



2011 Minerals Yearbook

LATIN AMERICA AND CANADA

THE MINERAL INDUSTRIES OF LATIN AMERICA AND CANADA

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The Latin America and Canada region reported upon in this volume is composed of about 50 countries and dependencies. These countries and dependencies have a combined population of approximately 631 million people and a land area of 30.5 million square kilometers. According to the World Bank, most Latin American countries and Canada were net commodity exporters (including agricultural, mineral and other commodities). In Latin America, smaller countries, mostly in Central America and the Caribbean, were typically net commodity importers. In 2008 (the latest year for which these data were available), the World Bank estimated that 93% of the total population of Latin America and the Caribbean (LAC) lived in net commodity exporting countries and that these countries also accounted for 97% of the total gross domestic product (GDP) of LAC (table 1; Sinnott and others, 2010, p. 5–6).

In 2011, Brazil, Canada, and Chile maintained their positions as leaders in the global mineral industry. Brazil was the world's leading producer of niobium, the second ranked producer of tantalum, the third ranked producer of asbestos and iron ore (gross weight), and the regional leader in the production of bauxite, mined graphite, manganese, phosphate rock, silicon, crude steel, and vermiculite. Canada was the world's leading producer of potash; the second ranked producer of cobalt, niobium, and titanium minerals (ilmenite); the third ranked producer of gem diamond and palladium; and the regional leader in the production of aluminum, cadmium, diamond, indium (refined), natural gas, nickel, peat, crude petroleum, platinum, salt, tellurium, and tungsten. Chile was the world's leading producer of copper (mine output), iodine, lithium, and rhenium; the second ranked producer of arsenic (estimated) and refined copper; and the third ranked producer of boron and molybdenum; and it was also estimated to have been the leading producer of refined selenium in the region. Argentina, Bolivia, Mexico, and Peru were also among the world's leading producers of base and precious metals and industrial minerals. Argentina was the world's second ranked producer of boron, and Bolivia was the third ranked producer of antimony. Mexico was the world's leading producer of silver, the second ranked producer of bismuth and fluorospar, and the third ranked producer of strontium and wollastonite; it was also the region's leading producer of barite, gypsum, industrial sand and gravel (silica), and sodium sulfate. Peru was the world's third ranked producer of mined copper, silver, tin, and zinc and the region's leading producer of mined gold and lead (tables 4–18; Apodaca, 2013; Bedinger, 2013; Carlin, 2013; Corathers, 2013a, b; Crangle, 2013; Dolley, 2013; Economic Commission for Latin America and the Caribbean, 2013b, p. 22; George, 2013; Jasinski, 2013; Kostick, 2013; Kuck, 2013; Loferski, 2013; Miller, 2013a, b;

Ober, 2013; Olson, 2013a, b; Papp, 2013a, b; Shedd, 2013; Tanner, 2013; Tolcin, 2013a, b; Tuck, 2013; Virta, 2013a, b).

In 2011, Colombia was estimated to be the world's ninth ranked producer of nickel (mine output). In the region of Latin America, Colombia was the leading producer of coal (and had the largest proven reserves of coal) and was a significant producer of natural gas. Venezuela was the world's 10th ranked producer of bauxite. In the region, Venezuela had the leading natural gas and petroleum reserves, and was the fourth ranked producer of natural gas. Mexico was the leading producer of crude petroleum in the region, followed by Venezuela, Brazil, Colombia, Argentina, and Ecuador (table 4; Bray, 2013b; Economic Commission for Latin America and the Caribbean, 2013b, p. 22).

Jamaica was estimated to be the world's seventh ranked producer of bauxite. The Republic of Trinidad and Tobago was a crude oil and natural gas producer, and its economy was dependent upon the hydrocarbon sector. In 2011, the Dominican Republic was estimated to be the 13th-ranked producer of nickel in the world. In 2009 and 2010, the country produced an insignificant amount of nickel because Xstrata Nickel of the United Kingdom halted operations at the company's Falconbridge Dominicana C. por A. operation in Bonao owing to high costs and poor nickel market conditions (table 4; Bray, 2013b; Economic Commission for Latin America and the Caribbean, 2013b, p. 22; Kuck, 2013).

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- Brazil—Departamento Nacional de Produção Mineral;
- Canada—Natural Resources Canada;
- Chile—Comisión Chilena de Cobre and Servicio Nacional de Geología y Minería;
- Colombia—Unidad de Planeación Minero Energética and Instituto Colombiano de Geología y Minería;
- Costa Rica—Dirección de Geología y Minas;
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- Guyana—Guyana Geology and Mines Commission;
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- Peru—Ministerio de Energía y Minas; and
- Trinidad and Tobago—Ministry of Energy and Energy Affairs.

General Economic Conditions

According to the International Monetary Fund (IMF), the growth rate of global real GDP was estimated to have slowed to about 3.2% in 2012 from about 4% in 2011; that of all LAC countries combined was estimated to have decreased to about 3% in 2012 from 4.6% in 2011, and that of Canada was estimated to have decreased to below 2% in 2012 from 2.4% in 2011. The IMF cited high commodity prices as an important factor in the relatively strong growth of the Canadian economy in 2010 and 2011 and projected that the annual growth rate of Canada's real GDP could increase to about 2.5% by 2014; the IMF also warned that decreases in commodity prices could contribute significantly to downside risks to the rate of Canada's economic growth and to the IMF's projection being too high. The IMF estimated that, as of the end of 2012, recovery from the global economic downturn from mid-2008 through 2009 was mostly completed in the financially integrated net-commodity-exporting LAC-6 economies (Brazil, Chile, Colombia, Mexico, Peru, and Uruguay) and that the growth rate of the combined real GDP of these countries had decreased slightly to about 4.1% in 2012 from 5.3% in 2011. In the less financially integrated net-commodity-exporting LAC countries (Argentina, Bolivia, Ecuador, Paraguay, and Venezuela), higher commodity prices during most of 2011 contributed to an estimated 6.1% rate of growth in the combined real GDP of these countries, but subsequent decreases in commodity prices contributed to a much lower combined growth rate of 3.3% in 2012. In 2009, the growth rates of the real GDPs of Brazil, Canada, Chile, Mexico and Venezuela were negative, and in 2011, the growth rates of the real GDPs of Argentina, Brazil, Canada, Chile, Mexico and Peru were lower than in 2010 (table 2; Beidas-Strom and others, 2012; Economist, The, 2012b; International Monetary Fund, 2013, p. 1, 6–9, 11–18).

For the period starting at the beginning of 2011 and lasting through the end of the first quarter of 2013, the growth rates of the real GDPs of the major commodity exporters in the region (especially in South America) appeared to be more or less correlated with the IMF's commodity-price indices. According to the IMF's commodity-price indices during this period, the price of oil was highly volatile but appeared to peak near the end of the first quarter of 2011, decreased to slightly below median level in the middle of 2011, reached the lowest level of the year near the beginning of the fourth quarter, and then increased again to an approximate median level by the end of 2011; at the end of the first quarter of 2012, oil prices again peaked very

close to the peak level of 2011, decreased to the lowest level of the period by mid-2012 (and a significantly lower level than the lowest price of 2011), partially recovered to an approximate median level for the period (again) by the end of 2012, and remained at or slightly less than the median level through the first quarter of 2013. Metals prices decreased more consistently than oil prices during this period, on average, following peak metals prices during the first half of 2011. By the end of 2011, average metals prices decreased to the lowest level of the year, recovered slightly during the first quarter of 2012, but bottomed out at the beginning of the third quarter of 2012 at their lowest level during this period; recovered slightly during the rest of the third quarter of 2012, exhibited another strong decrease in the fourth quarter 2012, appeared to increase to approximately the median level for the period by the end of 2012, and decreased to slightly below median level by the end of the first quarter of 2013. The IMF projected that average oil prices in 2014 could be about 3% lower than at the end of the first quarter of 2013, owing mostly to expected increases in supply in North America, and that metals prices for 2014 would remain about equal, on average, to price levels at the end of March 2013 (table 2; Beidas-Strom and others, 2012; International Monetary Fund, 2013, p. 1–3).

Through 2012, the growth rates of real GDP varied substantially for countries in Central America and the Caribbean (CAC), and Panama continued to have the leading growth rate (more than 10%) among CAC countries, primarily owing to investment related to the expansion of the Panama Canal and a large public investment program. In 2012, the average growth rate of the combined real GDP for Costa Rica, the Dominican Republic, El Salvador, Guatemala, and Honduras decreased to about 3.7% from about 4% in 2011, and economic activity was still estimated by the IMF to have been close to potential for these countries, on average. In general, the CAC economies depended heavily on trade with the United States and remittances, and prices of oil and other mineral fuel imports had the greatest effect on the growth rates of real GDPs for most CAC countries compared with the estimated economic effects of other commodity prices. The average growth rate of the combined real GDP of the commodity-exporting countries Belize, Guyana, Suriname, and Trinidad and Tobago is estimated to have increased in 2012 to about 3.4% from about 2.4% in 2011 whereas that for the more tourism-intensive CAC economies (including The Bahamas, Barbados, and Jamaica, among others) is estimated to have decreased to 0.3% from 0.4% in 2011 (table 2; Beidas-Strom and others, 2012; International Monetary Fund, 2013, p. 1, 13, 19–22).

The IMF estimated economic spillover effects on the rest of the world as a result of changes in domestic policies in China, the euro area, Japan, the United Kingdom, and the United States. In the IMF's simulations, a decrease in output growth in the euro area (possibly as a result of fiscal consolidation policies) could have some slight negative effects on economies in Latin America and Canada (transmitted through trade, financial market, and commodity price linkages). The net spillover effects of uncertainty in U.S. policy is unclear, but the IMF estimated that energy commodity prices could decrease by between 6% and 12% and nonenergy commodity

prices by between 3% and 6% a result of fiscal contraction in the United States, which would have a significantly adverse effect on the net commodity exporters in the region. Policy changes in China could potentially have a much greater impact on the net commodity exporters in Latin America and Canada (both through trade effects and effects on commodity prices). A slowdown in China's domestic investment could have a significant negative effect on the real GDP growth rates of trading partners and less-diversified net commodity exporters (such as Chile), and a notable negative effect on the real GDP growth rates of more-diversified net commodity exporters (such as Brazil), according to IMF simulations. A decrease in real estate investment in China (possibly as a result of Government policy to cool the housing sector) could have greater spillover effects than a decrease in total investment in China because the real estate sector is closely tied to the construction sector, which has strong linkages to the mining, manufacturing of construction material, metal and mineral products, and machinery and equipment sectors. According to IMF simulations, a 1% decrease in real estate investment in China could cause a worldwide decrease of some commodity prices (especially metals prices) of between 0.8% and 2.2% (Teja and others, 2012a; 2012b, p. 20–24, 58–60, 88–92, 114–122).

Mineral Trade and the Economy

According to the World Bank, the share of the value of exports of metals, mineral fuels, and other mineral ores and concentrates in the total value of all merchandise exports of the low- and middle-income economies of LAC had increased to about 33% in 2011 from 23% in 2000. This percentage was less than for the low- and middle-income economies in other regions of the world that depended more heavily on mineral fuel exports, such as in the Middle East and Northern Africa (where the share had actually decreased to 70% in 2011 from 79% in 2000) and in Eastern Europe and Central Asia (increased to 51% in 2011 from 43% in 2000), or where they depended more heavily on exports of all mineral commodities than in LAC, such as in sub-Saharan Africa (increased to 53% in 2011 from 44% in 2000). This share, however, was substantially greater for LAC than that for low- and middle-income economies in South Asia (increased to 17% in 2011 from 5% in 2000) and in the region of East Asia and the Pacific (increased to 12% in 2011 from 9% in 2000). Thus, LAC economies appeared to be more vulnerable to terms-of-trade shocks from changes in mineral commodity prices, on average, than economies in East Asia and the Pacific or in South Asia (World Bank, The, 2013a, p. 65–77; 2013c).

There were substantial differences in potential economic vulnerabilities to changes in mineral commodity prices among the LAC countries. In 2011, in Venezuela, the value of mineral fuel exports accounted for 97% of the value of total merchandise exports; in Colombia, 68%; Trinidad and Tobago, 66%; Ecuador, 58%; Bolivia, 47%; Belize, 43%; Canada, 29%; and Jamaica, 23%; and less than one might expect in Mexico (16%), Peru (14%), and Brazil (11%). In Chile, exports of metals and other mineral ores and concentrates accounted for 65% of the value of total merchandise exports; in Peru, 50%; Bolivia, 36%; and Guyana, 22%; these exports accounted for significantly

less for some other important metals exporters in the region, however, such as Brazil (19%) and Jamaica (12%) (Economist, The, 2012b; World Bank, The, 2013c).

Although the United States remained a key export market for commodities produced in Latin America and Canada, exports (by value) to this trading partner continued to decrease. In 2011, the share of LAC's total exports that went to the United States decreased to 39% from 41% in 2010 and 58% in 2000, whereas the share of total exports that went to the Asia region increased to 18% from 17% in 2010 and 6% in 2000, including an increase in exports to China to 9% of total exports from 8% in 2010 and 1% in 2000. During this timeframe, the total exports of Canada, Central America, and Mexico remained more heavily oriented toward the United States whereas South America made a greater shift towards exporting to emerging Asian countries, especially to China. In 2010 (the latest year for which these data were available), South America accounted for 93% of total LAC exports to China. Following ratification of the North America Free Trade Agreement (NAFTA), Canada's and Mexico's exports to the United States increased substantially, and Canada became the leading exporter to the United States during the 1990s. Since China's admission into the World Trade Organization in 2001, however, competition with China for the U.S. market (including the U.S. market for commodities) has increased. During the 2000s, China transplanted Canada as the leading U.S. trading partner and maintained that position in 2011. In 2011, Canada was the second ranked U.S. trading partner, and Mexico remained third (Economic Commission for Latin America and the Caribbean, 2012c, p. 18, 29, 51–56; Economist, The, 2012b; International Monetary Fund, 2012a, p. 1–3, 6–8, 13–18, 21–25; 2012b; 2013, p. 9).

The importance of the growth of China as an export destination for LAC countries is even more pronounced when commodity exports are considered, given that the increase in commodity exports to China accounted for 19% of the increase in the total value of LAC's exports of commodities and manufactures based on natural resources ("commodity-based manufactures," which includes cement, refined metals, and petroleum refinery products, among others) from 2000 until 2011. Beyond 2011, the United Nations' Economic Commission for Latin America and the Caribbean (ECLAC) estimated that the volume of LAC commodity exports to China will increase by about 16% per year, on average, if the growth rate of the real GDP of China increases by between 7% and 8% per year. Economic growth in China (and other emerging Asian countries) has had a greater effect on the growth of the commodity exports of many of the countries in South America than elsewhere in LAC, given that the increase in commodity exports to China (from 2000 until 2011) accounted for 22% of the increase in the total value of South America's exports of commodities and manufactures based on natural resources and that of Asia as a whole accounted for 36% of the growth in South America's commodity exports (Economic Commission for Latin America and the Caribbean, 2012c, p. 18, 29, 50–56; 2013b, p. 15, 21–26, 47–48; International Monetary Fund, 2012a, p. 1–3, 6–8, 13–18, 21–25; 2012b; 2013, p. 12–13, 32, 35, 37–45).

