	6.95	19.46	100.00
2018-19	6.06	5.38	61.87	0.15	1.88	1.42	7.77	15.45	100.00
2019-20	6.41	7.94	56.54	0.19	1.93	1.93	7.63	17.43	100.00
2020-21	6.33	7.90	56.76	1.93	2.29	0.28	6.14	18.37	100.00
2021-22	4.43	5.53	65.75	1.06	2.95	1.99	6.11	12.17	100.00
Foreign (Private)									
2015-16	8.02	5.22	56.73	0.20	2.32	7.91	4.71	14.89	100.00

Years	Wages	Capital	Raw Material	Technol ogy	Marketi ng	Taxes	Power	Others	Total
2016-17	9.67	5.21	56.46	0.57	2.58	7.72	5.32	12.47	100.00
2017-18	7.59	5.82	61.18	0.19	2.17	1.98	5.41	15.65	100.00
2018-19	7.49	5.40	60.63	0.31	1.92	1.13	6.44	16.69	100.00
2019-20	9.50	6.95	59.64	0.35	2.92	0.61	6.39	13.63	100.00
2020-21	9.92	7.83	60.90	0.32	1.96	0.17	6.55	12.36	100.00
2021-22	6.40	6.50	64.33	0.00	2.61	0.77	7.50	11.88	100.00
Public Sector									
2015-16	16.36	5.21	32.69	0.47	1.94	5.29	8.79	29.25	100.00
2016-17	17.77	6.06	36.71	0.48	2.88	5.99	8.63	21.48	100.00
2017-18	16.81	6.19	37.78	0.65	2.24	0.16	6.83	29.34	100.00
2018-19	13.12	5.23	42.15	0.84	1.79	0.61	6.66	29.61	100.00
2019-20	14.08	5.60	36.50	0.56	1.66	4.59	6.32	30.70	100.00
2020-21	20.63	7.98	21.68	0.92	1.31	3.07	6.54	37.88	100.00
2021-22	13.32	6.11	28.54	1.58	1.30	3.93	5.24	39.99	100.00

Source: Calculated using PROWESS IQ, CMIE.

Table 6 shows the cost decomposition for mega, large, medium, and small firms. It is important to note that the raw material component of mega firms is lower than that of the large-sized firms. This may be another indicator of mega firms owning captive mines, which reduces the cost component. Irrespective of the size factor, the cost component for raw materials has consistently shown an upward trend over the years. Small firms spend comparatively less amount on raw materials, which may be attributed to their involvement in areas where iron ore requirement is less. Hence, they may not be spending much on procuring iron ore[7]. It is visible from the table that mega firms spend a substantial amount on marketing, which is not widely followed by other sets of firms.

Table 6: Cost Structure Across Size Categorisation in the Steel Industry

Years	Wages	Capital	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
Mega									
2015-16	4.82	6.90	58.25	0.11	2.31	6.51	6.43	14.67	100.00
2016-17	4.80	6.61	59.11	0.13	2.45	6.75	6.41	13.76	100.00
2017-18	4.68	6.31	63.22	0.12	2.63	3.13	6.04	13.87	100.00
2018-19	4.30	5.28	67.48	0.17	2.68	1.75	6.10	12.25	100.00

[7] Many plants use scrap for production. It is possible that a large section of the small plants in the steel sector enagage in lesser value added services, without directly consuming iron ore.

Years	Wages	Capital	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
2019-20	5.06	6.15	66.26	0.21	2.80	1.69	6.20	11.63	100.00
2020-21	5.20	6.15	64.72	2.44	3.06	1.45	5.74	11.25	100.00
2021-22	4.21	4.02	70.90	1.42	3.30	3.33	4.44	8.37	100.00
Large									
2015-16	3.33	4.16	67.75	0.08	1.56	6.62	7.36	9.14	100.00
2016-17	3.46	4.11	66.36	0.08	1.48	7.30	7.33	9.88	100.00
2017-18	3.46	3.72	70.53	0.08	1.50	3.81	7.46	9.44	100.00
2018-19	3.24	3.17	74.56	0.15	1.29	2.97	7.06	7.56	100.00
2019-20	3.73	4.28	71.81	0.17	1.54	2.57	7.50	8.40	100.00
2020-21	3.79	3.96	72.28	0.34	1.61	2.22	6.85	8.95	100.00
2021-22	2.90	2.60	77.70	0.13	1.69	2.68	6.19	6.11	100.00
Medium									
2015-16	5.41	5.93	58.95	0.04	1.31	7.12	8.06	13.17	100.00
2016-17	5.57	5.64	59.49	0.04	1.42	7.39	8.37	12.08	100.00
2017-18	5.81	6.32	62.24	0.02	1.40	3.96	7.86	12.35	100.00
2018-19	5.25	4.45	66.15	0.05	1.54	3.96	7.30	11.31	100.00
2019-20	5.82	5.19	64.35	0.04	1.33	4.06	7.72	11.49	100.00
2020-21	6.01	6.30	62.92	0.04	1.45	3.06	7.12	13.10	100.00
2021-22	4.14	3.15	72.70	0.02	1.61	3.52	5.80	9.07	100.00
Small									
2015-16	8.49	9.26	47.00	0.26	1.30	0.80	5.55	28.95	100.00
2016-17	8.34	9.34	40.53	0.40	1.04	6.94	6.46	26.96	100.00
2017-18	8.88	8.99	43.04	0.35	0.81	3.40	5.78	28.76	100.00
2018-19	9.11	7.38	47.01	0.38	1.10	4.09	5.87	25.33	100.00
2019-20	9.94	7.60	44.27	0.37	0.99	6.69	5.61	24.54	100.00
2020-21	10.73	4.04	47.55	0.36	1.07	5.41	5.37	25.46	100.00
2021-22	8.29	5.04	59.68	0.54	1.41	1.28	6.44	17.32	100.00

Source: Calculated using PROWESS IQ, CMIE.

Table 7: Cost Decomposition Based on the Entry of Firms in the Steel Industry

Years	Wages	Capital	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
Pre 1989									
2015-16	6.83	6.01	54.35	0.11	1.92	7.55	7.87	15.36	100.00
2016-17	6.83	5.37	54.60	0.10	1.70	8.18	7.78	15.44	100.00
2017-18	7.14	5.49	57.56	0.10	1.82	4.08	7.77	16.05	100.00
2018-19	7.13	4.94	61.83	0.19	1.68	3.11	7.73	13.38	100.00
2019-20	7.46	5.80	58.25	0.21	1.95	3.65	7.83	14.85	100.00
2020-21	7.47	5.57	58.50	0.47	2.18	3.15	7.05	15.61	100.00
2021-22	5.28	4.03	67.96	0.24	2.78	2.67	6.80	10.25	100.00
1990-1999									
2015-16	4.40	5.18	65.37	0.07	1.15	3.63	7.55	12.65	100.00
2016-17	4.51	5.39	62.20	0.05	1.32	6.95	8.02	11.57	100.00
2017-18	4.78	5.48	65.46	0.05	1.26	3.29	7.59	12.11	100.00
2018-19	4.21	3.97	68.74	0.08	1.16	2.98	6.99	11.87	100.00

Years	Wages	Capital	Raw Material	Technology	Marketing	Taxes	Power	Others	Total
2019-20	5.30	5.43	66.73	0.09	1.24	3.26	7.38	10.57	100.00
2020-21	5.65	4.62	66.64	0.13	1.31	3.03	6.68	11.94	100.00
2021-22	3.55	2.71	77.56	0.12	1.35	2.98	5.22	6.51	100.00
2000-2009									
2015-16	3.48	6.23	64.75	0.12	1.64	5.76	6.20	11.82	100.00
2016-17	3.80	6.57	62.45	0.19	1.54	6.84	6.43	12.18	100.00
2017-18	3.56	6.23	66.25	0.17	1.43	4.10	6.33	11.89	100.00
2018-19	3.16	4.17	68.97	0.06	1.60	3.88	5.84	12.32	100.00
2019-20	3.76	4.78	70.39	0.20	1.45	3.92	6.45	9.05	100.00
2020-21	3.81	4.73	70.25	0.95	1.59	2.69	6.14	9.84	100.00
2021-22	3.37	2.78	75.45	0.55	1.42	3.32	5.42	7.69	100.00
2010-									
2015-16	5.49	5.97	50.86	0.06	1.14	7.14	7.16	22.17	100.00
2016-17	4.79	4.25	57.38	0.14	1.44	5.90	7.86	18.24	100.00
2017-18	4.66	4.05	64.51	0.05	1.45	2.64	7.07	15.57	100.00
2018-19	4.02	3.17	68.18	0.03	1.13	0.94	6.23	16.30	100.00
2019-20	4.66	4.10	62.83	0.03	1.27	3.06	6.59	17.46	100.00
2020-21	4.73	5.67	65.24	0.05	1.13	1.42	6.63	15.13	100.00
2021-22	3.73	3.58	69.35	0.05	1.42	1.78	6.58	13.51	100.00

Source: Calculated using PROWESS IQ, CMIE.

Firms that entered the market before the 1990s have a lower raw material component, which suggests the possibility of them owning captive mines. And, for those firms that entered between 1990 and 2009, the cost components for raw materials are very high. Wages are also relatively high for firms that entered before 1990s. Irrespective of categorisation, expenditure on raw materials has increased over the years, possibly due to price factors (Table 7).

5.3 Profitability of the Iron Ore and Steel Industry

Profitability of the Iron Ore Sector

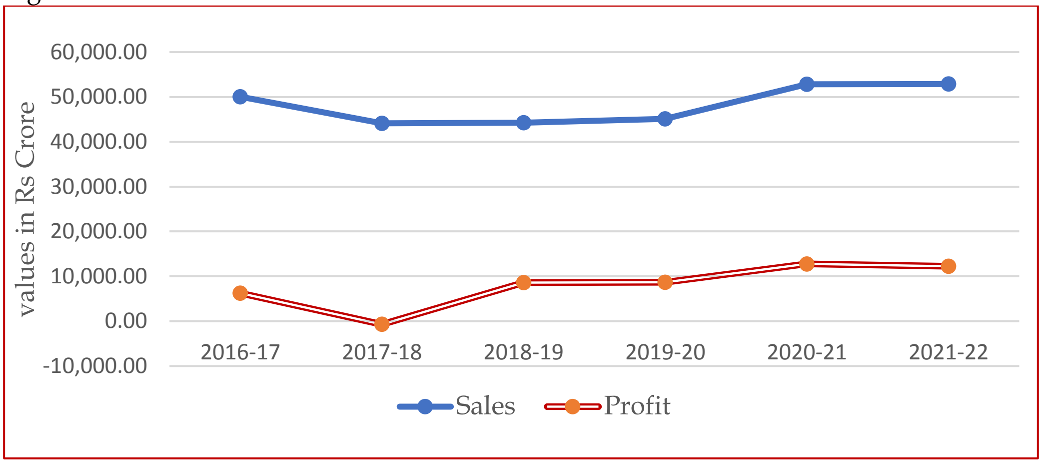
Table 8: Sales and Profits in Iron Ore Sector at 2011–12 Prices

Year	Sales (Crores)	Profit (Crores)	Profitability (%)
2016-17	50,050.20	6,249.47	12.49
2017-18	44,120.67	-716.42	-1.62
2018-19	44,235.45	8,595.73	19.43
2019-20	45,135.11	8,692.61	19.26
2020-21	52,792.95	12,776.39	24.20
2021-22	52,883.83	12,253.77	23.17

Source: Calculated using PROWESS IQ Data, CMIE.

Table 8 shows sales and profits in the iron ore sector in India. It is clear from Figure 2 that the industry's sales have not grown much during the last six years (from 2016–17 to 2021–22), whereas the profit has increased significantly to 12 thousand crores from around 6 thousand crores during the same period. However, the profitability of iron ore, computed as profit to sales ratio, has been impressive throughout, with the exception of 2017–18, when the sector suffered negative profit. Nonetheless, for the last four years (2018–19 to 2021–22), the profitability of iron ore sector has been outstanding, as it is averaging at 21.5 percent during 2018–19 to 2021–22.

Figure 2: Sales and Profit in Iron Ore Sector in 2011–12 Prices



Source: Calculated using PROWESS IQ Data, CMIE.

Having discussed the sales and profit of the iron ore industry, in what follows the study analysed the industry's profitability in a disaggregate manner. Firm size is an important factor that can influence the profitability in the iron ore sector. As seen from the earlier analysis, mega firms control a substantial portion of the industry's output. As seen in Table 9, they not only account for the majority of market shares, but also account for higher profitability. It is to be noted that the behaviour of the industry corresponds with the behaviour of the mega firms as the profitability of both the iron ore industry and of the mega firms follow a similar trend from 2016–17 to 2021–22. It is seen that in the year 2017–18, mega firms earned a positive profit of around ten percent, whereas large, medium, and small firms incurred huge losses (i.e. negative profits), causing overall industry profitability to turn negative (see Table 9).

Nonetheless, the profitability of the large and medium firms is seen to have improved since 2017–18.

Table 9: Profitability among Different Size Groups of Firms in Iron Ore Sector (Value in Percentage)

Year	Mega	Large	Medium	Small	Total profitability
2016-17	17.06	0.52	-105.83	-19.37	12.49
2017-18	9.66	-27.00	-371.51	-18.23	-1.62
2018-19	23.69	-13.07	13.61	4.34	19.43
2019-20	20.85	9.12	1.76	-3.47	19.26
2020-21	26.87	4.98	9.64	4.33	24.20
2021-22	23.98	16.01	13.70	4.20	23.17

Source: Calculated using PROWESS IQ Data, CMIE.

Similar to market share, public sector firms displayed a high profitability of around 28 percent on average from 2016–17 to 2021–22 (see Table 10). With the exception of 2016–17, which shows a negative profit, standalone firms enjoyed high profits throughout the study period. Similarly, business groups incurred huge losses during the first two years of the study period, as is apparent from their huge negative profitability, but thereafter they started earning high profits. It is to be noted that the business group's huge losses are mainly accountable for the iron ore industry's overall negative profitability in 2017–18. It is also noted that the high market share of public sector companies has made it easier for them to maintain higher profitability. It is to be highlighted that the market leaders (NMDC Ltd, OMC Ltd, Rungta Sons Pvt Ltd, Amba River Coke Ltd, and Essel Mining and Industries Ltd as seen earlier) control 75 percent of industry sales and 87 percent of industry profits.

Table 10: Profitability Across Ownership Category in Iron Ore Industry

Year	Standalone	Business Group	Government	Iron Ore sector profitability
2016-17	-2.15	-5.71	30.68	12.49
2017-18	8.53	-53.75	20.39	-1.62
2018-19	17.66	7.34	27.87	19.43
2019-20	17.10	12.67	24.61	19.26
2020-21	16.36	12.82	35.31	24.20
2021-22	20.55	14.79	27.01	23.17
2016 to 2022	13.01	-1.97	27.65	16.16

Source: Calculated using PROWESS IQ Data, CMIE.

Like successful players, there are some losers in the sector, too. It is observed that out of the total 58 firms, 13 had incurred losses in the last three years (2019–20 to 2021–22). Among the 13 loss-making firms, two are central government owned, one is state government owned, seven are from business groups, and three are standalone private firms. It is further seen that seven of these 13 firms are mega and large firms, while the remaining six are small and medium firms.

The average loss to sales ratio (in percentage) for the period 2019−20 to 2021−22 is used to analyse loss-making firms. The major loss-making companies, in the order of highest to lowest loss to sales ratio, are Sesa Mining Corpn Ltd (-961.3 percent), Sesa Resources Ltd (-434.7 percent), Sociedade De Fomento Ind Pvt Ltd (-176.7 percent), Orissa Minerals Development Co Ltd (-92.8 percent), and Idcol Kalinga Iron Works Ltd (-19 percent). Of these, Orissa Minerals Development Ltd and Idcol Kalinga Iron are central and state government run companies respectively. Three of Vedanta Group companies are among the 13 loss-making companies. Vedanta owned Sesa Mining Corpn Ltd and Sesa Resources Ltd are the highest loss makers in the industry. Contrary to the general trend, the performance of public sector companies in the iron ore sector is better than that of private companies.

