

# Canadian Occupational Projection System 2017 Projections

## *Industrial Summaries 2017-2026*

*December 2017*



## **COPS 2017: Industrial Summaries**

The occupational projections prepared under the Canadian Occupational Projection System (COPS) require the production of a macroeconomic scenario and an industrial scenario to determine future long-term trends in overall employment growth and in the distribution of employment across industries and occupations.

The future long-term trends in Canada's economic growth and industrial structure will be heavily influenced by demographic developments, namely slower population growth and population aging. Such demographic changes, which cannot be avoided, are projected to have a major influence in the long-term evolution of Canada's labour force, employment, potential output, final domestic demand, and industrial composition of the economy.

This report presents the industrial scenario that underlies the 2017 COPS projections. This scenario was developed in collaboration with the Conference Board of Canada based on information available as of Spring 2017. It provides a comprehensive analysis of the historical and future trends for each of the 42 industries defined by COPS. Those 42 industries cover the entire economy and are based on the North American Industry Classification System (NAICS), edition 2012.

Each of the 42 industrial summaries includes the following information:

- Definition and characteristics of the industry;
- Key stylized facts and main statistics;
- Key occupations related to the industry (see Text box);
- Historical performance in terms of production, employment and productivity;
- Domestic and external drivers of demand for the goods or services produced by the industry;
- Challenges and opportunities, including impacts of new technologies;
- A 10-year outlook for real GDP, employment and productivity.

More particularly, the purpose of the industrial summaries is to provide answer to three specific questions for each industry:

1. What have been the positive and negative drivers of growth in real GDP, employment and productivity over the past ten years?
2. What will be the positive and negative drivers of growth in real GDP, employment and productivity over the next ten years?
3. For what reasons growth in real GDP, employment and productivity is expected to accelerate (or decelerate) over the next 10 years relative to the previous 10 years?

## KEY OCCUPATIONS BY INDUSTRY

Key occupations by industry are based on the National Occupation Classification (NOC), edition 2016 (4-digit). They consist of the largest occupations within the industry and/or occupations that are highly concentrated in the industry (without necessarily being large occupations).

More specifically, they are occupations accounting for the largest shares of total employment in the industry (see example 1) and/or occupations for which the industry accounts for a significant share of total employment in the occupation (see example 2).

- Example 1: Carpenters (NOC 7271) and Electricians (NOC 7241) account respectively for 8% and 7% of total employment in the construction industry.
- Example 2: The construction industry employs 92% of Bricklayers (NOC 7281) although this occupation accounts for less than 1% of total employment in the industry.

The list of key occupations is sorted by the size of the occupation in the industry (decreasing order). Key occupations may be listed in more than one industry.

Key occupations generally exclude administrative and support occupations that can be found in all or most industries such as:

- Administrative officers (NOC 1221)
- Administrative assistants (NOC 1241)
- Janitors, caretakers and building superintendents (NOC 6733)
- Accounting technicians and bookkeepers (NOC 1311)
- Receptionists (NOC 1414)
- General office support workers (NOC 1411)
- Accounting and related clerks (NOC 1431)
- Human resources professionals (NOC 1121)
- Payroll administrators (1432)
- Human resources managers (NOC 0112)
- Any other administrative or support occupations not related to the core activities of the industry.

Such occupations are excluded from the key occupations by industry, unless they represent an important component of core activities. For example, all businesses require accountants, but only accounting firms employ accountants as part of their core activities.

For practical purposes, key occupations also exclude occupations with a relatively small number of workers in the industry. The objective is to provide the readers with the most relevant occupations by industry and not to cover all occupations across the economy.

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## Agriculture (NAICS 1111-1119; 1121-1129; 1151-1152)

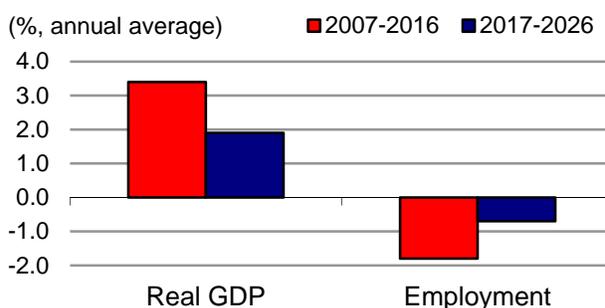
The agriculture industry is composed of three segments: crop production (63% of total production in 2016); animal production (24%); and related support activities (13%). Crop production includes oilseeds, grains, fruits, vegetables, plants and vines. Animal production is the process of raising cattle, hog, poultry and other animals for generating meat, egg and dairy products. It also includes aquaculture and apiculture. Examples of related support activities are harvesting, fertilizing and sterilizing services, and any services related to raising livestock, including companion animals. Crop production is highly export-oriented, while animal production is mostly domestic-oriented. The industry employed a total of 289,200 workers in 2016, with 45% in crop production and 47% in animal production. Employment is largely concentrated in Ontario (27%), Quebec (20%), Alberta (18%) and Saskatchewan (14%). The workforce is characterized by a high proportion of men (70%) and self-employed (59%). Key occupations (4-digit NOC) include:

Managers in agriculture (0821)  
 General farm workers (8431)  
 Agriculture service contractors, farm supervisors and specialized livestock workers (8252)  
 Nursery and greenhouse workers (8432)  
 Harvesting labourers (8611)

Managers in horticulture (0822)  
 Aquaculture and marine harvest labourers (8613)  
 Contractors and supervisors, landscaping, grounds maintenance and horticulture services (8255)  
 Transport truck drivers (7511)  
 Managers in aquaculture (0823)

The industry is very sensitive to weather conditions, to fluctuations in global demand and world prices for agriculture products, and to economic activity in the food processing and services industries. It has also encountered several challenges over the past decade, including the emergence of major competitors on global markets (such as Brazil and China) as well as international health and safety concerns which resulted in a series of trade restrictions against the industry (from the United States, European Union, China and Russia). While those factors led to significant fluctuations in production over the period 2007-2016, the resulting pace of growth in real GDP remained solid, averaging 3.5% annually. Output growth came mostly from crop production, as growth in livestock production was much more modest. The rise in crop production was primarily driven by an improvement in planting methods and stronger exports, supported by growing demand for corn and canola from the biofuels industry. Despite healthy growth in output, employment in the industry contracted at an average pace of 1.8% annually from 2007 to 2016, as increased global competition and market pressures forced the industry to lower its costs of production and restructure toward fewer and larger farms. This means that output growth was entirely achieved through productivity gains resulting from farm consolidation, a changing mix of products, and advanced technologies such as dairy cow self-milkers, precision seeding equipment, and the use of drones to survey crops and land area.

### Real GDP and Employment Growth Rates in Agriculture



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, real GDP growth in agriculture is projected to average 1.9% annually, a significant slowdown relative to the previous ten years. The adverse impact of climate change is expected to be the main reason explaining this slowdown. Although the general increase of temperature may grant farmers in Canada a longer period of crop growth, greater fluctuations in seasonal patterns may prove to be disruptive to the harvesting of these crops. The increase in production is expected to be driven by global demand for food and the growing use of biofuels. The outlook for exports is positive, supported by emerging markets with high population and wealth growth such as the BRICS countries (Brazil, Russia, India, China and South Africa) and better access to the lucrative markets of the European Union through the Comprehensive Economic and Trade Agreement (CETA). However, rising protectionism in the United States, increased global competition and stricter labelling and environmental regulations are expected to represent the most important challenges for farmers and livestock producers, in addition to climate change. Since much of the mechanization of processes and adoption of output-enhancing technologies have taken place over the last ten years, investments in new technologies are not expected to be as robust over the projection period, leading to weaker growth in productivity. As a result, employment in the industry is projected to keep declining over the 2017-2026 horizon, but at a slower pace relative to the previous decade, down by 0.7% annually. Difficulties to attract domestic workers due to the seasonal nature of the industry, its rural location, low wages and long hours have resulted in greater utilization of foreign temporary workers in agriculture.

### **Forestry and Logging (NAICS 1131; 1132; 1133; 1153)**

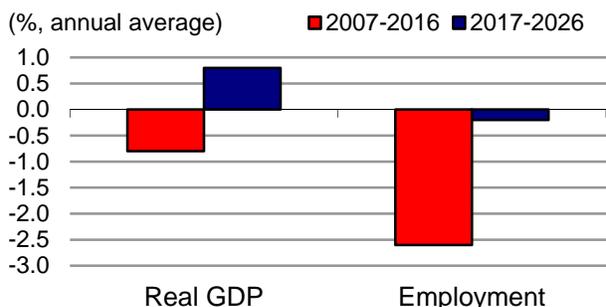
This industry comprises establishments primarily engaged in logging; timber tract operations; forest nurseries; and related support activities such as transportation, reforestation, pest control and firefighting services. Logging and support activities are the two largest segments, accounting for most of production and employment. While direct exports represent a small portion of total revenues, the forestry industry strongly relies on sales from the wood products and paper manufacturing industries which export a large share of their production, mainly to the United States. The industry employed 48,100 workers in 2016, largely concentrated in British Columbia (40%), Quebec (20%) and Ontario (14%), with a workforce primarily composed of men (82%). Key occupations (4-digit NOC) include:

Logging machinery operators (8241)	Transport truck drivers (7511)
Chain saw and skidder operators (8421)	Conservation and fishery officers (2224)
Supervisors, logging and forestry (8211)	Managers in natural resources production and fishing (0811)
Forestry technologists and technicians (2223)	Heavy-duty equipment mechanics (7312)
Logging and forestry labourers (8616)	Forestry professionals (2122)
Silviculture and forestry workers (8422)	

The industry experienced a downturn over the period 2007-2016, primarily due to the fallout of the U.S. housing market between 2006 and 2009. In addition to massive declines in U.S. housing starts, the use of newsprint grade paper and other forms of paper continued to decrease as publishers and readers transitioned to digital outlets, lowering the demand for forestry products. Production partially recovered from 2010 to 2016, in line with improved U.S. housing activity. The rebound in the industry's output was also supported by solid investment in residential construction in Canada and higher timber production in British Columbia to salvage

the remaining commercial values of trees that were affected by the mountain pine beetle. However, the industry could not completely overcome the drop in U.S. demand that occurred between 2006 and 2009, resulting in average annual declines of 0.8% in real GDP and 2.6% in employment over the full period 2007-2016. The majority of the job losses occurred during the collapse of the U.S. housing market, when the industry was forced to close plants and undertake significant consolidation in response to lower exports of wood products. The need to improve cost-competitiveness and boost productivity by adopting new technologies also constrained job creation in the industry from 2010 to 2016, as employment remained stagnant during that period despite the rebound in production.

### Real GDP and Employment Growth Rates in Forestry and Logging



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, production growth in forestry and logging is projected to return to positive territory, averaging 0.8% annually. Output growth is expected to be primarily driven by the ongoing recovery in residential investment in the United States and the resulting increase in demand for wood products. However, this demand will be negatively impacted by the end of the softwood lumber agreement with the United States, which has resulted in new tariffs averaging about 20% for many Canadian suppliers. After the U.S. housing market recovers, growth in forestry's output is projected to weaken, as the declining trend anticipated in household formation (due to slower demographic growth and population aging) will dampen the outlook for housing starts in North America. At the same time, annual allowable cuts (AAC) are expected to be reduced in several provinces, particularly in regions of inland British Columbia that were decimated by the mountain pine beetle outbreak. This factor, combined with stricter environmental regulations, will keep adding pressures on timber supply. Anaemic growth projected in the pulp and paper industry will also inhibit output growth in the forestry industry. On a positive note, the emergence of the biomass fuel industry and the increasing use of wood as a "greener" construction alternative for mid-rise and taller buildings are expected to support demand for forestry products over the long term. The new trade restrictions imposed by the U.S. administration could encourage additional focus on Asian markets, particularly China, while the Comprehensive Economic and Trade Agreement (CETA) could also help to support exports since the European Union is the world's third largest importer of wood. Production growth is expected to come from additional gains in productivity resulting from automation and the increasing use of machinery. As a result, employment in the industry is projected to keep declining over the 2017-2026 horizon, albeit at a much slower pace than the previous ten years, down by 0.2% annually.

### Fishing, Hunting and Trapping (NAICS 1141; 1142)

This industry comprises establishments primarily engaged in harvesting fish and other wild animals from their natural habitats. It is composed of commercial inland and salt water fishing

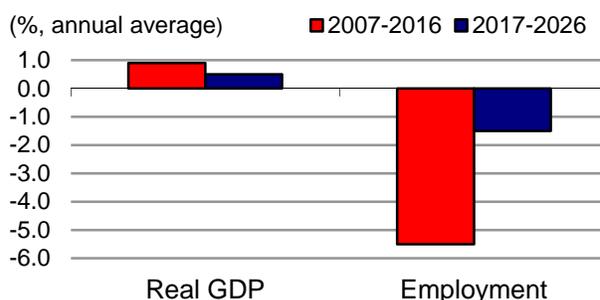
(excluding aquaculture which is part of the agriculture industry), as well as commercial hunting and trapping, including the exploitation and management of game preserves. Fishing is by far the predominant economic activity, accounting for almost all of the industry's production and employment. While direct exports represent a small portion of total revenues, the fishing industry relies heavily on sales from the seafood product preparation and packaging industry which exports about 75% of its production. Main export markets are the United States (64% of exports in 2016), China (17%) and Hong Kong (3%). The industry employed 14,900 workers in 2016, mostly concentrated in the Atlantic Provinces (80%) and British Columbia (13%). The workforce is characterized by a high proportion of men (81%) and self-employed (58%). The industry also shows the highest unemployment rate (average of 23% over the past ten years) across the 42 industries covered by COPS, largely reflecting the seasonal nature of its activities. Key occupations (4-digit NOC) include:

Fisherman/women (8262)  
Fishing vessel deckhands (8441)

Fishing masters and officers (8261)  
Trappers and hunters (8442)

The performance of the fishing industry is closely related to fluctuations in global supply and demand of fish and seafood and the net impact on world prices. Key challenges in Canada are associated with fish supply constraints and the various quotas and moratorium imposed on different species. The reason for those restrictions is that overfishing and environmental factors led to important decreases of several fish stocks, mainly ground-fish (such as cod and haddock) on the East coast and salmon on the West coast. Shellfish (lobsters, shrimps and crabs) have replaced other species as the main species harvested on the Atlantic coast, while the Pacific salmon fishery has gone through dramatic volatility since 2009. More recently, renewed growth in cod stocks has caused shrimp stocks to decline, prompting another round of quotas and leaving lobster as the Atlantic coast's only major product. Over the period 2007-2016, environmental factors and diminishing stocks were largely responsible for restraining production in the fishing industry, with real GDP growth averaging only 0.9% annually. Modest growth in output was accompanied by substantial growth in productivity, leading to a cumulative drop of 40% in employment or 5.5% per year. Improvements in nautical and hydraulic lifting equipment has allowed the industry to boost productivity, while waning stocks in some less-efficient fisheries have sent workers searching elsewhere for employment.

### Real GDP and Employment Growth Rates in Fishing, Hunting and Trapping



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Supply constraints are expected to continue to limit output growth in fishing over the projection period. In the near term, the significant reduction of shrimp quotas on the Atlantic coast will lower the shrimp fishing's contribution to industrial output, causing a structural correction in fisheries that will impact the industry for several years. In contrast, lobster landings are expected to keep increasing, as warming oceanic temperatures will continue to prompt lobster population

to concentrate in more northern areas where the water is colder. But the complete impact of climate change on the health of lobsters and other species remains unknown and scientific research is still divided on the potential impacts of oceanic acidification and de-oxygenization. Nevertheless, increasing global demand for lobsters is a positive development for the industry as 90% of Canadian lobsters are exported. In addition to traditional market such as the United States and Europe, exports will be supported by an explosion of demand in China from the growing middle class. Furthermore, the ratification of the new trade agreement between Canada and the European Union will eliminate duties on a wide range of fish and seafood products, while the relatively low value of the Canadian dollar will help to improve the price-competitiveness of Canadian exports, particularly on the U.S. market. Supply constraints are projected, however, to lower real GDP growth to an average annual rate of 0.5% over the period 2017-2026, while employment is expected to keep declining, albeit at a slower pace of 1.5% per year. Further declines in employment reflect additional gains in productivity, although those gains are not expected to be as robust as the previous ten years as the shift in industrial production toward higher-valued products winds down. Youth out-migration from coastal communities is also expected to reduce labour supply in the industry over the longer term, which may create some difficulties in attracting new workers.

### **Mining (NAICS 2121; 2122; 2123)**

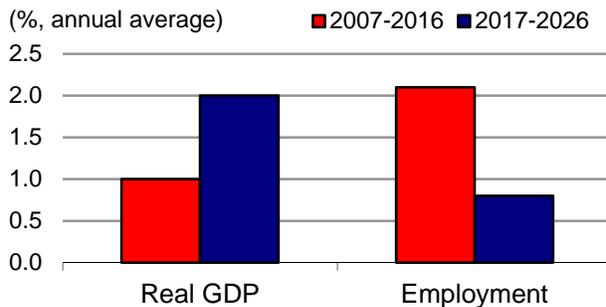
This industry comprises establishments primarily engaged in mining or preparing metallic and non-metallic minerals. It is composed of three segments: coal mining (6% of total production in 2016); metal ore mining (78%); and non-metallic mineral mining and quarrying (16%). The industry exports about two-thirds of its production, mainly to the United Kingdom (32% of exports in 2016), the United States (22%), China (7%) and Japan (7%). It employed 79,200 workers in 2016, with 54% in metal ore mining, 28% in non-metallic mineral mining and quarrying, 11% in coal mining and 7% that are not associated to any particular segment. Employment is mostly concentrated in Ontario (22%), Quebec (22%), British Columbia (21%) and Saskatchewan (16%), and the workforce is primarily composed of men (86%). Key occupations (4-digit NOC) include:

Underground production and development miners (8231)	Industrial electricians (7242)
Supervisors, mining and quarrying (8221)	Mine labourers (8614)
Heavy-duty equipment mechanics (7312)	Geological and mineral technologists and technicians (2212)
Underground mine service and support workers (8411)	Geoscientists and oceanographers (2113)
Construction millwrights and industrial mechanics (7311)	Mining engineers (2143)
Transport truck drivers (7511)	Geological engineers (2144)
Managers in natural resources production and fishing (0811)	

As a price taker on the global marketplace, the Canadian mining industry is very sensitive to world economic conditions and price fluctuations. The global recession of 2008-2009 resulted in a dramatic fall in demand and prices of most metals and minerals. In Canada, a large number of mining companies closed or saw temporary production cuts in order to bring supply into balance with demand. In 2009, the capacity utilization rate dropped to 55% and real GDP fell by 27%, reaching its lowest level since the mid-1990s. Production increased back in the following years

as demand for commodities from the emerging markets and the U.S. economy picked up, propelling the prices of many metals and minerals. It took five years, however, for the industry's output to fully recover from pre-recession levels. By 2015, the commodity boom came to a halt as China, which consumes roughly half of the global production of metals, began slowing its rate of industrialization, leading to weaker demand. While mining companies had made substantial investments on the expectation that prices would remain elevated, new projects were simply not economically viable given the low-price environment. Prices volatility affected revenues and profits, but the volume of production continued to grow. The resulting pace of growth in real GDP averaged 1.0% annually over the period 2007-2016. In comparison, employment growth averaged 2.1% per year, with a large part of the gains recorded in 2008. After falling in 2009 and 2010, employment fully recovered in 2011 and grew marginally thereafter.

### Real GDP and Employment Growth Rates in Mining



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Weaker global economic growth and the corresponding slowdown in Chinese demand, combined with 10 years of global investment in developing new mine production, have resulted in a situation where supply has caught up with demand. Following the correction in prices and production, a more optimistic outlook is expected for the Canadian mining industry over the projection period, supported by a strengthening in global demand and soft growth in global supply. While they are not projected to return to the levels reached in 2011, prices have been increasing over the past year and this is expected to bring large mining projects into operation across the country. In addition to increased production capacity in metal mining (such as gold, copper, nickel, zinc, silver, lead, iron ore, etc.), prospects in non-metallic mineral mining are promising, largely attributable to steady growth in the production of potash which is used as a fertilizer. As the world's largest producer of potash, Canada's mining industry is expected to benefit from the fact that global population will grow faster than the volume of cleared land suitable for agriculture, pushing up demand for higher crop yields. There are several large-scale potash projects under way in Saskatchewan that will add capacity to existing mines. Canada also holds large reserves of sand, gravel and stone, with Ontario and Alberta being the largest producers. The demand for such minerals is expected to be driven by construction activity in North America. Finally, new diamond mines in Quebec and Saskatchewan are set to begin production over the next few years, adding to the existing production capacity in Northwest Territories and Ontario. Real GDP in the mining industry is projected to increase at an average annual rate of 2.0% from 2017 to 2026, a notable acceleration from the previous ten years. In contrast, employment growth is expected to slow significantly, averaging 0.8% per year. Softer production growth in the last five years of the projection and a turnaround in productivity are the main factors behind the slowdown in employment growth. Rapid technological developments, such as GPS surveying, three-dimensional data maps, airborne technologies, remote-operated equipment, automated loading and transportation systems, and robotics and seismic mapping,

are expected to straighten productivity and reverse the negative pace of growth recorded during the period 2007-2016.

### Oil and Gas Extraction (NAICS 2111)

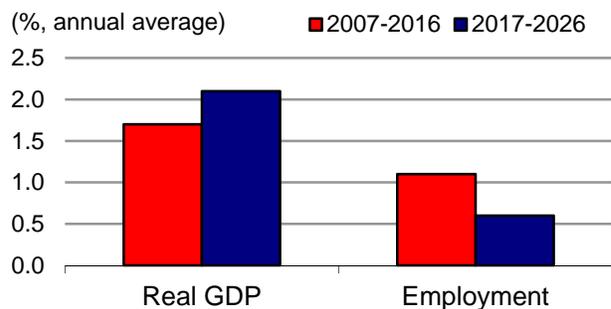
This industry comprises establishments primarily engaged in operating oil and gas field properties, such as exploration for crude petroleum and natural gas, drilling, completing and equipping wells, and other related activities in the preparation of oil and gas. It includes both the production from wells using normal pumping techniques and the production from surface shale or tar sands using non-conventional techniques. Canada is the fourth largest producer of crude oil and natural gas in the world. Alberta has always been the dominant producer in the country, supplying about 77% of total production of oil and gas, followed by British Columbia (mostly gas), Saskatchewan (mostly oil), and Newfoundland-Labrador (oil). Over three quarters of crude oil and about half of natural gas produced in Canada are exported, mainly to the United States. The industry employed 91,400 workers in 2016, mostly concentrated in Alberta (80%), with a workforce primarily composed of men (72%). Key occupations (4-digit NOC) include:

Oil and gas drillers, servicers, testers and related workers (8232)  
 Contractors and supervisors, oil and gas drilling and services (8222)  
 Petroleum engineers (2145)  
 Central control and process operators, petroleum, gas and chemical processing (9232)  
 Managers in natural resources production and fishing (0811)  
 Purchasing agents and officers (1225)

Power engineers and power systems operators (9241)  
 Geoscientists and oceanographers (2113)  
 Heavy-duty equipment mechanics (7312)  
 Construction millwrights and industrial mechanics (7311)  
 Industrial instrument technicians and mechanics (2243)  
 Steamfitters, pipefitters and sprinkler system installers (7252)  
 Oil and gas drilling, servicing and related labourers (8615)  
 Geological and mineral technologists and technicians (2212)

Between the early 2000s and 2014, the industry was spurred by rising global demand and soaring prices for energy products. Major investments were made to upgrade existing projects and to develop new projects, mainly in Alberta, but also in Newfoundland-Labrador, British Columbia and Nova Scotia. While production fell significantly during the 2008-2009 recession due to sharp declines in global demand and prices, it quickly recovered during the following two years, before falling again in 2012 as a result of lower activity in gas extraction. Production bounced back in 2013 but crude oil prices fell by more than 50% in the second half of 2014 and remained relatively low in 2015 and 2016 due to the oversupply on the global market. This resulted in a rapid decline in investment and drilling activity, but output continued to grow, largely driven by increased production capacity in the oil sands following many years of massive investments. The resulting pace of growth in real GDP averaged 1.7% annually over the full period 2007-2016. Employment also recorded large fluctuations over the past ten years, posting significant decreases on three occasions: 2009, 2013 and 2016, often

**Real GDP and Employment Growth Rates in Oil and Gas Extraction**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

lagging the effect of declining prices. Nevertheless, growth in employment was positive for the overall period 2007-2016, averaging 1.1% annually.

After three consecutive years of oversupply, global crude oil markets are finally moving back into balance. Stronger demand in coming years will put some upward pressure on prices but, with still-elevated inventories and ample spare production capacity, prices increases are expected to be modest. In the short term, the industry will remain in survival mode, with profitability remaining elusive for many firms. Investment should continue to be soft as cash flow continues to weaken and large capital projects that were previously under way begin to wind down. Over the medium term, export pipeline constraints are expected to ease, given the slew of recent approvals. However, failure to expand pipeline capacity in a timely and cost-effective fashion could result in increasing crude volumes moving via rail and in lower realized prices for Canadian producers. Over the projection period, most of the growth in the industry's output is expected to come from the oil sands, mainly from in-situ operations, as oil sands production capacity is projected to increase by roughly 40% relative to 2016's capacity. Meanwhile, conventional oil production (non-oil sands) is expected to decline slightly due to the gradual depletion of the Western Canadian Sedimentary Basin, while natural gas production is expected to be dampened by quickly rising production and competition from U.S. producers resulting from shale gas extraction. In 2016, North American natural gas prices were at their lowest levels in fifteen years. Not only the U.S. gas market is moving toward self-sufficiency, but the U.S. liquified natural gas (LNG) export projects are competing directly with proposed LNG export projects in Canada. The recent cancellation of the Pacific NorthWest Project has significantly reduced the potential of British Columbia to export liquified natural gas (LNG). Despite the gloomy outlook for exports, domestic demand in Canada is expected to increase, supported by power generation and oil sands projects, the fastest growing sources of natural gas consumption. Real GDP growth in the overall oil and gas extraction industry is projected to average 2.1% over the period 2017-2026, a slight acceleration from the previous ten years due to higher production capacity in the oil sands. In comparison, employment growth is projected to slow significantly, averaging 0.6% per year, as low energy prices will force the industry to maintain and strengthen the gains in productivity achieved in recent years. Faster growth in productivity are expected to be driven by technological improvements, particularly for the extraction of non-conventional oil and gas (such as the use of hydraulic fracturing and horizontal directional drilling techniques for shale and tight oil and gas extraction), and the fact that the production capacity in oil sands and offshore fields is increasing while becoming less labour intensive.

### **Support Activities for Mining, Oil and Gas Extraction (NAICS 2131)**

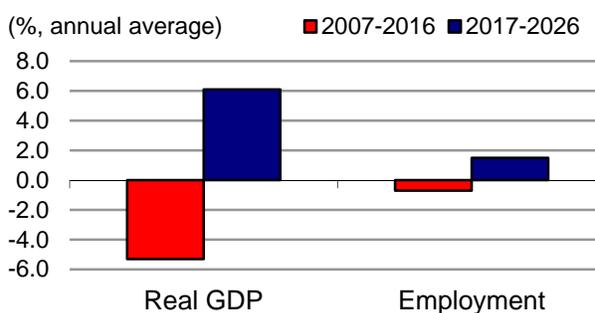
This industry comprises establishments primarily engaged in providing support services, on a contract or fee basis, required for the mining and quarrying of minerals and for the extraction of oil and gas, such as drilling activities. It also includes establishments engaged in the exploration for minerals, other than oil and gas, such as taking ore samples and making geological observations at prospective sites. The industry is essentially oriented toward the domestic market as most of its production is supplied within the country. It employed 93,200 workers in

2016, mainly concentrated in Alberta (61%), followed distantly by Ontario (11%), British Columbia (10%) and Saskatchewan (9%), with a workforce primarily composed of men (83%). Key occupations (4-digit NOC) include:

Oil and gas well drillers, servicers, testers and related workers (8232)	Underground production and development miners (8231)
Contractors and supervisors, oil and gas drilling and services (8222)	Oil and gas drilling, servicing and related labourers (8615)
Oil and gas well drilling and related workers and services operators (8412)	Supervisors, mining and quarrying (8221)
Managers in natural resources production and fishing (0811)	Transport truck drivers (7511)
	Heavy-duty equipment mechanics (7312)
	Construction millwrights and industrial mechanics (7311)

The performance of the industry is closely related to capital spending in exploration and extraction activities in the mining and fuel industries. Oil and gas represent the most important contributors, with output about four times larger than that of mining. The number of wells in operation and new drilling projects are key drivers for support activities and both are highly dependent on the prices of oil, gas, metals and minerals, which in turn are driven by global demand for energy and commodity products. The surge in prices recorded prior to the global recession of 2008-2009 resulted into major investments in the fuels and mining sectors, leading to a burst in various support activities, such as drilling, excavating, building and pumping wells for oil and gas field operations. While production fell temporarily in 2009 as a result of a cyclical contraction in commodity prices and investment, it quickly recovered during the following two years and continued to post healthy growth until 2014. However, the industry was severely affected by the sharp decline in crude oil prices that occurred during the second half of 2014 and led to major investment cutbacks from oil producers in 2015 and 2016. Over that period, output in the industry fell drastically, recording a cumulative decrease of 53% in only two years. This was severe enough to turn the last ten years GDP growth in the industry into a negative, with annual declines averaging 5.3% over the period 2007-2016. Employment also recorded significant fluctuations over the past ten years, with job losses generally taken place prior to the decreases in output. However, the decline in employment over the entire period was much more modest than the decline in output, averaging 0.7 annually, resulting in negative growth in productivity.