The ECLAC projected the future value of LAC's main commodity exports from 2012 through 2015 in three different

scenarios for future commodity export prices and demand from the region's major trading partners (neutral, optimistic, and pessimistic). Even in its pessimistic scenario (where ECLAC considered that prices for minerals and metals could decrease by as much as 9% compared with prices in 2011), the ECLAC projected that the total value of the region's main commodity exports could still increase by an annual rate of about 1% during this timeframe owing to increases in the volume of LAC's main commodity exports. For its neutral scenario, the ECLAC assumed an average annual growth rate of China's real GDP of 7.8%, which contributed to its projection that commodity prices could decrease by about 2% per year, on average, during this timeframe. Despite this projected decrease, the ECLAC estimated that the total value of the main commodity exports of LAC countries could still grow at an average of 4% per year from the end of 2011 through 2015 in its neutral scenario (Beidas-Strom and others, 2012; Economic Commission for Latin America and the Caribbean, 2012c, p. 9–10, 14–17, 49–50, 62–64; International Monetary Fund, 2012a, p. 1–3, 6–8, 13–18, 21–25; 2012b; 2013, p. 1–3).

According to the IMF, the real growth rate of China's GDP decreased to 9.3% in 2011 from 10.4% in 2010, and the growth rate of the country's real GDP was estimated to have decreased to about 7.8% in 2012. Similar to the growth rate of the real GDP, the growth rate of China's demand for commodities had been estimated to have also been increasing at an annual rate of more than 10% (at an average annual rate of 10.9% from 2005 until 2011) but was estimated to have then decreased to single digits during 2011 and 2012. This decrease coincided with a decrease in the average prices for LAC's main export commodities (which appeared to start during the second half of 2011). According to projections by the IMF, the growth rate of China's real GDP in 2013 could be about 8%; in 2014, about 8.2%; and in 2015, about 8.5%, which suggests that there could be even better external market conditions for LAC mineral exports during this timeframe than in the ECLAC's neutral scenario (Beidas-Strom and others, 2012; Economic Commission for Latin America and the Caribbean, 2012c, p. 38–39, 63–66; International Monetary Fund, 2012b; 2013, p. 2–3).

Minerals and Government Revenues

A dramatic increase in fiscal revenues from commodity production and exports since 2002 helped the economies of many developing LAC countries withstand the economic downturn in 2008 and 2009 (especially in the larger commodity exporters in South America), but fiscal revenues also became more dependent on revenues from commodity exports between 2000 and 2011. At least in the medium term, the funding for future Government programs will continue to rely heavily on commodity revenues in these LAC countries, and the Governments that develop the most efficient institutions to manage these revenues could have more funding available to implement policies to spur continued economic development (Economic Commission for Latin America and the Caribbean, 2012d, p. 77–80; 2013b, p. 15, 63; International Monetary Fund, 2013, p. 31–32, 35, 37–45, 47–51).

Mineral resource rents are defined by the ECLAC as the difference between the value of output of coal, natural gas, crude petroleum, and other minerals and the cost of production of these minerals up until the point of leaving the mine site (including through the concentration stage of mineral production, if any) or wellhead. According to the ECLAC, these rents can be distributed among the Government (through the extraction companies' payments of taxes, royalties, and other duties), the companies that extract the minerals (as profits), and other production activities carried out after extraction (primarily to pay wages for company employees). During the commodity price boom between 2004 and 2009, the economic rents generated by the mining sector in LAC countries increased by about 4 times, on average, from that during the period 1990 to 2003, and they increased by about 3.5 times in Canada. In 2011, the average contribution of total mineral resource rents to the GDPs of LAC countries was 9.4%, and to that of Canada, 4.6%. The countries in the region where such rents contributed more to the GDP than the LAC average were Trinidad and Tobago (37.6%), Venezuela (32.5%), Ecuador (25.7%), Bolivia (20.3%), Chile (18.8%), Guyana (14.9%), Peru (13.5%), Colombia (12%), and Suriname (11.5%). In addition to increasing mineral tax and royalty rates, Governments can also increase their portion of the mineral resource rents through direct ownership of the output of mineral extraction companies, either through having state-owned mining or oil and gas companies or through creating joint ventures with private companies (table 2; Economic Commission for Latin America and the Caribbean, 2012d, p. 77–80; 2013b, p. 15, 31–34, 54–63; World Bank, The, 2012, p. 204–207; 2013b).

From 2004 through 2009 (the latest year for which these data were available), the Governments' annual average shares in the economic rents generated by the mining sector were estimated by the ECLAC to have been 39.8% in Bolivia; Canada, 38.6%; Colombia, 37.1%; Chile, 35.7%; and Peru, 27.4%; and those for rents generated by the hydrocarbons sector were 90.3% in Brazil; Venezuela, 41.7%; Ecuador, 38.4%; Bolivia, 33.9%; Colombia, 30.2%; and Peru, 28.6%. In comparison with another major mineral producer and exporter that is not in this region, the Government of Australia's annual average share of the rents generated by the (metals) mining sector in that country was estimated to have been 26.1% during the same timeframe. In the case of Chile, fiscal contributions by the state-owned mining company *Corporación Nacional del Cobre (CODELCO)* accounted for 22.1% of the mining sector rents, so the Government's average annual share of these rents excluding those attributable to owning CODELCO was only about 13.6% (Economic Commission for Latin America and the Caribbean, 2013b, p. 31–34; 62–63).

Although the Government share of economic rents in a particular sector is an important measure of its ability and willingness to collect revenue from that sector, it could overstate the importance of the sector to total fiscal revenues (and to helping finance Government programs). In 2009 (the latest year for which these data were available), the World Bank estimated that the average share of fiscal revenue from commodities in the total Government revenues of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela was about 24% and

about 9% in Canada. From 2004 through 2009 (the latest year for which these data were available), the ECLAC estimated the annual average share of fiscal revenue from the mining sector in Chile to be 37.5% of total Government revenue; Peru, 14.2%; and Bolivia, 3.7%; and that from the hydrocarbons sector in Venezuela to be 44.9% of total Government revenue; Mexico, 35.8%; Ecuador, 29.4%; Bolivia, 27.4%; Colombia, 14.2%; Brazil, about 9%; and Peru, 3.2%. Using the case of Bolivia as an example, the Government's share of the economic rents generated by the mining sector was slightly higher than its share of the rents generated by the hydrocarbons sector, but the mining sector still accounted only for less than 4% of total Government revenues, on average, compared with greater than 27% from the hydrocarbons sector (Sinnott and others, 2010, p. 5–7; World Bank, The, 2012, p. 204–207; Economic Commission for Latin America and the Caribbean, 2013b, p. 31–34, 62–63).

From 2004 through 2009 (the latest year for which these data were available), the leading commodity or group of commodities for generating fiscal revenues from commodity production and exports were, for Argentina, agricultural products; Bolivia, natural gas; Chile, copper; Colombia and Ecuador, crude petroleum; Mexico, hydrocarbons; Peru, mined minerals; and Trinidad and Tobago and Venezuela, hydrocarbons. During this timeframe, the share of fiscal revenue from commodity production and exports in total Government revenues increased in almost all LAC countries, mostly owing to increases in commodity prices; to increases in the volume of commodity production (in some cases); additional sector-specific taxes or increased tax rates (including in Bolivia, Chile, Peru and Venezuela); and some increases of state shares in the operational earnings of mineral production companies (including through joint-venture or other contracts, state-owned mineral extraction or holding companies, nationalizations, and other measures). At least through 2009, Government revenues from hydrocarbons production and exports in Brazil were increasing and were expected to continue to increase as recent oil discoveries are developed. During the past decade, many Governments in Latin America appear to have been increasing their fiscal dependence on revenues from commodity production sectors, and this trend was expected to continue, especially if growth in other economic sectors slows (Sinnott and others, 2010, p. 5–8; Economic Commission for Latin America and the Caribbean, 2012d, p. 77–80; 2013b, p. 16–19, 31–35, 48–51, 54–63, 89–91; International Monetary Fund, 2013, p. 36–42, 47–51).

To secure funding from mineral resources, a major challenge for Governments is to extract as much economic rent as possible without driving off investment. With respect to securing revenues from the mining sector from 2004 through 2011, the ECLAC concluded that most countries in South America did not have adequate institutions or fiscal instruments to collect a progressive share of the economic rents in this sector, even though Government shares improved in absolute terms, on average, and were close to international averages for major mining countries during this timeframe. The ECLAC estimated that Government shares of economic rents were much higher in the hydrocarbons sector than in the mining sector, on average, possibly owing to the greater proportion of state-ownership

in the hydrocarbons sector than in the mining sector (table 2; Economic Commission for Latin America and the Caribbean, 2012d, p. 77–80; 2013b, p. 13–15, 89–91; World Bank, The, 2012, p. 204–207; 2013a, p. 15).

Minerals Taxation and Nationalization

In 2011 and through at least 2012, countries worldwide appeared to continue a trend towards increased taxes on mineral extraction companies, possibly because Governments viewed these companies as still earning extraordinary profits from increasing mineral commodity prices (that decreased only temporarily during the economic downturn in 2008 and 2009). Many countries in Latin America and Canada either sought to obtain a greater participation in mining projects or increased royalties, mining taxes, or profit sharing. Resource nationalization or expropriation of mineral assets in the region had taken place occasionally during the recent boom in commodity prices, and it happened (most notably) in 2011 and 2012 in Argentina, Bolivia, and Venezuela. Some examples of Government initiatives aimed at obtaining a greater share of profits from mineral production and exports in the region were as follows:

- In Argentina, the Government was reportedly considering increases to mining tax rates that would allow them to be higher than that established by the country's Mining Investment Law. In 2008, Argentina approved export duties of between 5% and 10% on the mining sector and between 25% and 45% on the hydrocarbons sector; a law was passed in 2011 that could require mining and oil companies operating in Argentina to repatriate all their future export revenues; and, in May 2012, the Government passed legislation that confirmed the nationalization of Repsol YPF, S.A. of Spain's 51% interest in Yacimientos Petrolíferos Fiscales (YPF) S.A., which was the leading oil and natural gas producer in Argentina.

- To comply with the new Constitution that took effect in Bolivia in 2009, mining and energy legislation was being revised through the end of 2011 that could allow the Government to exercise greater control over the management of Bolivia's natural resources, including exploration, production, processing, transportation, and marketing of minerals. Plans called for an increase in average royalty rates based on the international commodity price of up to 7% for gold, 6% for silver, and 5% for lead, tin, and zinc; and companies operating mineral concessions in the country could have to change over to a new mining contract system. Depending on the level of state participation, these new contracts could be either leasing or joint-venture contracts with the state-owned Corporación Minera de Bolivia (COMIBOL). In May 2012, COMIBOL was reportedly close to finalizing new joint-venture contracts for several mines operated by Sinchi Wayra S.A. (a Bolivian subsidiary of Glencore International plc of Switzerland), including the company's Colquiri tin and zinc mine, but the Government instead nationalized the Colquiri Mine in June 2012.

- In December 2010, the Brazilian Government approved a part of its proposed regulatory framework for the pre-salt oil reserves that laid out a new production-sharing agreement system regarding future production of oil from the pre-salt deposits. After holding extensive discussions about how best to increase the Brazilian mining royalty rates and other taxation

of the exploitation of mineral resources in the country during both 2011 and 2012, the Brazilian Government revealed some information concerning a new bill to revise the mining code in the country in June 2013. The revisions reportedly could include doubling the upper limit on the mining royalty rate to 4% (from the current upper limit of 2%).

- On June 6, 2011, the Canadian Province of Quebec enacted a Mining Tax Act, which stipulated that the flat tax rate on the annual profits from mining operations in the Province would increase to 16% in 2012 from the current 15% in 2011. On May 6, 2013, the provincial Minister of Finance released a proposal for a new mining tax regime in Quebec that could start in 2014, and would retain the existing mining profits tax rate of 16% for profit margins up to 35%; however, the rate would progressively increase if the mine operator's profit margin were to increase beyond 35%.

- In 2011, in Chile, most private mining companies agreed to pay higher mining-specific tax rates as a temporary measure to help pay for reconstruction following an earthquake in the country near the end of February 2010. The Government plan initially set a royalty of between 4% and 9% of product revenue on a sliding scale through 2012, returning to the 2011 rate of 4% to 5% from 2013 through 2017, and then moving to a sliding scale of 5% to 14% from 2018 through 2023. Ongoing revisions, however, could limit the maximum royalty rate after 2018 to no more than 9%.

- Despite only a nascent metals mining sector in Ecuador, the Government approved a new mining law in 2009 that would impose at least a 5% royalty and possibly a 70% windfall profits tax on large-scale mining operations (those producing more than 300 metric tons per day of mined material). In 2013, the Government was debating a revision of the mining law that would delay the imposition of the windfall profits tax until a mining company had recovered some portion of its initial investment, because this tax appeared to be the key deterrent to investment and development of the sector.

- During the first half of 2013, Mexico's Government was working on a revision of its mining law and proposed a new 5% mining royalty.

- Panama intended to pass a law that would allow foreign state-owned companies to participate in Panama's mining sector either by acquiring mining concessions or by establishing joint ventures with companies already operating in the country.

- In 2011, the Government of Peru approved a new tax (between 2% and 8.4%) on windfall profits in the mining sector, and it increased the maximum mining royalty rate to 12% from 3%. (The minimum rate remained at 1%.) For companies that had tax stability agreements in place that made them immune to potential increases in their mining royalty rates, the Government planned to charge a special mining levy ("contribution") of between 4% and 13.12% of mine operating profits.

- In 2011, the Venezuelan Government announced the nationalization of all gold mines in Venezuela, and it approved new marketing taxes on various mineral commodities. Since 2007, the Government had also increased its participation in the oil and natural gas sector by requiring at least a 60% ownership share by state-owned *Petróleos de Venezuela S.A.* (PDVSA) in joint ventures with various private companies.

(*Economist*, The, 2010; Sinnott and others, 2010, p. 33–35; Cespedes and others, 2011; Crooks and Pons, 2011; Kosich, 2011; PricewaterhouseCoopers LLP, 2011, p. 36, 70; 2012a, p. 2–3, 11–15, 17–21, 34–36; Quiroga, 2011; Rhodes, 2011; Topf, 2011; Vyas and De Cordoba, 2011; Economic Commission for Latin America and the Caribbean, 2012d, p. 153–154, 249; 2013b, p. 14–19, 29–36, 48–50, 56–63, 89–91; Gravelle, 2012, p. 11–20, 24–28; ITRI Ltd., 2012a, b; Thankayathil, 2012; Thomson Reuters, 2012; U.S. Energy Information Administration, 2012a, b; Bourke, 2013c; Government of Quebec, 2013, p. 8–11; Johnson, 2013; UK Trade & Investment, 2013; Webber, 2013; Williams, 2013a, b).

