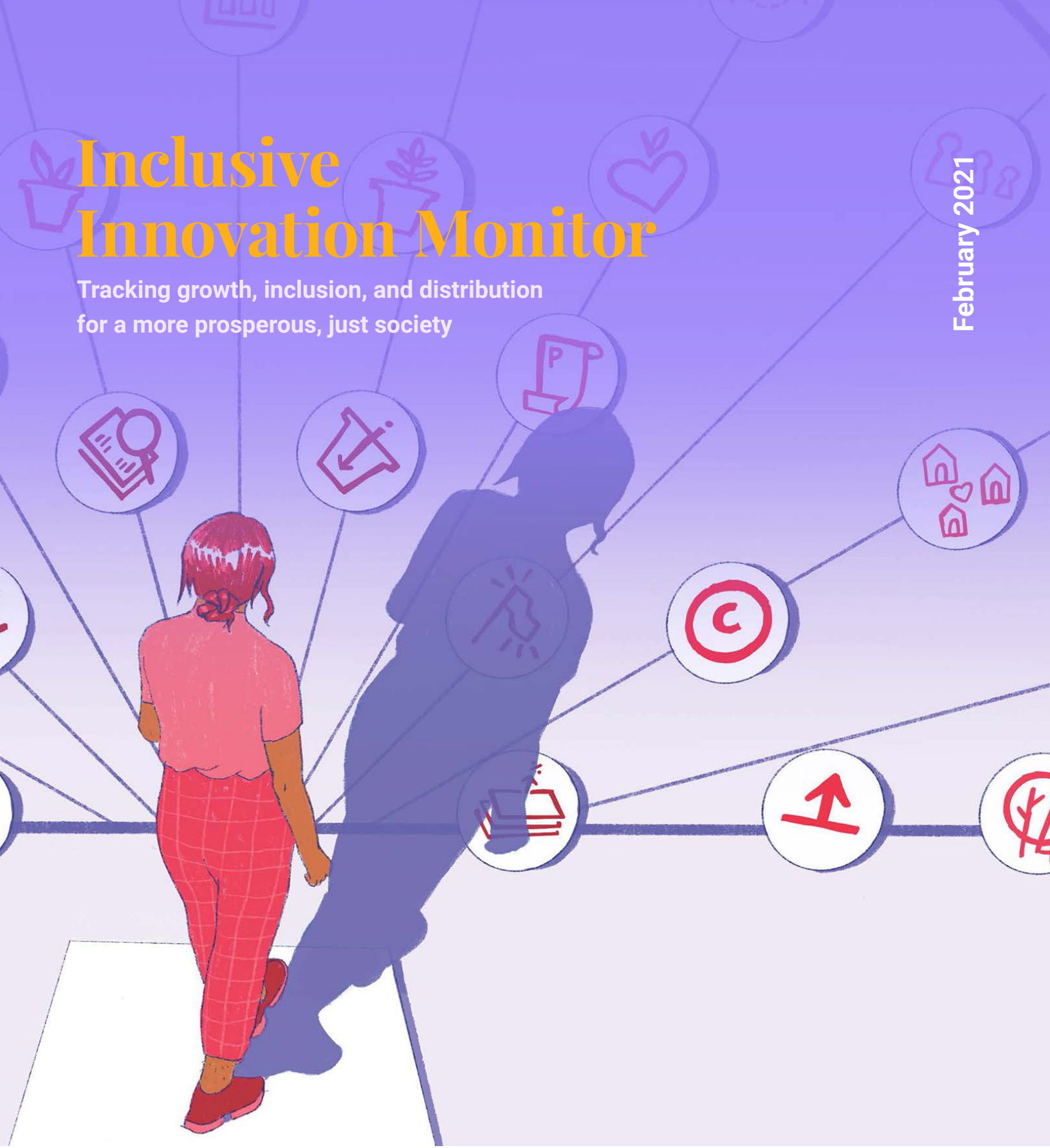


Inclusive Innovation Monitor

Tracking growth, inclusion, and distribution for a more prosperous, just society

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All of the data gathered for this report is from the OECD and Statistics Canada, aside from a few exceptions noted throughout. To review the complete data, along with sources, technical definitions, and further analysis, please visit our interactive tool at [inclusiveinnovation.ca](https://www.inclusiveinnovation.ca).

HIGHLIGHTS

- + The Brookfield Institute for Innovation + Entrepreneurship at Ryerson University and the Innovation Policy Lab at the University of Toronto's Munk School of Global Affairs & Public Policy have produced Canada's first *Inclusive Innovation Monitor*.
- + The *Inclusive Innovation Monitor* tracks the performance of more than 30 indicators of innovation, equity, and inclusion to highlight the relationships among these variables and to help inform policies aimed at building a more resilient, innovative, and inclusive economy in Canada.
- + A growing body of research suggests that inclusive economies generate more and better innovation, higher growth, and a more equitable distribution of the benefits of innovation. The *Inclusive Innovation Monitor* will help researchers and policymakers further explore this hypothesis by providing a clearer understanding of the state of innovation opportunities, activities, and outcomes—and how they are distributed among people and communities in Canada and globally.
- + A pre-COVID baseline of inclusive innovation metrics reveals that Canada lags international peers on many innovation opportunities, activities, and outcomes, while the ability to participate in and benefit from innovation are not equitably distributed across regions, income groups, racialized groups, gender, and disability.
- + **Canada has high levels of educational attainment, excellent idea generation, and, until recently, an improving ecosystem of innovation financing—but there are deep and persistent inequities in the distribution of these opportunities.**
- + **Canada's tech sector is growing and innovating, but firms in the economy more broadly are slow to adopt productivity-improving technologies, spend proportionally less on R&D than most OECD peers, and fail to adequately empower and reward women, racialized minorities, and Indigenous people.**
- + **Entrepreneurial initiative in Canada is world-leading, but actual start-up, scale-up, and innovation activities are less than stellar by international standards, and there are substantial inequities in entrepreneurial and employment opportunities.**
- + **Prior to the pandemic, Canada's productivity was similar to the OECD average, Canadians earned more than peers in the OECD, and poverty was declining, but we have struggled to improve productivity, and there are persistent and stark inequities in income and wealth distribution.**
- + If Canada wants a strong, innovation-led post-COVID recovery, we will need policies and strategies that provide better resources and opportunities for people and firms, and more equitable access to the benefits of innovation and economic growth

INTRODUCTION



Innovation is essential to the economic and social well-being of Canadians. The development of new or improved services, products, and processes shapes economic performance and provides opportunities for individuals and communities to thrive. Yet, innovation in Canada has been lackluster compared with our international peers, and its benefits have been poorly distributed among people and communities.¹ Moreover, evidence increasingly suggests that inequality of opportunity and resources “obstructs, subverts, and distorts” innovation and growth by preventing the development and effective use of skills, knowledge, and creativity.² Not only does innovation have distributive consequences, but also the distribution of opportunities and resources has consequences for innovation and growth.³

The COVID-19 pandemic and economic crisis have exacerbated these challenges. Some businesses have adapted to new conditions by shifting production and processes to serve customers even more effectively than they did before the

pandemic.⁴ But many are struggling merely to survive. At the same time, economic, social, and health inequities among people and communities have been revealed and exacerbated. Women, low-wage, and precariously employed workers were among the first to lose their jobs, and will face economic hardship for the foreseeable future.⁵ Both before and during the pandemic, Canada’s innovation performance has been sluggish, and its egalitarian aspirations unrealized.

As we look towards the post-COVID horizon, we need to consider more carefully what it will take to improve innovation and achieve a fairer distribution of opportunities for people to participate in and benefit from economic activity and growth. We also need a way to track and assess progress in improving innovation and equitable distribution. How will we know if Canada’s innovation potential and performance are improving, and how will we know if opportunities to participate in and benefit from an innovative economy and society are being distributed fairly? Our [Inclusive Innovation Monitor](#) will help answer those questions.

MONITORING INCLUSIVE INNOVATION: COVID AND AFTER

The Innovation Policy Lab at the Munk School of Global Affairs and Public Policy and the Brookfield Institute for Innovation + Entrepreneurship have partnered to produce an *Inclusive Innovation Monitor* (IIM) to track and understand Canada's performance in inclusive innovation. We believe that designing policies and business strategies that contribute to better innovation performance and more equitable distributions of opportunities and benefits requires a clear picture of inputs, capacities, activities, and outcomes—and the relationships among them. Our Inclusive Innovation Monitor (IIM) provides policy-makers, practitioners, and researchers with a clear picture of how Canada measures up on key inclusive innovation metrics, and opportunities to better understand how the variables are connected and what policy and levers we can pull to improve performance.

We initially conceived of the IIM prior to the COVID-19 pandemic and economic crisis. Our framework for understanding the links between innovation and distribution, and our approach to measuring performance on key inclusive innovation opportunities, activities, and outcomes, was developed in the fall of 2019 and early 2020. When the pandemic and economic crisis hit, two things became clear to us. First, understanding the links between innovation and distribution was more important than ever. The pandemic revealed how innovation would be necessary to address the virus and economic fallout, and how health and economic well-being is inequitably distributed among individuals and groups in Canada. Second, it became evident to us that the data that would populate our monitor would be pre-COVID data (owing to data collection and reporting lags among key organizations), and would therefore give us an outdated picture of Canada's inclusive innovation performance in a radically dynamic context.

The IIM has critical long-term value. By offering a pre-COVID baseline of Canada's innovation and distribution performance, we provide a benchmark against which to assess how well Canada is emerging from the crisis, and its progress on inclusive innovation. A pre-COVID snapshot combined with future data collection and analysis will help us understand whether innovation capacity and fair distribution of opportunities and benefits among all members of society are improving.

MONITORING INCLUSIVE INNOVATION: A FRAMEWORK

Understanding Canada’s social and economic realities requires looking through two lenses simultaneously—an innovation lens and an inclusion lens. If we look only through the lens of inclusion, we will neglect the important role that innovation plays in generating resources and opportunities for prosperity and well-being. If we look only through the lens of innovation, we will neglect the important role that inclusion plays in enhancing innovation and ensuring that opportunities and benefits are distributed equitably.⁶ Innovation and equitable distribution are equally important.

WHAT IS INNOVATION?

Innovation is the development, diffusion, or implementation of new or improved products, services, and processes that generate economic or social value for individuals, firms, communities, and/or economies.*

While it is commonly associated with technology and technological change, innovation is a broader phenomenon that includes new marketing methods, business models, organizational structures and processes, management practices, and other activities that produce value for firms, economies, and societies. Similarly, while start-up and scaling firms are often viewed as emblematic innovation actors, established firms and sectors can be innovative as well. Supply chain innovations by large, established firms—such as the adoption of warehouse robot-pickers and delivery tracking to improve speed and accuracy—have transformed the retail sector.

To count something as innovation, we must see both:

- + the emergence or adoption of a new or improved product, service, or process; and
- + the generation of new value, whether economic or social.⁷

Innovation does not have to be new to the world—it can include products, services, or processes that are new to a particular firm, organization, or sector. An established organization that implements an existing technology to improve efficiency and lower costs is innovating because the change generates value. Similarly, a new health procedure might allow for more efficient or more accurate diagnosis and treatment for patients—thereby producing value in terms of better health or lower cost of services.

WHAT IS INCLUSIVE INNOVATION?

Until recently, questions of fairness and the distribution of opportunities and benefits were rarely discussed in innovation research and policy. Attention was focused largely on identifying the causes of economic growth and policies and activities that would position firms and economies to innovate more effectively, with the implication that this would generate wealth for everyone. Concerns about the distribution of opportunities to participate in and benefit from innovation were considered in economic and social research more broadly—but not in innovation research and policy specifically. Over the past two decades, however, there has been greater recognition among economists and policy-makers that the distribution of innovation opportunities, benefits, and risks matters—both for achieving fairness and achieving better innovation performance and economic growth.⁸ But what does it mean for innovation to be more inclusive?