**Real GDP and Employment Growth Rates in Support Activities for Mining, Oil and Gas Extr.**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, production growth in the industry is projected to return to positive territory, averaging 6.1% annually. While this appears to be a huge improvement relative to the previous ten years, it is somewhat misleading since the sharp contractions recorded in output in 2015 and 2016 significantly lowered the last ten year average. The rebound in production is expected to occur gradually, as after three years of oversupply on the world crude oil market, demand is finally catching up, creating some upward pressures on oil prices. With oil prices improving and drilling costs falling, companies are expected to start ramping up exploration and

drilling activities again. The eventual construction of a major pipeline that would carry oil from Western Canada could also lead to increased investment from oil producers, while geological exploration in Northern Canada could lead to the development of large mining projects. Despite those positive developments and opportunities, the level of real GDP in the industry is not expected to return back to its historical peak of 2014 any time soon, neither are crude oil prices. The rebound in production is expected to lead to renewed growth in employment over the period 2017-2026, with gains averaging 1.5% annually. The modest pace of growth anticipated in employment reflects the fact that most of the increase in production will come from a turnaround in productivity. As mining and oil and gas producers focus on improving cost competitiveness and productivity, this will filter downstream and contribute to support services companies. Advances in technologies are allowing the industry to optimize logistics scheduling and operate several equipments remotely from one location by one operator without being on-site. The adoption of such technologies and logistical techniques are expected to straighten productivity, but also restrain job creation over the projection period, leaving the number of workers below its historical peak of 2013. In addition to high volatility in commodity prices, the industry is challenged by several factors, including the waning of conventional oil and gas reserves due to the gradual depletion of the Western Canadian Sedimentary Basin, rising compliance costs as exploration expands in more regulated and more environmentally sensitive areas, and the recent cancellation of the Pacific Northwest Project that has significantly reduced the potential of British Columbia to export liquified natural gas (LNG).

### **Construction (NAICS 2361-2362; 2371-2379; 2381-2389)**

This industry comprises establishments primarily engaged in constructing, repairing and renovating buildings and engineering works, and in subdividing and developing land. These establishments may operate on their own account or under contract to other establishments or property owners. They may produce complete projects or just parts of projects. The industry is composed of three segments: construction of residential and non-residential buildings (industrial, commercial and institutional); heavy and civil engineering construction (such as highways, bridges, utility systems, mining, oil and gas facilities); and specialty trade contractors (such as masonry, painting and electrical work). Construction activities are oriented toward the domestic market and primarily driven by residential and non-residential investment, which is particularly sensitive to fluctuations in economic and financial conditions as well as demographic trends in Canada. The industry employed 1.4 million workers in 2016 (7.7% of total employment in the economy), with 58% in specialty trade contractors, 31% in residential and non-residential construction, and 11% in heavy and civil engineering construction (see footnote for data on GDP)<sup>(1)</sup>. Employment is mostly concentrated in Ontario (36%), Alberta (18%), Quebec (17%) and British Columbia (15%). The workforce is characterized by a high proportion of men (88%) and a significant concentration of self-employed (29%). Key occupations (4-digit NOC) include:

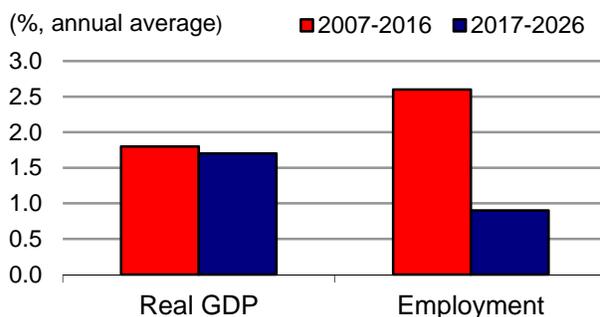
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<sup>(1)</sup> The breakdown for real GDP within the construction industry does not correspond to the NAICS codes, because GDP data are based on capital expenditures. According to this exclusive breakdown, residential and non-residential buildings construction accounted for 51% of the industry's real GDP in 2016, compared to 19% for repair construction and 30% for engineering and other construction activities.

Contractors and supervisors, industrial, electrical and construction trades (7201-7205)	Floor covering installers (7295)
Home building and renovation managers (0712)	Concrete finishers (7282)
Carpenters (7271)	Bricklayers (7281)
Construction trade helpers and labourers (7611)	Sheet metal workers (7233)
Electricians (7241)	Tiles setters (7283)
Construction managers (0711)	Insulators (7293)
Heavy equipment operators (7521)	Crane operators (7371)
Plumbers (7251)	Construction inspectors (2264)
Painters and decorators (7294)	Heavy-duty equipment mechanics (7312)
Contractors and supervisors in heavy equipment operator crews (7302)	Construction millwrights and industrial mechanics (7311)
Plasterers, drywall installers and finishers and lathers (7284)	Elevator constructors and mechanics (7318)
Residential and commercial installers and servicers (7441)	Cabinetmakers (7272)
Heating, refrigeration and air conditioning mechanics (7313)	Glaziers (7292)
Roofers and shinglers (7291)	Civil engineers (2131)
Iron workers (7236)	Drillers and blasters (7372)
Transport truck drivers (7511)	Telecommunications line and cable workers (7245)
Construction estimators (2234)	Gas fitters (7253);
Steamfitters, pipefitters and sprinkler system installers (7252)	Waterworks and gas maintenance workers (7442)
	Civil engineering technologists and technicians (2231)
	Electrical power line and cable workers (7244)
	Oil and solid fuel heating mechanics (7331)
	Boilermakers (7234)
	Water well drillers (7373)

The industry was a moderate performer for the Canadian economy over the past ten years, with output fluctuating significantly. Prior to the recession of 2008-2009, the industry was booming, propelled by substantial growth in non-residential investment, particularly in the energy sector for the development of the oil sands in Alberta, and sizeable growth in residential investment, especially in renovation spending. In 2009, real GDP and employment in the industry were severely impacted by the recession as non-residential and residential investment fell sharply, down by 20% and 7% respectively. The industry quickly recovered in 2010 and posted solid growth until 2014, spurred by substantial increases in capital expenditures on energy projects and mortgage rates at all-time lows. However, the industry's output fell back in 2015 and 2016, reflecting large declines in non-residential investment, primarily as a result of major investment cutbacks in oil and gas engineering structures due to the sharp decline in crude oil prices and persistent weakness in natural gas prices. Weaker energy prices resulted in delays or cancellations of higher-cost energy projects, ranging from oil sands development in Alberta to the building of liquefied natural gas (LNG) terminals in British Columbia. On average, real GDP in the construction industry grew at annual rate of 1.8% over the period 2007-2016, while employment grew at a faster pace of 2.6% annually, although job creation weakened significantly from 2014 to 2016. Declining productivity reflects the fact that the industry has moved toward smaller firms taking

#### Real GDP and Employment Growth Rates in Construction



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

on smaller-scale, less productive projects. It also reflects the fact that the industry is highly labour intensive, employing nearly three times as many workers per unit of output as the average for the entire goods-producing sector.

Over the period 2017-2026, real GDP growth in the construction industry is projected to be similar to the previous decade, as stronger growth in non-residential investment is expected to be accompanied by weaker growth in residential investment. With the gradual recovery anticipated in crude oil prices and positive announcements concerning pipeline projects, investment in oil and gas engineering structures are expected to pick up progressively, contributing to renewed growth in energy-related construction projects. Stronger investment in non-residential building construction and major investments in public infrastructure are also expected to contribute to faster growth in non-residential investment. Indeed, commercial building construction should benefit from rising demand for warehouse space due to the growing adoption of e-commerce (although e-commerce is also expected to restrain demand for retail space, while high office vacancy rates are expected to hold back demand for new office space). Industrial building construction should benefit from the need to boost production capacity, particularly in the manufacturing sector, following a period of under-investment. Institutional building construction and public engineering structures should benefit from the federal government's infrastructure program (\$186 billion over 12 years). This program includes not only spending on typical infrastructure such as roads, highways and other transportation projects, but also spending on "social infrastructure" such as schools, hospitals, cultural buildings, affordable housing, and indigenous and early-childhood facilities. However, growth in construction activity is expected to be restrained by the slower pace of growth projected in residential investment. With rising mortgage rates, stricter mortgage rules, inflated house prices, high consumer debt, and the gradual decline anticipated in household formation, investment in new housing is expected to start declining as soon as 2018, resulting in negative growth for the whole projection period. Ownership transfer costs (associated with the resale of existing houses) are also expected to post negative growth. In contrast, the pace of growth in renovation spending is expected to accelerate, making this sub-component the only source of growth in residential investment over the projection period. Beyond 2020, renovation spending is expected to exceed new housing spending. The resulting pace of growth in real GDP for the whole construction industry is projected to average 1.8% annually over the period 2017-2026, little changed from the previous ten years. Employment growth, however, is projected to weaken substantially, averaging 0.9% per year due to a major turnaround in productivity. Renewed growth in productivity is expected to come from the residential component. Indeed, population aging is expected to lead to a shift in the composition of housing starts from single-unit homes to multiple-dwellings (apartments and condominiums). Because multiple-dwellings are more capital intensive and require less labour by unit of output, productivity is projected to increase markedly in the construction industry.

### **Electric, Gas and Water Utilities (NAICS 2211; 2212; 2213)**

This industry comprises establishments primarily engaged in operating electric, gas and water utilities. These establishments generate, transmit, control and distribute electric power;

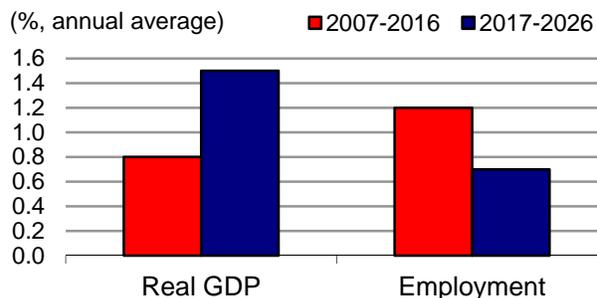
distribute natural gas; treat and distribute water and operate sewer systems and sewage treatment facilities and related systems (such as steam and air conditioning systems). They generally operate through a permanent infrastructure of lines, pipes, treatment and processing facilities. Electric power generation, transmission and distribution are by far the largest of the three segments, accounting for about 80% of production in 2016. The industry is mostly oriented toward the domestic market and is very sensitive to fluctuations in industrial production and construction activity. It employed 137,200 workers in 2016, with 73% in electric power generation, transmission and distribution, 10% in natural gas distribution, and 17% in water, sewage and other systems. Employment is mostly concentrated in Ontario (36%), Quebec (20%), Alberta (14%) and British Columbia (10%). The workforce is primarily composed of men (73%) and benefits from much higher wages than the national average, partly attributable to a high unionization rate. Key occupations (4-digit NOC) include:

Electrical power line and cable workers (7244)  
 Water and waste treatment plant operators (9243)  
 Power engineers and power system operators (9241)  
 Supervisors, petroleum, gas and chemical processing and utilities (9212)  
 Utilities managers (0912)  
 Power system electricians (7243)

Construction millwrights and industrial mechanics (7311)  
 Electrical and electronics engineers (2133)  
 Electrical and electronics engineering technologists and technicians (2241)  
 Waterworks and gas maintenance workers (7442)  
 Gas fitters (7253)

In 2007 and 2008, output growth in the industry was primarily driven by solid increases in non-residential investment, particularly in public infrastructure and electric power engineering structures. After falling significantly in 2009 as a result of the economic downturn, output quickly recovered in the following two years, supported by renewed growth in industrial production and construction activity. Since 2011 however, output has remained essentially flat. On average, real GDP grew at an annual rate of 0.8% over the period 2007-2016, with output growth almost evenly split between electric power generation, transmission and distribution and natural gas distribution, water sewage and other systems. In comparison, employment growth averaged 1.2% annually, but all the gains were recorded in 2007 and 2008 when the number of workers in the industry reached an historical peak. Employment fell continuously from 2009 to 2012, grew modestly in 2013 and 2014 and remained relatively stable thereafter. The significant gap between output and employment growth resulted in negative productivity growth, on average, for the full period 2007-2016. This partly reflects the fact that output growth was constrained by advances in energy efficiency and the resulting decline in the electricity intensity of the Canadian economy (electricity intensity is defined as the unit of electricity used per \$ of GDP). The shift in the sources of electric power generation from hydro to non-hydro technologies has also resulted in lower production capacity, as wind and solar energy technologies have generally lower capacity factors.

**Real GDP and Employment Growth Rates in Electric, Gas and Water Utilities**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, real GDP growth in the utilities industry is expected to accelerate significantly relative to the period 2007-2016, primarily driven by the electric power segment. While the electricity intensity of the Canadian economy should continue to decline gradually, stronger demand from the industrial and commercial sectors is expected to outpace those efficiency gains. Indeed, the oil and gas industry is expected to push industrial demand higher, as electricity use will grow in tandem with higher oil sands production, an energy intensive process. Electricity exports to the United States are also projected to contribute to faster output growth in the utilities industry. Investment in the industry is expected to be supported by mega energy projects in various provinces, including Newfoundland-Labrador (Lower Churchill), Quebec (Romaine Complex), Ontario (Darlington and Bruce Power nuclear stations), British Columbia (Site C Clean Energy) and Manitoba (Keeyask Hydropower). A continued shift toward a low-carbon economy could also create significant opportunities for electricity to gain market share in areas such as transportation. Faster growth in electric power generation, transmission and distribution activities is however expected to be accompanied by slower output growth in natural gas distribution and water, sewage and other systems. Nevertheless, the resulting pace of growth for the overall utilities industry is projected to average 1.5% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. In contrast, employment growth is projected to weaken significantly, averaging 0.7% per year. This reflects the need to contain production costs as the gradual increase anticipated in interest rates are expected to lead to higher borrowing costs for the industry. Renewed growth in productivity reflects a return to normal as this industry is highly capital intensive, with its capital stock per employee being six times that for the goods-producing industries. Rapid innovations in solar and biomass energy technologies should also help to boost productivity.

### **Food and Beverage Products (NAICS 3111-3119; 3121; 3122)**

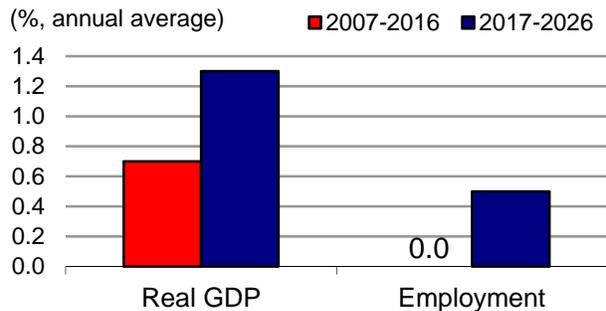
This industry comprises establishments primarily engaged in manufacturing food as well as beverage and tobacco products. Food manufacturing is by far the most important segment, accounting for 80% of production in 2016, followed by beverage products (17%) and tobacco products (3%). The industry is largely domestic-oriented as more than two thirds of its production is sold within the country. With a total of 286,700 workers in 2016, it is the largest employer of the manufacturing sector (16.9% of all manufacturing workers). Most workers are operating in food manufacturing (87%) and employment in the industry is largely concentrated in Ontario (38%) and Quebec (28%), with men accounting for 60% of the workforce. Key occupations (4-digit NOC) include:

Process control and machine operators, food and beverage processing (9461)	Bakers (6332)
Labourers in food and beverage processing (9617)	Testers and graders, food and beverage processing (9465)
Supervisors, food and beverage processing (9213)	Fish and seafood plant workers (9463)
Industrial butchers and meat cutters, poultry preparers and related workers (9462)	Labourers in fish and seafood processing (9618)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The industry was among the three manufacturing industries to post positive, albeit modest, growth in output from 2007 to 2016 (along with plastics and rubber products and aerospace, rail, ship and other transportation equipment). This partly reflects the fact that the production of the food segment increased almost continuously over that period, even during the recession of 2008-2009, as food is a necessity, making it less sensitive to cyclical fluctuations in aggregate demand. On average, real GDP in the food

### Real GDP and Employment Growth Rates in Food and Beverage Products



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

and beverage industry grew at an annual rate of 0.7% from 2007 to 2016, with all the increase coming from the food segment which expanded by 1.5% annually. While steady increases in domestic consumption have been the backbone for the food segment over the past decade, output growth has been primarily fueled by rising foreign demand, particularly from the U.S. and Asian markets. In contrast, production in the beverage and tobacco segments contracted by an annual average of 1.7% in the past ten years, reflecting higher import penetration of brewery products and weaker consumption of cigarettes. A growing presence of foreign competitors in the food and beverage market over the past several years forced the Canadian industry to undertake a significant amount of restructuring and consolidation to remain competitive globally. The larger plants have allowed manufacturers to take greater advantage of economies of scale, as well as containing costs per unit of output. At the same time, capital spending for some food segments has also started to pick up, benefiting from strong inflows of foreign direct investment (FDI), led by a surge in European capital. The greater shift toward technology boosted productivity in the industry, while keeping employment relatively stable (0.0% average annual growth rate) over the period 2007-2016, with the exception of a one year dip in 2010 that was fully reversed in 2011. In 2016, the employment level was essentially the same as 2006.

Production growth is projected to accelerate significantly over the period 2017-2026, primarily driven by foreign demand and a relatively low Canadian dollar. The export-oriented segment of the industry is expected to benefit from a stronger U.S. economy and new market opportunities resulting from the gradual implementation of the Canada-European Union Comprehensive Economic and Trade Agreement (CETA). Exports of food products are also expected to benefit from rising incomes and the growing middle class in emerging markets. Developing countries generally have higher population growth rates than developed countries and a greater capacity to increase per-capita consumption of food. In addition to enhance the price-competitiveness of Canadian exports of food and beverage products, the low value of the Canadian dollar is expected to increase import prices and encourage a shift toward local sourcing and domestic production. However, companies using imported inputs (such as fruits and vegetables) into domestic production may have a hard time passing price increases to Canadian consumers who have become increasingly sensitive to food prices in recent years. While the outlook is positive for exports, domestic demand for food and beverage products is expected to soften in line with the slower pace of growth anticipated in consumer spending over the longer term, largely due to

population aging. This factor is expected to counterbalance the positive impacts of higher import prices and healthy growth in the Canadian food services industry on domestic demand, making foreign demand the largest contributor of production growth in the food and beverage manufacturing industry. Better export conditions are expected to result in real GDP growth averaging 1.3% per year over the projection period (although the renegotiations of the North American Free Trade Agreement (NAFTA) represent a downside risk to the export outlook). This significant acceleration in output growth should lead to renewed growth in employment, with job creation projected to average 0.5% annually from 2017 to 2026. However, a large part of output growth will continue to come from productivity gains as technological innovations in the industry, particularly in advanced robotics, are expected to increase the automation of the production process. The amount of capital per worker is expected to keep rising, partly driven by foreign direct investment (FDI) brought by greater economic liberalization between Canada and the European Union. FDI tends to increase transfers of technology, improve resource allocation and provide better access to international markets. It has historically been shown to lead to higher product quality, stronger productivity and increased competitiveness.

### **Wood Product Manufacturing (NAICS 3211; 3212; 3219)**

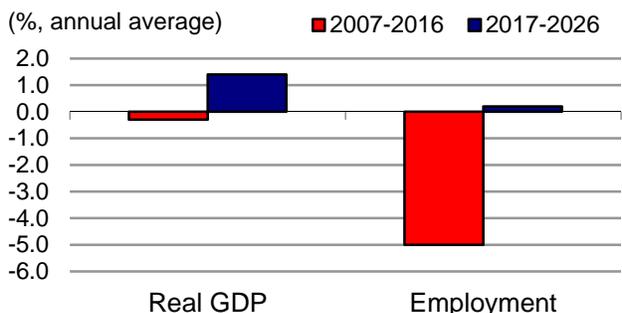
This industry comprises establishments primarily engaged in manufacturing products from wood. It is composed of three different segments: sawmills and wood preservation (46% of total production in 2016); veneer, plywood and engineered wood products (26%); and other wood products such as doors, windows and frames (28%). Overall, about 55% of the industry's production is shipped abroad, mostly to the United States which account for 80% of exports. China is the second largest export market as the share of that country in Canada's wood exports reached 11% in 2014, before declining to 9% in 2015 and 7% in 2016. The three segments, however, do not face the same degree of exposure to domestic and foreign economic conditions. Sawmills and wood preservation along with veneer, plywood and engineered wood products are highly dependant on foreign demand, with exports accounting for 77% and 60% of production respectively. In contrast, other wood products are far more sensitive to domestic demand with 80% of production sold within the country. The industry employed 122,200 workers in 2016 (7.6% of total manufacturing employment), with 38% in sawmills and wood preservation, 13% in veneer, plywood and engineered wood products, and 49% in other wood products. Employment is mostly concentrated in Quebec (35%), British Columbia (26%) and Ontario (18%), and the workforce is primarily composed of men (84%). Key occupations (4-digit NOC) include:

Labourers in wood, pulp and paper processing (9614)	Other wood processing machine operators (9434)
Other wood products assemblers and inspectors (9533)	Lumber graders and other wood processing inspectors and graders (9436)
Supervisors, forest products processing (9215)	
Sawmill machine operators (9431)	
Woodworking machine operators (9437)	

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The combination of the collapse in the U.S. housing market, beginning in 2006, and the ensuing global recession left an undeniable mark on Canada's wood products industry over the last decade. Real GDP and employment fell sharply between 2006 and 2009, posting cumulative drops of 32% and 26% respectively, primarily due to substantial declines in exports. The industry experienced significant consolidations, as many firms could not remain competitive and were forced to shut down. Since 2010, however, a

### Real GDP and Employment Growth Rates in Wood Product Manufacturing



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

recovery has taken place in production, driven by improving conditions in the U.S. housing market as well as a booming Chinese market. Indeed, real GDP in the wood products industry outgrew Canada's overall manufacturing sector for a fifth consecutive year in 2016 to stand at roughly 97% of its 2006 levels. With the recovery in production, employment stopped declining and remained relatively stable from 2011 to 2015, before falling again in 2016, down by 18%. On average, real GDP contracted by 0.3% annually over the period 2007-2016, while employment fell at a more severe pace of 5.0%. During that period, the industry lost 82,000 workers, representing 40% of its workforce. The large gap between the decline in output and the decline in employment primarily reflects substantial gains in productivity since 2010, driven by a significant pickup in investment in machinery and equipment, technological innovations in sawmills, increasing concentration of businesses, larger economies of scales, and higher value added through product development, particularly for wood fibre.

Over the projection period, the industry is expected to continue to benefit from a recovering housing market in the United States, where new housing starts are projected to increase at a double digit pace over the near term, mainly supported by improving labour market conditions and post-hurricane reconstruction in several states. However, the new round of duties on exports of Canadian softwood lumber to the United States is expected to act as a drag on industry growth. While the outlook remains healthy for non-lumber production (e.g. veneer, plywood and engineered wood products), the negative impacts of the U.S. trade restrictions on the sawmills segment should be permanent unless duty rates are re-evaluated or a new settlement is reached. Such restrictions could motivate Canadian producers with U.S. sawmill capacity to increase their production south of the border at the expense of production in Canada in order to avoid paying duties. Producers unable to withstand the costs associated with lumber duties will also have to replace U.S. demand by other export markets, particularly in China and Europe. For example, British Columbia could take further advantage of its proximity to Asian markets, while the Comprehensive Economic and Trade Agreement (CETA) with the European Union could provide new market opportunities. On the domestic front, rising mortgage rates, stricter mortgage rules, inflated house prices, high consumer debt and the gradual decline anticipated in household formation are all expected to lower new housing demand across Canada over the projection period. As a result, growth in domestic demand for wood products is projected to be primarily driven by stronger renovation activity. In the later part of the projection,

timber supply constraints, particularly in British Columbia and Quebec, are also expected to restrain investment decisions of Canadian firms, curtailing the industry's growth potential. Nevertheless, real GDP growth is projected to average 1.4% over the period 2017-2026, a notable improvement relative to the previous ten years, primarily supported by higher exports of non-lumber products to the United States in the short-term and stronger renovation activity in Canada over the longer term. Renewed growth in production is expected to lead to a marginal rebound in employment, with job creation averaging 0.2% annually. Advancements in harvesting technologies, transport management, data analytics and on-demand production will continue to restrain employment growth and maintain a competitive advantage on domestic and foreign markets, although a weaker investment outlook is expected to result in slower productivity growth relative to the past ten years.

### **Paper Manufacturing (NAICS 3221; 3222)**

This industry comprises establishments primarily engaged in manufacturing pulp and paper as well as converted paper products (such as paperboard boxes, corrugated boxes, fibre boxes and sanitary food containers). Pulp and paper is the most important of the two segments, accounting for 53% of production in 2016. Overall, the industry is export intensive as more than two-thirds of its revenues come from foreign markets, largely from the United States. The two segments, however, do not face the same degree of exposure to domestic and foreign economic conditions. Converted paper is highly dependent on domestic demand, with 65% of its production sold within the country. In contrast, pulp and paper is far more sensitive to foreign demand, with exports accounting for more than 85% of its production, largely shipped to the United States (60% of exports) but also to China (23%). The industry employed 60,200 workers in 2016 (3.6% of total manufacturing employment), with 59% in pulp and paper and 41% in converted paper products. Employment is mainly concentrated in Quebec (36%), Ontario (34%) and British Columbia (14%), and the workforce is primarily composed of men (81%). Key occupations (4-digit NOC) include:

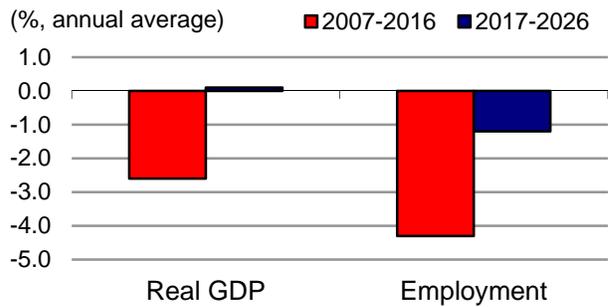
Paper converting machine operators (9435)	Plateless printing equipment operators (9471)
Labourers in wood, pulp and paper processing (9614)	Chemical engineers (2134)
Papermaking and finishing machine operators (9433)	Pulping, papermaking and coating control operators (9235)
Power engineers and power systems operators (9241)	
Supervisors, forest products processing (9215)	
Pulp mill machine operators (9432)	

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The industry has been through difficult times since the early 2000s as the rapid increase in the digitization of information and media has led to a long-term structural decline in demand for paper products, particularly newsprint. Moreover, stronger competition from abroad, notably from South American producers, combined with the significant appreciation of the Canadian dollar, left many pulp and paper mills facing competitiveness challenges. These problems were compounded by the collapse of the U.S. housing market, which led to numerous closures in

domestic sawmills. Sawmill closures damaged supply chains further downstream, hampering the ability of many pulp and paper mills to gain a steady supply of key inputs into their own production processes. These factors, combined with the global recession of 2008-2009, have forced firms to undertake major restructuring by consolidating and upgrading facilities and closing less efficient plants through mergers and acquisitions. Real GDP in the industry fell almost continuously from 2007 to 2013, before improving modestly in recent years, with the gradual re-orientation of production toward segments that have stronger demand profiles, such as paperboard containers and sanitary paper products. Employment, however, continued to contract as productivity gains were notable, supported by improving per-worker investment into machinery and equipment. On average, real GDP and employment fell at an annual rate of 2.6% and 4.3% respectively over the period 2007-2016. During that period, the industry lost 33,000 workers, representing about one-third of its workforce.

