FUELLING CANADA'S MIDDLE CLASS

Job Polarization and the Natural Resource Sector

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CARDUS

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EXECUTIVE SUMMARY

Shifting to lower-emitting sources of energy is a broadly shared policy priority in Canada due to the need to reduce greenhouse gas emissions and ultimately tackle climate change. Yet as important as these efforts are, they can sometimes fall victim to abstraction and lose sight of the people and places affected. This analytical gap is particularly important in light of the increasing bifurcation of economy-wide employment into low-skilled and high-skilled occupations caused by technological change and globalization.

Where other national economies have experienced a "vanishing middle," Canada's natural-resources sector in general, and oil and gas in particular, has counteracted the trend of job polarization by providing well-paying, mid-skilled jobs that have sustained Canada's middle class in recent decades. As of 2018, the sector directly employed over 269,000 Canadians and indirectly employed another 500,000. Average weekly earnings in this sector are more than two times higher than the national industrial average.

The prospect that the number of these jobs may significantly decline is particularly worrisome given that the natural resource sector has sustained employment and incomes for Canadians without post-secondary credentials. This has similarly counteracted trends in the broader labour market, which has exhibited a growing education premium. It is important to remember that more than one-third of working-age Canadians do not have post-secondary credentials; even among younger cohorts, the percentage with a high school diploma or less is still above 30 percent. Levels of educational attainment also vary among regions.

The upshot: The impact of resource-based job losses will disproportionately fall on low- and mid-skilled workers, particularly those without post-secondary credentials. Policy-makers must therefore place the people and places affected at the centre of the policy-making process. In particular, they must ensure that the burden of climate action is broadly distributed and that the focus should be on lowering the emission intensity of the sector rather than abandoning resource development altogether.

INTRODUCTION

There has been plenty of talk in recent months about the need to "transition away from fossil fuels" (Hennig 2019) and that "oil is dead" (May 2020). These pronouncements are driven by legitimate concerns about climate change and the contribution of fossil fuels—including oil, gas, coal, and so on—to the country's greenhouse gas emissions. They are finding increasing expression as Canadian policy-makers develop post-COVID recovery strategies including the prospect for a major emphasis on "green" investments and clean technology.

Shifting to lower-emitting sources of energy is a right priority over the short and long term. But we cannot afford to have these public-policy discussions in a world of abstraction. There are people, families, and communities involved. Climate-policy actions will invariably cause some level of employment disruption that is concentrated among certain people and places. The onus is on policy-makers to reckon with these real-life impacts of different policy options.

We also cannot have these policy debates in isolation. They are occurring against a backdrop of growing labour-market bifurcation driven by technology and trade. Countries such as Canada are experiencing job polarization as the relative shares of low- and high-skilled occupations grow and the percentage of mid-skilled employment shrinks. What we describe in this paper as the "vanishing middle" poses particular challenges for working-class Canadians. The natural-resources sector[1] in general and oil and gas in particular have generally counteracted these trends. They have provided well-paying jobs for this vulnerable cohort and in turn sustained Canada's middle class for the past two decades (Milligan 2018).

It is critical, then, that policy-makers are cognizant of the benefits and costs of climate policies that target these sectors. Policy analysis frequently assesses the economy's capacity to substitute high-emitting energy sources with lower-emitting ones, but it rarely considers the employment-substitution options available to the affected workers. This is, in our view, a major analytical gap.

The consequences could be significant for Canada's economy and its labour market—particularly for men without post-secondary qualifications. Consider the following:

- Notwithstanding the sustained challenges facing the energy sector, as of 2018 it still employed more than 280,000 Canadians and it exceeded more than half a million when one also considers indirect employment (Government of Canada 2020).
- Average weekly earnings for those in the oil and gas sector (as well as mining and quarrying) are more than two times higher than the national industrial average and even one and a half times higher than in finance and insurance.
- Working-age men in Alberta with an apprenticeship or trade certificate earn more, on average, than men with a bachelor's degree in every other province.
- Median earnings for working-age men with only a high school diploma are 20 percent higher in Saskatchewan and nearly 30 percent higher in Alberta than those of their peers in the rest of the provinces.
- The impact of resource-based job losses would disproportionately fall on low- and mid-skilled workers. Recent drops in employment are a good (or bad) proof point: The loss of working-class jobs in the oil sands in 2015 and 2016 was nearly quintuple the losses among the white-collar positions according to one estimate.

These facts underscore the importance of the natural-resources sector in general, and oil and gas in particular, in acting as a ballast against labour-market disruption for a significant number of working-class Canadians. It is no surprise therefore that nearly 60 percent of Canadians believe that the oil and gas sector is highly important today and close to 45 percent anticipate it will remain highly important in the future (Aguirre, Bird, and Gattinger 2020).

The purpose of this paper is not to challenge Canada's climate-change objectives or specific climate policies. Every major political party in Canada has committed to achieving the country's targets to reduce greenhouse-gas emissions by 30 percent below 2005 levels by 2030. Meeting this goal will necessarily have implications for the natural-resources sector in general and oil and gas in particular.

1 Defined as the energy, minerals and mining, forestry, and hunting, fishing, and water industries. See Statistics Canada 2020.

Our aim is to help policy-makers think clearly about the trade-offs inherent in these policy choices and the need for a credible plan for affected workers and communities. It is a rejoinder to those involved in climate-policy debate who would treat the affected workers and communities as chess pieces that can just be moved around the board. Our public-policy debates must ultimately be rooted in people and places.

Section 1 outlines the growing trend of job polarization in Canada and other developed countries. Section 2 considers the increasing educational wage premium and the state of educational attainment in Canada. Section 3 sets out the role of the natural-resources sector in general and oil and gas in particular in sustaining employment and opportunity for working-class Canadians. Section 4 highlights the need for policy-makers to root climate policies in particular, and public policy in general, in a clear understanding of the people and places that are affected by their choices.

THE VANISHING MIDDLE: LABOUR-MARKET BIFURCATION

Political debates about "shutting down the oil sands" (Walkom 2018) are not occurring in a vacuum. They are taking place against a backdrop of significant labour-market changes that are reshaping market demand, opportunities, and earnings along skill-based lines. This process is sometimes referred to as a "skills-biased technological change."

Skills-biased technological change describes a shift in production technology and the economy overall that favours skilled over unskilled labour by increasing its relative productivity and in turn the relative demand for it (Violante 2008). The basic idea here is that the technological innovation in recent decades has produced concentrated productivity gains for those with post-secondary qualifications. The result is a technology-driven skills bias in employment opportunities, wages, and other labour-market outcomes.

Trade-induced dislocation has also played a role in this trend. Increased globalization has contributed to certain sectors and occupations shifting from developed countries to developing countries in search of lower costs (Federal Reserve Bank of St. Louis 2017). Manufacturing is a good example. Estimates by the Centre for the Study of Living Standards, for instance, show that the so-called China Shock—that is, import penetration from China—contributed to a net loss of 113,000 manufacturing jobs in Canada between 2001 and 2011 (Kim 2018). These losses were sustained primarily among low- and mid-skilled workers.

Our observation about low- and mid-skilled workers is worth elaboration. Statistics Canada and others categorize the labour force according to low-, mid-, and high-skilled occupations.[2] The goal of this categorization is to analyze the composition of jobs in the economy based on a combination of characteristics, including typical educational requirements and an assessment of whether the occupations involve abstract, routinized, or manual work.

Reading employment and labour-force-participation statistics through a skill-level lens also permits us to better understand how the twin forces of technology and trade are affecting the labour force.

2 See, for instance, Statistics Canada 2016a.

We can go deeper than the aggregate effects and see which occupations are bearing the brunt of economic dislocation. The evidence is overwhelming: technological innovation and globalization are disproportionately affecting mid-skilled occupations and in turn contributing to rising inequality particularly at the bottom of the income distribution (Bussolo, Torre, and Winkler 2018).

This is intuitive when one thinks about it. High-skilled jobs and low-skilled jobs are less routinized than mid-skilled ones and in turn less susceptible to disruption by technology, offshoring, and import penetration from low-cost jurisdictions. Think of a high-end litigator on the one hand and a restaurant server on the other. The former requires specialized skills that are not easily automated or offshored, and the latter requires physical proximity that cannot be substituted. Mid-skilled occupations, such as a production-line worker in a manufacturing plant, by contrast, tend to be highly routinized and in turn are much more susceptible to a combination of technology- and trade-induced dislocation (Abel and Deitz 2012).