* This definition draws on OECD, Oslo Manual: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th ed. (Geneva: OECD, 2018), <https://www.oecd.org/science/oslo-manual-2018-9789264304604-en.htm>; and Conference Board of Canada, “How Canada Performs: Innovation,” last modified May 2018, <http://www.conferenceboard.ca/hcp/provincial/innovation.aspx>.

An innovation economy is *inclusive* when there are:

- + opportunities for all people to *participate* as workers (in good jobs with decent wages and security), entrepreneurs (if they choose), and consumers (with sufficient resources to lead good lives);
- + *fair distributions* of the benefits and harm produced by innovation—including more attention to and management of where and to whom the economic and social gains of innovation and growth flow, and who bears the burden of market failures and negative externalities; and
- + opportunities for people to *participate* in decision-making about the priorities, direction, and regulation of innovation.*

These criteria for inclusive innovation are interrelated. The extent to which people *benefit* from innovation depends in part on the extent to which they *participate* in the innovation economy. One of the best ways to ensure a fairer distribution of the benefits of innovation is to have people employed in good, well-paying jobs. Moreover, achieving equitable *participation* is shaped by *decisions about the priorities, direction and regulation of innovation*. And the extent to which individuals with different perspectives and experience get to shape the priorities and direction of innovation is partly a function of the extent to which they *participate* in the innovation economy—as researchers, managers, workers, and consumers.

Our IIM framework is composed of three pillars—Opportunities, Activities, and Outcomes—that focus attention on key elements of both innovation and inclusion/distribution. Together, they capture

the idea that *opportunities and resources* to innovate and participate (e.g., education and skills, financial resources, and research capacity) shape businesses' and individuals' innovation *activities* (e.g., R&D, product development, technology adoption, and entrepreneurship) which, in turn, shape outcomes for businesses (e.g., productivity, revenue, and growth) and individuals and communities (e.g., employment, income, wealth, and well-being).

This framework provides us with a clearer understanding of the ways in which the outcomes of innovation are influenced by initial distributions of opportunities and resources and, in turn, how the distribution of outcomes (including both the costs and benefits of innovation) influences future opportunities for innovation. We situate the framework within the broader context of policies, market structure, firm characteristics, and other variables that can affect opportunities, activities, and outcomes.

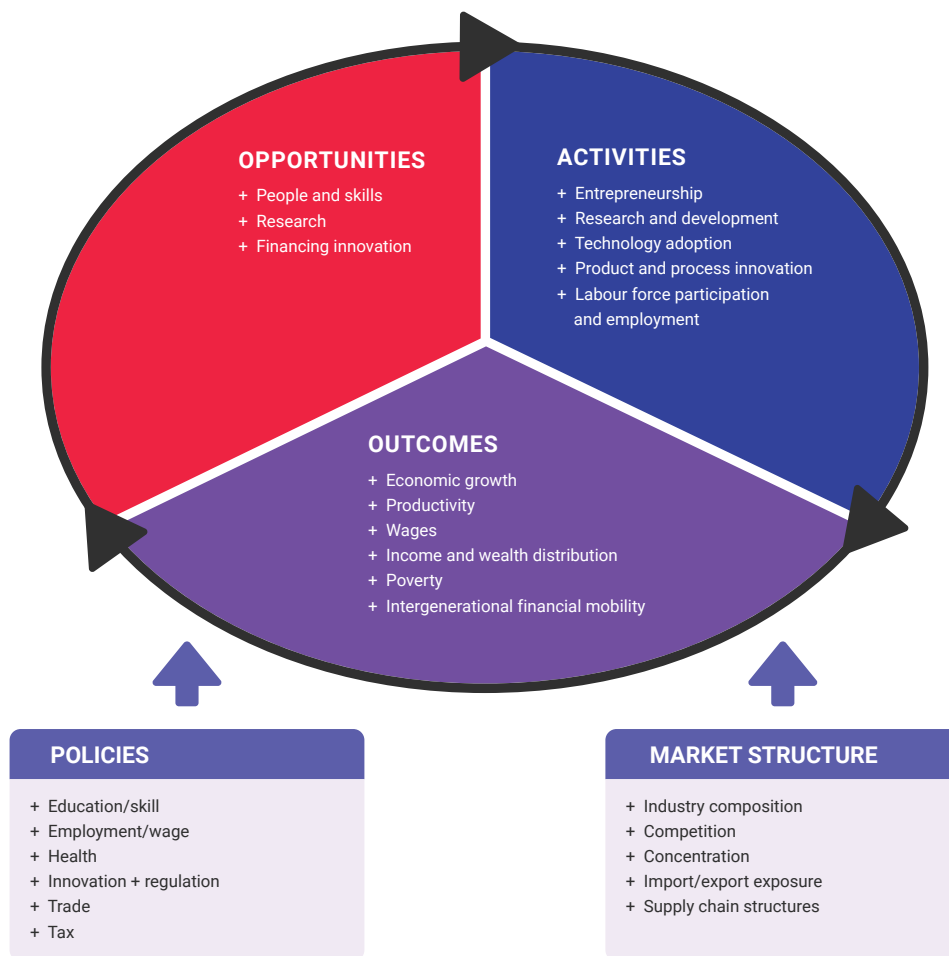
Indicators and data

We have selected indicators and data that help to provide a clearer picture of performance on the three pillars of inclusive innovation. The key criterion for choosing an *indicator* is whether it meaningfully captures some dimension of inclusive innovation opportunity, activity, or outcome. When selecting *data* to report on the indicator, we are concerned with *validity* (i.e., whether the data accurately represent the thing being measured), *reliability* (i.e., whether the data consistently measure the thing across time and space), *comparability* (i.e., whether the data allow us to compare Canada and provinces to other countries and sub-national regions), and *accessibility* (i.e., whether the data are reasonably available for use).

* This three-pronged conception of inclusive innovation draws from the definition offered in Stanley, Glennie, and Gabriel, *How Inclusive Is Innovation Policy?* We recognize that there is disagreement about how to define some of the normative terms used here—including “good,” “decent,” and “fair”—and that some of that disagreement is “reasonable.” Recognizing that not providing full definitions of those terms leaves some ambiguity in the idea of “inclusive innovation” more generally, we believe that developing more robust definitions of the normative terms is a job for democratic deliberation. At the same time, we follow the late Anthony Atkinson in holding that we “may well disagree as to how much inequality is acceptable while agreeing that the present level is intolerable or unsustainable.” For practical purposes, if we can agree on the “direction of movement” in addressing inclusion and inequality challenges, we can set aside disagreement about “the ultimate destination” for the time being. Atkinson, *Inequality*.

INCLUSIVE INNOVATION FRAMEWORK

Figure 1



The indicators and data in the monitor offer a picture of two dimensions of distribution—specifically, how opportunities and benefits are distributed among different income groups (i.e., *vertical dimensions*), and by demographic and identity characteristics, such as age, disability, racial identity, gender, immigration experience, Indigenous identity, and region (i.e., *horizontal dimensions*).⁹ And they provide a useful picture of inputs to innovation (e.g., human capital, R&D, and financing), innovation activities (e.g., entrepreneurship, technology adoption, and patents), and outcomes (e.g., growth, productivity, and employment).

In most cases, we have selected indicators on which data are already collected and reported by the OECD, Statistics Canada, and other agencies. We have tried to collect data that allow for international and inter-provincial comparisons,

and clarity about demographic differences, both currently and over time. However, there are gaps in the data that prevent us from painting a more complete picture. We point out some of these gaps below and highlight areas that Statistics Canada and others should prioritize.

Comparator countries

For most indicators, we compare Canada’s performance to OECD countries, with a special focus on G7 countries, given their similar levels of social and economic development. In general, focusing on OECD and G7 countries ensures that we benchmark performance against socio-economically similar countries for whom comparable data are available. Some important countries are excluded—most notably, China. While including China would be ideal, Chinese data does not always conform to OECD definitions and

standards, and thus it is not clear how reliable and comparable they are for this initiative.

There are some exceptions to our OECD/G7 comparator group. Where we think it is important to track a certain indicator in the Canadian context, but other countries' contexts do not allow for tracking, we include the indicator without an international comparison. For example, to

understand inclusive innovation in Canada it is important to understand the opportunities available, and distribution of benefits, to Indigenous peoples. But given differences in experience and data collection methods and norms, it is difficult to compare Indigenous peoples' experience with (non)inclusive innovation in Canada with that of Indigenous peoples' experience in other countries.

A NOTE ON PROBLEMATIC DATA CATEGORIES

For many of our indicators, we have relied on Census and other data collected and reported by Statistics Canada that risks obscuring some of the realities and experiences of racialized minorities and LGBTQ+ and other identities. Where possible, we have tried to unpack the categories used by Statistics Canada to provide as clear a picture as possible, but there are three cases in which we face challenges:

1. *Visible and non-visible minorities*

Statistics Canada often uses the terms "visible minority" and "non-visible minority" when it reports data on what we refer to as racialized minorities. There are a few concerns with this term. In the first place, "visible minorities"—and its mirror category, "not a visible minority"—hides some identities that some respondents experience. For example, the counterfactual category "not a visible minority" includes not only "White" or "Caucasian" people, but also Indigenous peoples and those who identify as White and another identity, such as Latin American, Arab, or West Asian.

The experiences of people with these identities are substantially different and should not be aggregated together. As the United Nations has noted, the "lack of precision" with the categories "visible" and "non-visible" minorities "may pose a barrier to effectively addressing the socio-economic gaps of different ethnic groups."¹⁰ Statistics Canada has said that they are planning on changing the term, and will improve

how they collect racial data. We are starting to see this with recent changes in the Labour Force Survey.¹¹

2. *Gender and sex*

Statistics Canada has recently updated their gender and sex variables. "Sex" now refers to "sex assigned at birth," which is typically "based on a person's reproductive system and other physical characteristics." "Gender" refers to "the gender that a person internally feels" (i.e., "gender identity" along the gender spectrum) and/or "the gender a person publicly expresses" (i.e., "gender expression").¹²

We believe this is an important step forward. However, because we rely on older data to understand trends in certain indicators, we have little choice but to use the older, less precise and less inclusive, categories "female/male" and "woman/man."

3. *The Census and Indigenous peoples*

The Census picture of Indigenous peoples is limited, due to gaps and challenges in data collection and reporting. While Indigenous peoples are increasingly participating in the collection of Census responses, the 2016 Census did not completely enumerate 14 reserves and settlements. This was partly due to disruption due to natural disasters, but also reflects ongoing concerns about the misuse of data collected from and about Indigenous peoples.^{13 14} As a result, data on Indigenous peoples in each of the indicators should be treated with caution.

PILLAR I: OPPORTUNITY



The Opportunity pillar focuses on indicators that tell us the extent to which the Canadian innovation ecosystem has the resources and inputs to support innovation, and the distribution of these resources and inputs among people and regions.

The state of innovation capacities and resources in the ecosystem generally, and how they are distributed among people, shapes the set of innovation opportunities available to firms and people. To be sure, the presence of key resources and inputs such as skilled people and financing does not necessarily lead to strong innovation activities and outcomes—that depends on other variables, including market conditions and firm-level decision-making. Nor does an inclusive and equitable distribution of education and skills, for example, necessarily lead to equitable participation in and benefit from the innovation economy. But these capacities and resources are important contributors to and enablers of innovation and inclusion, and therefore ought to be monitored.

HOW IS CANADA DOING?

Canada has a reputation for having strong inputs and conditions for innovation, but difficulty with commercialization, productivity, and growth. Similarly, some measures suggest that Canada is among the top jurisdictions for inclusion and equity in the distribution of education and skills attainment.* But troubling inequities persist, and

many face barriers to the use of their skills in the labour market, leading to stubbornly high levels of income and wealth inequality. In the aggregate, Canada has high educational attainment, strong skills development, excellent idea generation, and improving innovation financing, but there are persistent weaknesses and areas of major concern hidden beneath the surface.

