

Economic Insights

The Decline in Production and Investment in Canada's Oil and Gas Sector and its Impact on the Economy

by Weimin Wang

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The Decline in Production and Investment in Canada's Oil and Gas Sector and its Impact on the Economy

by Weimin Wang, Economic Analysis Division, Statistics Canada

This *Economic Insights* estimates the economic impact of the potential decline in production and investment in the oil and gas industry due to recent shocks in oil prices. Oil prices dropped sharply in March as the COVID-19 pandemic unfolded and as Russia and Saudi Arabia failed to reach an agreement to support oil prices by limiting production. In response, oil companies in Canada reacted by adjusting down both capital expenditures and production plan in 2020. This article uses input-output multipliers to estimate the impact of such cut backs in production and investment on GDP growth and jobs in the total economy under different scenarios.

Background

The oil and gas industry is an important contributor to the Canadian economy, especially in Alberta. From the year 2000 onwards, its share in the total economy averaged about 5% of Canadian and 21% of Albertan GDP. Its share of jobs was 0.4% and 2.9% in Canada and Alberta, respectively.¹ The recent decline in oil prices will have a large impact on Canada's oil and gas industry, which in turn will affect other industries. This article estimates the economic impact of the potential decline in production and investment in the oil and gas industry due to recent shocks on the Canadian economy in 2020 using input-output multipliers².

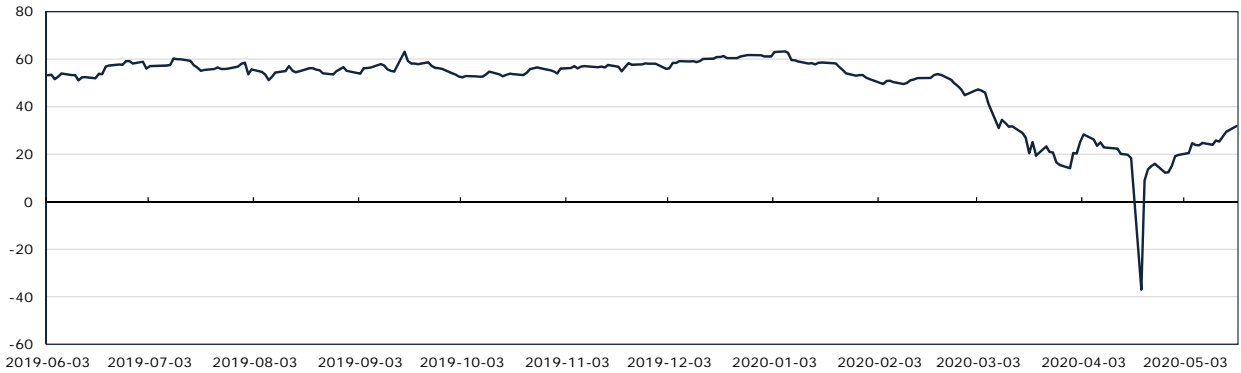
Oil prices dropped sharply in March as the COVID-19 pandemic unfolded and as Russia and Saudi Arabia failed to reach an agreement to support oil prices by limiting production. On Monday, March 9, 2020, U.S. West Texas Intermediate (WTI) crude fell around 30 percent to US\$27 a barrel. Since then, the WTI has slid further, to about US\$20 a barrel in the mid-April. It turned negative on April 20, closing at -US\$37.63 per barrel (Chart 1). Although this was temporary³, it exposed current constraints in the system for storage. At the same time, the Western Canadian Select (WCS), the benchmark indicator that is widely used to track the price for oil produced in the Alberta oilsands, dropped below US\$5 a barrel on average in April, its lowest level ever. WCS had been as low as US\$16 in early 2016 and US\$6 in 2018, but it began 2020 at just over US\$36 a barrel (Chart 2).

1. The job shares are much lower than the GDP share because the oil and gas industry is capital intensive.
2. The scope of the study is limited to the impact of prices through production and investment cuts as there are other channels through which prices will have an impact (cost of production in other sectors, consumer demand, etc.).
3. Since April 20, WTI has posted a strong rally, to above US\$30 per barrel in mid-May.