Other Legislation

In May 2013, environmental authorities in Chile ordered Barrick Gold Corp. of Canada to halt construction of the company's Pascua Lama gold-silver-copper project, which is at an elevation above 3,800 meters in the Andes Mountains between Argentina and Chile. In April 2013, a Chilean court had already ordered a partial suspension of work on the project while it heard claims by indigenous communities of environmental damages from the project (Bourke, 2013a; Thomson Reuters, 2013).

In July 2011, the Peruvian Government revoked the Renco Group of the United States's license to operate La Oroya smelter. The smelter was restarted by the creditors of the smelter's operating company in 2012 and reportedly was still operating through the first half of 2013. In April 2013, the mines, oil, and energy society of Peru reported that new environmental standards could come into effect at the beginning of 2014. If so, La Oroya could have to be shut down, at least temporarily, and other metallurgical facilities in the country could have to upgrade their operations to meet the new standards, possibly including Southern Copper Corp.'s Ilo copper smelter and Grupo Votorantim Metais S.A. of Brazil's Cajamarquilla zinc refinery (Mining, People, and the Environment, 2011; Velez, 2011; Emery, 2013).

In 2011, Colombia was in the process of reorganizing the country's mining and energy sectors to generate greater revenue for the state and improve safety in the country. On January 30, 2012, the Government defined strategic minerals of interest to Colombia and delimited special areas in the country as open to concession applications and other areas for which no new applications may be submitted. Mineral deposits containing coal, coltan (niobium and tantalum), copper, gold, iron, magnesium, phosphates, platinum, potassium, and the byproducts, concentrates, and associated minerals thereof were classified as strategic materials (minerals) based upon the Government's knowledge of the country's terrain and areas that had been identified as having the greatest potential for hosting the strategic mineral deposits (Mining Journal, 2011a).

A second provision of the 2011 decree to nationalize the Venezuelan gold mining sector required that future legal disputes (in the mining sector) must be resolved in Venezuelan courts. This action is likely in response to the filing for international arbitration by three mineral exploration companies (Vanessa Ventures, Gold Reserve Inc., and Crystallex International Corp.) that claim they are entitled to

financial reimbursement for assets that were expropriated. The Venezuelan Government planned to revoke several mining licenses in 2011, but further information regarding the outcome of those plans was not available (Canadian Business, 2011; Wall Street Journal Online, 2011).

In 2011, several Central American countries were restricting new mining projects. Costa Rican lawmakers voted in November 2010 to ban all new open pit mining projects, and the policy was to become effective in 2011. The Costa Rican President was expected to sign the bill into law, because she had previously placed a moratorium on mining after taking office in May 2010. The President of El Salvador had not approved new mining permits since 2008, and expressed interest in banning precious metal mining. Guatemala and Honduras were temporarily restricting new exploration and mining permits until new mining legislation has been passed. On the other hand, the Government of Panama passed an amendment to the country's mining law that allowed foreign state-owned companies to participate in Panama's mining sector either by acquiring mining concessions or by establishing joint ventures with companies already operating in the country. The regulation generated widespread protests, however, and was subsequently repealed (Josephs, 2010; Mining Journal, 2011b; Thomson Reuters, 2011).

Canada's 2011 Federal budget was amended on June 6, 2011, to extend the temporary 15% mineral exploration tax credit for another year to March 2012 as a means of maintaining revenues generated by the high level of mineral exploration investment in the country. The program applies to preliminary exploration activities conducted at or above the surface of the ground. The Canadian Government allocated C\$25 million (about US\$25.3 million¹) for a 5-year period to renew the Targeted Geoscience Initiative, with a focus on developing new methods for exploring deeper mineral deposits, and the 5-year, C\$100 million (US\$101 million) Geo-mapping for Energy and Minerals (GEM) program. The Canadian Northern Economic Development Agency plans to invest C\$3.275 million (US\$3.3 million) during 3 years (2012 through 2014) to support geoscience research and data analysis in the Northwest Territories (Government of Canada, 2011; Hill, 2011; North of 60 Mining News, 2011).

At the Provincial level, phase 1 of the Ontario Mining Act was implemented in 2011 to amend certain staking procedures and withdrawal provisions and provide exemption conditions from the mining land tax for surface rights landowners. The Quebec Government implemented a 25-year plan to stimulate investment in northern Quebec. Under the plan, called "Plan Nord," the Quebec Government will spend \$2.1 billion during the next 5 years to make areas of Quebec north of the 49th parallel more accessible for mineral exploration and development (Government of Ontario, 2011; Hiyate, 2011).

¹ Where necessary, nominal values have been converted from Canadian dollars (C\$) to U.S. dollars (US\$) at an annual average exchange rate of about C\$0.9895=US\$1.00 for 2011. All values are nominal, at current prices, unless otherwise stated.

Investment

From 2010 through 2012, the countries of Latin America and the Caribbean have been the recipients of ever greater flows of foreign direct investment (FDI), on average. In 2012, total FDI flows in the world decreased, so the increase in FDI in LAC countries caused the region's share of global FDI flows to increase to about 12%. In 2012, mining companies worldwide (especially junior mining and exploration companies) raised about 25% less capital than in 2011, including a 43% decrease in bank loans to the companies in this sector, so potential investors in mining were beginning to encounter greater financial constraints that could carry over into 2013. Through 2012, the LAC region's increased share of total FDI flows in the world was owing to (a) economic uncertainty in developed countries that redirected investment toward emerging markets; (b) a relatively favorable investment environment in Latin America that attracted foreign investors; (c) the boom in prices of natural resource commodities (especially metals) that began in 2003 and was ongoing from 2010 through 2012 (after a temporary downturn in 2008 and 2009); and (d) economic growth in the countries of the region that had been steady for several years, including growth in domestic markets for such services as telecommunications and financial services (Blas, 2013; Economic Commission for Latin America and the Caribbean, 2013a, p. 7–9, 37).

In 2012, the ranking of the destination sectors for FDI flows into LAC countries had not changed in 5 years, and the share of the services sector in the total FDI in the region was 44%; manufacturing sector, 30%; and sectors based on natural resources, 24%. In South American countries (excluding Brazil), on average, FDI in natural resource sectors (especially the mining sector) had been growing for several years and accounted for a 51% share of the total FDI in those countries in 2012 compared with 44% during the period 2007 through 2011. In Brazil, CAC, and Mexico, however, sectors based on natural resources accounted for far smaller shares of total FDI into those countries, on average, and the manufacturing and services sectors were growing recipients of FDI. In 2012, sectors based on natural resources accounted for 13% of total FDI in Brazil and 10% in Mexico and CAC compared with 23% and 10%, respectively, during the period 2007 through 2011 (Economist, The, 2012b; Economic Commission for Latin America and the Caribbean, 2013a, p. 7–9, 37).

From 2003 through 2011, the profitability of FDI (measured by FDI income or profits as a proportion of the total stock of FDI) in the LAC region increased dramatically. The increase was primarily owing to increasing economic growth in the region's major economies, which drove up the profits of multinationals that had a significant proportion of company sales to the domestic market(s), and to increasing prices for the region's main export commodities, which benefited foreign firms operating in various natural resources sectors, especially the metals mining sector. In 2011, about 80% of FDI income in the region was generated in Brazil (29%), Chile (17%), Colombia (13%), Peru (12%), and Mexico (9%). From 2007 through 2011, the highest profitability from FDI was in countries where the main target sector for FDI was the extraction of raw materials for export, including, in Peru, a profitability of 25%;

Chile, about 16% (25% in the mining sector alone); the Dominican Republic, between 13% and 14%; Colombia, about 12.5%; and Bolivia, about 12%. The average profitability of FDI in the region as a whole during this timeframe was 7.8%, and the target sector for FDI in many of the countries that had lower profitability the region was manufacturing (for export), including in Mexico (about 3%) and some Central American countries (Economist, The, 2012b; Economic Commission for Latin America and the Caribbean, 2013a, p. 9–12, 21–25, 27–33, 36–37, 51, 63–69).

Although possessing abundant mineral resources, Brazil, Ecuador, and Venezuela represent special cases where the profitability of FDI (2003 through 2011) was not as high as in other commodity-exporting countries in the region. In Brazil, domestic companies dominated the mining and hydrocarbons sector, so FDI income was mostly generated in the manufacturing and services sectors in the country. In the hydrocarbons sector, FDI did increase in 2011 as a result of ongoing development of the pre-salt oil deposits, and the pre-salt development project was expected to generate more profits for foreign investors in the sector after production is ramped up. In 2010, foreign oil companies operating in Ecuador began receiving only flat-rate payments based on the amount of oil extracted, and the Government began receiving a greater percentage of profits through provision-of-service contracts with the companies. FDI income for foreign oil companies in the country had actually begun decreasing in 2007, however, because the companies anticipated this policy and either liquidated their assets or otherwise reduced FDI in Ecuador. Similarly, foreign companies involved in production of crude petroleum and natural gas in Venezuela (the main sector for FDI in the country) had to operate in partnership with state-owned PDVSA, which limited the profits obtained by the foreign oil companies (Economic Commission for Latin America and the Caribbean, 2013a, p. 66–69).

In 2011 and 2012, investor interest in the exploitation of natural resources and in the domestic markets (mostly for financial services, retail commerce, and telecommunications) of the countries of LAC were the primary drivers of FDI flows into the region as a whole. Continuing high prices of many of the raw mineral materials (especially metals) found in some countries of the region encouraged greater flows of FDI, and the return on investment in the mining sector, on average, continued to be higher than that in any other economic sector, as it has in the region since about 2003. In 2012, total FDI flows into all LAC countries increased to about \$173 billion from \$166 billion in 2011. The leading recipient of FDI in the LAC region was Brazil, even though total FDI flows into Brazil decreased to \$65.3 billion from about \$66.7 billion in 2011. The second ranked recipient of FDI in LAC countries was Chile, and total FDI flows into the country increased to \$30.3 billion from about \$23 billion in 2011; followed by Colombia, where total FDI inflows increased to \$15.8 billion from \$13.4 billion in 2011; Mexico, decreased to about \$12.7 billion from \$21.5 billion in 2011; Argentina, increased to about \$12.6 billion from \$9.9 billion in 2011; and Peru, increased to about \$12.2 billion from \$8.2 billion in 2011. In 2012, Chile appeared to be establishing a role as a base for foreign investors to invest elsewhere in Latin America, as about 26% of the flow of FDI

into the country during the year was then invested elsewhere in the region by Chilean subsidiaries of foreign companies (Economic Commission for Latin America and the Caribbean, 2012b, p. 46–49; 2013a, p. 18–21).

In 2011 and 2012, the most notable foreign investment in the mineral industry of Brazil was with respect to improvements and ramping up of production at an integrated iron and steel plant by ThyssenKrupp AG of Germany, BG Group plc of the United Kingdom's investments in development of the Sapinhoa oil and gas field (one of the largest fields in the Santos offshore basin) and China Petrochemical Corp.'s (Sinopec's) 2012 acquisition of a 30% ownership interest in the natural gas and oil exploration and development company Petrogal Brasil Ltda. (a Brazilian subsidiary of Galp Energia S.A. of Portugal) (Economic Commission for Latin America and the Caribbean, 2012b, p. 25; 2013a, p. 23–24).

Also in both 2011 and 2012, the mining sector was the leading destination of net FDI flows into Chile. Decreasing ore grades and increasing extraction and processing costs in the country required increasing investment for investors in Chile's mining sector to continue to take advantage of high prices of mineral exports. In 2011, there were notable investments in mining (greenfield and expansion) projects by BHP Billiton Ltd. and BHP Billiton plc of Australia and the United Kingdom (BHP Billiton) and Freeport-McMoRan Copper & Gold Inc. of the United States (Economic Commission for Latin America and the Caribbean, 2012b, p. 25; 2013a, p. 25).

Of the total FDI inflow into Colombia in 2011, 40% went to the oil and natural gas sector and 20% went to the mining sector; 34% of the total FDI inflow into the country was destined for the oil and gas sector and 14% went to the mining sector in 2012. In 2011, BHP Billiton and Xstrata plc of Switzerland announced that they planned jointly to invest \$1.3 billion in the expansion of coal mines in Colombia. In 2011, all natural resource sectors combined attracted only 4.3% of the FDI flow into Mexico, and this share of total annual FDI inflows was still slightly higher than that during the period 2000 through 2010, on average. The consistently low share of the mineral industry as a recipient of FDI in the country could be owing to state-owned *Petróleos Mexicanos, S.A. de C.V.*'s (PEMEX's) monopoly on oil and natural gas extraction and control of much of the mining sector by large Mexican companies, such as *Empresas Frisco, S.A. de C.V.*; *Grupo México, S.A.B. de C.V.*; and *Industrias Peñoles, S.A.B. de C.V.* Still, foreign companies (mostly Canadian) made about 20 minor acquisitions in the Mexican mining sector in 2011, and *Gerdaul S.A.* of Brazil announced that it planned to invest \$600 million to build a new structural steel plant in Mexico in 2012 (Economic Commission for Latin America and the Caribbean, 2012b, p. 27–28; 2013a, p. 27–29; Economist, The, 2012b).

From 2010 through 2012, FDI flows into the hydrocarbon sector of Argentina included China's state-owned *China National Offshore Oil Corp. Ltd.*'s (CNOOC's) investment to acquire a 50% interest in Argentina's *BRIDAS Corp.* in 2010 and may have included some part of Sinopec of China's investment to acquire an Argentine subsidiary of *Occidental Petroleum Corp.* of the United States in 2011. Depending on the nature of the transaction, however, the transfer of ownership of

an asset from one foreign company to another may not count at all toward FDI flows. Possible disinvestment by Repsol of Spain following the Government's nationalization of Repsol's interest in YPF S.A. in 2012 could have resulted in an outflow of FDI in the hydrocarbon sector in Argentina. In 2012, the mining sector of Peru was estimated to have been the recipient of about 70% of total FDI in the country, and the leading investors in the sector were Compañía Minera Antamina S.A. (owned by BHP Billiton, 33.75%; Xstrata, 33.75%; Teck Cominco Ltd. of Canada, 22.5%; and Mitsubishi Corp. of Japan, 10%), Minera Chinalco Perú S.A. (a subsidiary of the Aluminum Corporation of China), Minera Yanacocha S.R.L. (majority owned by Newmont Mining Corp. of the United States), and Xstrata (separately from investments made through Compañía Minera Antamina). In Peru, FDI in the mining sector appeared to be mostly targeted at the production of copper and gold (Economic Commission for Latin America and the Caribbean, 2012b, p. 27; 2013a, p. 24–28).

