



The iron ore industry

By Andreas Tegen

The iron ore industry in the Western world is in a deep crisis, with massive lay-offs and mine closures.

In this article Andreas Tegen looks at the structural changes behind this crisis, with a particular emphasis on the new configuration of ownership and control in the industry.

The geography of iron ore production

Mining and processing of iron ore was one of the main foundations for industrialization in Europe and the USA. A strong steel industry was created, based on domestic ore. However, with diminishing domestic reserves the industry has been forced to import raw materials from more distant regions.

In the first stages of industrialization, during the 19th and early 20th centuries, almost all iron ore was produced in the consuming countries. The leading role of the UK in 19th century industrialization is demonstrated by its iron ore production level. In 1870, over half of the world iron ore was mined in the UK, while the USA, Germany and France produced 14, 12 and 10 per cent respectively.

Up to the First World War, international iron ore trade was small, but with a rapidly expanding arms production, the export from a few countries (Spain and Sweden) started to increase. By that time the USA had succeeded the UK as the leading industrial power. In 1907, the USA had 40 per cent of world iron ore production while the UK share had fallen to 12 per cent. Germany's increasing power was reflected by its increased iron ore production: 20 per cent of world production in 1907. Half of Germany's production came from Elsass-Lothringen, which had been conquered from France in 1871. France reconquered this economically important area during the First World War and as a result became the second largest iron ore producing country in the world in the 1920s.

From the period between the wars domestic iron ore production could no longer meet demand in the industrialized capitalist countries. West European steel works started to import cheap iron ore from Swedish, Spanish and North African mines. In 1929, the steel works in Germany imported two thirds, and the steel works in the UK one third, of their iron ore requirements. The USA started to import iron

ore from Canada and Latin America. The Japanese steel industry, which grew significantly during the inter-war period, relied almost completely on imported iron ore from occupied areas, mainly Manchuria in China.

During the post-war period, the location of production and consumption of iron ore has continued to change, which is shown in Table 1. The table shows that *the shares of the industrialized capitalist countries for both production and consumption of iron ore have fallen significantly*. In contrast, *the shares of the socialist countries and the "Third world" have increased*.

During the post-war period, both production and consumption of iron ore has been extensively redistributed among the industrialized capitalist countries. Both West European and North American shares of world iron ore production decreased by more than three quarters between 1950 and 1982. By 1982 no country in West Europe and North America accounted for more than 5 per cent of world production.

The decline in the production share of the industrialized capitalist countries would have been even more dramatic if Australian production would not have been increased more than tenfold. In 1982, Australia accounted for more than one third of the iron ore production within the industrialized capitalist countries. Besides in Australia, production has increased substantially in Canada and South Africa.

Between 1950 and 1982, the "Third world" share of world iron ore production increased from one sixteenth to more than one quarter. This is primarily due to the very large increase in the Brazilian production. In 1982 Brazil accounted for half of the iron ore production in the "Third world", and since 1978 it is the second largest producer in the world, after the Soviet Union. India and Liberia have also become large iron ore countries.

The socialist countries' share of world ore production increased during the pe-

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riod from one fifth to two fifths. Production in the Soviet Union was doubled, and was in 1982 one third of the world total. Production in China increased almost eightfold, albeit from a lower level, and was in 1982 slightly less than one tenth of the world total.

The geography of iron ore consumption

If the geographical development of iron ore production is compared to consumption, a similar pattern is found. In 1950, three quarters of world iron ore production was consumed in the industrialized capitalist countries. In 1982 their share of the total consumption was less than half. The industrialized capitalist countries' share of world consumption has also decreased, but not, however, to the same degree as their share of world production. The industrialized capitalist countries have, consequently, become more dependant on imports from "Third world" countries.

The Japanese iron ore consumption shows the largest increase during the period, consumption was increased fifteenfold. Japan is, since 1972, the second largest consumer of iron ore after the Soviet Union. It is almost totally dependent on imported iron ore.

Between 1950 and 1966, the iron ore production in the "Third world" increased substantially, while consumption increased relatively moderately. Between 1966 and 1982 this trend changed somewhat. During this later period, the increase in iron ore production in the "Third world" was not as large as during the previous period, while "Third world" iron ore consumption saw a sharper increase than during the previous period. In 1982 "Third world" countries consumed half of the iron ore they produced.