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Chart 1
Daily West Texas Intermediate price, June 2019 to May 2020

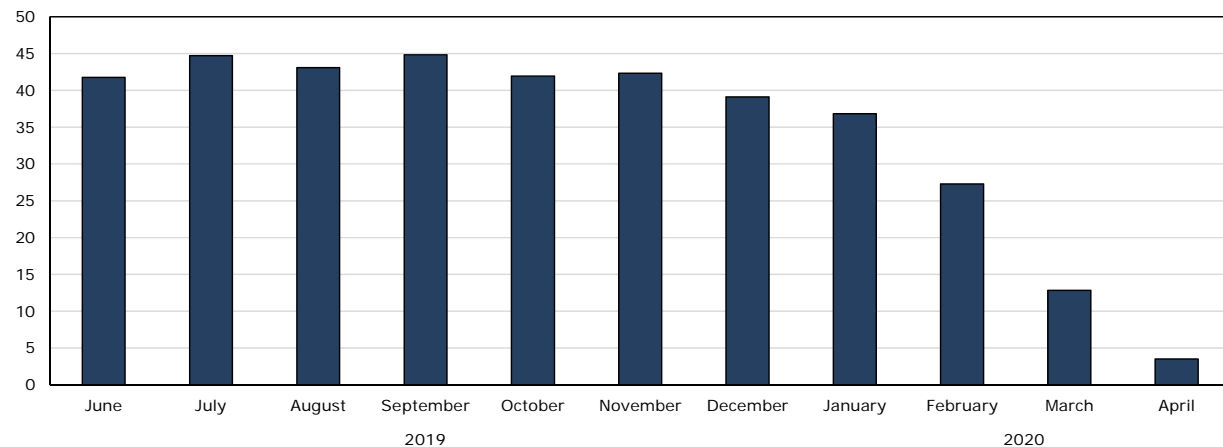
WTI price in U.S. dollars



Note: WTI = U.S. West Texas Intermediate.
Source: Federal Reserve Bank of St. Louis (<https://alfred.stlouisfed.org/series?seid=DCOILWTICO>).

Chart 2
Monthly Western Canadian Select price, June 2019 to April 2020

WCS price in U.S. dollars



Note: WCS = Western Canadian Select.
Source: Government of Alberta, 2020, "Oil Prices," Economic Data. <https://economicdashboard.alberta.ca/OilPrice>.

The oil price decline is related to changes in both supply and demand. The COVID-19 pandemic is resulting in layoffs, closures of non-essential businesses and travel restrictions, all of which have implications on the global demand for oil. The International Energy Agency states in its April 2020 "Oil Market Reports" that global oil demand is expected to fall by a record 9.3 million barrel per day year-on-year in 2020 (IEA 2020).

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Companies in the Canadian oil and gas sector reacted quickly to the drop in oil prices by adjusting capital expenditures. One major company, Suncor, put projects on hold and cut its 2020 capital budget by about \$1.5 billion, or 26%, to deal with lower oil prices. It now anticipates spending between \$3.9 billion and \$4.5 billion (Suncor Energy 2020). Husky Energy Inc. announced a reduction of its planned capital spending by \$1.7 billion or by 50% (Husky, 2020a), Cenovus Energy cut its capital expenditure by 43% from \$1.3-1.5 billion to \$0.75-0.85 billion (Cenovus, 2020), Pembina Pipeline Corp. slashed its capital spending plan by \$900 million (45%) to \$1.1 billion (Pembina, 2020), Enerflex Ltd. revised spending down by 57% from \$210 million to \$90 million (Enerflex, 2020), Cardinal Energy Ltd. reduced its capital budget to a minimal level by 54% from \$67 million to \$31 million (Cardinal, 2020), Enerplus Corp. reduced its 2020 capital spending plans by 40% to \$325 million (Enerplus, 2020), Vermilion Energy Inc. trimmed its capital expenditure budget by \$80-100 million (20%) to \$350-370 million in 2020 (Vermilion, 2020), and Crescent Point Energy Corp. revised its capital spending plans down by 35% to \$700-800 million (Crescent Point, 2020).