Sales and Profitability of the Steel industry

After discussing the profitability of the iron ore sector, in what follows we discuss the profitability of the steel industry, which is prominent user of iron ore. Table 11 captures the sales and profit of iron & steel industry. Similar pattern is observed in the sales of iron & steel industry, which only increased by a meagre three percent between 2016−17 and 2021−22. The industry is seen to have incurred losses during the initial two years, but thereafter it has demonstrated substantial improvements in profit-making. This is also reflected in the profitability of the iron & steel industry, which has significantly increased to 11 percent from around two percent between 2018−19 and 2021−22.[8]

Table 11: Sales and Profits in Iron & Steel Industry

Year	Sales (Rs Crore)	Profit (Rs Crore)	Profitability (%)
2016-17	5,93,639.17	-24,899.29	-4.19
2017-18	6,14,046.13	-50,803.05	-8.27
2018-19	6,55,143.51	10,957.68	1.67
2019-20	6,09,122.31	25,466.23	4.18
2020-21	6,42,166.45	56,460.52	8.79
2021-22	7,10,022.60	79,662.34	11.22

Source: Calculated using PROWESS IQ Data, CMIE.
Note: Values of sales and profit are at 2011−12 prices.

[8] Note that the profitability calculation includes loss of companies as well.

Table 12: Size-wise Distribution of Market Shares in Steel Industry (Value in Percentage)

Year	Mega	Large	Medium	Small	Total
2016-17	75.35	20.37	4.00	0.29	100.00
2017-18	74.06	21.60	4.08	0.26	100.00
2018-19	73.94	21.82	3.98	0.26	100.00
2019-20	74.58	21.68	3.52	0.22	100.00
2020-21	76.50	20.18	3.15	0.17	100.00
2021-22	78.85	18.28	2.72	0.15	100.00
2016-17 to 2021-22 (Average)	75.55	20.66	3.58	0.23	100.00

Source: Calculated using PROWESS IQ Data, CMIE.

Table 12 shows that mega firms in the steel sector constitute around 76 percent of the total sales of the industry, followed by large firms with 21 percent and medium firms with around four percent during the period 2016−17 to 2021−22. Both mega and large firms make up nearly 96 percent of the industry's overall market. It is evident that the mega firms control three-fourths of the overall market. Moreover, these mega firms have experienced a steady rise in profitability from 2018−19 to 2021−22. Both mega, large and medium firms in iron & steel industry have managed to improve their profits after facing initial losses in 2016−17 and 2017−18 (Table 13).

Table 13: Size-wise Distribution of Profitability in Iron & Steel Industry (Value in Percentage)

Year	Mega	Large	Medium	Small	Total profitability
2016-17	-3.97	-5.44	-1.46	-13.04	-4.19
2017-18	-9.96	-3.92	-0.87	-5.67	-8.27
2018-19	2.37	-0.39	0.49	-4.92	1.67
2019-20	4.58	3.74	-0.64	-10.98	4.18
2020-21	11.01	1.73	1.02	-9.35	8.79
2021-22	13.00	4.93	2.68	-0.42	11.22

Source: Calculated using PROWESS IQ Data, CMIE.

As observed in the case of iron ore sector, sales and profitability vary across different ownership of firms in the iron & steel industry (see Tables 14 and 15). Table 11 shows that business groups control a substantial portion of the sales generated in the steel industry. During the reference period, they controlled an average share of 52 percent. Unlike the iron ore sector, where public sector companies have a major share in the market, the steel industry market is dominated by business groups, followed by standalone private firms. Size-wise dominance is also reflected in profitability, as is evident from Table 15. Companies held by business groups have been far more profitable than others in recent years. Foreign companies are also catching up in terms of the steel industry's profitability.

Table 14: Distribution of Market Shares Among Different Ownership Groups in Steel Industry

Year	Standalone	Business Group	Foreign	Government	Total
2016-17	29.13	52.70	6.19	11.99	100
2017-18	29.89	51.28	6.38	12.45	100
2018-19	31.28	50.02	6.34	12.36	100
2019-20	31.77	49.70	6.26	12.27	100
2020-21	29.52	52.24	5.92	12.32	100
2021-22	25.23	54.07	7.32	13.38	100
2016-17 to 2021-22 (Average)	29.47	51.67	6.40	12.46	100.00

Source: Calculated using PROWESS IQ Data, CMIE

The market leaders of the iron & steel industry as of 2022 are Tata Steel Ltd, J S W Steel Ltd, Steel Authority of India Ltd, ArcelorMittal Nippon Steel India Ltd, and Jindal Steel & Power Ltd, with market shares of 13 percent, 11.8 percent, 10.4 percent, 5.6 percent, and five percent respectively. Their corresponding profit shares are 28.6 percent, 14.5 percent, 10.4 percent, 6.9 percent, 7.2 percent, 0.8 percent, 1.2 percent, and 1.5 percent respectively. These firms together control 53 percent of the industry's sales and 71 percent of the industry's profits.

Table 15: Profitability Among Different Ownership of Firms in Steel Industry

Year	Standalone	Business Group	Foreign	Government	Industry profitability
2016-17	-3.41	-2.91	-13.74	-6.80	-4.19
2017-18	-1.24	-9.60	-41.14	-2.89	-8.27
2018-19	2.19	3.49	-15.68	1.91	1.67
2019-20	2.07	4.00	33.17	-4.41	4.18
2020-21	5.23	12.70	5.58	2.30	8.79
2021-22	5.40	14.28	12.82	8.95	11.22

Source: Calculated using PROWESS IQ Data, CMIE.

Out of the 1375 iron and steel firms included in the analysis, 268 have experienced losses in the last three years (2020 to 2022). Among them, 254 are privately owned firms, seven are foreign firms, and seven are government-owned firms. The major loss-making companies, in the order of highest to lowest loss to sales ratio, are Coastal Andhra Power Ltd, Shree Sidhbali Ispat Ltd, Mysore Steels Ltd, Maithan Ispat Ltd, Bombay Forgings Ltd, MSP Metallics Ltd, Bishwanath Ferro Alloys Ltd, Rathi Super Steel Ltd, and Orissa Sponge Iron & Steel Ltd. While Orissa Sponge Iron & Steel Ltd is owned by the state government, other firms are privately owned. Four of these firms are large, while the rest are medium and small firms.

5.4 Revenue Generation and Profitability of OMC, NMDC and Selected User Firms

While examining the overall cost and profitability in the iron ore and steel sector, it is evident that the top players are generating high profits in the sector, whereas others are facing losses. In this context, Odisha Mining Corporation (OMC) and NMDC emerge as the prominent suppliers of iron ore in states abundant in iron ore resources. OMC mainly caters to the plants located in Odisha, whereas NMDC mainly supplies to downstream product plants located in Chhattisgarh and Karnataka. Apart from the findings of the secondary data analysis, the field interaction[9] conducted with iron ore user plants in Odisha highlighted the concern that certain firms, particularly OMC, are imposing exorbitant prices for the iron ore supplied, exhibiting characteristics of a monopoly. Such elevated prices are resulting in losses and closures of firms lacking captive mines. To address this issue, we have delved into an examination of the revenue generation, profitability, cost structure, and royalty contributions of these two firms to determine whether they are generating any extraordinary profits. Here it needs to be noted that the top players in the sector are public sector firms, indicating the presence of a natural monopoly. As mineral resources are public property, ideally, the government should have control and regulation over them, utilising the revenue generated for development purposes and the welfare of the masses. Nevertheless, the concept of 'competitive neutrality' discussed in Chapter 3 becomes significant in this context.

For this analysis, we have used Annual Reports of these companies extracted from CMIE along with the PROWESS database. We have also tried to estimate the profitability of selected user firms for which data is available, especially sponge and pellet manufacturers, as they reported losses and temporary shutdowns due to high iron ore prices.

[9] Observation from the field interaction is discussed in the next chapter in detail.

Odisha Mining Corporation

Odisha Mining Corporation operates in three major business segments, namely iron ore, chrome ore, and bauxite. It owns three major iron ore mines located in Daitari and Keonjhar districts of Kendujar, and in Kurmitar of Sundargarh district. Historically, OMC's primary revenue sources were from chrome ore and iron ore until 2017. However, from 2017 onwards, the contribution from iron ore steadily increased to 86 percent in 2022 from 46 percent (Figure 3). This growth could be attributed to either an increase in the quantity of iron ore sold or a rise in iron ore prices. To analyse this, Figure 4 illustrates the growth rate of the value generated from iron ore sales and the growth in the quantity sold. By examining these indicators, we can deduce whether the growth in sales is primarily due to an increase in the quantity sold or a hike in iron ore prices.

The figure clearly demonstrates that the growth in the value of sales has outpaced the growth in the quantity sold, indicating a significant increase in the prices of iron ore. This upward trend in iron ore prices is prominently visible in the figure, particularly from 2017–18 onwards, with the exception of the year 2019–20.[10] The recent financial years, 2020–21 and 2021–22 witnessed a substantial surge in iron ore prices. Such steep rise in prices can be attributed to (i) inflationary pressure, or (ii) an artificial increase in price due to monopoly elements. In order to ascertain whether the high growth in prices and revenue in recent years was influenced by inflationary pressure, we adjusted the sales value generated from the iron ore business using the GDP deflator,[11] wholesale price index (WPI) for manufacturing sector as well as using WPI for minerals.[12] The results displayed in Figures 5 and 6 indicate that the growth levels of prices and value remain almost the same as earlier. This suggests that the surge in prices and revenue is not attributed to inflationary pressure alone.

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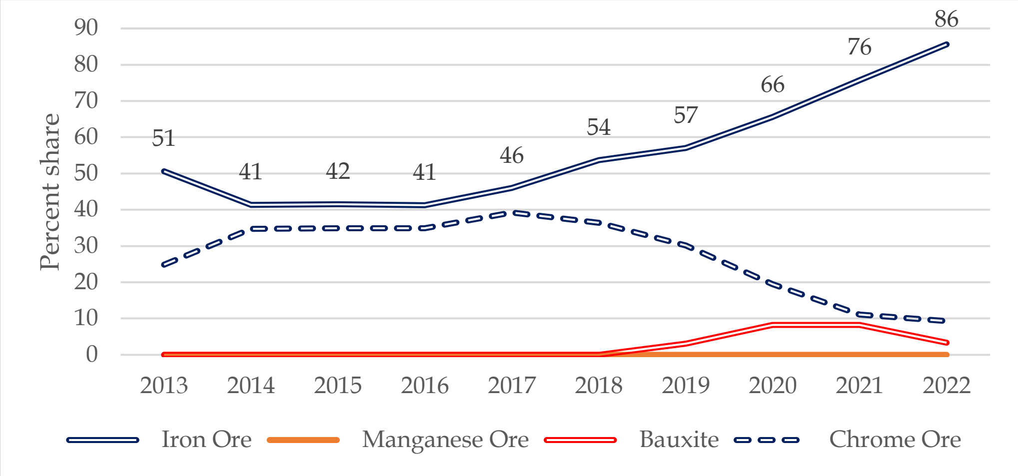
[10] This is the starting period of the pandemic. Pre-COVID period also experienced low growth in several economic indicators.

[11] GDP deflator is calculated using the GDP at current and constant values with the base year 2011-12 using the data extracted from Reserve Bank of India database. WPI data is also derived from RBI database, which is released by the Office of the Economic Adviser, Ministry of Commerce and Industry, Government of India. Base year followed is 2011-12.

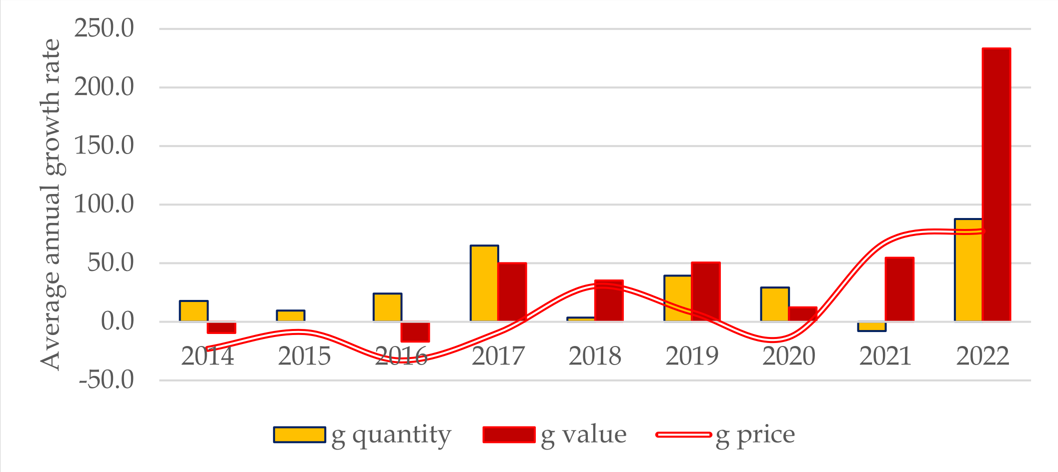
[12] WPI for manufacturing is also used since WPI for minerals might be reflecting the price of these top players. WPI for manufacturing is not displayed since it shows the same trends. Derived prices are calculated by dividing deflated sales value with quantity. Annual average growth is calculated for growth

Figure 3: OMCs Product Share (%)



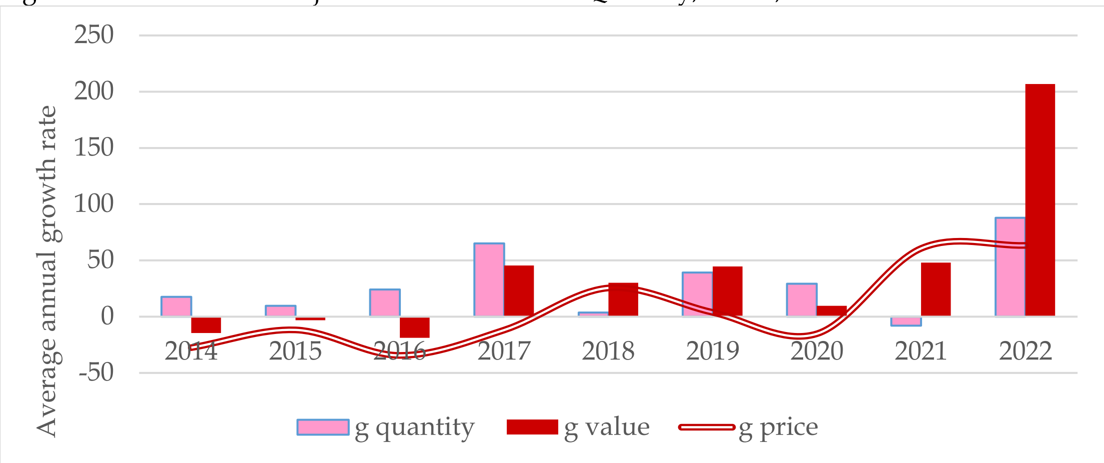
Source: Calculated using CMIE PROWESS Annual Reports.