The socialist countries, during the whole period, have, by and large, been able to cover their increased consumption by their own increased production.

Table 1

Geographical distribution (per cent) of world iron ore production and consumption 1950, 1966 and 1982.

		Production			Consumption		
		1950	1966	1982	1950	1966	1982
Industrialized capitalist countries		74.6	45.0	31.3	75.5	57.4	45.1
Europe	Total	30.9	20.9	7.5	25.0	22.7	17.5
	France	12.3	8.9	2.5	6.4	4.2	2.9
	UK	5.4	2.2	0.1	7.5	4.3	1.5
	Sweden	5.6	4.5	2.1	0.4	0.5	0.5
	FRG	3.7	1.5	0.2	4.9	6.1	5.1
	Others	3.9	3.8	2.7	5.8	7.6	7.5
North America	Total	41.8	20.6	8.9	47.5	24.1	8.2
	Canada	1.3	5.9	4.2	1.9	1.9	1.7
	USA	40.5	14.7	4.7	45.6	22.2	6.5
Oceania	Australia	1.0	2.0	11.4	1.3	1.4	1.1
South Africa		0.5	1.1	3.1	0.6	0.9	1.8
Japan		0.4	0.4	0.1	1.1	8.3	16.5
"Third world"		6.5	21.2	26.7	2.6	4.5	12.7
	Brazil	0.8	3.7	12.4	0.6	0.8	3.1
	Chile	1.2	2.0	0.9	0.2	0.1	0.1
	India	1.3	4.3	5.2	1.6	2.0	2.4
	Liberia	—	2.7	2.2	—	—	—
	Peru	—	1.2	0.8	—	0.1	0.1
	Venezuela	0.1	2.9	1.5	0.1	0.2	0.5
	Others	3.1	4.4	3.7	0.1	1.3	6.5
Socialist countries		18.9	33.8	41.9	21.9	38.1	42.2
	China	1.2	5.0	9.1	0.7	7.2	8.9 ¹
	Soviet Union	16.2	25.7	31.0	17.7	24.3	25.8
	Others	1.5	3.1	1.9	3.5	6.8	7.5 ¹
Total (per cent)		100.0	100.0	100.0	100.0	100.0	100.0
Total (Mt)		244	663	783	244	663	783

¹ estimate

Sources:

Manners: The changing World Market for Iron Ore 1950 - 1980, John Hopkins Press, Baltimore, 1971, UNCTAD TD/B/IPC/Iron ore/15 (Statistics on Iron Ore). 22/2 1984.

Table 2
The largest iron ore producing corporations in the Western world 1983.

Producing corporation (country)	Owner (share)	Ship-	Share of
		ments	Western
		Mt	world
			%
Cia Vale do Rio Doce (Bra)	Brazilian state (c. 60 %)	53.9	12.3
Hamersley Iron Pty (Aus)	CRA Ltd (93.7 %)	33.5	7.7
Mount Newman Iron Ore (Aus)	Amax (25 %) CSR Ltd (30 %) Broken Hill Pty (30 %) Mitsui - C Itoh Iron Pty (10 %) Selection Trust (5 %)	23.3	5.3
Luossavaara-Kirunavaara AB (Swe)	Swedish state (100 %)	14.7	3.4
Cliffs Robe River Iron Ass. (Aus)	Cliffs Western Australian Mining Co (30 %) Robe River Ltd (35 %) Mitsui Iron Ore Development Pty (30 %) Cape Lambert Iron Ass. (5 %)	13.8	3.2
South African Iron and Steel Industrial Corp (Iscor) (RSA)	South African state (99 %)	13.5	3.1
Mineracao Brasileiras Reunidas (MBR) (Bra)	(see chart on p 5)	12.4	2.8
Iron Ore Co of Canada (IOC)(Can)	(see chart on p 5)	11.8	2.7
CVG Ferrominera Orinoco (Ven)	Venezuelan state	11.1	2.5
US Steel Corp (USA)		11.1	2.5
Total, the ten largest iron ore producing corporations		199.1	45.5
Total, Western world		437	100.0

Sources:

APEF: Iron Ore News, Skilling's Mining Review, Mining 1984, Mining Journal and corporate annual reports.