The result is what some economists have referred to as "job polarization" (Boehm 2014). It refers to the modern economy's tendency to disproportionately produce employment growth in occupations at the top and bottom of the skills distribution and a smaller share in jobs at the middle. Labour economist David Autor has described this shift as a U-shaped distribution of employment rooted in skills and credentials (Canon and Marifian 2013). Others have termed it the "hourglass economy" (Lake 2018). We call it the "vanishing middle."

Labour-market disruption caused by technology and trade is, of course, not new. Past episodes such as the industrial revolution exhibited similar and even heightened levels of disruption than what we have witnessed in recent decades. But what is unprecedented about the current experience is that it is reshaping the composition of the labour force along skills-based lines (Buyst, Goos, and Salomons 2018).

Who is in the middle? What sectors and people are affected?

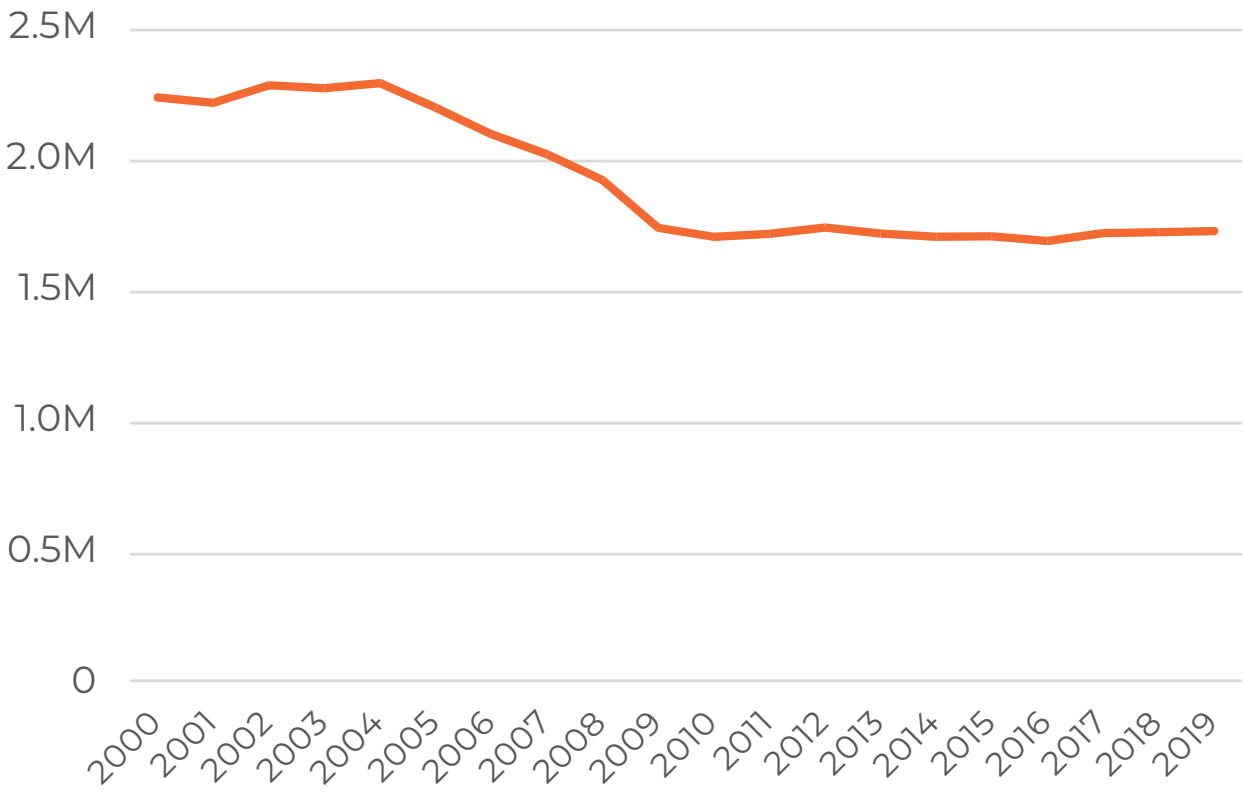
Job polarization has been felt most acutely in the manufacturing sector. It has typically had the largest share of routinized work across the economy and, as a result, has been most susceptible to the twin forces of technology and trade. Research shows that the decline in manufacturing employment has had a marked impact on job polarization in countries such as Canada and the United States (Bárány and Siegel 2019).

Consider, for instance, a 2017 Ball State University study that estimates that had the US manufacturing sector maintained 2000-levels of productivity (as defined by output per worker) and applied them to 2010-levels of production it would have had about 8 million more workers (Hicks and Devaraj 2017).

Think about it for a minute: technology-driven productivity has permitted US-based manufacturers to maintain and even grow manufacturing production with 40 percent fewer workers in a seventeen-year period. A large share of the displaced workers (a number equal to the entire population of New York City) fell into the mid-skilled classification as the sector became more specialized. And that does not even account for the role of trade and globalization in reshaping manufacturing employment.

The situation is no different here in Canada. A 2020 study by Statistics Canada shows that manufacturing employment fell by roughly half a million workers between 2000 and 2019 (see

FIGURE 1. MANUFACTURING EMPLOYMENT IN CANADA, 2000 TO 2019



SOURCE: TABLE 14-10-0023-01, STATISTICS CANADA 2020.

figure 1). This drop in employment was concentrated geographically in southwestern Ontario in general and among men without post-secondary qualifications across the country in particular (Morissette 2020).

But manufacturing is hardly the only sector affected by these trends—in fact, one study estimates that the sharp decline in manufacturing employment is responsible for roughly 40 percent of job polarization (Canon and Marifian 2013). Examples of other mid-skilled occupations include sales, office and administrative support, construction, maintenance and repair, transportation, and material moving. These jobs may require differing levels of educational credentials, but what is broadly shared among them is that they are generally procedural, rules-based, and routinized. These common characteristics are what make them highly susceptible to automation or offshoring. Mid-skilled occupations that are less susceptible are those that are highly geographically specific—construction and maintenance and repair (Buildforce 2020), for instance—and thus difficult to offshore or automate. This geographical link, as we will discuss below, is critical for thinking about employment policy.

Job polarization extends beyond North America. A 2017 study published by the Organisation for Economic Co-operation and Development (OECD), for instance, found that of twenty-three advanced economies studied, every one of them saw their aggregate share of mid-skilled jobs fall between the mid-1990s and 2015 (OECD 2017). The average percentage-point change in the share of mid-skilled jobs during this period was -9.5. The highest was Austria, at -16.8 percentage points. Canada was below the average, at -6.2 percentage points (see table 1).[3]

This is broadly consistent with other Canadian-based research. Consider:

- A 2017 study published by the Institute for Competitiveness and Prosperity found that between 2001 and 2015 the Province of Ontario "experienced a hollowing out of its typically medium-skilled, routine cognitive and manual occupations" (Institute for Competitiveness & Prosperity 2017).
- A 2019 C.D. Howe Institute study examined changes in the labour market's automation risk between 1985 and 2017. It found that the share of high-risk occupations (or jobs that require less adaptive skills) fell to 40 percent in 2015 from 50 percent in 1987. Similarly, the share of jobs in low-risk occupations (or jobs that require more adaptive skills) increased to 37 percent from 27 percent over the same period (Wynoch 2018).
- A major 2015 study by economists David Green and Benjamin Sand examined job polarization in Canada from 1970 to 2010. They found that the Canadian experience between 1970 and 2000 broadly conforms to what the research found elsewhere. Canada's labour market witnessed a relative increase in low- and high-skilled employment during this period. What is interesting though is that Green and Sand discovered that the polarization stopped in 2000. They speculate that the cause was the resource boom acting as an "employment alternative to low-paying services jobs" (Green and Sand 2015a).

We will return to this point in later sections. But there are three basic takeaways to draw so far. One is that Canada and other countries have experienced a job polarization in their labour markets for the past three decades or so due to a combination of technology and trade. The result is a U-shaped labour market in which the overall number of jobs is unaffected but where employment is growing faster at the high-skilled and low-skilled ends of the market than in the middle. A second is that Canada's job polarization is less marked than in European countries and generally similar to the experience in the United States. The third is that Canada's job polarization slowed during the first decade or so of the 2000s, and the resource boom that produced tremendous demand for mid-skilled workers was a major factor acting as a brake on mid-skill job losses.[4]

3 Measuring the relative role of globalization and technology in producing job polarization in advanced economies is challenging. A major literature review produced for the International Labour Organization found that the research generally points more to technology-induced dislocation than to offshoring. One of the challenges is that treatment of an occupation's skill level may differ between developed and developing countries. So, for instance, a low-skilled job in Canada may be characterized as a mid-skilled job in Vietnam. There is nevertheless some evidence that the decline in mid-skilled jobs in developed countries has been partly reflected in an uptick in mid-skilled jobs in developing countries. See Gemmel 2016.