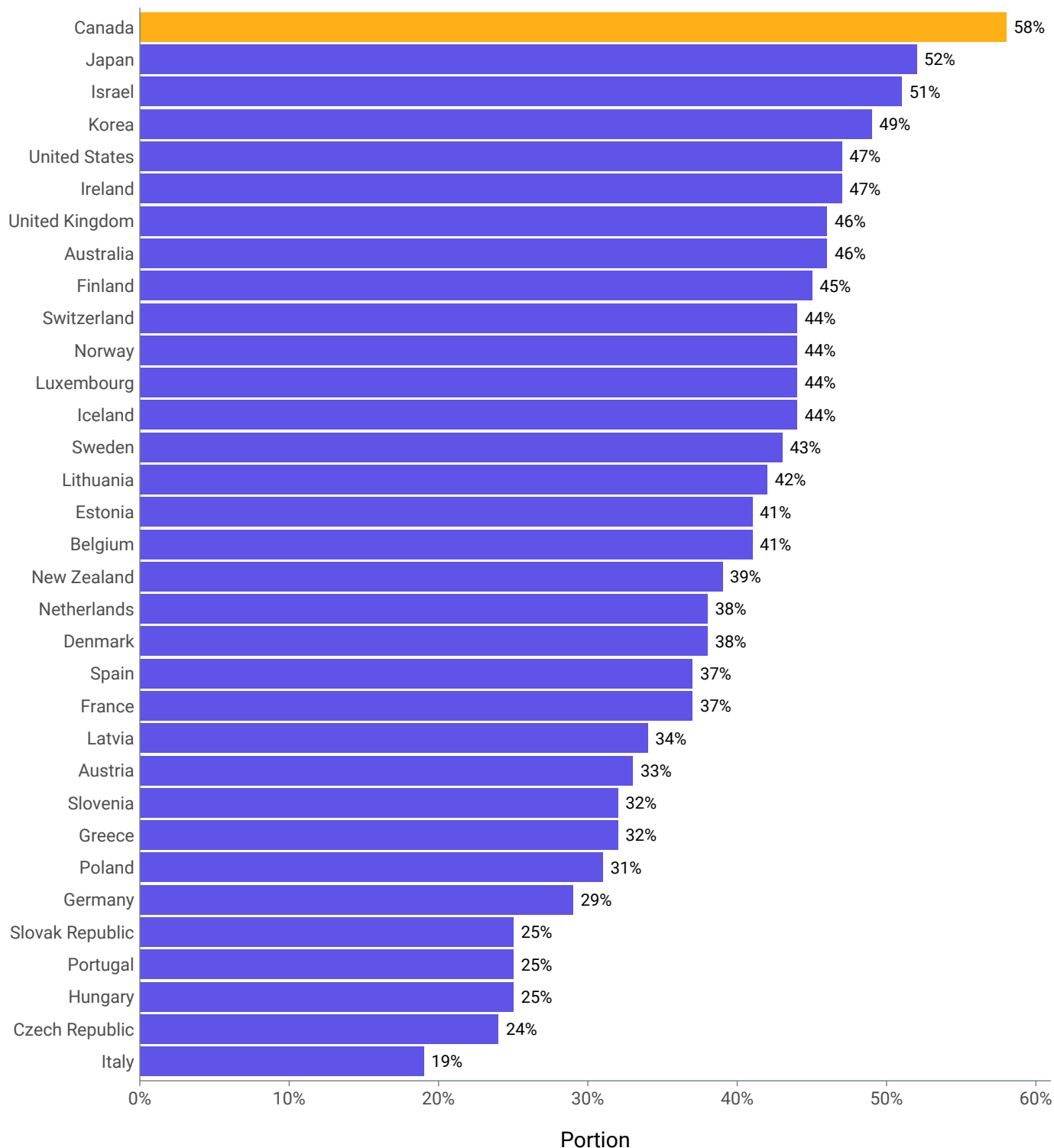
Education and skills

Nearly 58 percent of people aged 25 to 64 in Canada hold a **post-secondary education** (PSE) credential of some kind, placing the country at the top of the OECD. Canada's strength largely derives from world-leading **college attainment** (26 percent), which is five percentage points higher than the next-ranked country, Japan (21 percent). Moreover, Canada's adult **literacy and numeracy skills** are slightly higher, and **problem-solving using technology** skills are much higher than the OECD average. Yet, Canada is a middling performer in terms of **university attainment** (32 percent)—well below Switzerland (44 percent) and our closest neighbour, the United States (37 percent)

* For example, on the Conference Board of Canada's "Equity in Learning Outcomes" measure, Canada earns a grade of "A" and ranks second, while on the "Resilient Students" indicator—a measure of the proportion of lower-income students who score at the highest level on skills assessments—Canada earns a "B" and ranks fourth among peer countries. See <https://www.conferenceboard.ca/hcp/provincial/education/equity.aspx>; <https://www.conferenceboard.ca/hcp/provincial/education/resilientstudents.aspx>.

Figure 2: Post-secondary education attainment

Percentage of the working age population with a tertiary credential, 2018 or most recent year



Source: OECD table, Educational attainment and labour-force status, Educational attainment of 25-64 year-olds

At the same time, there are substantial gaps in educational attainment among women and men, racialized and non-racialized people, and Indigenous and non-Indigenous people in Canada. Women and men in Canada aged 25 to 34 tend to have higher PSE attainment than women and men, respectively, in almost all OECD countries, but the gap between women's and men's attainment in Canada is much wider than in most other countries. Women in Canada are 17.5 percentage points more likely to have a PSE credential than men in Canada. Despite women's higher PSE attainment in recent decades, the gender wage gap remains stubbornly wide, as data in the Outcomes pillar reveals (below).

Moreover, while racialized people in Canada (aged 25 to 34) are more likely to hold a PSE credential (74 percent) than the non-racialized population (68 percent), there are substantial differences among specific racial identities. 63 percent of those who identify as Chinese hold a university degree, but just 29 percent do among those who identify as Black. Meanwhile, Inuit (30 percent), Métis (56 percent), and First Nations (40 percent) are much less likely to hold a PSE credential than non-Indigenous people in Canada (71 percent) among those aged 25 to 34.

Attainment differences are important for two reasons: Lower educational attainment among some groups narrows opportunities to participate in innovation-related activities and employment—which means that new innovations and technologies can often ignore, and pose harm to, those communities, because they are developed without their knowledge and experiences in mind. Biased artificial intelligence systems and applications are a recent example.* Second, lower educational attainment makes it less likely that people will benefit from innovation and growth, given how economic benefits generally flow to those with higher education and skills.¹⁵ To be

sure, employment opportunities and income levels are influenced by factors other than education—including sexism and systemic racism—but educational attainment has some explanatory weight. Thus, while Canada has a good education and skills foundation for innovation in general, gaps in education and skills attainment poses risks to both the quality of innovation and the distributions of benefits among all people.

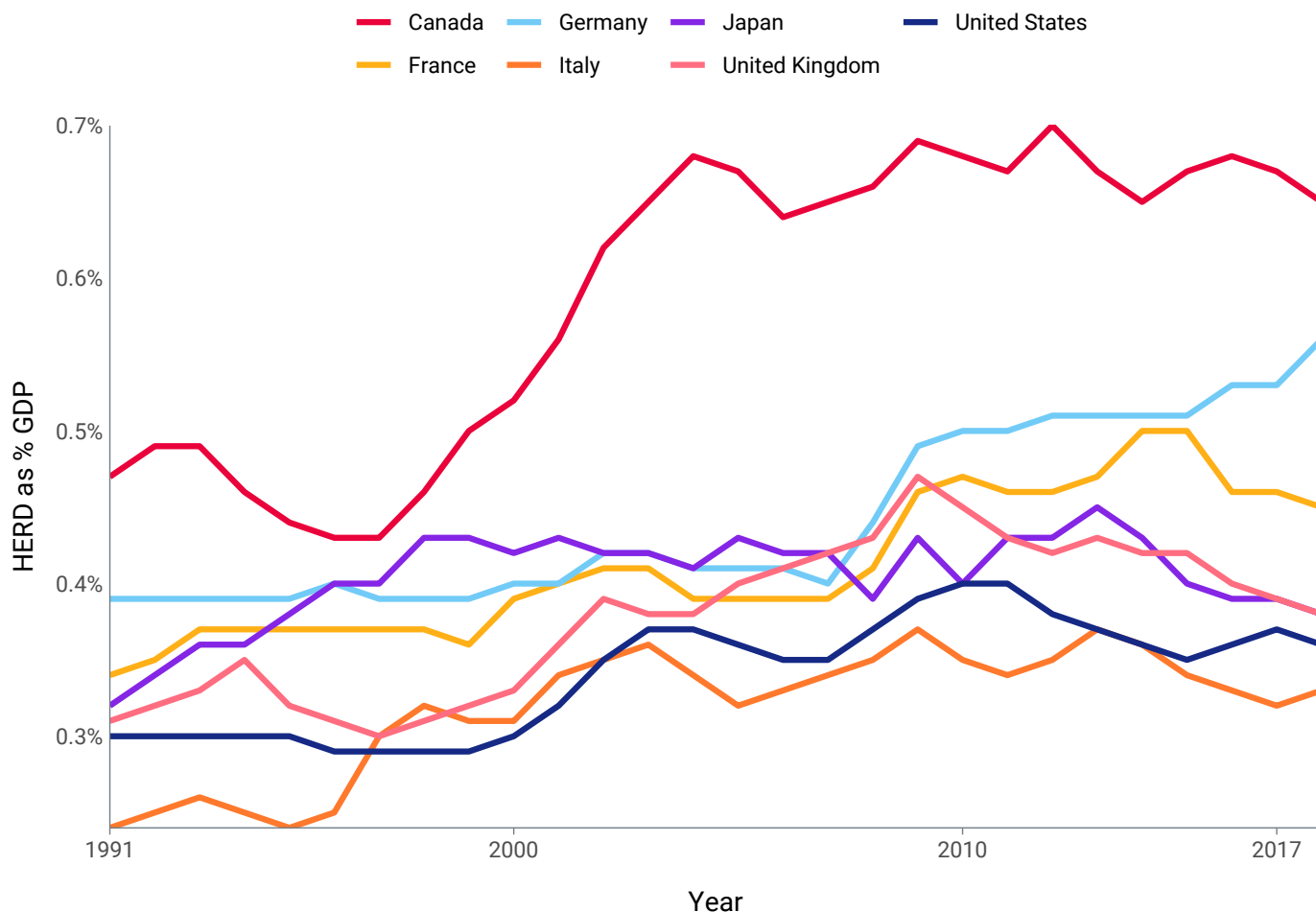
Research

Research is a key input into the innovation process. Whether Canadian firms have opportunity to innovate depends, in part, on the size and quality of the researcher population, access to new ideas, and availability of funding to produce and commercialize or implement new ideas. Our understanding of Canada's inclusive innovation capacity can be improved by looking at the researcher population, including the number of researchers and their access to funding.

Canada has **8.4 researchers per 1,000 people employed**, which is slightly lower than the OECD average of 8.6, but well behind leaders like Denmark (15.7), Korea (15.3), and Sweden (14.8). This includes researchers in industry, education, and government. Between 2001 and 2011, Canada experienced growth in researchers per 1,000 employed (rising from 7.5 to 9.4), but since then has experienced a steady decline to 8.4, while most other G7 countries have continued to increase their number of researchers. This is due to both an absolute decline in the number of researchers and growth in the labour force over the time period in question. Unfortunately, existing data from the OECD and Statistics Canada do not specify the gender or racial makeup of the researcher workforce in Canada.

* See, for example, the important work of the AI Now Institute, which consistently shows that without the participation of BIPOC, LGBTQ+, people with disabilities, and other marginalized communities, AI systems and applications tend to reflect and reinforce harmful stereotypes. See Meredith Whittaker, et al., "Disability, Bias, and AI," AI Now Institute, November 2019, <https://ainowinstitute.org/disabilitybiasai-2019.pdf>; Sarah Meyers West, Meredith Whittaker, and Kate Crawford, "Discriminating Systems: Gender, Race and Power in AI," April 2019, <https://ainowinstitute.org/discriminatingystems.pdf>.