Class 3: Influence. The superior corporation is not credited any share of the production of the producing corporation.

Class 4. No control or influence.

The ownership and control structure in the iron ore industry differs from the rest of the minerals industry by the large number of multi-participant joint ventures. This makes the iron ore industry less concentrated than other branches of the

minerals industry and can be seen in the many cases of control class 2, which means that the control of many producing corporations is shared.

Table 3 shows the *present* ownership and control structure in the iron ore industry. To monitor the *dynamics* of corporate control, the analysis must also include data from a longer period of time. This is part of the ongoing work in the research project.

Corporate control

Table 2 is an example of the traditional way of analysing the corporate structure of a branch in the minerals industry. The corporations are ranked by production and it is assumed that the largest are the most powerful. Sometimes, like in Table 2, the owners of the producers are listed.

Table 3 reflects more accurately the real power structure in the iron ore industry. This table is based on the preliminary method used in the RMG research project on the dynamics of corporate control in the minerals industry. The method is carried out in three steps:

1. *Examining the relations* between the producing corporations and other corporations which might be controlling them. Whether there is a control relation or not depends on *ownership share, board representation and management*.

2. *Determining the control classes* that characterizes the relations examined in step 1. Four control classes are defined, and for each class the contribution of power from the *producing corporation* to the *superior corporation* is defined. This contribution of power is measured by the production of the producing corporation.

3. *Collecting of all contributions of power* from the producing corporations to every superior corporation. Now the power of the corporations that control the mineral production can be evaluated.

The four control classes are shown in the second column of Table 3 and are used as follows:

Class 1: Full control. All production of the producing corporation is attributed to the corporation in control.

Class 2: Partial or probable control. A share of the production of the producing corporation is attributed to the corporation in control.

Table 3

Iron ore controlling corporations 1984

Ownership per June 1984. Shipment of 1983. Ranked according to controlled shares of shipments.

Controlling corporation/state		Relation to producing corporation			Producing corporation, iron ore shipments			Controlled share	
		Control class	Ownership %	Management		Shipments Mt	of shipments of producing corp. Mt	of total western world shipm. %	
Companhia Vale Do Rio Doce (CVRD) ¹	Bra	1			CVRD	Bra	53.9	53.9	
		2	51.0	M	Nibrasco	Bra	4.1	2.1	
		2	50.9	M	Itabrasco	Bra	2.0	1.0	
		2	50.9	M	Hispanobras	Bra	1.3	0.7	
					Total			57.7	13.2
Rio Tinto-Zinc Corp (RTZ) ²	UK	1	93.7	M	Hamersley Iron Pty	Aus	33.5	33.5	7.7
US Steel Corp ³	USA	1			US Steel Corp	USA	11.1	11.1	
		1	100		Quebec Cartier Mining	Can	6.4	6.4	
					Total			17.5	7.7
Swedish state	Swe	1	100		Luossavaara-Kirunavaara AB (LKAB)	Swe	14.7	14.7	
		2	75		Svenskt Stål AB	Swe	2.7	2.1	
					Total			16.8	4.0
Broken Hill Pty (BHP)	Aus	1			BHP	Aus	5.2	5.2	
		2	30	M	Mt Newman ⁴	Aus	23.3	7.0	
		2	49		Samarco Mineracao SA ⁵	Bra	4.5	2.2	
					Total			14.4	3.3
Arbed	Lux	1			Arbed	Fra	4.7	4.7	
		1	73	M	Samitri	Bra	6.7	6.7	
		2	51		Samarco Mineracao ⁶	Bra	4.5	2.3	
					Total			13.7	3.1
South African state	RSA	1	99		South African Iron and Steel Industrial Corp (Isacor)	RSA	13.5	13.5	3.1
Venezuelan state	Ven	1	100		CVG Ferrominera Orinoco	Ven	11.1	11.1	2.5
Thyssen Stahl AG	FRG	2	67	M	Bong Mining Co ⁷	Lib	7.6	5.1	
		2	58	M	Ferteco Mineracao SA	Bra	7.3	4.2	
					Total			9.3	2.1
CAEMI ⁸	Bra	2	65.7		Mineracao Brasileiras Reunidas SA (MBR)	Bra	12.4	8.1	1.9
Total, the ten largest iron ore controlling corporations								195.6	44.7

Sources:

APEF: Iron Ore News, Skilling's Mining Review, Mining 1984, Mining Journal and corporate sources (annual reports, interviews).