4 A 2015 study for the Harvard Business School found a similar phenomenon in the United States, where the launch of shale gas development produced significant, new employment opportunities for mid-skilled workers. The paper estimates that 50 percent of the jobs created in shale gas production were mid-skilled. See Porter, Gee, and Pope 2015.

TABLE 1. PERCENTAGE-POINT CHANGE IN SHARE OF TOTAL EMPLOYMENT BY SKILL LEVEL (BOTH SEXES), 1995 TO 2015

OECD Countries	Low-Skilled Jobs	Mid-Skilled Jobs	High-Skilled Jobs
Austria	3.0	-16.8	1.4
Switzerland	0.0	-15.6	15.6
Ireland	0.7	-15.1	14.4
Spain	3.4	-13.6	10.2
Greece	8.7	-13.2	4.5
Denmark	4.5	-12.7	8.2
France	4.1	-12.1	8.0
Sweden	3.0	-11.0	8.0
Portugal	2.7	-10.7	8.0
United Kingdom	1.1	-10.2	9.1
Norway	3.9	-10.0	6.1
Netherlands	4.2	-9.7	5.5
Finland	0.8	-9.7	8.9
Italy	4.6	-9.3	4.8
Germany	3.4	-8.2	4.7
Belgium	1.4	-7.3	6.0
United States	1.2	-6.6	5.3
Slovenia	-2.3	-6.5	8.8
Slovak Republic	0.9	-5.4	4.5
Japan	2.6	-5.2	2.5
Hungary	-5.0	-2.5	7.5
Czech Republic	-5.0	-2.1	7.1
Canada	1.8	-6.2	4.3
TOTAL	**1.9**	**-9.5**	**7.6**

SOURCE: OECD 2017.

THE GROWING EDUCATION PREMIUM: EDUCATION AND EARNINGS

One of the most significant manifestations of the trends described above is a growing education premium in the labour market. Job polarization is contributing to greater and greater returns for certain credentials and cognitive skills and placing less market value on aptitudes and skills historically associated with mid-skilled occupations. As leading labour economist David Autor has put it, "Changes in the nature of work—many of which are technological in origin—have been more disruptive and less beneficial for non-college than college [i.e., university] workers" (Autor 2019).

The education premium in the labour market has been evident across the world for the past thirty-five years. It has increased more rapidly and more slowly at different times and places, but the general trend has been clear. Economists attribute it in large part to the growing use of computers and related technologies in the workplace and the correlation between technological know-how and higher education (Valletta 2016).

The educational wage premium in Canada is significant. The median income for working-age men with a bachelor's degree, for instance, is one-third higher than those with only a high school diploma (see figure 2) (Statistics Canada 2017).

That is a powerful market signal in favour of higher levels of educational attainment. Syndicated columnist George F. Will has come to describe it as "the market screaming at the top of its lungs: stay in school" (Will and Roberts 2019).

The truth though is that we do not fully understand what the market is telling us. It is difficult to discern whether the market is valuing knowledge, credentials, or some other skills or traits for which educational attainment has become a proxy. It is hard, in particular, to judge the role of post-secondary education relative to other factors such as intelligence, work ethic, family status, and so on. It can therefore be challenging to assess whether one's professional success is attributable to his or her post-secondary qualifications or certain aptitudes, circumstances, or skills that would have drawn them to post-secondary education in the first place (Caplan 2000). Whatever ultimately the causality is here, the data and evidence affirm Will's point that educational attainment is a key factor in determining one's opportunity and earnings in the labour market.

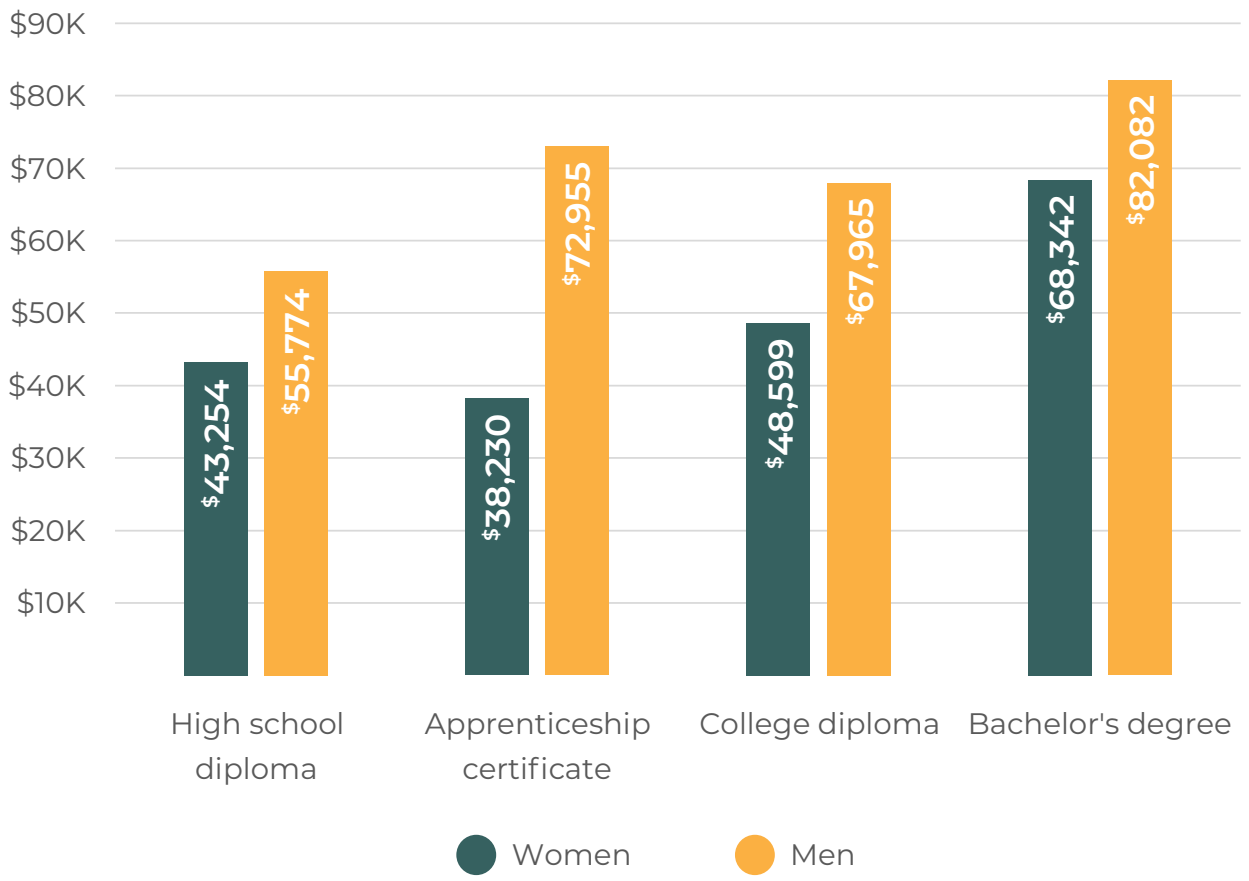
How does Canada perform with respect to its educational attainment rates?

Canada's educational attainment rates are among the highest in the OECD. This is an impressive policy accomplishment across different levels of government and political parties. More than half of Canadians aged twenty-five to sixty-four have either university or college qualifications (Statistics Canada 2019). Our college system plays a key role in our overall performance. Roughly 22 percent of working-age Canadians have a college diploma compared to only 8 percent in the OECD overall (Statistics Canada 2019).

Canada's distribution of educational attainment reflects these different post-secondary pathways. The 2016 Census shows that 22.4 percent have a college diploma, 3.1 percent have a university certificate below a bachelor's degree, and 28.5 percent have a bachelor's degree or higher. The cumulative share of the population with some post-secondary qualification is 54 percent, and this does not even include the nearly 11 percent with an apprenticeship or other trade certificate.

A comparison to the 2006 Census data finds progress in Canada's educational attainment rate. The share of those with a bachelor's degree or higher is increasing, and the share of those with only a high school diploma or less is falling. The 2006 Census showed that only 23 percent of working-age Canadians had a bachelor's degree or higher, 20.4 percent had a college diploma, 12.4 percent had an apprenticeship or other trade certificate, and 39.3 percent only had a high school diploma or less (see figure 3) (Statistics Canada 2016b). The differences between 2006 and 2016 reflect various forces including changing demographics, evolving cultural norms, and improved access to post-secondary education.

