

---

# MINING SECTOR: THE CHALLENGE OF BRAZILIAN MINING

## INDUSTRIAL OPERATIONS DEPARTMENT 2 – AO2

DIRECTOR  
Eduardo Rath Fingerl

SUPERINTENDENT  
Jorge Kalache Filho

Prepared by:

MINING AND METALS DEPARTMENT

**Maria Lúcia Amarante de Andrade - Manager**

Luiz Maurício da Silva Cunha - Economist

Guilherme Tavares Gandra - Engineer

Eliane Figueiredo Costa de Oliveira - Intern

Assistant:

Helena Yumi Kanemaru

Documentation:

Marlene Cardoso da Matta

July 1999

The reproduction of this work in part or in full is permitted, provided that the source is cited.  
This publication is available on the Internet at the following site: <http://www.bndes.gov.br>

---

INDEX

1. SUMMARY .....	1
2. INTERNATIONAL OUTLOOK .....	1
2.1. Global Foreign Direct Investment Flows .....	1
2.2. Global Investments in Mining .....	3
2.2.1. Investments by Large Corporations in the Mining Sector.....	3
2.2.2. Destination of Investments by Large Corporations in the Mining Sector .....	7
2.3. New Investment Flows in Mining in Latin America .....	10
2.3.1. Principal Investments by Large Corporations in Latin America.....	10
2.3.2. New Investments in Mining in Chile.....	11
2.3.3. New Investments in Mining in Argentina .....	13
2.3.4. New Investments in Mining in Peru.....	14
2.4. Development of Mineral Commodity Prices.....	17
2.5. International Mining Outlook.....	20
2.6. Global Restructuring of the Mining Sector .....	20
2.7. Recent Trends in the Restructuring of the Mining Sector .....	20
3. OUTLOOK FOR BRAZIL.....	21
3.1. Significance of Brazil in the International Panorama .....	21
3.2. Trade Flows .....	21
3.3. Mining Activity in Brazil - 1998.....	22
3.3.1. Gross Mining Output - Mining GDP.....	22
3.3.2. Importance of Brazilian Mining - 1997 .....	25
3.3.3. The Market for Minerals and Basic Metals - 1997/98.....	26

---

3.3.4. Exports and the Trade Balance for Mining/Metals and Steel.....	26
3.3.5. Exports/Imports of Minerals and Basic Metals .....	27
3.3.6. Exports/Imports of Other Minerals and Basic Metals - 1997.....	28
3.3.7 Exports/Imports of Other Minerals and Basic Metals – 1997 .....	29
3.3.8 Exports/Imports of Other Minerals and Basic Metals - 1997.....	29
3.4. Investment in Brazilian Mining - 1978-2000 .....	31
3.5. Causes of the Reduction in Investments in the Mining Sector .....	34
3.6. New Investments in Mining within Brazil .....	34
3.7. The Role of the BNDES in Investment in Mining and Metals.....	35
3.8. Outlook.....	36
4. CONCLUSION .....	37

---

## 1. Summary

This sector report begins by discussing direct foreign investment flows throughout the world, with an emphasis on developing countries, especially within Latin America.

This is followed by a presentation of the behavior of foreign investment flows by large corporations within the mining sector, concentrating on the principal countries and regions where these are located.

An attempt has also been made to give an overview of the market for minerals and its outlook, in terms of mining projects that are in the process of implementation, particularly in Chile, Peru and Argentina, since these countries collectively represent the bulk of investments by large foreign mining corporations.

This is followed by a section on the evolution and outlook of prices of the principal mining commodities.

This article also discusses the importance of Brazil at international level, new investments in mining and foreign trade flows.

Finally, details are provided of mining activity within Brazil (reserves, production, exports and imports), highlighting the potential for those minerals that contribute both positively and negatively to the trade balance.

The article concludes with a discussion of the prospects for the sector.

## 2. International Outlook

### 2.1. *Worldwide Foreign Direct Investment Flows*

- Global foreign direct investment flows are growing, increasing from US\$ 175 billion in 1991 to US\$ 412 billion in 1998, with average annual growth of 13% between 1991-98.
- Resources directed towards developed countries have grown significantly, reaching US\$ 260 billion in 1998, with average annual growth of 9.9% over the same period.
- The proportion of resources directed towards developing countries has also increased, rising from US\$ 41 billion in 1991, equivalent to 24% of total global investments, to US\$ 152 billion in 1998, equivalent to 37%. Growth over this period has averaged 21% per year.
- During the period 1996-98, resources assigned to Latin America amounted to US\$ 176 billion, of which US\$ 57 billion, or 32.4% of the total, were assigned to Brazil.
- In 1998, Latin America received around US\$ 66 billion, or 43% of total resources assigned during the year to developing countries, with average annual growth in resources received of 22% during the period 1991-98.
- Brazil has been the largest recipient of these investments in Latin America, with total inflows amounting to US\$ 26 billion in 1998, including privatization receipts, with this figure representing 39.4% of the regional total.

- 
- Direct foreign investment in Latin America during the first quarter of 1999 amounted to US\$ 20.7 billion, represented by 134 projects announced by investing companies. Of this total, 41% or US\$ 8.9 billion, was due to U.S. companies, US\$ 3.9 billion to Spanish companies, US\$ 1.9 billion to Chilean companies, US\$ 1.8 billion to French companies, US\$ 1.6 billion to German companies, US\$ 1.2 billion to British companies and US\$ 1.4 billion by several other countries. The main investments were directed towards the telecommunications sector (US\$ 5.5 billion), the automobile sector (US\$ 4.6 billion), the retail sector (US\$ 3.0 billion), the oil and gas sector (US\$ 2.9 billion), the food and beverages sector (US\$ 1.4 billion), as well as US\$ 3.3 billion to several other sectors.
  - For 1999, direct foreign investment in developing countries is expected to increase to US\$ 165 billion. Latin America should show a slight reduction to US\$ 63 billion, while investments in South East Asia should double to US\$ 33 billion. Direct foreign investment in Brazil could reach a figure in the US\$ 20-22 billion range, falling to US\$ 18 billion in 2000, due to the gradual conclusion of the privatization process that is currently in progress, and remaining in the US\$ 10-15 billion range in subsequent years.

## Worldwide Foreign Direct Investment Flows

	1991	1996	1997	1998 <sup>e</sup>	à 96-98	1Q99	1999*
	US\$ billion						
<b>World</b>	<b>175</b>	<b>335</b>	<b>396</b>	<b>412</b>	<b>1,143</b>	<b>140</b>	<b>440</b>
Developed Countries	134	208	246	260	714	87	275
Developing Countries	41	127	150	152	429	53	165
Developing Countries as % of World	23.4	38.0	38.0	36.9	37.5	<b>38.0</b>	<b>38.0</b>
<b>Latin America</b>	<b>16</b>	<b>45</b>	<b>65</b>	<b>66</b>	<b>176</b>	<b>21</b>	<b>63</b>
Brazil	1	11	20	26	57	8	22
Mexico	5	9	13	8	30	5	10
Argentina	3	5	6	6	17	6	8
Chile	1	5	5	5	15	0.2	4
Colombia	0.5	3	6	6	15	0.3	5
Peru	0	3	2	3	8	0.6	4
Venezuela	2	2	5	5	12	0.6	5
Other	3.5	7	8	7	23	0.3	5
<b>Brazil as a % of Latin America</b>	<b>6.3</b>	<b>24.4</b>	<b>30.8</b>	<b>39.4</b>	<b>32.4</b>	<b>39.4</b>	<b>32.0</b>

Source: International Institute of Finance - IIF, Publications, \*IIF and BNDES estimates.

## 2.2. Worldwide Investment in Mining

### 2.2.1 Investments by Large Corporations in the Mining Sector

- Canadian (26.2%) and Australian (24.8%) companies accounted for 51% of worldwide investment in mining during the period 1992-98, which amounted to some US\$ 19 billion. Investment grew during 1992-97, albeit shrinking in 1998. Canadian investments were around US\$ 5.0 billion, followed by investment by Australian companies at US\$ 4.7 billion, by U.S. companies at US\$ 3.4 billion, by European companies at US\$ 2.8 billion, African companies at US\$ 1.7 billion, Latin American companies at US\$ 800 million, and Asian companies at US\$ 500 million.
- During the period 1992-97, the foreign mineral prospecting budgets of the largest Canadian mining companies grew by a total of 45%, a sign of the readiness of such companies to invest in the sector.
- In 1997, the largest Canadian mining companies (which invest more than US\$ 3.0 million per year in mineral prospecting) invested some US\$ 300 million in their own country, as well as US\$ 800 million outside it. It should be noted that total Canadian investments in mining throughout the world amounted to US\$ 1.1 billion, represented 28% of total global investment by Canadian companies. The largest share of this total was directed towards Latin America.
- During 1997-98 junior companies invested some US\$ 600 million per year. During the 1990s, domestic investment by the same companies peaked in 1996 at US\$ 220 million, with significant additional investment in other regions. This level of investment was not repeated in 1997 and 1998, due to their difficulty in raising equity finance on the Vancouver and Toronto stock exchanges in the wake of a number of unsuccessful projects.
- World investment in mining amounted to some US\$ 2.8 billion in 1998, a 31% reduction with respect to 1997 that was largely a result of the international financial crisis that resulted in:
  - a fall in commodity prices;
  - a reduction in demand for end products, and
  - low confidence on the part of international investors in emerging markets;
- Large local corporations based in Latin America (Codelco, CVRD, Minero Peru, etc.) made direct investments in mining research and development of US\$ 132 million in 1998, and approximately US\$ 837 million over the period 1992-98, accounting for only 4.4% of the US\$ 19 billion of global investment in mining during the same period.