Production was also trimmed by companies in the Canadian oil and gas sector subsequent to the sharp decline in oil prices. For instance, Suncor reduced its 2020 production guidance by 60,000 barrels (8%) of oil equivalent per day (BOE/DAY) to about 740,000 to 780,000 BOE/DAY (Suncor, 2019b and 2020), Husky reduced its production by 20 million BOE/DAY (7%) to 275-300 million BOE/DAY (Husky, 2020b), Cenovus revised down its production by 5-6% (Cenovus, 2020), and Crescent Point cut its production by 10,000 BOE/DAY to 130,000 (8%) to 134,000 BOE/DAY (Crescent Point, 2020).

The input-output framework

The cuts to the oil and gas industry's capital spending and production will impact the economy. A million dollar reduction in oil and gas production has a direct effect on the total economy by the same dollar amount. But an exogenous shock to the sector will also reverberate to the broader economy. As production and investment decline in the oil and gas industry, so does the demand for the inputs the sector uses. The reduction in the production of these inputs by other industries is called the indirect effect. Both the direct and indirect effects also cause employees' income and hence their spending to fall. Therefore, businesses serving the needs of these affected employees will be also experiencing falling demand. This impact is referred to as the induced effect of the shock.

The total impact of the decline production and investment in the oil and gas industry on the Canadian economy, including the indirect and induced effects, can be quantified using input-output multipliers derived from supply and use tables. According to Statistics Canada (2018), these multipliers "... provide a measure of the interdependence between an industry and the rest of the economy." They summarize the direct, indirect, and induced effects any exogenous change (shock) to production and/or capital expenditure in the oil and gas industry has on the overall economy.

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Based on the 2016 supply-use table, Canada's oil and gas industry uses goods and services from all industries except agriculture, education services, health services, arts, entertainment, and recreation services. The oil and gas industry's major suppliers of its inputs include manufacturing (18.7%), finance, insurance, and real estate services (18.8%), other mining industries (15.0%), professional services (12.8%), administrative services (7.9%), and the oil and gas industry itself (7.4%).⁴

The detailed information that allows the characterization of the structure of the Canadian economy and the forward and backward linkages between industries is available only with a lag. The estimates in this article use the 2016 supply-use tables, which are the latest available from Statistics Canada. However, the structure of the economy evolves slowly, so the lag should have a minimal impact on the estimates in the scenarios discussed in the next section.

Estimated impact of the potential decline in investment and production in the oil and gas sector on GDP and jobs

The first step in estimating the potential decline in investment and production in the oil and gas sector using the input-output multipliers is to determine the size of the exogenous shock on production and investment. The reactions of specific companies in the oil and gas sector to the decline in oil prices suggest a possible range of outcomes. As described in the background section, many companies have revised downward their capital expenditures by 20% to 57%⁵, and their production by 5% to 8%.⁶ It is unclear how representative these specific firms' declines are for their industry in general. Therefore, three scenarios are presented for the total industry. In the first scenario, capital expenditures are assumed to decline 30%⁷ and production is assumed to decline by 7%. In the second scenario, the industry's capital expenditures and production are assumed to fall by 40% and 10%, respectively. In the third scenario, capital expenditures and production are assumed to fall by 20% and 5%, respectively.

Ratios that map changes in production and investment into changes in GDP and jobs in the oil and gas sector and shares that relate changes in the oil and gas sector to changes in the total economy are used to calculate the direct effect of each scenario on these variables. Using the most recent values for these ratios and shares, the direct impact of the first scenario's 7% decline in output and a 30% decline in investment in the oil and gas industry is equivalent to a 0.7% drop in GDP and a decline of 23,122 in the total number of jobs.