### Real GDP and Employment Growth Rates in Paper Manufacturing



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Real GDP in the paper manufacturing industry is projected to remain essentially stable over the period 2017-2026, while employment is projected to keep declining, albeit at a slower pace than the previous ten years. Production is expected to be primarily supported by exports as a result of a relatively low Canadian dollar, a stronger U.S. economy, and continued expansion into niche market opportunities. Since most of paper products are priced in U.S. dollars, a weaker currency will increase the effective price Canadian firms receive for their products, boosting revenues and profitability. Beyond the U.S. market, exports could benefit from growing opportunities in Asian markets such as China, India, Indonesia, Japan and South Korea. Furthermore, the rise in e-commerce, both globally and in Canada, is expected to boost demand for packaging, supporting the production of paperboard containers. The outlook for sanitary paper products also remains largely positive. On the negative side, growing production from competing suppliers in South America and Asia will keep putting pressures on Canadian manufacturers to consolidate operations, as firms in these regions are able to produce at lower costs and can also benefit from their closer proximity to key emerging markets. In addition, timber supply constraints in Canada and the recent imposition of duties on Canadian exports of softwood lumber to the United States are expected to hurt domestic lumber production and boost the price of this key input for paper manufacturing. The industry is unlikely to expand production beyond current level as the increasing use of electronic media and growing environmental concerns will continue to reduce demand for traditional reading and writing papers. On average, real GDP is projected to increase marginally from 2017 to 2026, up by 0.1% per year, while employment is projected to contract by 0.8% annually. While a more positive outlook for production may help mitigate the severity of future employment declines, retirements and automation will continue to put downward pressure on the size of the industry's workforce throughout the projection period. Indeed, an aging workforce is expected to result in an increasing number of retirements, while occupations consisting of repetitive and routine

tasks, such as those performed by labourers and operators, should continue to be replaced by machinery.

### Printing and Related Activities (NAICS 3231)

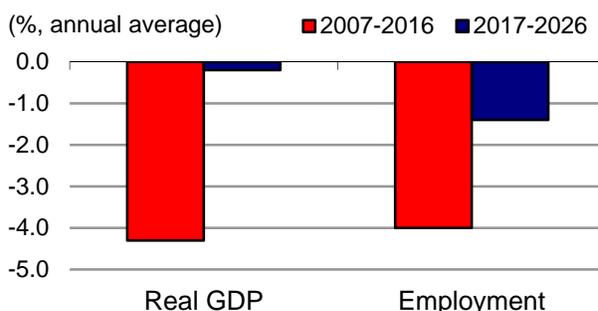
This industry comprises establishments primarily engaged in printing and providing related support activities such as pre-press and bindery work. Printing is among the few manufacturing activities in Canada that are not significantly exposed to changes in global economic conditions and in the value of the Canadian dollar as only 10% of production is shipped to foreign countries, mostly to the United States which account for 77% of exports. The industry employed 59,200 workers in 2016 (3.5% of total manufacturing employment), largely concentrated in Ontario (44%) and Quebec (33%), with a workforce predominantly composed of men (64%). Key occupations (4-digit NOC) include:

Printing press operators (7381)	Binding and finishing machine operators (9473)
Graphic designers and illustrators (5241)	Camera, platemaking and other prepress occupations (9472)
Supervisors, printing and related occupations (7303)	Plateless printing equipment operators (9471)
Other labourers in processing, manufacturing and utilities (9619)	Graphic arts technicians (5223)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

Production and employment in the industry have been on a declining trend since the early 2000s, primarily reflecting lower demand for printed materials, largely attributable to the transition toward digital media. More specifically, printing has been adversely affected by the increasing use of electronic documents and e-mails. The Internet has pulled readers away from newspapers, magazines and other paper media products. Growing environmental concerns have also incited businesses and consumers to reduce their use of paper, such as printed bills and promotional brochures. E-commerce and e-billing represent lower cost alternatives for businesses looking to reduce their expenditures, while e-readers continue to grow in popularity, reducing demand for conventional printing. Business form printing has been declining for many years, as digital forms are cheaper and easier to track. Recent developments in secure electronic signatures and fillable documents have also contributed to amplify this trend. As a result of lower demand for printed materials, real GDP and employment in the industry fell continuously over the period 2007-2016, declining at an average annual rate of 4.3% and 4.0% respectively. Since its employment peak of 2003, the industry has cut about half of its workforce through major consolidations.

#### Real GDP and Employment Growth Rates in Printing and Related Activities



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, most of the challenges faced throughout the past decade will continue to be problematic for the industry, as the displacement of print by digital media is projected to keep weighing on printing activities. Structural changes in demand is expected to encourage the industry to look beyond the traditional printing processes and into areas such as labelling and packaging for growth. Examples of new printing technologies include erasable printing, three-dimensional digital printing for packaging, and jetted-material printing in a variety of materials, such as foil, wood, textiles, ceramics, metal and glass. Firms are also expected to change and diversify their business models in order to provide more value-added services, including graphic design, marketing, communication and online content management services. While the persistent weakness anticipated in the value of the Canadian dollar could lead to an expansion of exports, the majority of printing firms are relatively small and oriented toward local and domestic markets, making it difficult for them to penetrate foreign markets. Furthermore, profitability has deteriorated to its lowest point since the recession of 2008-2009 and profit margins are nearing all-time lows. This situation, combined with limited growth prospects, could constrain the industry's ability to make investments in order to adapt to structural changes in demand. As a result of this very challenging environment, real GDP and employment are projected to keep declining over the period 2017-2026, but at a much slower pace than in the previous ten years, down by 0.2% and 1.4% per year respectively. With the industry shifting from traditional printing techniques to digital printing, firms are expected to spend more on their information and communication technology (ICT) infrastructure and less on labour. There could be, however, an increased demand for higher-skilled workers to operate the complex new technology.

### **Chemical Products (NAICS 3251-3259)**

This industry comprises establishments primarily engaged in manufacturing chemical products from organic and inorganic raw materials (such as petrochemicals and industrial gas, fertilizers and pesticides, pharmaceutical and medicine products, paint, ink, soap and cleaning products). Pharmaceutical and medicine products and basic chemicals are the largest two segments of the industry, accounting respectively for 39% and 20% of production in 2016. Overall, the industry is highly export intensive as more than 70% of its production is shipped to foreign markets, essentially to the United States which account for 77% of exports. Pharmaceutical and medicine products have the highest export intensity, with close to 100% of production delivered abroad. In contrast, pesticides and fertilizers have the lowest export intensity, with two-thirds of production sold on the domestic market. The industry employed 94,900 workers in 2016 (5.6% of total manufacturing employment), with 39% in pharmaceutical and medicine products, 17% in basic chemicals, and 14% in soap, cleaning compound and toilet preparation products. Employment is mostly concentrated in Ontario (47%) and Quebec (31%), and the workforce is largely composed of men (64%). Key occupations (4-digit NOC) include:

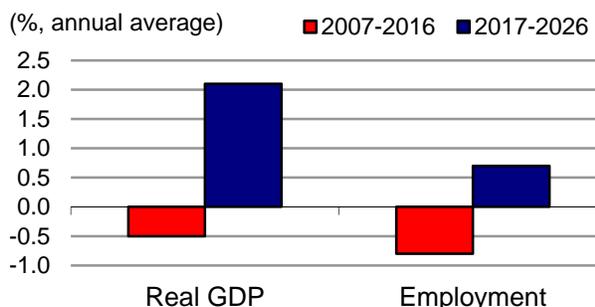
Chemical plant machine operators (9421)  
Supervisors, petroleum, gas and chemical  
processing and utilities (9212)  
Chemical technologists and technicians (2211)  
Chemists (2112)

Labourers in chemical products processing  
and utilities (9613)  
Central control and process operators, petroleum,  
gas and chemical processing (9232)  
Chemical engineers (2134)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

Some segments of the industry, such as basic chemicals, synthetic resins and artificial and synthetic fibres and filaments, are strongly tied to the North American manufacturing supply chain. Other segments rely on demand for pharmaceutical and medicine products from the health sector, demand for fertilizers and pesticides from the agriculture sector, or demand for paint, coating and adhesive materials from the construction sector. The industry was already struggling before being hit further by the effects of the global recession of 2008-2009. After reaching a peak in 2003, production declined by 25% in the following six years. Stimulated by the recovery in economic activity in Canada and the United States ensuing the recession and by the decline in the value of the Canadian dollar in recent years, output increased back from 2010 to 2016, but it never fully recovered from its pre-recession level. This resulted into negative growth over the whole period 2007-2016, with real GDP contracting at an average rate of 0.5% annually. Employment has been on a declining trend since the early 2000s, even when output straightened between 2010 and 2016, with the exception of temporary jumps in 2010 and 2013 that were fully reversed in subsequent years. On average, employment in the industry declined by 0.8% per year from 2007 to 2016.

### Real GDP and Employment Growth Rates in Chemical Products



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, renewed growth in the industry is expected to be primarily driven by the straightening anticipated in manufacturing activity and stronger demand for chemical products, particularly from the United States. The decline in the value of the Canadian dollar boosted exports of many chemical products from 2014 to 2016, with the most notable increases in pharmaceutical and medicine products, and this situation is expected to persist for some time. Tariff reductions included in the Comprehensive Economic and Trade Agreement (CETA) are also expected to provide incentives for domestic firms to increase their penetration into the European Union market. The recent merger of Potash Corporation of Saskatchewan and Agrium Inc., valued at \$36 billion, makes Canada the world's largest producer of potash and second-largest producer of nitrogen fertilizer. Since manufacturing firms often deal with large amounts of toxic materials, alliances with research facilities to develop more environmentally conscious products is also expected to increase demand for domestic chemicals. For example, Canada is well-positioned for the development of new technologies to produce chemicals from biomass, given the high volume and diversity of its available biomass. Furthermore, population aging is expected to result in growing demand for pharmaceutical and medicine products, boosting production in the largest segment of the industry. On the negative side, constantly evolving regulations can increase operating costs and curtail the market for certain products.

For example, Health Canada is working toward banning the use of imidacloprid due to its harmful levels in waterways, a chemical commonly used by farmers to manage insects on several crops. Increased competition from foreign chemical producers based in the Middle East and Asia could also restrain growth in the industry, while the renegotiations of the North American Free Trade Agreement (NAFTA) represent a downside risk to the export outlook. Nevertheless, real GDP growth in the industry is projected to return to positive territory over the period 2017-2026, averaging 2.1% annually. Renewed growth in production is expected to result in a full recovery in employment, with job creation averaging 0.8 per year. However, two-thirds of production growth is expected to be met by solid gains in productivity. Low interest rates over the past several years have enabled many Canadian chemical producers to finance new plants and equipment in order to increase efficiency and stay competitive. Emphasis on R&D activities for the production of advanced specialty chemicals is also expected to increase the value added in some segments of the industry.

### **Plastics and Rubber Products (NAICS 3261; 3262)**

This industry comprises establishments primarily engaged in making goods by processing raw rubber (such as tires and inner tubes, hoses and belts, shoe and boot parts, latex products) and plastics materials (such as plastic resins, plastic packaging, polystyrene and urethane foam, plastic pipes, plastic bottles). Plastics are the largest of the two segments, accounting for 85% of production in 2016. Overall, close to half of the industry's production is exported. The two segments, however, do not face the same degree of exposure to domestic and foreign economic conditions. Plastics are largely dependent on domestic demand, with 60% of production sold within the country. In contrast, rubber products are far more sensitive to foreign demand, with exports accounting for 72% of production, 93% of which are shipped to the United States. The industry employed 91,000 workers in 2016 (5.4% of total manufacturing employment), with 82% in plastics and 18% in rubber products. Employment is mostly concentrated in Ontario (46%) and Quebec (33%), and the workforce is largely composed of men (68%). Key occupations (4-digit NOC) include:

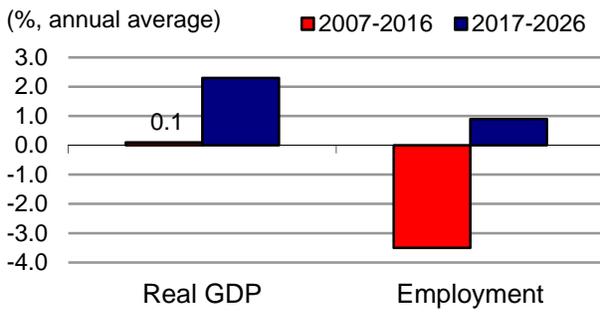
Plastics processing machine operators (9422)	Labourers in rubber and plastic products manufacturing (9615)
Plastic products assemblers, finishers and inspectors (9535)	Rubber processing machine operators and related workers (9423)
Supervisors, plastic and rubber products manufacturing (9214)	Chemical engineers (2134)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

Demand for plastics and rubber products is heavily tied to the North American manufacturing supply chain, making it particularly sensitive to business cycles. The industry was already struggling before being hit further by the effects of the global recession of 2008-2009. After reaching a peak in 2005, production declined by 30% in the following four years. Underpinned by the recovery in manufacturing and housing activity in Canada and the United States, output

increased back from 2010 to 2016, progressively returning to its pre-recession level. The resulting pace of growth in real GDP averaged 0.1% annually over the period 2007-2016. Employment growth was particularly sluggish over the last ten years, even when output recovered between 2010 and 2016. On average, employment declined by 3.5% per year from 2007 to 2016, reflecting significant gains in productivity attributable to further automation of the production process and the adoption of more advanced technologies such as 3D printing.

### Real GDP and Employment Growth Rates in Plastics and Rubber Products



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, renewed growth in the industry is expected to be primarily driven by the straightening anticipated in manufacturing activity and stronger exports, spurred by a relatively low Canadian dollar and a recovering U.S. demand for new housing and motor vehicles. The growing middle class in large markets such as China and India is also expected to increase demand for automobiles and airplanes, which are major users of plastic and rubber parts. Major restructuring undergone in the past decade has enabled the industry to become a major force in global markets and this welcome development should help to increase exports to emerging markets. Furthermore, technological developments have led to growing demand for plastics as a substitute for metals. For example, plastics are now being used more intensively in electronics, while efforts to reduce vehicle weight will continue to support greater use of plastics in automotive (which are lighter than traditional metal parts). The global bioplastic market also provides new opportunities for manufacturer to move away from petroleum-based plastics. On the negative side, the recycling rate for plastics is far below the rates for paper, iron and steel and since most plastic packaging is single-use, the industry is likely to face restrictions such as bans on plastic bags. The muted outlook for new housing activity in Canada is also expected to restrain growth in the industry, while the renegotiations of the North American Free Trade Agreement (NAFTA) represent a downside risk to the export outlook. Nevertheless, real GDP growth in the industry is projected to return to positive territory over the period 2017-2026, averaging 2.3% annually. Renewed growth in production is expected to result in a modest rebound in employment, with job creation averaging 0.9 per year. However, a significant part of production growth is expected to be met by additional gains in productivity resulting from further adoption of advanced manufacturing technologies.

### Primary Metals and Mineral Products (NAICS 3241; 3271-3279; 3311-3315)

This industry comprises establishments primarily engaged in transforming crude petroleum and coal into intermediate and final products (such as fuels, hydraulic fluids and asphalt), in manufacturing non-metallic mineral products (such as bricks, ceramic, cement and glass), and in smelting and refining primary metals (such as iron, steel, copper or aluminum) for the production of bars, sheets, pipes, tubes or wires. The transformation of primary metals is the

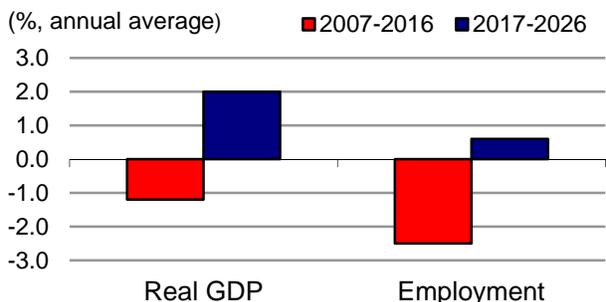
largest of the three segments, accounting for 54% of production in 2016, followed by petroleum and coal products (24%) and non-metallic mineral products (22%). The industry exports about 40% of its production. However, within the industry, primary metals are the most exposed to global economic conditions as two-thirds of production are shipped to foreign countries, mostly to the United States which account for 76% of exports. The industry employed 131,200 workers in 2016 (7.7% of total manufacturing employment) with 54% in primary metals, 36% in non-metallic mineral products, and 10% in petroleum and coal products. Employment is concentrated in Ontario (40%) and Quebec (35%), and the workforce is primarily composed of men (84%). Key occupations (4-digit NOC) include:

Supervisors, mineral and metal processing (9211)	Inspectors and testers, mineral and metal processing (9415)
Machine operators, mineral and metal processing (9411)	Central control and process operators, mineral and metal processing (9231)
Concrete, clay and stone forming operators (9414)	Foundry workers (9412)
Labourers in mineral and metal processing (9611)	Machining tool operators (9417)
Crane operators (7371)	
Glass forming and finishing machine operators and glass cutters (9413)	

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

With the largest users of primary metals and mineral products being the manufacturing and construction sectors, the industry generally tracks activity in these two sectors. Over the past ten years, the industry struggled alongside the manufacturing sector, with all three segments recording similar declines in output. A key factor driving the decline in output was the negative impact of the 2008-2009 recession on North American industrial activity. Many of the industry's products are used as inputs in manufacturing industries such as motor vehicles, trailers and parts, chemical products, and fabricated metals and machinery, and those three industries were hit hard by the recession. More recently, the construction sector has been largely responsible for restraining activity in the industry, as the sharp decline in non-residential investment, particularly in engineering structures related to oil and gas extraction, has reduced demand for the industry products that are used as building materials. On average, real GDP contracted by 1.2% annually over the period 2007-2016, compared to a steeper decline of 2.5% for employment, reflecting the need to improve productivity and competitiveness through significant consolidations and closures of the least productive plants. All of the declines in output and employment occurred during or shortly after the 2008-2009 recession. The tepid pace of growth recorded in the industry in subsequent years left output an employment significantly below their pre-recessions levels.

**Real GDP and Employment Growth Rates in Primary Metals and Mineral Products**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, renewed growth in the industry is expected to be partly driven by the rebound anticipated in manufacturing activity in Canada, particularly in motor vehicles, trailers and parts, chemical products, and fabricated metals and machinery. Additional growth in construction activity, primarily supported by faster increases in non-residential investment, is also expected to fuel demand for primary metals and mineral products. More specifically, the gradual recovery anticipated in investment related to the development of oil and gas engineering structures; the faster pace of growth projected in the construction of commercial, industrial and institutional buildings; and major investment in public infrastructure from the federal government are all expected to increase the demand for bricks, ceramic, glass, cement, concrete, asphalt, iron, steel, aluminium products, etc. Faster economic growth in the United States and a relatively low Canadian dollar are also expected to stimulate exports of primary metals and mineral products, largely supported by the accelerating pace of growth anticipated in residential and non-residential investment south of the border. However, the renegotiations of the North American Free Trade Agreement (NAFTA) and discussions around “Buy America” provisions for infrastructure projects represent a downside risk to the export outlook. The resulting pace of growth in the industry’s real GDP is projected to return to positive territory over the period 2017-2026, averaging 2.0% annually. Renewed growth in production is expected to result in a modest rebound in employment, with job creation averaging 0.6% per year. Gains in productivity led by modernization of machinery, combined with economies of scale resulting from increased production, are projected to restrain employment growth in the industry.

### **Fabricated Metal Products and Machinery (NAICS 3321-3329; 3331-3339)**

This industry comprises establishments primarily engaged in manufacturing ferrous and non-ferrous metal products (such as hand tools, architectural and structural products, boilers, tanks and shipping containers, springs, wires, bolts and screws) and establishments producing industrial and commercial machinery (used in the production process of various primary, construction, manufacturing and services industries). Production in the industry is evenly split between its two segments: fabricated metal products (49% in 2016) and machinery (51%). Overall, the industry is export intensive as around 55% of its production is shipped to foreign markets. The two segments, however, do not face the same degree of exposure to domestic and foreign economic conditions. Metal fabrication is highly dependent on domestic demand, with 75% of its production sold within the country. In contrast, machinery is far more sensitive to foreign demand, with exports accounting for about 80% of its production, 70% of which are shipped to the United States. Overall, the industry employed 270,100 workers in 2016 (15.9% of total manufacturing employment), with 56% in metal fabrication and 44% in machinery. Employment is mostly concentrated in Ontario (45%), Quebec (25%) and Alberta (11%), and the workforce is primarily composed of men (81%). Key occupations (4-digit NOC) include:

Machinists and machining and tooling inspectors (7231)	Assemblers, fabricators and inspectors, industrial electrical motors and transformers (9525)
Welders and related machine operators (7237)	Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations (7201)
Supervisors, other mechanical and metal products manufacturing (9226)	Structural metal and platework fabricators
Labourers in metal fabrication (9612)	
Other metal products machine operators (9418)	
Metalworking and forging machine operators (9416)	

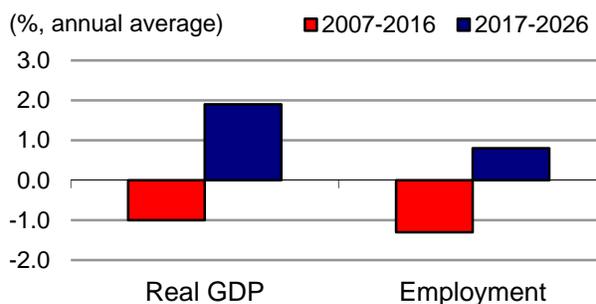
Machining tool operators (9417)  
 Mechanical assemblers and inspectors (9526)  
 Industrial painters, coaters and metal finishing process operators (9536)

and fitters (7235)  
 Mechanical engineers (2132)  
 Tool and die makers (7232)  
 Mechanical engineering technologists and technicians (2232)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The industry primarily relies on business investment in machinery and equipment as well as activity in the construction and manufacturing sectors, which are the largest users of metal products and machinery. Because those two sectors are very sensitive to business cycles, so is the fabricated metals and machinery industry. During the global recession of 2008-2009, production declined by 20%, while employment fell by 37,000 on the heels of the 24,000 jobs that were lost in 2006 and 2007. Stimulated by the economic recovery in North America, and more particularly by the rebound in manufacturing and construction activity, real GDP increased back from 2010 to 2014, returning to its pre-recession level. However, the industry's output fell again in 2015 and 2016, primarily reflecting weaker construction activity in Canada brought by major investment cutbacks in oil and gas engineering structures due to the collapse in oil prices. Employment fell for a fifth consecutive year in 2010, before increasing modestly in 2011 and remaining relatively stable in subsequent years. On average, real GDP and employment in the industry contracted at an annual rate of 1.0% and 1.3% respectively over the period 2007-2016.

### Real GDP and Employment Growth Rates in Fabricated Metal Products and Machinery



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, the industry is expected to benefit from the straightening anticipated in manufacturing activity, additional growth in construction activity, and faster growth in business investment into non-residential structures and machinery and equipment in North America. More specifically, demand for fabricated metals and machinery is expected to be driven by the positive outlook for the automotive, aerospace and other transportation equipment industries; the gradual recovery anticipated in investment related to the development of oil and gas engineering structures; the faster pace of growth projected in the construction of commercial, industrial and institutional buildings; and major investments in public infrastructure from the federal government. Furthermore, after holding back on investment in machinery and equipment (M&E) for years, Canadian businesses are expected to replace or upgrade their existing capital stock in response to the development of new productivity-enhancing technologies, the gradual recovery in energy-related investment, renewed growth in manufacturing activity, and the anticipated slowdown in labour force growth (labour supply). Those factors are projected to result in a substantial rebound in M&E investment in Canada, boosting domestic demand for industrial and commercial machinery. The persistent weakness anticipated in the value of the

Canadian dollar, along with faster growth in M&E investment and solid construction activity in the United States, are also expected to support foreign demand for fabricated metals and machinery. However, the renegotiations of the North American Free Trade Agreement (NAFTA) and discussions around “Buy America” provisions for infrastructure projects represent downside risks to the export outlook. The resulting pace of growth in the industry’s real GDP is projected to return to positive territory over the period 2017-2026, averaging 1.9% annually. Renewed growth in production is expected to result in a partial recovery in employment, with job creation averaging 0.8% per year. However, a significant part of production growth is expected to be met by additional gains in productivity. Additive manufacturing, which refers to technologies that build three-dimensional objects by adding multiple layers of material, could potentially revolutionize how several fabricated metal products are created, reducing waste in production and improving efficiency. Although many jobs associated with repetitive and routine tasks are expected to be threatened by increased automation, there could be stronger demand for skilled workers who can operate more complex machinery used in the manufacturing process.

### **Computer, Electronic and Electrical Products (NAICS 3341-3346; 3351-3359)**

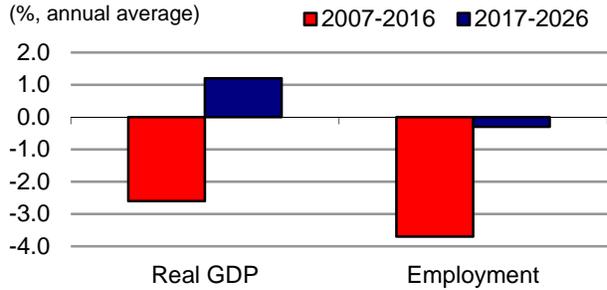
This industry comprises establishments primarily engaged in manufacturing information and communication technology (ICT) devices, such as computers and peripherals, telecommunication and audio-video equipment, navigational and measuring instruments, as well as electronic components for such products. It also comprises establishments involved in manufacturing products that generate, distribute and use electrical power, such as generators, transformers, switchgears, batteries, wires, electrical motors and household appliances. ICT is the most important of the two segments, accounting for about two-thirds of production in 2016. Overall, the industry is highly export intensive, with about 75% of its revenues coming from abroad, largely from the United States which account for 70% of exports. The industry is also largely exposed to import penetration with a substantial share of domestic demand met by imports, mainly from the United States, China and Mexico. It employed 106,600 workers in 2016 (6.3% of total manufacturing employment), with 63% in the ICT segment. Employment is mostly concentrated in Ontario (49%) and Quebec (29%), and the workforce is predominantly composed of men (73%). Key occupations (4-digit NOC) include:

Electronics assemblers, fabricators, inspectors and testers (9523)	Machine operators and inspectors, electrical apparatus manufacturing (9527)
Assemblers and inspectors, electrical appliance, apparatus and equipment manufacturing (9524)	Computer programmers and interactive media developers (2174)
Electrical and electronics engineers (2133)	Electrical and electronics engineering technologists and technicians (2241)
Supervisors, electronics manufacturing (9222)	
Supervisors, electrical products manufacturing (9223)	

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

While the industry posted impressive growth in the late 1990s, largely driven by the strong performance of the ICT segment, production and employment fell almost continuously after the dot-com bubble burst of 2001. This reflects various challenges faced by the industry during that period, including the market saturation for ICT products in the early 2000s (largely due to an over capacity in the telecommunications infrastructure); the global recession of 2008-2009; the strong appreciation of the Canadian dollar (prior to 2013); and most importantly, the intensification of international competition on both domestic and foreign markets.