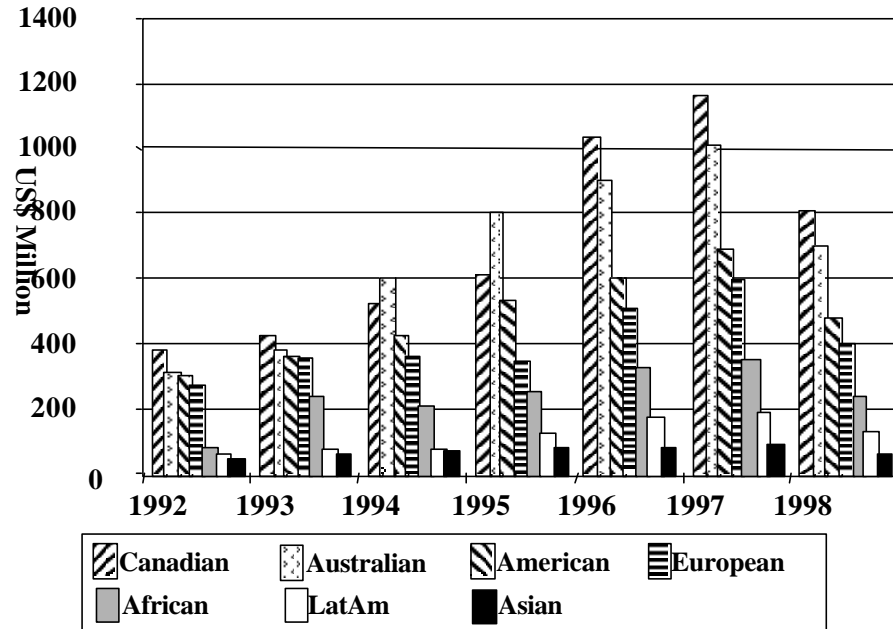
### **Worldwide Foreign Investment in Mining Large Companies - 1992-98**

	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>Total</b>	US\$ million
									<b>%</b>
Canadian	385	427	524	610	1,037	1,166	806	4,955	26.2
Australian	310	383	598	799	878	1,010	697	4,695	24.8

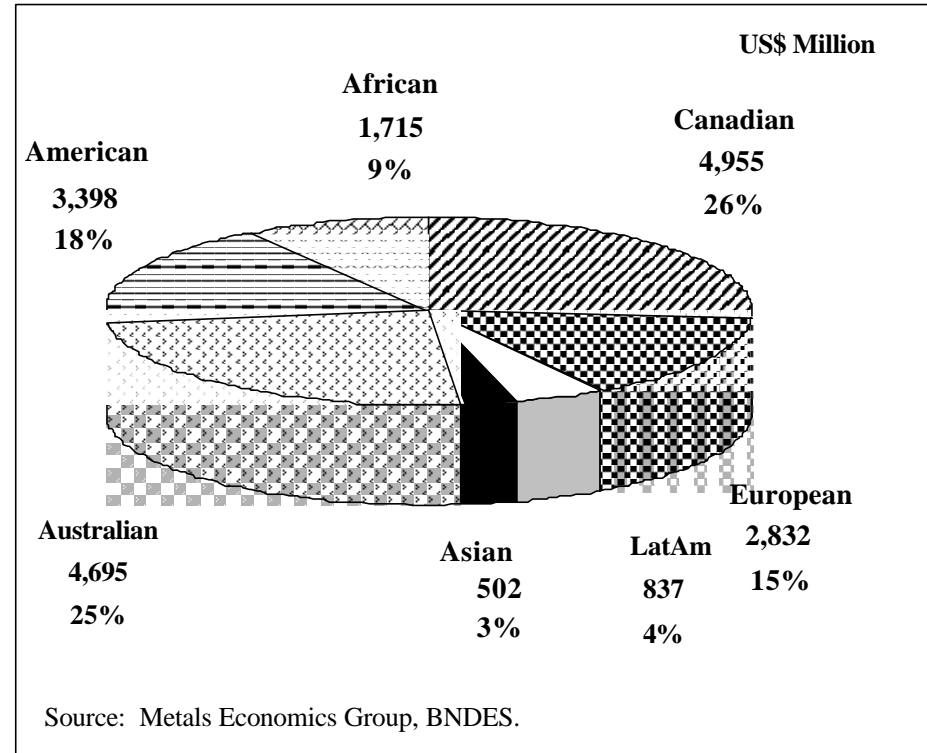
American	308	361	417	534	603	696	479	3,398	17.9
European	270	356	360	342	510	590	404	2,832	15.0
African	85	245	207	255	330	350	243	1,715	9.0
Latin American	64	75	75	128	171	192	132	837	4.4
Asian	42	64	68	85	83	96	64	502	2.7
<b>Total</b>	<b>1,464</b>	<b>1,911</b>	<b>2,249</b>	<b>2,753</b>	<b>3,632</b>	<b>4,100</b>	<b>2,825</b>	<b>18,934</b>	<b>100.0</b>

Source: Metals Economics Group and BNDES.

## Foreign Investment in Mining Large Companies - 1992-98



Sources: Metals Economics Group, BNDES.



Source: Metals Economics Group, BNDES.

---

### *2.2.2. Destination of Investments by Large Corporations in the Mining Sector*

- During the period 1992-97, US\$ 5.0 billion, or 26.2% of global investment of US\$ 19 billion by the largest mining companies in the world, was directed towards Latin America, showing the willingness on the part of such corporations to invest in the region. As a result, such investment grew at an average annual rate of around 24% between 1992-98.
- The highest level of investment in Latin America was reached in 1997, when it received US\$ 1.2 billion or 28.8% of all investment in mining in that year.
- In 1998, investment in Latin America fell by 30.4% to US\$ 814 million, albeit with the region maintaining its 28.8% share of worldwide investment.
- During the period 1992-97, significant growth was observed in mining investment in Africa, with high levels of spending there by sector multinationals.
- It should be highlighted that during the period 1992-98, the large mining corporations continued to invest significant amounts in their home countries, such as Canada (13.2% of total), Australia (9.0%) and the U.S. (12.1%), particularly in copper, gold, zinc and nickel. The same was observed with regard to South Africa, and certain Pacific Rim/South East Asian countries. Taken as a whole, Africa, Asia, Europe and the CIS accounted for almost 30% of investment in mining during the period 1992-98.

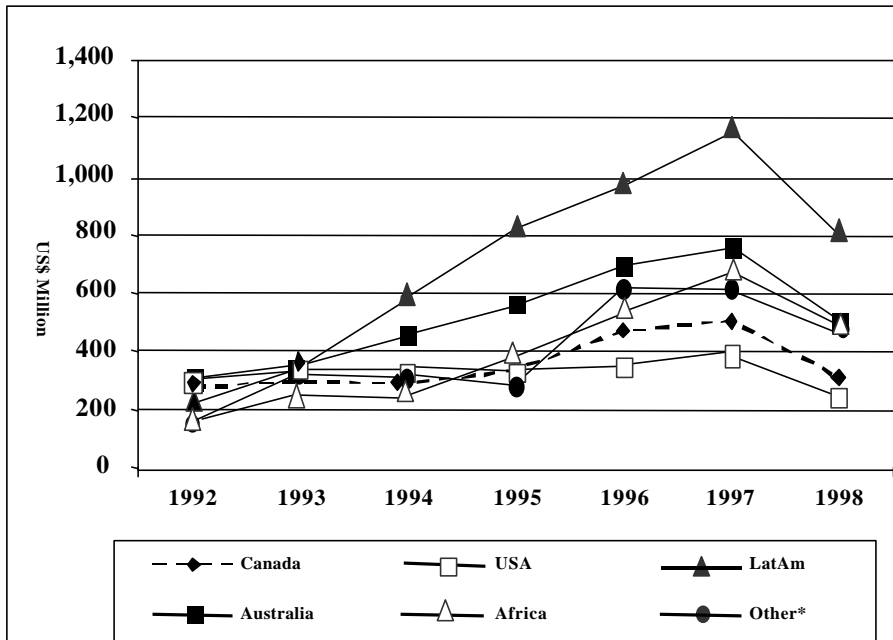
**Destination of Worldwide Investment in Mining  
Large Sector Corporations - 1992-98**

	US\$ Million								
	1992	1993	1994	1995	1996	1997	1998	Total	%
Canada	285	300	293	338	465	500	308	2,489	13.2
U.S.	323	338	323	330	345	390	243	2,291	12.1
Latin America	225	345	593	833	975	1,170	814	4,955	26.2
Australia	308	323	458	563	690	755	495	3,591	19.0
Africa	165	255	270	405	548	675	490	2,807	14.7
Other*	159	351	314	284	609	610	475	2,801	14.8
<b>Total</b>	<b>1,464</b>	<b>1,911</b>	<b>2,249</b>	<b>2,753</b>	<b>3,632</b>	<b>4,100</b>	<b>2,825</b>	<b>18,934</b>	<b>100.0</b>

Sources: Metals Economics Group, BNDES.