Chinese investment in LAC appeared to have decreased in 2011 compared with estimated flows of FDI from China to LAC countries of greater than \$15 billion in 2010, but an accurate estimate of China's share of the total flow of FDI into the region was not available. Most of China's FDI in the region appeared to be channeled through non-LAC countries and then was concentrated in many LAC countries, such as Peru and Venezuela, that did not report official 2011 FDI inflow data by origin to the ECLAC. According to researchers at the Peterson Institute for International Economics (PIIE), Brazil (24%) and Peru (10%) were the first and fourth ranked global destinations for Chinese investment for the period 2003–2011, respectively, of those countries for which data were available. According to data compiled by the PIIE, Brazil was by far the leading recipient of China's investment in the mineral industries of LAC countries with about \$11.5 billion, followed by Peru (\$4.9 billion), Guyana (\$1 billion), Argentina (\$47 million), Venezuela (\$15 million), Colombia (\$10 million), and Bolivia (\$2 million). For the same period, 59% of Chinese FDI in South America was accounted for by metals and 4% was accounted for by coal, crude oil, and natural gas combined (Economic Commission for Latin America and the Caribbean, 2012b, p. 24–31, 50–52; 2013a, p. 35–36; Kotschwar and others, 2012, p. 22).

By 2013, the Government of China had loaned at least \$35 billion to the Government of Venezuela since 2007 for infrastructure and oil projects in the Orinoco tar sands, and the Venezuelan oil minister announced in June 2013 that an additional \$4 billion line of credit from the Export-Import Bank of China had been secured to help PDVSA Petrolera Sinovensa S.A. (a joint venture between PDVSA and China National Petroleum Corp.) increase oil production in the Orinoco heavy oil belt; Venezuela planned to pay off its debt in oil at cut-rate prices. The Orinoco tar sands were estimated to contain greater than 500 billion barrels of recoverable heavy crude oil and could represent the world's largest oil reserve. It was reported that Venezuela sent about 460,000 barrels per day (about 20% of its oil exports) to China in recent years and that there were concerns that the arrangement could drive Venezuela into bankruptcy (Hearn, 2012; Kotschwar and others, 2012, p. 3, 21; Iwata, 2013; Wallis, 2013).

At least in the short- to mid-term, new taxation on minerals production may not affect output much, because it is costly to scale back production substantially once a mine is fully operational. So, it is possible that a Government can get an initial boost to its revenue stream from implementing a new mining tax or royalty, but this temporary boost to fiscal revenues can decrease in the long run as the policy reduces investment (and later output) in the sector. If fiscal commodity rents are saved or invested in some type of sovereign wealth fund (SWF), then another potential issue is when and in what sector to reinvest the gains from such funds. Investment decisions regarding SWFs could place Governments in the position of having to guess what economic sectors are going to be the most successful future drivers of the economy. In the past, developing countries in Latin America and elsewhere have had mixed results from such industrial policies, and the outlook for the future saving and investment of funds from the recent commodity boom in the region is uncertain (Sinnott and others, 2010, p. 13–23, 57–67; Economic Commission for Latin America and the Caribbean, 2012d, p. 17, 26, 37, 41–42, 48–54, 61–62, 77–80, 225–227, 235–241; 2013a, p. 119; 2013b, p. 10–15, 26–35, 50–54, 89–91; Fortin, 2013).

An issue with Governments investment of funds accrued from the nonrenewable resources sector is the need to develop new capital (human, physical, or other), encourage innovation and technological development, improve production infrastructure, and (or) develop other sustainable assets to replace the stock of nonrenewable resources that is being used (given that accurate information concerning what the future available stock of the resource will be is not available). Otherwise, countries could be, in effect, borrowing against their future stock of natural resources capital to support current consumption (which could become increasingly costly to their economies). From 2003 through 2011, the ECLAC found that investment in exploration and development in the hydrocarbons sector of LAC economies did not increase as much as that in the mining sector, on average. In 2012, the International Monetary Fund (IMF) estimated that while some Governments of commodity-exporting LAC countries could still be overspending their share of rents from the commodities production sector on current consumption, most LAC countries were saving more of the extraordinary revenues from the boom in commodity prices from 2003 through 2011, on average, than during previous commodity price booms (Economic Commission for Latin America and the Caribbean, 2012d, p. 77–80; 2013a, p. 119; 2013b, p. 89–91; International Monetary Fund, 2012b, p. 4; 2013, p. 47–52).

Two Chilean Government SWFs were based on revenues from the country's mining sector (mostly copper mining). Through at least 2011, it appeared that the Chilean Government had collected and saved offshore a seemingly significant portion of the windfall profits from the copper boom (via new mining royalties that it started collecting in 2005). To a lesser extent, some other countries appeared to have also been able to save some of the rents from the commodity price boom in the 2000s, including Bolivia, Mexico, and Peru. In 2010, Brazil passed legislation that initiated a new SWF to manage Government revenues from developments of the pre-salt oil fields. In 2012,

debate over how to best distribute the funds of this SWF continued, and the Brazilian Government reportedly appeared to be favoring almost immediately spending them on education and antipoverty programs (Economist, The, 2010; Sinnott and others, 2010; PricewaterhouseCoopers LLP, 2012a, p. 11–13; Williams, 2013a, b).

At least from 1980 and through 2011, the total rate of investment (including both public and private investment) in fixed capital formation in LAC countries had been heavily influenced by economic cycles associated with trends in commodity prices and by external (to the LAC region) financial conditions. From 1980 through 2003, public investment in LAC countries had been decreasing as a share of total investment and as a share of the GDP, and this was at least partially owing to widespread privatizations of state-owned fixed assets (including Government enterprises in the mining and hydrocarbons sectors). As the global economy expanded and prices for LAC exports (including mineral commodity exports) increased rapidly, there was a dramatic increase in the acquisition of fixed capital assets by LAC Governments compared with that during the period 1999–2002, and the total value of state-owned fixed assets in the LAC region continued to increase through 2011 (Economic Commission for Latin America and the Caribbean, 2012a, p. 77–83).

From 2003 through 2011, Venezuela led all LAC countries in the Government's level of investment as a percentage of the GDP, followed by Ecuador and Bolivia. In these three countries, the Government had a prominent role in the hydrocarbons sector, and investment in the sector was the main reason for these countries leading the LAC region in public investment (as a percentage of the GDP) during this timeframe. Any increases in total investment in other LAC countries during this timeframe was mostly owing to increases in private investment (including FDI), most notably in Chile, Colombia, and Peru, although increased public investment also appeared to contribute significantly to increases in total fixed capital formation in some other countries, most notably in Mexico and Peru (Economic Commission for Latin America and the Caribbean, 2012a, p. 80–84).

Mergers and Acquisitions

In 2012, the value of cross-border mergers and acquisitions (M&As) that targeted LAC countries decreased by about 34% from that of 2011 to about \$57.7 billion, mostly owing to a 65.7% decrease in the value of acquisitions in the region by companies based in the European Union, but the value of M&A transactions worldwide by companies based in Latin America increased by about 139% to \$21.3 billion in 2012 from \$8.9 billion in 2011. Thus, LAC-based companies became the main source of M&A activity in LAC, but this was not enough to offset the decrease in the value of M&A transactions originating in non-LAC countries. From 2010 through 2012, LAC-based companies benefited from the region's economic growth, which helped them stay profitable, and from high investor confidence in the economies of the region, which helped their access to credit. In 2012, the M&A transactions in the mining and hydrocarbon sectors of LAC countries appeared to be fewer in number and of less value than in 2011 (Economic

Commission for Latin America and the Caribbean, 2012b, p. 26; 2013a, p. 18, 36–40).

In terms of the value of mining acquisitions in 2012, Canada led all buyers in the M&A market with a 29% share, followed by the United Kingdom (11%), Australia and China (9% each), and the United States (6%); in a much larger M&A market in 2011, Australia led with a 22% share, followed by the United States (17%), Canada (14%), China (11%), and Russia (5%). In 2011 (the latest year for which this information was available), the leading geographical location of the mining projects that were acquired during the year was Canada (where 25% of the total number of acquired projects were located), followed by the United States (15%), Australia (11%), China (6%), and Russia (3%) (PricewaterhouseCoopers LLP, 2012b, p. 6–10; 2013, p. 15).

In 2012, copper and gold were the main targets of global M&A investments compared with five key mineral commodities that dominated M&A targets in 2011 (coal, copper, gold, iron ore, and niobium). In 2012, gold was the target of the greatest number of mining M&A deals, accounting for 30% of global M&A transactions, followed by copper and diversified metals (14% each), and iron ore (4%); in terms of the values of these M&A transactions, the value of M&A deals primarily targeting copper accounted for 30% of the total value of M&A mining deals during the year, followed by gold (27%), iron ore (12%), and diversified metals (10%). Geographically, Canada was the leading target country for M&A deals to acquire an interest in copper mine production (accounting for 38% of the total number of M&A deals in the copper mining sector during the year), followed by Australia (18%) and the United States (8%); Canada was also the leading target country for M&A deals in the gold mining sector (35%), followed by Australia (14%) and the United States (11%). In 2013, M&A transactions targeting copper and gold were expected to continue to dominate the global M&A market, and iron ore was not expected to be a leading commodity target of M&A deals; it was anticipated that more M&A transactions could target uranium than in 2012 and that one of the deals could be the Russian state-owned company JSC Atomredmetzoloto (ARMZ)'s proposed acquisition of Uranium One Inc. of Canada (PricewaterhouseCoopers LLP, 2012b, p. 16; 2013, p. 10–12; Akin and Gordon, 2013).

In 2012, the leading global M&A mining deal was expected to be Glencore's merger with Xstrata, which was proposed in early 2012 but not finalized until May 2013. To obtain the Chinese Government's approval for the deal, Xstrata agreed to sell its Las Bambas copper project in Peru to a buyer that would have to be approved by the Chinese commerce ministry, and Glencore agreed on copper, lead, and zinc concentrate supply deals with China. This merger would consolidate ownership of a large number of mines in Latin America and Canada, and PricewaterhouseCoopers LLP reported an estimated value of about \$54 billion for the deal proposed in 2012 (Bourke, 2013b; Grabski, 2013e; PricewaterhouseCoopers LLP, 2013, p. 2–9).

Other significant mining mergers or acquisitions involving target properties or projects in the region during 2011 and 2012 included the following:

- \$6.7 billion (copper)—In October 2012, First Quantum Minerals Ltd. of Canada announced that it intended to acquire all shares of Inmet Mining Corp. of Canada, including all of

Inmet Mining's 80% ownership interest in the Cobre Panama copper mining development project; the acquisition was completed in April 2013 (First Quantum Minerals Ltd., 2013).

- \$5.4 billion (copper)—In November 2011, Mitsubishi Corp. of Japan acquired 24.5% of Anglo American Sur S.A. of Chile, which holds a significant portfolio of copper assets in Chile, including Los Bronces Mine, El Soldado Mine, the Chagres smelter, and a number of exploration properties (Mitsubishi Corp., 2011).

- \$5.2 billion (bauxite and aluminum)—In 2011, Norsk Hydro ASA of Norway acquired significant Brazilian bauxite and alumina assets from Vale S.A. (Vale) of Brazil. Norsk Hydro obtained full control and ownership of the Paragominas bauxite mine, a 91% share in the Alunorte alumina refinery, an 81% share in the CAP alumina refinery, and a 51% share in the Albras aluminum plant, among other assets (Norsk Hydro ASA, 2011).

- \$4.8 billion (iron ore)—In May 2011, Ohio-based Cliffs Natural Resources Inc. acquired Consolidated Thompson Iron Mines Ltd. of Canada. Following the merger, Cliffs is expected to become one of the leading mining and natural resource companies in North America and to have significant exposure to Asian markets. Cliffs will control 10 iron ore facilities, 6 coal mines, and a prefeasibility chromite-development project in Australia, North America, and South America (Cliffs Natural Resources Inc., 2011a; 2011b, p. 7; 2011c, p. 6).

- \$2.84 billion (copper)—In December 2011, KGHM Polska Miedz S.A. of Poland signed a binding conditional agreement with Canadian company Quadra FNX Mining Ltd. under which KGHM would acquire 100% of the shares of Quadra FNX. Quadra mined copper, nickel, gold, platinum, and palladium from the Carlota and the Robinson Mines in the United States; the Franke Mine in Chile; and the McCreedy West, the Levack, and the Podolsky Mines in Canada (KGHM Polska Miedz S.A., 2012, p. 20).

- \$2.8 billion (iron ore and steel)—In November 2011, Ternium S.A. of Luxembourg announced that it had entered into an agreement to acquire 27.7% of the voting capital of Usinas Siderúrgicas de Minas Gerais S.A. (Usiminas) of Brazil. The deal involved Ternium joining the group that controls Usiminas, which was led by Nippon Steel Corp. of Japan. The transaction closed in January 2012 and resulted in Nippon Steel holding 46.1% of the total ordinary shares held by this control group; Ternium, 43.3%; and a Usiminas employee's pension fund, 10.6% (Ternium S.A., 2011, 2012).

- \$1.95 billion (niobium)—In March 2011, a group composed of Japan Oil, Gas and Metals National Corp. (JOGMEC), JFE Holdings Inc., Nippon Steel, and Sojitz Corp. of Japan; the National Pension Service and POSCO of the Republic of Korea acquired a 15% interest in Companhia Brasileira de Metalurgia e Mineração of Brazil, which was reportedly the leading producer of niobium in the world (MercoPress, 2011).

- \$1.95 billion (niobium)—In September 2011, China Niobium Investment Holdings Ltd. (a consortium of Anshan Iron & Steel Group Corp., CITIC Group Co., Shanghai Baosteel Group Corp., and Taiyuan Iron & Steel (Gropu) Co., Ltd. of China) also acquired a 15% interest in Companhia Brasileira de Metalurgia e Mineração of Brazil (MercoPress, 2011).

- \$1.9 billion (copper)—In August 2012, CODELCO and Anglo American plc of the United Kingdom agreed that Inversiones Mineras Acrux SpA (owned 83% by CODELCO and 17% by Mitsui & Co., Ltd. of Japan) would acquire a 25.4% share of Anglo American Sur (Anglo American plc, 2013, p. 70, 158, 187, 232).

- \$1.5 billion (coal)—In 2011, ITOCHU Coal Americas Inc. (a subsidiary of ITOCHU Corp. of Japan) acquired a 20% interest in Drummond Company, Inc. of the United States' Colombian coal mining operations and related infrastructure (Mizuta, 2011).

- \$1.43 billion (gold)—In January 2012, Pan American Silver Corp. and Minefinders Corporation Ltd. of Canada entered into a definitive agreement for Pan American Silver to acquire all of the shares of Minefinders, including 100% ownership of the Dolores gold and silver mine in northern Mexico (Pan American Silver Corp., 2013).

- \$1.3 billion (rare earths)—In March 2012, Molycorp Inc. of the United States entered into a definitive agreement to acquire Neo Material Technologies Inc. of Canada and Neo Material Technologies' rare-earths processing capacity and distribution network for rare-earths products (Molycorp Inc., 2012).