Figure 3: Higher education R&D
As a percentage of GDP, G7 countries from 1991 to 2018



Source: OECD table, Main Science and Technology Indicators, HERD as a percentage of GDP

What resources do researchers have available to contribute to knowledge generation and innovation? At 0.65 percent (as a share of GDP), Canada ranks among the top spenders on **higher education research and development** (HERD)—well above the OECD average of 0.41 percent. While Canada remains among the top countries, HERD has stagnated for nearly 15 years, allowing other OECD countries to narrow the gap as they steadily increase spending. As a share of GDP, HERD

is much higher in Nova Scotia (1 percent) and Newfoundland and Labrador (0.98 percent) than all other provinces, similar to the top-ranking OECD country, Denmark (0.98 percent). Alberta (0.46 percent) and Saskatchewan (0.43 percent) have the lowest HERD among provinces.

By contrast, at 0.11 percent (as a share of GDP), Canada ranks among the lowest spenders on **government-performed research and development**

(GOVERD)*—below the OECD average of 0.24 percent. Canada’s GOVERD steadily declined from 0.29 percent in 1991 to 0.11 percent in 2018, while the OECD average declined from 0.3 percent to 0.24 percent over the same period. PEI (0.25 percent) is the only province that exceeds the OECD average (0.24 percent). Newfoundland and Labrador (0.06 percent) and BC (0.05 percent) have the lowest GOVERD among provinces.

Thus, while Canada has a reputation of having a highly educated and skilled population, we are less likely to have people working—and well-funded to work—on research activities that contribute to social and economic innovation. To be sure, Canada’s performance on HERD remains quite high, but when combined with the low levels of research conducted in government facilities, few researchers generally, and the fact that our HERD advantage is slipping away, Canada may be much less of a research innovation powerhouse than some believe.

Financing innovation

Innovators and entrepreneurs in Canada frequently perceive a scarcity of funding, which can act as a barrier to innovation and growth. Indeed, the opportunity to innovate successfully depends not only on having highly skilled and motivated people and good foundational research and ideas, but also on the financial resources to support innovation and commercialization. On this set of metrics, Canada’s inclusive innovation potential reveals a mixed picture.

Borrowing costs for Canadian firms are higher than they are for firms in most other countries, which could make funding innovation more difficult.

Among OECD countries, only New Zealand (9.3 percent) records a higher **interest rate on loans for small and medium enterprises (SMEs)** than Canada (5.2 percent). In 2017 most European countries recorded average interest rates for SME loans between 1.5 and 3.5 percent, while the United States had a rate of 4.9 percent. At 2.9 percent, Canada’s average **interest rate on loans to large firms** was lower than that in six other countries (including the United States, at 4.1 percent), but still in the bottom third of all comparator countries. Canadian firms’ concerns about access to some kinds of innovation financing may be justified.

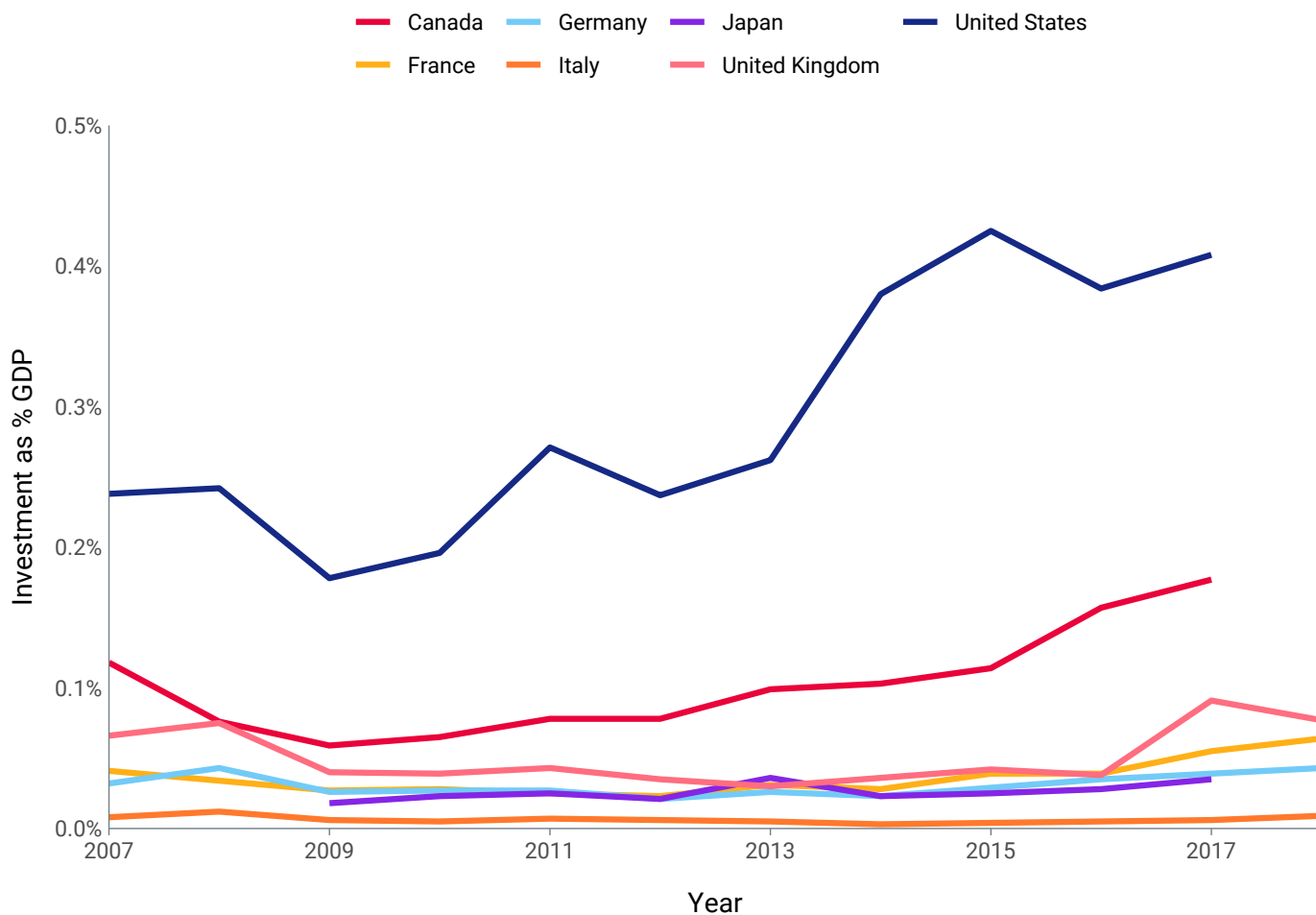
At the same time, Canadian firms have seen access to **venture capital (VC)** grow substantially in absolute terms and relative to peer countries. At 0.18 percent, Canadian firms attract proportionally more VC as a percentage of GDP than almost all comparator countries except Israel (0.38 percent) and the United States (0.55 percent). Yet, while impressive by global standards, the fact that Canadian firms attract only one third of what US firms attract, proportional to economy size, is troubling given that US-based firms are more likely to be Canadian competitors than firms in Europe, Asia, or elsewhere. Moreover, VC varies substantially by region, with Quebec- and Ontario-based firms attracting proportionally more than other provinces. This means VC-backed innovation opportunities in Canada are emerging in just a handful of places, and being acquired by only a few hundred firms.

Tracking opportunity: COVID-19 and after

Canada’s overall education and skills fundamentals are not likely to change substantially in the

* R&D statistics tables distinguish between *funders and performers* of R&D. OECD convention is to report R&D by performing sector, regardless of funder, to get a sense of the level of R&D *activity* (and not merely available funding). OECD definitions for R&D performance by sector—i.e., HERD, GOVERD, and BERD (business expenditures on R&D)—can be found in the OECD’s 2015 Frascati Manual (<http://www.oecd.org/sti/inno/Frascati-2015-Glossary.pdf>). In Canada, GOVERD would include R&D conducted, for example, at the National Research Council, or by researchers working in agencies such as Fisheries and Oceans, Environment Canada, Health Canada, and others. It does not include R&D conducted in higher education institutions and labs, even if this is funded by governments; that would be classified as HERD. Statistics Canada’s table distinguishing between *funding and performing sectors* can be found at <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2710027301>.

Figure 4: Venture capital investment
As a percentage of GDP, G7 countries from 2007 to 2018



Source: OECD table, Venture capital investments

COVID or immediate post-COVID era. However, given the challenges of opening universities and colleges during COVID, and the fact that some families will have fewer resources for education—due to unemployment and/or lost income— we could see some changes in who attends higher education. Innovation financing could become an even more pressing issue for Canadian firms which could affect start-up and growth rates in the near to medium term. Higher education and government R&D funding could be squeezed as federal and provincial governments look for ways to manage the budgetary fallout from the COVID economic crisis. To be sure, innovative solutions to challenges generated by the COVID pandemic and economic crisis could attract funding, and interest in inclusive innovation among some policy-makers

could spur policy changes that would contribute to a widening of opportunities. Until that happens, however, the risk of a narrowing of inclusive innovation opportunities remains.

PILLAR II: ACTIVITY



The Activity pillar provides a picture of the innovation-related activities pursued by firms. It also shows who is participating in the economy generally, and in innovation specifically.

The Activity indicators tell us the extent to which Canadian firms spend on research and development, adopt new technologies, implement new processes and business models, start new ventures, and develop new products and services. Because innovation is so often unpredictable, these activities may or may not lead to higher revenues, lower costs, improved productivity, firm growth, or the generation of better products and services for consumers and citizens. But they tell us whether firms are making an effort.

The extent of inclusive participation in economic and innovation activities is captured through labour force participation, employment, and a variety of entrepreneurship indicators. It is possible to have innovative activity that is undertaken by only a small group or is not reflective of broader population demographics, but such activity will suffer from two deficits. In the first place, innovation that does not allow for participation by women, racialized minorities, people with disabilities, and others risks generating products and services that further exclude and marginalize many people, and that appeal to only a narrow slice of the population. In the second place, innovation without inclusive participation short-circuits a key mechanism for more equitable distribution of the economic benefits of innovation, namely, employment.

HOW IS CANADA DOING?