Figure 4: Growth of OMC's Sales Quantity, Value, and Price of Iron Ore



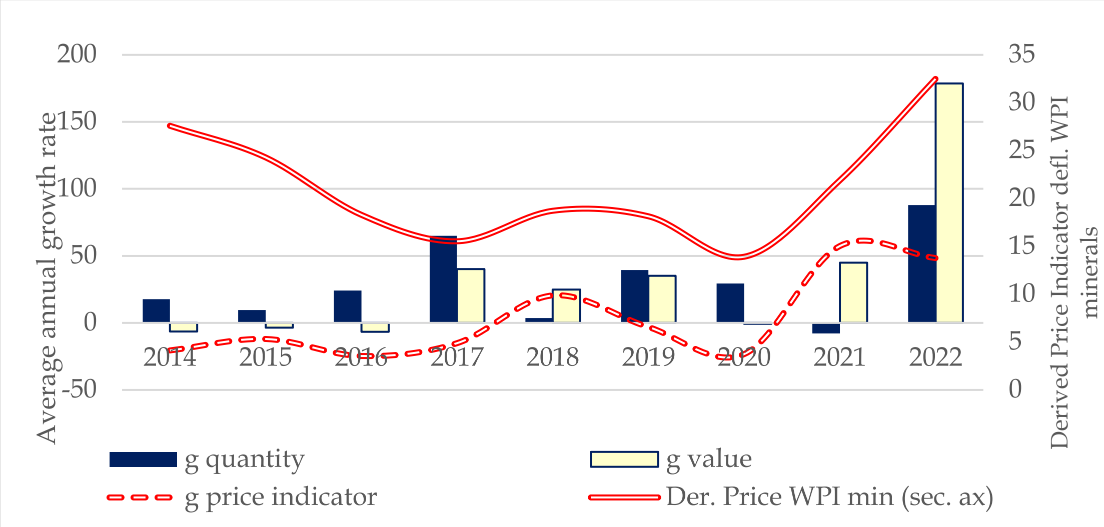
Source: Calculated using CMIE PROWESS Annual Reports.

Figure 5: GDP Deflator Adjusted Growth of Sales Quantity, Value, and Price of OMC



Source: Calculated using CMIE PROWESS Annual Reports

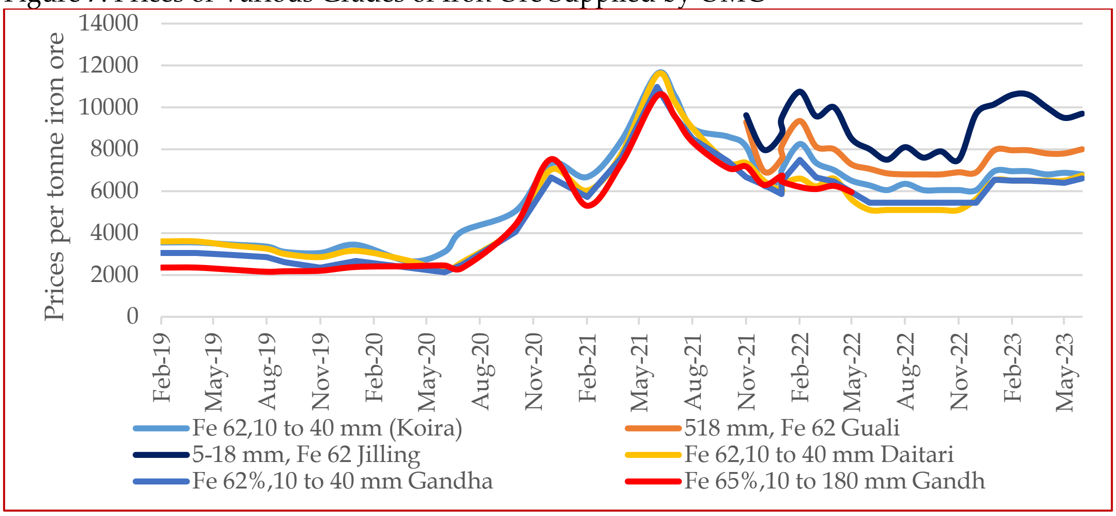
Figure 6: WPI Minerals Adjusted Growth of Sales (Quantity, Value) and Derived Price Indicator of OMC



Source: Calculated using CMIE PROWESS Annual Reports, deflator data source discussed in footnote.
Note: WPI for manufacturing and minerals used in separate figures. Both gives almost same trends.

Figure 7 indicates the monthly price charged for various grades of iron ore supplied by OMC. It is clear from the figure that the prices have increased over time. There was a significant increase in iron ore prices, with some grades reaching as high as Rs 11,975 per tonne in June 2021, compared to Rs 2,500 per tonne in May 2020 (Table 16; Figure 7). Fe 62 grade Daitari cost was Rs 11552/- per tonne in June 2021, which was also the COVID-19 period. While the prices have slightly declined since then, they remain substantially higher compared to the initial period. This price pattern in recent years is not solely attributed to inflation, as our earlier analysis indicated that the values are higher even after deflating.

Figure 7: Prices of Various Grades of Iron Ore Supplied by OMC



Source: SteelMint Database.
Note: For some items data was missing for some months. We have used the average of pre- and post-month price for continuity. For Fe 65 grade, data is not available after June 2022.

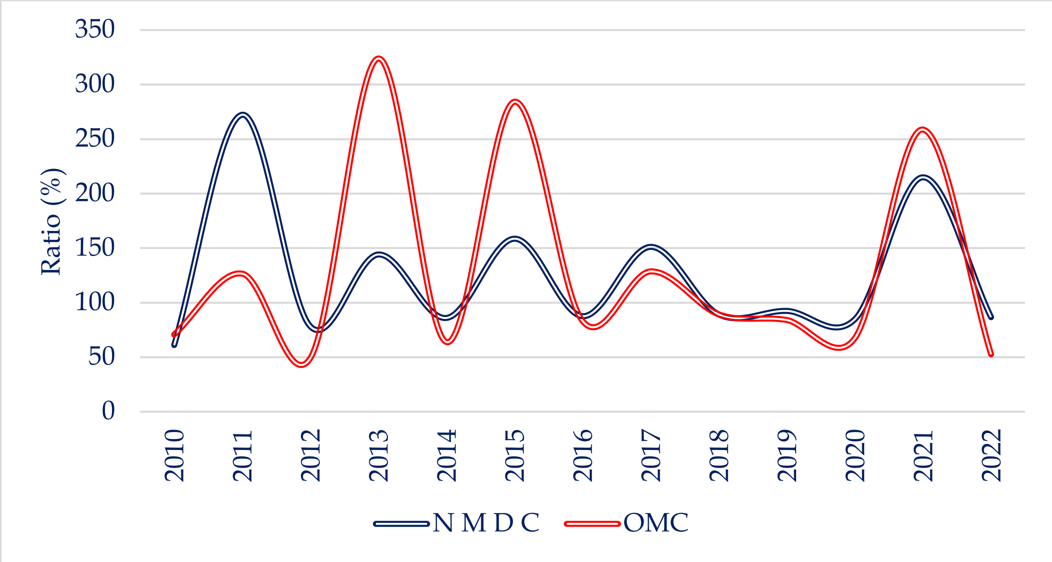
Table 16: Price Levels (OMC Mines; Prices in Rs/tonnes) of Lumps and Fines

Month year	Fe 62,10 to 40 mm (Koira)	518 mm, Fe 62 Guali	5-18 mm, Fe 62 Jilling	Fe 62,10 to 40 mm Daitari	Fe 62%,10 to 40 mm Gandhaardan	Fe 65%,10 to 180 mm Gandh
Feb-19	3550			3600	3050	2350
Jun-21	11600			11550	10975	10550
Nov-21	8125	9300	9625	7350	6675	7175
Jun-23	6800	8000	9700	6750	6600	
Fines						
Month year	Fe 62-60%,0 5 mm (Koira)	Fe 62-64%,0 5 mm (Daitari)	Fe 62-60%,0 5 mm (Gandh	Fines 5 mm, Fe 60-62% (Guali)	Fines 5 mm, Fe 60-62% (Jilling)	
Mar-19	1125	2325	1200			
Jul-21	6980		6384			
Jan-22	4400	6200	4150	4500	4500	
Jun-23	5450		5500	6000	6000	

Source: SteelMint Database.

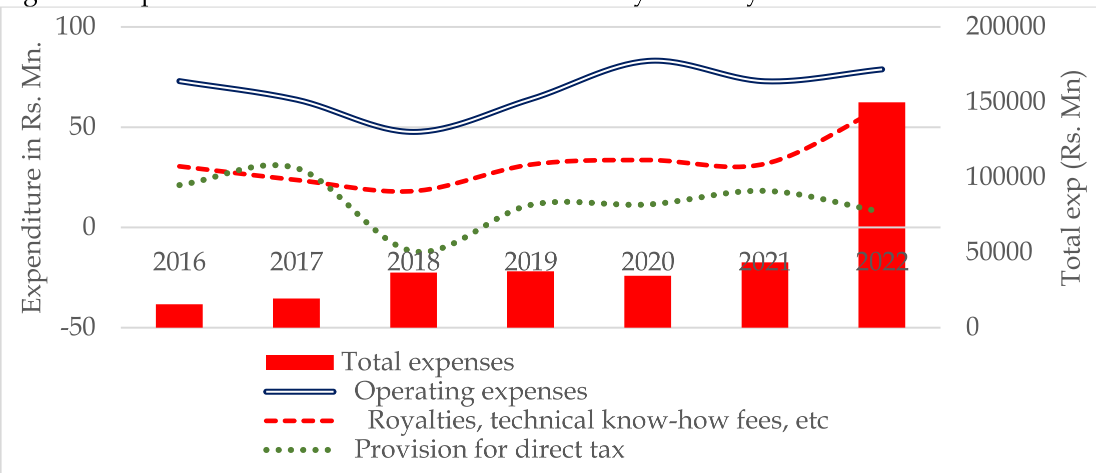
Next, profit to sales ratio is calculated to determine the profitability of OMC and we find that except for the year 2017–18, OMC has a profit to sales ratio ranging between 53 and 259 during the last five years, which shows the company is generating high profit margins (Figure 8). In 2022, the ratio has declined, although it still remains high. The OMC had higher profit ratios compared to NMDC in some years. The cost structure of OMC is disaggregated to know where the firm is spending more. It is evident that the operating cost is the largest cost component, out of which payments made for royalties is the major cost component (Figure 9). In 2022, the operating expenses constituted 79 percent of the total expenditure incurred, with 60 percent of this amount representing royalties. This is the royalties given to the government, which indicates the increasing revenue share for the government over time. Overall, an increasing revenue share is visible after 2015, except for a few years. It is further observed that OMC and NMDC together account for a substantial share of royalties received through iron ore companies in India (Figure 10). Since the mid-2000s, NMDC had held the major share, while OMC's share also started to increase. However, NMDC has consistently maintained a larger royalty share than OMC throughout this period.

Figure 8: PBDITA to Sales Ratio of NMDC and OMC



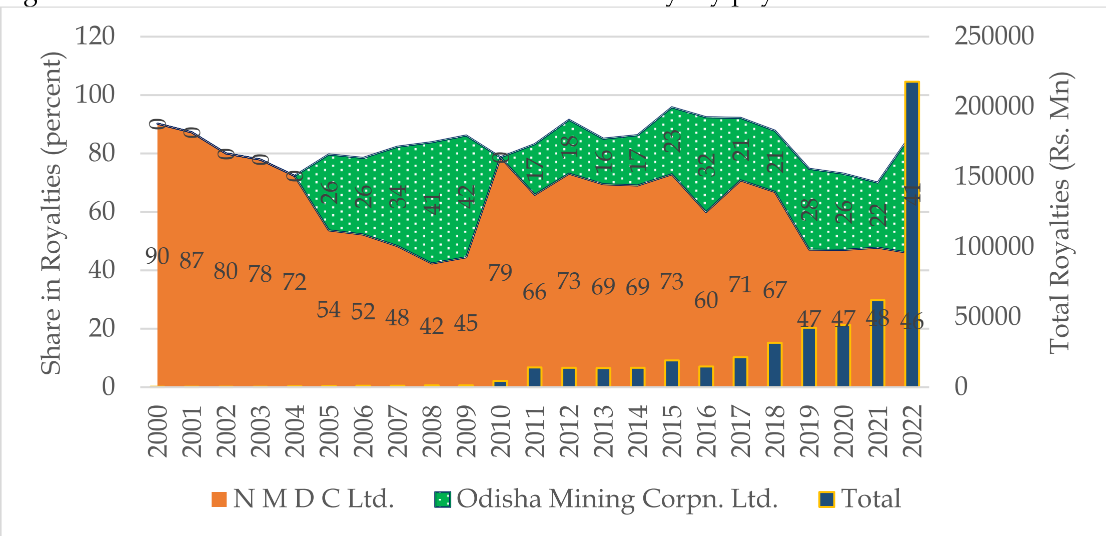
Source: Calculated using PROWESS, CMIE.

Figure 9: Expenditure Pattern of OMC: 2016–2022: Royalties Payment



Source: Calculated using CMIE PROWESS Annual Reports.

Figure 10: NMDC and OMC's share in Total Iron Ore Royalty payments

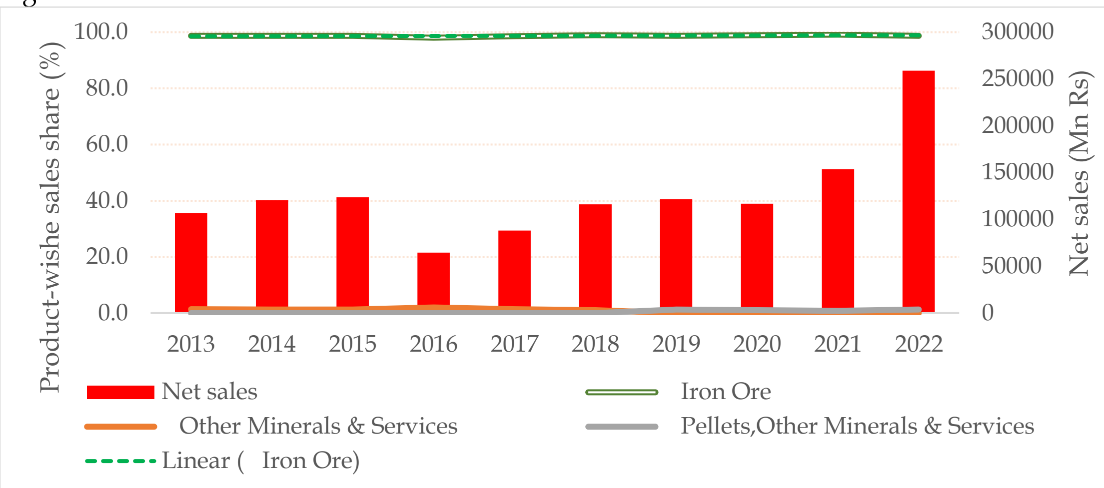


Source: Calculated using PROWESS, CMIE.

