

Iron ore in Brazil: Restructuring with growth

– Introduction

Brazil is one of the world's largest iron ore producers, and the largest iron ore exporter. The Brazilian company Companhia Vale do Rio Doce (CVRD) is the world's largest iron ore exporter and its largest producer. Other important Brazilian iron ore producers and exporters are Minerações Brasileiras Reunidas (MBR), Mineração da Trindade (Samitri), Samarco Mineração and Ferteco Mineração.

Brazilian iron ore production totaled 193.0 million tons in 1999, made up of 156.1 million tons of fines and lump ore and 36.9 million tons of pellets. In 1999, CVRD held 51.7% of the Brazilian market for iron ore production in terms of volume, and was responsible for 61% of total pellet production.

The economic crises, especially in Asia (a significant consumer of Brazilian iron ore), resulted in a fall in Brazil's exports, particularly in 1998 and the first half of 1999. Pellet production was particularly affected, with some plants temporarily paralyzed. The market began to recover in the second half of 1999, and is expected to grow even stronger due to the recovery in world steel production.

The domestic iron ore market has stabilized at between 36 and 37 million tons/year, a figure that represents some 20% of Brazil's production. However, internal demand is expected to grow over the next few years to meet the needs of growing domestic steel production.

– Reserves

Brazil's proven iron ore reserves total 19.7 billion tons, which ranks Brazil as having the sixth largest reserves worldwide and compares to proven world iron ore reserves of 306.5 billion tons. However, taking into account the level of reserves in terms of the amount of iron contained in the ore, Brazil jumps to the number one position worldwide. This is due to the high level of iron contained in hematite ore (60%), mainly found in the state of Pará, and in Itabirito ore (50%), mainly found in the state of Minas Gerais.

The table below shows Brazil's reserves by state:

Brazil's Iron Ore Reserves, by State

	Millions of tons			
	1996	1997	1998	1999
Minas Gerais	14,657	14,440	14,256	14,223
Pará	4,527	4,460	4,415	4,393
Mato Grosso do Sul	873	860	851	837
São Paulo	203	200	198	197
Other	40	40	80	50
Total	20,300	20,000	19,800	19,700

Sources: DNPM; U.S. Geological Survey.

– Brazilian market

Production

Brazilian iron ore production was 193 million tons in 1999, 3.0% lower than the previous year's total of 199 million tons, of which 80% was processed ore (fines and lump ore), and the remaining 20% was pellets. CVRD remained the leading producer, with 51.7% of total production.

Brazilian Iron Ore Production – 1999

Company				Million tons
	Processed	Pellets	Total	Market Share
CVRD	77.3	22.5	99.8	51.7
MBR	25.5	0	25.5	13.2
Ferteco	12.4	4.0	16.4	8.5
Samitri	16.3	0	16.3	8.5
Samarco	3.1	10.4	13.5	7.0
CSN	10.4	0	10.4	5.4
Itaminas	5.0	0	5.0	2.6

Other	6.1	0	6.1	3.1
Total	156.1	36.9	193.0*	100.0

Sources: Sinferbase, DNPM, *BNDES estimate.

Iron ore production is expected to total some 199.6 million tons in 2000, a 3.4% increase on 1999, to meet growth in exports, domestic demand of the steel industry, and independent pig iron producers.

Restructuring and Investment

Almost all Brazilian companies in the sector are seeking to expand production to meet both local and international demand for iron ore. In May, CVRD acquired Samitri, owned by the Arbed de Luxemburgo Group, for approximately R\$ 970 million. The transaction gave CVRD an indirect 50% stake in Samarco, Brazil's second largest pellet producer, while the other 50% is still held by the Australian company Broken Hill Proprietary (BHP). The acquisition, along with the acquisition of Socoimex, an independent iron ore producer in Minas Gerais state, increases CVRD's market share from 20% to 25% in the international market and to 55% in the domestic market.