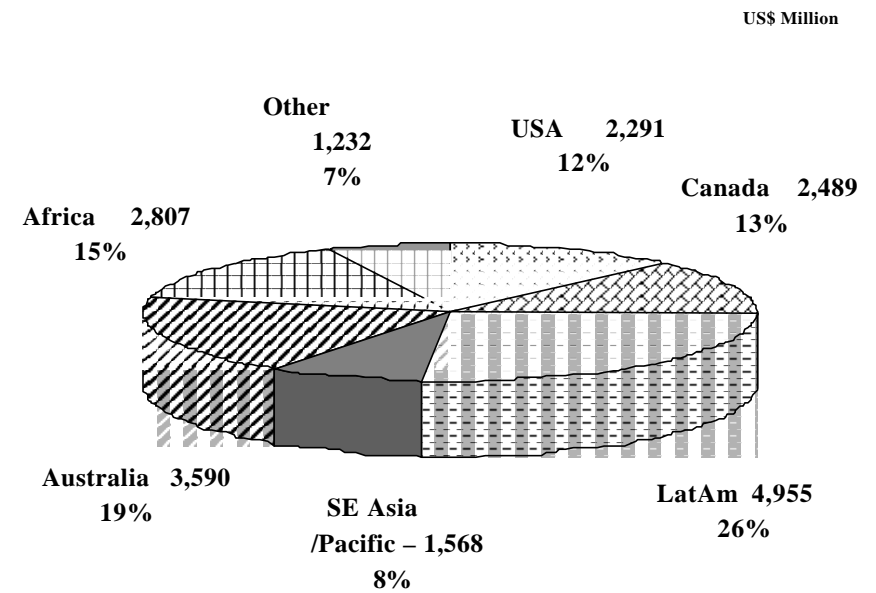
\* Asia, Europe, CIS

## Destination of Worldwide Investment in Mining Large Sector Corporations - 1992-98



Sources: Metals Economics Group, BNDES.

\*Asia, Europe, CIS, etc.



Sources: Metals Economics Group, BNDES.

---

## ***2.3. Flows of New Investments in Mining to Latin America***

### ***2.3.1. Principal Investments by Large Corporations in Latin America***

#### ***1992-98 and Outlook***

- Latin America continues to be the region of the world that attracts the most interest in mineral prospecting, despite the growing attractiveness of Africa.
- Factors such as the geological and market potential, mining legislation, political and economic stability, infrastructure and security are taken into account in establishing the attractiveness of countries.
- Chile, Argentina, Peru, Brazil and Bolivia accounted for 43.5% of all investments in Latin America in recent years. At the end of 1998, *Mining Journal* cited the first four of these countries as the most attractive destinations in Latin America for international investment in mining. While less attractive, Bolivia, Mexico, Venezuela and Panama may be added to this list. Outside the region, South Africa, Indonesia and New Guinea also have attractive mining prospects.
- Having said this, as a result of the reduction in worldwide investment in mining, projections point to a fall in investment in mining in Latin America in 1999, as occurred in 1998 with respect to 1997. Latin America should nevertheless maintain its 29% share of overall investments by large international corporations, equivalent to some US\$ 2.4 billion during the period 1999-2002.
- The recent “Complementary Mining Treaty” signed between Argentina and Chile favors a potential increase in new investment in these countries.
- For the period 1997-2007, there is evidence that around 20 copper extraction projects are under study/in the process of implementation, representing investments of approximately US\$ 12 billion; gold prospecting projects account for investments of US\$ 3.1 billion, non-ferrous metal projects for US\$ 1.3 billion, and iron ore projects for US\$ 1.9 billion.
- In Venezuela the Loma de Níquel (Minorco) mining and smelting project is currently underway, absorbing investment of US\$ 450 million, and is due to begin operations in 2000. The Las Cristinas (Placer Dome/CVG) gold project is also under construction, entailing investment of US\$ 576 million, while implementation of two iron ore projects could begin during 1999-2000: one project (BHP/Sivensa) will account for investment of US\$ 650 million, while another that is integrated with a pelletization plant (Ferrominera/Kobe Steel) represents investment of US\$ 1.3 billion. In Mexico, investments of US\$ 248 million in copper and gold are currently under study.

## Effective and Projected Investment in Mining in Latin America Large Sector Corporations – 1992-2002

US\$ Million

Annual Average	1992	1993	1994	1995	1996	1997	1998	*1999-2002
Latin America (A)	225	345	593	833	975	1,170	814	2,350
World (B)	1,464	1,911	2,249	2,753	3,632	4,100	2,825	8,150
(A/B) %	15.4	18.1	26.4	30.3	26.8	28.5	28.8	29.0

Source: Metal Economics Group. \* BNDES estimate.

### 2.3.2. *New Investments in Mining in Chile*

- The country is cited as the first choice among international investors. Since 1993, it has maintained an average rate of GDP growth of 7.9%, reaching US\$ 77.8 billion in 1997. Its Gross Mining Product is in excess of US\$ 6.5 billion. Inflation remains under control, while investment in mining, by the government, the domestic private sector and foreign investors is growing, with foreign investment reaching US\$ 1.5 billion in 1997. Codelco, the principal state-owned company, is also making heavy investments in copper and gold, with these amounting to US\$ 850 million in 1997. Among the large multinational corporations that are active within the country, there is a notable predominance of Canadian and Japanese companies.
- Chile has enormous mining potential that is being exploited through large-scale projects that began with the copper cycle, such as Escondida (BHP/Rio Tinto), which is the largest copper and the third largest producer of gold; Andina and Chuquicamata (both Codelco projects), and Candelária (Phelps Dodge/Sumitomo). Heavy investments are being channeled to the Collahuasi project (Minorco/Falconbridge), which should produce 380,000 metric tons per year starting in 2000, at a cost of US\$ 1.8 billion. Official copper reserves are estimated at 32% of known world reserves. On the basis of current conditions, production is expected to reach 4.3 million metric tons in 2000, or almost 40% of world output.
- Gold reserves total 699,000 metric tons, with annual production of around 50 metric tons. With the starting up of the Pascua project, a significant increase in domestic gold production is expected. New estimated reserves are in excess of 360,000 metric tons. Estimated reserves of molybdenum stand at 1.1 million tons, corresponding to 20% of world reserves.
- In 1997, exports of copper products amounted to 85% of total export volumes, which reached US\$ 8.5 billion. Of this amount, 35% was exported by the state-owned company, Codelco, and around 50% by foreign companies, and other small- and medium-sized companies.
- Planned investment in mining is projected at a significant US\$ 6.0 billion during the period 1999-2002, including foreign investment, investment by state-owned companies (Codelco and Enami), as well as investment by domestic private sector companies in association with foreign companies.

**Projected Investments in Mining in Chile  
1999-2002**

<b>Project</b>	<b>Stage</b>	<b>Company</b>	<b>Product (Estimated Production)</b>	<b>Operation</b>	<b>Investments (US\$ Million)</b>
Los Pelambres	Under Construction	Nippon Mining (Japan) Mitsubishi (Japan) Grupo Luksic (Chile)	Concentrated copper (255,000 t/year)	1999	1,300
Cerro Casale	Pre-Feasibility	Placer Dome (Canada) Bema Gold (Canada) Arizona Star (Canada)	Concentrated copper (128,000 t/year)  Concentrated Gold (30,000 t/year)	2000/01	1,330
Pascua / Nev.	Pre-Feasibility	Banrick Gold (Canada)	Gold (12,000 kg/year)	2000	500
Spence	Pre-Feasibility	Rio Algom (Canada)	Concentrated/cathode copper (100,000 t/year)	2001	350/450
El Peñón	Feasibility	Mendian Gold (Canada)	Gold (4,500 kg/year) Silver (70,000 kg/year)	99/2000	100
Leonor Tesoro	Funding	Equatorial Mining (Australia) Grupo Luksic (Chile)	Cathode copper (75,000 t/year)	99/2000	300
Atacama Kozán	Under Study	Cominor (Chile) Nittesu Mining (Japan)	Concentrated copper (25,000 t/year)	2000	150
Collahuasi	Implementation	Minorco/Falconbridge (South Africa/Australia)	Refined copper (380,000 t/year)	2000	1,800

Source: *Sociedad Nacional de Minería*.