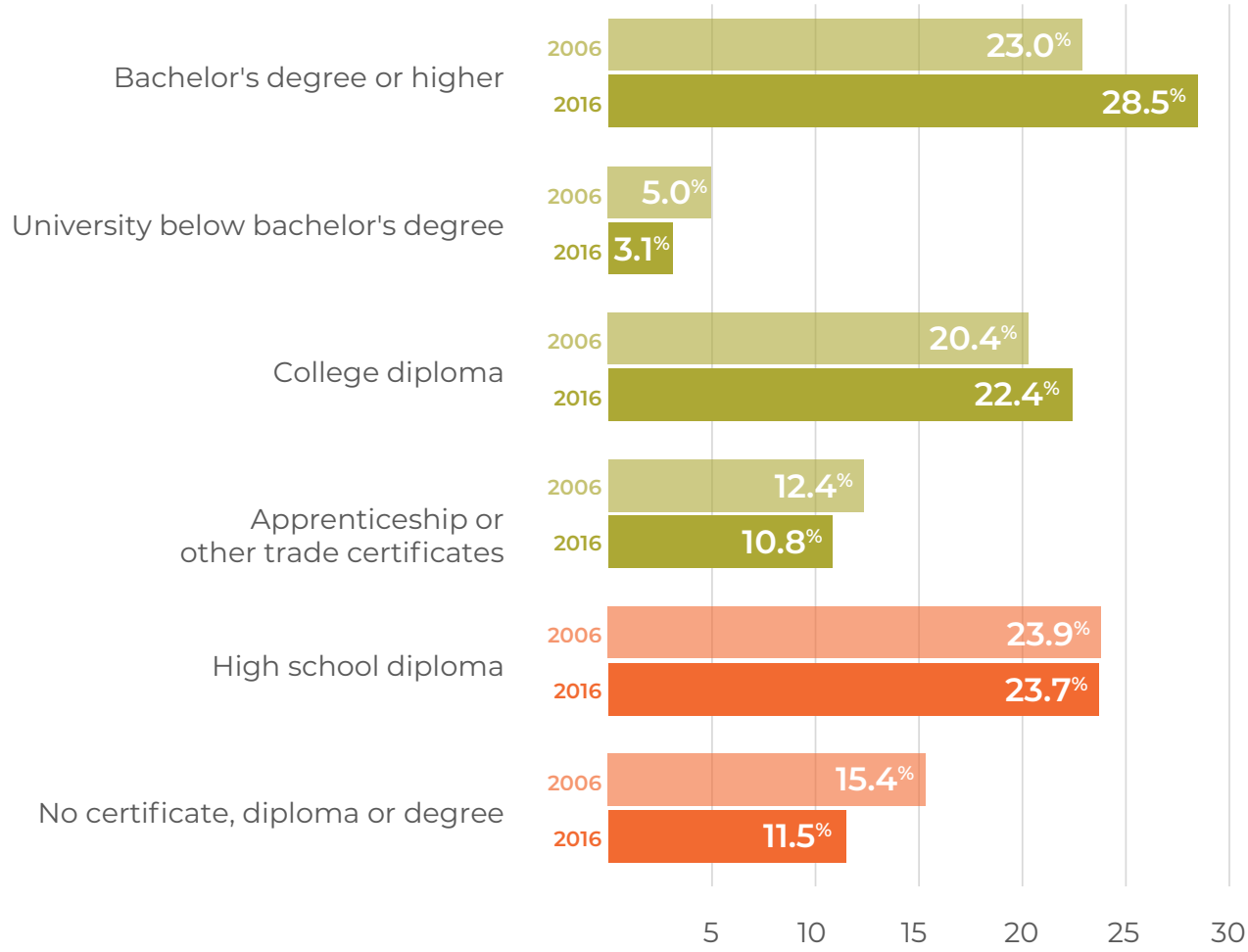
FIGURE 2. MEDIAN ANNUAL EARNINGS OF FULL-TIME WORKERS (BOTH SEXES, AGES 25 TO 64), 2015 [5]



SOURCE: STATISTICS CANADA 2017.

5 The significant difference in median earnings between men and women with apprenticeship certificates seems to reflect gender differences in the types of apprenticeship programs in which men and women enter. A 2019 study published by Statistics Canada finds that only 20.7 percent of female apprentices were in male-dominated programs (such as welding or other machining) compared to female-dominated programs (such as hairstyling or esthetician). Women in male-dominated programs tend to earn roughly the same as their male counterparts. But this gender gap in the selection of apprenticeship programs leads to significant earnings differences. See Frank and Frenette 2019.

FIGURE 3. EDUCATIONAL ATTAINMENT RATES IN CANADA (BOTH SEXES, AGED 25 TO 64), 2006 AND 2016



SOURCE: STATISTICS CANADA 2017.

But as impressive as our progress on educational attainment is, it is just as notable how many Canadians still do not have post-secondary qualifications. As of 2016, more than one-third of Canadians between the ages of twenty-five and sixty-four have a high school diploma or less. This represents 6.7 million working-age Canadians (down from 6.8 million in 2006), which is roughly equivalent to the total population of the three prairie provinces (Speer 2019a; Statistics Canada 2016b).

What is striking though is how persistent this share of less-educated Canadians is across age groups. It is not just limited to older Canadians. Even among younger cohorts the percentage with a high school diploma or less is still above 30 percent. This tells us that, notwithstanding the progress that has been made in increasing educational attainment, roughly three in ten Canadians still do not pursue post-secondary education (see table 2).

TABLE 2. HIGHEST LEVEL OF EDUCATIONAL ATTAINMENT (BOTH SEXES, AGED 25 TO 64), 2016

Age Group	Total	High School	No Diploma	Percentage
25-64	18,931,285	4,494,590	2,169,795	35.2
25-34	4,576,575	398,475	1,007,695	30.7
35-44	4,507,775	395,435	926,885	29.3
45-54	4,991,975	588,625	1,196,545	35.8
55-64	4,855,055	787,270	1,363,455	44.3

SOURCE: STATISTICS CANADA 2016B.

The level of educational attainment is not evenly distributed among places either. There is a notable educational gap along urban-rural lines. Ontario is a good example. More than 50 percent of residents of major urban centres such as Toronto and Ottawa have bachelor's degrees or higher compared to barely 10 percent in the province's most rural communities (Ahmed 2019).

Urban-rural differences in educational attainment are hardly unique to Canada. Other jurisdictions similarly find lower levels of educational attainment in their rural areas across age groups.[6] But Canada's urban-rural gap is significant: in fact, according to the Canadian Rural Revitalization Foundation, it is the largest among the OECD (Lauzon, Bollman, and Ashton 2015).

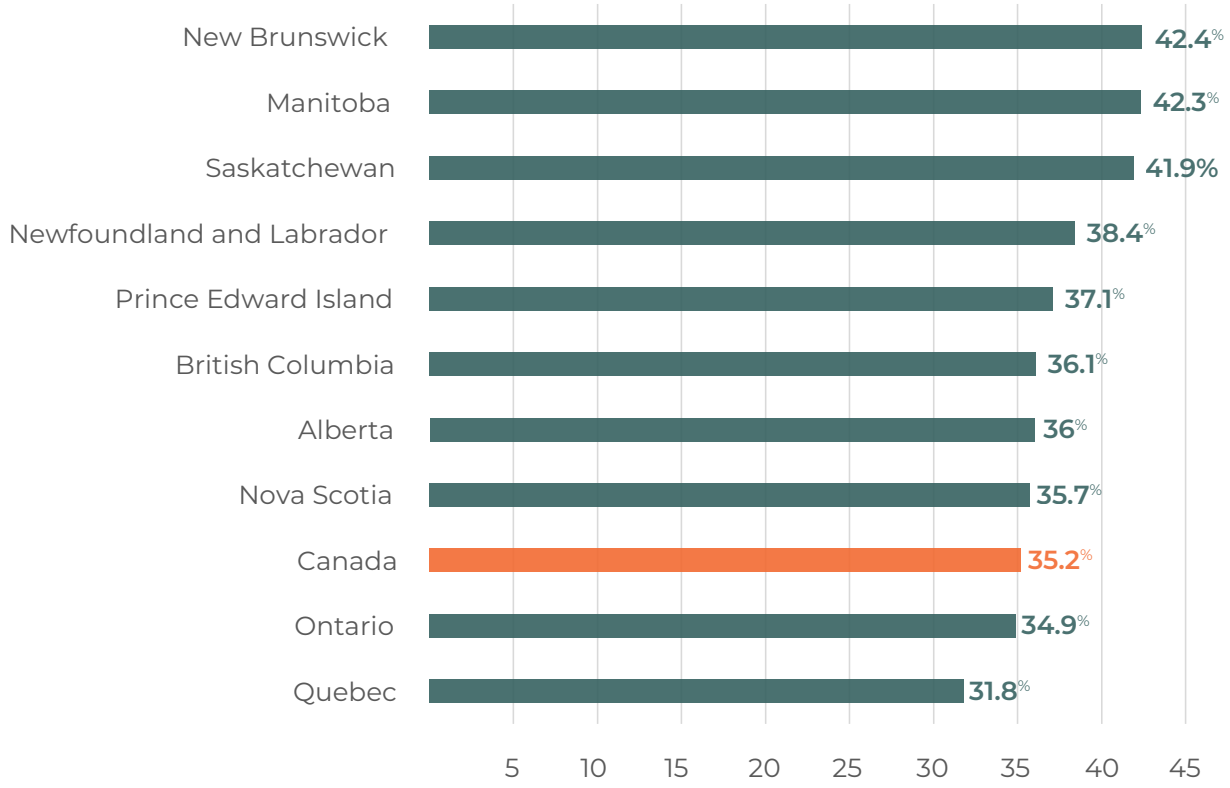
This place-based analysis is important because of the spatial clustering of both those with lower rates of educational attainment and those in vulnerable mid-skilled occupations. It is not just that there is a persistent share of the population without post-secondary qualifications or a declining share of mid-skilled employment opportunities. What makes these separate-yet-linked labour-market characteristics relevant to this discussion is that they are both concentrated in particular regions and places. The effects of job polarization manifest themselves more in rural than urban places and in certain regions more than others.