- \$1.1 billion (iron ore)—In May 2013, ArcelorMittal of Luxembourg announced that it had completed the sale of a 15% interest in its Canadian subsidiary, ArcelorMittal Mines Canada Inc., to a consortium led by China Steel Corp. of China and POSCO (ArcelorMittal, 2013).

In February 2013, CNOOC of China announced that the company had finalized its acquisition of Nexen Inc. of Canada. In 2011 and 2012, the most common M&A strategy in the hydrocarbons sector by Chinese national oil companies (NOCs) appeared to have been to acquire noncontrolling minority ownership interests, such as CNOOC's acquisition of a 50% noncontrolling interest in BRIDAS of Argentina and Sinopec's acquisition of 30% of Petrogal Brasil. This strategy also included acquiring noncontrolling interests through joint-venture contracts, such as Sinochem Corp. of China's acquisition of a 40% interest in the Peregrino field offshore of Brazil through a joint venture with Statoil ASA of Russia and China Investment Corp.'s acquisition of a 30% interest in oil and natural gas properties in Trinidad and Tobago through a joint venture with GDF Suez S.A. of France (Economic Commission for Latin America and the Caribbean, 2012b, p. 26; 2013a, p. 38; CNOOC Ltd., 2013; Deloitte Development LLC, 2013, p. 2–7; Xu, 2013).

In July 2011, A.P. Møller-Mærsk A/S of Denmark completed its acquisition of SK do Brasil Ltda. (a Brazilian subsidiary of SK Energy Co., Ltd. of the Republic of Korea), including a 40% interest in the Polvo oil and natural gas field, a 27% interest in the Itaipu oil and natural gas discovery, and a 20% interest in the Wahoo oil and natural gas discovery. In October 2011, TNK-BP Group of Russia acquired a 45% interest in the Solimões Basin oil and natural gas project in Brazil through a joint-venture operating agreement with HRT Participações em Petróleo S.A., and TNK-BP signed a joint-venture agreement with PDVSA that gave the company a 16.7% interest in the Petromonagas oil venture and other assets in Venezuela (MacCarthy and Juna-a, 2010; Bierman and Crooks, 2012; Economic Commission

for Latin America and the Caribbean, 2012b, p. 26; BP p.l.c., undated).

Exploration

According to the Metals Economics Group (MEG), Latin America continued its leading position as a destination for exploration activity based on MEG budget data and was listed second after Canada according to the list compiled by the USGS. The MEG estimated that the 2011 exploration budget for Latin America increased by 47% to about \$4.2 billion from the \$2.9 billion estimated for 2010. Recent discoveries high in the Andes Mountains of Argentina and Chile have focused exploration in an area where exploration costs are relatively high owing to the remoteness of the area. Brazil, Chile, Colombia, Mexico, and Peru were ranked in MEG's top 10 country list for anticipated exploration spending in 2011. On the basis of data compiled by the USGS, Latin American countries with the greatest exploration activity, in descending order by number of sites for which data were compiled, were Mexico, Peru, Brazil, Argentina, Chile, and Colombia. Gold and silver attracted about 67% of total exploration activity in Latin America, and interest in base metals achieved 19% of the total exploration activity based on the number of active sites. Exploration for 14 other minerals made up the remaining 14%. Activity in 2011 was primarily used to further define early-stage resources (75%), conduct exploration at a producing site (14%), conduct feasibility studies of promising discoveries (7%), and further explore for resources of deposits under development (4%) (Metals Economics Group, 2011; Kosich, 2012).

Latin America was a leading region for mineral exploration owing to its promising geology, the perception of positive mineral policies in many countries, and its successful historical record of mineral production and development. As mineral properties reach a more advanced stage leading to development, exploration costs tend to increase. Consequently, a region such as Latin America that hosts many properties at an advanced stage of exploration would likely have a high regional exploration budget, although the number of sites actively being explored in such a region may not be as high as in a region where most of the sites are at an early stage of exploration. The Latin American region has generally been able to maintain its global share of exploration sites for the past decade, suggesting that exploration companies have continued to favor this region, even during lean economic conditions or when nationalization of resources in some countries has led to increased risk of resource development.

Brazil is reported to have issued about 28,000 exploration permits in 2011, which was an increase from the 20,000 permits issued in 2010. The greatest number of permits were for iron ore and gold deposits. Other minerals receiving a sizable amount of exploration activity in Brazil were bauxite, copper, manganese, nickel, potash, silver, tantalum, tin, and tungsten. In 2010, the National Mining Registry of Colombia reported that 1,717 companies had submitted requests for mineral exploration and extraction, in addition to 7,200 licenses held by individuals. The Colombian Government suspended new request applications in 2011 for at least 6 months until measures could be implemented

to handle these requests and monitor this growing sector (Campbell, 2011; Kimball, 2011; Ronderos, 2011).

Exploration activity data for Venezuela suggest that there has been a recent shift in exploration activity from predominantly Australian, Canadian, and U.S. companies to companies with ties to Brazil, China, and Russia. Rusoro Mining Ltd. was exploring 10 sites in Venezuela by means of joint-venture agreements with the Venezuelan state mining company Corporación Venezolana de Guayana. Other companies conducting gold exploration included ValGold Resources Ltd. of Canada and Shandong Gold Mining Company Ltd. of China.

Canada continued to be a focus of global mineral exploration. Statistics as of December 2010 (released by Natural Resources Canada, which is an agency of the Canadian Government) show 2011 exploration expenditures as of October 2011 through the feasibility level at C\$3.8 billion (US\$3.84 billion), which was up by 45% from an expenditure of C\$2.8 billion (US\$2.83 billion) for 2010. The MEG reported budgeted exploration spending in Canada for 2011 at US\$2.9 billion, or about 18% of the estimated overall worldwide exploration budget. Canadian Government statistics include planned exploration expenditures for a wider variety of minerals and materials than are included in the MEG estimates. It is also important to note that the total of revised spending intentions for Canada reported by Natural Resources Canada as of October was 27% higher than its February 2011 estimate of C\$3.2 billion (US\$3.23 billion), although these adjusted figures may reflect increased exploration costs rather than a greater amount of exploration activity. In 2011, precious metals (gold and silver) accounted for C\$1.9 billion (US\$1.92 billion); base metals, C\$760 million (US\$768 million); uranium, C\$185 million (US\$187 million); and diamond, C\$93 million (US\$94 million) of the C\$3.8 billion exploration total. When the Canadian exploration statistics are reconfigured to make them comparable with MEG statistics, the reported exploration expenditures as of October 2011 by Natural Resources Canada would be C\$2.9 billion (US\$2.93 billion), which is essentially equivalent to the MEG estimate (Natural Resources Canada, 2011).

Company exploration spending for 2011 as reported by the Canadian Government as of February 2012 was greatest in Ontario (27% of the total exploration and deposit appraisal expenditures for Canada), Quebec (19%), British Columbia (15%), Nunavut Territory (10%), Saskatchewan (9%), and Yukon Territory (8%); other Canadian Provinces made up the remaining 12% of the expenditure. Canadian Provinces or Territories with a 50% or more increase in exploration activity in 2011 from 2010 based on reported expenditures were Yukon Territory (97% increase, primarily a result of exploration for precious and base metals), Alberta (94% increase, primarily a result of exploration for coal, industrial minerals, and iron), New Brunswick (85% increase, primarily a result of increased exploration for base and precious metals and rare-earth elements), British Columbia (54% increase, a result of increased exploration for precious and base metals, as well as other metals and nonmetals), and Nunavut (54% increase, primarily a result of increased exploration for base and precious metals and iron). Junior exploration companies accounted for about 57% of total expenditures in 2011. In terms of mineral commodities sought

countrywide, precious metals received the largest exploration expenditure (50%), followed by base metals (20%), uranium (5%), and diamond (2.5%). Coal, iron ore, and other minerals made up the remaining 22.5% (Natural Resources Canada, 2012).

Canadian Provinces or Territories with the greatest exploration activity were, in descending order by number of sites in 2011 as compiled by the USGS, British Columbia, Ontario, Quebec, Yukon Territory, Saskatchewan, Manitoba, Newfoundland and Labrador, Nunavut, New Brunswick, Northwest Territories, Nova Scotia, and Alberta. Based on the site data, exploration sites for gold and silver accounted for approximately 59% of all 2011 Canadian exploration sites; base metals accounted for about 20%; uranium, about 5%; iron ore, about 3%; diamond, about 3%; platinum-group metals (PGMs), 1%; and other minerals, 9%. There was a significant increase in exploration for graphite, lithium, potash, and rare-earth elements in 2011. Approximately 87% of all reported exploration sites were considered early-stage sites. Gold exploration in Canada (based on the number of sites reporting activity in 2011) focused on British Columbia, Ontario, Quebec, and Yukon Territory, where recent gold discoveries have generated much interest. Base-metal exploration in Canada based on the number of active sites focused primarily on British Columbia, Ontario, Manitoba, Yukon Territory, and Quebec. Uranium exploration took place primarily in Saskatchewan. Exploration for rare-earth elements in 2011 took place in British Columbia, New Brunswick, Newfoundland, Northwest Territories, Nunavut Territory, Ontario, Quebec, and Yukon Territory. Potash exploration in 2011 took place in Saskatchewan and Alberta. Exploration for lithium deposits in 2011 took place in Nova Scotia, Ontario, and Quebec.

Commodity Review

This section summarizes the supply and demand trends and potential developments for the leading mineral commodities in Latin America and Canada. The region's share of world production of selected mineral commodities is listed by commodity in table 4. Estimates for production of major mineral commodities for 2012 and beyond have been based upon supply-side assumptions, such as announced plans for increased production/new capacity construction, announced plans to reduce production and close production facilities either temporarily or permanently, and bankable feasibility studies. The outlook tables in this summary chapter show historic and projected production fluctuations and trends; therefore, no indication is made about whether the data are estimated or reported, and revisions are not identified. Data on individual mineral commodities in tables in the individual country chapters are labeled to indicate estimates and revisions. The outlook segments of the mineral commodity tables are based on current (2013) producing facilities and on planned new facilities that operating companies, consortia, or Governments have projected to come online within indicated timeframes. Forward-looking information, which includes estimates of future production, exploration, and mine development; cost of capital projects; and timing of the start or closure of operations, are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in the following section are presented as an

indication of industry plans and are not a USGS prediction of what will occur.

Metals

Aluminum and Bauxite and Alumina.—*Aluminum.*—The London Metal Exchange Ltd. (LME) spot price of aluminum averaged \$2,400 per metric ton in January 2011, but prices decreased to an average of about \$2,000 per metric ton in December. In 2012, prices were estimated to have averaged about \$2,020 per metric ton. In January 2013, the LME mean cash spot price averaged about \$2,040 per metric ton; February, about \$2,050 per metric ton; and March, about \$1,910 per metric ton. In Canada, production could increase to about 3.9 million metric tons per year (Mt/yr) by 2018 owing to expected increases in capacity at Rio Alcan's Kitimat smelter in British Columbia and new capacity at Rio Tinto Alcan's AP 60 plant in Quebec (tables 4, 6; Bray, 2013a; London Metal Exchange, 2013).

In South America, hydroelectric power supplied about 86% of the energy requirement for aluminum production in 2011 compared with 84% in 2010, and the share of natural gas decreased to about 14% in 2011 from 16% by 2010. Coal was not used as a power source for aluminum smelting in South America in either year (International Aluminium Institute, 2013).

Bauxite and Alumina.—In 2012, the estimated price of bauxite averaged \$36 per metric ton compared with \$39 per metric ton in 2011 and \$29 per metric ton in 2010. Bauxite production in Brazil, which was the leading regional producer, increased in 2011 compared with that of 2010 owing to expanded production at existing mines. Other bauxite-producing countries in the region included Guyana, Jamaica, Suriname, and Venezuela. South America and the Caribbean were estimated to have 21% of the world's bauxite resources. Production in the region is projected to increase substantially in 2014 and incrementally through 2018, mostly owing to expected increases in bauxite production in Jamaica. In January 2013, the Jamaica Bauxite Institute had signed a memorandum of understanding with Nippon Light Metal Company Ltd. of Japan to establish a pilot project to extract rare-earth elements (possibly including scandium) from red mud (bauxite) deposits in Jamaica (tables 4, 5; Bray, 2013b; Jamaica Information Service, 2013).

Copper.—*Ore.*—Chile remained the leading producer in the world, and Peru was the second leading producer in the region. In 2012, the average copper ore grade mined by CODELCO at its existing mines was estimated to have decreased to 0.73% compared with 0.8% in 2011 and 0.84% in 2010, although production increased to about 1.8 million metric tons (Mt) of fine copper in 2011 from 1.76 Mt in 2010 before decreasing to about 1.76 Mt (again) in 2012. The state-owned mining company planned to complete numerous projects to expand copper production from 2013 through at least 2018. Private mining companies in Chile also planned to increase copper production through 2018. In 2012, the new Esperanza Mine produced slightly less than 100,000 metric tons (t) of copper in 2011 and was expected possibly to ramp up to a production level of about 180,000 metric tons per year (t/yr) in 2013. There were also major expansions planned at the Escondida

and Los Bronces Mines, and the country's total copper mine production capacity was expected to increase by more than 600,000 t/yr by 2018 compared with that in 2012 (tables 4, 7; Corporación Nacional del Cobre, 2013; Farchy, 2013).

Copper production in Argentina was expected to increase dramatically by 2016 owing to the projected startup of Xstrata's El Pachon Mine, which would have an estimated production capacity of 400,000 t/yr of fine copper during the first 5 years of full production. In Peru, some new deposits were expected to be developed between 2013 and 2015, including Las Bambas and Los Chancas deposits in the Department of Apurimac and the Toromocho deposit. The Rio Blanco copper project in the Department of Piura was expected to be developed by the end of 2018. During the period 2012 through 2018, however, it appears that any additional copper production from new mines and expansions at existing mines in Peru could be mostly counteracted by decreasing production at existing mining operations in Peru (tables 4, 7).

Refined Copper.—In 2012, the LME spot price of high-grade copper metal was estimated to have averaged about \$8,000 per metric ton compared with about \$8,800 per metric ton in 2011 and about \$7,500 per metric ton in 2010. In January 2013, the LME mean cash spot price averaged about \$8,050 per metric ton; February, about \$8,070 per metric ton; and March, about \$7,660 per metric ton. Chile was the world's leading producer of primary refined copper, and other significant producers in the region included Brazil, Canada, Mexico, and Peru. The Chilean Government agency Comisión Chilena del Cobre projected that production of refined copper by solvent-extraction/electrowinning (SX/EW) processes could decrease by more than 200,000 t/yr by 2018 from its expected level of SX/EW production in 2012. At the end of 2009, Xstrata closed its Kidd Creek copper smelter and refinery in Canada, and the company cited excess smelting capacity (given increasing costs and the low copper concentrate treatment and refining charges at the time) as the reason for the closure. An estimated total production capacity could be about 370,000 t/yr of refined copper in the country, and it is projected that Canada could produce close to that capacity level during the period 2014 through 2018 if international market conditions for the treatment and refining of copper concentrates warrant it (tables 4, 8; Edelstein, 2013; London Metal Exchange, 2013).