CVRD also invested heavily in the iron ore sector via the construction of a pellet plant in São Luís, the capital of Maranhão state, which will produce 6 million tons of pellets per year. Other important investments are being made in the production system (mines, railroads and ports), research, the environment, and in capacity expansion. Investments in the Carajás mine seek to increase production from 51 million tons/year to 62 million tons/year, while investments at Vargem Grande are for a processing center with capacity for 15 million tons/year after the construction of the second phase.

Following the same trend, MBR is planning to invest some US\$ 240 million under its Long-Term Development Plan (PDLP) for expansion of production from its current level of 26.5 million tons/year via the construction of a new iron ore processing plant in Minas Gerais state and the doubling of capacity at its seaport terminal at Ilha de Guaíba, in Sepetiba, Rio de Janeiro state. The work on the terminal will increase the company's annual capacity to ship iron ore by some 20% to 30 million tons, allowing production to increase to 32 million tons/year by 2004.

The Caemi group, the controlling stockholder in MBR, has recently become the target of takeover attempts by Brazilian and international groups, including CVRD, North Limited and Anglo American. Outside of Brazil, Rio Tinto Zinc (RTZ) is seeking to acquire a majority stake in North Limited, in which it already holds a 14.5% stake, which would cinch a takeover. Meanwhile, Anglo American has set its sights on a majority stake in North and acquisition of Caemi, bringing the group into yet another activity.

Among many other possibilities for Caemi are acquisition by Billiton or a merger with Ferteco of Thyssen Krupp Group.

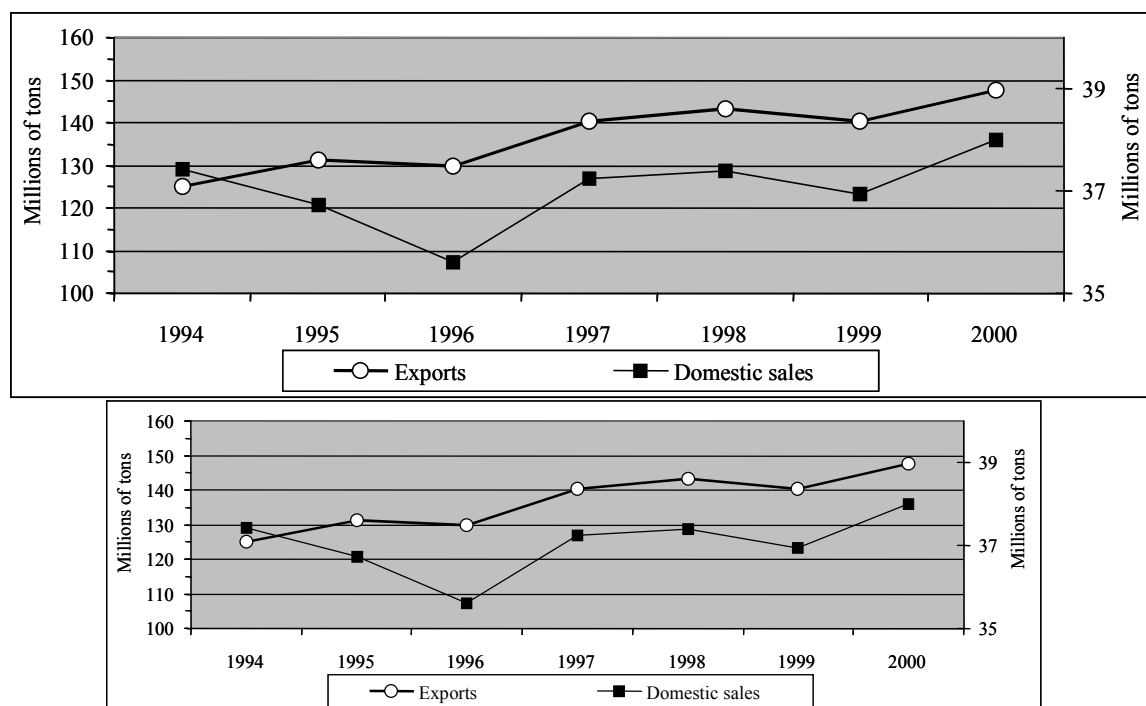
With the acquisition of the Sweet River stake in Valepar, Billiton Metais now holds 2.8% of the voting capital in CVRD, which entered a restructuring process following the loss of its controlling stake in the Vicunha Group.