Controlling corporation/state		Relation to producing corporation			Producing corporation, iron ore shipments			Controlled share	
		Control class	Owner-ship %	Mana-gement	Ship-ments Mt		Ship-ments Mt	of ship-ments of producing corp.	of total western world shipm.
Hanna Mining Co	USA	2	34.3		Mineracao Brasileiras Reuni- das (MBR)	Bra	12.4	4.2	
		2	26.8	M	Iron Ore Co of Canada (IOC)	Can	11.8	3.2	
		2	37.5	M	Butler Taconite Project	USA	1.6	0.6	
		3	-	M	National Steel Pellet Co	USA	3.3	-	
					Total				8.0
Bethlehem Steel Corp	USA	2	62		Hibbing Taconite Co	USA	4.5	2.8	
		2	18.8		Iron Ore Co of Canada (IOC)	Can	11.8	2.2	
		2	25		Lamco Joint Venture ⁹	Lib	6.6	1.6	
		2	45		Erie Mining Co	USA	2.2	1.0	
		3			Mineracao Brasileiras Reuni- das (MBR) ¹⁰	Bra	12.4	-	
			Total				7.6	1.7	
French state	Fra	1		Sacilor	Fra	7.5	7.5	1.7	
Sté National Industrielle et Minière (SNIM) ¹¹	Mau	1		SNIM	Mau	7.4	7.4	1.7	
Mitsui & Co	Jap	2	7		Mt Newman ¹²	Aus	23.3	1.6	
		2	41.5		Cliffs Robe River Iron Associates (CRRIA) ¹³	Aus	13.8	5.7	
		3	3		Mineracao Brasileiras Reuni- das (MBR)	Bra	12.4	-	
					Total				7.3
CSR Ltd	Aus	2	30		Mt Newman ¹⁴	Aus	23.3	7.0	1.6
Cleveland Cliffs Iron Co	USA	2	19.5	M	Cliffs Robe River Iron Associates (CRRIA) ¹⁵	Aus	13.8	2.7	
		2	39	M	Tilden Iron Ore Partnership	USA	4.7	1.7	
		2	15	M	Empire Iron Mining Partn.	USA	6.0	0.8	
		3	-	M	Adams Mine	Can	0.8	-	
		3	10	M	Sherman Mine	Can	0.8	-	
			Total				6.6	1.5	
Amox ¹⁶	USA	2	25		Mt Newman	Aus	23.2	5.8	1.3
Indian state	Ind	1	100		National Mineral Develop- ment Corp	Ind	5.8	5.8	1.3
National Steel Corp ³	USA	1	100		National Steel Pellet Co	USA	3.3	3.3	
		2	19.0		Iron Ore Co of Canada (IOC)	Can	11.8	2.2	
					Total				5.5
Total, the twenty largest iron ore controlling corporations								264.1	60.3
Total, Western world								437	100.0

Sources: APEF: Iron Ore News, Skilling's Mining Review, Mining 1984, Mining Journal and corporate sources.

Development trends

The structure and the development of the iron ore industry since the Second World War can be briefly summarized as follows (See also RMR Vol 1 No 1 and No 2):

- **The dominance of US corporations has been reduced but is still considerable**

The rich iron ore reserves within the USA have been depleted. In the 1970s some foreign subsidiaries of US iron ore corporations were nationalized. CVG Ferro-minera Orinoco in Venezuela, previously owned by US Steel, and Marcona Corporation in Peru, previously owned by General Electric via Utah International, are two examples. However, the US corporations try to recapture their markets shares by concentrating their efforts to countries, which are considered "politically stable", such as Canada and Australia.