### Real GDP and Employment Growth Rates in Computer, Electronic, Electrical Products



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Canada's market share in the United States has been declining since the the early 2000s, while imports from China have more than doubled in the last ten years. Producers are increasingly relocating to low-cost countries and China's market share in Canada has been exceeding that of the United States since 2010 and is now accounting for almost 40% of Canadian imports of ICT products. Sales from the wireless communications segment were particularly affected by BlackBerry's difficulties and decision to stop making phones, in part because of intense competition from Apple's iPhone and Google's Android. While real GDP in the industry contracted at an annual average rate of 2.6% over the period 2007-2016, the decline in employment was more severe, averaging 3.7% per year and reflecting major restructuring in the industry. However, all of the declines occurred prior to 2014 as production and employment have stabilized in recent years, partly supported by renewed growth in exports of ICT products, most likely as a result of a weaker Canadian dollar.

Over the projection period, production in the industry is expected to pick up, primarily driven by the strengthening anticipated in business investment in North America and growing opportunities brought by new technologies. After posting mitigate growth over the past decade, business investment in machinery and equipment in Canada and the United States is projected to improve significantly, increasing domestic and foreign demand for ICT products which rely heavily on corporate spending. High replacement rates and perpetual innovation for many ICT products are also expected to keep driving consumer interest in new products. New technologies, such as mobile and cloud computing, the Internet of Things (IoT), advanced robotics, machine learning and artificial intelligence, are projected to result in growing global demand for ICT products. With electronics being increasingly embedded in a variety of consumer products, such as autos and appliances, and considering the proliferation of applications for smartphones and other ICT devices, the design and manufacture of sensors and control instruments represent a key source of growth for the industry. The increasing use of new navigational, measuring and medical devices, an area where Canada has a competitive advantage compared with its competitors in developing countries, is also a key factor in the industry's resurgence. For example, Canada has great potential when it comes to the untapped drone market. On the supply side, domestic firms have easy access to the latest technology and cutting-edge operations available for unmanned aerial vehicle (UAV) systems. The demand side

is promising as well because Canada is a large country with many rural communities and high transportation costs. Finally, the persistent weakness anticipated in the value of the Canadian dollar is expected to support exports, particularly over the short- to medium-term, while a more positive outlook for R&D spending is expected to increase the industry's capacity to take advantage of emerging opportunities. Over the period 2017-2026, real GDP growth is projected to return to positive territory, averaging 1.7% per year, while employment is projected to keep declining, albeit at a much slower pace than the previous ten years, down by 0.3% annually. Renewed growth in production is expected to be achieved through additional gains in productivity resulting from increased automation within the industry and the shift toward higher value added products.

### **Motor Vehicles, Trailers and Parts (NAICS 3361; 3362; 3363)**

This industry comprises establishments primarily engaged in manufacturing motor vehicles (48% of total production in 2016); motor vehicle bodies and cabs, truck trailers and non-commercial trailers (5%); and motor vehicle parts, including engines (47%). Overall, the industry is highly export intensive as around 80% of its production is shipped to foreign markets, mostly to the United States which account for 95% of exports. The three segments, however, do not face the same degree of export intensity. The motor vehicles segment is the most export intensive (94%), followed by motor vehicle parts (59%) and motor vehicle bodies and trailers (43%). The industry employed a total of 151,700 workers in 2016 (9.0% of total manufacturing employment), with 32% in motor vehicles, 57% in motor vehicle parts, and 10% in motor vehicle bodies and trailers. The workforce is mostly composed of men (79%) and Ontario is by far the largest employer, accounting for 85% of all automobile workers in Canada. Key occupations (4-digit NOC) include:

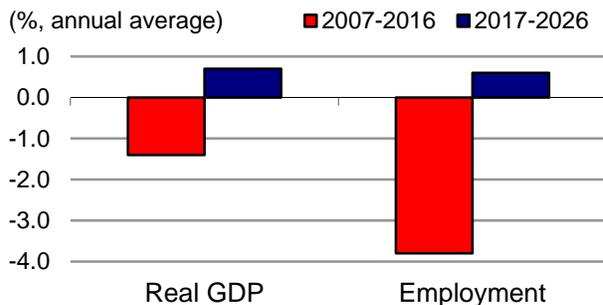
Other metal products machine operators (9418)	Mechanical assemblers and inspectors (9526)
Motor vehicle assemblers, inspectors and testers (9522)	Tool and die makers (7232)
Supervisors, motor vehicle assembling (9221)	Mechanical engineering technologists and technicians (2232)
Metalworking and forging machine operators (9416)	Industrial painters, coaters and metal finishing process operators (9536)
Welders and related machine operators (7237)	Machining tool operators (9417)
Mechanical engineers (2132)	
Labourers in metal fabrication (9612)	

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The industry has been through difficult times over the past decade, primarily reflecting increased import penetration on the North American market and the aftermath of the 2008-2009 recession. In addition to the shift in consumer preferences toward more fuel-efficient Asian-made cars, the recession led to a drastic decline of new vehicle sales in the United States, which fell to their lowest level in 27 years. As a result, the Detroit Three manufacturers undertook major restructuring programs to avoid bankruptcy, including a new era of wage negotiations and belt tightening to contain legacy pension costs. With the new wage structures in place, Canada's automotive sector emerged as a more efficient global contender, but that

was not sufficient to offset the shift in production to Mexico, where hourly wage rates range from US \$8 to \$10, compared with US \$30 to \$40 in Canada. As a result, Mexico's share of North American light vehicle production currently stands at 20%, compared to 13% for Canada. After falling markedly in 2009 and 2010, production and employment in the Canadian industry partially recovered in subsequent years, primarily driven by the accumulation of a huge pent-up demand in the United States during the recession. The rebound in employment, however, was quite modest. On average, real GDP contracted at an annual rate of 1.4% over the period 2007-2016, while employment fell at a more severe rate of 3.8% per year. This situation reflects significant gains in productivity resulting from the capital intensity of the automotive industry and the retention of experienced workers under union labour contracts.

### Real GDP and Employment Growth Rates in Motor Vehicles, Trailers and Parts



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Broad economic conditions are positive for the Canadian motor vehicle industry, particularly in the first half of the projection period. Low fuel prices, robust labour markets, low interest rates and a favourable currency situation have pushed demand in the United States to record levels in 2015 and 2016, and this situation is expected to persist over the short- to medium-term. Over the longer term, however, North American demand may be nearing saturation as consumer spending is expected to moderate with the advent of rising interest rates, higher fuel costs, and weaker growth in disposable income as the baby-boom generation retires. Structural factors are also expected to restrain demand for Canadian automotive products. American consumers are holding onto their vehicles longer than in the past, both due to frugality and better vehicle construction. This factor and the fact that American households are the most motorized in the world, owning one quarter more vehicles than the G7 average, provide minimal opportunity for automakers to increase penetration of the U.S. market. On the supply side, generous government subsidies and low wage costs for Mexican producers are a direct threat to Canadian market share, pushing Canadian automakers to streamline operations and consolidate production in high-value-added segments such as light trucks, vans, sport utility vehicles (SUVs) and cross-over vehicles, where Canada has a competitive advantage. Commercialization of innovative assisted driver, efficient internal combustion engines and electric vehicles are now strategic priorities in design and development. As a result of fierce competition from Mexico, new plant commitments have been almost inexistent in the last decade (the last new auto assembly plant built in Canada was the Toyota Woodstock facility in 2008). Recently, however, more than \$2 billion of investments in plant upgrades have been announced to maintain the existing productive capacity. General Motors has committed \$554 million to upgrade its Oshawa assembly plant; Fiat-Chrysler Automotive has earmarked \$331 million for a new paint shop at its Brampton plant and a new engine development program; Ford has pledged a \$713 million investment for its new engine program in Windsor; and Honda has committed \$500 million to build a state-of-the-art paint shop in Alliston. On average, real GDP in

the industry is projected to increase at an annual rate of 0.7% over the period 2017-2026. Renewed growth in production is expected to result in a modest rebound in employment, with job creation averaging 0.6% per year. However, uncertainty with regards to the North American Free Trade Agreement (NAFTA) poses a risk to automakers' investment and production on Canadian soil.

### **Aerospace, Rail, Ship and Other Transportation Equipment (NAICS 3364; 3365; 3366; 3369)**

This industry comprises establishments primarily engaged in manufacturing aerospace products and parts; railroad rolling stock; ships and boat building; and other types of transportation devices (such as military vehicles, motorcycles, snowmobiles, golf carts, bicycles). Aerospace is by far the most important of the four segments, accounting for 70% of production in 2016. Overall, the industry is highly export intensive as around 60% of its production is shipped to foreign countries, largely to the United States which represent about 66% of exports. The aerospace segment is the most exposed to global economic conditions as deliveries to foreign markets account for almost 80% of total production. The industry employed 84,800 workers in 2016 (5.0% of total manufacturing employment), with 70% in aerospace, 11% in ships and boat building, 9% in railroad rolling stock, and 9% in other types of transportation devices. Employment is mostly concentrated in Quebec (48%) and Ontario (31%), and the workforce is predominantly composed of men (81%). Key occupations (4-digit NOC) include:

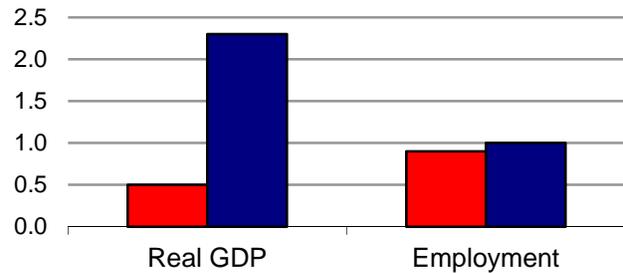
Aircraft assemblers and aircraft assembly inspectors (9521)	Industrial painters, coaters and metal finishing process operators (9536)
Aerospace engineers (2146)	Labourers in metal fabrication (9612)
Aircraft instrument, electrical and avionics mechanics, technicians and inspectors (2244)	Welders and related machine operators (7237)
Supervisors, other mechanical and metal products manufacturing (9226)	Machinists and machining and tooling inspector (7231)
	Mechanical assemblers and inspectors (9526)
	Boat assemblers and inspectors (9531)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

The industry was among the three manufacturing industries to post positive, albeit modest, growth in output from 2007 to 2016 (along with food and beverage products and plastics and rubber products). It experienced two sizeable cycles during that period, with contractions in production occurring in 2009-2010 and 2015-2016. Because the industry is highly integrated into global supply-chains and driven by trade, demand for products such as finished aircrafts and related components like engines and parts tend to line up with developments in the world economy. Consequently, contractions in real GDP followed the global financial crisis, and more recently, the global economic slowdown which has prevailed over the last couple of years. Between 2011 and 2014 however, the industry's output expanded at a pace exceeding 5% annually, consistent with stable global economic growth that averaged close to 4% in those years. Employment in the industry also recorded significant fluctuations over the past decade,

with notable declines in 2010 and 2015, indicating that the workforce was constantly adjusted to changing demand and production needs. On average, real GDP and employment in aerospace, rail, ship and other transportation equipment increased at annual rates of 0.5% and 0.9% respectively over the period 2007-2016, recording the second strongest pace of growth in production (behind food and beverage products) and employment (behind miscellaneous manufacturing) among the thirteen manufacturing industries covered by COPS.

**Real GDP and Employment Growth in Aerospace, Rail, Ship and Other Transportation Equipment**  
(%, annual average) ■ 2007-2016 ■ 2017-2026



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Output growth in the industry is expected to accelerate markedly over the period 2017-2026, primarily driven by the improvement in global macroeconomic drivers. While the world economy slowed significantly in 2016, it is projected to grow at an accelerating pace going forward, supported by steady growth in developing markets but also improving prospects in developed economies. After years of rising profits and high returns on capital invested, global airline profits are at historically high levels and financial conditions remain favourable for investment in new aircrafts. The order book for Canada’s aerospace industry is increasing and the current order backlog represents over two-and-half-years worth of production. Growing production and export levels for new aircraft models, such as Bombardier’s CSeries and Global 7000 and 8000, are expected to support industry’s activity, along with the federal government’s commitment to replace the aging fleet of CF-18 fighter jets. However, as the renegotiations of the North American Free Trade Agreement (NAFTA) moves forward, it will be critical for the industry to minimize the disruption on cross-border supply chains and to diversify its trade base away from the U.S market where protectionist trade policies are on the rise. Under this context, the proposed Airbus and Bombardier’s CSeries partnership announced in October 2017 is a positive development. The world class sales, marketing and support networks that Airbus brings into the venture are expected to strengthen and accelerate the CSeries’ commercial momentum by expanding its order book and providing access to new markets, particularly in Europe and Asia. Airbus’ supply chain expertise is expected to generate significant production cost savings, improving the competitiveness of the CSeries in the fast growing single aisle market, which represents 70% of future global demand for aircraft (the 100-150 seat market segment alone is projected to represent more than 6,000 new airplanes over the next 20 years). The industry is also expected to be supported by solid growth in shipbuilding and rail activity. Several major contracts have been awarded to Canadian businesses for the construction of combat and non-combat vessels for the Canadian Navy and Canadian Coast Guard under the federal government National Shipbuilding Procurement Strategy. The outlook for the fabrication of railroad equipment looks quite optimistic as the transportation of oil by train is increasing at a rapid pace in North America due to the lack of pipeline capacity. Changing demographics, increased road congestion and environmental concerns are also expected to foster global demand for transit systems, including rail and subway. On average, real GDP in aerospace, rail,

ship and other transportation equipment is projected to grow at an annual rate of 2.3% over the period 2017-2026, compared to 1.0% for employment. The more moderate pace of growth anticipated in employment reflects the need to improve cost-competitiveness by increasing productivity, particularly in the aerospace segment due to fierce competition from Boeing and Embraer. Nevertheless, employment is projected to post the strongest pace of growth among all manufacturing industries.

**Textile, Clothing, Leather and Furniture  
(NAICS 3131-3133; 3141-3149; 3151-3159; 3161-3169; 3371-3379)**

This industry comprises establishments primarily engaged in manufacturing textiles, clothing, leather, and furniture and related products (such as kitchen cabinets, bathroom vanities and counters). Furniture and related products is the largest segment, accounting for 64% of production in 2016, followed distantly by textiles (19%) and clothing (17%). Overall, close to 60% of the industry’s production is shipped to foreign countries, mostly to the United States which account for 90% of exports. Clothing is the most export intensive segment (77%), followed by furniture and related products (52%) and textiles (48%). All segments of the industry have also been facing a substantial increase in import penetration in both the Canadian and U.S. markets from low-cost producers, particularly from China. The industry employed 128,900 workers in 2016 (7.6% of total manufacturing employment), with 57% in furniture and related products, 23% in clothing, 18% in textiles, and 3% in leather. Employment is mostly concentrated in Quebec (40%) and Ontario (35%), with men accounting for a slight majority of the workforce (56%). Key occupations (4-digit NOC) include:

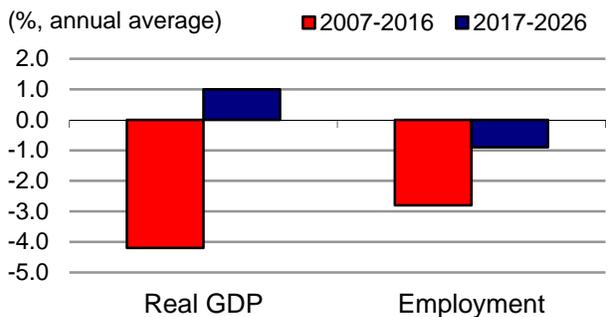
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| Furniture and fixture assemblers and inspectors (9532)                                     | Weavers, knitters and other fabric making occupations (9442)                           |
| Industrial sewing machine operators (9446)   | Industrial designers (2252)  |
| Supervisors, furniture and fixtures manufacturing (9224)                                   | Labourers in textile processing (9616)   |
| Supervisors, textile, fabric, fur and leather products processing and manufacturing (9217) | Inspectors and graders, textile, fabric, fur and leather products manufacturing (9447) |
| Furniture finishers and refinishers (9534)   | Textile fibre and yarn, hide and pelt processing machine operators and workers (9441)  |
| Other labourers in processing, manufacturing and utilities (9619)                          | Cabinetmakers (7272)   |
| Woodworking machine operators (9437)   | Fabric, fur and leather cutters (9445)   |

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

While the industry posted impressive growth during the 1990s, production and employment fell drastically between 2002 and 2010. This reflects various challenges faced by the industry over that period, including the intensification of competition from low-cost producers on the domestic and export markets; the reduction of trade barriers (more particularly the lifting of import quotas on textile, clothing and leather products in 2005); the strong appreciation of the Canadian dollar (which contributed to lower exports and increase imports); and the global recession of 2008-2009. Since 2011, however, production and employment in the industry have stabilized,

supported by the positive impact of the U.S. housing recovery on demand for furniture and related products and by the shift in textile production toward more value added products. The recent decline in the value of the Canadian dollar also contributed to increase exports in the industry. On average, real GDP and employment fell at annual rates of 4.2% and 2.8% respectively over the period 2007-2016. Since the early 2000s, the industry has cut about half of its workforce in response to declining production, largely attributable to the growing presence of low-cost producers on the domestic and export markets. For example, between 2002 and 2016, the share of imports in the domestic market increased from 59% to 93% for textiles and clothing and from 37% to 58% for furniture and related products, mostly due to a surge in imports from China. During the same period, Canada's share in U.S. imports fell from 21% to 8% for furniture and related products and from 4.2% to 1.6% for textiles and clothing.

### Real GDP and Employment Growth Rates in Textile, Clothing, Leather and Furniture



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, the industry is expected to benefit from the persistent weakness anticipated in the value of the Canadian dollar, which makes products manufactured in Canada more competitive relative to imports and contributes to support exports and domestic sales. Stronger growth anticipated in consumer spending in the United States and new market opportunities are also expected to increase foreign demand. For example, the ongoing recovery in new housing investment in the United States should continue to support demand for furniture and related products over the short- to medium-term, while the growing middle class in emerging countries could lead to new business opportunities, particularly for high-end and luxury furniture. Canada also benefits from a unique expertise in developing and producing technical and smart textiles used by industries such as construction, health care, defence and aerospace. That said, while some of the restructuring has forced the industry to move up the value added chain and develop specialized niche products, the penetration of new export markets will remain very challenging in this highly competitive industry. Uncertainty about the renegotiations of the North American Free Trade Agreement (NAFTA) represents an additional risk to the export outlook. On the domestic front, the industry will be challenged by the fact that growth in consumer spending on durable and semi-durable goods is projected to weaken progressively due to slower growth in disposable income (resulting from the gradual slowdown in overall employment growth in Canada and massive retirements of baby-boomers). High household debt levels, combined with the gradual increase anticipated in interest rates, are also expected to reduce consumer's ability to finance new furniture purchases. The decline anticipated in new housing activity in Canada is an additional factor expected to restrain domestic demand for furniture and related products, although this factor should be partly offset by faster growth anticipated in renovation spending. The resulting pace of growth in the industry's real GDP is projected to average 1.0% annually over the period 2017-2026. Employment, however, is projected to keep declining, down by 0.9% per year. While a more

positive outlook for production may help mitigate the severity of future employment declines, the need to increase productivity and lower production costs in this highly competitive industry will continue to put downward pressure on the size of the workforce. As a result, occupations consisting of repetitive and routine tasks should continue to be displaced by automation.

### Miscellaneous Manufacturing (NAICS 3391; 3399)

This industry comprises establishments not classified in any other manufacturing industries. These establishments manufacture a diverse range of products, including medical equipment and supplies (such as blood transfusion equipment, surgical instruments, dental equipment, eyeglasses, contact lenses, prosthetics and wheel chairs) and miscellaneous products (such as jewellery and silverware, sporting and athletic goods, toys and games, and office supplies). Miscellaneous products are the largest of the two segments, accounting for two-thirds of production in 2016. Overall, about 50% of the industry’s production is shipped to foreign countries, primarily to the United States which account for 75% of exports. The industry employed 107,300 workers in 2016 (6.3% of total manufacturing employment), with 80% in miscellaneous products and 20% in medical equipment and supplies. Employment is mostly concentrated in Ontario (56%), Quebec (21%) and British Columbia (10%), and the workforce is mainly composed of men (63%). Key occupations (4-digit NOC) include:

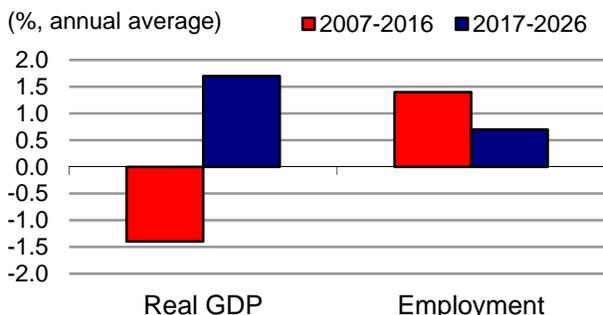
Other products assemblers, finishers and inspectors (9537)  
 Supervisors, other products manufacturing and assembly (9227)  
 Other labourers in processing, manufacturing and utilities (9619)

Dental technologists, technicians and laboratory assistants (3223)  
 Other medical technologists and technicians (except dental health) (3219)  
 Denturists (3221)

\* Key occupations for manufacturing industries in general also include: Manufacturing managers (0911); Construction millwrights and industrial mechanics (7311); Material handlers (7452); Shippers and receivers (1521); Transport truck drivers (7511); Industrial engineering and manufacturing technologists and technicians (2233); Industrial electricians (7242); and Industrial and manufacturing engineers (2141).

Since the products manufactured by the industry are largely utilized by consumers and businesses, production is primarily tied to household consumption and business spending. Furthermore, many of the industry’s products can be classified as recreational or leisure goods, making demand for such products very sensitive to discretionary expenditures and business cycles. As a result, production and employment in the industry fell markedly during the global recession of 2008-2009, reflecting lower demand for products in the miscellaneous segment due to rapid declines in discretionary income and corporate profits. In contrast, demand for medical equipment and supplies remained steady due to the indispensable nature of medical products and the fact that the need for health care is immune

### Real GDP and Employment Growth Rates in Miscellaneous Manufacturing



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

from cyclical fluctuations in economic conditions. After straightening modestly in 2010, production in the miscellaneous segment remained tepid in subsequent years, leaving the industry's output in 2016 well below its pre-recession level. During that period, growing household debt and weak business confidence continued to restrain discretionary spending. This resulted into negative output growth from 2007 to 2016, with real GDP contracting at an average rate of 1.4% annually. In contrast, employment increased by 1.4% per year, with most of the gains occurring in 2015 and 2016 as a result of stronger exports, spurred by the lower value of the Canadian dollar. Negative growth in productivity primarily reflects softer capital spending in the industry over the past decade and the fact that a large number of firms are highly labour intensive.

Over the projection period, renewed growth in the industry's output is expected to be primarily driven by growing demand for medical products and stronger exports. The relatively low value of the Canadian dollar should help the industry to stay competitive on export markets, particularly in the United States. It is also expected to encourage domestic sales by increasing import prices and to remain competitive relative to low cost countries, particularly China which accounts for the largest share of Canadian imports of recreational and leisure products. Medical equipment is projected to be a major contributor to output growth as population aging is expected to lead to stronger demand for health care. Canadian firms have unique expertise in developing and producing the latest health-related equipment and are well positioned to take advantage of growing market opportunities, particularly in developed countries planning to improve their health care infrastructure. On the negative side, the industry will be challenged by the fact that growth in consumer spending is projected to weaken progressively due to slower growth in disposable income (resulting from the gradual slowdown in overall employment growth in Canada and massive retirements of baby-boomers). High consumer debt levels and the gradual increase anticipated in interest rates are also expected to put pressures on household budgets, restraining discretionary spending on recreational and leisure products. Uncertainty about the renegotiations of the North American Free Trade Agreement (NAFTA) represents an additional risk to the industry's outlook, given the significant amount of exports to the United States. Nevertheless, real GDP growth is projected to return to positive territory over the period 2017-2026, averaging 1.7% annually. Renewed growth in production is expected to result in further, albeit slower, gains in employment, with job creation averaging 0.7 per year. The slower pace of growth in employment relative to the period 2007-2016 reflects a turnaround in productivity, as improved business conditions should lead to greater capital spending over the next ten years. The industry is expected to make increasing use of additive manufacturing, which refers to technologies that synthesise three-dimensional objects. Such technologies have the potential to be applied to a wide range of products, enhancing productivity in the industry.

### **Wholesale Trade (NAICS 4111-4191)**

This industry comprises establishments primarily engaged in wholesaling merchandise, and providing related logistic, marketing and support services. The wholesaling process is generally an intermediate step in the distribution of merchandise in large quantities to retailers, businesses and institutions. Machinery, equipment and supplies are the most important

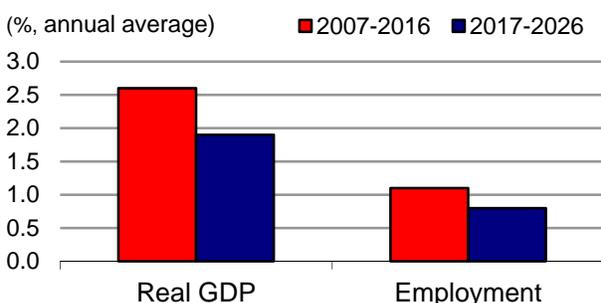
segment within the industry, accounting for 27% of production and 30% of employment in 2016. Other key segments include building material and supplies (16% of production and 15% of employment), personal and household goods (14%, 14%), food and beverages (11%, 15%), and motor vehicles and parts (8%, 7%). The industry employed 678,100 workers in 2016, mostly concentrated in Ontario (41%), Quebec (22%), British Columbia (13%) and Alberta (12%), with a workforce primarily composed of men (69%). Key occupations (4-digit NOC) include:

Sales and account representatives - wholesale trade (non-technical) (6411)  
 Technical sales specialists - wholesale trade (6221)  
 Retail and wholesale trade managers (0621)  
 Material handlers (7452)  
 Transport truck drivers (7511)  
 Shippers and receivers (1521)

Supervisors, supply chain, tracking and scheduling co-ordination occupations (1215)  
 Heavy-duty equipment mechanics (7312)  
 Accounting and related clerks (1431)  
 Retail and wholesale buyers (6222)  
 Store shelf stockers, clerks and order fillers (6622)  
 Purchasing and inventory control workers (1524)  
 Storekeepers and partspersons (1522)

Wholesale trade primarily relies on household consumption and business investment, making the industry highly sensitive to fluctuations in domestic and foreign economic conditions. As a result, the industry's output was severely affected by the recession of 2008-2009 due to anaemic growth in consumer spending in Canada and a sizeable drop in business investment, particularly in non-residential structures and machinery and equipment. The decline in exports is an additional factor that contributed to the contraction in output, since many wholesalers are involved in international trade. While the negative impact of the recession was more severe than in any other services industries, wholesalers' deep integration in supply chains across multiple sectors of the economy also augmented the industry's recovery from the recession. Indeed, after falling markedly in 2009, real GDP quickly recovered in 2010 and continued to grow at a solid pace during the following six years, largely exceeding the rate of growth in the overall economy. Employment, however, remained relatively stable until 2013, before increasing substantially from 2014 to 2016, likely reflecting higher labour demand in response to stronger exports of merchandises spurred by a weaker Canadian dollar. On average, real GDP in the industry grew at an annual rate of 2.6% over the period 2007-2016, compared to 1.1% for employment. This means that a significant share of growth in output was achieved through productivity gains as new technologies, such as radio frequency identification devices, have allowed wholesalers to track their inventory more accurately with fewer workers. Increased competition from e-commerce have also helped consumers compare prices across wholesalers, putting downward pressures on profit margins and keeping hiring subdued.

### Real GDP and Employment Growth Rates in Wholesale Trade



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, growth in the industry's output is expected to weaken relative to the period 2007-2016, reflecting the slower pace of growth anticipated in consumer spending and

residential investment. More specifically, the gradual slowdown projected in overall employment growth in Canada and massive retirements of baby-boomers from the labour market are expected to restrain growth in disposable income, while the decline anticipated in household formation is expected to lower investment in new housing. High household debt levels and the gradual increase anticipated in interest and mortgage rates are also expected to constrain growth in consumer spending and residential investment. On the positive side, the industry is expected to benefit from renewed growth in business investment related to machinery and equipment and faster growth in renovation spending and non-residential investment (which includes the construction of commercial, industrial and institutional buildings and the construction of heavy and civil engineering structures). Those factors are expected to stimulate purchases of machinery and equipment and building materials and supplies, which account for the largest segments of the industry. The persistent weakness anticipated in the value of the Canadian dollar is expected to have a mixed impact for wholesalers, increasing price competitiveness for exporters but lowering price competitiveness for importers. Uncertainty with regards to the renegotiations of the North American Free Trade Agreement (NAFTA) may also be challenging for wholesalers involved in international transactions of merchandises. On average, real GDP in the industry is expected to increase by 1.9% annually over the period 2017-2026, compared to 0.8% for employment. Productivity-enhancing technologies related to inventory management and other logistical services are expected to continue to restrain employment growth in the industry. Increased competition from e-commerce, on-demand production and other direct-to-customer operations by manufacturers that bypass intermediates will also have many implications for supply chains and for storage, forcing wholesalers to restructure their operations and lower labour costs.