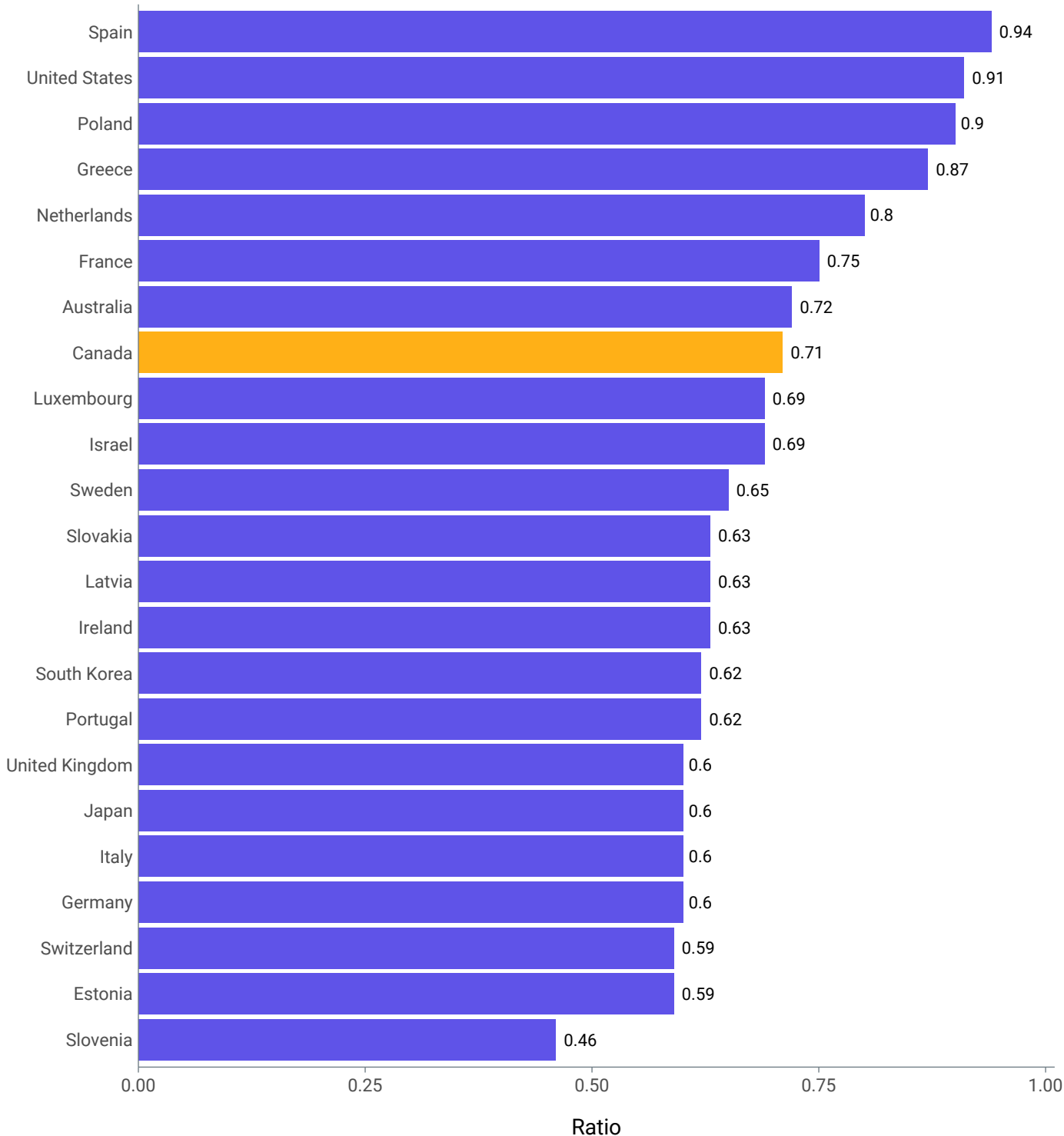
The indicators in the Activity pillar reveal mixed performance. There is strong evidence of an entrepreneurial ethos among people in Canada, but innovation execution—in terms of business R&D, technology adoption, and new product and service development—is less than stellar. Moreover, looking at differences in entrepreneurship by gender, and employment rates by gender, race, disability, and Indigeneity, suggests that Canada does not have an inclusive economy.

Entrepreneurship

One of the bright lights in Canada's innovation ecosystem is the **entrepreneurial initiative** of those in Canada—an important contributor to innovation insofar as it is associated with generating new ideas, products, and businesses. At 18.2 percent, Canada leads all global peers in the percentage of the population aged 18 to 64 who report early-stage entrepreneurial activity, including intentions to start new businesses and making initial steps towards doing so. The United States follows with 17.4 percent, and Latvia with 15.4 percent. Canada has declined slightly from a high of 18.8 percent in 2017, but is above the 12.2 percent recorded in 2013, and well above the 7.2 percent recorded in 2006. Entrepreneurial initiative is especially strong in Alberta (25 percent) and Ontario (20 percent), but lags somewhat in Quebec (13 percent).

Figure 5: Women's entrepreneurial initiative

Percentage of women who report early stage entrepreneurial activity, divided by the equivalent percentage of men, 2019



Source: Global Entrepreneurship Monitor 2020
 Note: Population is those aged 18 to 64

Although Canada's entrepreneurial initiative is high, the actual rate of **business start-ups** is less impressive. With new firms making up 8 percent of all active firms in 2017, Canada falls below the OECD average of 10.5 percent, and well behind leading countries Hungary, Poland, and Korea with start-ups rates near or above 16 percent. At the same time, Canada has a higher enterprise birth rate than Japan, Germany, and Switzerland, which are often regarded as innovation powerhouses. This serves as a useful reminder that the indicators may tell more than one story. High start-up rates might indicate business dynamism, with scarce resources shifting from unproductive to potentially more productive firms, or from old ideas to new. Or they might also be a sign that large, established firms are performing well and therefore that there is less need for new ventures. Still, a healthy innovation economy will want to see some business dynamism—if only to pressure established firms to use resources more productively rather than becoming large drains on the economy.

The **gender gap in entrepreneurial initiative** in Canada is concerning. At 0.71, the ratio of women's to men's entrepreneurial initiative in Canada ranks eighth among 23 peers, with Spain (0.94) and the United States (0.9) leading all other countries. A ratio of 1 means women are just as likely as men to report early-stage entrepreneurial activity. Moreover, the gap between the rate of self-employed women (whose businesses have employees) and self-employed men (whose businesses have employees) is larger in Canada (3.43 percentage points) than in the OECD generally (3.26 percentage points). Lagging entrepreneurial initiative and activity among Canadian women does not necessarily reflect lower ambition, desire, or capacity to start businesses. Many Canadian women who would like to start businesses may simply decide not to do so because of both real and perceived barriers. In Ontario, for example, women are much less likely than men to say that they have the skills and knowledge to start a business (47 percent versus 62 percent), and are more likely to fear failure (43 percent versus 34 percent).¹⁶ A more inclusive innovation economy would identify and address those barriers to ensure more equal entrepreneurial opportunities for

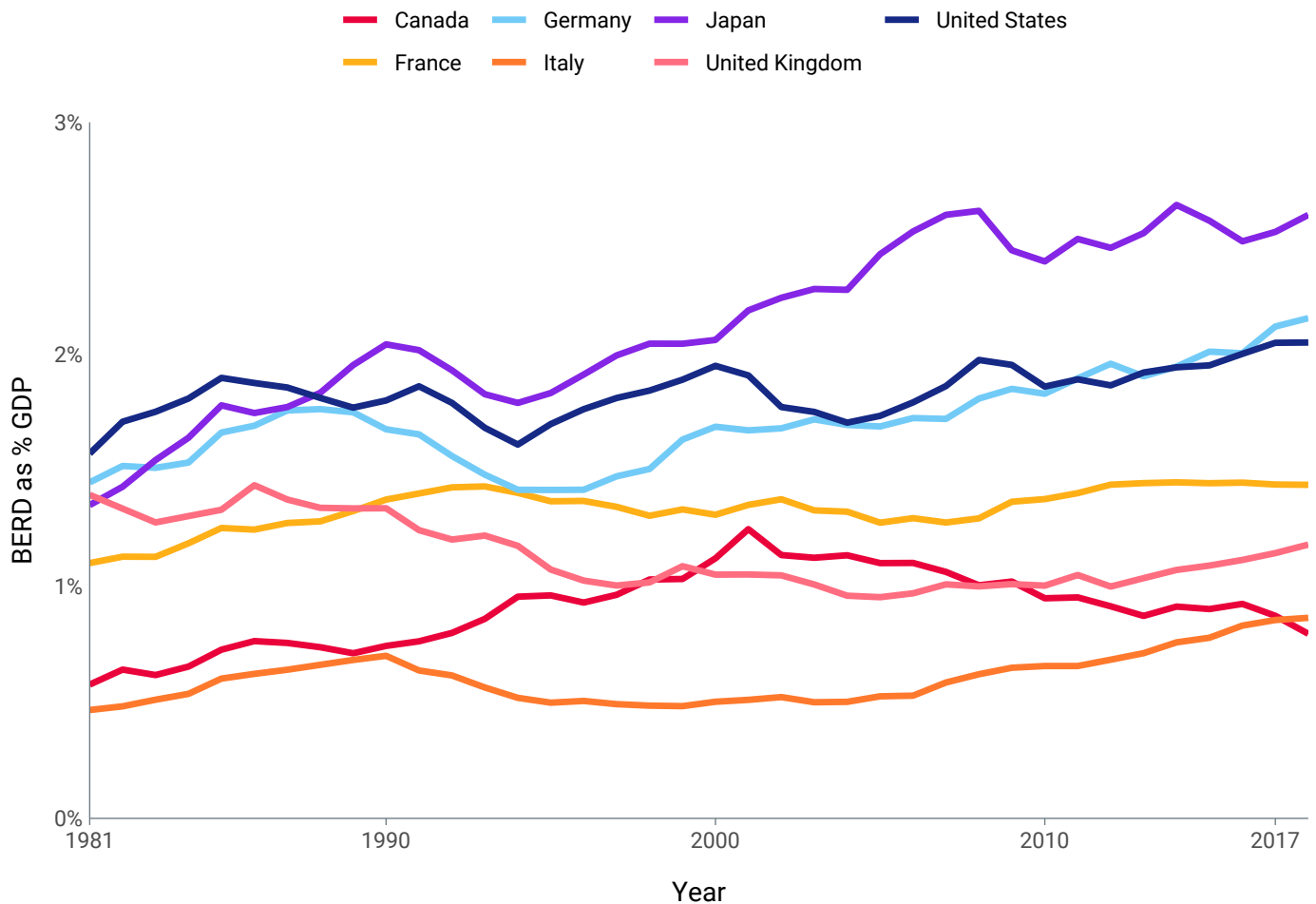
women and men. To that end we need finer tuned indicators of female entrepreneurship, including more research on intersectional demographics of entrepreneurship. For more information on this, please refer to the ongoing work of the [Women Entrepreneurship Knowledge Hub](#), a regional network of organizations and researchers led by Ryerson University and supported by the federal government's Women Entrepreneurship Strategy.¹⁷

Research and development

Business expenditures on research and development (BERD) is often considered an indicator of businesses' commitment to innovation, and therefore provides a useful, albeit indirect, gauge of innovation commitment and activity in an economy. Canada lags the OECD overall on BERD, and the gap has been widening for two decades as Canadian BERD intensity continues to fall.

At 0.8 percent (as a share of GDP), Canada's BERD is well below the OECD-wide level of 1.7 percent. We rank near the bottom in the OECD generally, and last among G7 nations. By contrast, BERD in Israel is over 4 percent as a share of GDP, while Korea, Japan, Sweden, Switzerland, Austria, Germany, and the United States all post BERD intensities over 2 percent—more than twice the Canadian rate. While Canada's lower BERD intensity is explained in part by the industrial structure of the economy—with greater shares of the economy made up of less R&D-intensive sectors like resource extraction—many of Canada's more R&D intensive sectors tend to spend less on R&D (adjusted for size) than the same sectors in the G7 more broadly.¹⁸ Moreover, not only has Canada lagged OECD peers on BERD for many years, our BERD intensity has been trending down since 2001 while in the OECD overall it has been rising.