These recent transactions show the strong restructuring through which the sector is currently undergoing.

Domestic sales and Exports

The internal and external markets for Brazilian iron ore have remained strong, in spite of economic crises (see chart below).

Brazilian Iron Ore - Domestic Sales and Exports



Source: Sinferbase; IBS; BNDES. Note: The right-hand scale is for exports and the left-hand for domestic sales.

In 1999, CVRD sold 96.2 million tons, of which 80.2 million tons was destined for exports, with the remainder sold in the internal market. For 2000, the company is forecasting a 5% increase in sales to 105 million tons, the vast majority destined for the export market. CVRD also forecasts an increase of 6 million tons in its sales to the domestic market, which currently total 14 million tons.

MBR is forecasting internal sales for 2000 of approximately 3.9 million tons, unchanged from 1999 levels. However, MBR forecasts 2000 export sales of 23 million tons, 11.1% higher than the exports of 20.7 million tons sold in 1999. The increase will translate into a 7.7% increase in overall sales in 2000, from 24.6 million tons to 26.9 million tons.

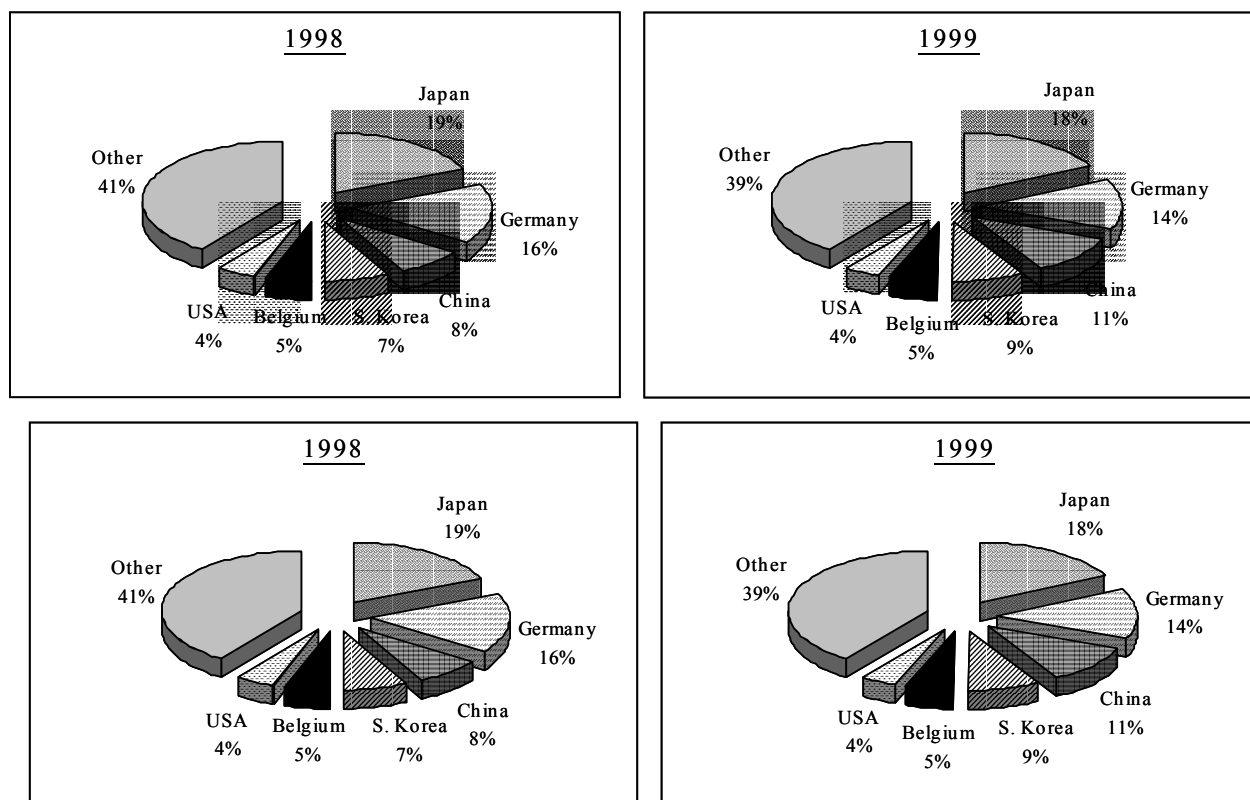
Samitri forecasts no change in 2000 sales from its 1999 level of some 16 million tons, of which 70% (12 million tons) was sold on the export market and remainder on the internal market. Samarco is expecting a 14% increase in its pellet sales, from 10.5 million tons in 1999 to 12 million tons in 2000, reaching full capacity utilization.