---

### 2.3.3. *New Investments in Mining in Argentina*

- With GDP of US\$ 324 billion (1997), Argentina accounted for mining output of US\$ 665 million in 1997, representing 0.2% of its GDP. In 1998, mining output jumped to US\$ 1.15 billion, with official projections indicating output of US\$ 2.8 billion in 2002.
- As a result, production and exports have grown rapidly. Argentine mining production grew at an average annual rate of 8.9% during the period 1992-97, and is expected to grow at an annual rate of 20% over the next four years, with annual growth in exports of around 30% projected for the same period.
- The main minerals produced are copper, lead, zinc, precious metals, uranium, coal and borate.
- The share of total output represented by metals has also been growing significantly, rising from 7.4% in 1996 to 24.6% in 1997, and expected to reach 66% in 2000, due to the development of new projects.
- Despite the lack of tradition in the sector, the country offers stable conditions for mining activity. In 1992, a study of specific mining legislation was begun, with a view to providing security for local and foreign companies. This culminated in the “Ley de Inversion Minera” [Law of Mining Investment] in 1993.
- Government policy is directed towards the organization of the sector, on the basis of the “*Plan de Acción Minero: 1996-2000*” [Mining Action Plan: 1996-2000].
- In 1992, only 4 foreign companies were active in research and prospecting activities, investing less than US\$ 10 million. At present, 68 international and 8 domestic companies are currently active, investing some US\$ 100 million per year in research since 1995.
- Bajo de la Alumbrera (US\$ 1.2 billion) and Salar del Hombre Muerto began production in 1997, and are considered to be the principal mining projects, together with El Pachón (Cambior), Agua Rica and Cerro Vanguardia (the latter of these projects in copper and gold), collectively accounting for investment of US\$ 1.8 billion. For the period 1999/2002, there are plans to invest around US\$ 3.3 billion.

## Effective and Projected Investments in Mining in Argentina 1997-2002

Project	Region	Product	Operation	Investment – US\$ million
Bajo de La Alumbreira	Catamarca	Copper and Gold	1997	1,240
Solar del Hombre Muerto	Catamarca	Lithium	1997	137
Cerro Vanguardia	Santa Cruz	Gold and Silver	1998	270
Potasio Río Colorado	Mendoza	Potassium	2000	150
El Pachón	San Juan	Copper	2001	900
Piriquitas	Jujuy	Tin and Silver	2000	1,000
San Jorge	Mendoza	Copper	2000	110
Água Rica	Catamarca	Copper/Nickel	2002	900

Source: *Ministerio de Economía y Obras y Servicios Públicos* [Ministry of Economics, Public Works and Services].

### *2.3.4. New Investment in Mining in Peru*

- Peruvian mining output grew by 8.7% in 1997, reaching US\$ 3.3 billion, or 5% of GDP of US\$ 65 billion.
- The Peruvian mining sector is continuing to receive investments, with 55 mining companies currently active, due to the simplification of access to mining assets, and the promotion of conditions and guarantees that are favorable to investment.
- In addition, the country has overcome internal political problems, and has been consolidating the privatization of sector companies. The government has already transferred seven large mining operations to the private sector, including Cerro Verde, Tintaya, Hierro Peru and Centromin.
- Within Latin America, Peru is already the largest producer of gold, zinc, lead and cadmium, and the second largest producer of silver, copper, tungsten and tin.
- Given clear and stable rules, the continuation of the privatization process will entail constant investment. The following projects that are in progress are also of significance: Antamina (Rio Algon/Noranda/Teck/Mitsubishi) for the production of copper and zinc, absorbing total investment of US\$ 2.0 billion, and due to begin operations in 2002; Pierina (Barrick Gold) for the production of gold and silver, absorbing total investment of US\$ 300 million, and due to begin operations in 1999, with a useful life of 10 years. Two other copper projects, La Granja (Cambior) and Cuajuone (Southern Peru Copper), should together absorb investment of some US\$ 1.6 billion. On the basis of investments in progress, copper production should reach 1.0 million metric tons, and gold 139 metric tons by 2004.

- 
- Potential investment in mining during the period 1999-2004 is estimated at around US\$ 5.0 billion, against a previous projection of US\$ 7.4 billion, with some US\$ 200 million due to be spent on mining research. As a result, mining exports, which currently account for 47% of national exports, are expected to double over the same period.

**Projected Investments in Mining Research in Peru  
1998-2002**

<b>Project</b>	<b>Company</b>	<b>Product</b>	<b>Period</b>	<b>Investment - US\$ million</b>
Sabrina	Buenaventura / Britannia Gold	Gold	-	2.5
La Arena	Cambior	Gold	-	5.0
Distrito de San Vicente	San Ignacio de Morococha / Phelps Dodge	Gold	-	-
Felix	Southwestern Gold / Pan American Silver	Gold	1998-2001	6.0
Proyeto Puno	Southwestern Gold / Newmont	Gold	1998-2002	3.0
Las Huaquillas	Sullider Exploration	Gold	-	-
Rio Palca	Southwestern Gold / Minorco	Gold	-	-
Poracota	Southwestern Gold / Teck	Gold	1999-2002	4.0
Tantahuatay	Buenaventura / Southern	Gold	-	-
Tres Cruces	Oro Peru Resources / Pan American Silver	Gold	-	-
Pacapausa	Southwestern Gold / Minorco	Gold	1998-2001	2.0
Santo Tomas	Southwestern Gold	Gold/Copper	-	4.0
Area Norte de Yanacocha	Solitario Resources / Placer Dome	Gold/Copper	1998-2002	44.0
Minas Conga	Buenaventura / Newmont	Gold/Copper	-	-
San Gregorio	El Brocal	Zinc	-	16.0
Soloco	Solitario Resources / Billington Exploration	Zinc	1998-2002	5.0
Bongará	Solitario Resources / Comingo	Zinc	1998-2002	27.5
<b>Total</b>				<b>119.0</b>

Source: *Sociedad Nacional de Minería, Petróleo y Energía, Minérios y Minerales* [National Mining, Oil and Gas, Ores and Minerals Company] (Edition 237, Year 18, April 1999)

### Projected Investment in Mining Projects in Peru: 1999-2004

Stage	Project	Company	Product	Investments - US\$ million	
Under Study	Yanacocha (Quinua)	Newmont / Buenaventura	Gold	60	
	Minas Conga	Newmont / Buenaventura	Gold	100	
	Tantahuatay	Southern / Buenaventura	Gold	50	
	La Arena	Cambior	Gold	60	
	San Gregorio	El Brocal	Zinc	310	
	Yauliyacu	Minera Yauricmayo	Lead/Silver/Zinc	90.2	
	Berenguela	Kappes and Cassidey / International Turnigan	Copper/Silver	38.1	
	Bongará	Solitario Resources / Comingo	Zinc	28.0	
	San Antonio de Poto	Andrade Gutierrez Mineração	Gold	9.5	
	Mishki	Minera Sunshine del Peru	Gold	0.4	
	Under Development	Antamina	Rio Algom / Noranda / Teck / Mitsubishi	Copper	1,950
		Pierina	Barrick / Mischichilca	Gold	300
	Being Implemented	Toquela-Cuajone	Southern	Copper	1,580
Cerro Verde		Cyprus Amax Minerals	Copper	238.8	
BHP Tintaya		BHP	Copper	150	
Shouhang		Shouhang Corp.	Iron	100	
Minsur		Minsur	Tin	30	
Postponed	La Granja	Cambior	Copper	1,100	
	Quellaveco	Mantos Blancos (Chile)	Copper	750	
	Quilcay	Centromin	Gold	191.7	
	Cerro Corona	Grupo Gubbins	Copper/Gold	382	
	Cerro Negro	Cyprus Amax Minerals	Copper	99	
	Los Calatos	Phelps Dodge	Copper	4.7	
<b>Total</b>				<b>7,346,4</b>	

Source: *Minérios e Minerales* [Ores and Minerals] (Edition 237, Year 18, April 1999)

#### 2.4. Evolution of Mineral Commodity Prices

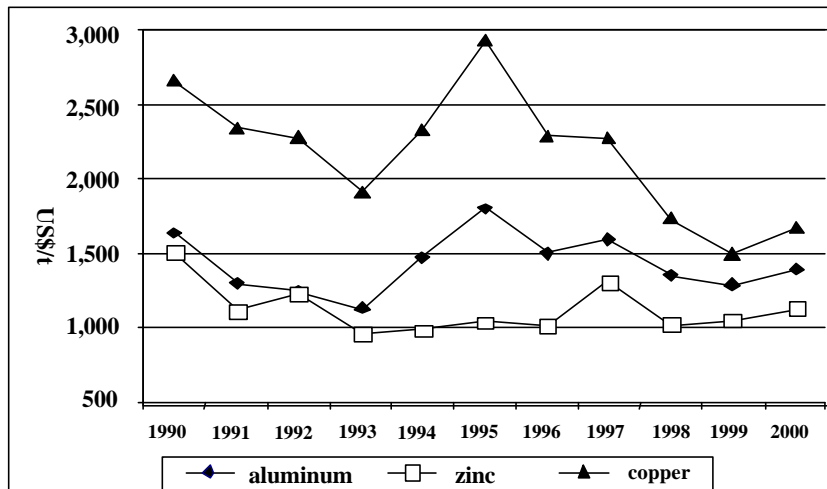
- During the period 1990-93, the prices of the principal commodities fell sharply.
- During the period 1993-95, prices recovered to a satisfactory extent, although this trend was not subsequently maintained.
- During the period 1995-99, due to various localized crises, prices fell sharply, particularly during the last three years.
- Prices are expected to recover during 1999, rising to new levels during 2000.