Figure 6: Business R&D spending
As a percentage of GDP, G7 countries from 1981 to 2018



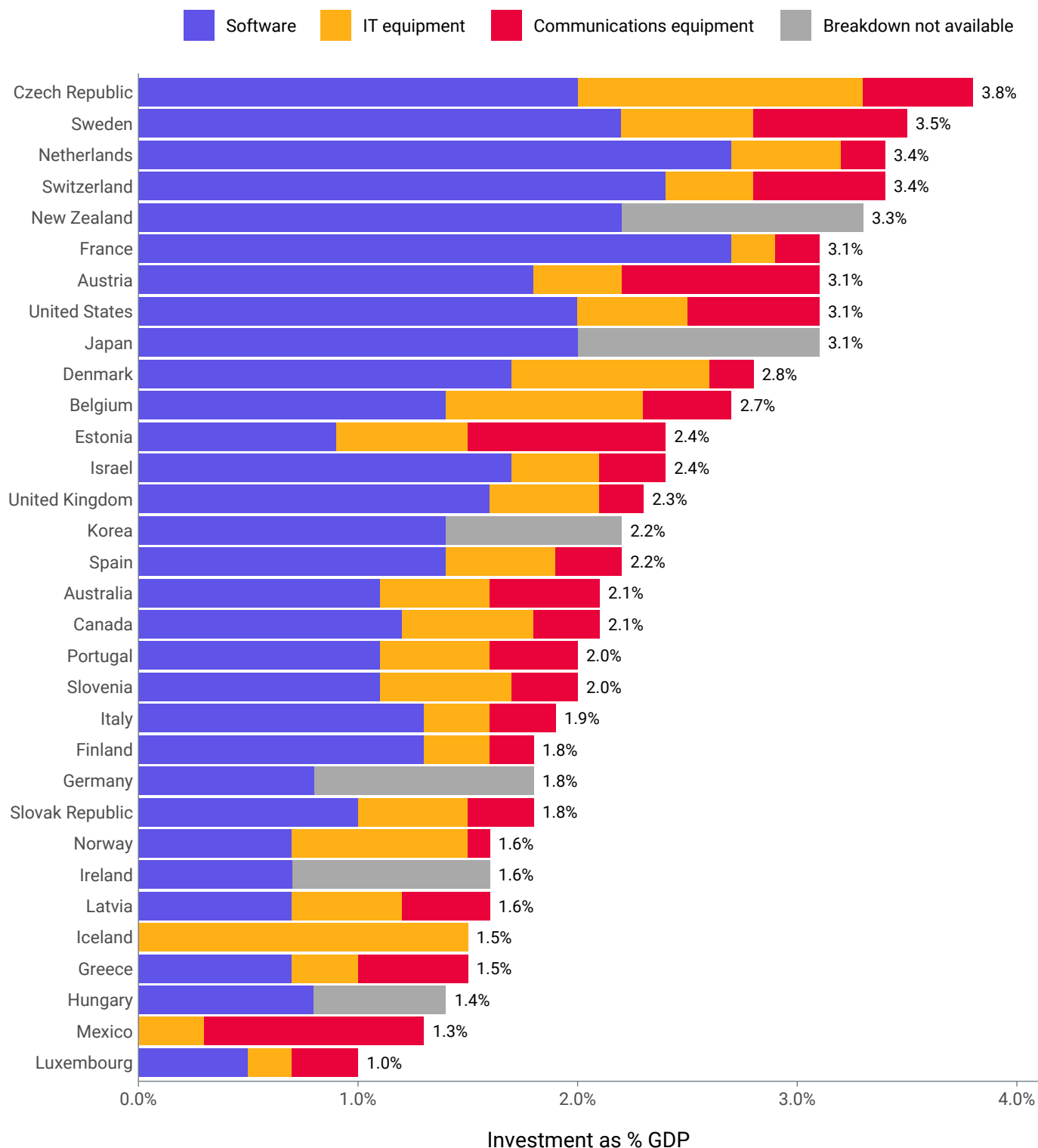
Source: OECD table, Main Science and Technology Indicators, BERD as a percentage of GDP

Technology adoption

Technology plays a critical role in the innovation economy, acting as an *enabler* of innovation—facilitating collaboration and creativity within organizations, improving production, sales and marketing, and contributing to business efficiency and productivity—a facilitator of worker and consumer participation in the economy; and as the *embodiment* of innovation that has already occurred. In all cases, technology adoption serves as a useful, albeit partial, signal of innovation in the economy, as it tends to improve business performance and, in turn, productivity and prosperity for economies more broadly. We track two measures of technology adoption: ICT investment (investment by firms across the

economy in information and communications technologies) and e-commerce (firms who offer sales and services through online platforms).

Figure 7: ICT Investment
As a percentage of GDP, 2015



Source: OECD Digital Economy Outlook 2017

Canada's **ICT investment** of 2.1 percent (as a share of GDP), is below the OECD level of 2.2 percent, and well below the United States at 3.1 percent. From 2000 to 2007, ICT investment as a share of total investments declined in Canada and all but one G7 country. ICT investment rebounded in the United States, France, the United Kingdom, and Italy from 2008 to 2015, but fell in Germany, Japan, and Canada. In short, Canada's ICT investment—and thus our track record in implementing and reaping the productivity and prosperity benefits of technology—is low and declining.

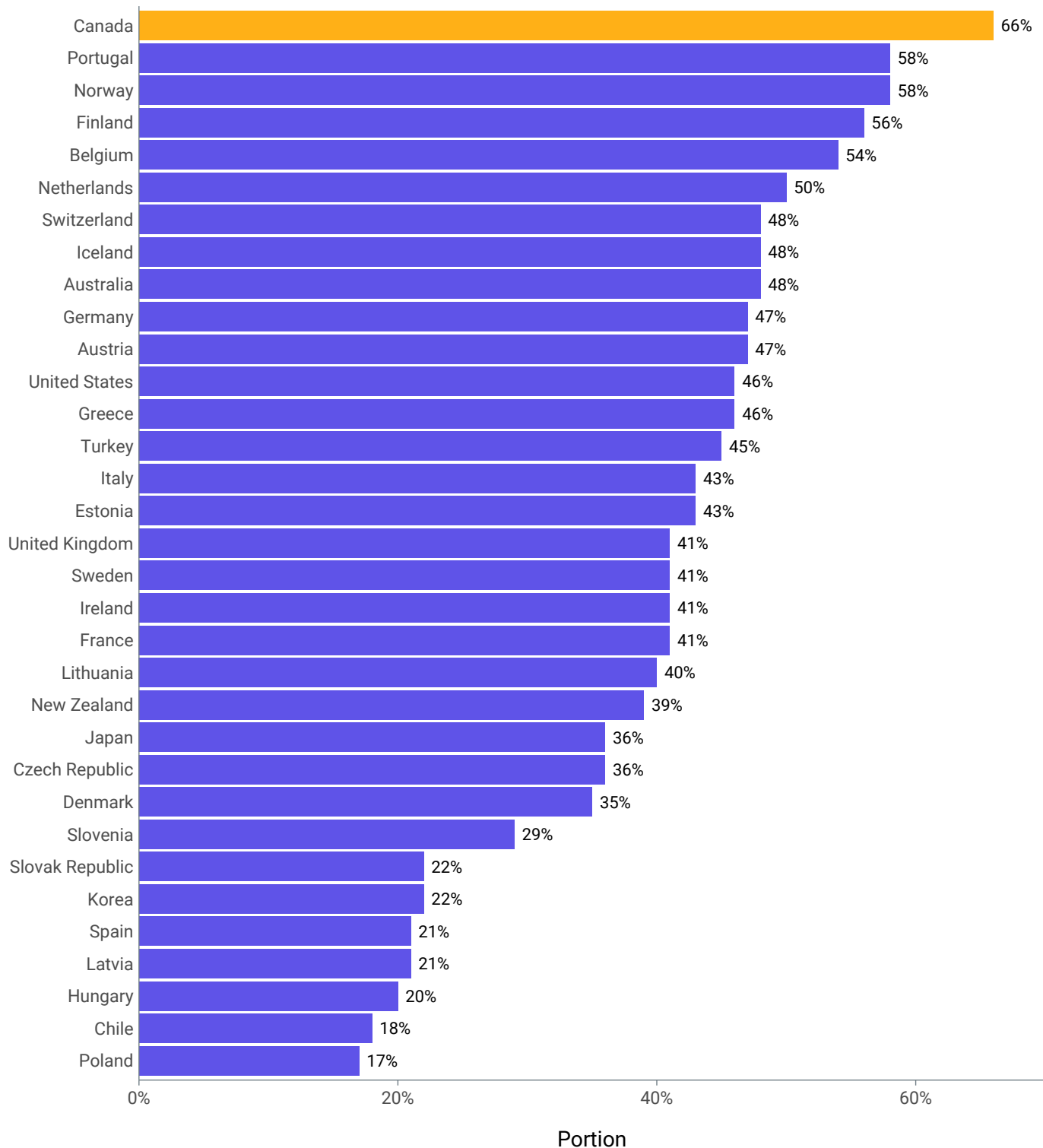
There is variation across provinces. In 2018, ICT investment was higher in Ontario (2.85 percent) than in all other provinces. Six provinces (Alberta, BC, PEI, Saskatchewan, Manitoba, and Newfoundland and Labrador) had ICT investment that registered below 2 percent. The four largest provinces saw ICT investment decline in the 2000s following the dot-com crash, some improvement leading up to the 2008 recession, and then continued decline or stagnation from 2009 to 2018—with the exception of Ontario, which recorded steady improvement from 2013 to 2018.

E-commerce—the selling and buying of goods online—allows firms to reach more customers, and customers to access a wider variety and quality of goods and services, than was possible when bricks-and-mortar stores were the main places to sell goods and services. Online buying and selling has become increasingly sophisticated to keep up with large and rising volumes of transactions, and has enabled a number of businesses to grow much faster and larger than would have been possible in a pre-digital environment. In short, by offering products online, firms are able to reach more customers than can physically visit a bricks-and-mortar retail location. In the age of COVID-19, firms that had already adopted e-commerce have struggled less than firms that had not, and many firms have accelerated adoption over the past six months.¹⁹

In 2017—the last year for which comparable data are available—18.5 percent of Canadian firms reported taking orders over computer networks, which is lower than the OECD average of 23

percent, and far behind leading countries New Zealand (50 percent) and Australia (46 percent). In Canada, 16.5 percent of small firms reported taking orders online, versus 21 percent of small firms in the OECD overall. Although large firms in Canada (29 percent) are more likely than small firms (16.5 percent) to report taking orders online, Canada's large firms are further behind large firms in the OECD generally (44 percent) and leading countries Slovenia (62 percent) and Ireland (62 percent).

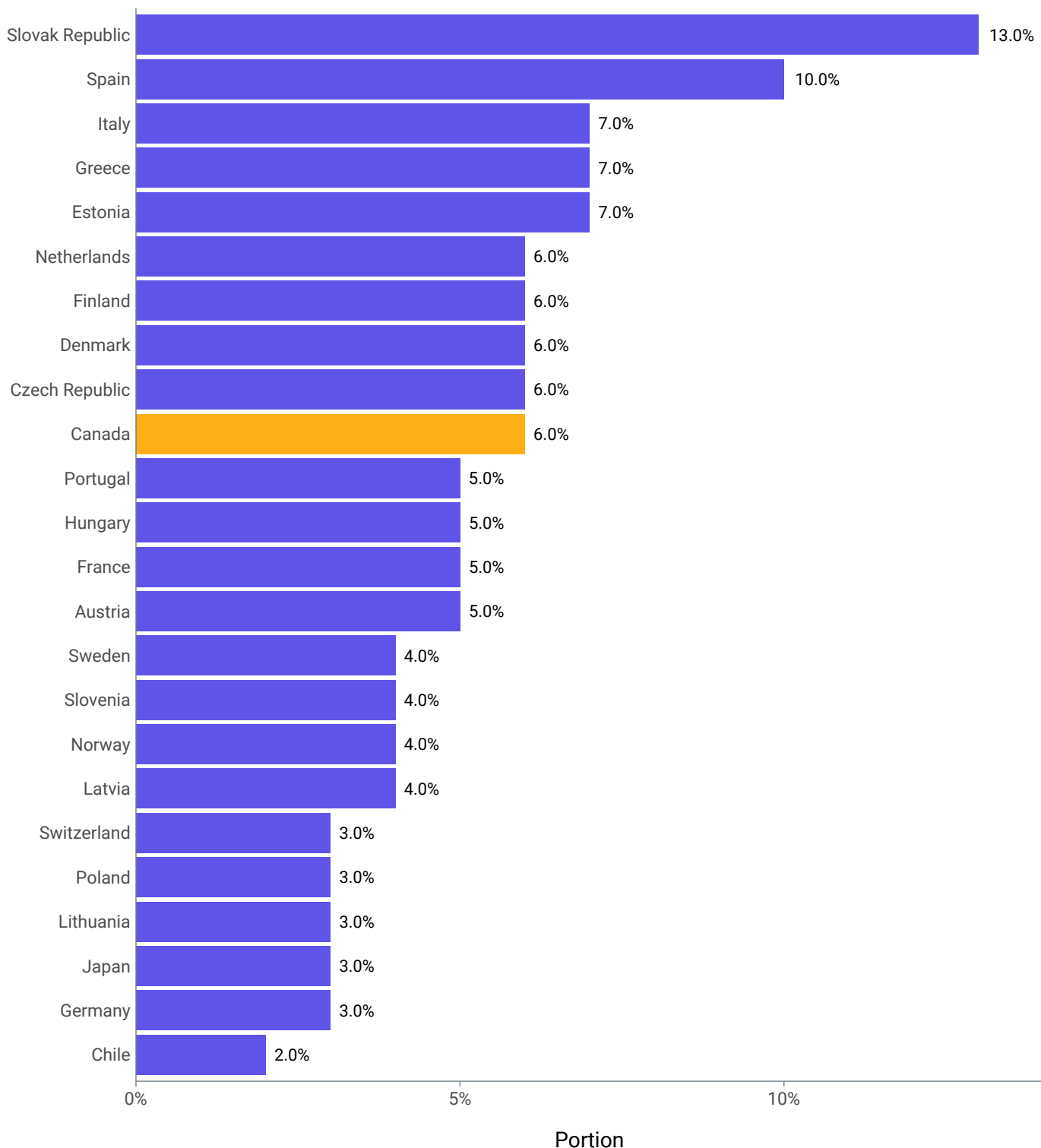
Figure 8: Product or process innovation among firms
 Percentage of firms reporting a new or improved product or process, 2017