Brazilian Iron Ore Exports

		Million tons							
	Product	CVRD	MBR	Ferteco	Samarco	Samitri	Other	Total	% of total production
1999	Pellets	20.5	-	3.3	10.5	-	-	34.3	93.0
	Fines	54.4	17.1	9.2	1.9	9.8	1.5	93.9	64.1
	Lump ore	5.3	3.6	1.6	-	1.0	0.4	12.0	62.0
	Total	80.2	20.7	14.1	12.5	10.8	1.9	140.2	72.6

Sources: DNPM; Sinferbase.

Brazil's iron ore exports have increased to China, which currently imports some 55 million tons per year, of which 14 million comes from Brazil. CVRD exported 7.3 million tons to China in 1999, making it Brazil's principal iron ore exporter to the country, followed by MBR, which exported 3 million tons last year.



Destination of Brazilian Iron Ore Exports

Source: Sinferbase.

Brazilian iron ore exports in the whole of 2000 are expected to be some 5% higher than in 1999, reaching a minimum of 147.5 million tons, while exports in the year are expected to increase by 3.0% to 38 million tons. Total iron ore sales are expected to increase 4.7%, from 177.1 million tons in 1999 to 185.6 million tons in 2000.

Brazilian Iron Ore - Internal Consumption and Export Prices

Year	Internal consumption (millions of tons)	Exports		
		Millions of tons	US\$ million	US\$/ t
1992	34.1	106.0	2,303.4	21.72
1993	35.8	111.9	2,180.5	19.49
1994	37.4	125.0	2,294.8	18.35
1995	36.7	131.4	2,530.1	19.30
1996	35.6	129.7	2,667.9	20.56
1997	37.3	140.4	2,911.9	20.74
1998	37.4	143.2	3,066.1	21.41
1999	36.9	140.2	2,673.6	19.07
2000*	38.0	147.6	2,940.9	20.00

Source: Sinferbase (*BNDES estimate).

The average export price by year for each type of product for the period 1995-99, and the forecast for 2000, is shown in the following table.

Average Iron Ore Export Price, by Product

Price	1995	1996	1997	1998	1999	2000*
						US\$/ t

Fines	16,24	16,28	16,57	17,08	15,08	15,80
Lump ore	21,59	23,56	23,01	22,87	19,79	20,81
Pellets	30,67	32,67	33,29	34,07	29,73	31,51
Average	19,26	20,56	20,74	21,41	19,07	20,00

Source: Sinferbase, BNDES (*BNDES estimate).

The prices negotiated this year are expected to result in a 4.7%, 5.2% and 5.9% increase in export prices of fines, lump ore and pellets, respectively.

For further date on the international iron ore market, please see Sector Report No. ??? of the BNDES's Mining and Metallurgy Department, entitled "Iron Ore Worldwide: Resumption in Growth".

Outlook

Domestic iron ore consumption is mainly concentrated in the steel sector and totaled 36.9 million tons in 1999, 1.2% lower than the 37.3 million tons consumed in 1998.