Gold.—In 2012, the annual average price of gold increased to \$1,669 per troy ounce from \$1,572 per troy ounce in 2011, \$1,225 per troy ounce in 2010, and \$972 per troy ounce in 2009. Increases in gold prices and production during this timeframe were mainly attributable to investment demand resulting from the continuing uncertainty in the global economy following the economic downturn in 2008 and 2009, which reaffirmed gold's role as a store of value in times of economic uncertainty. In 2013, the average price of gold in January was estimated to have been about \$1,670 per troy ounce (approximately equal to the 2012 annual average), but then it was estimated to have decreased to about \$1,630 per troy ounce in February to about \$1,590 per troy ounce in March (Kitco Metals Inc., 2013).

At the beginning of 2013, there were numerous gold mining projects in Latin America and Canada, but the timelines for them to actually enter production appeared to become increasingly

uncertain during the first quarter of the year, as gold prices varied considerably and appeared to trend downward. In 2011, Peru and Canada were the first and second ranked producers, respectively, in the region. Canada's production had declined since at least 2000 but was projected to increase by sometime after 2014. Peru's gold production also decreased in 2011 from that of 2010 but was projected to increase incrementally through 2018. Projections of increases in Chile's production of gold are highly dependent on the startup of the Pascua Lama Mine that was planned to straddle the border between Argentina and Chile and was expected to start production of gold by the end of 2014. Uncertainty in the timing of the startup of gold production at Pascua Lama increased in April 2013, however, when a Chilean court ordered a temporary suspension of development of the project, reportedly because of environmental concerns. By mid-2013, Barrick estimated that the company would not begin processing ore at Pascua Lama until mid-2016 (tables 4, 9; Kosich, 2012; Bourke, 2013a).

Iron Ore and Iron and Steel.—*Iron Ore.*—From January 2011 to December 2011, iron ore prices decreased, and leading iron ore producers reported reduced profits in the fourth quarter of the year. In 2012 and continuing into the first quarter of 2013, iron ore prices were volatile. In September 2012, spot prices reportedly decreased to a low of about \$87 per metric ton, increased to possibly as high as \$150 per metric ton in February 2013 (at least partially owing to restocking by steelmakers), before decreasing to about \$144 per metric ton or lower in March 2013 (mostly owing to decreased imports by China). In 2013, there appeared to be a substantial amount of uncertainty surrounding what path the price of iron ore could take during the remainder of the year and beyond (Economist, The, 2012a; Barbosa, 2013b; Financial Times, The, 2013b; Pearson, 2013; Tasker, 2013; Treadgold, 2013; World Steel Association, 2013).

In 2011, Brazil continued to be the leading producer of iron ore (Fe content) in the region, and Vale was the world's leading iron ore producer. For the fourth quarter of 2012, Vale reported its first quarterly loss in about a decade. Nonetheless, Brazil reportedly had many potential investors inquire about iron ore development projects, including the Government of China. China was buying about 25 million metric tons per month of Brazilian iron ore. In 2013, Chinese companies also appeared to be investing in increasing iron ore production in Peru, reportedly including plans by Shougang Hierro Perú S.A.A. (a 100% owned subsidiary of Shougang Corp. of China) to increase the production capacity at the company's Marcona Mine (Peru's only iron ore mine) to 46 Mt/yr of iron ore by the end of 2016 compared with about 13 Mt/yr in 2011 (tables 4, 10; Economist, The, 2012a; Grabski, 2013b, c; Tasker, 2013).

In Canada, if the Kami iron ore project enters production before 2016, then it could add about 5 Mt/yr of iron ore (Fe content) production capacity compared with the country's total production capacity in 2011. Also, if Tata Steel Minerals Canada Ltd. (80% owned by Tata Steel Ltd. of India and 20% owned by New Millennium Iron Corp. of Canada)'s direct shipping ore (DSO) project was also to be completed within that timeframe, then it could add another 2.6 Mt/yr of iron ore production capacity in Canada by 2016. In Chile, CAP S.A.'s Cerro Negro Norte project and expansion of the company's

Los Colorados Mine had been projected to come onstream sometime in 2013, Santa Fe Mining Co.'s new Bellevista Mine was projected to start up production of iron ore in 2015, and Capstone Mining Co. estimated that it could start up production at the company's new Santo Domingo Mine by 2017 (table 10).

Steel.—In 2011, Brazil was the leading producer of crude steel in Latin America and Canada, followed by Mexico and Canada. In April 2013, the World Steel Association (WSA) estimated that total steel use in Canada, Mexico, and the United States increased to about 131 Mt in 2012 and forecast that it could increase to 135 Mt in 2013 and 139 Mt in 2014. The WSA also estimated that total steel use in the countries of Central America and South America increased to about 47 Mt in 2012 and forecast that it could increase to 50 Mt in 2013 and 52 Mt in 2014. In May 2013, Brazil's steel industry association (IABr) estimated that crude steel production in the country could increase by about 5.8% compared with that of 2012 after decreasing by about 1.5% in 2012 compared with that of 2011. The IABr also reported that realization of this projected increase would depend on domestic consumption, however, and that Brazil's producers were competing (primarily) against cheap imports of steel from China. During the first 2 months of 2013, the combined production of crude steel in LAC was 2% lower than during the same period in 2012. Crude steel production in the region was led by production in Mexico and Brazil, but crude steel production in Argentina in February 2013 was 29% lower than in February 2012. In addition to competing with China in domestic markets for sales of crude steel, producers of crude steel in Latin America and Canada also compete against imports of steel from the United States. In April 2013, Canada was the leading importer of U.S. steel in the region, followed by Mexico (tables 4, 11; Barbosa, 2013a; Demo-Dananberg, 2013b; Williams, 2013c; World Steel Association, 2013).

Platinum-Group Metals.—Palladium production capacity in Canada was expected to increase to about 19 t/yr by 2018. Canada and Colombia were the only countries to produce any platinum-group metals (PGMs) in the region in 2011. Canada was the only palladium producer in the region, and it accounted for 87% of regional platinum production. The Lac des Isles palladium and platinum mine in Canada (owned by North American Palladium Ltd. of Toronto, Ontario) reopened in April 2010 after having been placed on care-and-maintenance status in October 2008 owing to low metal prices. Canada's production of PGMs had decreased by about 50% since that time. Other producers of PGMs in Canada were Xstrata plc of Switzerland and Vale Ltd. of Canada. Both companies produced PGMs as byproducts from their nickel mining operations in Sudbury (tables 12, 13).

Tin.—During the first quarter of 2013, the LME mean cash spot price of tin was decreasing from an average of about \$24,650 per metric ton in January to about \$24,320 per metric ton in February and to about \$23,330 per metric ton in March. New regulations were scheduled to come into effect in Indonesia at the beginning of June 2013 that would require all imported tin to be 99.9% pure, and this (along with high inventories of tin in Asian warehouses and decreasing tin imports by China) was expected to affect the price of tin negatively during the remainder of 2013, at least. In 2011, Peru was the leading tin

producer in the region, followed by Bolivia and Brazil. Canada was not a tin-producing country, but there were tin exploration projects underway in the country. In Bolivia, a project by a company from China to expand production at the Huanuni Mine by 4,000 t/yr of Sn content did not appear likely to come onstream until at least sometime after 2014. The delay of this project would mean a continuation of limited access to feed for the new Ausmelt tin smelting furnace at the Vinto smelting complex, which will probably mean that the tin smelter will be operating below capacity until the expansion of the Huanuni Mine is completed (tables 4, 14, 15; Grabski, 2013d; London Metal Exchange, 2013).

Industrial Minerals

Diamond.—Canada was the only significant diamond mine producer in the Latin America and Canada region in 2011. Other countries in the region that were minor producers included Brazil, Guyana, and Venezuela. Globally, Canada was the world's fourth ranked producer in terms of volume after Russia, Botswana, and the Democratic Republic of the Congo [Congo (Kinshasa)], and it was ranked third in terms of the value of production after Botswana and Russia. Canada's diamond mine production was expected to increase to 15 million carats by 2016 owing to the opening of the Gahcho Kué Mine sometime in 2015 and ramping up of production there in 2016. By 2018, Canada's production is expected to decrease to 14 million carats, primarily owing to decreases in production at the Diavik Mine in both 2017 and 2018 and a decrease in production at the Ekati Mine in 2017, which are projected to be not quite offset by increases in diamond production at the Renard and the Shore Mines in 2017 (and flat production thereafter). Slight, incremental decreases in production are also projected at the Snap Lake and the Victor Mines through 2018. The planned reopening of the Jericho Mine, which had been on care-and-maintenance status since 2008, was expected to be delayed until at least after 2018 (table 16).

Lithium.—In 2011, Chile was the leading producer of lithium in the region and the world, and the country was followed in the region by Argentina and Brazil. In Canada, the Quebec Lithium Project was expected to begin operation by 2013 and to produce about 4,000 t/yr of lithium by 2014, which would mean that it could supplant Brazil as the third ranked producer in the region. The Puna Plateau is spread across Argentina, Bolivia, and Chile and was estimated to contain more than 80% of the world's lithium brine resources. These evaporite brines, which are commonly referred to as salars, are an economical and plentiful source of lithium in aqueous solution that is pumped from aquifers (as well as being a source of commercially important boron and potassium) (table 17; Houston and others, 2011; Jaskula, 2013).

The leading tonnages of lithium and potassium in brines in the world are located in the Andes Mountains of Argentina, Bolivia, and Chile, and in western China and Tibet [Xizang] Autonomous Region. Recent developments in the automotive industry and other industries that use lithium in manufacturing led to an exploration boom with respect to the salars of the central Andes, primarily because the brine bodies in China and

Tibet have a more complex chemistry that makes recovery of the contained elements more difficult and less economical. In Argentina, a lithium production project in the Salar del Rincon had been projected to start up by sometime in 2012, but information was unavailable concerning whether it did; lithium production was expected to be ramped up to about 3,760 t Li content at the new Cauchari-Olaroz Mine by 2015; and the Salar de Diablillos, Salar de Olaroz, and Sal de Vida lithium projects had been projected to start up by yearend 2015. In this report, production of lithium in Chile is projected to remain fairly constant from 2014 through 2018 because reliable information concerning projects to further expand production of lithium in the country after 2012 was not available (table 17; Houston and others, 2011; Jaskula, 2013; Syrett, 2013).

Mineral Fuels and Related Materials

Coal.—Colombia was the regional leader in coal production in 2011, followed by Canada, Mexico, Venezuela, and Brazil. The Colombian Government planned to seek up to \$6.8 billion in private investment to expand production and increase the country's output of coal to about 150 Mt by 2020. The country was estimated to have about 24 billion metric tons (Gt) of coal reserves. Port capacity was expected to be increased to 151 Mt/yr in 2019 from 80.6 Mt/yr. At yearend 2011, the total proven global reserves of coal were estimated to be 861 Gt, of which the region composed of Central and South America accounted for just 1.5%; almost all the reserves in Central and South America were anthracite and bituminous coal from Colombia. Canada accounted for about 0.8% of global coal reserves composed of about equal amounts of (a) anthracite and bituminous and (b) subbituminous and lignite. Total coal production in Canada could increase by between 4 Mt/yr and 5 Mt/yr if both Xstrata's Donkin project and Compliance Energy Corp. of Canada's Raven project come onstream; both projects were at the prefeasibility stage in 2011 (tables 4, 18; BP p.l.c., 2012, p. 30).

Outlook

In 2013, many analysts were speculating on whether the commodity price boom of the previous decade might be over or not, as prices for many commodities (including for most of the minerals that many of the countries of Latin America and Canada produce and export) appeared to decrease at times during the first half of the year. Mineral commodity prices are very uncertain, however, and what may interest the mineral producers and exporters in Latin America and Canada more is what the quantity demanded in important destination markets like China will be. Opinions about future mineral demand also vary substantially, but many analysts reported expectations of global surpluses for some mineral commodities, as increasing mineral production (including in Latin America and Canada) appeared as if it could be increasing faster than demand (at least in the short run). For example, there could have been some consensus at Chile's Cesco week that the global copper market could be in surplus in 2013, 2014, and probably in 2015 after approximately zero growth in global copper demand during 2012. This projected copper surplus could be despite

increasing demand, as it was also reported from Cesco week that many felt that China's copper consumption for power grid construction was still strong, and that the drastic destocking by global copper consumers in 2012 appeared to have ended by the end of the first quarter of 2013 (Evans-Pritchard, 2012; Farchy, 2013; Farchy and Blas, 2013; Financial Times, The, 2013a; Grabski, 2013a).

In 2013, China's process of urbanization continued, its domestic construction market appeared to exhibit strong growth, and the country's demand for minerals and materials that are essential for the construction sector and the expanding national electricity grid (such as cement, copper, and steel, and iron ore for manufacturing steel and for use in other construction materials) will have to remain formidable just to maintain the huge base of construction projects that have been completed since 2000. The construction boom in China has continued despite the Government's reported attempts to slow down the property market by setting restrictions on bank loans to property developers since 2010, but such policies do introduce uncertainty into the future markets for mineral commodities. For thermal coal (combustion of which reportedly accounts for about 60% of China's annual electricity generation), growth in demand in China was estimated to have been about 2.5% in 2012, which was much slower than in previous years, and the chief executive of Baosteel reportedly expected the country's growth in steel demand to be about 3% in 2013 (Rabinovitch, 2012; Hook, 2013).

Electronics manufacturing is an important demand sector in the market for tin, and demand for electronic goods is not expected to decrease in the near future. As various electronics technologies become cheaper over time, the volume of electronics goods produced could continue to grow, and cheap electronics gadgets tend to use as much tin (used in solder as part of the electronics manufacturing process) as more expensive ones. In 2012, strong growth in demand for lithium continued, mostly owing to growth in demand related to battery use. Even if the trend of increasing global demand for lithium continues, there appear to be projects coming onstream in the region of Latin America and Canada to help meet that demand (table 17; Economist, The, 2013; Sociedad Quimica y Minera de Chile S.A., 2013, p. 5–6, 29–31).

If physical demand for commodities does continue to increase, but prices do not keep pace (whether because of an excessive supply response, financial market influences, or other market factors), then producers will have to expand mineral production while exerting greater cost controls. In this case, LAC Governments would also have to exercise greater fiscal spending controls, or they could attempt to extract greater rents from mineral production companies in order to effectively continue economic development and diversification programs (among other fiscal spending priorities) at the risk of providing further incentive for a significant reduction in FDI in the sector. In 2013, some analysts have projected that economic growth in Latin America will be slower than expected, mostly as a result of lower than expected commodity prices. Standard & Poor's Financial Services LLC has projected that companies in the Latin American metals and mining sector will remain stable despite price decreases, at least partially because the

ratings service expected appreciation of the U.S. dollar to help maintain the value of mineral exports of these companies and that companies will control mining costs (denominated in local currencies) and be more prudent with capital expenditures and dividend distributions (Colitt and Cattan, 2013; Demo-Dananberg, 2013a; Rindebro, 2013; Standard & Poor's Financial Services LLC, 2013).