### **Retail Trade (NAICS 4411-4543)**

This industry comprises establishments primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The retailing process is the final step in the distribution of merchandise in small quantities to the general public. Food and beverage stores are the most important segment within the industry, accounting for 18% of production and 24% of employment in 2016. Other key segments include motor vehicle and parts dealers (17% of production and 12% of employment), general merchandise stores (11%, 12%), health and personal care stores (11%, 10%), and clothing stores (10%, 10%). With a total of 2.1 million workers in 2016, it was the largest employer across the economy. The workforce is characterized by a strong concentration of young (29% of workers are aged between 15 and 24) and part-time workers (34%). Employment is distributed proportionately to population: 37% in Ontario, 24% in Quebec, 14% in British Columbia, 12% in Alberta and 14% in the remaining provinces, with women accounting for a slight majority of the workforce (54%). Key occupations (4-digit NOC) include:

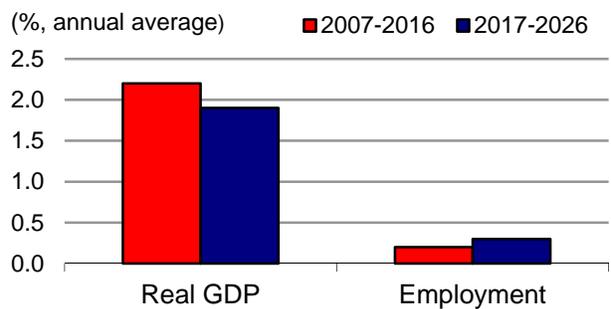
Retail salespersons (6421)	Delivery and courier service drivers (7514)
Cashiers (6611)	Bakers (6332)
Retail and wholesale trade managers (0621)	Retail and wholesale buyers (6222)
Retail sales supervisors (6211)	Service station attendants (6621)
Store shelf stockers, clerks and order fillers (6622)	Supervisors, supply chain, tracking and scheduling co-ordination occupations (1215)
Butchers, meat cutters and fishmongers - retail	

and wholesale (6331)  
 Other medical technologists and technicians (except dental health) (3219)  
 Automotive service technicians, truck and bus mechanics and mechanical repairers (7321)  
 Material handlers (7452)  
 Pharmacists (3131)  
 Shippers and receivers (NOC 1521)  
 Other customer and information services representatives (6552)  
 Food counter attendants, kitchen helpers and related support occupations (6711)  
 Other sales related occupations (6623)

Accounting and related clerks (1431)  
 Specialized cleaners (6732)  
 Transport truck drivers (7511)  
 Purchasing and inventory control workers (1524)  
 Opticians (3231)  
 Other automotive mechanical installers and servicers (7535)  
 Storekeepers and partspersons (1522)  
 Other repairers and servicers (7445)  
 Motorcycle, all-terrain vehicle and other related mechanics (7334)  
 Photographic and film processors (9474)  
 Jewellers, jewellery and watch repairers (6344)

Retail trade is closely linked to wholesale trade and is essentially driven by consumer spending in Canada. While the industry is mostly oriented toward the domestic market, the advent of e-commerce has increased the global trade of merchandises, making Canadian retailers more exposed to foreign competition, but also creating new market opportunities outside the country. The industry was negatively affected by the recession of 2008-2009, primarily reflecting anemic growth in consumer spending as a result of the substantial deterioration in domestic economic conditions. After declining in 2009, production and employment quickly recovered in 2010, and output continued to grow at a healthy pace during the following six years, driven by renewed consumer confidence, improving labour market conditions, solid growth in disposable income, and low interest rates. Employment, however, remained sluggish, with the exception of a temporary jump in 2013-2014 that was fully reversed in subsequent years. On average, real GDP in the industry grew at an annual rate of 2.2% over the period 2007-2016, compared to a weak 0.2% for employment. This means that growth in output was almost entirely achieved through productivity gains as new technologies, such as radio frequency identification devices, scheduling software and self-serve kiosks have replaced many of the tracking, shipping and storage tasks traditionally performed by workers. The high degree of competition in the industry has also forced many firms to close stores and reduced headcount to contain labour costs. Many previously well-established retail chains ceased operations, while several foreign-owned chains have expanded throughout Canada.

**Real GDP and Employment Growth Rates in Retail Trade**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in retail trade is projected to weaken somewhat relative to the period 2007-2016, primarily reflecting the adverse impact of demographic changes on consumer spending. Indeed, slower growth in the working-age population is expected to constrain overall employment growth in the longer term, while the aging of the population will result in massive retirements of baby-boomers from the labour market. These two factors are expected to constrain the pace of growth in disposable income and consumer spending, including spending on durable, semi-durable and non-durable goods sold by retailers.

Older households also tend to consume more services and slightly fewer goods, reducing the share of goods in total consumer spending as a result of population aging. High household debt levels and the gradual increase anticipated in interest rates are additional factors expected to lower the pace of growth in consumer spending by reducing, for example, the affordability to purchase big-ticket items such as cars and household appliances. On the positive side, higher import prices resulting from a lower currency should encourage Canadians, especially those close to the U.S. border, to shop in Canada, supporting revenues in domestic retail stores. Changes in shopping patterns will continue to influence the outlook for retailers. As e-commerce expands, Canadian retailers are expected to face a surge in competition from global suppliers, but they are also expected to take advantage of new opportunities to expand their markets outside the country. And those firms that sell goods abroad will be in a favourable position as the value of the Canadian dollar is expected to remain weak throughout the projection horizon. On average, real GDP in the industry is projected to increase by 1.9% annually over the period 2017-2026, compared to a weak 0.3% for employment. Again, productivity is expected to account for most of the growth in output as the shift to online shopping will continue to increase competition and reduce profit margins, forcing retailers to lower labour costs and embrace new productivity-enhancing technologies. Hiring is expected to be especially weak at clothing and department stores, which make up a significant portion of the retail industry.

### **Truck and Ground Passenger Transportation Services (NAICS 4841-4842; 4851-4859)**

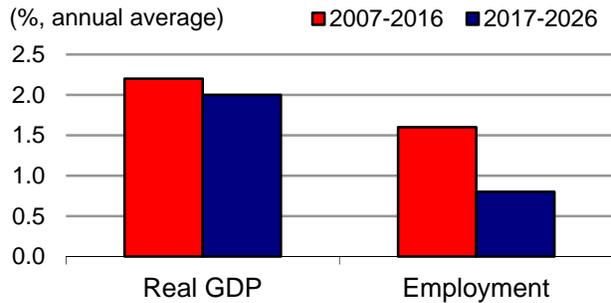
This industry comprises establishments primarily engaged in the truck transportation of merchandises and in a variety of transit and ground passenger transportation activities (such as urban transit systems, interurban and rural bus transportation, taxi and limousine services). Truck transportation is the largest of the two segments, accounting for 80% of production and 63% of employment in 2016. In comparison, transit and ground passenger transportation accounted for only 20% of production but 37% of employment, making this segment the most labour intensive. Overall, the industry employed 473,300 workers in 2016, mostly concentrated in Ontario (38%), Quebec (22%), Alberta (14%) and British Columbia (13%). The workforce is primarily composed of men (82%) and characterized by a significant proportion of self-employed, particularly in truck transportation (32%). Key occupations (4-digit NOC) include:

Transport truck drivers (7511)	Material handlers (7452)
Bus drivers, subway operators and other transit operators (7512)	Managers in transportation (0731)
Taxi and limousine drivers and chauffeurs (7513)	Dispatchers (1525)
Supervisors, motor transport and other ground transit operators (7305)	Railway and motor transport labourers (7622)
Automotive service technicians, truck and bus mechanics and mechanical repairers (7321)	Transportation route and crew schedulers (1526)
	Ground and water transport ticket agents, cargo service representatives and related clerks (6524)

The industry closely tracks the performance of the domestic economy, as roughly three quarters of revenues in truck transportation are domestic freight, with the largest users being the retail and wholesale trade industries and the goods-producing industries (agriculture, resources, manufacturing and construction). Transit and ground passenger transportation is also strongly influenced by the degree of urbanization and the associated demand for public transit systems

across major cities in Canada. After being negatively affected by the recession of 2008-2009, production and employment in the industry increased at a solid pace between 2010 and 2016, driven by the improvement in domestic economic conditions and increased activity in public transit systems, largely resulting from the expansion of the SkyTrain in Vancouver, the subway in Montreal and the C-Train network in Calgary. On average, real GDP and employment increased at annual rates of 2.2% and 1.5% respectively over the period 2007-2016, outperforming the overall economy in terms of output growth and job creation. Employment growth was particularly strong in the transit and ground passenger transportation segment, averaging 2.9% annually.

### Real GDP and Employment Growth Rates in Truck and Ground Passenger Transportation



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, the industry's output is projected to keep increasing at a solid pace, supported by healthy growth in retail and wholesale trade activities. However, the weaker pace of growth anticipated in final domestic demand is expected to lower output growth marginally relative to the period 2007-2016, particularly in truck transportation. This factor is expected to be partly offset by stronger increases in exports, spurred by a vigorous U.S. economy and the relatively low value of the Canadian dollar. This will help supporting demand for the transportation of merchandises across the border. With the collapse of crude oil prices in 2014, fuel costs are projected to remain low over the short- to medium-term, resulting in lower prices and/or higher profits in the industry. Furthermore, the industry will continue to benefit from the gradual displacement of the Canadian population toward urban centers over the coming years, increasing the need to ease road congestion with more public transit services. A desire to decrease emissions and pollution is also expected to entice more commuters to use environmentally-friendly public transit systems. This demand should be met in part by major commuter-rail projects under construction in Edmonton, Toronto and Ottawa. On average, real GDP in the industry is projected to increase by 2.0% annually over the period 2017-2026, compared to 0.8% for employment. Job creation is expected to be constrained by labour shortages for truck drivers and productivity-enhancing technologies. While driverless vehicles are already in use in controlled environments like ports, mines and even Alberta's oil sands, it is unlikely that driverless freight trucks will appear on the roads over the next five years. Over the next decade, however, driverless trucks and cars are a real possibility. Until then, truck drivers are expected to face significant labour shortages, especially those involved in long-haul operations who are particularly difficult to attract (specific requirements in terms of driver licenses and driving skills, lengthy periods of time being away from home, etc.). On the other hand, non-traditional driving services like Uber should continue to affect traditional taxi services, decreasing prices for consumers and lowering demand for taxi drivers.

## Air, Rail, Water and Pipeline Transportation Services (NAICS 4811-4812; 4821; 4831-4832; 4861-4869; 4871-4879; 4881-4889)

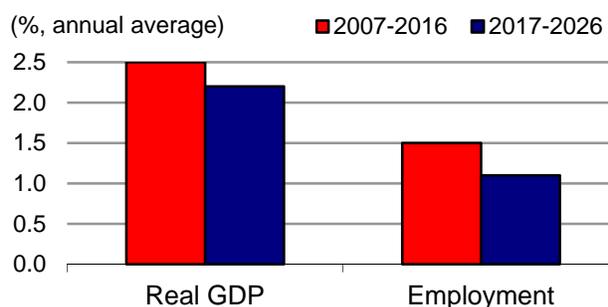
This industry comprises establishments primarily engaged in transporting passengers and merchandises by air, rail and water. It also includes establishments transporting goods by pipeline (such as crude oil, natural gas and refined petroleum), those providing recreational transportation services (such as sightseeing or dinner cruises and steam train excursions), as well as those providing support services to various transportation establishments (specific to a mode of transportation or multi-modal). Support services are the largest of the six segments, accounting for 38% of production and 47% of employment in 2016. Other major segments include: air transportation (24% of production and 29% of employment); rail transportation (18%, 12%); and pipeline transportation (16%, 6%). Overall, the industry employed 251,600 workers in 2016, mostly concentrated in Ontario (26%), Quebec (23%), British Columbia (22%) and Alberta (15%), with a workforce primarily composed of men (71%). Key occupations (4-digit NOC) include:

Air pilots, flight engineers, flying instructors (2271)  
 Transport truck drivers (7511)  
 Airline ticket and service agents (6523)  
 Purser and flight attendants (6522)  
 Aircraft mechanics and aircraft inspectors (7315)  
 Public works maintenance equipment operators and related workers (7522)  
 Managers in transportation (0731)  
 Supervisors, supply chain, tracking and scheduling co-ordination occupations (1215)  
 Railway and yard locomotive engineers (7361)  
 Air transport ramp attendants (7534)  
 Deck officers, water transport (2273)  
 Customs, ship and other brokers (1315)  
 Longshore workers (7451)  
 Air traffic controllers and related occupations (2272)

Railway yard and track maintenance workers (7531)  
 Railway conductors and brakemen/women (7362)  
 Water transport deck and engine room crew (7532)  
 Supervisors, railway transport operations (7304)  
 Railway carmen/women (7314)  
 Boat and cable ferry operators and related occupations (7533)  
 Ground and water transport ticket agents, cargo service representatives and related clerks (6524)  
 Railway and motor transport labourers (7622)  
 Railway traffic controllers and marine traffic regulators (2275)  
 Engineer officers, water transport (2274)

The industry relies heavily on domestic and foreign demand for travel as well as on transportation and international trade of merchandises. After being negatively affected by the recession of 2008-2009, output in the industry increased at a solid pace between 2010 and 2016, driven by the recovery in domestic and global economic conditions, which resulted in increased discretionary spending on travel and tourism activities and renewed growth in international trade. Growth in output was particularly strong in the past three years as the industry benefited from the sharp drop in crude oil prices in 2014, which resulted in lower fuel costs and a weaker Canadian dollar. More precisely, lower fuel costs have allowed airlines to reduce fare prices, stimulating demand for their services, while a weaker

**Real GDP and Employment Growth Rates in Air, Rail, Water and Pipeline Transportation Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

currency has attracted a record number of international travelers flying to Canada and encouraged more Canadians to choose vacation within the country and use routes exclusively served by domestic airlines. A weaker currency has also contributed to increase Canadian exports, supporting demand for the transportation of goods by rail, boat or pipeline. On average, real GDP and employment in the industry increased at annual rates of 2.5% and 1.5% respectively over the period 2007-2016, outperforming the overall economy in terms of output growth and job creation, primarily driven by the solid performance of the air transportation and support services segments.

Broad economic conditions remain positive for the industry, particularly in the first half of the projection period. Low fuel prices, a favourable currency situation, and robust labour markets in the United States and Canada have pushed demand for air travel to record levels in recent years and this situation is expected to persist over the short- to medium-term. By adding capacity on domestic and international markets, Canadian airlines are well positioned to capture as much of this trend as possible. Demand for air travel is rising in line with higher incomes in emerging markets, particularly in Asia, while the growing interconnectedness of the global economy is expected to stimulate business travel between Canada and the rest of the world. The faster pace of growth projected in exports (spurred by stronger foreign demand, a weak Canadian dollar and incoming trade deals such as the Comprehensive Economic Trade Agreement with the European Union) is also expected to increase business travel and the transportation of merchandises by rail or boat. The construction of several large pipelines across Canada is an additional factor expected to support output growth in the industry. Over the longer term, however, growth is expected to slow gradually, as the tailwinds that have propelled the industry to new heights will begin to soften. Most of the readjustment of travel patterns to the lower currency will be realized and although the increases in oil prices are projected to be modest, they will put upward pressures on fares and downward pressures on demand. High consumer debt levels and the gradual increase anticipated in interest rates are also expected to put pressures on household budgets, restraining discretionary spending on travel and tourism activities, while the threat of higher protectionism in the global economic system, including the United States, could curtail trade and business travel between countries. The resulting pace of growth in the industry's real GDP is projected to average 2.2% annually over the period 2017-2026, a slight slowdown relative to the previous decade. Employment growth is also projected to weaken, averaging 1.1% per year. Increased competition for incumbent airline companies has arrived in the form of Canada Jetlines and Newleaf, which is expected to lower prices and decrease profits. The growing number of competitors on the domestic and international markets will inevitably force the industry to increase efficiency and productivity at the expense of employment.

### **Postal, Courier, Warehousing and Storage Services (NAICS 4911, 4921-4922, 4931)**

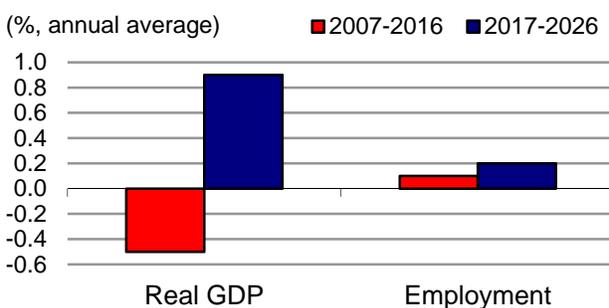
This industry comprises establishments primarily engaged in operating postal services; providing courier and delivery services; and operating general merchandise, refrigerated and other warehousing and storage facilities. Courier and delivery services are the most important of the three segments, accounting for 43% of production and 34% of employment in 2016,

compared to 29% and 36% respectively for postal services. Warehousing and storage accounted for the remaining share of production (28%) and employment (30%). Overall, the industry employed 182,400 workers in 2016, mostly concentrated in Ontario (38%), Quebec (22%), Alberta (14%) and British Columbia (13%), with a workforce primarily composed of men (70%). Key occupations (4-digit NOC) include:

Letter carriers (1512)	Supervisors, mail and message distribution occupations (NOC 1214)
Delivery and courier service drivers (7514)	Supervisors, supply chain, tracking and scheduling co-ordination occupations (1215)
Material handlers (7452)	Postal and courier services managers (0132)
Mail, postal and related workers (1511)	
Shippers and receivers (1521)	
Couriers, messengers, door-to-door distributors (1513)	

Output in the industry has been on a downward trend for most of the last decade, primarily due to the growing use of e-mail, electronic billing, online advertising, and direct deposit services by households, businesses and governments, which have displaced large portions of the letter mail market. As a result, output in postal services declined continuously from 2009 to 2016 (postal services are mostly provided by Post Canada). In contrast, output in the other two segments of the industry expanded modestly in the past four years, largely supported by stronger demand for parcel delivery and warehousing services resulting from the growing adoption of e-commerce by households and businesses. However, production gains in courier and delivery services and warehousing and storage services were not strong enough to reverse the significant declines recorded in postal services, leading to negative output growth and anemic employment growth in the industry over the period 2007-2016. On average, real GDP decreased by 0.5% annually, compared to a marginal increase of 0.1% for employment. Positive growth in employment reflects the fact that parcel delivery is more labour intensive than letter mail delivery and has become an increasing part of the industry's operations.

**Real GDP and Employment Growth Rates in Postal, Courier, Warehousing, Storage Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, renewed growth in the industry's output is expected to be primarily driven by the increased popularity and further adoption of e-commerce. The pace of growth in real GDP, however, is projected to be relatively modest and significantly below the rate of growth projected for the overall economy. Because e-commerce is largely driven by consumer spending, the weaker pace of growth anticipated in disposable income (resulting from the gradual slowdown in overall employment growth in Canada and massive retirements of baby-boomers) is expected to restrain growth opportunities in the industry, particularly in the longer term. Nevertheless, as the amount of letter mail continues to decline, postal and courier services firms will face increasing pressures to make parcel delivery their key business line, although those firms will also face threats from large e-commerce companies developing their own parcel delivery capabilities. While direct marketing (such as promotional brochures and

catalog distribution) is often perceived as another business line with potential to grow, it is most likely that direct marketing will simply not be able to compete with online marketing over the long-term. Indeed, online marketing is more environmentally friendly and enables businesses to better personalize offers to customers by building a profile of their purchasing history and preferences. On average, real GDP in the industry is projected to increase by 0.9% annually over the period 2017-2026. Despite renewed growth in output, employment growth is projected to remain weak, averaging 0.2% per year. Labour costs pose the greatest constraint to job creation and to the competitive sustainability of the industry. For example, in 2016, labour costs and employee benefits accounted for over 70% of Canada Post's costs of operations, making productivity the only way to increase competitiveness and output. Productivity is projected to pick up over the coming decade, more particularly in the second half of the projection period as 16,000 employees at Canada Post are expected to retire in the next five years, representing an opportunity for the organization to lower its labour costs and restructure its operations.

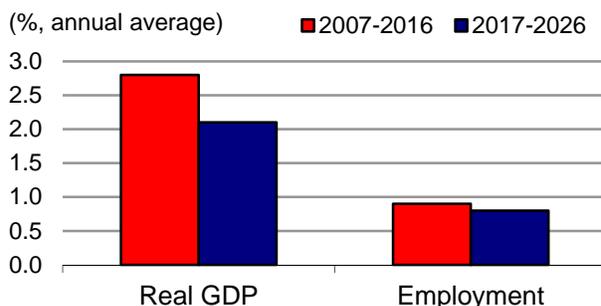
### **Finance, Insurance, Real Estate and Leasing Services (NAICS 5211-5269; 5311-5331)**

This industry comprises establishments primarily engaged in financial transactions or in facilitating financial transactions (such as banks, insurance carriers and brokerage agencies) and establishments primarily engaged in selling and buying real estate for others or renting and leasing various tangible or intangible assets. Real estate and leasing services are the most important segments in terms of production, accounting for 60% of the industry's real GDP in 2016, while finance and insurance are the most important segments in terms of employment, accounting for 71% of all workers. More precisely, the industry employed 1.1 million workers in 2016, with 49% in finance and banking, 22% in insurance, 24% in real estate and 5% in leasing. Employment is largely concentrated in Ontario (49%), Quebec (19%) and British Columbia (12%), with women accounting for a slight majority of the workforce (54%). The real estate segment is also characterized by a high proportion of self-employed (43%). Key occupations (4-digit NOC) include:

Other financial officers (1114)	Securities agents, investment dealers and brokers (1113)
Real estate agents and salespersons (6232)	Computer programmers and interactive media developers (2174)
Customer services representatives - financial institutions (6551)	Insurance underwriters (1313)
Insurance agents and brokers (6231)	User support technicians (2282)
Banking, credit and other investment managers (0122)	Computer and information systems managers (0213)
Financial sales representatives (6235)	Assessors, valuers and appraisers (1314)
Financial and investment analysts (1112)	Data entry clerks (1422)
Accommodation service managers (0632)	Financial managers (0111)
Insurance adjusters and claims examiners (1312)	Database analysts and data administrators (2172)
Property administrators (1224)	Business development officers and marketing researchers and consultants (4163)
Banking, insurance and other financial clerks (1434)	Computer network technicians (2281)
Insurance, real estate and financial brokerage managers (0121)	Economists and economic policy researchers and analysts (4162)
Financial auditors and accountants (1111)	Software engineers and designers (2173)
Information systems analysts and consultants (2171)	Collectors (1435)
Supervisors, finance and insurance office workers (1212)	Mathematicians, statisticians and actuaries (2161)

Although firms in the finance and insurance segments participate in international markets, the industry as a whole is heavily reliant on the performance of the domestic economy, given the importance of the real estate segment in terms of output. Overall, the industry is particularly sensitive to consumer spending and business investment, including residential and non-residential investment. Output and employment in the industry increased continuously from 2007 to 2016, even during the recession of 2008-2009, reflecting the fact that banking, insurance and other financial services are often essential services needed by both households and businesses regardless of the fluctuations in economic conditions. The substantial rebound recorded in equity markets following the financial crisis has given a boost to the finance and banking segment, while mortgage rates at all-time lows have stimulated growth in the real estate segment, with buyers purchasing homes at record prices because of low financing costs. The resulting pace of growth in the industry's real GDP was among the strongest across the economy, averaging 2.8% annually over the period 2007-2016. Employment growth, however, was significantly lower, averaging 0.9% per year. This situation reflects productivity improvements attributable to the growing use of online technologies in financial, banking and real estate services, allowing the industry to increase output with modest growth in employment.

### Real GDP and Employment Growth Rates in Finance, Insurance, Real Estate and Leasing



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, output growth in the industry is projected to soften and be more in line with the overall economic activity. This reflects slower growth in final domestic demand, particularly in residential investment and consumer spending, which is expected to restrain demand for real estate services and for mortgage and non-mortgage loans. Indeed, rising mortgage rates, inflated house prices and the gradual decline anticipated in household formation are expected to lower demand for new housing as soon as 2018, leaving renovation spending as the only source of growth in residential investment over the next ten years. Changes to mortgage regulations, such as homebuyer stress testing, and new policy measures, such as the implementation of a foreign buyer's tax in Vancouver and Toronto to refrain housing speculation, are also expected to affect demand for new mortgages. These developments on the residential side will not only affect real estate and lending services, but also property insurance services. Moreover, rising interest rates, high household debt levels and weaker growth anticipated in disposable income (resulting from the gradual slowdown in overall employment growth in Canada and massive retirements of baby-boomers) are expected to restrain the pace of growth in consumer spending, particularly for the purchases of big-ticket items such as cars and household appliances. On the positive side, renewed growth in business investment related to machinery and equipment and faster growth in non-residential investment (which includes the construction of commercial, industrial and institutional buildings and the construction of heavy and civil engineering structures) may result in higher demand for business lending. The growing middle class in emerging markets also represents growth opportunities for

the insurance segment, as many markets remain underserved. Higher demand for privacy and security insurance in response to the rise of cyber attacks in a world of increased digitization is an additional factor expected to stimulate growth in the insurance segment. On average, real GDP in the industry is projected to increase by 2.1% annually over the period 2017-2026, a notable slowdown relative to the previous decade. In comparison, employment growth is projected to remain essentially unchanged, averaging 0.8% per year. Again, most of the growth in output is expected to be fuelled by productivity gains resulting from technological innovations. The increased prevalence of automation and online services in real estate, banking, insurance, and even investment services will continue to improve efficiency in the industry. However, productivity growth may not always come at the expense of employment growth. It is mostly the composition of jobs within the industry that is expected to change over the coming years. For example, the automation of repetitive tasks should reduce demand for less skilled workers such as bank tellers and customer service representatives. Demand for financial advisors could also be impacted, as new digital tools and platforms are automating a growing number of activities traditionally performed by portfolio management firms. In order to leverage the potential from the latest digital technologies, firms in the industry are expected to hire thousands of individuals with specialized skills in information technology (IT), such as software engineers, data scientists and cyber security experts, which could more than compensate for the jobs that may be displaced. Fintech, insurtech and blockchain transactions are among the few technologies that are expected to disrupt finance, banking and insurance services, by opening doors to new IT start-ups and increased competition from firms in the computer services industry, forcing traditional incumbent firms to modify their business models.