4. Author's calculation based on Statistics Canada data table 36-10-0478.

5. The percentage deduction in capital spending here is compared with its planned level in 2020, not the 2019 level. However, this has little impact on scenarios considered in this article. This is because the year-over-year change in capital investment is much smaller than the percentage cut in capital spending after the oil price shock. For example, Suncor planned with a flat investment in oil related projects in 2020 (see Suncor 2019a).

6. Company reports are used because the official Statistics Canada estimates are not available now. Statistics Canada will release its 2020 first and second quarter GDP in May and August 2020, and its annual 2020 GDP in February 2021.

7. This is consistent to a statement made in the Bank of Canada (2020) that "on average, companies had revised their 2020 capital spending plans down 30 percent compared with 2019".

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Input-output multipliers derived from the 2016 supply-use tables are used to calculate the indirect, induced and total impacts. Based on the relative values of these multipliers, the indirect and induced effects of a shock in the oil and gas industry are 77% and 37% of its direct effect on GDP and 388% and 203% of its direct effect on jobs, respectively. This means that for each dollar in lost GDP in the oil and gas industry, \$1.14 is lost in other industries due to indirect (\$0.77) and induced (\$0.37) impacts. For each job lost in the oil and gas industry, 6 jobs are lost in other industries (4 through indirect effects and 2 through induced effects).

The estimated impacts under the three scenarios are presented in Table 1. Under scenario 1, GDP is reduced by 1.5% and the total number of jobs by 159,810, relative to what they would have been without the change in oil prices⁸.

The composition of the total effects are quite different for GDP and jobs. The shares of direct, indirect, and induced effects in total are 47%, 36%, and 17% for GDP, and 15%, 56%, and 29% for jobs, respectively. That is, 53% of decline in GDP and 85% of job losses due to a shock in the oil and gas industries are expected to take place in other industries. The much greater indirect and induced effect on jobs relative to output can be explained by the fact that the oil and gas sector is one of the most capital-intensive sectors in Canada.

Unless supply and demand conditions for oil and gas unexpectedly improve during the course of 2020, the results suggest that the anticipated reduction in oil and gas production and investment will be dramatic and will lead to significant drops in GDP and total number of jobs in the total economy.

The estimated impacts in this article need to be interpreted with caution. First, given the nature of the shocks facing the sector, demand and supply conditions for oil and gas are highly uncertain and may play out much differently than the scenarios analysed. Second, there are several assumptions behind input-output models, including that: inputs are used in fixed proportions as output is increased or decreased; firms within an industry use the same production process; and prices are fixed. These assumptions can lead to an overstatement of the impacts of a shock if firms can tailor their technology to their new economic conditions, firms are heterogeneous in their capacity to respond to shocks, and/or prices are flexible. Third, the article has focused on the impact of the oil price shock through production and investment in the oil and gas sector. Other channels through which oil prices affect the economy have not been explored.

8. The impact of declines in production and investment are combined in the study. Estimates that separate the impact of the decline in production from that of the decline in investment are available upon request.

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Table 1
Percentage differences from baseline GDP level and total number of jobs in the total economy in 2020 due to the oil price shock

	Scenario 1		Scenario 2		Scenario 3	
	Production -7%		Production -10%		Production -5%	
	Investment -30%		Investment -40%		Investment -20%	
	GDP	Jobs	GDP	Jobs	GDP	Jobs
Direct	-0.70%	-23,122	-1.00%	-32,117	-0.50%	-16,058
	(47%)	(15%)	(47%)	(15%)	(47%)	(15%)
Indirect	-0.50%	-89,664	-0.70%	-124,544	-0.40%	-62,272
	(36%)	(56%)	(36%)	(56%)	(36%)	(56%)
Induced	-0.30%	-47,023	-0.40%	-65,316	-0.20%	-32,658
	(17%)	(29%)	(17%)	(29%)	(17%)	(29%)
Total	-1.50%	-159,810	-2.00%	-221,976	-1.00%	-110,988
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)

Note: GDP = Gross domestic product.

Source: Statistics Canada, author's calculation.

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