It is beyond the scope of this paper to delve deeply into place-based effects of these developments. But it is notable that job polarization is distributed unevenly across the provinces. A 2018 report by the C.D. Howe Institute, for instance, found that Alberta, British Columbia, Ontario, and Quebec have relatively low levels of job polarization in their economies. Manitoba, Saskatchewan, and the Atlantic provinces have higher rates (Wynock 2018).

The same goes for educational attainment rates by province. There is an interesting correlation between a province's rate of job polarization and its share of the working-age population whose level of educational attainment is a high school diploma or less. Manitoba, New Brunswick, and Saskatchewan, for instance, not only have high rates of job polarization, they also have the highest population shares with high school diplomas or less (see figure 4) (Statistics Canada 2016b).

6 For more on the United States, for instance, see Campbell 2019.

FIGURE 4. SHARE OF WORKING-AGE POPULATION WITH HIGH SCHOOL DIPLOMA OR LESS (BOTH SEXES, AGED 25 TO 64), 2016



SOURCE: STATISTICS CANADA 2016B.

It is a sign that the labour-market effects of job polarization will be experienced by different people and places. This is key for policy-makers to remember: the overall distribution of post-secondary qualifications or employment growth can obscure what is happening below the aggregate data.

There are four major takeaways to draw from this section. First, there is a significant earnings premium based on educational attainment in Canada. Second, while Canada's overall performance on educational attainment is impressive, roughly one-third of working-age Canadians (across age groups) still hold a high school diploma or less. The third is that educational attainment rates differ greatly among provinces and between urban centres and rural places. The final is that there seems to be a correlation between a province's educational attainment rates and its degree of job polarization.

A WORKER'S PARADISE: JOBS AND OPPORTUNITY IN NATURAL RESOURCES

The declining share of mid-skilled occupations is, as we described earlier, a trend that is common across most advanced economies. The precipitous drop in manufacturing employment has been a major contributor. Technology- and trade-induced dislocation has also affected various other mid-skilled occupations.

Canada has participated in these trends. But research by Green and Sand suggests that Canada's experience has been less marked than other countries due to the role of the so-called resource boom. Their basic point is that labour demand in the oil and gas sector over the last decade and a half may have lessened job polarization in Canada.

Green and Sand argue this case by comparing the experiences of Ontario and Alberta. The two provinces were following a similar path of job polarization until the early 2000s, when Alberta deviated from the shared path (Green and Sand 2015b). This "regional dimension" seems to have been driven by high labour demand in the oil and gas sector, which sustained low- and mid-skilled workers who would otherwise have been pushed into low-skilled service jobs.

This conclusion is broadly similar to work by UBC economist Kevin Milligan, who has argued that the resource sector sustained Canada's middle class in the first decade and a half or so of this century (Milligan 2018). As he has put it, "The resource sector has contributed substantially to the good jobs that underpin middle-class resilience."

Another way to put it is this: during a period of job polarization, the natural resources sector in general and oil and gas in particular has counteracted this trend and in so doing buttressed Canada's middle class, including vulnerable workers such as those without post-secondary qualifications.

This is especially true for working-class men. Women have generally had better labour-market outcomes over the past quarter century or so. This partly reflects Canadian women's higher rates of post-secondary qualifications and rising labour-force participation rates (Speer 2019a). As social norms have evolved, women have made up considerable ground after decades of lagging behind men.

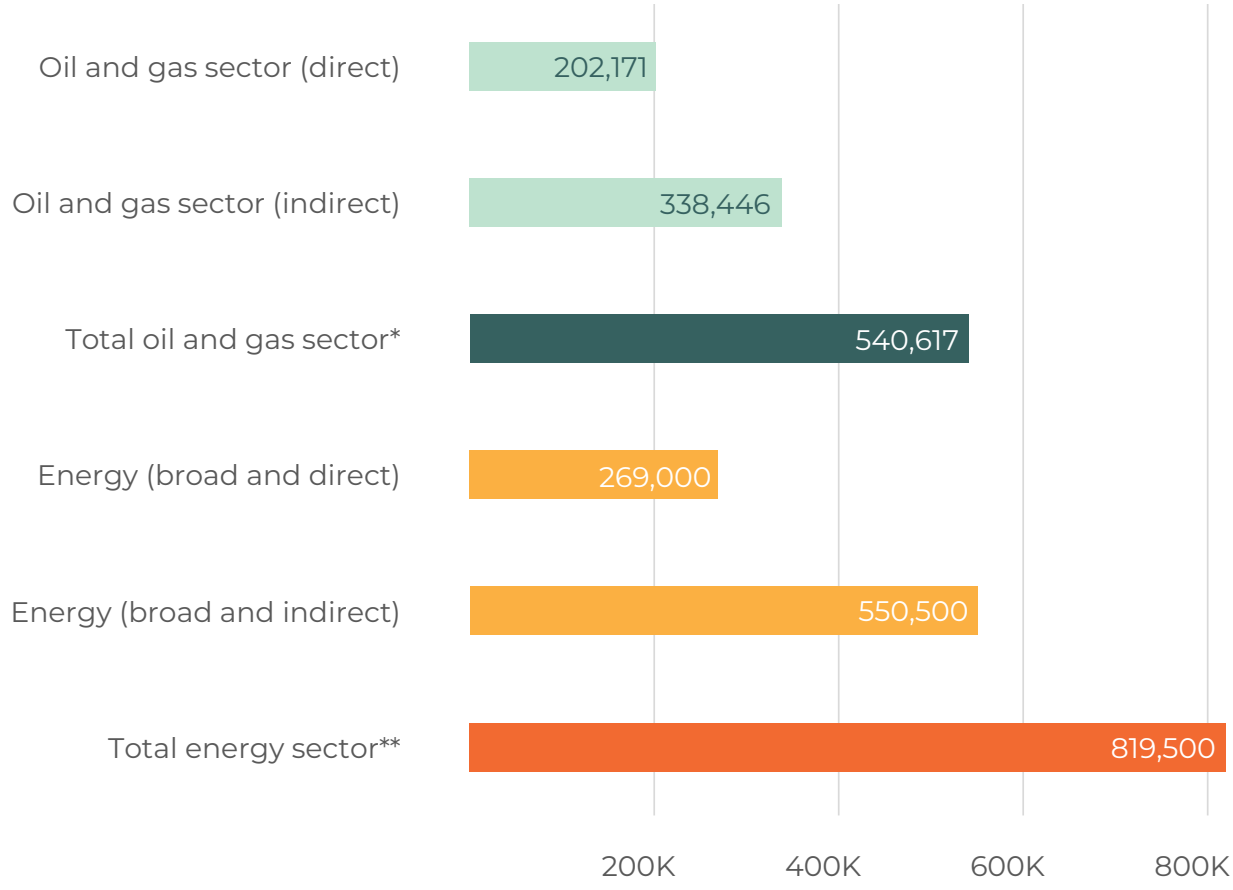
Consider, for instance, that thirty years ago women with post-secondary qualifications (such as a bachelor's degree or a college diploma) had a slightly lower employment rate than men without post-secondary education, and now their employment rate is ten percentage points higher than this comparison group (Speer 2019b). The labour-market outcomes for women is great news, of course. But it is also a reminder that economic opportunities for working-class men seem to be narrowing in the world of job polarization.