### **Legal, Accounting, Consulting and Other Professional Services (NAICS 5411; 5412; 5416; 5418; 5419)**

This industry comprises establishments that provide highly specialized business services. It is composed of five segments: legal services (27% of production and 24% of employment in 2016); accounting, tax preparation, bookkeeping and payroll services (25% of production and 28% of employment); management, scientific and technical consulting (26% and 21%); advertising and public relations (9% and 13%); and other professional, scientific and technical services such as photographic, translation and veterinary services (12% and 14%). Overall, the industry employed 651,400 workers in 2016, mostly concentrated in Ontario (43%), Quebec (21%), British Columbia (14%) and Alberta (13%). The workforce is characterized by a majority of women (59%), a high level of education, and a large proportion of self-employed (37%). Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

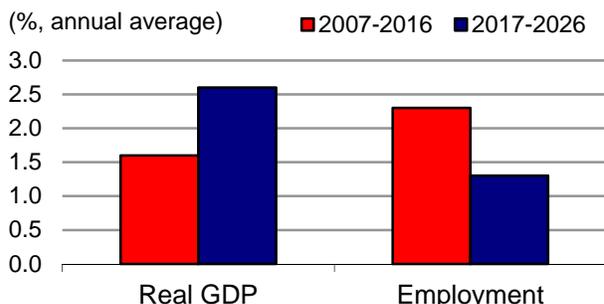
Financial auditors and accountants (1111)	Translators, terminologists, interpreters (5121)
Lawyers and Quebec notaries (4112)	Natural and applied science policy researchers, consultants and program officers (4161)
Professional occupations in business management consulting (1122)	Veterinarians (3114)
Accounting technicians and bookkeepers (1311)	Other business services managers (0125)
Legal administrative assistants (1242)	Graphic designers and illustrators (5241)
Paralegal and related occupations (4211)	Advertising, marketing and public relations managers (0124)
Professional occupations in advertising, marketing and public relations (1123)	Financial managers (0111)

Photographers (5221)  
 Animal health technologists and veterinary technicians (NOC 3213)  
 Business development officers and marketing researchers and consultants (4163)

Mathematicians, statisticians and actuaries (2161)  
 Agricultural representatives, consultants and specialists (2123)  
 Sheriffs and bailiffs (4421)  
 Forestry professionals (2122)

The industry strongly relies on the performance of the domestic economy and is largely driven by business activities and government expenditures. Corporate profitability is also a key driver of the industry as higher profits mean more discretionary income to spend on legal, consulting and advertising services, often perceived as non-essential activities. Although the industry is mostly oriented toward the domestic market, it is also sensitive to foreign economic conditions since the clientele comes from various businesses, some of which are heavily reliant on foreign demand. With the exception of accounting services that are less sensitive to cyclical fluctuations in economic conditions, the other segments of the industry were severely affected by the recession of 2008-2009, as a result of the sharp decline in corporate profits which fell by 47% in 2009 only. It took three years for the industry's output to fully recover from its pre-recession level, before increasing at a much faster pace from 2013 to 2016. The recent strengthening in output reflects solid demand for legal, accounting, consulting and advertising services, largely driven by the growing number of businesses that chose to outsource internal operations, by the record number of mergers and acquisitions which reached a nine-year high in 2016, and by double-digit growth in digital advertising spending. The convergence of international accounting standards and the growing international footprint of Canadian financial institutions have also supported growth in exports of accounting services, while a weaker Canadian dollar has allowed domestic consultants and advertisers to be more competitive on foreign markets. On average, the industry's real GDP increased by 1.6% annually over the period 2007-2016, with most of the growth occurring in the past four years. In comparison, employment increased continuously over the last decade, with the exception of a temporary drop in 2012 that was fully reversed in subsequent years. The resulting pace of growth in employment averaged 2.3% per year from 2007 to 2016. Negative growth in productivity primarily reflects weak capital investment from the industry over the past decade and the fact that a large number of tasks are highly labour intensive.

**Real GDP and Employment Growth Rates in Legal, Accounting, Consulting Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in the industry is expected to accelerate significantly relative to the period 2007-2016, primarily driven by stronger business activities and renewed growth in corporate profits. The industry will continue to benefit from the growing trend in business-to-business outsourcing in order to increase operation efficiency, particularly from manufacturing firms which are more likely to be exposed to fierce competition from low cost countries. Under that context, the straightening anticipated in Canadian manufacturing activity and additional growth in other sectors of the economy represent greater opportunities for the industry. Demand for legal and accounting services is expected to be stimulated by the rising

complexity of corporate regulations and auditing practices, the growing number of mergers and acquisitions resulting from globalization, and the increased frequency of cyber attacks and fraudulent activities. Consulting firms are also becoming increasingly prevalent in fields such as human resources management, environmental solutions and technology implementation. They are expected to benefit from the end of austerity measures by the provincial governments in Ontario and Quebec as well as increased spending from the federal government, including consulting work required during a variety of infrastructure projects. Demand for advertising services is expected to be stimulated by the use of big data in better understanding consumer behaviour, further developments in new advertising streams enhanced by mobile and video technologies, and the growing area of social media strategies. There is also some potential to increase exports of professional services as demand for Canadian expertise is growing rapidly. While the relatively low value of the Canadian dollar is expected to improve price-competitiveness, particularly with the United States, the mutual recognition of professional qualifications under the Comprehensive Economic and Trade Agreement (CETA) is expected to enable professional service providers to bid on service contracts within the European market. On the negative side, many firms are exposed to risks involving revenue volatility and client retention, as the loyalty of clients is often tied to particular employees. On average, the industry's real GDP is projected to increase by 2.6% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. In contrast, employment growth is expected to slow significantly, averaging 1.3% per year due to a major turnaround in productivity. Renewed growth in productivity reflects rapid advancements anticipated in cognitive technologies. Indeed, routine cognitive tasks are being increasingly automated and performed by technology, while non-routine cognitive tasks are being increasingly complemented and enhanced by technology. For example, tasks related to data entry, tax preparation, legal research and translation can be increasingly performed by online applications and specialized software, while artificial intelligence and machine learning can complement high-skill jobs related to professional and consulting services.

### **Computer Systems Design and Related Services (NAICS 5415)**

This industry comprises establishments primarily engaged in providing information technologies expertise (such as writing, modifying, testing and supporting software, including the creation of Internet home pages); planning and designing computer systems that integrate hardware, software and communication technologies; providing on-site management and operation of clients' computer and data processing facilities. It excludes the development and retailing of computer hardware and packaged software. The industry employed 346,100 workers in 2016, mostly concentrated in Ontario (47%), Quebec (25%), British Columbia (13%) and Alberta (10%). The workforce is primarily composed of men (76%) and characterized by a high level of education and a significant proportion of self-employed (27%). Key occupations (4-digit NOC) include:

Information systems analysts and consultants (2171)	Web designers and developers (2175)
Computer programmers and interactive media developers (2174)	Computer network technicians (2281)
Computer and information system managers (0213)	Computer engineers (2147)
	Database analysts and data administrators (2172)

Software engineers and designers (2173)  
User support technicians (2282)

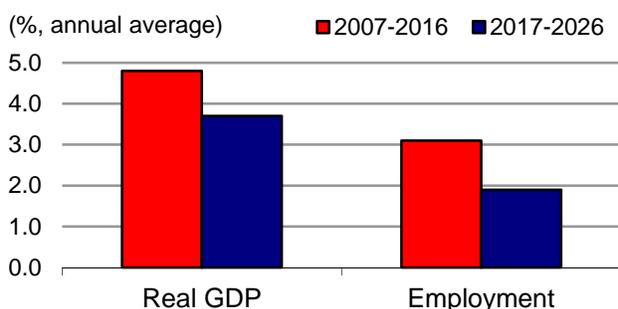
Information systems testing technicians (2283)

The industry strongly relies on business investment and government expenditures related to software and information and communication technologies (ICT) in Canada. It is also characterized by a relatively high degree of exposure to trade for a service industry, with about 20% of its revenues coming from exports, mainly to the United States, making it sensitive to the investment environment south of the border. Driven by the rapid pace of computer technology adoption from the private and public sectors

and the constant need to upgrade their ICT infrastructure, output in this industry grew continuously since the early 1990s, even during the global recession of 2008-2009, albeit at a slower pace. Growth in production and employment was particularly strong in the past four to five years as rapid innovation has opened doors to new growth opportunities in the industry. Cloud computing, Internet of Things (IoT), big data and predictive analytics are now part of many Canadian businesses' daily operations. The increased complexity of ICT systems and the growing use of mobile devices fuelled robust demand for computer services. On average, real GDP and employment increased at annual rates of 4.8% and 3.1% respectively over the period 2007-2016, posting the strongest growth rate in output across the 42 industries covered by COPS, and the second strongest growth rate in employment behind health care services. Productivity growth was relatively modest, primarily reflecting the rise of smaller firms and start-ups in the industry and the fact that they do not benefit from the same economies of scale as larger companies.

Over the projection period, computer system design services should continue to outperform most industries in terms of production and employment growth. Demand is expected to be supported by solid investment in software and information and communication technologies (ICT), reflecting the need for businesses and governments to continually upgrade their ICT systems in order to keep up with the most recent technologies and remain competitive. Indeed, computer services benefit from the constant development of innovative computer and communication products that are designed and serviced by the industry. Cloud-based platforms, Internet of Things (IoT), big data and open source software continue to gain in popularity, while new technologies in advanced manufacturing and autonomous transport, virtual and augmented reality, machine learning and artificial intelligence, fintech/insurtech and blockchain are creating a multitude of growth opportunities. Consumers and businesses own multiple electronic devices and are increasingly asking for compatibility, transferability and access to their content from any of those devices. The industry will also continue to benefit from the growing number of firms across the economy that choose to outsource IT work in order to remain focused on their core activities. In many areas, IT investment cannot be delayed, particularly in the area of cybersecurity where threats to private and public targets continue to emerge, warranting

### Real GDP and Employment Growth Rates in Computer Systems Design and Related Services



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario projections).

significant new investment by any organization that has information to safeguard. Simultaneously, the growing amount of data being made publicly available by all government levels through open data initiatives is expected to encourage the private sector to innovate and develop various applications to leverage this large pool of information, leading to the creation of new products and business models in the industry. Fintech, insurtech and blockchain technologies are also opening doors to new start-ups, representing niche opportunities within the industry to compete directly with the traditional financial, banking and insurance services. Increased competition will force the incumbent finance and insurance companies to modify their business models and upgrade their ICT infrastructure, resulting in additional demand for computer services. Finally, a positive outlook for exports, spurred by solid economic growth in the United States and improved price competitiveness due to a relatively low Canadian dollar, is expected to bring more business to Canadian computer services firms. That said, the industry also faces increased competition on the global market, particularly from developing countries which benefit from lower wages and capital costs than those in developed countries. Imports of computer services have surged in recent years, increasing by 10% annually since 2011. The resulting pace of growth in the industry's real GDP and employment is projected to average 3.7% and 1.9% per year respectively over the period 2017-2026. Although this represents a slowdown relative to the previous decade, output and employment in computer services are expected to post the second strongest growth rates across the 42 industries covered by COPS. Again, productivity growth is projected to be restrained by the rising number of small firms and start-ups and the fact that production in the industry is highly labour intensive.

### **Architectural, Engineering, Design and Scientific R&D Services (NAICS 5413; 5414; 5417)**

This industry comprises establishments that provide highly specialized business services in three different segments. Architectural, engineering and related services are by far the largest segment, accounting for 77% of production and 72% of employment in 2016. In comparison, specialized design services (which include interior, industrial and graphic design) accounted for only 5% of production but 18% of employment, versus 18% and 10% respectively for scientific research and development services. The industry employed 396,100 workers in 2016, mostly concentrated in Ontario (38%), Quebec (22%), Alberta (16%) and British Columbia (15%). The workforce is mainly composed of men (67%) and characterized by a high level of education and a significant proportion of self-employed (26%). Key occupations (4-digit NOC) include:

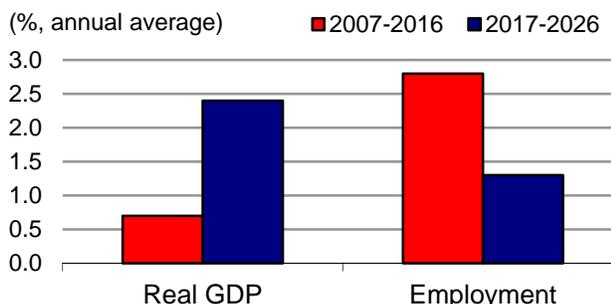
Graphic designers and illustrators (5241)	Architectural technologists and technicians (2251)
Civil engineers (2131)	Electrical and electronics engineering technologists and technicians (2241)
Other professional engineers, n.e.c. (2148)	Industrial engineering and manufacturing technologists and technicians (2233)
Interior designers and interior decorators (5242)	Chemists (2112)
Drafting technologists and technicians (2253)	Non-destructive testers and inspection technicians (2261)
Architects (2151)	Land surveyors (2154)
Mechanical engineers (2132)	Biological technologists and technicians (2221)
Electrical and electronics engineers (2133)	Geological and mineral technologists and technicians (2212)
Civil engineering technologists and technicians (2231)	Industrial designers (2252)
Engineering managers (0211)	
Construction inspectors (2264)	
Geoscientists and oceanographers (2113)	
Land survey technologists and technicians (2254)	

Architecture and science managers (0212)  
 Chemical technologists and technicians (2211)  
 Petroleum engineers (2145)  
 Biologists and related scientists (2121)  
 Theatre, exhibit and other creative designers (5243)  
 Mechanical eng. technologists and technicians (2232)

Chemical engineers (2134)  
 Geological engineers (2144)  
 Industrial and manufacturing engineers (2141)  
 Physicists and astronomers (2111)  
 Landscape architects (2152)

The industry strongly relies on the performance of the domestic economy and is largely driven by business investment and government expenditures, as well as R&D spending. More precisely, the architectural and engineering segment and the design segment are heavily tied to residential and non-residential investment and the resulting impact on construction activity. Demand for engineering services also relies on business investment into machinery and equipment (M&E). In comparison, the R&D segment is closely tied to R&D spending from the private and public sectors for the development of new innovative products and technologies. Spending on R&D activities is generally driven by profitability in the private sector and by government expenditures in the public sector. After being negatively affected by the deterioration of the economic conditions during the recession of 2008-2009, output in the industry quickly recovered and reached an historical peak in 2012. However, production fell back in the subsequent four years, returning to the level observed during the recession. This situation primarily reflects the fact that non-residential investment and construction activity were severely affected by major investment cutbacks in mining, oil and gas engineering structures due to the declining trend in metal and energy prices. Indeed, demand for engineering services started to ease in 2012 when metal prices began to weaken, and then fell markedly after crude oil prices plummeted in the second half of 2014. Negative growth in R&D spending and M&E investment over the past decade is an additional factor that contributed to restrain demand for R&D and engineering services. On average, real GDP in the industry increased by 0.7% annually during the period 2007-2016, with most of the growth occurring prior to 2013. In comparison, employment increased almost continuously over the past ten years, with growth averaging 2.8% annually, largely exceeding output growth. Despite significant declines in non-residential investment in recent years, growth in residential investment remained solid, supporting labour demand for architects, engineers and designers. Declining productivity reflects the fact that lower oil prices severely affected activity in the industry, lowering revenues and profitability, forcing many firms to reduce their capital expenditures, including investment in new technologies.

**Real GDP and Employment Growth Rates in Architectural, Engineering, Design, R&D Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in the industry is expected to accelerate markedly relative to the period 2007-2016, primarily driven by faster growth in non-residential investment and renewed growth in business investment related to machinery and equipment. More specifically, with the gradual recovery anticipated in metal and crude oil prices and positive announcements concerning pipeline projects, investment in mining, oil and gas engineering

structures are expected to pick up progressively, contributing to renewed growth in resources-related construction projects. The faster pace of growth projected in the construction of commercial, industrial and institutional buildings, along with major investments in public infrastructure from the federal government, are also expected to contribute to stronger growth in non-residential investment (see the construction industry for more details), increasing demand for architectural, engineering and design services. Furthermore, after holding back on investment in machinery and equipment (M&E) for years, Canadian businesses are expected to replace or upgrade their existing capital stock in response to the development of new productivity-enhancing technologies, the gradual recovery in resources-related investment, the upturn in manufacturing activity, and the anticipated slowdown in labour force growth (labour supply). Those factors are projected to result in a substantial rebound in M&E investment in Canada, boosting demand for engineering services. On the other hand, rising mortgage rates, stricter mortgage rules, inflated house prices, high consumer debt and slower household formation are expected to lower new housing investment as soon as 2018, restraining growth in residential investment and demand for architectural services. Population aging is expected, however, to lead to a shift in the composition of housing starts toward multiple-dwellings (apartments and condominiums), which require more engineering work than single-family units. There is also some potential to increase exports of engineering and architectural services as demand for Canadian expertise is growing rapidly. While the relatively low value of the Canadian dollar is expected to improve price-competitiveness, particularly with the United States, the mutual recognition of professional qualifications under the Comprehensive Economic and Trade Agreement (CETA) is expected to enable the industry to bid on service contracts within the European market. Finally, renewed growth in corporate profits is expected to result in renewed growth in R&D spending. On average, the industry's real GDP is projected to increase by 2.4% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. In contrast, employment growth is expected to slow significantly, averaging 1.3% per year due to a major turnaround in productivity. This situation reflects the need to improve productivity in response to growing difficulties in recruiting highly qualified workers and the need to improve cost-competitiveness in response to more open competition on the global market, particularly with the implementation of CETA. While engineering and construction firms have been slow to adopt new technologies, an increasing number of companies are using building information modeling (BIM) systems to automate much of the work of design and engineering. The most cutting-edge firms are using 3D printing to produce components for modular construction and drones to inspect sites and monitor progress.

### **Management, Administrative and Other Support Services (NAICS 5511; 5611-5619; 5621-5629)**

This industry is composed of three segments: management of companies and enterprises (including security holdings and head offices); administrative and support services (such as record keeping, employment placement, document preparation, call centres, collection agencies, travel arrangement, and security, janitorial and landscaping activities); and waste management and remediation services (such as the collection, treatment and disposal of waste material, soil remediation, waste water treatment, hazardous material removal). Administrative

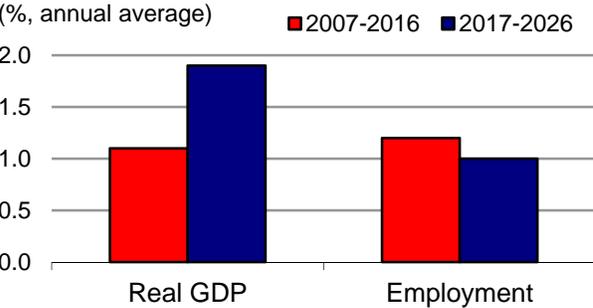
and support services are the largest and the most labour intensive of the three segments, accounting for 67% of production and 93% of employment in 2016. In comparison, management of companies and enterprises accounted for 22% of production and 6% of employment, versus 11% and 1% respectively for waste management and remediation services. The industry employed 766,400 workers in 2016, mostly concentrated in Ontario (43%), Quebec (24%), British Columbia (14%) and Alberta (10%). The workforce is characterized by a slight majority of men (56%) and a significant proportion of self-employed (25%) and part-time workers (25%). The industry is also characterized by much lower wages than the national average. Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

- Light duty cleaners (6731)
- Security guards and related security service occupations (6541)
- Landscaping and grounds maintenance labourers (8612)
- Janitors, caretakers and building superintendants (6733)
- Other customer and information services representatives (6552)
- Contractors and supervisors, landscaping, grounds maintenance and horticulture services (8255)
- Cleaning supervisors (6315)
- Material handlers (7452)
- Travel counsellors (6521)

- Public works maintenance equipment operators and related workers (7522)
- Specialized cleaners (6732)
- Landscape and horticulture technicians and specialists (2225)
- Human resources and recruitment officers (1223)
- Employment counsellors (4156)
- User support technicians (2282)
- Public works and maintenance labourers (7621)
- Court reporters and medical transcriptionists and related occupations (1251)
- Collectors (1435)
- Conference and event planners (1226)
- Pest controllers and fumigators (7444)
- Tour and travel guides (6531)

Overall, the industry is heavily reliant on the performance of the domestic economy, particularly business activities and corporate profitability as it is primarily engaged in activities that support the day-to-day operations of other organizations. With the exception of waste management services that are less sensitive to cyclical fluctuations in economic conditions, the other segments of the industry were negatively affected by the recession of 2008-2009, as a result of the sharp decline in corporate profits which fell by 47% in 2009 only. During that year, production contracted significantly and the industry cut 20,000 jobs. It took three years for output and employment to fully recover from its pre-recession level, due to the high degree of uncertainty about economic prospects. Production and employment growth strengthened after 2012, primarily driven by higher demand for employment, building and security services. However, demand for office support and travel arrangement has been declining in recent years, most likely due to the growing use of automated administrative software and travel booking platforms from businesses. On average, real GDP and employment in the industry increased at annual rates of 1.1% and 1.2% respectively over the period 2007-2016. Anemic growth in productivity reflects little investment in new capital to increase the workers' efficiency and the fact that a large number of tasks are highly labour intensive. Capital

**Real GDP and Employment Growth Rates in Management and Administrative Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

expenditures in the industry decreased for two consecutive years during the recession and for two additional years following the oil price crash in 2014.

Over the period 2017-2026, output growth in the industry is projected to accelerate significantly relative to the previous decade, primarily driven by stronger business activities and renewed growth in corporate profitability. The industry will continue to benefit from the growing number of firms across the economy that choose to outsource management, administrative and other support functions in order to remain focused on their core activities and increase operation efficiency, particularly manufacturing firms which are more likely to be exposed to fierce competition from low cost countries. Under that context, the straightening anticipated in Canadian manufacturing activity and additional growth in other sectors of the economy represent greater opportunities for the industry. The faster pace of growth projected in the construction of commercial, industrial and institutional buildings is expected to boost demand for facilities support services such as janitorial and landscaping, care and maintenance, guard and security, mail routing and logistical support services. Massive retirements of baby-boomers from the labour market are expected to stimulate demand for employment and recruitment services, while the growing number of mergers and acquisitions resulting from globalization is expected to increase demand for the management of companies and enterprises, including security holdings and head offices. Demand for waste management and remediation services is also expected to increase, particularly for water treatment, as part of the “Clean Water and Wastewater Fund” put in place by the federal government in its Budget 2016 (\$2 billion over four years). On average, the industry’s real GDP is projected to increase by 1.9% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. In contrast, employment growth is expected to weaken marginally, averaging 1.0% per year due to a significant straightening in productivity. While the industry is highly labour intensive, an increasing number of occupations and tasks are being automated and performed by technology, particularly those involving routine or low-skilled work. At the same time, an increasing number of non-routine jobs and cognitive tasks are being complemented and enhanced by technology. For example, tasks related to administrative support and travel arrangements can be increasingly performed by software and online applications, while rapid advancements in robotics and security systems may result in greater automation of tasks related to janitorial, cleaning and security services. Artificial intelligence and machine learning may also complement tasks associated with more complex administrative and management work.

**Information, Culture and Telecommunications Services  
(NAICS 5111-5112; 5121-5122; 5151-5152; 5171-5179; 5182; 5191)**

This industry is composed of six segments: publishing (newspapers, magazines, books and software); motion picture and sound recording (movies, videos, television programs, commercials, music recording); radio and television broadcasting (radio and TV networks, including pay and specialty channels); telecommunications (providing telephone, television and Internet services through wireline, co-axial cable, fibre optic, wireless and satellite technologies); data processing, hosting and related services (web hosting, video and audio streaming services); and other information services (publishing or broadcasting content on the Internet,

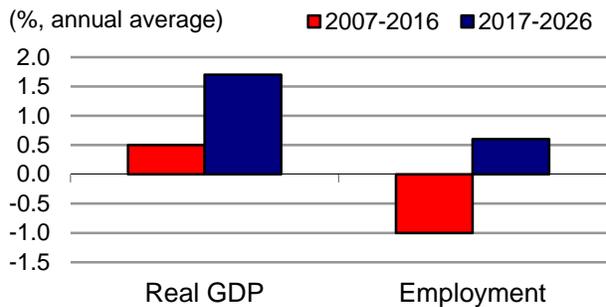
web search portals). Production and employment is distributed quite unevenly across the six segments. Telecommunications services are the largest segment, accounting for 60% of production and 33% of employment in 2016, making this segment the most capital intensive. In comparison, motion picture and sound recording accounted for only 7% of production but 26% of employment, making this segment the most labour intensive. Publishing services accounted for 17% of production and 19% of employment, compared to 16% and 22% respectively for the remaining three segments. Overall, the industry employed 358,100 workers in 2016, largely concentrated in Ontario (41%), Quebec (23%) and British Columbia (17%), with men accounting for the majority of the workforce (61%). Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

Producers, directors, choreographers and related occupations (5131)	Couriers, messengers and door-to-door distributors (1513)
Telecom. installation and repair workers (7246)	Computer and information systems managers (0213)
Library assistants and clerks (1451)	Telecommunications line and cable workers (7245)
Graphic designers and illustrators (5241)	Other technical and co-ordinating occ. in motion pictures, broadcasting and performing arts (5226)
User support technicians (2282)	Film and video camera operators (5222)
Information systems analysts and consultants (2171)	Announcers and other broadcasters (5231)
Telecommunication carriers managers (0131)	Software engineers and designers (2173)
Computer programmers and interactive media developers (2174)	Managers - publishing, motion pictures, broadcasting and performing arts (0512)
Journalists (5123)	Librarians (5111)
Support occupations in motion pictures, broadcasting, photography, performing arts (5227)	Cable television service and maintenance technicians (7247)
Audio and video recording technicians (5225)	Graphic arts technicians (5223)
Editors (5122)	Library and public archive technicians (5211)
Computer engineers (2147)	Broadcast technicians (5224)
Computer network technicians (2281)	

Digital technologies have transformed the ways information and cultural products are produced, distributed and consumed, and telecommunications services providers are playing an increasing role in making these products accessible to the public. Basically, the industry is heavily reliant on consumer spending and businesses expenditures in Canada, making it sensitive to fluctuations in domestic economic conditions. After experiencing a slight decline during the recession of 2008-2009, output increased at a solid pace in the subsequent three years. However, production in the industry stalled from 2013 to 2016, primarily reflecting the ongoing transition toward the digital economy. Growth in telecommunications services was constrained by the decline in the use of wireline phones at home, the maturity of the wireless segment, and changing TV viewing habits toward online content (such as Netflix), which has weighed on paid-TV subscriptions (such as cable, fibre optic or satellite TV). Output in radio and television broadcasting was significantly lowered by the consumers' shift toward audio and video streaming (such as Spotify and YouTube) and the resulting decline in advertising expenditures in traditional media in favour of digital platforms. The transition toward digital media has also reduced demand for printed materials (newspapers, magazines, books), lowering advertising revenues and economic activity in the traditional publishing segment as well. Those factors were compensated by solid growth in smaller segments, notably motion picture and sound recording and other information services (which include Internet publishing and broadcasting). The resulting pace of growth in the industry's real GDP averaged a modest 0.5% annually over

the period 2007-2016, with most of the growth occurring prior to 2013. While the advent of digital technologies clearly restrained output growth in the industry, the impact was even more pronounced for employment, which fell at an average rate of 1.0% per year over the past decade. During that period, the traditional publishing and radio-television broadcasting segments lost 23,000 jobs due to the declining trend in their respective output, while the telecommunications segment lost 37,000 jobs, partly reflecting the fact that a large part of their customer services operations was outsourced to external call centres. Telecommunications firms have also invested heavily in their information systems, which resulted in robust productivity gains. In turn, the growing number of tasks being automated has reduced demand for less skilled workers. On the other hand, rapid output growth in motion picture and sound recording since 2012 has led to the creation of 26,000 jobs in the past four years only. These sizable gains were largely supported by new technologies and digital platforms which have significantly reduced the costs associated with the production and distribution of audio and video content. This segment has also benefited from the recent decline in the value of the Canadian dollar, which has increased Canada's competitiveness as a location for the shooting of foreign movies and TV series, particularly American productions.

### Real GDP and Employment Growth Rates in Information, Culture and Telecom. Services



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in the industry is expected to accelerate significantly relative to the period 2007-2016, primarily driven by stronger demand for online content, wireless data and faster broadband Internet. More specifically, the shift in the distribution and consumption of information and cultural products toward digital media will continue to stimulate the demand for Internet publishing and broadcasting as well as audio and video streaming, boosting growth in the data processing, hosting and other information services segments of the industry. The telecommunications segment is also expected to expand at a faster pace, driven by robust demand from both consumers and businesses for wireless data and faster broadband Internet due to the growing need for cloud computing, unified communications and cyber security solutions. Renewed growth anticipated in both corporate profits and investment in machinery and equipment (including investment in information and communication technologies) is an additional factor expected to boost business spending on telecommunications services. The next generation of wireless networks is nearly a reality, with deployment of 5G technologies starting in 2020, allowing self-driving cars and Internet of Things (IoT) applications to become mainstream and creating new market opportunities for telecommunications services providers. Furthermore, the multiplication of online platforms for audio and video content should continue to drive solid output and employment growth in the motion picture and sound recording segment, while the persistent weakness anticipated in the value of the Canadian dollar will maintain Canada's competitiveness as a location for the production of American movies and TV series. On the negative side, the traditional publishing and radio-television broadcasting segments are expected to keep contracting, albeit at a slower

pace than the past decade. Both segments should eventually reach a new equilibrium following the significant disruptions caused by the digital revolution. On average, the industry's real GDP is projected to increase by 1.7% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. Faster output growth is expected to result in a partial recovery in employment, with job creation averaging 0.6% per year. The telecommunications segment, which represents the backbone of all activities powered by Internet connectivity, is expected to add new positions moving forward, particularly in areas requiring high skills such as IT professionals and data scientists. However, a significant part of production growth in the industry is projected to be met by additional gains in productivity, powered by rapid advancement in digital technologies and the fact that telecommunication services, the largest segment of the industry, are highly capital intensive.