National Mineral Development Corporation (NMDC)

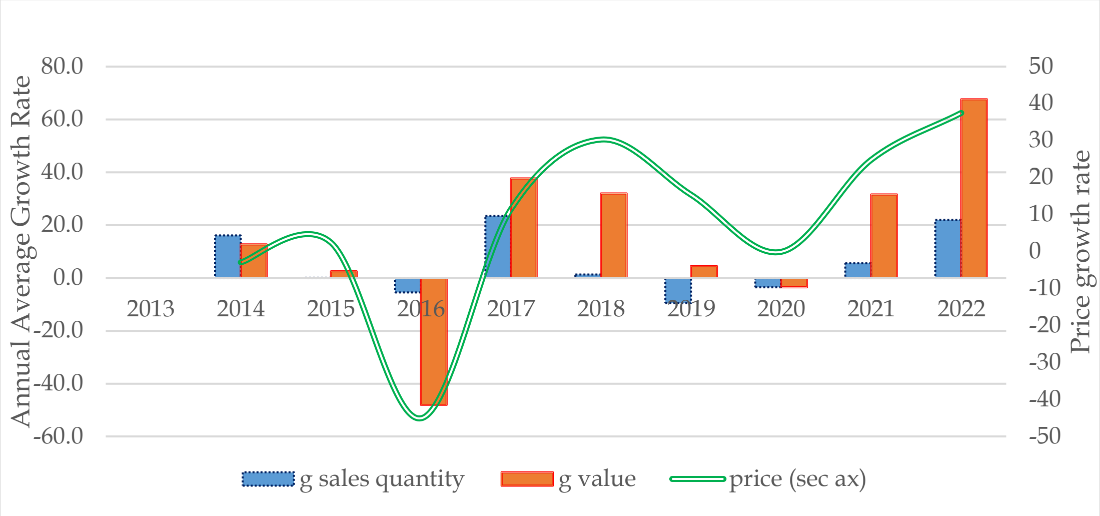
As seen in Chapter 4, NMDC is the top producer of iron ore in India. It has four mechanised iron ore mines in Bailadila (Dantewada district, Chhattisgarh) and Donimalai (Bellary district, Karnataka, which also has pellet manufacturing facility). Besides its iron ore operations, NMDC is also involved in the diamond business. It is further noted that from the year 2019 onwards NMDC has also been generating revenue from pellets production. In 2022, this accounted for a relatively modest 1.3 percent of NMDC's overall production. NMDC also established the NMDC Steel plant to generate vertical linkages, but this company was demerged in 2023. Although such vertical linkages can increase efficiency, they should be viewed with caution as they may lead to anticompetitive practices against the buyers of iron ore. As seen from Figure 11, around 99 percent of the income generated by this company is through iron ore business. A revenue decomposition is undertaken to determine whether the growth is primarily driven by the price increase of iron ore or the rise in the quantity supplied. Similar to the OMC trends, it is observed that the value of sales has significantly increased, while the quantity has shown less growth. The derived price of iron ore has exhibited a sharp rise from 2017 onwards, reaching a peak in 2022, although it dipped in 2020. The price appears to be following a cyclical pattern (Figure 12), influencing the overall value-based curve.

Figure 11: NMDC: Income from Different Products



Source: Calculated using CMIE PROWESS Annual Reports.

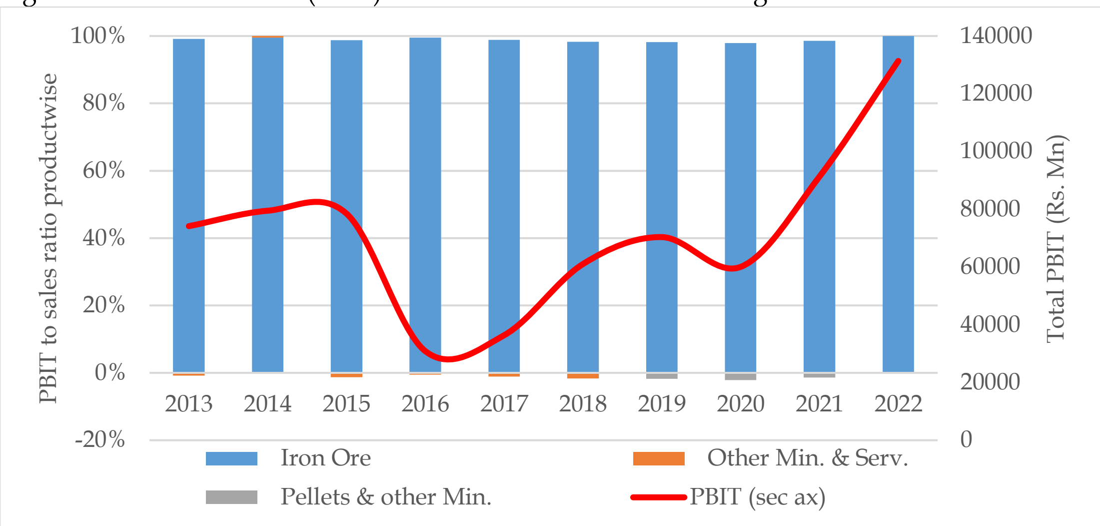
Figure 12: Growth in Quantity, Sales, and Price: NMDC



Source: Calculated using CMIE PROWESS Annual Reports.

We have also attempted to ascertain whether the rise in iron ore prices is resulting in higher profitability for NMDC. Figure 13 shows the profit generated from various product segments including iron ore. It is clear that NMDCs iron ore business accounts for almost the entire profit generated by the company. Interestingly, the profit before interest and taxes (PBIT) figures show a continuous increase starting from the year 2016, which corresponds to the period year when iron ore prices began to rise, as seen earlier. The PBIT to sales ratio is depicted for the period 2013 to 2022, indicating a profit to sales ratio ranging from 41 percent to 69 percent, a favourable performance indicator (Table 16).

Figure 13: NMDC's Profit (PBIT) Share from Various Product Segments



Source: Calculated using CMIE PROWESS Annual Reports.

Table 17: Profit to Sales Ratios: NMDC

Profit Ratios	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Net profit	63424	64201	64219	30283	25891	38059	46421	36101	62531	93985
Net Profit / Net Sales (%)	59	53	52	47	29	33	38	31	41	36
Net Profit / Capital employed (%)	201	172	20	10	12	16	18	12	21	27
Net Profit / Total assets (%)	155	139	19	9	10	13	16	12	17	21
PBIT to sales* (Calculated)	69	66	64	48	41	53	58	51	59	51

Source: CMIE PROWESS Annual Reports and PBIT/sales calculated using PROWESS data.

Profitability of User Firms

To analyse the profit generation of pellet manufacturers and sponge iron manufacturers, we calculated the same ratio for the available firms in these sectors. The results presented in Table 18 indicate that firms engaged in iron ore mining tend to be more profitable in general. On the other side, firms using iron ore for various processes, such as pellets, sponge iron, basic iron, and steel production, are either facing losses or generating lower profits. In recent years, pellet manufacturers have been significantly affected, as evidenced by the losses they have incurred. To examine their expenditure pattern, a cost decomposition analysis is also undertaken (Table 19) for selected firms. It is visible that the raw material expenditure of Brahmani River Pellets has shown a significant increase, rising to 72 percent in 2022 from 34 percent of the total expenses in 2014. Similarly, for KIOCL, which is a public sector company engaged in pellets production, raw material component increased to 71 percent from 45 percent during the same reference period. This analysis indicates that in recent years, these firms have been facing significantly high raw material costs.

Table 18: Profit to Sales Ratio of Selected Iron Ore/Purchasing Firms

Firm	2020	2021	2022	Main Product
Brahmani River Pellets Ltd.	-284	-6	-2639	Pellet
Essel Mining & Inds. Ltd.	42	223	51	Iron ore
Idcol Kalinga Iron Works Ltd.	-14	-718	-8	Basic iron & steel
K I O C L Ltd.	-10	-1832	9	Pellet
M S P Sponge Iron Ltd.	9	952	10	Sponge iron & Pellet
N M D C Ltd.	85	215	87	Iron ore
Odisha Mining Corpn. Ltd.	68	259	53	Iron ore
Sesa Mining Corpn. Ltd.	14	887	14	Iron ore

Source: Calculated using PROWESS, CMIE.
Note: PBDITA is used as the profit indicator.

Table 19: Raw Materials Expenditure of Selected User Firms in Total Expense (Share, Percent)

	Brahmani River Pellets		KIOCL Ltd	
Year	Operating expenses	Raw mat. component	Operating expenses	Raw mat. component
2014	70.4	34	85	45
2015	77.7	44	91	47
2016	75.4	32	93	21
2017	52.9	26	99	59
2018	101.0	48	98	64
2019	86.5	47	95	66
2020	86.0	42	97	69
2021	95.4	67	93	69
2022	95.9	72	94	71

Source: Calculated using CMIE PROWESS Annual Reports.

5.5 Concluding Observations

This chapter highlighted several aspects of the iron ore sector, including the field observations, cost decomposition, profitability, and the revenue and cost analysis of selected seller and buyer firms.

The primary concern raised during the field interaction in Odisha is the high base prices set by OMC for iron ore auctions. OMC is a major supplier for non-captive users of iron ore. The high prices have led to losses and the closure of small steel producers. Odisha Mining Corporation also engages in LTL policy with selected buyer plants, and 80 percent of the iron ore is sold through this route, leaving only the remaining 20 percent open for auction. Under the LTL policy, firms are obliged to purchase a minimum quantity, which compels them to buy even at high prices and low quality. Furthermore, the auction process applies to various types of iron ore buyers, such as integrated plants, pellet manufacturers, sponge iron producers, pig iron manufacturers, and others, which has resulted in complications. Respondents from Karnataka have pointed out the shortage of iron ore as a significant concern. The royalty payment fixed is also considered high, and the issue of 'royalty on royalty' has been highlighted by some respondents.

The study decomposed various cost components to see whether raw material cost (a major component of which is iron ore consumption) is a significant component in the total cost incurred by the steel plants. Major observation from this analysis is that the raw material cost is the highest expense incurred by steel companies with the percentage ranging from 60.67 percent in 2015–16 to 73.30 percent in 2021–22. It is important to mention that the cost of raw materials has risen drastically over the seven-year period, accounting for 73 percent of the total expenses incurred in 2021–22. It is also striking to note that of all expenses, the expense for technological upgradation in the industry is minimal at 0.3 percent in 2021–22. This analysis is repeated for different ownership categories and it is found that the raw material cost component of standalone firms is much higher than that of business group owned firms, while it is very low for public sector companies. The observed outcome can be attributed to the ownership of captive mines, as evidenced by the reduced iron ore expenditure by public sector and business group owned firms. Additionally, public sector firms tend to have higher wage expenses. In mega firms, the raw material component is smaller compared to large firms, possibly due to their ownership of captive mines, which helps lower the overall cost. Irrespective of the size factor, the cost component for raw materials has generally been increasing over the years.

The profit analysis conducted for firms in the iron ore sector reveals impressive results for the last six-year period from 2016–17 to 2021–22, with the exception of the year 2017–18 when the industry experienced negative profitability. However, over the last four years (2018–19 to 2021–22), the profitability of the iron ore sector has been exceptional, averaging at 21.5 percent. Notably, top firms not only dominate the market shares in the iron ore sector, but also achieve significantly high profitability. The sectoral profitability closely aligns with the profitability of these major firms. It is to be highlighted that the market leaders (NMDC Ltd, OMC Ltd, Rungta Sons Pvt Ltd, Amba River Coke Ltd, and Essel Mining and Industries Ltd) control 75 percent of the total sales and 87 percent of the profits in the sector. There are also loss-making firms in the iron ore sector (13 out of 58 firms), apart from the high-performance firms.

The study has also estimated the profitability of the steel industry, which is a prominent user of iron ore. The idea is to identify any unfair practices in the iron ore sector, in terms of prices and profitability, that may trickle down to the buyers, and affect the performance of the steel sector. It is found that the steel sector experienced losses in the first two years of the reference period (2016–17 and 2017–18). Nevertheless, in the following years, there have been signs of improvement in its performance. Both mega and large firms make up nearly 96 percent of the industry's overall market, and the profitability is higher for mega firms compared to other ownership categories. Unlike the iron ore sector where public sector companies hold a major share in the market, steel production is dominated by business groups with more than 51 percent market share, followed by standalone private firms. Firms owned by business groups have been far more profitable than others in the sector. The share of public sector in the steel industry is only about 13 percent. It is to be recalled that many steel plants are integrated and have captive mines. Captive mines are owned by the top players and business group affiliated companies. This may result in increased profitability. Small plants generally incur losses, whereas medium-sized plants are less profitable.

The empirical analysis of OMC and NMDC's profitability and cost structure reveals that the majority of OMC's revenue comes from its iron ore business. When we break down the inflation-adjusted revenue growth from iron ore, it becomes evident that the substantial revenue growth is primarily driven by the high price of iron ore, rather than an increase in the quantity supplied in recent years. OMC’s major expenditure is the payment for royalties. The revenue generated by the government through royalties has indeed been increasing in recent years. To gain insights into the profitability of user industries like pellets, sponge iron and steel, the study examined their financial performance. It is evident that some of these plants are facing losses, which aligns with the concerns raised during the field visit. Pellet plants are particularly vulnerable, while the profitability of sponge iron plants is also lower.

In conclusion, mineral resources are valuable national assets that should ideally be regulated and controlled by the government. Public sector companies that dominate mineral production and generate revenue from these resources can play a significant role in funding public welfare initiatives. However, it is essential to ensure that such efforts do not negatively impact any section of the business community. The study has revealed that smaller players in the market are more affected by price hikes and often face temporary shutdowns of their operations. In contrast, large integrated steel plants, having captive mines, are less dependent on market-driven iron ore prices. Conversely, non-captive producers, which are relatively smaller firms, encounter difficulties in handling the volatile iron ore prices while manufacturing pellets, sponge iron, pig iron, and other products. The process of fixing base prices should be transparent and take into account the dynamics of both large and small players in the industry. Allocating a substantial quantity of iron ore only to selected firms within a particular state should be carefully scrutinised to avoid creating shortages in other regions. Since iron ore reserves are not uniformly distributed across the country, its allocation should not be limited to any specific area. In sectors like minerals, competitive neutrality should be exercised with caution. While ensuring the profits generated from public resources are used for the welfare of the people, there should also be appropriate checks on the pricing of inputs for smaller producers. Overall, a balanced and fair approach is necessary to promote sustainable growth and equitable opportunities in the iron ore sector.

Chapter VI
Summary and Conclusions

Competition issues in the mineral sector are unique due to sector specific features such as natural resource characteristics, state intervention in operation and control over minerals, resource generation potential, welfare implications, and more importantly, the environmental hazards created due to over exploitation of nature. Mineral resources have been pivotal in the development and progress of human societies, facilitating industrial advancements and modern living conditions. Given their non-renewable nature and limited availability, countries blessed with abundant mineral wealth possess a natural advantage. However, the rising demand for minerals like iron ore is driven by the growing infrastructure and developmental needs of emerging economies. India possesses abundant and valuable mineral resources, which provide a significant competitive advantage for the country's industrial growth, offering cost-effective inputs for production. Mining activity accounts for roughly 2.3 percent of India's GDP in 2022-23. Iron ore holds a dominant position, accounting for 79 percent of the total mineral value produced in the country. Such advantageous resources play a vital role in fostering the development of basic and heavy industries, and infrastructure, forming the backbone of the country's industrial development.

Mining activities throughout the world involve huge start-up costs and investments with longer turnover time. This is the reason why mining activities are largely dominated by few big players, giving rise to an oligopolistic structure. In such a context, effective regulation becomes crucial to ensure judicious and efficient use of minerals, ensuring their availability to industries at reasonable prices. In its endeavour to ensure fair markets, the Competition Commission of India periodically undertakes various market studies to ensure that the concerned market is operating without any hindrances to competition. As a part of this endeavour, this study examines whether the mineral sector, especially the iron ore market, is operating smoothly. The specific objectives of the study are to examine the structure, extent, and dynamics of market competition in the sector; to identify the value chains and the competition issues across value chains; and, to unravel any regulatory issues affecting market competition in the sector. The study has also made a detailed assessment of the output growth, trade, and competitiveness in the sector. The report consists of seven chapters, and the major highlights from each of these chapters are discussed here.

The second chapter provides a detailed overview of mining and iron ore sector in India. India is the fourth largest producer of iron ore globally, trailing Australia, Brazil, and China. The country exhibits self-sufficiency in mineral endowment and production, with iron ore being entirely domestically sourced. Iron ore constitutes around two percent of India's export basket, whereas its import basket share is almost nil. The Revealed Comparative Advantage (RCA) analysis undertaken to examine export competitiveness shows that Australia, Brazil, and India have been able to maintain their competitiveness in iron ore products. In the case of India, RCA has been declining till 2015, and thereafter improved performance is visible. Products like pellets and other related items were not competitive until 2013, but this trend has reversed since then. This suggests that India's value addition in the form of pellets is increasingly becoming export competitive.