## Principal Minerals and Metals

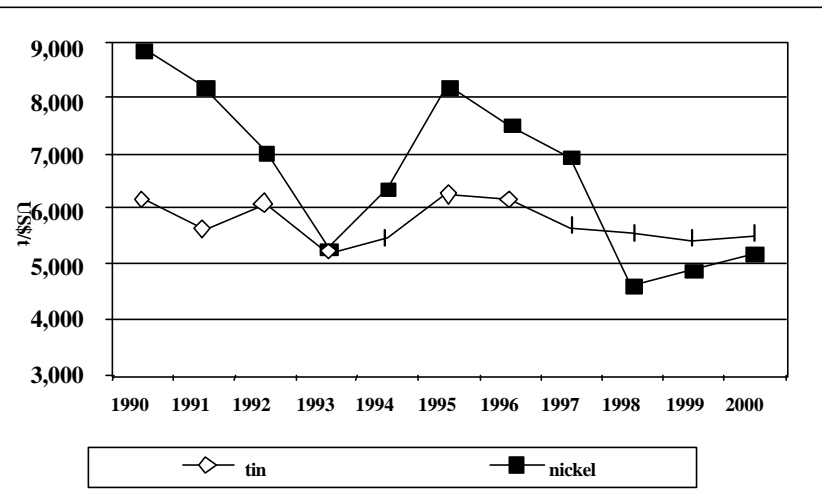
Product	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999*	2000*
Aluminum	1,640	1,303	1,254	1,138	1,479	1,804	1,507	1,597	1,350	1,290	1,390
Alumina	314	179	162	167	120	264	174	207	175	167	180
Bauxite	32.3	26.8	23.4	23.1	22.5	21.7	23.1	23.2	23.9	23.0	23.5
Iron – fines	17.5	19.3	18.7	16.6	15	16.2	16.3	16.7	17.2	15.2	16.0
Pellets	32.9	33.8	31.9	28.9	28.6	30.7	32.7	33.3	34.2	31.7	33.3
Gold (US\$/oz)	384	362	344	360	384	385	388	331	296	270	280
Zinc	1,519	1,117	1,240	962	998	1,043	1,025	1,316	1,030	1,050	1,140
Copper	2,665	2,337	2,282	1,914	2,333	2,935	2,296	2,275	1,740	1,500	1,670
Tin	6,148	5,599	6,088	5,162	5,465	6,217	6,162	5,641	5,530	5,380	5,500
Nickel	8,863	8,179	7,010	5,291	6,349	8,223	7,496	6,907	4,610	4,870	5,180

Sources: Warburg Dillon Read, CVRD Annual Report, Publications, SINFERBASE, ABAL. \* BNDES estimate.

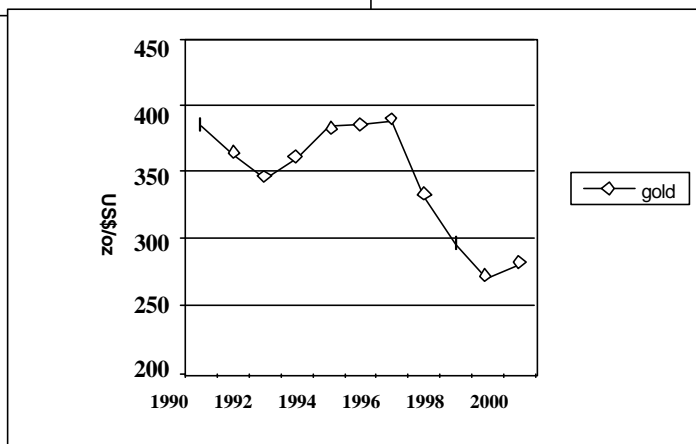
## Evolution of Prices of Principal Metals



Sources: Warburg Dillon Read, Periodicals, Companies, BNDES.



Sources: Warburg Dillon Read, Periodicals, Companies, BNDES.



---

## ***2.5. International Mining Outlook***

The current international mining scenario is characterized by:

- Excess supply
- Depressed prices
- Stable/falling demand for minerals/metals
- High cost and low availability of capital for investment
- Reduced profitability
- Poor performance of mining sector shares compared with new technology shares

## ***2.6. Worldwide Restructuring of Mineral Sector***

The recessionary scenario is characterized by:

- The postponement of certain projects
- The closure of less competitive mines
- The need for ongoing restructuring through mergers, acquisitions, associations, etc.
- The search for greater competitiveness

## ***2.7. Recent Restructuring Trends in the Mining Sector***

- At international level, mergers and incorporations within the mining sector increased by 30% in 1998 with respect to 1997, with this restructuring trend expected to continue over the next two years.
- A merger is currently in progress of the iron ore operations of the Australian group, Broken Hill Proprietary (BHP), and the Anglo-Australian group Hammersley, that is owned by Rio Tinto Zinc (RTZ). If negotiations are fruitful, the combined companies should produce around 125 million metric tons of ore, becoming the world's largest producer, ahead of CVRD (which produces around 100 million metric tons per year). The two companies rank ahead of Rober River, MBR, Iscor, LKAB and IOC.
- In copper production, Nippon Mining, the largest copper refiner in Japan, and LG Metals, a copper producer owned by the South Korean group, LG Group, have signed a letter of intent for the formation of a joint venture.
- The South African group, Anglo American, has merged its operations with Minorco, its operating arm outside South Africa. Its gold operations will become the responsibility of its subsidiary, Anglo Gold, while its basic metals and fertilizer operations will be assigned to

---

Anglo American Plc, the successor to Minorco in these activities. Within Brazil, its gold operations will be concentrated in Morro Velho Participações, a subsidiary of Anglo Gold.

- CVRD has acquired from Caemi, 36% of the capital of Pará Pigmentos (PPSA) a producer of kaolin for coatings, thereby becoming the majority owner. Caemi had previously maintained contacts with the U.S. group, Thiele Kaolin Co, with a view to the latter taking a stake in Cadam, another large producer of kaolin within the Caemi group, in order to achieve a greater penetration of the U.S. market.

### **3. Brazilian Outlook**

#### ***3.1. Importance of the Country in the International Outlook***

- **One of the ten largest economies of the world**
- **Sixth most populous country** - 161.7 million inhabitants
- **Fifth largest country by area** - 8.5 million km<sup>2</sup>
- **1997 GDP** - US\$ 802 billion = R\$ 866 billion
- **1998 GDP** - US\$ 803 billion = R\$ 901 billion
- **GDP growth (%):**   **1995** **1996** **1997** **1998** **1999E**  
                                  4.20 2.90 3.68 0.15 (1.00)
- **1997 per capita income** - US\$ 5,020 = R\$ 5,414
- **1998 per capita income** - US\$ 4,959 - R\$ 5,569
- **Within Latin America :**   40% of the population  
  39% of GDP

#### ***3.2. Trade Flows***

- The change in exchange rate policy in January 1999, should lead to a gradual increase in exports and a reduction in imports, with a consequent improvement in the trade balance, that could turn positive before the end of 1999.

	US\$ billion				
<b>Foreign Trade Flows</b>	<b>1991</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999<sup>E</sup></b>
Trade Balance	52.6	100.9	114.3	108.7	98.4
Exports	31.6	47.7	52.9	51.1	49.7
Imports	21.0	53.2	61.3	57.5	48.7
<b>Balance</b>	<b>10.6</b>	<b>(5.5)</b>	<b>(8.4)</b>	<b>(6.4)</b>	<b>1.0</b>

<sup>E</sup> BNDES estimate.

### ***3.3. Mining Activity in Brazil - 1998***

The mining sector in Brazil is of great importance to the overall economy:

- **Mining Gross Domestic Product – Mining GDP** - 2% of GDP
- **Product of extractive mining industry** - 1% of GDP
- **Product of primary mineral industry** - 3% of GDP
- **Product of mineral transformation industry** - 8% of GDP
- **Employment in extractive/primary transformation industries** - 1.5 million jobs
- **Number of companies** - 1,400 active mining companies

\* BNDES estimate.