### **Arts, Entertainment and Recreation Services (NAICS 7111-7115; 7121; 7131-7139)**

This industry comprises establishments primarily engaged in operating facilities or providing services to meet the cultural, entertainment and recreational interests of their patrons, including live performances and events or exhibits intended for public viewing. It is composed of three segments: performing arts, spectator sports and related industries (live presentations involving actors, singers, dancers, musicians, writers, athletes, and their respective agents, managers and technicians); heritage institutions (museums, historic sites, zoos, botanic gardens, nature parks); and amusement, gambling and recreation industries (such as golf courses, skiing facilities, marinas, recreational, sports and fitness centres, bowling centres, amusement parks, arcades, casinos, etc.). Amusement, gambling and recreation industries are the largest segment, accounting for 57% of production and 61% of employment in 2016. The other two segments account for the remaining share of production (i.e. 43%; breakdown not available for GDP), with performing arts, spectator sports and related industries accounting for 31% of employment, compared to 8% for heritage institutions. Overall, the industry employed 424,300 workers in 2016, mostly concentrated in Ontario (40%), Quebec (23%), British Columbia (15%) and Alberta (12%). The workforce is evenly split between men and women and is characterized by a large proportion of part-time workers (40%). The performing arts and spectator sports segment is also characterized by a substantial concentration of self-employed (65%). Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

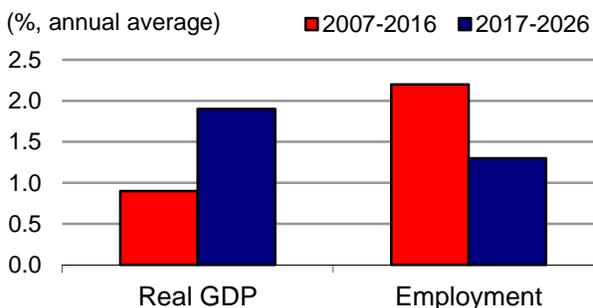
Program leaders and instructors in recreation, sport and fitness (5254)	Producers, directors, choreographers and related occupations (5131)
Operators and attendants in amusement, recreation and sport (6722)	Recreation, sports and fitness policy researchers, consultants and program officers (4167)
Authors and writers (5121)	Other technical and co-ordinating occ. in motion pictures, broadcasting and performing arts (5226)
Actors and comedians (5135)	Conference and event planners (1226)
Musicians and singers (5133)	Recreation, sports and fitness program and service directors (0513)
Painters, sculptors and other visual artists (5136)	Audio and video recording technicians (5225)
Landscaping and grounds maintenance labourers (8612)	Outdoor sport and recreational guides (6532)
Coaches (5252)	Support occ. in motion pictures, broadcasting, photography and performing arts (5227)
Facility operation and maintenance managers (0714)	Conductors, composers and arrangers (5132)
Technical occupations related to museums and art galleries (5212)	

Casino occupations (6533)  
 Sports officials and referees (5253)  
 Other performers, n.e.c. (5232)  
 Artisans and craftspersons (5244)  
 Accommodation, travel, tourism and related services supervisors (6313)  
 Conservators and curators (5112)

Library, archive, museum and art gallery managers (0511)  
 Managers - publishing, motion pictures, broadcasting and performing arts (0512)  
 Athletes (5251)  
 Tour and travel guides (6531)

The industry is largely driven by consumer spending and tourism activity, making it particularly sensitive to fluctuations in domestic and foreign economic conditions and changes in discretionary expenditures. It is also heavily reliant on government funding, particularly grants dedicated to art organizations. The industry's output started to decline during the recession of 2008-2009, as a result of anemic growth in consumer spending. After reaching a trough in 2010, output remained essentially flat in the subsequent four years, as consumers remained cautious about economic conditions and restrained their discretionary expenditures. However, output jumped markedly in 2015 and 2016, driven by the release of some pent-up demand and major international sporting events hosted in Canada, namely the 2015 PanAm Games and the 2015 FIFA Women's World Cup of Soccer. The decline in the value of the Canadian dollar also attracted a large number of foreign tourists to Canada, particularly Americans, and encouraged more Canadians to choose vacation within the country, increasing demand for arts, entertainment and recreation activities in recent years. Lower transportation costs resulting from lower fuel costs represent an additional factor that contributed to increase tourism activity. The resulting pace of growth in the industry's real GDP averaged a modest 0.9% annually over the period 2007-2016, with most of the gains occurring in the last two years. In comparison, employment increased almost continuously over the past decade, expanding at an average annual rate of 2.2%. This may reflect the fact that government funding (both at the federal and provincial levels) is a key supporter of employment in this industry, which is highly vulnerable to changes in macroeconomic conditions and heavily dependant on large and irregular events. Some of the activities provided by the industry would not even be possible in the absence of government grants to artists. According to the Canadian Council for the Arts, in fiscal year 2015-2016, about 3,800 grants were awarded to arts organizations and about 2,300 grants were awarded to individual artists.

**Real GDP and Employment Growth Rates in Arts, Entertainment and Recreation Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Output growth in the industry is projected to accelerate significantly over the period 2017-2026, primarily driven by a positive outlook for tourism activity and the increase anticipated in leisure time. More specifically, in addition to major events related to the 150th anniversary of the Canadian Confederation and the 375th anniversary of Montreal, tourism activity will continue to benefit from a favourable currency situation, lower transportation costs, and robust labour markets in the United States and Canada, increasing demand for arts, entertainment and recreation activities within the country, particularly in the short- to medium-term. The industry is

also expected to benefit from massive retirements of baby-boomers from the labour market, as this large and relatively well-off demographic group will have more time to spend on leisure activities. Baby-boomers are expected to inherit \$750 billion by 2026, providing another source of income to spend on arts, entertainment and recreation activities. This will help to compensate for the slower pace of growth projected in disposable income and consumer spending resulting from the gradual slowdown in overall employment growth in Canada over the longer-term. High consumer debt levels and the gradual increase anticipated in interest rates are also expected to put pressures on household budgets, restraining discretionary spending on arts and recreation activities. On average, the industry's real GDP is projected to increase by 1.9% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. In contrast, employment growth is expected to weaken significantly, averaging 1.3% per year due to a major turnaround in productivity. Because many arts and culture organizations are non-profits, the industry depends on volunteers to complement paid staff, and this is an important consideration when it comes to future employment and productivity trends. In 2013, Canadians volunteered the equivalent of 56,000 jobs in arts and culture organizations. As the baby boom generation enters retirement, this demographic group will have extra leisure time not just for consuming the output of the industry but also for contributing to it as volunteers, allowing the industry to increase production without necessarily hiring additional paid workers. Another trend that should contribute to increase productivity is capital investment. Many performing arts facilities dated from the 1960s and 1970s are expected to be renovated and upgraded through the infrastructure program put in place by the federal government. The renewal of those facilities should help to improve the quality of service, increase attendance and, ultimately, improve output in the industry.

### **Accommodation Services (NAICS 7211; 7212; 7213)**

This industry comprises establishments primarily engaged in providing short-term lodging to travellers and vacationers in facilities such as hotels, resorts, motels, bed and breakfast homes, and cottages and cabins. These establishments may offer complementary services, such as food and beverages, recreational services, conference rooms and convention services, laundry and parking services. The industry also includes establishments operating recreational vehicle (RV) parks and campgrounds (including hunting and fishing camps); and establishments operating rooming and boarding houses, which may serve as a principal residence for the period of occupancy. Traveller accommodation is by far the largest of the three segments, accounting for 88% of employment in 2016, followed by RV parks and recreational camps (11%), and rooming and boarding houses (1%). The 4-digit NAICS breakdown for GDP is not available. Overall, the industry employed 193,000 workers in 2016, mostly concentrated in Ontario (32%), Quebec (23%), British Columbia (16%) and Alberta (13%), with women accounting for the majority of the workforce (60%). The industry is also characterized by much lower wages than the national average and a significant proportion of part-time workers (24%). Key occupations (4-digit NOC) include:

Light duty cleaners (6731)  
Hotel front desk clerks (6525)  
Accommodation service managers (0632)

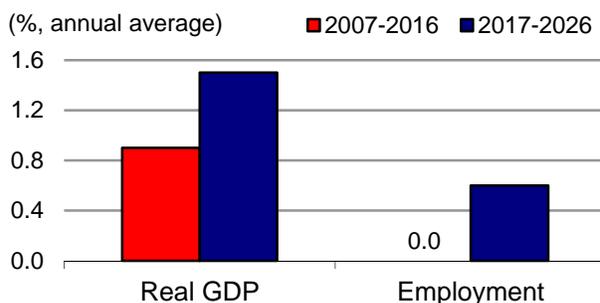
\* Also include many occupations related to the food services industry:  
Food and beverage servers (6513)

Janitors, caretakers and building superintendents (6733)  
 Accommodation, travel, tourism and related services supervisors (6313)  
 Executive housekeepers (6312);  
 Support occupations in accommodation, travel and facilities set-up services (6721)

Cooks (6322)  
 Food counter attendants, kitchen helpers and related support occupations (6711)  
 Chefs (6321)  
 Bartenders (6512)  
 Maitres d'hôtel and hosts/hostesses (6511)

Accommodation services are heavily reliant on tourism activity and business travel, which in turn are driven by consumer spending and business activity, both from the domestic and foreign sides (domestic tourism accounts for about two-thirds of revenues). Consequently, the industry is particularly sensitive to fluctuations in domestic and foreign economic conditions, travelling costs, and the value of the Canadian dollar. After being negatively affected by the global recession of 2008-2009, output in the industry quickly recovered in 2010 and increased continuously in the following six years, with the exception of a temporary decline in 2015 that was fully reversed in 2016. Despite constant increases in output, the pace of growth was relatively modest, averaging 0.9% annually over the period 2007-2016. The expansion of the industry was restrained by a number of factors limiting tourism activity in Canada, including the post 9/11 passport requirements for re-entry into the United States and the strong appreciation of the Canadian dollar prior to 2013. More recently, lower fuel costs and the sharp depreciation of the Canadian dollar have contributed to improve tourism activity and increase domestic and foreign demand for accommodation services. Indeed, lower fuel costs have resulted in lower air and ground transportation fares, while a lower currency has attracted a large number of foreign tourists to Canada, particularly Americans, and encouraged more Canadians to choose vacation within the country. However, growing competition from sharing economy services such as Airbnb and HomeAway, which enable people to list, find and rent vacation homes through digital platforms, have captured an increasing part of the accommodation market. After reaching a peak in 2011, employment in the industry fell markedly and almost continuously in the following five years, resulting in anemic growth (0.0%) for the whole period 2007-2016. Technological innovations, such as online hotel bookings, have played an important role in reducing labour demand and increasing productivity. High labour turnover in the industry also suggests difficulties in retaining and attracting workers due to the seasonal nature of its activities and much lower wages relative to other industries. Average weekly earnings are 40% lower than the average for the entire service sector, implying that external job prospects are often more desirable.

### Real GDP and Employment Growth Rates in Accommodation Services



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in the industry is expected to accelerate significantly relative to the period 2007-2016, primarily driven by a more positive outlook for tourism activity and business travel. Lower transportation costs, a favourable currency situation, and robust labour markets in the United States and Canada have increased tourism activity in the country in recent years and this situation is expected to persist over the short- to medium-term. The

celebrations related to the 150th anniversary of the Canadian Confederation and the 375th anniversary of Montreal, combined with the fact Canada was named best travel destination by Lonely Planet and the New York Times, are expected to boost domestic and foreign demand for accommodation services in 2017. Tourism activity is also expected to rise in line with higher incomes in emerging markets, particularly in China and India. The number of visitors from China has more than doubled in the past five years and this country now ranks third behind the United States and the United Kingdom as a source of visitors to Canada. Furthermore, a stronger U.S. economy and increased business activity and corporate profitability in Canada are expected to stimulate spending on business travel. The growing interconnectedness of the global economy and incoming trade deals such as the Comprehensive Economic Trade Agreement (CETA) with the European Union are also expected to increase international business travel and demand for accommodation services. The industry may also benefit from massive retirements of baby-boomers from the labour market, as this large and relatively well-off demographic group will have more time to spend on tourism activities. Baby-boomers are expected to inherit \$750 billion by 2026, providing another source of income to spend on travel and accommodation services. This will help to compensate for the slower pace of growth projected in disposable income and consumer spending resulting from the gradual slowdown in overall employment growth in Canada over the longer-term. High consumer debt levels and the gradual increase anticipated in interest rates are also expected to put pressures on household budgets, restraining discretionary spending on travel and accommodation services. On average, the industry's real GDP is projected to increase by 1.5% annually over the period 2017-2026, a notable acceleration relative to the previous ten years. Faster growth in output is expected to result in higher employment, with job creation averaging 0.6% per year. However, a significant part of production growth is projected to be met by additional gains in productivity by implementing, for example, new technologies such as online checkouts. This reflects the need to contain labour costs vis-à-vis increased competition, particularly from new business models like Airbnb and HomeAway. Many of the rentals found through those digital platforms are less expensive than hotels and often offer a more unique experience than traditional accommodations, thereby appealing to budget-conscious travellers. Given the weaker pace of growth anticipated in Canada's labour supply and the gradual tightening of the labour market, low wages that characterized this industry will also make it increasingly challenging for employers to compete with other industries to attract workers, forcing businesses to increase their level of productivity.

### **Food Services (NAICS 7223; 7224; 7225)**

This industry comprises establishments engaged in preparing meals, snacks and beverages for immediate consumption on and off the premises. It is composed of three segments: special food services (caterers and mobile food services); drinking places serving alcoholic beverages (bars and taverns); and full-services restaurants and limited-service eating places (family and fine-dining restaurants, fast food restaurants, coffee shops). It does not include food service activities that occur within establishments such as hotels, civic and social associations, amusement and recreation parks, and theatres. However, leased food-service locations in facilities such as hotels, shopping malls, airports and department stores are included. Full- and

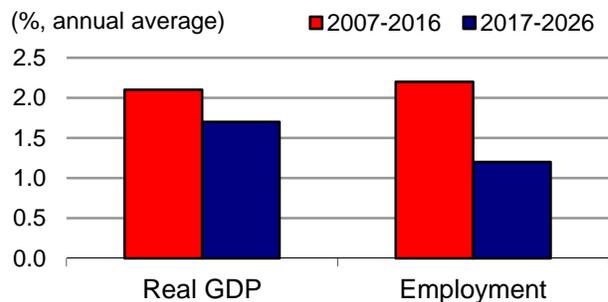
limited-services restaurants are by far the largest segment, accounting for 91% of employment in 2016, followed by special food services (5%) and drinking places (4%). The 4-digit NAICS breakdown for GDP is not available. Overall, the industry employed 1.0 million workers in 2016, distributed proportionally to provincial population: 39% in Ontario, 24% in Quebec, 14% in British Columbia, 12% in Alberta and 11% in the remaining provinces, with women accounting for the majority of the workforce (57%). The industry is characterized by much lower wages than the national average and by the largest concentration of part-time workers in the economy, accounting for 46% of its workforce. Food services also provide many young people with their first jobs as about 40% of workers are aged between 15 and 24. Key occupations (4-digit NOC) include:

Food counter attendants, kitchen helpers and related support (6711)  
 Cooks (6322)  
 Food and beverage servers (6513)  
 Restaurant and food service managers (0631)  
 Food services supervisors (6311)

Maîtres d'hôtel and hosts/hostesses (6511)  
 Chefs (6321)  
 Bartenders (6512)  
 Bakers (6332)  
 Delivery and courier service drivers (7514)

Food services are heavily reliant on consumer spending and are particularly sensitive to growth in disposable income and changes in discretionary expenditures. Tourism activity, both from the domestic and foreign sides, is an additional driver of demand, as non-local consumers account for about one quarter of the industry's revenues. Demand for food services also relies, to a smaller degree, on business spending (e.g. business lunch) and business travel. The industry has been a bright spot for the Canadian economy over the past decade.

**Real GDP and Employment Growth Rates in Food Services**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

After declining somewhat during the recession of 2008-2009, output and employment quickly recovered and increased continuously and solidly from 2010 to 2016. Improving household income, combined with a growing affinity of Canadians to dine out, have been key drivers behind the industry's solid performance. The emergence of the fast-casual dining restaurants, which has been able to create a wedge between traditional full-service restaurants and fast food restaurants in terms of costs and quality, is an additional factor that contributed to the expansion of the industry. In contrast, drinking places continued to struggle as a result of changing social trends, growing health awareness, population aging, and the increasing gap between the price of alcoholic beverages served in bars and those sold in stores. More recently, the sharp depreciation of the Canadian dollar attracted a large number of foreign tourists to Canada, particularly Americans, and encouraged more Canadians to choose vacation within the country, increasing demand for food services. Lower transportation costs resulting from lower fuel costs also contributed to increase tourism activity. On average, real GDP and employment in the industry increased at annual rates of 2.1% and 2.2% respectively over the period 2007-2016, largely outpacing the performance of the overall economy. Anemic growth in productivity reflects the fact that the industry is highly labour intensive, employing nearly four times as many workers

per unit of output as the average for the entire services-producing sector. That said, employment growth has slowed somewhat in recent years as restaurants have begun to explore increasingly sophisticated concepts such as self-service ordering and robotic servers. Most notably, McDonald's Canada introduced and continues to spread the use of its build-your-own-burger kiosks.

Over the projection period, food services will continue to benefit from a positive outlook for tourism activity in the short- to medium-term, but slower growth anticipated in consumer spending over the longer term is expected to weaken output growth in the industry relative to the period 2007-2016. More precisely, tourism activity should continue to be driven by a favourable currency situation, lower transportation costs, robust labour markets in the United States and Canada, major events related to the 150th anniversary of the Canadian Confederation and the 375th anniversary of Montreal, and the fact Canada was named best travel destination by Lonely Planet and the New York Times in 2017. Those developments are expected to support demand for food services resulting from tourism activity in the short- to medium-term. Over the longer term, however, the industry will be affected by the adverse impact of demographic changes on consumer spending. Indeed, slower growth in the working-age population is expected to constrain overall employment growth, while the aging of the population will result in massive retirements of baby-boomers from the labour market. These two factors are expected to constrain the pace of growth in disposable income and consumer spending, including discretionary spending on food services. High consumer debt levels and the gradual increase anticipated in interest rates are also expected to put pressures on household budgets, reducing discretionary income available for dining out. Moreover, if the dining habits among retiring baby-boomers follow the trends of the previous generation, they are likely to spend more of their food dollars at home as they age. On the other hand, the aging of Canada's population is expected to increase demand for food services from health care institutions, which account for more than half of institutional food services sales. A stronger U.S. economy and increased business activity and corporate profitability in Canada are also expected to stimulate business travel and business spending on food services. The resulting pace of growth in the industry's real GDP is expected to average 1.7% over the period 2017-2026, a slight slowdown relative to the previous decade. Employment growth is also projected to weaken, averaging 1.2% per year. In contrast, productivity growth is projected to pickup. Indeed, given the weaker pace of growth anticipated in Canada's labour supply and the gradual tightening of the labour market, low wages that characterized this industry will make it increasingly challenging for employers to compete with other industries to attract workers, forcing businesses to increase their level of productivity. As a result, the industry will continue to explore ways to digitalize dining in order to engage customers and improve efficiency. The technical feasibility of automation for various occupations within the industry given current technologies remains significant. For instance, food counter attendants and kitchen helpers are at risk of being automated over the next 10 to 20 years. While the cost of technologies relative to the cost of labour (e.g. higher minimum wages making labour less attractive to capital) will ultimately influence the pace at which automation technologies are adopted within the industry, automation is nonetheless expected to maintain downward pressure on labour demand.

## Repair, Personal and Household Services (NAICS 8111-8114; 8121-8129; 8131-8139; 8141)

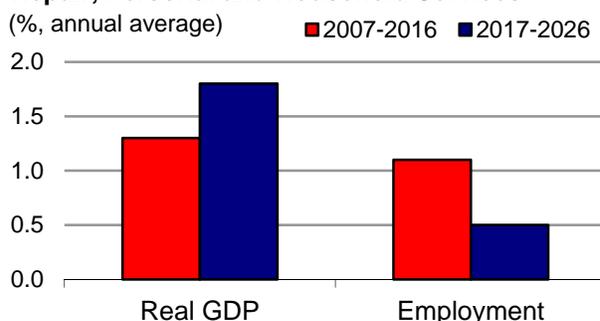
This industry comprises establishments not classified in any other services industries and provides a wide range of services to consumers or businesses. It is composed of four segments: repair and maintenance (on motor vehicles, electronic equipment, commercial and industrial machinery, personal and household goods); personal and laundry services (such as hair care, esthetic services, dry cleaning and funeral services); religious, grant-making, civic and professional organizations (supporting religious, social and political causes); and private household services (employing individuals such as home support workers, housekeepers, gardeners, family caregivers and baby-sitters). Repair and maintenance services are the largest segment, accounting for 39% of production and 36% of employment in 2016, followed by religious, civic and professional organizations (32% of production and 25% of employment), personal and laundry services (21% and 31%), and private household services (8% and 8%). Overall, the industry employed 774,900 workers in 2016, distributed proportionally to population: 36% in Ontario, 22% in Quebec, 16% in Alberta, 14% in British Columbia and 14% in the remaining provinces. The workforce is characterized by a slight majority of women (53%), lower wages than the national average, and a significant concentration of self-employed (29%), particularly in personal and laundry services (45%). Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

Hairstylists and barbers (6341)  
 Automotive service technicians, truck and bus mechanics and mechanical repairers (7321)  
 Estheticians, electrologists and related occupations (6562)  
 Home child care providers (4411)  
 Professional occupations in religion (4154)  
 Motor vehicle body repairers (7322)  
 Contractors and supervisors, mechanic trades (7301)  
 Welders and related machine operators (7237)  
 Pet groomers and animal care workers (6563)  
 Home support workers, housekeepers and related occupations (4412)

Electronic service technicians (household and business equipment) (2242)  
 Dry cleaning, laundry and related occupations (6741)  
 Heavy-duty equipment mechanics (7312)  
 Tailors, dressmakers, furriers and milliners (6342)  
 Funeral directors and embalmers (6346)  
 Other religious occupations (4217)  
 Conference and event planners (1226)  
 Upholsterers (6345)  
 Appliance services and repairers (7332)  
 Jewellers, jewellery and watch repairers (6344)  
 Image, social and other personal consultants (6561)  
 Shoe repairers and shoemakers (6343)

The industry mostly relies on the performance of the domestic economy, more specifically consumer spending and business activity in Canada, which in turn are driven by growth in disposable income and corporate profits. The religious, civic, grant-making and professional organizations segment is particularly sensitive to discretionary spending and cyclical fluctuation in economic conditions. Following a slight contraction in the aftermath of the 2008-2009 recession, the industry's output quickly recovered in 2011 and continued to grow at a solid pace during the subsequent three years,

### Real GDP and Employment Growth Rates in Repair, Personal and Household Services



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

largely driven by the gradual improvement in

domestic economic conditions. However, output increased at a much slower pace in 2015, before contracting again in 2016, reflecting more modest economic growth in Canada during those two years along with sharp declines in corporate profitability. The religious, civic, grant-making and professional organizations segment was the most severely affected. After reaching a peak in 2012, employment in the industry has been on a declining trend in recent years, including a significant drop in 2015 that was followed by a marginal rebound in 2016. On average, real GDP and employment in repair, personal and household services grew at annual rates of 1.3% and 1.1% respectively over the period 2007-2016. Weak growth in productivity reflects the fact that the industry is highly labour intensive, employing twice as many workers per unit of output as the average for the entire services-producing sector.

Over the projection period, output growth in the industry is expected to accelerate significantly relative to the period 2007-2016, driven by robust labour market conditions in Canada and the resulting increases in disposable income as well as stronger business activities and renewed growth in corporate profits. Population aging is expected to stimulate demand for personal and private household services, including funeral, cemeteries and crematoria services, personal assistance, family caregiving, housekeeping and home support services. The religious, civic, grant-making and professional organizations segment is expected to benefit from the increasing number of retired workers who will have more time to spend on voluntary and charity work or in supporting and advocating various social and political causes. The repair and maintenance segment of the industry is also expected to benefit from the solid pace of growth recorded over the past decade in consumer spending on durable goods, such as motor vehicles, household appliances and electronics. The straightening anticipated in business investment in commercial and industrial machinery and equipment (including electronic and precision equipment) is an additional factor expected to support demand for repair and maintenance services. On the negative side, the industry will be challenged by the fact that growth in consumer spending is projected to weaken progressively over the longer term due to slower growth in disposable income (resulting from the gradual slowdown in overall employment growth in Canada and massive retirements of baby-boomers). Nevertheless, the industry's real GDP is projected to increase by 1.8% annually over the period 2017-2026, a notable improvement relative to the previous ten years. In contrast, employment growth is expected to weaken significantly, averaging 0.5% per year due to a substantial acceleration in productivity growth. Although the industry is highly labour intensive, the weaker pace of growth anticipated in Canada's labour supply and the gradual tightening of the labour market are expected to induce employers to automate some of their operations and to come up with new and more efficient ways of delivering services, leading to faster gains in productivity.

### **Elementary and Secondary Schools (NAICS 6111)**

Elementary and secondary schools comprise establishments primarily engaged in providing academic courses that consist of a basic preparatory education, from kindergarten to grade 12. They employed 755,900 workers in 2016, with women accounting for 75% of the workforce. Employment is distributed proportionately to population: 40% in Ontario, 22% in Quebec, 12% in

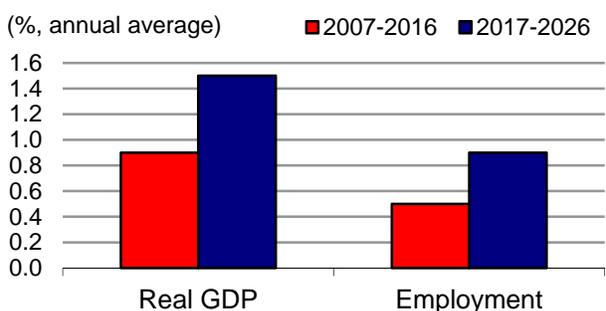
British Columbia, 12% in Alberta, and 14% in the remaining provinces. Key occupations (4-digit NOC) include:

Elementary school and kindergarten teachers (4032)	Educational counsellors (4033)
Elementary and secondary school teacher assistants (4413)	Education policy researchers, consultants and program officers (4166)
Secondary school teachers (4031)	Audiologists and speech-language pathologists (3141)
School principals and administrators of elementary and secondary education (0422)	Instructors of persons with disabilities (4215)
Early childhood educators and assistants (4214)	Library and public archive technicians (5211)

\* Also include a significant number of Bus drivers (7512).

Economic activity in elementary and secondary schools is mainly driven by demographic trends in population aged 5 to 17 and particularly sensitive to government expenditures in education. Growth in output and employment was relatively modest over the past ten years, as positive growth in population aged 5 to 11 was accompanied by negative growth in population aged 12 to 17. Indeed, during that period, the millennial generation, the children of the baby boomers, slowly started to exit secondary school to either find a job or attend college or university. Furthermore, in the aftermaths of the 2008-2009 recession, when fiscal constraints for most governments were stretched to the limit, many provinces cut back expenditure budgets on elementary and secondary schools, although growth remained in positive territory. Some governments tried to restrain expenditures by increasing classroom sizes and cutting back on teacher aides, leading to small declines in employment from 2009 to 2011 that were fully reversed in subsequent years. On average, real GDP increased at an annual rate of 0.9% over the period 2007-2016, compared to 0.5% for employment. This means that productivity accounted for about half of output growth, although the concept and measurement of productivity in educational services may differ from the other sectors of the economy where goods and services are traded and more easily valued in monetary terms. For example, the introduction of more computers in the classroom may improve the educational experience of students, but this development may not necessarily show up in the productivity figures because the number of teachers does not necessarily change as the use of technology accelerates.