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TABLE 1
THE AMERICAS: AREA AND POPULATION IN 2011

Region and country	Area ¹ (square kilometers)	Estimated population ² (thousands)
North America:		
Canada	9,984,670	34,483
Mexico	1,964,375	114,793
United States ³	9,826,675	311,592
Total	21,775,720	460,868
Central America and the Caribbean:		
Antigua and Barbuda	443	90
Aruba	193	108
Bahamas, The	13,940	347
Barbados	431	274
Belize	22,966	357
Bermuda	53	65
Costa Rica	51,100	4,727
Cuba	110,860	11,253
Dominica	754	68
Dominican Republic	48,730	10,056
El Salvador	21,040	6,227
Grenada	344	105
Guadeloupe	1,780	448
Guatemala	108,890	14,757
Haiti	27,750	10,123
Honduras	112,090	7,755
Jamaica	10,991	2,709
Martinique	1,100	402
Montserrat	102	5 ¹
Netherlands Antilles	960	194
Nicaragua	129,494	5,870
Panama	78,200	3,571
Saint Kitts and Nevis	261	53
Saint Lucia	616	176
Saint Vincent and the Grenadines	389	109
Trinidad and Tobago	5,128	1,346
Other ⁴	17,154	4,187
Total	765,759	85,382
South America:		
Argentina	2,780,400	40,765
Bolivia	1,098,580	10,088
Brazil	8,514,875	196,655
Chile	756,950	17,270
Colombia	1,138,915	46,927
Ecuador	283,560	14,666
French Guiana	83,534	222
Guyana	214,970	756
Paraguay	406,750	6,568
Peru	1,285,215	29,400
Suriname	163,820	529
Uruguay	176,215	3,369
Venezuela	912,050	29,278
Total	17,815,834	396,493
Americas total	40,357,313	942,743
World total	148,940,000	6,973,738

¹Source: U.S. Central Intelligence Agency, The World Factbook 2013.

²Source: The World Bank, 2013 World Development Indicators Database.

³Excludes Puerto Rico and U.S. Virgin Islands

⁴Includes Anguilla, British Virgin Islands, Cayman Islands, Puerto Rico, Turks and Caicos Islands, and U.S. Virgin Islands.

TABLE 2
THE AMERICAS: GROSS DOMESTIC PRODUCT^{1,2}

Region and country	Gross domestic product in 2011 based on purchasing power parity		Real gross domestic product growth rate (percentage)		
	Gross value (million dollars)	Per capita (dollars)	2009	2010	2011
North America:					
Canada	1,395,370	40,519	-2.8	3.1	2.4
Mexico	1,666,530	14,653	-6.0	5.6	3.9
United States	15,075,680	48,328	-3.1	2.4	1.8
Total	18,137,580	XX	XX	XX	XX
Central America and the Caribbean:					
Antigua and Barbuda	1,495	17,069	-10.7	-8.5	-5.5
Aruba	NA	NA	NA	NA	NA
Bahamas, The	10,056	29,630	-4.9	-0.2	1.6
Barbados	6,929	24,989	-4.1	0.2	0.6
Belize	2,786	8,219	0.0	2.7	2.0
Bermuda	NA	NA	NA	NA	NA
Costa Rica	55,020	11,923	-1.0	4.7	4.2
Cuba	NA	NA	NA	NA	NA
Dominica	1,014	14,339	-1.3	1.2	1.0
Dominican Republic	93,381	9,287	3.5	7.8	4.5
El Salvador	44,575	7,550	-3.1	1.4	1.4
Grenada	1,440	13,802	-5.7	-1.3	0.4
Guadeloupe	NA	NA	NA	NA	NA
Guatemala	74,844	5,078	0.5	2.9	3.9
Haiti	12,365	1,235	2.9	-5.4	5.6
Honduras	35,699	4,444	-2.1	2.8	3.6
Jamaica	24,563	8,927	-3.5	-1.5	1.3
Martinique	NA	NA	NA	NA	NA
Montserrat	NA	NA	NA	NA	NA
Netherlands Antilles	NA	NA	NA	NA	NA
Nicaragua	18,877	3,206	-1.5	4.5	4.7
Panama	50,611	14,096	3.9	7.6	10.6
Saint Kitts and Nevis	875	15,573	-5.6	-2.7	-2.0
Saint Lucia	2,183	13,099	0.1	0.4	1.3
Saint Vincent and the Grenadines	1,264	11,540	-2.3	-1.8	0.0
Trinidad and Tobago	26,536	20,338	-3.3	0.0	-1.5
Other ³	85,558	XX	XX	XX	XX
Total	550,071	XX	XX	XX	XX
South America:					
Argentina	716,451	17,660	0.9	9.2	8.9
Bolivia	50,944	4,793	3.4	4.1	5.2
Brazil	2,294,180	11,769	-0.3	7.5	2.7
Chile	299,451	17,361	-0.9	6.1	5.9
Colombia	471,890	10,247	1.7	4.0	5.9
Ecuador	127,419	8,487	0.4	3.6	7.8
French Guiana	NA	NA	NA	NA	NA
Guyana	5,851	7,569	3.3	4.4	5.4
Paraguay	40,643	6,223	-4.0	13.1	4.3
Peru	301,963	10,062	0.9	8.8	6.9
Suriname	6,326	11,751	3.0	4.1	4.2
Uruguay	50,907	15,112	2.4	8.9	5.7
Venezuela	374,105	12,568	-3.2	-1.5	4.2
Total	4,740,130	XX	XX	XX	XX
Americas total	23,427,781	XX	XX	XX	XX
World total	78,969,780	XX	XX	XX	XX

NA Not available. XX Not applicable.

¹Source: International Monetary Fund, World Economic Outlook Database, October 2012.

²Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

³Includes Anguilla, British Virgin Islands, Cayman Islands, Puerto Rico, Turks and Caicos Islands, and U.S. Virgin Islands.

TABLE 3
SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2011¹

Location	Type ²	Site	Commodity	Company	Resource ³
Argentina	E	Cerro Moro	Au, Ag	Extorre Gold Mines Ltd.	578,000 oz Au, 39 Moz Ag (ID).
Do.	D	Cerro Negro	Au, Ag	Goldcorp Inc.	4.3 Moz Au, 36 Moz Ag (R).
Do.	E	El Tranquilo	Au, Ag	Patagonia Gold plc.	640,000 oz Au, 21 Moz Ag (D).
Brazil	E	Cerrado Verde	K ₂ SO ₄	Verde Potash plc.	6.8 Mt K ₂ O (ID).
Do.	D	Pilar	Au	Yamana Gold Inc.	1.4 Mt Au (R).
Do.	E	Volta Grande	Au	Belo Sun Mining Corp.	2.2 Moz Au (D).
Canada	E	Aley	Nb	Taseko Mines Ltd.	683,000 t Nb ₂ O ₅ (IF).
Do.	E	Back River	Au	Sabina Gold & Silver Corp.	4 Moz Au (ID).
Do.	E	Blackwater-Davidson	Au, Ag	New Gold Inc.	5.4 Moz Au, 27 Moz Ag (ID).
Do.	E	Brewery Creek	Au	Golden Predator Corp.	155,000 oz Au (ID).
Do.	E	Brucejack	Au, Ag	Pretium Resources Inc.	5 Moz Au, 31 Moz Ag (D).
Do.	E	Burns Block (Rainy River)	Au	Bayfield Ventures Corp.	4.4 Moz Au (D).
Do.	E	Caribou	Au	Barker Gold Mines Ltd.	86,000 oz Au (R).
Do.	E	Coffee	Cu, Au, Mo, Ag	Western Copper Ltd.	Data not released.
Do.	D	Detour Lake	Au	Detour Gold Corp.	14.9 Moz Au (R).
Do.	E	Dilworth	Au, Ag	Ascot Resources Ltd.	Data not released.
Do.	E	Eleonore	Au	Goldcorp Inc.	3 Moz Au (R).
Do.	E	Granduc/Leduc	Cu	Castle Resources Inc.	60,000 t Cu (ID).
Do.	E	Hammond Reef	Au	Osisko Mining Corp.	10.6 Moz Au (IF).
Do.	E	Hardrock	Au	Premier Gold Mines Ltd.	2.5 Moz Au (D).
Do.	E	Kirkland Lake	Au	Queenston Mining Inc.	329,000 oz Au (ID).
Do.	P	Lac des Iles	Pt, Pd, Au, Ni, Cu	North American Palladium Ltd.	6.4 Moz Pd, 469,000 oz Pt, 394,000 oz Au, 49,000 t Ni, 39,000 t Cu (D).
Do.	E	Lac la Heche	Cu, Au, Ag, Fe	GWR Resources Inc.	16,000 t Cu, 9,800 oz Au, 229,000 oz Ag, 636,000 t Fe (ID).
Do.	E	Marban	Au	NioGold Mining Corp.	600,000 oz Au (ID).
Do.	E	Meladine West	Au	Agnico-Eagle Mines Ltd.	2.6 Moz Au (R).
Do.	E	Nechalacho (Thor Lake)	REE, Nb, Ta, Zr	Avalon Rare Metals Inc.	222,000 t REE, 55,000 t Nb ₂ O ₅ , 5,800 t Ta ₂ O ₅ , 422,000 t ZrO ₂ (R).
Do.	P	Niobec	Nb	Iamgold Corp.	242,000 t Nb ₂ O ₅ (R).
Do.	E	Phoenix	Au	Rubicon Minerals Corp.	479,000 oz Au (ID).
Do.	F	Rainy River	Au, Ag	Rainy River Resources Ltd.	4.4 Moz Au, 9.1 Moz Ag (ID).
Do.	F	Red Chris	Cu, Au	Imperial Metals Corp.	1.1 Mt Cu, 2.6 Moz Au (R).
Do.	E	Spanish Mountain	Au, Ag	Spanish Mountain Gold Ltd.	2.2 Moz Au, 2.8 Moz Ag (D).
Do.	E	Three Bluffs	Au	North Country Gold Corp.	508,000 oz Au (ID).
Do.	F	Tulsequah Chief	Zn, Cu, Au, Ag, Pb	Queenston Mining Inc.	396,000 t Zn, 87,000 t Cu, 532,000 oz Au, 20 Moz Ag, 77,000 t Pb (IF).
Do.	D	Veza	Au	N. American Palladium Ltd.	320,000 oz Au (D).
Do.	E	Wasamec	Au	Richmont Mines Inc.	556,000 oz Au (ID).
Do.	F	Westwood	Au	Iamgold Corp.	73,000 oz Au (R).
Do.	E	Woodjam	Cu, Au	Gold Fields Ltd.	483,000 t Cu, 283,000 oz Au (IF).

See footnotes at end of table.

TABLE 3—Continued
SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2011¹

Location	Type ²	Site	Commodity	Company	Resource ³
Chile	E	El Espino	Cu, Au	Pucobre S.A.	168,000 t Cu, 226,000 oz Au (D).
Colombia	E	Buritica	Au, Ag, Zn	Continental Gold Ltd.	635,000 oz Au, 1.5 Moz Ag, 8,900 t Zn.
Do.	E	Gramalote	Au	AngloGold Ashanti Ltd.	925,000 oz Au (ID).
Do.	E	Tiitiribi	Au, Cu	Sunward Resources Ltd.	2.2 Moz Au, 212,000 t Cu (ID).
Guyana	E	Aranka/Aurora	Au	Guyana Goldfields Inc.	277,000 oz Au (ID).
Mexico	E	Cordero	Ag, Au, Zn, Pb	Levon Resources Ltd.	311,000 oz Ag, 839,000 oz Au, 2.4 Mt Zn, 1.9 Mt Pb (ID).
Do.	F	Morelos	Au	Torex Gold Resources Inc.	2.6 Moz Au (ID).
Do.	P	San Francisco	Au	Timmins Gold Corp.	1.3 Moz Au (R).
Do.	E	Sierra Mojada	Ag, Zn	Silver Bull Resources Inc.	47 Moz Ag, 279,000 t Zn (ID).
Do.	E	Tepal	Au, Cu, Ag, Mo	Geologix Explorations Inc.	786,000 oz Au, 145,000 t Cu, 814,000 oz Ag, 790 t Mo (ID).
Peru	E	Haquira	Cu, Mo, Au, Ag	First Quantum Minerals Ltd.	2.2 Mt Cu, 50,000 t Mo, 500,000 oz Au, 20 Moz Ag (D).
Do.	E	Los Catalos	Cu, Mo	MetMinco Ltd.	9.6 Mt Cu, 339,000 t Mo (R).
Do.	E	Shahuindo	Au, Ag	Sulliden Gold Corp.	2 Moz Au, 28 Moz Ag (D).
Suriname	P	Rosebel	Au	Iamgold Corp.	5.8 Moz Au (R).

¹ Abbreviations used in this table for commodities are as follows: Ag, silver; Au, gold; Cu, copper; Fe, iron ore; K₂SO₄, potash; Mo, molybdenum; Ni, nickel; Nb, niobium; Pb, lead; Pd, palladium; Pt, platinum; REE, rare-earth elements; Ta, tantalum; Zn, zinc; Zr, zirconium.

Abbreviations used in this table for units of measurement are as follows: Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

² D, approved for development; E, active exploration; F, feasibility work ongoing/completed; P, exploration at producing site.

³ Based on 2011 data reported from various sources; D, measured + indicated; ID, indicated; IF, inferred, R, proven + probable. Data not verified by U.S. Geological Survey.