#### ***3.3.1. Mining Gross Domestic Product - Mining GDP***

Regional distribution of Mining Gross Domestic Product – Mining GDP (by value)

North East	12%
Center-West	7%
North	23%
South East	52%
South	6%

---

The states of Minas Gerais (40%), Pará (20%), São Paulo (10%), Bahia (8%) and Goiás (6%) represent 84% of mining GDP.

By production value, metal products represent 64.5% of Mining GDP, while non-metallic minerals represent the remaining 35.5%. Among metallic minerals, four products account for 88.9% of the total: namely iron ore (68.6%), followed by gold (10.5%), bauxite (7.2%) and manganese (2.6%).

Despite the obstacles that still confront the development of the Brazilian mining sector, Mining GDP has been growing at satisfactory rates, both for minerals and fossil fuels.

- **Brazil**

### Mining Gross Domestic Product

US\$ billion

	1991	1996	1997	1998	Growth % 1998 vs. 1997	Avg. Annual Growth 1991-98
Minerals	5.5	6.6	7.4	7.7	+ 4.24	4.9 %
Fossil fuels	5.3	5.4	6.9	8.1	+ 17.39	6.3 %
<b>Total</b>	<b>10.8</b>	<b>12.0</b>	<b>14.3</b>	<b>15.8</b>	<b>+ 10.73</b>	<b>5.6 %</b>

Source: DNPM.

- **Other Countries\***

### Mining GDP

US\$ billion

	1997
Canada	12.7
Australia	12.5
South Africa	11.5
Chile	6.5
Peru	3.3
Argentina	0.7

Source: DNPM and publications. \* Value of mining GDP, excluding fossil fuels.

---

### 3.3.2. Importance of Brazilian Mining - 1997

Brazil has a notable position in the international mining sector, since it is one of the ten largest countries in the world for a series of important minerals, both in terms of levels of reserves, and of output.

Mineral	Reserves		Production	
	Position	Share of World Res. (%)	Position	Share of World Prod'n (%)
Niobium	1 <sup>st</sup>	84.0	1 <sup>st</sup>	91.0
Kaolin	2 <sup>nd</sup>	12.7	3 <sup>rd</sup>	6.7
Bauxite	5 <sup>th</sup>	6.6	4 <sup>th</sup>	9.9
Iron	7 <sup>th</sup>	7.3	2 <sup>nd</sup>	18.1
Manganese	6 <sup>th</sup>	1.1	4 <sup>th</sup>	12.5
Tin	5 <sup>th</sup>	8.0	4 <sup>th</sup>	9.0
Zinc	7 <sup>th</sup>	1.3	7 <sup>th</sup>	1.9
Gold	8 <sup>th</sup>	4.2	10 <sup>th</sup>	2.4

Source: DNPM, Mining Summary 1997.

### 3.3.3. Market for Minerals and Basic Metals - 1997/98

In 1998, according to the DNPM, growth in production of the following metallic minerals was particularly significant: bauxite (+8.5%), kaolin (+18,3%), iron ore (+5.5%), niobium (+22.7%), manganese (+22.2%) and nickel (+4.8%). Output of the following fell: copper (-14.0%), chromium (-19.8%), cassiterite (-23.4%), gold (-15.4%) and zinc (-19.2%).

'000 t

	Production 1998	Production 1997*	Consumption 1997	Exports 1997	Imports 1997	% Net Exports 1997**
<b>Bauxite</b>	11,704	11,504	7,310	4,374	39.8	38
<b>Alumina</b>	3,349	3,088	2,398	606	5.4	19
<b>Aluminum</b>	1,208	1,189	647	816	143	57
<b>Lead (concentrate)</b>	12	14	4	11	2	64
<b>Cement</b>	42,000	38,070	38,275	302	510	(0.6)
<b>Copper (metallic)</b>	150	180	305	35	110	(42)
<b>Copper (primary)</b>	33,5	40	180	0	140	(350)
<b>Tin (conc'd ore)</b>	14,6	18	0	0	0	0
<b>Tin (metallic)</b>	17	18	5	13	0	72
<b>Iron (million t)</b>	195	187	50	140	0	75
<b>Nickel (conc'd ore)</b>	20	17	15	7	8	(6)
<b>Gold (metal in t)</b>	49	59	20	48	9	66
<b>Zinc (primary)</b>	125	153	363	0	210	(138)
<b>Zinc (metallic)</b>	152	186	165	25	6	10
<b>Steel (rolled)</b>	<b>23,289</b>	<b>24,149</b>	<b>15,300</b>	<b>9,200</b>	<b>800</b>	<b>35</b>

Source: 1998-DNPM – Mining Summary (1998 - preliminary), Abal, BNDES.

\* Some data was taken from Statistical Reports for certain sectors, differing from data provided by the DNPM.

\*\* (exports – imports)/production 1997

### 3.3.4. Exports and the Mining-Metals and Steel Trade Balance

In 1998, the trade balance for the mining sector registered a surplus of US\$ 1.9 billion according to the definition of the DNPM, which includes oil and gas. Excluding these products, the balance rises to US\$ 7.5 billion. Using the methodology based on the production chain for metallic minerals, the behavior of non-metallic minerals and the steel sector, according to IBS definitions, the comparative data for the trade balance is as follows:

US\$ billion

	1996	1997	% Growth 1997/96	1998	% Growth 1998/97
Exports of minerals/metals	6.0	6.1	+ 1.7	5.8	(4.9)
Exports of steel	3.4	3.1	(8.8)	2.7	(12.9)
Total exports	9.4	9.2	(2.1)	8.7	(4.8)
<b>Balance for minerals/metals</b>	<b>3.0</b>	<b>2.8</b>	<b>(6.7)</b>	<b>2.5</b>	<b>(10.7)</b>
<b>Balance for steel</b>	<b>2.9</b>	<b>2.3</b>	<b>(20.6)</b>	<b>1.8</b>	<b>(21.7)</b>

Source: DNPM – Mining Summary, BNDES.

It may be observed that the mining/metals sector is one of the industrial sectors within Brazil that makes the greatest contribution to Brazilian exports.

### 3.3.5 Exports/Imports of Minerals and Basic Metals

Within the Brazilian mining sector, the major generators of positive trade balances are iron ore, components of the aluminum chain, and gold, with these having together contributed some US\$ 4.5 billion over the last 3 years. It is also notable that the trade balance for other minerals and basic metals has been increasingly negative, reaching US\$ 1.8 billion in 1998. The overall trade balance has been positive but shrinking, registering US\$ 2.5 billion in 1998.

US\$ billion

	Exports			Imports			Balance		
	1996	1997	1998	1996	1997	1998	1996	1997	1998
Iron	2.7	2.9	3.2	0	0	0	2.7	2.9	3.2
Aluminum	1.6	1.6	1.2	0.4	0.5	0.5	1.2	1.1	0.7
Gold	0.6	0.5	0.4	0	0	0	0.6	0.5	0.4
<b>Subtotal</b>	<b>4.9</b>	<b>5.0</b>	<b>4.8</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.3</b>
Other	1.1	1.1	1.0	2.6	2.8	2.8	(1.5)	(1.7)	(1.8)
<b>Total</b>	<b>6.0</b>	<b>6.1</b>	<b>5.8</b>	<b>3.0</b>	<b>3.3</b>	<b>3.3</b>	<b>3.0</b>	<b>2.8</b>	<b>2.5</b>

Source: DNPM – Mining Summary, BNDES.

### 3.3.6. Exports/Imports of Other Minerals and Basic Metals - 1997

Copper, lead and zinc have shown negative trade balances, while tin and nickel have registered positive ones.

US\$ million

	Exports		Imports		Balance		
	Metallic	Concentrate	Metallic	Concentrate	Metallic	Concentrate	Total
Lead	0.2	1.6	37.5	0	(37.3)	1.6	(35.7)
Copper	83.9	0	282.4	276.5	(198.5)	(276.5)	(475.0)
Tin	64.9	0	1.8	0	63.1	0	63.1
Nickel	77.4	0	71.2	0	6.2	0	6.2
Zinc	33.3	0	10.2	88.5	23.1	(88.5)	(65.4)
<b>Subtotal</b>	<b>259.7</b>	<b>1.6</b>	<b>403.1</b>	<b>365.0</b>	<b>(143.4)</b>	<b>(363.4)</b>	<b>(506.8)</b>
Other	451.5	438.9	695.7	1,372.6	(244.2)	(933.7)	(1,177.9)
<b>Total</b>	<b>711.2</b>	<b>440.5</b>	<b>1,098.8</b>	<b>1,737.6</b>	<b>(387.6)</b>	<b>(1,297.1)</b>	<b>(1,684.7)</b>

Source: DNPM – Mining Summary, BNDES.

### 3.3.7 Exports/Imports of Other Minerals and Basic Metals – 1997

#### With a Positive Trade Balance

This group includes niobium, ornamental rocks, manganese and kaolin, all with positive trade balances that together were responsible for a surplus of US\$ 566.7 million. The other eight minerals with positive surpluses contributed only US\$ 79.5 million.