One of main challenges stemming from job polarization is that there are limits on working-class men's ability to climb into higher-skilled occupations. Research published by the Federal Reserve Bank of Boston hypothesizes that these limits are a major factor behind the drop in the labour-force-participation rate for working-class men in the United States (Foote and Ryan 2014). Canada has also experienced a drop in labour-force participation for working-age men (aged twenty-five to fifty-four) without post-secondary qualifications over the past three decades, but it has been less precipitous than in the United States (Speer 2019a). The natural-resource economy has been an outlier for this vulnerable cohort.

Think about the oil and gas sector, for instance. Although the sector has underperformed in recent years due to global supply-and-demand issues, it continues to be a major source of employment in the country. Consider the following:

- In a 2016 Statistics Canada analysis, the oil and gas sector (defined as oil and gas extraction and oil and gas investment) directly employed 202,171 Canadians and indirectly employed another 338,446. Combined, the sector employed 540,617 people in Canada that year (Statistics Canada 2016a).
- Analysis by the federal Department of Natural Resources on the overall level of employment in the broader energy sector (including coal, utilities, and pipelines) found that in 2018, Canada's energy sector directly employed more than 269,000 people and indirectly supported over 550,500 jobs. Employment in the sector thus totaled 819,500 jobs in 2018 (see figure 5).

FIGURE 5. OVERALL EMPLOYMENT IN THE OIL AND GAS AND ENERGY SECTORS, CANADA, 2018



*THE OIL AND GAS SECTOR IS DEFINED AS THE SUM OF OIL AND GAS EXTRACTION AND OIL AND GAS INVESTMENT.

**THE BROADER ENERGY SECTOR INCLUDES OIL AND GAS EXTRACTION, PETROLEUM AND COAL MANUFACTURING, UTILITIES, AND PIPELINES.

SOURCE: MILKE AND KAPLAN 2020A.

- In the same analysis, the Department of Natural Resources estimated direct energy employment at 143,019 people in Alberta, followed by 41,527 in Ontario, 27,455 in Quebec, 21,478 in British Columbia, and 17,334 in Saskatchewan, with lower employment levels in the other provinces.[7]

But these provincial data are somewhat misleading because of the significant number of Canadians from other provinces who migrate to the west to work in oil and gas. A new paper that draws on tax data estimates that over the past twenty years more than 200,000 Atlantic Canadians have migrated to Alberta for "mobile work" (Lionais, Murray, and Donatelli 2020). Newfoundland and Labrador is home to 40 percent of these mobile workers alone. The authors observe that for Newfoundland and Labrador and for Cape Breton, mobile work in Alberta has essentially come to replace the dominant industries of the previous century in these provinces of outmigration (Lionais, Murray, and Donatelli 2020). Or as former *Globe and Mail* energy reporter Shawn McCarthy has noted, "Oil sands jobs for out-of-province workers—mainly from Atlantic Canada—have resulted in a significant drop in unemployment in their provinces and a flow of money back home" (McCarthy 2014).

The oil and gas sector also pays higher earnings than the national average. The average weekly earnings for all industries in Canada was $1,028 in 2019. Oil and gas extraction (which also includes mining and quarrying) was $2,130. It is actually the highest weekly average earnings among the nineteen industry classifications reported by Statistics Canada (see figure 6).

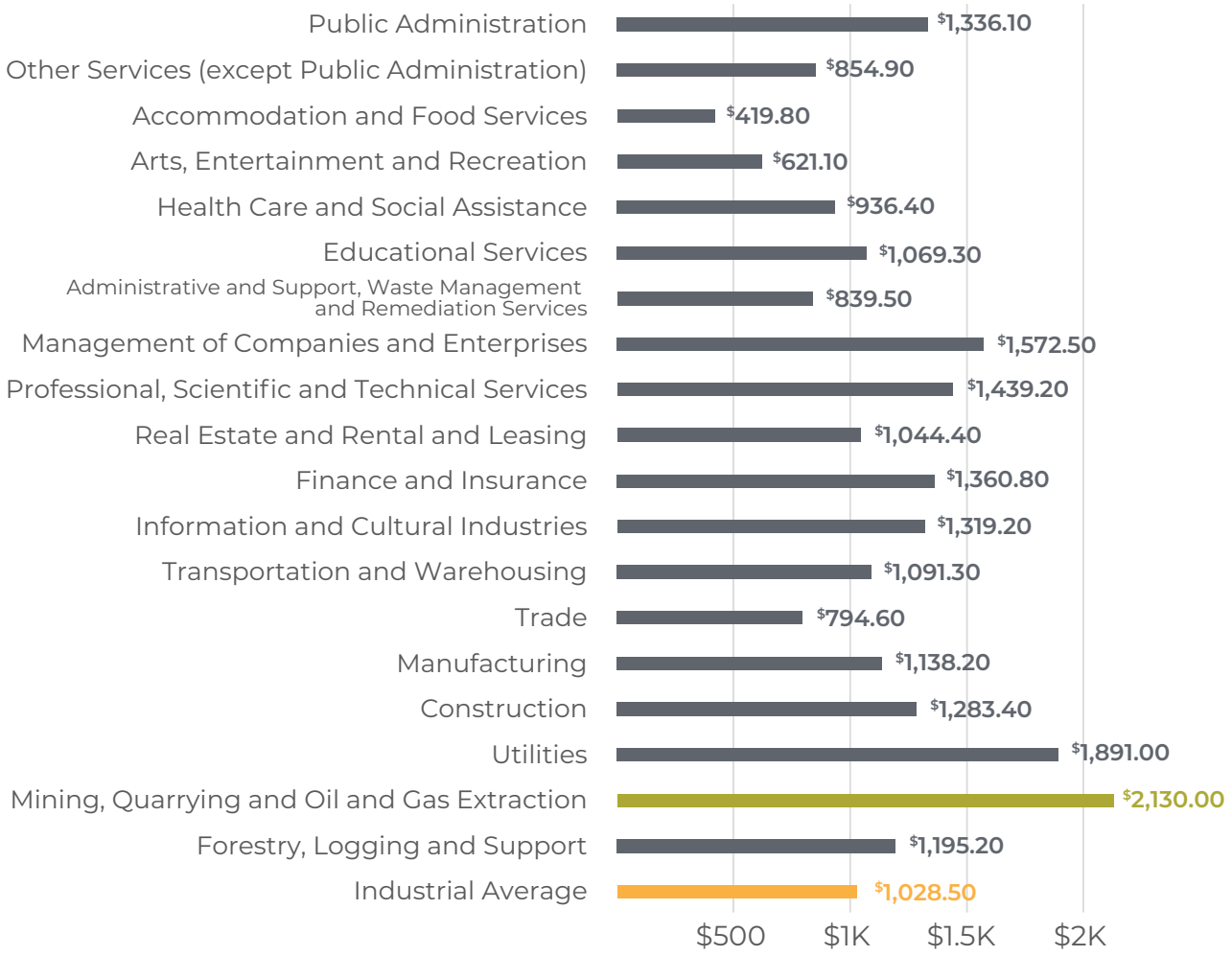
Average weekly earnings in these resource-based occupations are more than two times higher than the industrial average and even one and a half times higher than in finance and insurance. The industry does not just produce a lot of jobs, it also produces well-paying ones. And of course this does not even account for the myriad of non-financial benefits and social capital that flow from such employment (Dijkema and Gunderson 2019).

These facts may be broadly familiar to readers, but what is less commonly known is the extent to which the oil and gas sector has been a major source of opportunity for Canadians without university qualifications or any post-secondary credentials at all. Figure 2 shows the median annual incomes in Canada based on educational attainment. Alberta and Saskatchewan (which are two of our largest oil-producing provinces) are notable outliers.

Consider, for instance, that in Alberta the earnings of men with an apprenticeship certificate were close to the earnings of men with a bachelor's degree in the province and higher than those of men with a bachelor's degree in every other province. Or consider that men with an apprenticeship certificate in Saskatchewan actually had higher median earnings than men with bachelor's degrees (see table 3).

7 These data are pulled from Milke and Kaplan 2020a.

FIGURE 6. AVERAGE WEEKLY EARNINGS BY INDUSTRY (INCLUDING OVERTIME), CANADA, 2019 (CURRENT DOLLARS)



SOURCE: STATISTICS CANADA 2020.