This year domestic iron ore consumption is expected to increase by 3.0% over 1999, to 38 million tons. Between 1999 and 2010, domestic iron ore consumption is forecast to grow at an average annual rate of 2.8%, reaching 43 million tons in 2005 and 50 million tons in 2010.

These figures were based on a forecast of 3% average annual growth in Brazilian steel production in the 1999-2010 period, which should reach 30 million tons in 2005 and 35 million tons in 2010. Calculations of the amounts of iron ore and scrap required to meet this demand are shown in the following table:

Brazilian Crude Steel Production vs. Brazilian Consumption of Iron Ore and Scrap

Millions of tons

	1992	1993	1994	1995	1996	1997	1998	1999	2005*	2010*
<i>Crude steel production</i>	24	25	26	25	25	26	26	25	30	35
<i>Blast furnace</i>	19	20	21	21	20	21	21	20	24	28
<i>Electric furnace</i>	5	5	5	4	5	5	5	5	6	7
Consumption of iron ore for blast furnace	27	28	29	28	29	30	29	28	34	40
<i>Total iron ore consumption</i>	34	36	37	37	36	37	37	37	43	50
<i>Consumption of scrap for electric furnace</i>	7	7	7	7	7	8	8	8	9	10

Sources: Sinferbase, IBS, BNDES (*BNDES estimate).

Brazil's demand for iron ore is concentrated in fines and lump ore in view of the nature of the country's steel industry, which is highly concentrated in blast furnace production (20 million t/year vs. 5.5 million tons by electric furnace). The use of pellets is still limited due to its higher price, even though it offers productivity gains.

Accordingly, growth in the supply of iron ore is expected to continue to be focused on fines and lump ore with growth in the supply of pellets concentrated in export sales.

Brazilian Iron Ore Consumption - Forecasts

Millions of tons

	1992	1993	1994	1995	1996	1997	1998	1999	2005*	2010*
Pellets	1	1.1	1.9	0.8	1.8	1	0.5	1.6	2	2.6
<i>Blast furnace</i>	1	1	1.9	0.8	1.8	1	0.5	1.6	2	2.6
<i>Fines / Lump ore</i>	26	26.9	27	27	27	29	28	26.4	32	37.4
<i>Blast furnace</i>	26	26.9	27.1	27.2	27.2	29	28.5	26.4	32	37.4
Total for blast furnace	27	28	29	28	29	30	29	28	34	40
<i>Iron ore for pig iron</i>	7	8	8	9	7	7	8	9	9	10
<i>Total iron ore consumption</i>	34	36	37	37	36	37	37	37	43	50

Sources: Sinferbase, IBS, BNDES (*BNDES estimate).

Over the medium and long term, demand for slabs in the open market is expected to grow (the captive market is represented by producers of hot rolled coils and sheets), due to various factors such as: growth in rerollers, especially in Southeast Asia; greater utilization of slabs acquired in the open market by integrated mills with insufficient furnace capacity; integrated mills with outdated units and high production costs, such as those in the United States, Europe and Japan; the closing of steel mills in the United States and Europe as a result of obsolescence and environmental problems.

Estimates show that sales of slabs on the open market in 1999 represented some 5% (19 million tons) of total demand for slabs of the order of 350 million. Without taking into account the additional potential represented by the factors mentioned above, slab sales on the open market are expected to reach 25 million tons by 2010, or 5% of total slab sales.

These figures signal an opportunity for competitive iron ore producers, such as those in Brazil, to consider the integration of slab production, given the competitive advantage of the ability to produce low cost slabs.

The study by the BNDES's Mining and Metallurgy Department entitled "The Rise of Minimills in International Steel Industry" to be published in September in *BNDES Sector Review*, No. 12, focuses on the development of this technological process and direct reduction processes worldwide.

Within this scenario, iron ore producers, seeking to assure a high degree of competitiveness, will move towards increasing the supply of pellets for independent HBI (Hot Briquetted Iron) and DRI (Direct Reduction Iron) production, and in the near future strategically create their own direct reduction units, thus integrating themselves vertically in the slab production process.