Public sector companies account for approximately 39 percent of iron ore mining, with the remaining 61 percent being undertaken by the private sector. However, the distribution of mining leases witnessed a significant decline after the implementation of the MMDR Amendments Act, 2015. The data shows that smaller miners, in terms of land area, have a higher number of mining leases, while the larger players dominate in terms of the total allocated area. Additionally, there has been a gradual increase in the presence of captive mines in the iron ore sector, indicating that large-scale producers are gaining control over the critical raw material requirements. This is also helping them derive vertical integration in production as well as control fluctuations in raw material prices. The effective tax rates and the royalty payments in India are much higher than in most mineral-rich countries, namely Brazil, Australia, Canada, Chile, and South Africa.

The third chapter provides a detailed analysis of the mining laws in India, including the state level regulations, interaction between mining laws and competition law, and the international experience. Mining, being a strategically significant sector, has seen a shift in its development approach over the years. Initially, the public sector played a central role, but in the 1990s, there was a realisation of the need for private and foreign investment, leading to policy changes. Recently, some major reforms were introduced in the sector. One aimed at enhancing transparency in ore block allocation, while the other removed the distinction between captive and merchant mines. The presence of captive mines created competition concerns as it led to differential cost structure in the sector. An analysis of the various provisions in the recent mining laws and its impact on competition outcomes found that the MMDR Amendment, 2021 appears to be supportive of the competition policy objectives. However, improvements are required, especially in terms of smoothening interstate regulations, and ease of obtaining multiple permissions within a shorter time period. State governments like Odisha have been reserving their mining resources for own consumption. It is observed that though the licensing processes have been liberalised, there are still extensive compliance requirements that small players must adhere to through multiple hierarchies, which creates a chilling effect on small players.

The fourth chapter identifies the relevant products, including the horizontal and vertical line of products, and the geographical market in the sector. The vertical integration analysis based on SUT, which was previously Input Output Transaction, shows that the iron and steel sector is the primary consumer (95 percent) of iron ore in India, whereas intermediate goods' demand constitutes only 55 percent of the total value ouput in the sector. Based on state level analysis, it is clear that iron ore production is concentrated mainly in a few states, such as Odisha, Chhattisgarh, Karnataka, and Jharkhand. These are the major states producing various categories of iron ore (including magnetite and hematite; lumps/fines/concentrates). Rajasthan is leading in concentrates. Goa had a significant presence in the past, but its position has considerably declined. In Odisha, out of the 163 reported iron ore leases, only 61 are currently operational, with 52 leases having lapsed, and eight temporarily discontinued. Notably, some companies in the state, like SAIL, OMC, Tata, and JSW, hold significant portions of the mining areas. In terms of installed capacity for pellets production and sintering, JSW plants hold a large share of the total capacity, followed by Tata.

The study examined the level of concentration in the Indian iron ore market using various economic indicators of market competition, such as HHI, concentration ratios, and changes in concentration levels. The findings indicate that the iron ore sector is highly concentrated, with a four-firm concentration ratio of 80 percent and an HHI of 2370, which is moderate but close to being highly concentrated. Although the concentration levels have decreased compared to the 1990s, they are still relatively high. Competition was also analysed across different categories of firms, including ownership and entry-based categories, as well as product categories. Changes in the levels of market shares and HHI also shows that there has been a gradual decline in the values, both in terms of concentration ratios and HHI. This sector is dominated by public sector companies. The top two players, i.e. central government owned NMDC and state-owned OMC together account for 65 percent shares in the iron ore sector, followed by Amba River Coke, an OP Jindal group company, which is a relatively new entrant in the market. In recent years, there has been a noticeable increase in the presence of both business groups and standalone firms in the iron ore sector. OP Jindal and Aditya Birla are the top business groups in the sector. Market shares are predominantly held by firms that entered the sector before 1990 and during the 1990s. Additionally, the sector has witnessed a number of M&As. Iron ore production is highly concentrated in some states. Odisha alone accounts for more than half (53.82 percent) of the iron ore production, followed by Chhattisgarh (16.3 percent), Karnataka (15.9 percent), and Jharkhand (9.7 percent). The regional concentration of iron ore production also suggests a high level of concentration among a few companies at the regional level.

The fifth chapter of the study presents the findings of field interactions with stakeholders mainly from Odisha and Delhi. The objective of this field interaction was to gain insights into the competition issues faced by them at the ground level if any. It was observed that in Indian mines, there is a higher presence of iron ore fines compared to lumps, leading to increased production costs. Regarding the quality of iron ore, high-grade ore with more than 62 percent Fe content is found predominantly in the states of Odisha and Chhattisgarh. One of the major issues raised during the field interaction in Odisha was related to the pricing of iron ore. Non-captive users can purchase iron ore through any of the following routes: (i) participating in the auction process of the public sector companies like OMC, (ii) engaging in LTL with the OMC, or (iii) purchasing from private merchant mines. In each of these routes, the respondents highlighted various issues.

One of the significant challenges faced in participating in the auction is the high base prices set for iron ore auctions. OMC has emerged as the major supplier for non-captive use of iron ore in Odisha. During field interactions, it was revealed that the high prices were causing losses and closures of small steel producers. As per the Odisha Gazette (2023), OMC follows an LTL policy with selected buyer plants, with 80 percent of the iron ore being sold through this arrangement, leaving only the remaining 20 percent open for auction. This distribution strategy raises concerns from a competition regulation perspective, as OMC allocates iron ore supply to specific segments of buyers who meet prescribed eligibility conditions. Under the LTL policy, firms are obligated to purchase a minimum quantity of iron ore, leading to situations where they have to buy regardless of prices and quality to meet the quota. Moreover, the allocation of 80 percent of iron ore through LTL makes the auction less preferable, as the auction prices are used to set the LTL price. Another issue is that the same auction is applicable to various types of iron ore buyers, including integrated plants, pellet manufacturers, sponge iron, pig iron, etc., creating problems as bid price hikes affect all firms equally. Respondents from Karnataka pointed out that the entry fee for participating in auctions is very high. In Odisha, there is no shortage of iron ore, but in Karnataka, a shortage is reported. Iron ore availability in Chhattisgarh is also not satisfactory. From a regulatory perspective, Odisha has a more favourable environment with good infrastructure and an efficient administrative setup. However, processing time can be further reduced through digitalisation, and improvements in transportation to establish better connectivity between all mining sites and companies, which is applicable to other states as well.

A cost decomposition analysis of the steel sector was undertaken to examine whether raw material (which includes mainly iron ore) is a significant component of cost of production. The findings reveal that the raw material component accounts for 73 percent of the total expenses in the sector. This proportion has been steadily increasing over the past seven years, while the tax component has been declining during the same period. In the mineral sector, a common phenomenon is that a few large players tend to collaborate, acquire a significant share of mines, and manipulate prices to generate substantial profits. This concentration of ownership allows these players to exercise critical control over mineral resources, enabling them to extract rents in addition to regular profits. As a result, owning mines becomes a source of significant economic advantage, allowing them to recover their initial investment costs. However, the high prices of minerals can negatively impact industries that heavily rely on them as raw materials. In many cases, it becomes challenging to transfer the increased costs of inputs to the final output prices. This is mainly due to the fact that industries closer to the end user usually have a larger number of suppliers compared to the initial stages of the production value chain. As a result, when the prices of inputs like iron ore rise, they cannot be fully passed on to the prices of steel, and this price increase gets constrained as we move further along the value chain. Hence the asymmetry in sharing the burden of higher prices is somewhat structural because of the nature of the market and the varying number of players in subsequent stages of production.

The study also assessed the profitability of the steel industry and observed that it incurred losses in the initial two years of the reference period (2016–17 and 2017–18). However, there has been an improvement in the profitability trend in subsequent years. Mega and large firms account for approximately 96 percent of the total market, and among them, mega firms show higher profitability compared to other ownership categories. In contrast to the iron ore sector, where public sector companies hold a significant market share, steel production is largely dominated by business groups with over 51 percent market share, followed by standalone private firms. Business group-owned firms are found to be more profitable than other entities in the sector. The public sector's presence in the steel industry is relatively limited, accounting for approximately 13 percent of the market. It is to be recalled that several steel plants are integrated and have captive mines, with the majority of such mines being affiliated with top players and business groups. This presence of captive mines seems to contribute to their profitability. On the other side, smaller plants tend to face losses, while medium-sized firms show relatively lower profitability. As a result, the existence of captive mines creates a favourable market condition for larger plants, shielding them from significant price fluctuations.

Next the study examined the cost and profitability of OMC and NMDC, the major iron ore suppliers in India. OMC is a major supplier in Odisha whereas NMDC is the top supplier in Chhattisgarh and Karnataka. Both companies generate significant revenue from iron ore sales, resulting in remarkable financial performance with high profits. However, a significant portion of OMC's expenditure goes towards paying royalties to the government. Despite increasing revenue from iron ore and royalties, the high prices of iron ore are adversely impacting the profitability of user industries such as pellets, sponge iron, and steel. The study analysed the growth rates of quantity and inflation adjusted sales revenue of OMC and found that, the growth in the value of sales has outpaced the growth in the quantity sold, indicating a significant increase in the prices of iron ore. The study has further analysed the financial performance of a number of user companies with available data and revealed that they have been facing losses in recent years. It is observed that their expenditure on raw material purchase, particularly iron ore, is increasing. These findings are further substantiated by the insights gathered from field interactions. Among the various companies, pellet manufacturers appear to be more vulnerable, while sponge iron plants also exhibit lower profitability.

In conclusion, the study emphasises that iron ore resources are non-renewable and valuable public assets and should be managed and utilised efficiently under stringent government oversight. The central position of public sector companies in mineral production and generation of revenue from these operations can contribute to the welfare of the nation. However, it is essential to ensure that this approach does not adversely impact any section of the business. It is seen that the relatively small players in the market are more affected by the rising raw material costs and the consequent temporary shutdown of operations. Large integrated steel plants with captive mines are less affected as they are not dependent on market-determined iron ore prices. On the other side, non-captive producers, which are relatively small firms, face challenges due to the high iron ore prices, affecting downstream industries. In addition, the process of base price fixation should be transparent and considerate of the interests of both large and small producers within the industry. Imposing quantity constraints by allocating a significant portion of iron ore to firms within the home state should be carefully examined to avoid creating shortages in other regions. Since natural resources like iron ore are not evenly distributed across the country, their allocation should not be limited to any particular region.

Chapter VII
Policy Recommendations

1. Before delving into the recommendations, it is to be noted that the iron ore and its vertically linked steel manufacturing sector is regulated by multiple government agencies through several legislations, including state level interventions. In addition, as part of the industrial development strategy and to foster long-term competitiveness, greater incentives were granted to some players in the vertically related sectors, such as steel. Presence of captive mines is one such example. Conversely, the essence of competition regulation in India has been to guarantee fair market operations and establish a level playing field for all firms to operate smoothly. Further, the National Steel Policy aims at creating a technologically advanced and globally competitive steel industry, fostering self-sufficiency in steel production and contributing to overall economic growth. Hence, there are multiple policies and stakeholders with varying business objectives. However, the utmost priority should be given to the economic development of the nation by establishing a globally competitive manufacturing sector. And, most importantly, it is critical to acknowledge that iron ore is a non-renewable national asset that needs to be protected for the future generations. In light of these considerations, the study puts forth the following major recommendations from a competition policy perspective.

Captive Mines are Creating Differential Market Conditions

2. Allocation of captive mines to some players creates entry barriers in the iron ore and steel sector as entry and successful operation becomes costly for new firms. It is to be noted that as per Competition Act, 2002, the presence of entry barriers, including the regulatory barriers, is a pivotal consideration in assessment of competition. Vertical integration and the forward contract or implicit quota for minimum purchase quantities are common strategies adopted in various markets to ensure a consistent supply of inputs and stabilise price fluctuations from the supply side, while for sellers it is about ensuring the sale of their output. This sort of vertical integration is implemented through captive mines, by which the steel manufacturers can eschew the unusual fluctuations in both supply of inputs and prices. For smaller players, this is not possible as they have to rely on outside suppliers.

3. The study observed that the presence of differential pricing of iron ore for different end users is likely to create competition concerns. For example, in a scenario where a company with a captive mine competes against a similarly sized non-captive firm, the latter may encounter difficulties in competing since it is subject to the market price for iron ore. The best example here is the losses faced by Rashriya Ispat Nigam Ltd (RINL) due to absence of a captive mine (Rao, 2021). It is needless to say that the non-captive users are relatively small firms, while the captive users are large and integrated plants. Vertical integration through captive mines allows larger firms to obtain a steady supply of raw materials at a consistent price, ensuring uninterrupted operations. However, smaller firms face higher price volatility of minerals, significantly impacting their profitability. In 2020–21, captive mines accounted for around 41 percent of the total production (and 20 percent of the total number of mines), whereas non-captive production accounted for 59 percent (80 percent of total number of mines). It indicates that a significantly larger portion of the industry is not benefitting from captive mines.

4. In this regard, it is not possible to withdraw already operational captive mines before the completion of their tenure. Doing so could disrupt the synergies and efficient production, as these firms represent Indian steel in the global market. With the MMDR Amendment of 2021 eliminating the distinction between captive and merchant mines, these firms are now permitted to sell up to 50 percent of the surplus iron ore in the market. This will boost the supply of iron ore in the market. However, when a captive mine sells its surplus input to other entities, it is crucial to monitor the prices charged to ensure that it does not result in high costs for the buyer firm, especially if the buyer competes with captive mine owned firm in the steel market. Further, it may be argued that the absence of captive mines may increase the steel prices, as these firms have to depend on the market for their iron ore requirement. Those with captive mines also participate in the auction process and procure iron ore through the LTL route. It was also argued by some stakeholders that captive mines are not being utilised optimally. In this regard, the ideal situation would be a more equitable distribution of iron ore mines in the future, based on an appropriate criterion, with the caveat that any surplus should be sold in the open market at a fair price. Hence, to compensate for those without

captive mines, preferential treatment should be granted to these entities when allocating iron ore through LTL by OMC in Odisha.

Iron Ore Sales Auction: Need for a Single e-Auction Process for All Iron Ore Mines in Odisha

5. OMCs pricing and distribution of iron ore and its involvement in auction process raises multiple competition concerns. This may have implications in terms of the provisions of Sections 4(2)(a) (i) and (ii) of the Competition Act, 2002, which needs to be examined further. Currently, OMC is the single major supplier of iron ore in Odisha, especially for the non-captive segment of users. It was found that private mines often wait for the OMC's auction process, and then establish their prices at a higher level than what was determined by OMC in its auction process. As a result, competition elements are further diluted in a naturally concentrated iron ore market. To address this concern, a potential solution could be to introduce a single e-auction process for all iron ore producers including merchant miners in the state. This approach will ensure competitive neutrality by including private and public companies, promote greater competition, and also control high prices charged, if any, by private miners. To ensure the effective implementation of the auction process, it may be advisable to exclude merchant mines of very small size by setting a threshold size for eligibility. Apart from merchant miners, captive mines are also permitted to sell approximately 50 percent of their production in open market. Including this quantity in the e-auction process can further enhance the supply of iron ore, thereby strengthening the auction system. Furthermore, the frequency of iron ore auction processes should be increased to address the current bottleneck in availability, as firms currently have to wait for approximately one month between auctions. The auctions could be held weekly or bi-weekly, as per the business requirements of the firms.

Pricing of Iron Ore in Odisha

6. The determination of base prices for iron ore by OMC during the auction process has emerged as a significant issue based on field interactions, which raises competition concerns based on the anticompetitive provisions in the Competition Act. Specifically, the competition concerns raised may be based on Sections 4(2)(a)(i) and 4(2)(a)(ii) of the Competition Act, 2002 as mentioned earlier. If prices

are solely determined by market forces, it eliminates any possibility of complaints or disputes. Whereas the auction prices for iron ore are partially regulated through the base price fixation, which, according to most of the respondents, is very high, leading to losses for them. Most often, the base price is also the selling price. On the other side, the profitability indicators of iron ore producing firms are more favourable compared to those of steel plants, especially the smaller sized plants. Besides, some of these firms are experiencing losses, further confirming the field observation that many pellet producers temporarily ceased operations. It is to be noted that the prices of end products are market determined.

