



information bulletin

June 2000

productivity in the minerals and metals sector

Productivity in the Minerals and Metals Sector

The minerals and metals sector comprises the mineral exploration, mining and quarry industries, as well as the primary metals, fabricated metal products and nonmetallic mineral products industries. Collectively, the sector generates significant regional and national incomes. It accounts for about 4% of our gross domestic product (GDP), 11% of the goods produced in Canada and 13% of our exports. The sector generates approximately 386 000 direct jobs across Canada and many more jobs in ancillary industries. It is significantly larger than the new economy, as represented by the information technology sector, which accounts for 3% of our GDP

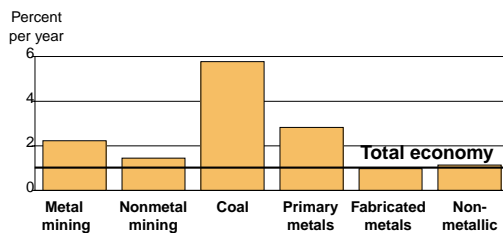
Productivity is a measure of the efficiency with which inputs — such as people, capital and natural resources — are employed in a company, industry or

economy to produce goods and services. It is defined as the ratio of the quantity of outputs over the quantity of inputs. The minerals and metals sector has a strong productivity record, indicating that it comprises dynamic “sunrise” industries that rely on advanced technologies.

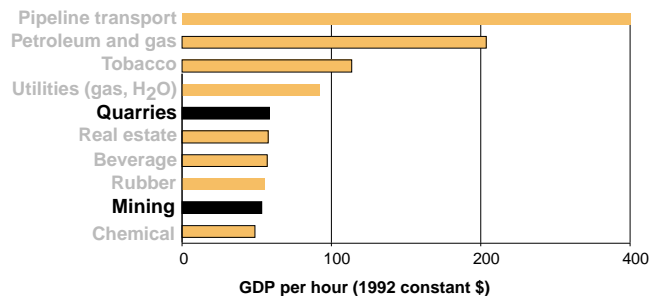
Annual productivity growth in the minerals and metals industries has exceeded that of the total economy over the most recent business cycle — 1984 to 1998. Productivity in Canada’s coal industry grew at an outstanding rate of nearly 6% per year, eclipsing gains in most other industries over this period.

Two of the ten leaders in labour productivity levels are part of the minerals and metals sector. The sector is a leader in the creation of wealth per worker and, as a result, raises the living standards of Canadians.

Average Annual Labour Productivity Growth in the Minerals and Metals Sector in Canada, 1984-98



Leading Ten Industries in GDP Per Hour of Work in Canada, 1998



Source: Centre for the Study of Living Standards.

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"...Canada must become and remain the world's 'smartest' natural resources steward, developer, user and exporter — the most high-tech, the most environmentally friendly, the most socially responsible, the most productive and competitive — leading the world as a living model of sustainable development."

Hon. Ralph Goodale
Minister of Natural Resources

"Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker."

Paul Krugman
Economist, Massachusetts Institute of Technology



The sector's productivity growth in Canada has generally exceeded that of its competitors in the United States. Furthermore, labour productivity levels surpass those in the United States in most minerals and metals industries. For example, a Canadian miner produces 4.2 tonnes of iron ore per hour versus 3.7 tonnes in the United States. Coal and uranium miners in Canada also have a greater yield per hour than their U.S. counterparts.

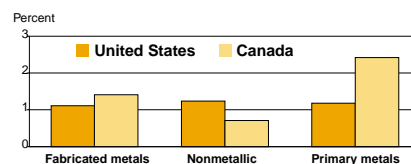
Reasons for Productivity Growth

The minerals and metals sector's strong productivity growth has occurred partly as a result of investment in physical assets. The ratio of investment to value added in the sector was 50% greater than in manufacturing as a whole over the past two decades.

Innovation, another major determinant of productivity growth, has occurred in all aspects of mining and processing from exploration to the protection of the environment. Technologies bear little resemblance to those of half a century ago or even ten years ago. Exploration innovations include global positioning systems and geochemical techniques. Extraction and processing innovations include robotics and remote operations, as well as improvements in mine design and automated handling systems. Other examples of technological advances include improvements in environmental monitoring and rehabilitation.

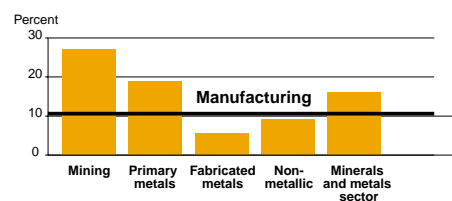
Another reason for the minerals and metals sector's strong productivity performance has been improvements in human capital. Today, the sector's employees and managers have greater knowledge, skills and education than their predecessors. In 1981, a minority — approximately one third of the sector's work force — had post-secondary education. In contrast, the majority of the work force had post-secondary education in 1996. The sector comprises knowledge-based industries.