**Real GDP and Employment Growth Rates in Elementary and Secondary Schools**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, output and employment growth in elementary and secondary schools is projected to accelerate significantly from the previous ten years, primarily reflecting much stronger gains in population aged 5 to 17 as the children of the millennial generation will begin to reach the age where they start primary school. More precisely, faster growth in population aged 5 to 11 and renewed growth in population aged 12 to 17 are expected to boost output and employment in both elementary and secondary schools. However, population aging will continue to erode the federal and provincial tax bases while simultaneously putting further

pressures on the health care system, limiting the ability of governments to expand expenditures in educational services. The resulting pace of growth in elementary and secondary schools' real GDP and employment is projected to average 1.5% and 0.9% per year respectively from 2017 to 2026, which is nevertheless a notable improvement from the previous decade. Productivity is expected to continue to account for a significant share of output growth, supported by additional, albeit limited, investment in teacher-training and the increasing use of technology and the Internet.

### **Colleges, CEGEPs and Vocational Schools (NAICS 6112, 6114-6117)**

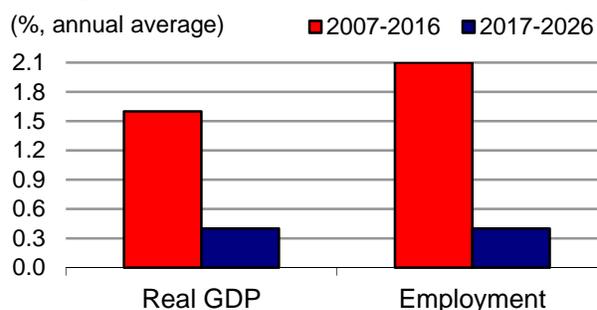
Community colleges and CEGEPs comprise establishments primarily engaged in providing academic or technical courses and granting associate degrees, certificates or diplomas that are below the university level. The requirement for admission to an associate or equivalent degree program is at least a high school diploma or equivalent general academic training. Vocational schools comprise establishments such as business, computer and management training schools, technical and trade schools, and other schools primarily engaged in providing instruction in fine arts, sports, languages and a variety of other topics (first-aid training, driving lessons, adult literacy programs). These establishments may be privately owned and operated, either for profit or not, or they may be publicly owned and operated. Community colleges and CEGEPs account for the largest share of output (68% in 2016) while vocational schools account for the largest share of employment (60% in 2016; with "other schools" alone accounting for 50%). This situation can be explained by the fact that vocational schools are characterized by a high proportion of part-time workers (56%) and self-employed (43%). Overall, the industry employed 246,800 workers in 2016, with women accounting for 60% of the workforce. Employment is distributed proportionately to population: 40% in Ontario, 22% in Quebec, 16% in British Columbia, 11% in Alberta, and 10% in the remaining provinces. Given the wide variety of educational services offered by the industry, key occupations (4-digit NOC) include a mix of:

College and other vocational instructors (4021)	Dancers (5134)
Other instructors (4216)	Coaches (5252)
Program leaders and instructors in recreation, sport and fitness (5254)	Post-secondary teaching and research assistants (4012)
Musicians and singers (5133)	Administrators in post-secondary education and vocational training (0421)
Education policy researchers, consultants and program officers (4166)	Educational counsellors (4033)

Economic activity in community colleges and CEGEPs is mainly driven by demographic trends in population aged 17 to 21 (the prime age for attending college or seeking technical training) and is particularly sensitive to government spending in education. In comparison, many of the educational services provided by vocational schools cover multiple age groups (including children, youth and adults) and are partly supported by consumer spending on extra-curricular activities associated with arts, sports and hobbies in general (such as music, dance, ski or tennis lessons). Growth in the industry's output and employment was relatively strong over the past ten years, partly driven by positive growth in population aged 17-21. During that period, a significant number of millennials graduated from high school and began to attend colleges and CEGEPs. Output and employment expanded almost continuously, even during the recession of

2008-2009, reflecting the fact that during bad economic times, youth usually stay in school longer while displaced workers return to school in response to poorer job opportunities. This development was reinforced by the gradual disappearance of high paying jobs in the manufacturing sector that only required a high school diploma. On average, real GDP in colleges, CEGEPs and vocational schools increased at an annual rate of 1.5% over the period 2007-2016, compared to 2.1% for employment. The significant gap between

### Real GDP and Employment Growth Rates in Colleges, CEGEPS and Vocational Schools



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

output and employment growth resulted in negative productivity growth, although the concept and measurement of productivity in educational services may differ from the other sectors of the economy where goods and services are traded and more easily valued in monetary terms. Declining productivity in the industry could be linked to changes in the types of programs offered within schools or simply the difficulty associated with measuring real output.

Over the period 2017-2026, output and employment growth in colleges, CEGEPs and vocational schools is projected to slow markedly relative to the previous ten years, largely reflecting the decline anticipated in population aged 17 to 21 during the period 2017-2021 and the fact that most millennials will have completed their college education by that time. While population in the 17-21 age cohort is projected to pick up somewhat beyond 2022, growth is expected to remain weak. However, the growing demand for higher educated and skilled workers resulting from the continued shift toward a knowledge-based economy is expected to keep pushing up enrolment rates in colleges and technical schools in Canada. This is also true for older workers who may see the need to upgrade their skills in order to adjust to technological progress. Indeed, automation is increasing rapidly in many sectors of the economy, particularly in the manufacturing sector. Some jobs are being eliminated while many others are changing and require new skills and technical training. That said, despite higher enrollments rates anticipated in post-secondary education, the pace of growth in the number of students attending colleges and technical schools is expected to slow markedly due to demographic factors. The resulting pace of growth in colleges, CEGEPs and vocational schools is projected to average 0.4% annually in both real GDP and employment over the period 2017-2026, a notable slowdown from the previous decade. The growing popularity of online courses and e-learning applications are expected to restrain demand for new teachers and help productivity to stop declining.

### Universities (NAICS 6113)

Universities comprise establishments primarily engaged in providing academic courses and granting degrees at the bachelor or graduate levels. The requirement for admission is at least a high school diploma or equivalent general academic training for baccalaureate programs, and often a baccalaureate degree for professional or graduate programs. Canadian universities employed 267,200 workers in 2016, distributed proportionately to population: 37% in Ontario,

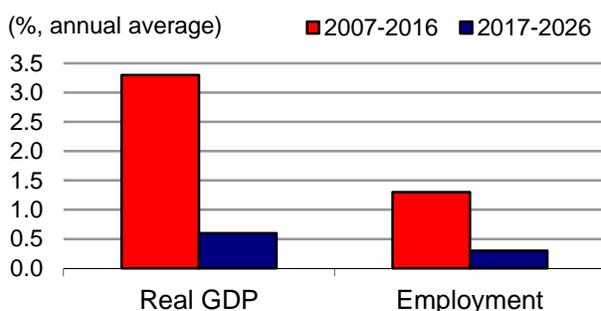
22% in Quebec, 14% in British Columbia, 12% in Alberta, and 15% in the remaining provinces. The workforce is characterized by a slight majority of women (53%) and a relatively high share of part-time employees (23%). Key occupations (4-digit code) include:

University professors and lecturers (4011)  
 Post-secondary teaching and research assistants (4012)  
 Administrators - post-secondary education and vocational training (0421)

Education policy researchers, consultants and program officers (4166)  
 Educational counsellors (4033)  
 Librarians (5111)

Economic activity in universities is mainly driven by demographic trends in the 18-24 age cohort and particularly sensitive to government expenditures in education. Growth in output was particularly strong over the past ten years, primarily driven by solid gains in population aged 18 to 24. During that period, a large number of millennials graduated from high school (or from CEGEPs in Quebec) and began to attend universities. An emphasis on attracting foreign students also contributed to increase attendance in many Canadian universities. Output expanded continuously over the past decade, even during the recession of 2008-2009, reflecting the fact that during bad economic times, youth usually stay in school longer while displaced workers return to school in response to poorer job opportunities. However, employment was more volatile, declining somewhat in 2008, 2009 and 2014, before quickly recovering in subsequent years. On average, real GDP in universities increased at an annual rate of 3.3% over the period 2007-2016, compared to 1.3% for employment. This means that productivity accounted for about 40% of output growth, although the concept and measurement of productivity in educational services may differ from the other sectors of the economy where goods and services are traded and more easily valued in monetary terms. Nevertheless, new technologies such as online courses and e-learning applications have enabled universities to meet the growing demand for their services without increasing employment excessively. This allowed universities to contain costs at a time when many provinces had to cope with surging fiscal deficits following the recession of 2008-2009.

### Real GDP and Employment Growth Rates in Universities



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, output and employment growth in universities is projected to slow markedly relative to the previous ten years, primarily reflecting the significant decline anticipated in population aged 18 to 24. However, the growing demand for higher educated and skilled workers resulting from the continued shift toward a knowledge-based economy is expected to keep pushing up enrolment rates in post-secondary education. Universities are also expected to increase their efforts to attract foreign students, but this may be challenging because the demographic patterns observed in Canada are also present in many other developed countries, although the persistent weakness anticipated in the Canadian dollar represents a competitive advantage. The resulting pace of growth in universities' real GDP and employment is projected to average 0.6% and 0.3% per year respectively from 2017 to 2026, a notable slowdown from

the previous decade, as higher enrolment rates anticipated in post-secondary education will not be enough to offset demographic trends. As it is generally the case for all new technologies, the impact of online courses and e-learning applications on productivity are expected to fade over time, partly explaining the slower pace of growth projected in productivity over the projection period.

### **Health Care (NAICS 6211-6219; 6221-6223; 6231-6239)**

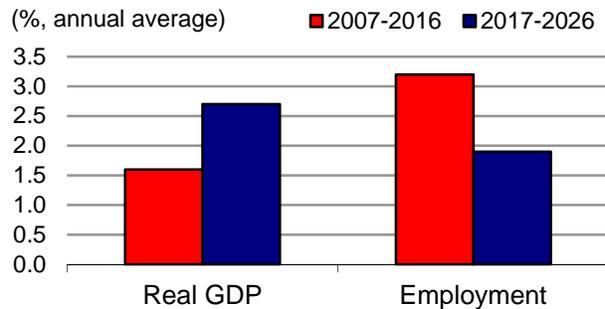
This industry comprises establishments primarily engaged in providing health care by diagnosis and treatment and providing residential care for medical and social reasons. It is composed of three segments: ambulatory health care services which include offices of physicians, dentists and health care practitioners, and medical and diagnostic laboratories (43% of real GDP and 33% of employment in 2016); hospitals which include general medical, surgical, psychiatric and substance abuse hospitals (41% and 44%); and nursing and residential care facilities which provide services to people with developmental handicaps, mental illness and substance abuse problems and services to the elderly and persons who are unable to fully care for themselves or who do not desire to live independently (16% and 23%). With a total of 1.8 million workers in 2016, health care was the second largest employer of the Canadian economy, behind retail trade. The workforce is primarily composed of women (81%) and characterized by a high level of education and a significant concentration of part-time workers (23%). The ambulatory health care services segment is also characterized by a strong concentration of self-employed (33%). Health care employment is distributed proportionately to population: 36% in Ontario, 23% in Quebec, 13% in British Columbia, 12% in Alberta, and 16% in the remaining provinces. Key occupations (4-digit NOC) include:

Registered nurses and registered psychiatric nurses (3012)	Health policy researchers, consultants and program officers (4165)
Nurse aides, orderlies and patient service associates (3413)	Other medical technologists and technicians (except dental health) (3219)
Licensed practical nurses (3233)	Occupational therapists (3143)
General practitioners and family physicians (3112)	Respiratory therapists, clinical perfusionists and cardiopulmonary technologists (3214)
Social and community service workers (4212)	Dietitians and nutritionists (3132)
Specialist physicians (3111)	Pharmacists (3131)
Medical administrative assistants (1243)	Practitioners of natural healing (3232)
Physiotherapists (3142)	Audiologists and speech-language pathologists (3141)
Dental assistants (3411)	Chiropractors (3122)
Nursing co-ordinators and supervisors (3011)	Optometrists (3121)
Managers in health care (0311)	Other professional occupations in therapy and assessment (3144)
Dental hygienists and dental therapists (3222)	Medical sonographers (3216)
Medical laboratory technicians and pathologists' assistants (3212)	Opticians (3231)
Psychologists (4151)	Cardiology technologists and electrophysiological diagnostic technologists, n.e.c. (3217)
Massage therapists (3236)	Instructors of persons with disabilities (4215)
Social workers (4152)	Denturists (3221)
Medical radiation technologists (3215)	Health information management occupations (1252)
Other assisting occupations in support of health services (3414)	Dental technologists, technicians and laboratory assistants (3223)
Dentists (3113)	
Paramedical occupations (3234)	
Medical laboratory technologists (3211)	

\* Also include a significant number of Light duty cleaners (6731); Food counter attendants, kitchen helpers and related support occupations (6711); and Cooks (6322).

Health care is largely influenced by demographic trends in Canada and very sensitive to government expenditures in health and social programs. Demand for health care is essentially immune from cyclical fluctuations in domestic economic conditions as health care is a necessity. As a result, output in the industry increased continuously over the period 2007-2016, even during the recession of 2008-2009, averaging 1.6% annually. Growth in output was mainly driven by the growing demand from an aging population and

### Real GDP and Employment Growth Rates in Health Care



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

it would have been stronger if not for surging provincial fiscal deficits in the aftermaths of the recession, which led governments to restrain public health care funding, particularly in Ontario and Quebec. Increased demand for health care, combined with expenditure constraints at the government level, resulted in long wait times for certain non-life-threatening conditions, such as knee and hip replacements, as well as lengthy delays to see specialists. The other development that has taken place over the past decade was the requirement that patients pay a portion of the bill for services that were previously covered by the health care system. The process referred to as “delisting” varies from province-to-province but, in general, services like annual eye exams and physiotherapy are no longer covered in full by some provinces. That said, increased demand for health care led to the creation of about half a million jobs in the industry over the past decade. While fiscal constraints restrained hiring following the recession of 2008-2009, employment growth accelerated markedly in 2015 and 2016, as many provinces managed to improve their fiscal positions. On average, health care employment increased at an annual rate of 3.2% over the period 2007-2016, largely exceeding the 1.0% recorded for the Canadian economy. In addition to strong labour demand, limited training seats for health professionals and difficult working conditions have constrained labour supply, leading to significant labour shortages in the industry as suggested by very low unemployment rates for health occupations. The large gap between output and employment growth resulted in negative productivity growth for the whole period 2007-2016, although the concept and measurement of productivity in public health care may differ from the other sectors of the economy where goods and services are traded and more easily valued in monetary terms. Indeed, health care providers implemented several measures to improve efficiencies and lower costs over the past decade but these changes were not reflected in the productivity numbers due to the large gains in employment. Examples of such measures include a greater focus on primary care, prevention and home care services.

Over the projection period, population aging will keep driving health care costs up, compelling provincial governments to increase health care funding. The commitment of many provinces to reduce wait times at emergency rooms and for surgical procedures and specialized treatments

is expected to boost government spending and output growth in health care. Real GDP growth is projected to average 3.2% annually from 2017 to 2026, a notable acceleration from the previous ten years. Employment growth, however, is projected to slow significantly, averaging 1.9% per year, but still exceeding the pace of job creation projected for the Canadian economy. Slower job creation primarily reflects labour shortages in high demand occupations (such as doctors and nurses) and fiscal challenges in provinces. Indeed, over the longer term, demographic changes will constrain employment and real GDP growth in Canada, which in turn will reduce growth in government revenues, thus limiting the capacity of governments to increase expenditures, including spending on health care services. In such a context, health care providers are expected to keep developing innovative approaches and implement new labour-saving ways of delivering services, leading to renewed growth in productivity. New models of services delivery include the expansion of the private sector involvement in the provision of health care services, the growing use of home care for terminally ill patients, and the consideration of permitting nurses and pharmacists to perform services that used to be provided by doctors. E-health and other alternative delivery models enhanced by technology are also playing an important role in almost all processes, including patient registration, data monitoring, lab tests and self-care tools. Smartphones and tablets are starting to replace conventional monitoring and recording systems, and people are now given the option of undergoing a full consultation in the privacy of their homes. Services are being taken out of hospital walls and integrated with user-friendly accessible devices. In addition to implementing procedures and technology to improve efficiency in the delivery of health care services, providers will continue to take steps to contain costs in the system. Such initiatives include sending patients home the same day following joint replacement surgeries. By receiving follow-up care at home, those patients are far less expensive than those staying overnight in a hospital. The increased use of midwives in some provinces and shorter hospital stays following birth are other measures that will continue to lower costs in the system. Those initiatives are crucial over the long term given the growing pressures anticipated on public health care funding brought by demographic changes.

### **Social Assistance (NAICS 6241; 6242; 6243; 6244)**

This industry comprises establishments primarily engaged in providing social assistance such as counselling, welfare, youth protection, community housing, vocational rehabilitation and child care. It is composed of four segments: individual and family services which include child and youth services and services for the elderly and persons with disabilities; community food and housing, and emergency and other relief services; vocational rehabilitation services such as providing job counselling, job training and work experience to unemployed or underemployed persons and persons with disabilities; and child day-care services, including pre-kindergarten educational programs. Individual and family services along with child day-care services are the two largest segments of the industry, accounting for 47% and 46% of employment respectively in 2016. The remaining share of employment (7%) is evenly split between the other two segments. The 4-digit NAICS breakdown for GDP is not available. Overall, the industry employed 503,900 workers in 2016, with a workforce primarily composed of women (88%) and characterized by a significant concentration of part-time workers (24%). Employment is

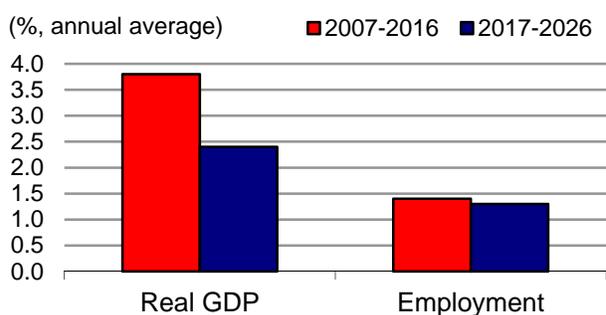
distributed almost proportionately to population: 34% in Ontario, 31% in Quebec, 12% in British Columbia, 9% in Alberta, and 15% in the remaining provinces. Key occupations (4-digit NOC) include:

Early childhood educators and assistants (4214)  
 Social and community service workers (4212)  
 Home support workers, housekeepers and related occupations (4412)  
 Social workers (4152)  
 Family, marriage and other related counsellors (4153)  
 Managers in social, community and correctional services (0423)

Social policy researchers, consultants and program officers (4164)  
 Cooks (6322)  
 Registered nurses and registered psychiatric nurses (3012)  
 Employment counsellors (4156)  
 Instructors of persons with disabilities (4215)

Social assistance is a central component of Canada's welfare state. It comprises a set of need-based, last-resort income programs for Canadians who require support for a variety of reasons, including financial difficulties during bad economic times. As a result, many components of social assistance are inversely related to negative fluctuations in Canada's economy. Demographic trends also have a significant impact on demand for social assistance, particularly for services provided to child, youth and the elderly. During and shortly after the recession of 2008-2009, output increased at an accelerating pace as the slump in the economy forced many Canadians to seek welfare in response to the rapid increase in unemployment. Output growth slowed from 2011 to 2013 when the economy was doing better, before accelerating again from 2014 to 2016, largely reflecting economic difficulties and the surge in unemployment in the oil-producing provinces (Alberta, Saskatchewan and Newfoundland-Labrador) following the collapse in crude oil prices. Renewed growth in child population (ages 1-4 and ages 5-11) and accelerating growth in population aged 65 and over also contributed to expand output in social assistance during the past decade, particularly in child day-care services and individual and family services, including services to the elderly. On average, real GDP in the industry increased at an annual rate of 3.8% over the period 2007-2016, largely exceeding the pace of growth in the Canadian economy. However, employment growth was much weaker, averaging 1.4% annually as a large part of growth in output was met by solid gains in productivity. Indeed, surging fiscal deficits in the afterwards of the 2008-2009 recession forced most provincial governments to restrain labour costs in social programs and implement innovative approaches to increase the efficiency of delivering services.

### Real GDP and Employment Growth Rates in Social Assistance



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the projection period, output growth in the industry is expected to weaken significantly relative to the period 2007-2016, largely reflecting stronger economic growth and robust labour market conditions in Canada in the short-term. The slower pace of growth anticipated in population aged 1 to 4 over the next ten years is also expected to lower output growth somewhat in child-day care services. On the other hand, population aging and faster growth in population aged 5 to 17 is expected to strengthen output growth in individual and family services,

particularly social services provided to the elderly, children and youth. Massive retirements of baby-boomers from the labour market are also projected to restrain growth in disposable income over the longer term, and those who have not managed to save enough to fund their retirement years may require financial support (a development made even more precarious by the fact that interest rates have remained at historically low levels since 2009, restraining the rate of return on financial assets). On average, real GDP in social assistance is projected to increase at an annual rate of 2.4% over the period 2017-2026, a notable deceleration relative to the previous ten years, essentially due to better economic prospects in the short-term (growth is expected to accelerate in the second half of the projection period). In comparison, the rate of growth in employment is projected to be relatively similar to the past decade, averaging 1.3% annually. Productivity should continue to account for a significant part of output growth, given additional pressures anticipated on public finances. Indeed, demographic changes are projected to constrain employment and real GDP growth in Canada in the longer term, which in turn will reduce growth in government revenues and limit the capacity of governments to increase expenditures, including spending on social services. In such a context, social assistance providers are expected to keep developing innovative approaches and implement new labour-saving ways of delivering services, leading to additional gains in productivity.

### **Public Administration (NAICS 9111-9119; 9121-9129; 9131-9139; 9141; 9191)**

Public administration comprises establishments primarily engaged in activities of a governmental nature at the federal, provincial, territorial, regional, municipal and local levels. It covers legislative activities, taxation, national defence, public order and safety, immigration services, foreign affairs and international assistance, and the administration of government programs. The industry includes not only public servants, but also members of the Canadian armed forces, policemen and firefighters. The federal administration is the the largest of the five segments, accounting for 38% of production and 37% of employment in 2016 (excluding full time members of the Canadian armed forces), followed by local, municipal and regional administration (32% of production and 33% of employment), and provincial and territorial administration (27% and 29%). Aboriginal administration along with international and other extra-territorial administration account for the remaining share of production and employment (3% and 1%). Overall, public administration employed 927,300 workers in 2016, distributed proportionately to population: 38% in Ontario, 26% in Quebec, 11% in British Columbia, 10% in Alberta, and 15% in the remaining provinces and territories. The workforce is evenly split between men (49%) and women (51%) and benefits from much higher wages than the national average, partly attributable to high unionization rates (72%). Given the wide variety of activities, key occupations (4-digit NOC) include a mix of:

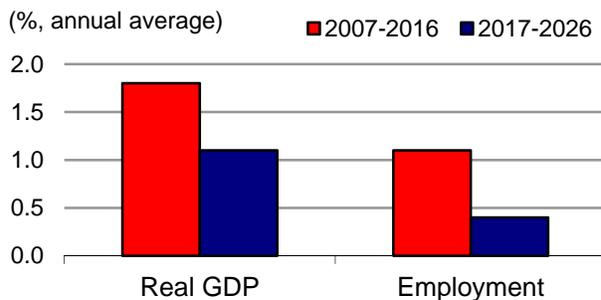
Police officers (4311)	Health policy researchers, consultants and program officers (4165)
Employment insurance, immigration, border services and revenue officers (1228)	Urban and land use planners (2153)
Government managers (0411-0414)	Civil engineering technologists and technicians (2231)
Social policy researchers, consultants and program officers (4164)	Correspondence, publication and regulatory clerks (1452)
Firefighters (4312)	Survey interviewers and statistical clerks (1454)
Information systems analysts and consultants (2171)	

Financial auditors and accountants (1111)  
 Correctional service officers (4422)  
 Lawyers and Quebec notaries (4112)  
 Computer programmers and interactive media developers (2174)  
 Security guards and related security service occupations (6541)  
 User support technicians (2282)  
 Natural and applied science policy researchers, consultants and program officers (4161)  
 Public works and maintenance labourers (7621)  
 Purchasing agents and officers (1225)  
 Civil engineers (2131)  
 Senior government managers and officials (0012)  
 Economists and economic policy researchers and analysts (4162)  
 Executive assistants (1222)  
 Financial managers (0111)  
 Construction inspectors (2264)  
 Inspectors in public and environmental health and occupational health and safety (2263)

Probation and parole officers (4155)  
 Database analysts and data administrators (2172)  
 Program officers unique to government (4168)  
 Court officers and justices of the peace (1227)  
 Data entry clerks (1422)  
 By-law enforcement and other regulatory officers, n.e.c. (4423)  
 Biologists and related scientists (2121)  
 Biological technologists and technicians (2221)  
 Legislators (0011)  
 Court clerks (1416)  
 Engineering inspectors and regulatory officers (2262)  
 Agricultural and fish products inspectors (2222)  
 Translators, terminologists and interpreters (5125)  
 Technical occupations in geomatics and meteorology (2255)  
 Mathematicians, statisticians and actuaries (2161)  
 Judges (4111)  
 Physicists and astronomers (2111)  
 Meteorologists and climatologists (2114)

During and shortly after the recession of 2008-2009, the various programs put in place by the federal and provincial governments in order to stimulate the economy boosted output and employment in public administration. As a result, from 2007 to 2011, real GDP and employment growth in this industry averaged 3.6% and 2.0% per year respectively. However, lower tax revenues and increased public spending resulted in large fiscal deficits across all levels of governments. Starting in 2012, the federal and provincial governments announced plans to curtail growth in spending programs in order to balance their budgets. This led to marginal declines in output and employment in public administration from 2012 to 2015. The federal government was the most restrictive in terms of program spending in order to achieve a balanced budget by 2014-2015. While the federal administration was successful in achieving its goal, the situation deteriorated again following the collapse in crude oil prices, as weaker economic growth in Canada reduced growth in government revenues. In 2016, the federal government increased spending significantly to stimulate the economy, strengthening output growth in public administration. This development, combined with hiring related to the 2016 Census, led to a notable rebound in employment. On average, real GDP in public administration increased at an annual rate of 1.8% over the period 2007-2016, compared to 1.1% for employment. Fiscal challenges were the main factors behind the creation of more efficient models to improve government program management and public services delivery, resulting in healthy gains in productivity.

**Real GDP and Employment Growth Rates in Public Administration**



Sources: Statistics Canada (historical) and ESDC 2017 COPS industrial scenario (projections).

Over the period 2017-2026, output and employment growth in public administration is projected to weaken significantly relative to the previous ten years, primarily reflecting additional pressures on public finances resulting from demographic changes. Slower growth in the working-age population and the decline anticipated in the overall participation rate due to population aging are projected to lower the pace of growth in the Canadian labour force over the long term, restraining employment and economic growth in the country, which in turn will affect growth in government revenues. In addition to erode the federal and provincial tax bases, population aging will put further pressures on the health care system, limiting the ability to expand expenditures in government programs and public administration. This double-edged sword will certainly lead to a prolonged period of cost containment for governments who already find themselves in delicate fiscal positions. As a result, real GDP growth in public administration is projected to average 1.1% annually from 2017 to 2026, a significant slowdown relative to the previous ten years. The deceleration in employment growth is projected to be even more pronounced, with job creation averaging only 0.4% per year, less than half the pace recorded from 2007 to 2016. By the end of the projection period, government hiring is expected to be negligible. In addition to fiscal constraints, the weaker pace of growth anticipated in Canada's labour supply and the gradual tightening of the labour market are expected to induce governments to automate some of their operations and to keep implementing new labour-saving ways of delivering services, leading to further gains in productivity. With rapid advancements anticipated in cognitive technologies, government operations involving routine tasks (in occupations such as clerks, inspectors and program officers) are expected to become increasingly automated and performed by specialized software, smart systems and online applications, while those involving non-routine tasks (in occupations such as researchers, analysts and scientists) are expected to become increasingly complemented and enhanced by big data analytics, artificial intelligence and machine learning.