7. The soaring prices of raw materials, specifically iron ore, significantly impact small sponge iron industries and pellet-producing enterprises. It is important to note that processing of minerals increases its usability and quality. Hence, processing activities would increase the use of minerals and help reduce imports. However, if iron ore prices rise excessively, it renders many processing industries, especially smaller ones, economically unviable.

8. Permitting such practices would be detrimental to the sustainable operation of end-user industries. It is imperative to establish transparency in determining the base price and develop a suitable mechanism for base price fixation, preferably utilising a price index. This approach would help moderate mineral prices, making them affordable for user industries. Such measures are crucial since an escalation in steel prices could trigger cascading effects, leading to an inflationary spiral for the entire economy.

9. For those without captive mines and ineligible for LTL, the auction route becomes a necessity. Hence, it is obvious that the relatively small firms will participate in the auction process. And, the price determined through the auction route is likely to be higher than that of the LTL route. Alternative option for these firms is to rely on private miners. To ensure transparency in the process, the base price calculation should be publicly displayed on the relevant website at regular intervals. Furthermore, the industry's perspectives should be taken into consideration while determining the amount, which can be collected timely through market surveys before a specified date, a few days prior to each auction.

Need for an End Product Based Auction System in Odisha

10. It is observed that the same auction process for various products, ranging from steel to pellets, is raising concerns among both large and small plants. It is said that small plants occasionally present higher bids for a smaller quantity of iron ore. Once they present their bid, the rate becomes applicable to all plants, which adversely affects the larger plants, as they have to purchase larger quantities at the same rate.[1] Small plants might be offering higher bids due to limited alternative options for raw material procurement. In this regard, a separate auction for different categories of end users may be implemented, which will be beneficial for both sets of firms. An alternative suggestion may be to allocate a specific number of mines to smaller producers (like pellets, sponge iron, and pig iron) at a lower cost.

Long-term Linkage Policy of Odisha Government through OMC

11. Presently, only 20 percent of OMC's sales occur through the auction process, with the remaining 80 percent being sold through the LTL route[2]. This initiative by the Odisha government aims to ensure uninterrupted supply of raw materials to the downstream sectors. Though limiting supply in any manner is against competition regulation, such long-term contract has certain advantages like: (i) less uncertainty about market demand, preventing unsold stock from accumulating, and (ii) firms have a guaranteed supply of materials, and enabling them to adjust production accordingly. However, restricting 80 percent of production within a single state, despite being one of the top producers of iron ore in India, raises concerns about the fair functioning of the market, specially considering that a significant portion of the reserves is concentrated in only a few states in the country. In any case, firms from other states will purchase OMC's iron ore only if it is cost-competitive for them, considering the transport cost involved.
12. The ideal policy here is to safeguard the advantages of long-term contracts while correcting the issues that may arise from them. In this context, efforts should focus

[1] To illustrate, consider a base price of Rs 100/tonne. If a small player offers Rs 10/- and buys 50 tonnes, the total amount is 110*50=5500/- (against the pre-price-hike situation of (100*50)=5000). Hence, the net increase would be Rs. 500/- (i.e. 5500-5000) for the small player. If this price applicable to large player buying 5000 tonne: (110*5000 =550000/-total amount required against the pre-hike situation: 100*5000=500000/-. Here the net increase is Rs. 50000/- (i.e., 550000-500000). So, the small companies pay Rs.500 extra, while the large pay Rs. 50000 extra.

[2] Surplus quantity in LTL may be adjusted in auction route.

on maintaining the LTL quantity within the mid-range rather than the upper limit, in the spirit of equity, and trading the rest through the auction route. Otherwise, no discrimination should be made between firms registered in Odisha and those from other regions while implementing the LTL scheme. From the point of view of competition regulation, limiting the bidding process also restricts competition. The price decided for LTL is also influenced by the auction price; hence, the proposed price index for base price fixation may also be applied here. Also, the minimum purchase requirement as part of this agreement should be contingent on whether OMC supplied the required grade and quality of iron ore needed by the firm. Otherwise, firms will be forced to make additional purchases solely to fulfil the quota. The LTL should give priority to firms without captive mines. As previously suggested, integrating merchant miners and surplus from captive mines into the auction system along with OMC supply would effectively mitigate concerns about high price fixation. This measure will foster greater competition for OMC. The LTL policy needs to be further reviewed specifically from the point of abuse of dominance provisions in the Competition Act.

Iron Ore Block Auctions and Future Competition

13. Ensuring a transparent mechanism for allocating mineral blocks is crucial. Respondents generally agreed that the auction process implemented after MMDR Amendment 2015 has brought transparency. However, the presence of top players has intensified in the process. It is observed that the iron ore blocks auctioned after 2015 are dominated by some private companies like JSW,[3] accounting for nearly 47 percent of the total quantity of the reserves auctioned from 2015. Therefore, it is imperative to avoid the concentration of critical iron ore reserves in only a few firms or business groups, given that these contracts span an initial 50-year period, which holds significant implications for the economy. To safeguard the finite and non-renewable nature of iron ore mines, it is essential to impose a suitable maximum limit on the ownership of these mines in terms of the quantity of reserves held by a steel producer at a given time. This measure becomes necessary as the auction process typically awards the mines to the highest bidder, and preserving these resources for future generations is of utmost importance. Due to the ability of top

[3] JSW and Jindal together; calculations based on Ministry of Mines, Government of India.

firms to submit exceedingly high bid prices, it is crucial to impose limitations on their participation in the auction process. Otherwise, the ownership control of iron ore mines may impact future competition in the iron ore and steel sector.

Adoption of Green technologies, Beneficiation Process, and Sustainable Mining

14. Accumulation of unused low-quality iron ore has been a concern in the past, necessitating the adoption of advanced technologies from countries like Japan and China to beneficiate it into high grades without compromising cost advantages. Respondents suggested that converting fines into pellets is an important option to minimise carbon emissions compared to other production methods. Numerous plants have refrained from adopting pelletisation due to existing investments in alternative facilities. In this regard, the government may introduce schemes like Production Linked Incentive (PLI) for intermediary businesses, normally owned by relatively smaller players, to encourage the adoption of better technologies and thereby mitigate carbon emissions to a great extent. Furthermore, promoting the use of solar energy in all plants can help complement their energy requirements with green technology, thereby contributing to environmental sustainability.

15. It is important to promote sustainable mining through regulations to gradually phase out 'dirty' technologies over time. A well-defined regulatory framework should encourage the adoption of clean technology and provide incentives for the transformation of existing production processes into sustainable modes of mineral production. International practices to restore soil and forest cover, along with rebuilding ecological balance, is important for long-term sustainability. The Indian government has established a Clean Energy Fund to support the development and adoption of clean energy technologies in various sectors, including the iron ore sector. The fund provides financial support for research and development of clean energy technologies and helps in the deployment of renewable energy projects. Regulatory agencies need to device legal framework and regulatory tools to gradually phase out old polluting technologies.

Ease of Implementing Regulations

16. A competitive environment fosters trust among all stakeholders, i.e., the government, miners, local communities, and others through openness, fairness,

better regulation, responsiveness, and inclusive policy-making. It would be vital for the country to gain the trust of these stakeholders to achieve sustained growth in the mining sector. The reforms introduced through the 2021 Amendment in the mining laws are slated to benefit the iron ore sector; however, the actual implementation of these reforms at the ground level would be crucial. It is worth noting that some state governments have been protective of their mining resources, as evidenced by their reservations of iron ore mines for captive use. Anassessment of the state governments' reservations of iron ore would be essential to optimise the utilisation of these resources.

17. Despite the liberalisation of licensing processes, the extensive compliance requirements and multiple hierarchies can be intimidating for small players. This may create a chilling effect on new entrants, discouraging them from participating in the sector. To facilitate exploration of scattered iron ore deposits by small miners, separate processes could be introduced. While the National Mineral Policy 2019 and its implementation through central legislation are commendable steps, further efforts are required to strengthen and enforce these policies at the state level to ensure effective implementation.

18. To avoid lengthy court battles, any disputes, which may arise, should be resolved through amicable mediation and arbitration specially considering that a significant portion of the reserves is concentrated in only a few states in the country. Regular reviews of the implemented reforms with inputs from stakeholders will enable timely interventions and improvements. Additionally, ensuring public reporting of resources is crucial to maintain transparency and provide valuable information to the public.

19. Embrace comprehensive digitalisation in handling various applications to enhance transparency. This will lead to faster processing times. Creating a business-friendly environment for firms will ensure proper implementation of regulations. Conducting joint inspections can save time and resources. Moreover, improved coordination between different districts and states is essential, given that inputs and production often take place in different regions.

Royalty and Royalty on Royalty

20. The royalty rates in the Indian market are currently higher compared to international markets, leading to increased compliance costs for mining companies due to various additional fees. Introducing a uniform royalty rate could be advantageous, especially for small miners or new entrants. Additionally, some respondents have raised concerns about having to pay 'Royalty on Royalty' since the Average Sales Price (ASP) published by the IBM includes the royalty component. And at the time of dispatch, royalty payment is calculated based on the ASP (which already includes royalty). The auction process has further complicated the royalty regime. Kumar and Sinha (2020) find that the all-India weighted-average premium for iron and manganese ore blocks comes to 101 percent, which leaves no margin to recover the cost of actual production, royalty and statutory levies to be paid, etc. This skewness varies from state to state and needs to be addressed.

Infrastructure Development:

21. While Odisha possesses relatively better infrastructure, states like Karnataka must focus on developing their infrastructure. It is essential to establish effective road and rail connections between mines and processing plants to ensure that the sector operates seamlessly. However, the sector's competitiveness is hindered by the high transportation costs it incurs.

Iron ore is a National Wealth: Discourage Iron ore Export

22. As the country transitions to Aatmanirbhar Bharat, India should prioritise the export of higher value-added products, such as finished steel. The export of iron ore should not be encouraged as it is not a renewable material. By discouraging such exports, we can enhance the domestic supply. It is crucial to bear in mind that excessive consumption of iron ore today might result in its depletion, affecting the resources available to future generations. Government has been changing the export duty structure for iron ore sector from time to time to regulate the outward movement of the 'national wealth.' Starting from November 19, 2022, the Government of India removed the export duty imposed on low grade iron ore, pellets, and specified steel products, including pig iron. However, for high-grade lumps and fines containing more than 58 percent iron, a reduced export duty of 30

percent is applicable. Considering that iron ore is a non-renewable national resource and a vital raw material in various industries, strict control over its overexploitation is necessary. India should consider adopting the Chinese strategy of importing iron ore even though China is one of the leading global producers of iron ore, which has helped China to become the world's top manufacturer of steel. In order to address the problem of the accumulation of low grade iron ore, India should implement the most cutting-edge technologies to upgrade low grade iron ore to higher grades through beneficiation processes.

Association Activity:

23. There are active associations in this sector for both buyers and sellers. Seller associations primarily focus on merchant mines. The buyer power is constrained by quality considerations since the desired quality may only be found in specific mines, and the location of these mines also influences the cost competitiveness. Certain associations within the industry have shown significant activity and have previously lodged cases with the Competition Commission of India, demonstrating their vigilance on competition-related matters. These associations may choose to conduct additional competition compliance awareness programmes for their members, aiming to educate them about what practices are deemed acceptable and unacceptable to ensure fair market operations.

Advocacy Initiatives and Self-Regulation:

24. From the field interaction, it is clear that the awareness of competition regulations is expanding among different stakeholders. It has also been observed that various training programmes should be organised, particularly for small-scale producers and various stakeholder associations. Such training sessions can help them recognize competition-related issues and increase their awareness of prohibited and permitted activities. Empowering stakeholders in this manner will enable them to confidently report any unfair practices they come across, thus strengthening their position as buyers or sellers. For sectors where firms are spread across the forest and remote areas, competition advocacy with associations is the best option, as these associations can engage the maximum number of participants to mutual benefits. Besides this, state governments should also be given adequate training on what comes under the purview of the Competition Commission of India. With the

help of state level regulators, a list of various stakeholders in this sector can be compiled, which can be used for advocacy initiatives. Social media including WhatsApp may be effectively used to disseminate advocacy information to various stakeholders, providing a powerful means of communication and engagement. Creating awareness is the best option for promoting self-regulation. In this regard, the Commission is working on reaching out to various stakeholders in different markets for effective competition advocacy. And, this market study is part of that initiative.

Future Prospects of the Sector

25. Being a finite non-renewable natural resource, the future prospects of this sector highly depend on preserving the immeasurable natural resources for future generations. The demand for iron ore is derived from the demand for steel, which is expected to increase due to the increasing demand for infrastructure, housing, aviation, automobile and so on. Our policies should focus on creating a globally competitive steel sector, which will have a multiplier effect on the economy. Providing adequate quantity of iron ore within a reasonable timeframe is essential to achieve this goal. Iron ore exports outside India should not be encouraged for generating foreign exchange, as in the case in other sectors. In this process, it is also important to adopt the best technologies to beneficiate low-grade iron ore, without reducing the cost competitiveness.

References

Banerjee, Srestha (2020), "Mining and Jurisprudence: Observations for India's Mining Sector to Improve Environmental and Social Performance," Working Paper, Brookings India. Available at: https://www.brookings.edu/wp-content/uploads/2020/07/Mining-and-Jurisprudence_F.pdf

Barton, Barry *et al* (2006), *Regulating Energy and Natural Resources*, Oxford University Press.

Benson, E, et.al, (2023), 'Analysing the European Union's Carbon Border Adjustment Mechanism', CRIS Briefs, February. Available at: https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-02/230217_Analyzing_EU_CBAM.pdf?VersionId=lFMwWnLo1VQ8xbBUx7lwn6RVNj8.Ck_t.

Bhandari, Laveesh *et al*. (2009), *Public Enterprises, Government Policy and Impact on Competition: Indian Steel Industry*, Report prepared for the Competition Commission of India by Indicus Analytics, New Delhi. Available at: https://www.cci.gov.in/public/images/marketstudie/en/docs1652438794.pdf.

Borah, Prarthana (2022), "How India can Decarbonise the Steel Industry?" *Economic Times*, November 27. Available at: https://economictimes.indiatimes.com/small-biz/sme-sector/how-india-can-decarbonise-the-steel-industry/articleshow/95780357.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Chadha, Rajesh and Ishita Kapoor (2022), "Mineral Royalty Rates: A Policy Review," CSEP Discussion Note 15, Centre for Social and Economic Progress, New Delhi. Available at: https://csep.org/wp-content/uploads/2022/08/Mineral-Royalty-Rates.pdf

Coal India Case (2013, 2017), *Maharashtra State Power Generation Company Limited against Mahanadi Coalfields Limited and Coal India Limited* – CCI Cases 3, 11, and 59 of 2012 decided on 09.12.2013 and revised order dated 24.03.2017.

Datt, Divya *et al*. (2009), "Resource Federalism in India: The Case of Minerals," *Economic & Political Weekly*, Vol. 44, No. 8, pp. 51-59.

Davis, Graham A (2010), "Trade in Mineral Resources," Background paper to the 2010 World Trade Report, Staff Wofrking Paper ERSD-2010-01, World Trade Organization, Economic Research and Statistics Division. Available at: https://www.wto.org/english/res_e/reser_e/ersd201001_e.pdf

Deloitte (2023), *Tracking the Trends 2023: The Indispensable Role of Mining and Metals*. Available at: https://www.deloitte.com/content/dam/assets-shared/legacy/docs/gx-Trends_consolidated-report-new.pdf

Dhall, V. (2007). Competition law today: Concepts, issues, and the law in practice. Oxford: Oxford University Press.