US\$ million

	Exports		Imports		Balance		
	Metallic	Concentrate	Metallic	Concentrate	Metallic	Concentrate	Total
Niobium	211.6	0	0	0	211.6	0	211.6
Ornamental rocks	0	191.6	0	28.6	0	163.0	163.0
Manganese	68.6	53.2	10.8	0	57.8	53.2	111.0
Kaolin	7.9	84.6	10.0	1.4	(2.1)	83.2	81.1
Asbestos	54.4	30.4	35.3	19.1	19.1	11.3	30.4
Diamonds	0.6	32.0	9.3	8.1	(8.7)	23.9	15.2
Graphite	0	14.5	0	0.5	0	14.0	14.0
Magnesite	0	13.8	0	3.8	0	10.0	10.0
Chromium	8.4	5.8	6.0	2.2	2.4	3.6	6.0
Titanium	12.3	0	9.2	0.9	3.1	(0.9)	2.2
Vermiculite	0	1.1	0	0	0	1.0	1.0
Lime	0	0.5	0	0	0	0.4	0.4
<b>Total</b>	<b>363.9</b>	<b>427.4</b>	<b>80.5</b>	<b>64.6</b>	<b>283.4</b>	<b>362.8</b>	<b>646.2</b>

Source: DNPM – Mining Summary, BNDES.

### 3.3.7 Exports/Imports of Other Minerals and Basic Metals – 1997

#### With a Negative Trade Balance

This group includes minerals with the largest trade deficits, most notably coal, potassium and phosphate fertilizer, which together account for a deficit of US\$ 1.5 billion. The overall trade deficit for this category amounts to US\$ 322.8 million, and relates to some 15 minerals and basic metals.

US\$ million

	Exports		Imports		Balance		
	Metallic	Primary	Metallic	Primary	Metallic	Primary	Total
Coal	0	0	0	663.1	0	(663.1)	(663.1)
Potassium	0	0.2	0	467.6	0	(467.4)	(467.4)
Phosphate fertilizers	56.9	0	413.6	42.2	(356.7)	(42.2)	(398.9)
Sulfur	0	0.2	0	77.1	0	(76.9)	(76.9)
Molybdenum	0	0	29.5	20.8	(29.5)	(20.8)	(50.3)
Platinum metal	5.6	0	51.8	0	(46.2)	0	(46.2)
Silver	9.6	1.1	43.0	0	(33.4)	1.1	(32.3)
Quartz-crystal	0	1.6	25.7	0.3	(25.7)	1.3	(24.4)
Zirconium	0.5	0.7	12.2	6.5	(11.8)	(5.8)	(17.6)
Tungsten	2.7	0	19.7	0	(17.0)	0	(17.0)
Bentonite	0	0	0	14.8	0	(14.8)	(14.8)
Cement	11.9	0	18.3	0	(6.4)	0	(6.4)
Gypsum	0	0.3	0	2.6	0	(2.3)	(2.3)
Other	0.4	7.3	2.6	12.8	(2.2)	(5.5)	(7.7)
<b>Total</b>	<b>87.6</b>	<b>11.5</b>	<b>616.4</b>	<b>1,307.9</b>	<b>(528.8)</b>	<b>(1,296.4)</b>	<b>(1,825.2)</b>

Source: DNPM – Mining Summary, BNDES.

### 3.4. Resources Invested in Brazilian Mining – 1978-2000

The principal countries with active mining sectors, such as Australia, Canada and South Africa, invest between US\$ 400-600 million in mining research per year, equivalent to around 5% of the Mining GDP of each of these countries. The average for Brazil in recent years has been around US\$ 100 million, or 1.4% of its Mining GDP.

- **Research and Prospecting**

US\$ million – 1997 dollars

	1978-82*	1983-87*	1988-93*	1994	1995	1996	1997	1998 <sup>E</sup>	1999-2000* <sup>E</sup>
State	53.1	92.6	41.3	46.2	49.0	20.7	0.0	0.0	0.0
Private	66.5	55.0	56.7	26.8	28.3	75.5	114.0	80.0	90.0
Foreign	74.4	16.4	13.0	12.0	12.7	13.8	16.0	10.0	10.0
<b>Total</b>	<b>194.0</b>	<b>164.0</b>	<b>111.0</b>	<b>85.0</b>	<b>90.0</b>	<b>110.0</b>	<b>130.0</b>	<b>90.0</b>	<b>100.0</b>

Source: DNPM, Publications, and BNDES (estimate).

\* Annual average

<sup>e</sup> Estimate

- **Implementation and Expansion, Extraction and Production**

US\$ million – 1997 dollars

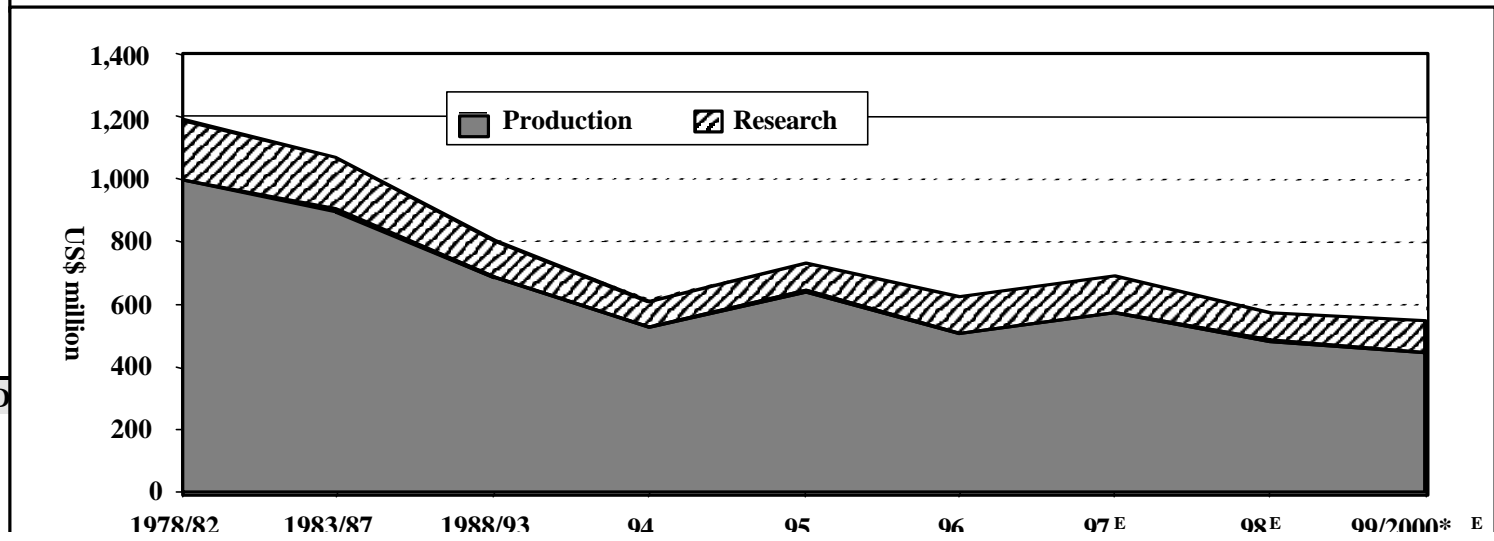
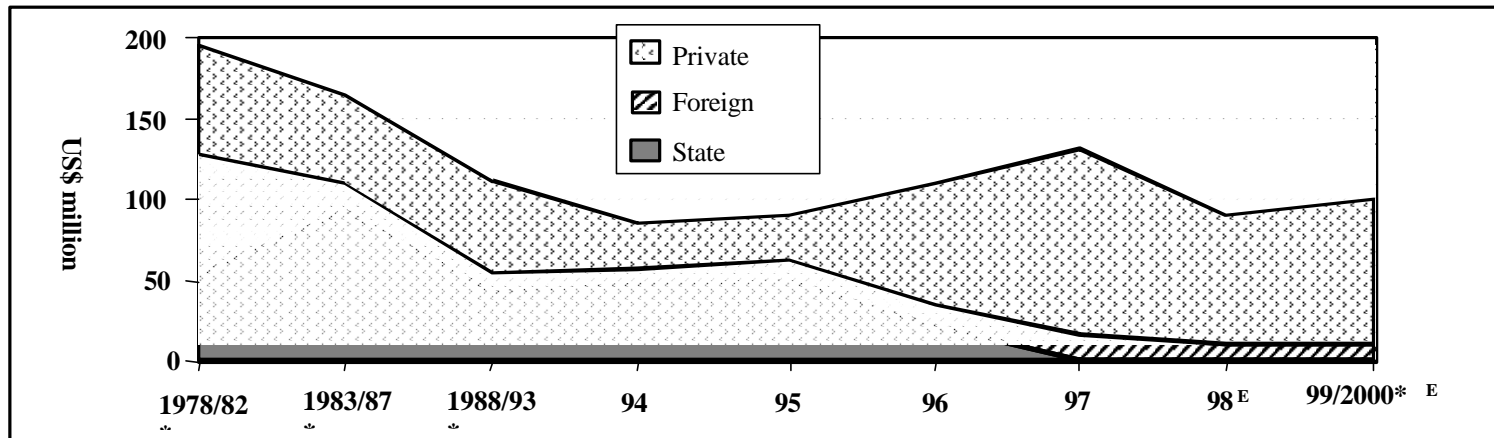
	1978-82*	1983-87*	1988-93*	1994	1995	1996	1997 <sup>E</sup>	1998 <sup>E</sup>	1999/2000* <sup>E</sup>
<b>Total</b>	<b>990</b>	<b>900</b>	<b>690</b>	<b>530</b>	<b>640</b>	<b>510</b>	<b>570</b>	<b>485</b>	<b>450</b>

Source: DNPM, Publications and BNDES (estimate).