Average Annual Productivity Growth in the Minerals and Metals Sector in the United States and Canada, 1984-97



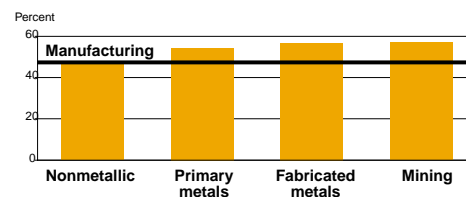
Source: Centre for the Study of Living Standards.

Investment Index¹ in Selected Industries in Canada, 1984-97



¹ $\{(Gross\ fixed\ capital\ formation/value\ added) \times 100\}$
Sources: Natural Resources Canada and Statistics Canada.

Labour Force with Post-Secondary Education in the Minerals and Metals Sector and Manufacturing in Canada, 1996



Sources: Natural Resources Canada and Statistics Canada.

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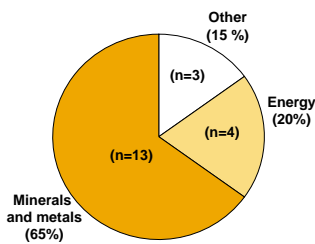
Significance of Productivity Growth

Strong productivity growth has permitted the minerals and metals sector to expand output at a rate equal to the rest of the Canadian economy over the past two decades. As a result, the sector has maintained a constant share of Canada's total economic output. Over the period 1994-98, 13 of the 20 fastest growing businesses by revenue were mining companies.

"...our traditional industries are being revitalized and renewed...the staples of Canada's 20th century industrial base are being remade in the image of a new high-tech, value-added global economy."

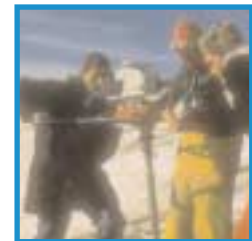
Hon. Paul Martin
Minister of Finance

Twenty Fastest Growing Companies by Revenue in Canada, 1994-98

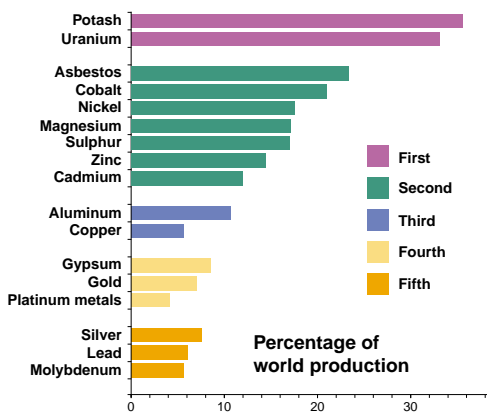


Source: Report on Business Magazine (July 1999).

The strong productivity growth has also permitted the sector to maintain and create high-paying jobs, many of which are located in rural and remote areas where alternative sources of employment are scarce. The sector's strong productivity record has not occurred at the expense of labour. Employment levels have remained unaltered over the past decade. In addition, many jobs have been created in ancillary sectors such as equipment manufacturing, transportation, construction, consulting, assaying, mineral processing, financial services and law.



Canada's Share and Ranking in the Production of Minerals and Metals in the World, 1997



Source: Natural Resources Canada.

As a result of productivity gains, Canada ranks among the world's top five producers of 17 mineral commodities. Canada is the world's largest producer of potash and uranium, the second largest producer of nickel and zinc, the third largest producer of aluminum and copper, and the fourth largest producer of gold. Overall, Canada is the second largest producer of minerals and metals in the world.



Productivity growth has permitted the sector to not only remain competitive in global markets, but also to maintain output despite falling real prices.



"...primary (including mineral and metal) products are still an important source of Canada's wealth and high standard of living, and they are likely to remain so for some time."

Gordon Thiessen
Governor, Bank of Canada

Conclusions

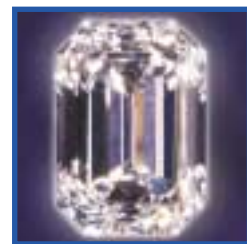
The production and processing of minerals and metals remain important activities in Canada due to innovation and productivity gains. The minerals and metals sector comprises dynamic industries that rely on highly skilled employees and managers, and leading-edge technologies. A strong interrelationship exists between the sector and the new economy.

As in the past, the minerals and metals sector and the new economy will be inextricably linked in the future. The new economy will affect both the supply and demand for minerals and metals. With respect to supply, new technologies will continue to increase productivity and lower production costs. With regard to demand, if we have truly entered a new digital age, most economies of the world will prosper. Synchronized global economic growth will spur demand and maintain the prices of minerals and metals. As a result, the minerals and metals sector will continue to be an important component of Canada's economic strength in this new century.

For more information . . .

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The above photo (courtesy Aber Resources Ltd.) is a Canadian diamond from the Diavik Project in the Northwest Territories.

www.nrcan.gc.ca/mms

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