Editor2 (2021), "Mines and Minerals (Development and Regulation) Amendment Act, 2021," TaxGuru. Available at: https://taxguru.in/corporate-law/mines-minerals-development-regulation-amendment-act-2021.html

Federation of Indian Mineral Industries (2023), Coal, Iron Ore and Steel - Emerging Trends and Challenges. (2023). Available at: https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/mining-metals/2023/04/ey-steel-coal-and-iron-ore-report.pdf?download#:~:text=The%20steel%20sector%20relies%20on; accessed on July 24, 2023.

FIMI (2019), '*Mining Matters for India*', June.
FIMI (2021), *Auction of Mineral Resources - An Anatomy*, Federation of Indian Mineral Industries, New Delhi. Available at: https://www.fedmin.com/fedmin/auctionananatomy.pdf
FIMI (2020), *Captive Mines for Iron and Steel Industry: A Boon or a Bane?* Federation of Indian Mineral Industries, New Delhi. Available at: https://www.fedmin.com/fedmin/captive.pdf
Ghani, Nusrat (2023), "Critical Minerals Refresh: Delivering Resilience in a Changing Global Environment," Policy Paper, Government of United Kingdom. Available at:https://www.gov.uk/government/publications/uk-critical-mineral-strategy/critical-minerals-refresh-delivering-resilience-in-a-changing-global-environment-published-13-march-2023
GoI (Undated), *Amendments in the Mines and Minerals (Development and Regulation) Act,1957 (2015-2021): A Big Boost to Mineral Production and Employment Generation*, Ministry of Information and Broadcasting. Available at: https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/apr/doc202242749901.pdf; accessed on July, 2023.
GoI (Undated), "Average Sale Price," Indian Bureau of Mines. Available at: https://ibm.gov.in/IBMPortal/pages/Average_Sale_Price
GoI (Undated), List of Notified Exploration Agency – Government Agency, Ministry of Mines, Government of India. Available at: https://mines.gov.in/webportal/govtmentagency
GoI (Undated), List of Notified Exploration Agency – Private Agency, Ministry of Mines, Government of India. Available at: https://mines.gov.in/webportal/privateagency
GoI (Undated), "Mineral-wise Auction Summary," Ministry of Mines. Available at: https://mines.gov.in/webportal/content/mineral-auction-summary
GoI (Undated), "National Mineral Scenario," Ministry of Mines, Government of India. Available at: https://mines.gov.in/webportal/nationalmineralscenario; accessed on July 24, 2023.
GoI (Undated), "Notices and Returns under MCDR, 2017," Indian Bureau of Mines. Available at: https://ibm.gov.in/IBMPortal/pages/Notices_and_Returns_under_MCDR__2017
GoI (Undated), "Standardisation & Quality Control of Iron & Steel," Ministry of Steel. Available at: https://steel.gov.in/en/standardization-quality-control-iron-steel
GoI (2006), *Mineral Royalties*, Controller General, Indian Bureau of Mines, Controller General, Indian Bureau of Mines, Ministry of Mines. Available at: https://ibm.gov.in/writereaddata/files/10172016122931Mineral%20Royalties.pdf
GoI (2006), *National Mineral Policy: Report of the High Level Committee*, Planning Commission, New Delhi, December. Available at: https://www.fedmin.com/fedmin/hoda-rep.pdf
GoI (2007), *Development of Clean Technology for Iron Ore Mines and Development of Environmental Standards*, Comprehensive Industry Document on Iron Ore Mining Comprehensive Industry Document Series, Central Pollution Control Board, Ministry of Environment and Forests. Available at: https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvTmV3SXRlbV8xMDVfaXJvbl9vcmVfbWluaW5nXzMxLjA3LjA4LnBkZg
GoI (2008), *National Mineral Policy, 2008: For Non-fuel and Non-coal Minerals*, Ministry of Mines. Available at: https://mines.gov.in/admin/storage/app/uploads/643533ae33cb91681208238.pdf

GoI (2013), "All Odisha Steel Federation vs Odisha Mining Corporation Limited," CCI Case No. 12 of 2012, order dated 19th September 2013, para 13.9, Competition Commission of India, Government of India. Available at: https://www.cci.gov.in/antitrust/orders/details/239/0

GoI (2002), Competition Act, 2002.

GoI (2007) *Iron Ore: A Market Survey*, Indian Bureau of Mines.

GoI (2013), "Price of Iron Ore," Ministry of Mines. Available at: https://www.pib.gov.in/newsite/PrintRelease.aspx?relid=93902

GoI 2018), *Competition Assessment Toolkit*, Competition Commission of India. Available at: https://www.cci.gov.in/images/publications_competition_assesment/en/competition-assessment-toolkit1652242714.pdf

GoI (2019), "Mineral Policy," Ministry of Mines. Available at: https://pib.gov.in/Pressreleaseshare.aspx?PRID=1814232

GoI (2019), *National Mineral Policy 2019*, Ministry of Mines. Available at: https://mines.gov.in/admin/storage/app/uploads/64352887bcfa41681205383.pdf

GoI (2021), *Indian Minerals Yearbook 2019: Iron Ore*, Chapter 16, 58th Edition, Indian Bureau of Mines, Ministry of Mines.

GoI (2023), *Indian Minerals Yearbook 2021: Iron Ore*, Chapter 16, 60th Edition (Advance Release), Indian Bureau of Mines, Ministry of Mines.

GoI (2021), "Mines Ministry Adopts Scheme for Accreditation of Private Exploration Agencies for Undertaking Prospecting Operations of Minerals," Press Information Bureau. Available at: https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=1746921

GoI (2021), *Study of Transportation of Iron Ore over Indian Railways*, Ministry of Railway. Available at: https://rdso.indianrailways.gov.in/uploads/TFC-101-IronOre_Report.pdf

GoI (2021), "The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2021 Notified: New Rules Provide for Sale of 50% of Mineral Produced from Captive Leases," Ministry of Mines. Available at: https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1770242

GoI (2021), *The Minerals (Evidence of Mineral Contents) Rules, 2015: As Amended up to 18th June, 2021*, Indian Bureau of Mines. Available at: https://ibm.gov.in/writereaddata/files/11222021124927The%20Mineral%20_Evidence%20of%20mineral%20contents_%20Rule%202015%20updated%20upto%2018062021.pdf

GoI (2021), "Year End Review – 2021 – Ministry of Mines," Press Information Bureau. Available at: https://pib.gov.in/PressReleseDetail.aspx?PRID=1785782

GoI (2022), "Amendment to Mineral Auction Rules," Ministry of Mines. Available at: https://pib.gov.in/PressReleasePage.aspx?PRID=1814233

GoI (2022), *Annual Report 2021-22*, Ministry of Mines, Government of India.

Government of Maharashtra (Undated), "Interstate Mineral Transport" Revenue Department. Available at: https://mahakhanij.maharashtra.gov.in/interstate-mineral-transport.aspx

Grohol, Milan and Constanze Veeh (2023), *Study on the Critical Raw Materials for the EU 2023: Final Report*, European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Publications Office of the European Union. Available at: https://data.europa.eu/doi/10.2873/725585

Hummels, David and Alexandre Skiba (2004), "Shipping the Good Apples Out? An Empirical Confirmation of the Alchian-Allen Conjecture," *Journal of Political Economy*, Vol. 112, No. 6, pp. 1384-1402. As cited in Davis, Graham A (2009), "Trade in Mineral Resources," World Trade Organisation Economic Research and Statistics Division. Available at: https://www.wto.org/english/res_e/reser_e/ersd201001_e.pdf

Indian Bureau of Mines (Undated), "Our Mission," Government of India. Available at: https://ibm.gov.in/IBMPortal/pages/Our_Mission

Indian Bureau of Mines (2011), *Mineral Royalties*, Ministry of Mines, Government of India. Available at: https://ibm.gov.in/writereaddata/files/06302014174344mineralroyalties2011.pdf

Indian Bureau of Mines (2012), "Indian Bureau of Mines & State Governments Relations," *Report of the Committee for Review and Restructuring of the Functions and Role of IBM*, Chapter 6, Ministry of Mines, Government of India, pp. 115-125. Available at: https://ibm.gov.in/writereaddata/files/07142014165928ibmreport%20Chapter-VI.pdf

Indian Bureau of Mines (2015), *Indian Minerals Yearbook 2013, Part III: Mineral Reviews*, Ministry of Mines, Government of India, 52nd Edition. Available at: https://ibm.gov.in/writereaddata/files/07302015125218IMYB2013_Diaspore.pdf.

International Energy Agency (2022), 'What is the Carbon Footprint of Steel?', Available at: https://www.sustainable-ships.org/stories/2022/carbon-footprint-steel#:~:text=Steel%20carbon%20footprint&text=The%20IEA%20estimates%20that%20direct,of%20CO2%20per%20ton%20steel.

Invest India (2021), *Inside India's Production Linked Incentive Schemes: Specialty Steel*, Ministry of Steel, Government of India. Available at: https://steel.gov.in/sites/default/files/PLI%20Steel%20Report_Final.pdf

Karnataka High Court (2021), *Sri. Sai Keshava Enterprises v. State Of Karnataka*. Available at: https://www.casemine.com/judgement/in/6021fffb9fca19316a056cb7#

Kedia, Pawan (2022), "Levy of GST on Mining Royalty," TaxGuru. Available at: https://taxguru.in/goods-and-service-tax/levy-gst-mining-royalty.html

Kooroshy, Jaakoo, Felix Preston, and Sian Bradley (2014), "Cartels and Competition in Minerals Markets: Challenges for Global Governance," The Royal Institute of International Affairs, Chatham House Available at: https://www.chathamhouse.org/sites/default/files/field/field_document/20141219CartelsCompetitionMineralsMarketsKooroshyPrestonBradleyFinal.pdf

Krishnan, K P (Undated), "India's Constitution and the Economy." Available at: https://india-seminar.com/2013/642/642_k_p_krishnan.htm

Kumar, S Vijay and R K Sinha (2020), *Mineral Auctions in India: Winner's Curse or Owner's Pride?* The Energy Resource Institute. Available at: https://www.teriin.org/policy-brief/mineral-auctions-india-winners-curse-or-owners-pride

LSI Financial Services (2021), *The India Steel Sector: A Macroeconomic Overview and Way Forward.* Available at: https://www.lsifinance.com/wp-content/uploads/2021/12/The-Indian-Steel-Sector.pdf

Ministry of Steel (2023), "Energy and Environment Management in Steel Sector." Available at: https://steel.gov.in/en/energy-environment-management-steel-sector; accessed on July 15, 2023.

Mitchell, Paul (2022). *Top 10 business risks and opportunities for mining and metals in 2023*. EY Global Miming and Metals. Available at: https://www.ey.com/en_gl/mining-metals/risks-opportunities.

Mohanty, Debabrata (2023), "Downgrading of Iron Ore: Odisha Govt Fines ₹341 cr to 3 Mining Leaseholders," *Hindustan Times*. Available at: https://www.hindustantimes.com/cities/others/downgrading-of-iron-ore-odisha-govt-fines-rs-341-cr-to-3-mining-leaseholders-101677680160538.html

Mohanty, Nilmadhab (2018), *Political Economy of Mining in India*, Har-Anand Publications Pvt Ltd, Delhi.

Motta, M. (2009). *Competition Policy: Theory and Practice*. Cambridge: Cambridge University Press.

Narayan, Subhash and Saurav Anand (2023), "India's Steel Export to EU to Come Under Pressure on CBAM Framework: ICRA," *Livemint*, June 23. Available at: https://www.livemint.com/industry/indias-steel-exports-to-eu-to-come-under-pressure-on-cbam-framework-icra-11687517299420.html.

Niti Aayog (Undated), "Competitive Federalism." Available at: https://www.niti.gov.in/competitive-federalism

Parashar, Prerna (2018), "India: The CCI And The IBC In The Context Of The Indian Steel Sector," Mondaq, November 7. Available at: https://www.mondaq.com/india/insolvencybankruptcy/752298/the-cci-and-the-ibc-in-the-context-of-the-indian-steel-sector

Observatory of Economic Complexity (Undated), "Iron Ore." Available at: https://oec.world/en/profile/hs/iron-ore

OECD (2021), "Trade in Raw Materials." Organisation for Economic Co-operation and Development. Available at: https://www.oecd.org/trade/topics/trade-in-raw-materials/

Official Journal of the European Union (2001), "Commission Decision of 30 October 2001 Declaring a Concentration to be Compatible with the Common market and the Functioning of the EEA Agreement (Case COMP/M.2420 -Mitsui/CVRD/Caemi) (notified under document number C(2001) 3363)." Available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:092:0050:0090:EN:PDF

PMAI Newsletter (2022), Pellet Manufacturers Association of India, New Delhi.

PWC India (2019), *The Indian Steel Industry: Growth, Challenges and Digital Disruption*, Indian Steel Association. Available at: https://www.pwc.in/assets/pdfs/consulting/technology/the-indian-steel-industry-growth-challenges-and-digital-disruption.pdf

Rai, Shantanu (Undated), "Revisiting the Mining Sector in the Wake of COVID-19," Available at: https://www.niti.gov.in/revisiting-mining-sector-wake-covid-19

Rao, G Janardhana (2021), 'How Lack of Captive Iron Ore Mines Even After 30 Years Hits RINL Hard," The New Indian Express, March 12. Available at: https://www.newindianexpress.com/states/andhra-pradesh/2021/mar/12/how-lack-of-captive-iron-ore-mines-even-after-30-years-hits-rinl-hard-2275606.html; accessed on July 30, 2023.

Ray, Surya Sarathi (2021), "Iron Ore Exports: India Puts an End to Decades-old Pacts with Japan, Korea," *Financial Express*, June 18. Available at: https://www.financialexpress.com/economy/iron-ore-exports-india-puts-an-end-to-decades-old-pacts-with-japan-korea/2273477/

Reddy, O Chinnappa (2011), In *State of Tamil Nadu versus M/s Hind Stone and others*, 1981 (2) SCC 205.

Rijesh, R (2022). Trade Liberalisation and Export Competitiveness of Indian Manufacturing Sector: An Empirical Study. In Rajesh Raj S. N. and Komol Singha (Eds) *The Routledge Handbook of Post-Reform Indian Economy* (pp. 157-183). Routledge India.

Saraswathy, B (2021), Economic Reforms and Market Competition in India: An Assessment, *The Antitrust Bulletin*, Vol. 66 No. 2, pp. 184-202.

Saraswathy, B (2018), "*The Globalisation of Indian Business: Cross-border Mergers and Acquisitions in Indian Manufacturing*", Routledge, UK.

Singh, Vijay Kumar (2019), "Reforming SOEs in Asia: Lessons from Competition Law and Policy in India," ADBI Working Paper No. 1056, Asian Development Bank Institute, Tokyo. Available: https://www.adb.org/publications/reforming-soes-asia-lessons-competition-law-policy-india

Supreme Court of India (2009), *Monnet Ispat and Energy Ltd vs Union of India And Ors* (2012) CIVIL APPEAL NO. 3285 OF 2009. Available at: https://indiankanoon.org/doc/4436830/

The Goa Foundation (Undated), *The State of Mining in Goa*. Available at: http://goafoundation.org/mining/

The Odisha Gazette (2022), "Long Term Linkage (LTL) Policy of Minerals for Odisha Based Industries through Odisha Mining Corporation Limited (OMC) - 2022," Steel & Mines Department, August 16. Available at: https://investodisha.gov.in/download/Long-Term-Linkage-LTL-Policy-of-Minerals-2022.pdf

The Odisha Gazette (2023), "Long Term Linkage (LTL) Policy of Minerals for Odisha Based Industries through Odisha Mining Corporation (OMC) Limited - 2023, Steel & Mines Department, June 21. Available at: https://steelmines.odisha.gov.in/sites/default/files/2023-07/Long%20Term%20Linkage%20%28LTL%29%20Policy%20of%20Minerals.pdf

US Department of Justice and the Federal Trade Commission *(2010), Horizontal Merger Guidelines*,. Available at: https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf

Whish, R. (2007). Control of cartels and other anti-competitive agreements. In Competition Law Today: Concepts, Issues and the Law in Practice (pp. 50–51). Oxford: Oxford University Press.