Source: OECD, Business innovation statistics and indicators, Product and/or process innovative firms (regardless of organisational or marketing innovation), as a percentage of total firms

Figure 9: Profit from new or improved products

Percentage of firm turnover from new or significantly improved products, 2017



Source: OECD, Business innovation statistics and indicators, Share of turnover from new or significantly improved products that were new to the market

Product and process innovation

In surveys of innovation behaviour, Canadian firms are more likely than other firms in the OECD to say that they have introduced new products or processes. Nearly two thirds (66 percent) of surveyed firms in Canada say that they developed a new product or process in 2017, versus 58 percent in Portugal and Norway—the next two leading countries—and well above peers like Germany (47 percent), the United States (46 percent), and France (41 percent).

While this is in tension with the common narrative that Canada is an innovation laggard, there are a few ways to understand the result. In the first place, it may simply be that the definitions of “new products” or “new process” are broader in the Canadian surveys or in the minds of Canadian respondents. That is, what is being measured might be inconsistent across jurisdictions.

More substantially, it may be that Canada’s surprising result is explained by a higher level of process innovation, as opposed to product innovation.* In fact, on reported revenue from new or improved products as a portion of total firm revenue, Canada ranks much lower—near the OECD average. Canada tends to be more of an upstream supplier of commodities and cheap manufactured goods than its peers, which means that innovation in Canada is more likely to show up as plant-floor process changes—to ensure efficiency and keep costs low—than the development of new and improved products. Not surprisingly, most firm revenue in Canada does not come from new products.

* The subsidiaries are constrained to operate within this strategic framework, with local management responsible for efficient implementation. Innovation strategy in such cases is focused on adapting equipment and business methods to local conditions, achieving defined objectives more cost-effectively, and in some cases winning mandates in competition with other units of the corporate family. Canadian companies often excel at what might be called “plant-floor innovation”—efficiently employing equipment and intellectual property from an American equipment and intellectual property from an American or other foreign parent. For example, several Canadian auto-assembly plants have been among the productivity leaders in the North American industry.” Peter Nicholson, “Canada’s Low-Innovation Equilibrium: Why It Has Been Sustained and How It Will Be Disrupted,” Canadian Public Policy 42, no. S1 (2016): S41, <https://doi.org/10.3138/cpp.2015-019>.

† To facilitate international comparisons, we have had to use 2018 data—the most recent data that aligns with data collection in other OECD countries. More recent labour force data for Canada is available from the monthly Labour Force Survey, which we use to track trends within Canada in the IIM itself.

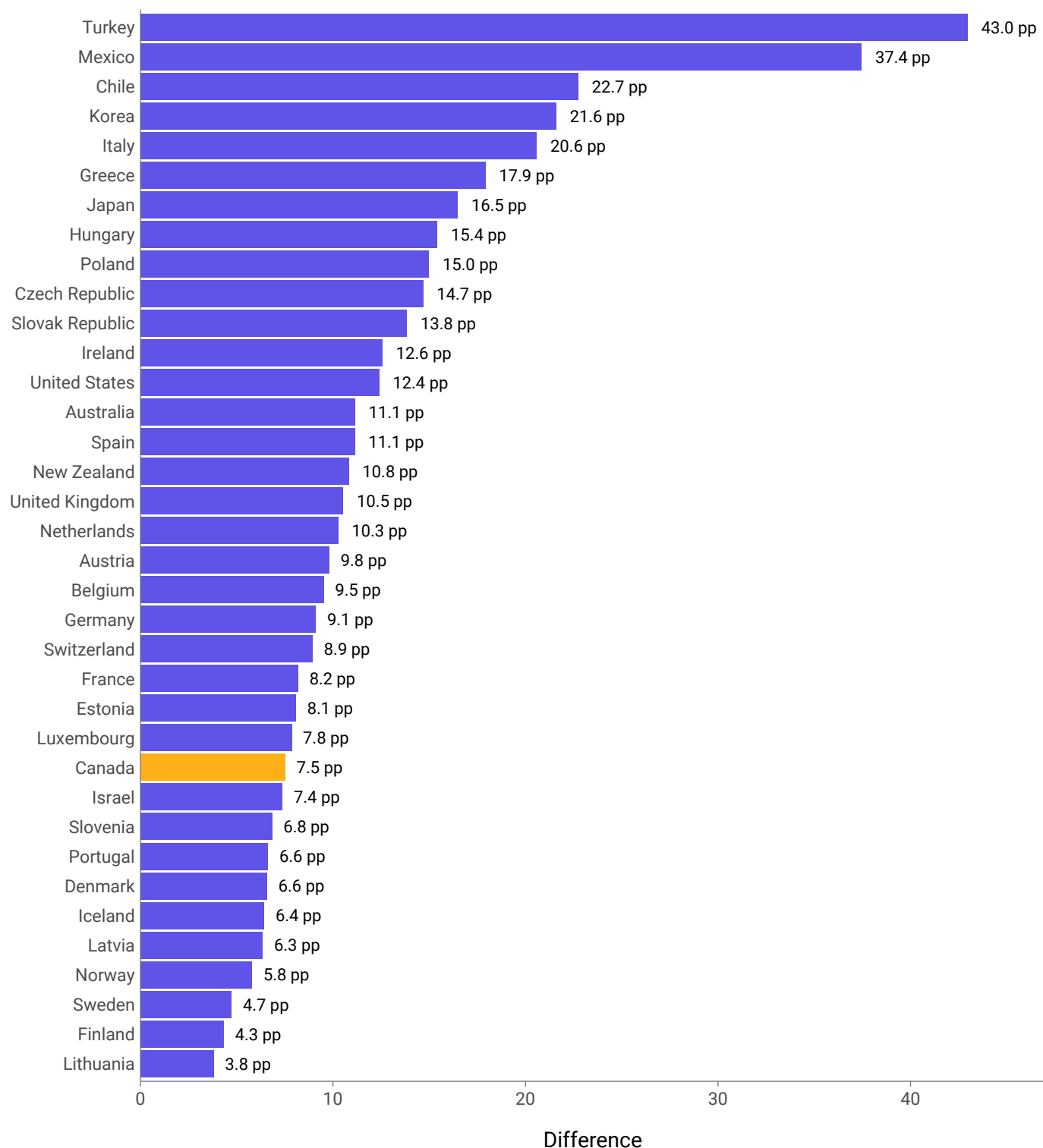
Labour force participation and employment

Employment is an important mechanism through which people participate in and benefit from the economy. Although occupations differ widely in terms of the opportunities they provide to contribute to and shape innovation, being employed in some occupation is an important way for many to secure the income and resources necessary to access a range of opportunities and benefits in education, health, culture, and society generally.

Employment indicators reflect much more than inclusive innovation performance, but persistent differences across jurisdictions can tell us about the structural features of an economy—such as an economy’s balance of labour and technology intensity, and the extent to which people have opportunities for employment and the income and benefits it brings. Differences in employment among demographic groups reveal much about how the benefits and risks of innovation and the economy more generally are distributed. Indeed, when unemployment rises, some groups are more likely to lose their jobs than others.²⁰

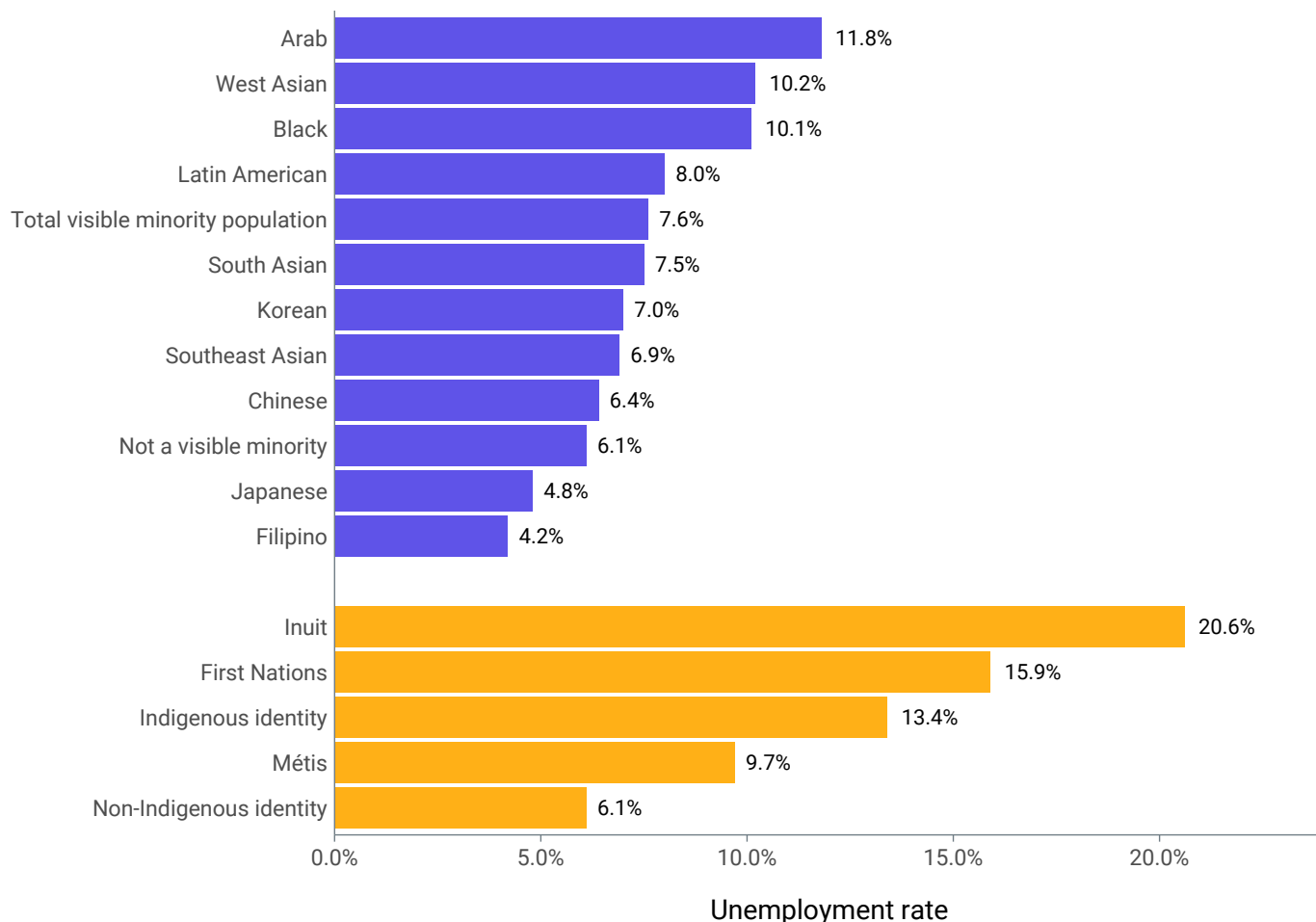
Canada tends to fall in the middle of the OECD when it comes to **labour force participation** and **employment rates** for working age individuals (ages 20 to 64).[†] Yet, there have been some positive signs in terms of the distribution of participation and employment. For example, although there are gaps between men’s and women’s labour force participation and employment, they tend to be smaller in Canada than in other G7 and OECD countries—with the notable exception of the Nordic countries. To be sure, there are long-standing barriers to women’s labour force participation