- **Cooperation between the corporations has increased**

Industrial and financial groups from different countries have formed joint ventures to minimize the political and finan-

cial risks when exploiting iron ore reserves in e.g. Brazil, Liberia and Australia. In the Mount Newman project in Australia, capital was provided by corporations and banks based in the US, Japan and Australia. In the Cliffs Robe River project, the participants were based in the USA, Japan, Australia and South Africa. (The South African interest, held by the Anglo American group, was recently transferred to an Australian corporation, Peko-Wallsend).

The number of joint ventures has increased by two main reasons. Firstly, due to the large investments involved in mining projects, it is difficult for individual companies to raise the necessary capital. Secondly, the "wave of nationalization" in the 1970s made it necessary to minimize the economic and political risk when making the huge investments necessary to open up a new iron ore mine.

- **Strong advance by state-owned companies**

The share of iron ore production by state-owned mining companies in the Western

world has increased. This is mainly due to the nationalizations in the late 1960s and the early 1970s, but state-owned companies have grown also in the industrialized countries. Iscor, the South African iron ore producer, quadrupled its production between 1966 and 1982.

However, even in the state-owned companies the mining TNCs have a strong direct and indirect influence.

A large part of the ore is further processed in corporate steel works, and the limited market shares of the state owned companies restrict their influence on the market.

State companies have to finance their investments with loans from banks which often have close connections with competing mining corporations.

The iron and steel TNCs have lobbied for a more direct state support to survive the present crisis. US corporations, for example, are now protected by import quotas on foreign steel. These restrictions are officially defended by reference to "unfair competition" from state-owned companies. ■

Notes to Table 3:

¹ The Brazilian state owns the majority (approx 65 %) of the shares of CVRD.

² RTZ owns 52.9 % of Australia based CRA Ltd. CRA in turn owns 93.7 % of Hamersley, the remainder being held by a Japanese consortium of eight companies.

³ US Steel has entered an agreement to acquire National Steel Corp in 1984. The acquisition will further increase the market strength of US Steel.

⁴ Held through Dampier Mining Ltd.

⁵ BHP acquired Utah International Inc from US based General Electric Co in May 1984. Utah owns 49 % of Samarco.

⁶ Samarco is 51 % owned by Arbed-controlled Samitri.

⁷ The Liberian state owns 50 % of Bong. Bong is controlled by its manager, Exploration und Bergbau GmbH, which is controlled by Thyssen, Hoesch and Krupp.

⁸ CAEMI (Companhia Auxiliar de Empresas de Mineracao) owns directly 14.7 % of MBR and indirectly another 51 %. See chart on p 5. CAEMI is controlled by the Antunes group.

⁹ Bethlehem has proposed to sell its share in LAMCO JV.

¹⁰ Bethlehem's interest in MBR is held through 49 % owned ICOMI (Industria e Comercio de Minérios SA), which holds 20 % of EBM (Empreendimentos Brasileiros de Mineracao SA), which in turn holds 51 % of MBR. See chart on p 5.

¹¹ SNIM is 70.9 % owned by the Mauritanian state. The balance is held i a by Arab Mining Co (5.7 %) and Contracting and Investment Co (9.6 %).

¹² Mitsui holds 70 % of Mitsui - C Itoh Iron Pty Ltd, which holds 10 % of Mt Newman.

¹³ Mitsui's interests in CRRIA are held through Mitsui Iron Ore Development Pty Ltd (MIOD). MIOD directly holds 30 % of CRRIA. MIOD also holds 35 % of Cliffs Western Australian Mining Co Pty Ltd, which holds 30 % of CRRIA. MIOD also holds 20 % of Cape Lambert Iron Associates, which in turn holds 5 % of CRRIA. This brings the total Mitsui holding in CRRIA up to 41.5 %.

¹⁴ CSR Ltd owns 68 % of Pilbara Iron Ltd, which holds 30 % of Mt Newman.

¹⁵ Cleveland Cliffs owns 53 % of Cliffs Western Australian Mining Co Pty Ltd, which in turn owns 30 % of CRRIA.

¹⁶ Amax is partly controlled by Standard Oil of California, which in May 1984 increased its stake in Amax from 19.5 % to 23 %, by buying half of BP's share in Amax. ■