TABLE 3. MEDIAN ANNUAL EARNINGS OF FULL-TIME WORKERS BY PROVINCE (MEN, AGES 25 TO 64), 2015

	High School Diploma	Apprenticeship or Trade Certificate	College Diploma	Bachelor's Degree
Canada	55,774	77,955	67,965	82,082
Newfoundland and Labrador	50,121	73,800	71,088	83,115
Prince Edward Island	42,454	53,829	52,992	67,149
Nova Scotia	48,401	60,943	59,236	72,692
New Brunswick	45,895	58,631	57,922	74,252
Quebec	48,344	53,177	61,450	75,107
Ontario	55,216	72,135	67,576	85,645
Manitoba	53,615	73,086	65,524	76,677
Saskatchewan	62,199	86,059	78,176	84,825
Alberta	69,774	92,580	87,983	97,733
British Columbia	59,180	75,344	69,513	77,168

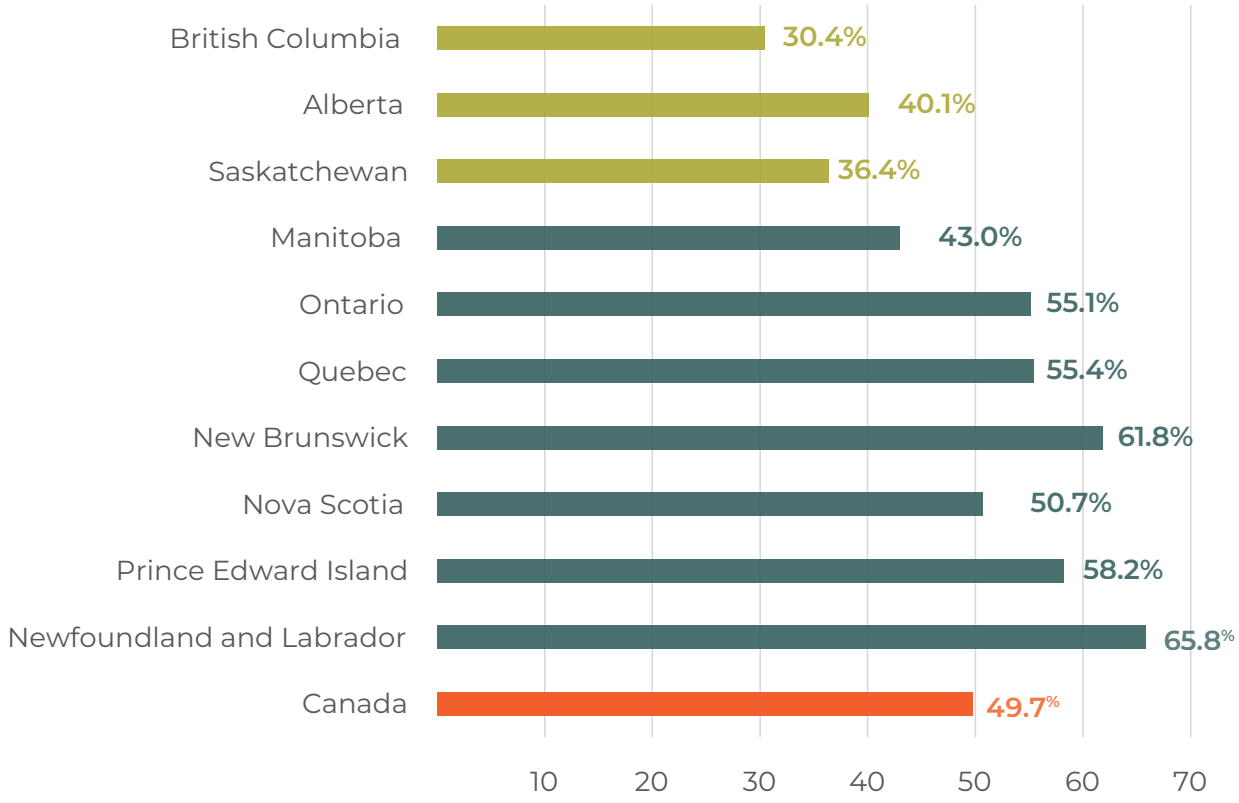
SOURCE: STATISTICS CANADA 2017.

Men without any post-secondary qualifications at all also have better outcomes in the western provinces, where the oil and gas sector has provided employment opportunities. Median earnings for those with only a high school diploma are 20 percent higher in Saskatchewan and nearly 30 percent higher in Alberta than in the rest of the provinces.

Another way to think about it is to analyze the earnings advantage for holding a bachelor's degree relative to having only a high school diploma. The Canadian average is just under 50 percent—that is to say, a working-age man with a bachelor's degree will earn, on average, 49.7 percent more than a working-age man with only a high school diploma.[8] But the earning average falls to 40 percent, 36 percent, and 30 percent for Alberta, Saskatchewan, and British Columbia respectively (see figure 7).

8 The average earnings advantage for the provinces excluding Alberta, BC, and Saskatchewan jumps to 55.7 percent.

FIGURE 7. EARNINGS ADVANTAGE OF A BACHELOR'S DEGREE AMONG MEN (AGED 25 TO 64) WHO WORKED FULL TIME, BY PROVINCE, 2015



SOURCE: STATISTICS CANADA 2017.

It is clear that these provinces have paid higher returns on lower levels of educational attainment. It is less clear why there are these different outcomes. There are ostensibly various factors at play. But Statistics Canada's analysis points to the oil boom in the 2000s as a major factor for the increased demand and in turn higher income for these workers (Statistics Canada 2017).

The oil and gas sector also provides significant opportunities for Indigenous Canadians, a population in Canada that has faced tremendous challenges in the labour market. The proximity of many resource projects to Indigenous communities suggests significant implications for the well-being of Indigenous communities, which are often deprived of access to well-paying, stable jobs. One estimate is that the sector employs roughly twelve thousand Métis and First Nations, and their average salaries are three times the average of those working in other sectors (Desjarlais 2020). Other analysis shows that the relative share of self-identified Indigenous Canadians working in the oil and gas sector is higher than across industries as a whole (Milke and Kaplan 2020b).

There are several key takeaways from this section. One is that the natural-resources sector in general and oil and gas in particular have counteracted the trend toward job polarization. The second is that in normal economic conditions, the energy sector directly employs more than a quarter of a million

Canadians, including many "mobile workers" who travel interprovincially for work. The third is that the oil and gas sector pays average weekly earnings that are two times higher than the industrial average. The fourth is that these sectors provide well-paying employment to working-class men with apprenticeship or trade certificates or with only high school diplomas. And the final is that oil and gas employs a considerable number of Indigenous Canadians.

ROOTING PUBLIC POLICY IN PEOPLE AND PLACES

Previous sections have highlighted the trend of job polarization in Canada, its relationship with educational attainment, and the role of the natural-resource economy in counteracting its effects in Canada. It is a good reminder that policy-makers must think critically about public policy, trade-offs, and the impact on people and places.

Too much of the debate about climate policy and the oil and gas sector seems rooted in abstraction. Even the notion of a "transition plan" (which has become common parlance in public-policy circles) seems cold and unhuman. It treats the people and places that are affected as chess pieces that can just be moved around the board without any regard for their preferences, well-being, or circumstances. And it has contributed to growing political divisions and a sense that governments are ignoring those workers, regions, and communities that are affected.

This problem is hardly unique to climate policy or the natural-resource economy. It pervades various areas of public policy. As Steve Hilton, an advisor to former British Prime Minister David Cameron, wrote in his 2016 book *More Human*,

> I now realize why so many policies fail, why so much money is wasted, why so many promises are never delivered, why this happened in our administration—and in every government. It has to do with a mindset, an attitude, an approach in which policymaking is much more about theory than practice, where the people making the policy and the people implementing it make no real effort to understand, in detail, the lives of the people whom the policy is for. I have no hesitation in saying . . . that the single biggest improvement we could bring to policy making in government is to make it more human, to put people at the centre of the process. (Hilton, Bade, and Bade 2016)

This tendency toward abstraction seems particularly acute in the realm of climate policy, which is suffused with a combination of religious-like zeal and uncompromising partisanship. We are stuck in an unproductive zero-sum struggle or one in which we are falsely told that "the environment and the economy go hand-in-hand" (Liberal Party of Canada 2018). The trade-offs inherent in any policy debate are ignored or downplayed, and compromise becomes impossible.

This policy polarization is a challenge because the answer self-evidently lies somewhere in the middle. Polling shows that Canadians support expanding oil and gas production, but they also want greater progress on the environment (Aguirre, Bird, and Gattinger 2020). Delivering on these public preferences will require a careful policy approach that balances trade-offs and supports people and places that are affected.