TABLE 4
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2011¹

(Thousand metric tons unless otherwise specified)

Country	Metals											
	Aluminum		Copper,		Gold,		Iron and steel		Lead, mine	Nickel,	Silver,	Tin, mine
	Bauxite	Metal, primary	mine output, Cu content	Au content (kilograms)	Iron ore, gross weight	Steel, crude	Pb content	Ni content	Ag content (metric tons)	Sn content (metric tons)		
Argentina	--	440 ^e	117	59,140	--	5,655	26	--	747	--	--	
Bolivia	--	--	4	6,513	--	--	100	--	1,214	--	20,373	
Brazil ^p	34,494	1,440	219	60,250	391,098	35,200	20	111	69	--	9,550	
Chile	--	--	5,263	45,137	12,625	1,620 ^s	1	--	1,291	--	--	
Colombia ^p	--	--	4	55,908	174	1,290	--	70 ^e	24	--	--	
Costa Rica	--	--	--	--	--	--	--	--	--	--	--	
Cuba ^p	--	--	--	--	--	282	--	71	--	--	--	
Dominican Republic	--	--	12	490	--	--	--	1,143	18	--	--	
Ecuador	--	--	--	4,149	--	525	--	--	1	--	--	
El Salvador ^e	--	--	--	--	--	56	--	--	--	--	--	
French Guiana ^e	--	--	--	1,300	--	--	--	--	--	--	--	
Guatemala	--	--	--	11,898	1,160	445	--	--	273	--	--	
Guyana	1,818	--	--	11,293	--	--	--	--	--	--	--	
Honduras	--	--	--	1,943	--	--	17	--	53	--	--	
Jamaica ^p	10,190	--	--	--	--	--	--	--	--	--	--	
Mexico	--	--	402	88,648	12,806	18,101	224	--	4,778	--	--	
Nicaragua	--	--	--	6,395	--	--	--	--	8	--	--	
Panama	--	--	--	1,675	--	--	--	--	--	--	--	
Paraguay ^e	--	--	--	--	--	30	--	--	--	--	--	
Peru ^p	--	--	1,095	164,009	10,626	750 ^s	230	--	3,414	--	28,882	
Suriname	3,236	--	--	21,000 ^s	--	--	--	--	--	--	--	
Trinidad and Tobago ^p	--	--	--	--	--	610 ^e	--	--	--	--	--	
Uruguay ^e	--	--	--	1,725 ²	38	80	--	--	--	--	--	
Venezuela ^e	4,500	380	--	12,000	27,000	2,200	--	10	--	--	--	
Other ^{e,3}	--	--	--	NA	--	--	--	--	--	--	--	
Total	54,200	2,260	7,120	553,000	456,000	66,800	618	1,410	11,900	58,800		
Share of world total	21%	5%	45%	21%	15%	4%	13%	48%	14%	23%		
Canada ^p	--	2,988	566	100,379	33,573	12,891	55	220	572	--		
Share of world total	--	7%	4%	4%	1%	1%	1%	8%	1%	--		
United States	NA	1,990	1,110	234,000	54,700	86,400	334	--	1,120	--		
Share of world total	NA	4%	7%	9%	2%	6%	7%	--	1%	--		
Total Western Hemisphere	54,200	7,230	8,800	888,000	544,000	166,000	1,010	1,630	13,600	58,800		
Share of world total	21%	16%	55%	33%	18%	11%	21%	56%	16%	23%		
World total	252,000	44,300	15,900	2,670,000	2,980,000	1,520,000	4,730	2,910	82,800	256,000		

See footnotes at end of table.

TABLE 4—Continued
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2011¹

(Thousand metric tons unless otherwise specified)

Country	Mineral fuels and related materials									
	Metals—Continued					Petroleum				
	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Gypsum	Phosphate rock, P ₂ O ₅ content	Salt	Coal, all grades	Dry (million cubic meters)	Plant liquids (thousand 42-gallon barrels)	Crude, including condensate (thousand 42-gallon barrels)	Refinery products (thousand 42-gallon barrels)
Argentina	33,975	10,000 ^e	1,453	--	1,885	178	34,060	10,000 ^e	214,142	275,327
Bolivia	427,129	2,658	1	--	45 ^e	--	15,400 ^e	3,000 ^e	12,600 ^e	11,800 ^e
Brazil ^p	206,130	62,600	2,750	2,200	7,000	6,330	24,090	9,840	770,179	746,060
Chile	36,602	4,406	918	4 ^e	9,966	654	1,440	--	1,741	70,182
Colombia ^p	--	10,777	--	--	428	85,803	11,000	--	334,100	112,570 ^e
Costa Rica	--	1,600 ^e	--	--	--	--	--	--	--	9,000 ^e
Cuba ^p	--	1,731	131	--	281	--	1,020	--	19,000	5,640
Dominican Republic	--	3,997	62	--	--	--	--	--	--	13,600 ^e
Ecuador	--	5,000 ^e	--	--	--	--	600 ^e	300 ^e	185,800	54,015
El Salvador ^e	--	1,200	--	--	--	--	--	--	--	6,200
French Guiana ^e	--	62	--	--	--	--	--	--	--	--
Guatemala	--	1,600 ^e	46	--	50 ^e	--	--	--	3,995	1,000 ^e
Guyana	--	--	--	--	--	--	--	--	--	--
Honduras	26,000	1,710	--	--	--	--	--	--	--	--
Jamaica ^p	--	766 ^e	96 ^e	--	--	--	--	--	--	8,592
Mexico	631,859	34,500 ^e	3,560 ^e	507	8,812	34,685	34,000	138,000	947,624	428,800 ^e
Nicaragua	--	600 ^e	30	--	--	--	--	--	--	5,500 ^e
Panama	--	790	--	--	17	--	--	--	--	--
Paraguay ^e	--	730	5	--	--	--	--	--	--	2,660
Peru ^p	1,256,383	8,100	331	17 ^e	1,565	182	2,251	30,485	25,387	74,026
Suriname	--	65 ^e	--	--	--	--	--	--	5,840	2,940 ^e
Trinidad and Tobago ^p	--	600	--	--	--	--	42,883	14,800	33,550	50,098
Uruguay ^e	--	620	1,150	--	--	--	--	--	--	15,300
Venezuela ^e	--	7,700	7	115	350	8,792 ²	28,000	78,500	914,500 ²	434,000
Other ^{e,3}	--	751	--	--	1,249 ²	--	12	--	1,814 ²	53,800 ²
Total	2,620,000	163,000	10,500	2,840	31,600	137,000	195,000	285,000	3,470,000	2,380,000
Share of world total	21%	4%	10%	5%	12%	2%	6%	10%	13%	10%
Canada ^p	611,577	12,001	2,555	200 ^e	12,625	67,114	188,849	225,000 ^e	1,050,000 ^e	710,000 ^e
Share of world total	5%	(4)	2%	(4)	5%	1%	6%	8%	4%	3%
United States	769,000	68,600	NA	8,160	45,000	994,000	681,000	809,000	2,060,000	NA
Share of world total	6%	2%	NA	14%	3%	13%	20%	29%	7%	NA
Total Western Hemisphere	4,000,000	243,000	13,100	11,200	89,300	1,200,000	1,060,000	1,320,000	6,580,000	3,090,000
Share of world total	33%	6%	12%	19%	37%	16%	31%	47%	24%	13%
World total	12,300,000	4,040,000	110,000	60,100	274,000	7,600,000	3,410,000	2,850,000	27,600,000	24,700,000

See footnotes at end of table.

TABLE 4—Continued
 LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2011¹

^aEstimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. ^bPreliminary. NA Not available. -- Zero or zero percent.

¹Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Table includes data available as of January 31, 2013.

²Reported figure.

³Includes Aruba, Barbados, Belize, Curacao, Guadeloupe, Haiti, Martinique, Saba, Saint Eustatius, and Saint Marraaten.

⁴Less than ½ unit.

TABLE 5
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2005–2018¹

(Thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Brazil	22,034	32,028	34,494	35,000	35,500	36,000
Dominican Republic	535	--	--	--	--	--
Guyana	1,648	1,083	1,818	2,000	2,200	2,500
Jamaica	14,116	8,540	10,190	13,000	14,000	15,000
Suriname	4,757	3,104	3,236	3,300	3,350	3,400
Venezuela	5,900	2,500	4,500	5,000	5,500	6,000
Total	49,000	47,300	54,200	58,000	61,000	63,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 6
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED
PRIMARY AND SECONDARY ALUMINUM PRODUCTION, 2005–2018¹

(Thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	270	413	440	450	500	515
Brazil	1,749	1,788	1,689	1,700	1,750	1,800
Canada	3,070 ²	3,000	3,040	3,700	3,900	3,900
Mexico	574	700	700	700	700	700
Venezuela	615	335	380	400	450	500
Total	6,280	6,240	6,250	7,000	7,300	7,400

^eEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Includes secondary aluminum production.

TABLE 7
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2018¹

(Metal content in thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	187	140	117	130	545	545
Bolivia	1	2	4	5	5	5
Brazil	133	214	219	225	250	255
Canada	595	522	566	630	640	600
Chile	5,321	5,419	5,263	5,600	5,700	5,800
Colombia	9	4	4	3	3	3
Ecuador	--	--	--	--	50	75
Mexico	429	238	402	410	420	425
Peru	1,010	1,094	1,095	1,100	1,150	1,200
Total	7,690	7,630	7,670	8,100	8,800	8,900

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 8
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 2005–2018¹

(Thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina ²	16	16	13	--	--	--
Bolivia	--	1	1	1	1	1
Brazil	224	224	233	240	245	250
Canada	515	320	274	370	370	370
Chile ³	2,824	3,244	3,093	2,900	2,800	2,700
Mexico	416	278	400	410	420	430
Peru ³	512	394	368	380	385	400
Total	4,510	4,480	4,380	4,300	4,200	4,200

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Secondary only.

³Primary only.

TABLE 9
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2018¹

(Au content in kilograms)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	27,904	63,138	59,140	65,000	64,000	65,000
Belize	(2)	--	--	--	--	--
Bolivia	8,871	6,394	6,513	7,000	7,000	7,000
Brazil	38,293	62,047	60,250	60,500	61,000	61,500
Canada	120,541	102,693	100,379	100,000	110,000	110,000
Chile	40,447	39,494	45,137	50,000	60,000	75,000
Colombia	35,783	53,600	55,908	50,000	70,000	70,000
Costa Rica	424	--	--	--	--	--
Cuba	--	--	--	--	--	--
Dominican Republic	--	500	490	35,000	33,000	30,000
Ecuador	5,338	4,600	4,149	5,000	7,000	9,000
French Guiana	1,955	1,140	1,300	1,350	1,400	1,450
Guatemala	741	9,213	11,898	7,000	7,500	8,000
Guyana	8,325	9,594	11,293	11,400	11,400	11,500
Honduras	4,438	2,197	1,943	2,000	2,000	2,000
Mexico	30,356	72,600	88,648	90,000	92,000	94,000
Nicaragua	3,674	4,900	6,395	5,000	5,000	5,000
Panama	--	--	1,675	2,000	4,000	5,000
Peru	208,002	164,084	164,009	164,000	164,000	165,000
Suriname	10,619	20,686	21,000	21,500	22,000	22,500
Uruguay	3,151	1,736	1,725	1,750	1,750	1,750
Venezuela	10,480	12,000	12,000	12,500	12,500	13,000
Total	559,000	631,000	654,000	690,000	740,000	760,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

TABLE 10
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED IRON ORE PRODUCTION, 2005–2018¹

(Fe content in thousand metric tons)

Country	Iron content	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	68%	--	--	--	600	600	600
Bolivia	65%	--	(2)	(2)	10	10	10
Brazil	66%	186,891	247,772	260,408	265,000	270,000	271,000
Canada ³	64%	19,333	23,300	21,000	21,000	29,000	30,000
Chile	61%	4,707	5,852	7,747	12,000	14,000	16,000
Colombia	55%	325	42	65	100	100	100
Cuba	45%	9	--	--	--	--	--
Guatemala	65%	7	(2)	(2)	(2)	(2)	(2)
Mexico	60%	7,012	7,931	7,763	7,700	7,700	7,700
Peru	68%	4,565	6,140	7,123	7,250	7,300	7,350
Uruguay	50%	12	19	19	20	20	20
Venezuela	65%	13,000	14,000	17,000	17,500	18,000	18,500
Total	XX	236,000	305,000	321,000	330,000	350,000	350,000

^eEstimated. XX Not applicable. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

³Includes beneficiated and direct-shipping ore.

TABLE 11
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2018¹

(Thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	5,386	5,138	5,665	5,800	5,500	6,000
Brazil	31,631	33,033	35,200	36,000	36,500	37,000
Canada	15,327	13,003	12,891	13,000	13,000	13,000
Chile	1,537	1,011	1,620	1,600	1,600	1,600
Colombia	1,007	1,213	1,287	1,290	1,400	1,400
Cuba	245	278	282	300	400	300
Dominican Republic	242	193	--	300	400	500
Ecuador	389	372	525	500	500	500
El Salvador	48	64	56	100	150	125
Guatemala	207	274	445	700	700	700
Jamaica	--	--	--	--	--	--
Mexico	16,202	16,710	18,101	18,200	18,200	18,200
Paraguay	101	59	30	40	50	60
Peru	750	750	750	800	800	800
Trinidad and Tobago	711	572	610	475	500	450
Uruguay	64	65	80	90	95	100
Venezuela	4,907	2,207	2,200	2,250	2,300	2,350
Total	78,800	74,900	79,700	81,000	82,000	83,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 12
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 2005–2018¹

(Pt content in kilograms)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Canada	6,075	3,500	8,000	9,000	9,000	10,000
Colombia	1,082	997	1,231	1,000	900	900
Total	7,160	4,500	9,230	10,000	9,900	11,000

^eEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 13
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 2005–2018

(Pd content in kilograms)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Canada	10,400	6,200	14,300	15,000	15,000	19,000

^eEstimated; estimated data are rounded to no more than three significant digits.

TABLE 14
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 2005–2018¹

(Sn content in metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	1	--	--	--	--	--
Bolivia	18,640	20,190	20,373	18,000	22,000	22,000
Brazil	11,739	10,400	9,550	9,700	9,750	9,800
Peru	42,145	33,848	28,882	30,000	32,000	34,000
Total	72,500	64,400	58,800	58,000	64,000	66,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 15
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 2005–2018¹

(Metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	120	--	--	--	--	--
Brazil	9,236	9,348	8,600	8,800	8,850	8,900
Bolivia	13,841	14,975	14,518	15,000	22,000	22,000
Mexico	17	--	--	--	--	--
Peru	36,733	36,451	32,290	34,100	34,500	35,000
Total	59,900	60,800	55,400	58,000	65,000	66,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 2005–2018¹

(Thousand carats)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Brazil	208	25	25	30	30	30
Canada	12,314	11,773	10,795	11,000	15,000	14,000
Guyana	357	50	52	55	55	60
Venezuela	115	15	15	20	20	20
Total	13,000	11,900	10,900	11,000	15,000	14,000

^eEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED LITHIUM PRODUCTION, 2005–2018¹

(Li content in metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	2,750	3,188	2,630	4,500	8,000	11,000
Bolivia	--	--	--	5	8	8
Brazil	180	315	315	320	320	320
Canada	700	--	--	4,000	4,000	4,000
Chile	8,290	9,720	12,850	13,500	13,500	13,500
Total	11,900	13,200	15,800	22,000	26,000	29,000

^eEstimated. -- Negligible or no production.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2018¹

(Thousand metric tons)

Country	2005	2010	2011	2014 ^e	2016 ^e	2018 ^e
Argentina	320	140	178	200	200	200
Brazil	6,480	6,310	6,330	6,350	6,400	6,450
Canada ²	67,555	67,876	67,114	70,000	70,000	75,000
Chile	732	619	654	700	700	700
Colombia	59,064	74,350	85,803	75,000	75,000	100,000
Mexico ²	11,750	27,565	34,685	36,000	36,000	36,000
Peru ²	22	121	182	185	190	200
Venezuela	7,195	8,793	8,792	8,800	8,850	8,850
Total	153,000	186,000	204,000	200,000	200,000	230,000

^eEstimated.

¹Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

²Run of mine.