\* Annual average

<sup>e</sup> Estimate

- **Investment in Mining – 1978-2000**





---

### ***3.5. Causes of the Reduction in Investment in the Mining Sector***

In recent years, Brazil has failed to realize its potential within the mining sector as a result of:

- Economic and political instability during the 1980s
- Constitutional restrictions on foreign capital
- A high level of taxation
- Complex mining legislation
- A lack of basic geological surveys
- A reduction in the prices of basic commodities
- A reduction in levels of consumption - international crisis
- Greater attractiveness of Chile, Peru and Argentina as destinations for investment (stable rules)

### ***3.6. New Investments in Mining within Brazil***

- CVRD has begun to explore the Águas Claras gold deposit that has estimated reserves of 50 metric tons, as well as the Gamaleira copper and gold deposit, that has slightly greater potential, both of which are located in the Carajás complex in the state of Pará. The reserves of Águas Claras will allow an increase in the production of the Igarapé Bahia mine of around 10 t/year, extending the active life of the mine by a further 4 years. Within the context of the Risk Contract with the BNDES, CVRD has been carrying out prospecting studies for gold and copper at 3 sites in the Carajás complex that appear highly promising: Cristalino, 118 and 46. Together with Phelps Dodge, CVRD is in the final stages of prospecting a gold and copper deposit in the Sossego region of the Carajás complex. CVRD and Anglo-American are, with the participation of the BNDES, revising the Salobo project in the light of the new pricing environment for gold and copper, as well

---

as the feasibility of the project using a hydro-metallurgical route. CVRD is also studying the possibility of installing a pelletizing unit in São Luiz, in the state of Maranhão.

- Anglo-American is investing in phosphates in Goiás through Copebrás, as well as in fertilizer production in Cubatão, and in basic metals (the Barro Alto project), through the exploitation of a nickel deposit acquired from the Canadian group, Inco. The company is investing in mining research into promising sites for copper, zinc and lead through Codemim (Ferro-nickel) and Catalão (Ferro-niobium). With regard to gold, Anglo is also concluding investment studies on the Cuiabá mine in the state of Minas Gerais.
- Mineração Santa Elina has carried out research studies on copper, gold and silver projects in Chapada in the state of Goiás, and is in the process of assembling the financial structure for the project.
- CBMM is investing in an increase in niobium production in Poços de Caldas.
- MRN will continue investing in the expansion of its bauxite capacity to meet the expansion of Alunorte's alumina production.
- CMM began investing in 1998 with a view to increasing zinc and lead production capacity in Vazante and Paracatú, in the state of Minas Gerais.
- Rio Capim and PPSA are involved in a project to double the production capacity of kaolin coatings in the state of Pará.
- Messer of the Hoechst Group in association with Hylsa and domestic producers, are studying the structuring of project finance for a direct reduction operation in Barra Mansa, in the state of Rio de Janeiro.

### ***3.7. Participation of the BNDES in Investment in Mining and Metals***

- Over the years, the BNDES has taken an active part in the funding of large mining and metals projects, most notably those in the aluminum, cement, nickel, zinc, iron ore, kaolin, copper and gold segments. The BNDES has also taken part, in association with CVRD, in geological research in the Carajás area, through risk contracts for future stake.
- Project spending during the period 1994-98 amounted to some R\$ 1.1 billion, representing 61% of total investments of around R\$ 1.8 billion. For the period 1999-2004, possible investment is estimated at around R\$ 1.8 billion of total investment in various prospective projects amounting to R\$ 3.1 billion.

## Participation of the BNDES in Mining and Metals Projects – 1994-2004

R\$ '000

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	TOTAL	
<i>Aluminum products/cans</i>	5,243	70,119	47,130	71,277	42,088	75,000	75,000	40,000	40,000	70,000	30,000	<b>565,857</b>	19.3%
<i>Cement</i>	1,863	32,457	74,550	153,561	22,522	42,275	85,000	50,000	-	-	-	<b>462,228</b>	15.8%
<i>Nickel/Zinc</i>	-	18,862	54,318	2,077	3,702	55,072	-	-	-	-	-	<b>134,031</b>	4.6%
<i>Iron ore</i>	975	83,318	18,753	29,712	4,150	137,871	90,000	50,000	25,000	20,000	60,000	<b>519,779</b>	17.7%
<i>Kaolin</i>	1,163	12,628	7,104	-	-	12,911	13,364	14,727	5,364	-	-	<b>67,260</b>	2.3%
<i>Geological research/ Other</i>	-	-	-	-	325,000	-	40,000	-	-	-	-	<b>365,000</b>	12.4%
<i>Copper</i>	-	-	-	-	-	-	120,000	50,000	180,000	320,000	150,000	<b>820,000</b>	27.9%
<b>TOTAL BNDES</b>	<b>9,244</b>	<b>217,384</b>	<b>201,855</b>	<b>256,627</b>	<b>397,462</b>	<b>323,129</b>	<b>423,364</b>	<b>204,727</b>	<b>250,364</b>	<b>410,000</b>	<b>240,000</b>	<b>2,934,156</b>	100%
<b>Global Investment</b>	<b>15,407</b>	<b>362,307</b>	<b>336,425</b>	<b>427,712</b>	<b>662,437</b>	<b>538,548</b>	<b>705,606</b>	<b>341,212</b>	<b>417,273</b>	<b>683,333</b>	<b>400,000</b>	<b>4,890,258</b>	
	←----- REALISED ----->					←----- PROSPECTIVE ----->							

Source: BNDES (prospective projects – 1999-2004)

### 3.8. Prospective Outlook

- Maintenance of economic and political conditions
- New constitutional environment
- Wide-ranging revision of Brazilian mining legislation
- Simplified and flexible system of mineral rights

- 
- Brazil's geological potential/more extensive geological mapping
  - Improvement in infrastructure
  - Increase in foreign investment
  - Exchange rate adjustments that favor exports
  - Improving trend in commodity prices
  - Recovery in international market for mineral products

#### **4. Conclusion**

The future of Brazilian mining requires a joint action strategy that promotes the formation of a mining policy with a program defined on the basis of a diagnosis of the real state of extractive industry within the country, that considers its prospects and existing potential. In this way, the government has been making an effort to restructure the mining sector, beginning the process with the deregulation of the 1967 mining code, which prohibits the presence of foreign capital, through the introduction of Law 9,314 of 1995. By way of providing continuity to the restructuring process, a series of measures are currently in progress that include the introduction of a new Mining Code that permits the creation of a Title to Mining Rights (TDM), which will be transferable at any time during the research and extraction phases; the creation of the National Mining Agency (ANM) to succeed the DNPM, that will become an independent regulatory agency, with financial and administrative autonomy; the consolidation of the CPRM as a national institution for geological research, that will change its name to the Brazilian Geological Service (SGB); as well as the creation of the National Mining Policy Committee, that will be responsible for the formulation of sector policy and guidelines, as well as for evaluating the performance of mining policy at macroeconomic level. It is hoped that the changes will lead to greater agility, less bureaucracy, and greater credibility for the restructuring process, that will provide incentives for the investment that is required for the exploitation of domestic mining activity.

It should also be noted that the MME, BNDES and Ibam have been drawing up agreements with a view to the resumption of investment in the Brazilian mining sector, particularly with regard to mining research, with a view to reaching future investment of US\$ 400 million per year, representing 5% of Mining GDP, a level observed in the principal producer countries for minerals, such as Canada and Australia.

Other factors are contributing to a more positive outlook for the Brazilian mining sector: its major geological potential; its political and economic stability; the potential of the vast and expanding domestic market; the existence of qualified manpower; the development of heavy equipment and machinery industries; an improvement in infrastructure and an increased awareness of the environment.

---

In this way, and considering the expectations of an upturn in the international market for mineral and metal products, Brazil is growing in attractiveness as a destination of foreign investment in the mining sector.

In recent years, the BNDES has been supporting the development of the sector, and is likely to increase investment, particularly with regard to copper, zinc, coal, potassium and phosphate fertilizers, since these products collectively generate a trade deficit of around US\$ 2.1 billion.

In this way, the Brazilian mining sector is expected to enter a period that is favorable to its development, with an increase in investment within the sector, and positive contributions to the Brazilian trade balance.