This is one of the biggest problems with the "hand-in-hand" narrative. It is a nice message, but it is patently false. As University of Calgary economist Trevor Tombe has observed, "Any action to lower emissions will come with a cost to the economy" (quoted in Hunter 2019). That is not in doubt. The more important questions relate to who is affected and where, and how to mitigate these effects.

How we think about the benefits and costs of different policy actions should not be limited to the financial costs alone either. We must also consider the broader costs of disrupting mid-skilled jobs in light of evidence from elsewhere: these disruptions can lead to lower labour-force-participation rates for men without post-secondary qualifications and ultimately contribute to higher rates of income inequality in our society.

This broader perspective has been in place when considering the distributional effects of carbon taxes. The Trudeau government's Climate Action Rebate, which is a means-tested benefit associated with the federal carbon tax, aims to minimize its uneven distributional effects. This reflects a deliberate policy action to balance benefits and costs of the carbon tax and ensure that no individuals or households are disproportionately affected. We do not, however, generally tend to pay the same attention to the uneven employment effects of our other policy choices. It is an odd analytical gap in our policy thinking.

This gap is especially perplexing given the trend of job polarization and what it means for our economy and society. One would think that understanding the employment effects of different policy options would be a top priority. One of us has written in the past about the general need for a "job lens" in the policy-making process (Speer 2018a; 2017). That lens allows us to see that work—or the lack thereof—has broad consequences for individuals, communities, and Canada as a whole. Those consequences extend beyond the loss of a paycheque (Dijkema 2020).

What would such a lens reveal if it were applied to policies that harm employment in the natural-resources sector in general and oil and gas in particular?

We would find that the impact of resource-based job losses would disproportionately fall on low- and mid-skilled workers. Analysis of the employment and income effects of the drop in oil-sands activity in 2015 and 2016 is a good example. Evidence shows that the loss of working-class jobs was nearly quintuple the loss of white-collar positions (Crowley 2017). And new research from Statistics Canada finds that the majority of workers who lost their jobs over roughly the same period experienced short-term income losses and about one-quarter suffered persistent income losses even if they were ultimately able to find new employment (Chen and Morissette 2020).

This is intuitive. Bankers, lawyers, and other highly skilled professionals can more easily move on to the next deal or to a different sector due to labour-market demand. Mid-skilled workers have fewer options and may be less geographically mobile (Williams 2017). There is also of course a declining share of middle-skilled jobs available to many of them. It makes sense therefore that the sustained downturn in the oil and gas sector would disproportionately harm working-class Canadians, who may be forced to relocate, accept a lower-paying job, depend on government transfers, or some combination thereof.

The good news is that we are starting to see a growing recognition that climate policy must reckon with the employment effects (both financial and non-financial) of different policy options. A 2019 report by the Canadian Centre for Policy Alternatives, for instance, recognized that workers and

communities affected by climate-change policies are at risk of facing even greater inequality without a "just transition strategy" (Mertins-Kirkwood and Deshpande 2019).

This is an important step. But the policy debate is still thin. A "just transition" tends to be characterized as a binary choice: affected workers must choose either mid-career skills training, which has a mediocre record of helping people secure new jobs, or perpetual income support, which can have various negative effects on people and their families. The COVID-19 crisis has, in our opinion, wrongly heightened calls for a universal basic income as a means of supporting unemployed and underemployed workers.

We must do better—especially given the economic, social, and political considerations at play. The rise of political populism elsewhere has been driven in part by a widespread sense that policy-makers were ignoring people and places affected by the trends of technology and trade (Speer 2018b). We cannot afford to do the same here.

The first step should be to put the people and places affected by policy decisions at the centre of the policy-making process, as Hilton proposes (Hilton, Bade, and Bade 2016). We must start by recognizing the role that the resource sector has played in counteracting the trends of job polarization and its contribution of well-paying employment for vulnerable workers. This, of course, does not mean that the government should not advance climate-change policies or other priorities that may conflict with resource-based employment. But when one considers the important role that the sector plays in an era of job polarization, we must be judicious in how we balance the benefits and costs of different policy actions. As Kevin Milligan has written, "For Canadians concerned with inequality, the equalizing effect of resource development on our economy is too strong to ignore" (Milligan 2018).

Seeing resource development as a valid and integral part of our overall economy will require that policy-makers stop viewing resource development as a retrograde industry (Speer and Coates 2016). It is a dynamic, world-leading part of the economy that produces tremendous wealth and opportunity. We need to stop thinking that being "hewers of wood and drawers of water" is something to be self-conscious about and start seeing it as the source of Canada's global advantage (Majumdar 2018). In fact, hewing wood and drawing water has, as one of us has argued elsewhere, helped to turn Canada into a land flowing with milk and honey that continues to attract people from all over the world (Dijkema 2012). This conceptual change could have far-reaching policy implications. If we saw resource development as core to Canada's economic future, it would shift the policy and political debate to one that is about how to cultivate and leverage opportunities as opposed to the current atmosphere of negativity and partisanship.

The next priority must be to ensure that the burden of climate action is broadly distributed. It seems highly unfair for resource-based workers to possibly have to give up their livelihoods while most of the rest of us make few sacrifices. There is nothing just about disproportionately affecting those workers who are producing the energy that the rest of us demand. It is odd, for instance, to attribute the downstream emissions of manufacturing, or driving a car, to an oil-sands project, as if the energy producer ought to be responsible for the full, economy-wide effects of energy consumption. If we are serious about making progress on climate change, policy-makers must ensure that the costs are spread more evenly, or the political costs will ultimately be seen as too high.

Getting this balance right flows naturally from how we think about resource development. Disproportionately targeting resource development under a different conceptual framework would not just be unfair, it would be injurious to our collective interests if we saw these sectors as core to our economic future. And, of course, it would be rightly seen as running counter to the goal of reducing inequality in our society.

The final priority is related: we ought to focus on lowering the emission intensity of Canadian natural resources rather than abandoning resource development altogether. This should be self-evident. The "oil is dead" meme is not backed by evidence, but it persists in our political discourse. Editorial pages of our major papers and elsewhere[9] feature articles about "peak oil" and the decline of demand, yet estimates from the International Energy Agency show that in the coming decades global demand for oil and gas will actually continue to grow (albeit more slowly than in the previous decade) (International Energy Agency 2019). The overriding focus, then, ought to be on lowering emissions from energy production, transmission, and usage.

Canada's coal electricity transition is a useful case study. It has produced one of the biggest changes in emissions anywhere in North America. A thirty-year process has provided the country with close to a carbon-free electricity grid and has established a foundation for further decarbonizing our economy in the automotive, construction, and possibly oil and gas sectors.

The truth is that we actually have a good sense of how to achieve the goal of lowering emissions in resource extraction by electrification of the oil and gas fields through some combination of clean hydroelectric power, small modular reactors, and carbon capture storage. It is beyond the scope of this paper to drill down into these topics. But the point here is that it would be far more constructive for our public-policy debate to be less about a "just transition" for workers and more about how to transform the natural-resource sector, and in so doing create new and lucrative opportunities for the companies, workers, and communities involved in resource development.

But we will shift our policy thinking and debate in this direction only if we start to see those affected by our political decisions as actual people and places rather than as abstractions. We need to stop treating them as chess pieces that can just be moved around the board. It is time to think of them as humans.

CONCLUSION

As Lakehead University economist Livio Di Matteo has put it, "The Canadian economy [is] a large leafy deciduous tree. From a distance you see the many branches and leaves of the economy, but all of it is supported by a slender trunk—the natural resource sector" (Di Matteo 2018). This is especially the case when one considers the trends of job polarization and the increasing economic returns of post-secondary qualifications in the modern economy. The natural-resource sector in general and oil and gas in particular have been an outlier to these trends and provided significant economic opportunity for working-class Canadians—particularly men without post-secondary qualifications.

9 See for instance Keith, Hastings-Simon, and Whittingham 2020.

This paper has argued that our public-policy debate must be cognizant of these dynamics. These sectors play a unique role in our economy and society, and we should not treat them lightly or dismissively when designing policies that will affect them. The economic, social, and political costs could be significant, including declining labour-force-participation rates for working-class men, rising income inequality, and ultimately political and social unrest.

Our aim here has been to help policy-makers think clearly about the trade-offs inherent in these policy choices and the need for a credible plan for affected workers and communities. One might characterize our basic message as a rejoinder to those involved in climate-policy debate who would treat the affected workers and communities as abstractions that can be ignored or shunted aside in singular pursuit of our environmental policy goals. Our public-policy debates must ultimately be rooted in people and places. We hope that this research and analysis helps to spur us all in this direction.

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