WTO (2018), "Dispute Settlement; DS518: India - Certain Measures on Imports of Iron and Steel Products." Available at: https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds518_e.htm

WTO (2021), "Understanding the WTO: Basics - Principles of the Trading System," World Trade Organisation. Available at: https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm

Yadav, Monika (2022), "Government Removes Export Duty on Steel, Iron Ore and Pellet," *The New Indian Express*, November 19. Available at: https://www.newindianexpress.com/business/2022/nov/19/government-removes-export-duty-on-steel-iron-ore-and-pellet-2519936.html#:~:text=Export%20duty%20on%20high%20grade%20ore%20and%20pellets.

Appendix Tables: Chapter 4

Appendix Table 1: Market Share of Top Companies in Iron Ore (Share %)

Year	N M D C	OMC	Amba River Coke. (OPJ)	Essel Mining & Inds. (Ad. Birla)
1992	37.7	0.0	0.0	0.0
1993	31.7	0.0	0.0	0.0
1994	28.2	0.0	0.0	3.0
1995	37.1	0.0	0.0	4.7
1996	41.2	0.0	0.0	0.0
1997	43.1	0.0	0.0	0.0
1998	45.4	0.0	0.0	0.0
1999	41.8	0.0	0.0	0.0
2000	37.1	0.0	0.0	8.7
2001	44.7	0.0	0.0	4.6
2002	41.5	0.0	0.0	5.9
2003	39.1	0.0	0.0	7.2
2004	31.7	0.0	0.0	9.2
2005	28.1	9.6	0.0	14.3
2006	39.3	7.2	0.0	18.8
2007	42.3	10.9	0.0	19.2
2008	36.5	12.6	0.0	15.4
2009	40.4	11.2	0.0	18.0
2010	40.5	10.2	0.0	16.2
2011	44.9	10.9	0.0	9.2
2012	47.2	9.0	0.0	6.9
2013	53.0	8.2	0.0	11.4
2014	52.7	8.1	0.0	7.4
2015	53.4	8.1	11.1	3.8
2016	44.1	10.6	18.4	5.2
2017	39.8	10.5	20.5	4.4
2018	41.4	10.2	17.2	3.3
2019	36.1	12.0	14.4	10.3
2020	34.1	11.9	11.0	12.3
2021	36.8	13.4	9.4	9.9
2022	39	25.7	9.9	5.7

Source: Calculated using PROWESS IQ Database, (CMIE).

Appendix Table 2: Ownership-wise Concentration in the Iron Ore Sector

	Business Group	Foreign	Govt	Standalone Indian	Indian pvt (sec.ax)
1992	4	0	96	0	4
1993	6	0	94	0	6
1994	11	0	89	0	11
1995	10	0	90	0	10
1996	6	0	94	0	6
1997	5	0	95	0	5
1998	13	1	84	2	15
1999	21	1	75	3	25
2000	25	5	67	3	28
2001	8	16	72	4	12
2002	18	9	69	4	22
2003	15	12	68	4	20
2004	16	11	64	8	24
2005	23	0	68	9	32
2006	27	0	65	8	35
2007	20	0	62	18	38
2008	17	0	63	20	37
2009	26	0	62	12	38
2010	27	0	61	12	39
2011	19	0	66	15	34
2012	18	0	64	18	36
2013	17	0	69	13	31
2014	12	0	68	19	32
2015	19	0	65	16	35
2016	28	0	57	15	43
2017	29	0	55	16	45
2018	25	0	59	16	41
2019	28	0	54	17	46
2020	28	0	53	19	47
2021	25	0	58	16	42
2022	20	0	69	11	31

Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

Appendix Table 3: Number of Companies Owned by Business Groups

Group/Ownership	No. of companies
Adhunik Group	1
Aditya Birla Group	1
Central Govt. – Commercial Enterprises	4
Chowgule Group	3
Hira Group	1
MSP Group	1
OP Jindal Group	2
Private (Foreign)	2
Private (Indian)	14
State Govt. – Commercial Enterprises	4
Vedanta Group	2
Grand Total	35

Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

Appendix Table 4: Market share Owned by Business Groups (Percent)

Year	Birla Aditya Group	Chowgule Group	Om Prakash Jindal Group
1990	0.0	0.1	0.0
1991	0.0	0.1	0.0
1992	0.0	3.7	0.0
1993	0.0	5.9	0.0
1994	3.0	7.5	0.0
1995	4.7	5.8	0.0
1996	0.0	4.2	0.0
1997	0.0	3.8	0.0
1998	0.0	3.4	0.0
1999	0.0	13.7	0.0
2000	8.7	9.9	0.0
2001	4.6	3.7	0.0
2002	5.9	11.8	0.0
2003	7.2	8.3	0.0
2004	9.2	7.1	0.0
2005	14.3	8.3	0.0
2006	18.8	7.3	0.0
2007	19.2	0.2	0.0
2008	15.4	0.2	0.0
2009	18.0	0.1	0.0
2010	16.2	0.0	0.0
2011	9.2	0.0	0.0
2012	6.9	0.0	0.0
2013	11.4	0.0	0.0
2014	7.4	1.1	0.0
2015	3.8	0.4	11.1
2016	5.2	1.2	18.4
2017	4.4	1.5	20.5
2018	3.3	1.5	17.2

Year	Birla Aditya Group	Chowgule Group	Om Prakash Jindal Group
2019	10.3	0.8	14.4
2020	12.3	1.5	11.0
2021	9.9	2.1	9.4
2022	5.7	0.9	9.9

Source: Calculated using PROWESS IQ, Centre for Monitoring Indian Economy (CMIE).

Appendix Table 5: Market Share Across Entry Category (Percent)

Year	Pre 1990	1990s	Post 2000	Post 2010	Grand Total
1990	100	0	0	0	100
1991	100	0	0	0	100
1992	100	0	0	0	100
1993	100	0	0	0	100
1994	100	0	0	0	100
1995	100	0	0	0	100
1996	100	0	0	0	100
1997	100	0	0	0	100
1998	99	1	0	0	100
1999	99	1	0	0	100
2000	95	5	0	0	100
2001	84	16	0	0	100
2002	91	9	0	0	100
2003	84	16	0	0	100
2004	83	17	0	0	100
2005	96	4	0	0	100
2006	97	3	0	0	100
2007	95	5	0	0	100
2008	95	5	0	0	100
2009	96	4	0	0	100
2010	96	4	0	0	100
2011	97	3	0	0	100
2012	94	3	2	0	100
2013	90	5	5	0	100
2014	84	6	10	0	100
2015	73	16	11	0	100
2016	69	23	8	0	100
2017	69	23	8	0	100
2018	71	20	9	0	100
2019	72	18	10	0	100
2020	73	14	12	0	100
2021	76	13	11	0	100
2022	79	13	7	0	100
Entry (No. of firms)	16	8	9	2	100

Source: Calculated using PROWESS IQ, CMIE.

Annexure I

Market Study on Dynamics of Competition in Mining Sector in India with a Focus on Iron Ore

(A study Initiated by the Competition Commission of India)

Questionnaire for Interaction with Iron Ore Mining Sector

Stakeholder category--------------------

(i). Background Information

1. Name of Organisation/individual: ………………………………………..
2. Address of operation: --
3. Years of experience in Iron ore: ---
4. Size of operation (if applicable): Approx. turnover during the last financial year. ---------------------------------------(specify fin. year)
5. Ownership category: Public □ Business group □ Standalone private □ Foreign □
    a. If business group owned, the name of group: ……………………………………………
6. Do you own captive mines? Yes □ No □ If yes, kindly give details of operation ---

(ii). Entry Barrier

7. Do you think any kind of entry barrier exist in the sector especially for the small players?
    a. Investment/capital related ---
    b. Marketing related: --
    c. Technical: --
    d. Regulatory barriers: ---

(iii). Auctions/Price:

8. Have you ever participated in the iron ore mineral blocks' auction process? Yes □ No □
    e. If yes, provide details including the outcome: --
    f. Was there any kind of unfair practices including price fixing/collusion to deter entry of other players? --
9. Do you think big companies/business groups /those with captive mines in any manner misappropriate auctions? --
10. Your views/experience on the small companies entering in the auction process? --

11. Do you think auction is the best model for pricing? Provide reasons/alternative options -- ---

(iv). Bargaining Power/Countervailing Buyer Power from Steel Sector

12. Do you think the top steel companies impose any kind of buyer power on iron ore sector? ---

    Is there any kind of organised behaviour or 'acting together' by the iron ore consumers? If so give evidence. --

13. How do you overcome quality constraints? Did you implement any advanced technologies to make use of the less quality iron ore? ---

14. Do you think the quality standards set in India by the steel companies is creating supply constraints?-- --

15. Do you think the steel companies are generating high profits using cheap iron ore inputs? Provide details..--- --

16. Are you part of any association?-- --

(v). Regulatory Issues

17. Is there any regulatory barrier creating disturbances in the sector? --------------- ---

18. Do you think the ease of getting various permissions, and, complying with the government regulations are same for both small and big players in the sector? If not, details: --- ---

19. Your experience with the reforms in MMDR Act:-------------------------------------- ---

20. Do you have mining operation in more than one state? Yes ☐ No ☐

    If yes, provide a comparative picture of the mineral concession policy prevailing in both states including the timeliness of various regulatory approvals; various fees charged; procedural delays etc.). --------------------------- ---

(vi). Operation of Large Public/Private Sector Companies

21. Your views on the operation of dominant iron ore companies in the state and India. Specifically, do you think these firms create any kind of market imperfections against the free play of other firms in the sector?

(vii). Market Share, Profitability and Sustainability of Iron Ore

22. Your market share in various Iron ore products (kindly provide published data if available including that of competitors)
23. Types of Iron ore products produced and the respective market shares: --------
24. Top competitors with relative market share: ---
25. Do you have any additional advantage over competitors? -------------------------
26. Top customers with the approx.. market share sold: ---------------------------------

27. Do you have pan India operation? Yes ☐ No ☐
28. Do you think the Iron ore companies are concentrating in specific locations (states)?
29. Your vertical network of operation.---
30. Profitability across various products produced (data, if available)-----------------
31. Any suggestion on areas where green technologies can be implemented.-------

(viii). Import Competition & Trade

32. Your views on the import duty in the sector. Do you think high import duties restrict import of cheap iron ore to India?
----
33. Are you (or the iron ore sector) facing any obstacles in exporting iron ore from India? If so what kind of policy changes required to encourage export of iron ore from India? --
34. Do you think an effective trade policy is a solution for reducing/efficiently utilising the stockpile of low-quality iron ore in India? -------------------------------
----
35. Any other suggestions on competition issues in the iron ore sector?--------------
----
36. Provide your phone/email for future contact if required (not mandatory)----------

(If you wish to provide any data/evidence/information (confidentially or otherwise) on the existence of unfair practices in the iron ore sector (or linked to steel) in India, kindly send it to sbeena@isid.org.in at the earliest.)

The Study Team,
Institute for Studies in Industrial Development (ISID), New Delhi
www.isid.org.in

Date-------------------------

Annexure II

Market Study on Dynamics of Competition in Mining Sector in India with a Focus on Iron Ore

(A study Initiated by the Competition Commission of India)

Questionnaire for Interaction with the Iron Ore Consumers (and Associations)

Stakeholder category: Iron ore consuming firm ☐ Iron ore consumer Association ☐

1. Name of Organisation/individual:
2. Address of operation (optional):
3. States of Operation:
4. Years of experience in Iron ore consumption:
5. Size of operation (if applicable): Small & Micro ☐ medium ☐, Large & mega ☐
(Micro: Annual turnover less than Rs.5 crore; small: 5 to 50 crore; medium: 50 to 250 crore; Large: 250 to 1000 crore; Mega: others)
6. Ownership category:
Public ☐ Business group ☐ Standalone private ☐ Foreign ☐
    a. If business group owned, the name of group: ------------------------------------

Raw Material (Iron ore) Availability and Pricing

7. Do you own captive mine(s)? Yes ☐ No ☐
If yes, approximately what percent of your total iron ore requirement is met with captive mines?
(----------------percent of total consumption in -----------financial year)
8. Are you selling surplus iron ore? Yes ☐ No ☐
If yes, is there any issue with excess supply and difficulty in generating demand for iron ore? ---------------------------------?
9. Have you ever experienced shortage of iron ore required for your production? If yes, specify the iron ore category, and provide details along with the possible reasons for scarcity: ----------
10. Normally who decides the price of iron ore? Do you face any issues related to the pricing of these critical inputs? kindly give details/evidence if any:------------------
11. Have you ever faced any kind of organised behaviour like seller power or acting together from iron ore companies in terms of pricing of iron ore products, quantity/quality considerations or imposing any unnecessary conditions while purchasing iron ore? If so, kindly give details/evidence if any. -------------------------
12. Do you think the iron ore prices in India are reasonable for the steel sector, especially the small steel players? If not, kindly discuss-----------------------------------
13. Do you think iron ore pricing mechanism is functioning well? If not, provide reasons/ alternative options------------
14. Do you think there exists any kind of locational disadvantages due to the mismatch between iron ore and steel plants location? If yes, do you think railway/public transport system needs to be adapted according to the needs of the industry? Explain what kind of changes required------------------
15. Do you think the number of iron ore sellers are few/less for any specific iron ore product(s) in India or in your region? If so, kindly provide details of such product and the reasons if any ----

16. Are you getting iron ore with the required quality? Yes ☐ No ☐
If not, kindly provide the reasons and how to improve the situation ------------------

Trade Issues

17. Do you import iron ore inputs? Yes ☐ No ☐
18. Do you think import of iron ore products is better than domestic production? If yes, why?-----
19. Do you think we have great potential to export iron ore products from India, and what kind of policy changes required to encourage export of iron ore from India? ------------------------------
20. Do you think we need to focus on any particular export market? If so, provide reasons.-------------

Regulatory issues: Ease of Doing Business

21. Do you think the implementation of in MMDR Act[1] affected iron ore availability/accessibility for your business? Kindly explain how ------
22. Discuss, if any other regulatory issue exists while procuring iron ore products? ---
23. Do you have operation in more than one state? Yes ☐ No ☐
If yes, kindly discuss the operational differences of iron ore procurement in different states including a comparative picture of the mineral procurement policies enforced in various states, procedural delays; and regulatory hurdles faced in any state if any:---------
24. In your experience/view, is it possible for the small firms (and others) to enter into iron ore business? If Not, which of the following barrier(s exists in the market? Provide details.
    a. Investment/capital related ---------------------
    b. Marketing related: ---------------------------------
    c. Technical: ---
    d. Regulatory barriers: --------------------------------
    e. Any other?

Auction Process of Iron Ore blocks:

25. Have you ever participated in the iron ore mineral blocks' auction process? Yes ☐ No ☐
If yes, provide details including the type of auction, the outcome, and any reason for such an outcome: ---------------------
26. What are your views/experience on the small companies entering in the iron ore auction process? Is there any manipulation from the established players? -----------
27. Do you think auction is the best model for pricing? If not, provide reasons/alternative options:---------------

Miscellaneous

28. What are your views on the operation of large public/private sector iron ore companies in your state and in general? Specifically, do you think these firms create any kind of market imperfections in the sector?-------------
29. Are you part of any association? If so, what are the benefits of being associated with the association?--------
30. Any other views/challenges/point on competition issues in the iron ore sector?---
31. Provide your phone/email for future contact if required (not mandatory)----------

1 Kindly focus on issues like demand/supply/auction/closing of units etc. related aspects, which are having influence on the market completion.

(If you wish to provide any data/evidence/information (confidentially or otherwise) on the existence of unfair practices in the iron ore sector (or linked to steel) in India, kindly send it to sbeena@isid.org.in at the earliest.)

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