Figure 10: Sex differences in labour force participation
 Labour force participation rate for men minus the rate for women, 2018



Source: OECD table, LFS by sex and age - composition
 Note: Population is aged 20 to 64

Figure 11: Unemployment of racialized groups, 2016



Source: Statistics Canada tables 98-400-X2016286 and 98-400-X2016267
 Note: Population is aged 25 to 64

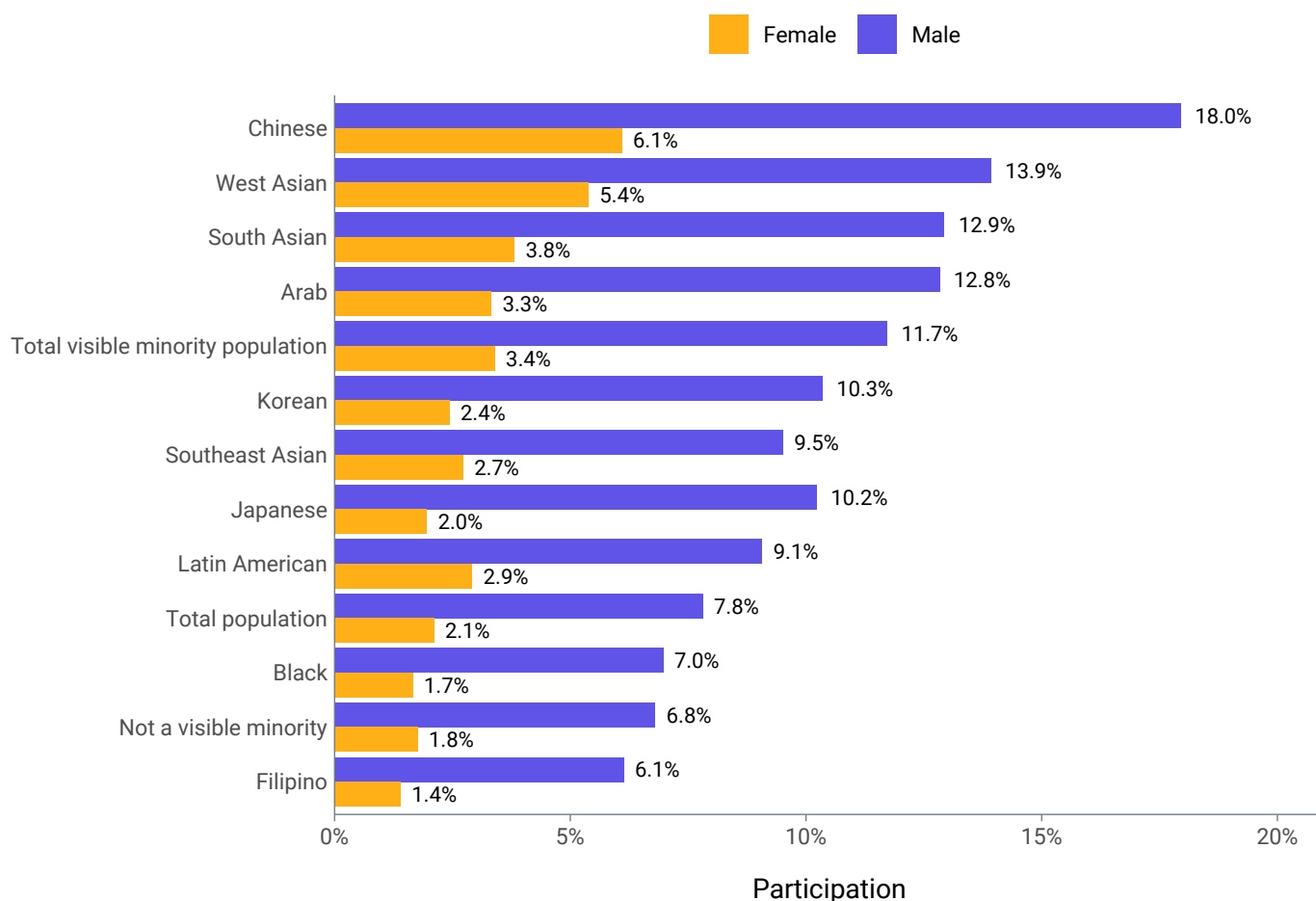
and employment in Canada, and since the pandemic and economic crisis set in women have experienced disproportionately high unemployment and reduced hours, leading to urgent calls for women-centred recovery plans.²¹ Canada’s economy risks becoming more unequal in the years ahead.

People with disabilities face substantial barriers to full labour force participation and employment. While labour force participation for Canada’s population as a whole was 80.9 percent in 2017, it was just 62 percent for people with disabilities.

Participation rates vary by type and severity of disability—ranging from 81 percent for those with “unknown disabilities”^{*} to less than 48 percent for those with physical disabilities. Some people with disabilities may not want to work, may not be offered sufficient accommodations to do so, or may not be able to work at all, but among those who do want to work, unemployment is high. In 2017, Canada’s **unemployment rate** overall was 5.4 percent, whereas for people with disabilities it was 9.8 percent. For those with cognitive disabilities, unemployment was nearly 16 percent in 2017.

^{*} Statistics Canada defines persons with an unknown disability as those “whose daily activities are limited because of any long-term health problem or condition other than the 10 specific types of disabilities identified by the survey (seeing, hearing, mobility, flexibility, dexterity, pain, learning, developmental, mental health and memory disabilities).” Statistics Canada, “Canadian Survey on Disability Reports,” Appendix B, last modified November 28, 2018, <https://www150.statcan.gc.ca/n1/pub/89-654-x/2018001/app-ann-b-eng.htm#a11>.

Figure 12: Participation in technology-intensive occupations
 Percentage of the those in Canada employed in a tech occupation by visible minority and sex, 2016



Source: Statistics Canada 2016 census & BII+E analysis

It is worth noting that the lack of more recent employment data for people with disabilities is a stunning gap in Canada’s labour force statistics.

Indigenous peoples also have lower labour force participation and employment rates than the non-Indigenous population in Canada. The labour force participation rate for Indigenous peoples in Canada is 71.6 percent—nearly 10 percentage points lower than the rate for non-Indigenous peoples. This ranges from 77.6 percent for Métis, 72.4 percent for Inuit, and 67.5 percent for First Nations people. Unemployment rates are very high for Indigenous peoples in Canada. Inuit had an unemployment rate of 20.6 percent in 2016, while First Nations people stood at 15.9 percent, and Métis at 9.7 percent. Employment conditions are especially challenging in the territories, and vary between Indigenous

people who live on reservations and those who do not. Those who live on reservations have an employment rate of 49.6 percent and a labour force participation rate of 62 percent.

Differences in labour force participation and employment across **racial identities** are also striking. While the labour force participation rate of those whom the Census refers to as “visible minorities” is just 1.3 percentage points lower than those who do not identify as visible minorities (79.6 versus 80.9 percent, respectively), there are large gaps among particular racial and ethnic groups. Those who identify as Korean, West Asian, or Arab have participation rates between 7 and 10 percentage points lower than those who do not identify as visible minorities—largely due to lower participation among women in those communities.

But unemployment is 4 to 7 percentage points higher for those who identify as Korean, West Asian, or Arab than those who do not identify as visible minorities (6.1 percent).

Those who identify as Black or Latin American have participation rates one percentage point higher than those who do not identify as visible minorities- but unemployment rates that are four and two percentage points higher, respectively. Those who identify as Filipino have a very high labour force participation rate (89.8 percent) and low unemployment rate (4.2 percent).

Participation in technology intensive occupations

The technology sector plays an important role in Canada's innovation economy and provides interesting innovation opportunities and the potential for good incomes for those it employs. Accordingly, it is useful to see how employment opportunities are distributed in this frontier sector and in related technology-intensive occupations.

In previous work, the Brookfield Institute defined tech occupations as those that involve a high degree of technology development or use.²² This has the benefit of including occupations in non-tech sectors that are focused on tech development, implementation, and use, but excludes less technology-intensive jobs in technology companies, such as finance and marketing. Nevertheless, to the extent that tech occupations are those at the frontier of technological innovation and implementation, understanding who holds those occupations is essential to understanding inclusive innovation.

The distribution of employment in technology-intensive occupations has two striking features. From a gender perspective, women are nearly four times less likely to be employed in tech jobs than men. While 7.8 percent of all employed men in Canada are employed in technology intensive occupations, only 2.1 percent of all employed women are in these occupations. This despite the fact that women are only a little more than two times less likely than men to hold a PSE credential in a technology-related field. The gap between

men's and women's tech employment is consistent across all racial groups.

The second striking feature of the distribution of tech employment is that racialized minorities, as a whole, are nearly two times more likely to be employed in technology-intensive occupations than those who do not identify as racialized minorities. Of employed racialized minorities, 11.7 percent work in tech jobs versus 6.8 percent among those who do not identify as a racialized minority. Among men, participation is highest among those who identify as Chinese (18 percent) or West Asian (13.9 percent), and lowest among those who identify as Filipino (6.1 percent). Similarly, among women, participation is highest among those who identify as Chinese (6.1 percent) and lowest among those who identify as Filipino (1.4 percent).

In short, while Canada's technology-intensive occupations reveal a large gender deficit, they tend to be more racially diverse than the employed labour force as a whole. As we will discover in the Outcomes pillar, however, wages for women and most racial minorities in the tech sector tend to be lower than those of men and those who do not identify as visible minorities.

TRACKING ACTIVITY: COVID-19 AND AFTER

Innovation and inclusion are likely to suffer in the COVID-19 era. Initial data show that firms are pulling back on spending, and women are experiencing substantial job loss, reduced hours, and a high risk of labour force exit. While technology investments may be on the rise to facilitate work-from-home arrangements and e-commerce for some, these investments could be a double-edged sword. Technology can enhance productivity, but could also lead to job losses in the short to medium term in the absence of strategies to retrain and redeploy those who are displaced.²³ Time will reveal the full range of effects. The Inclusive Innovation Monitor will track the effects of any changes as they emerge.

PILLAR III: OUTCOMES



The Outcomes pillar reveals the extent to which the economy and society benefit from innovative activity, and the distribution of those benefits among people and communities.

We care about innovation not simply for the productivity and prosperity it can produce, but also for how it contributes to, or undermines, wealth, health, and well-being for all. The Outcomes pillar focuses on both aggregate indicators of productivity and growth (i.e., the size of the economic pie) and indicators of distribution (i.e., how the pie is shared).

HOW IS CANADA DOING?

Canada has a mixed record on Outcomes measures. Canada's economy is as productive as the OECD average, but far below the productivity levels we need to sustain long-term prosperity and well-being. Moreover, while Canadians tend to earn more on average than peers in the OECD, the distribution of income and wealth is unequal. Income and wealth inequities in Canada are even more troubling when one sees how they track race, sex, and Indigenous identity. Prior to the pandemic, poverty was declining in Canada, and Canadians were less likely to stay in poverty than people in many other countries. Yet poverty persists for some, robbing millions of the good health and well-being enjoyed by others.

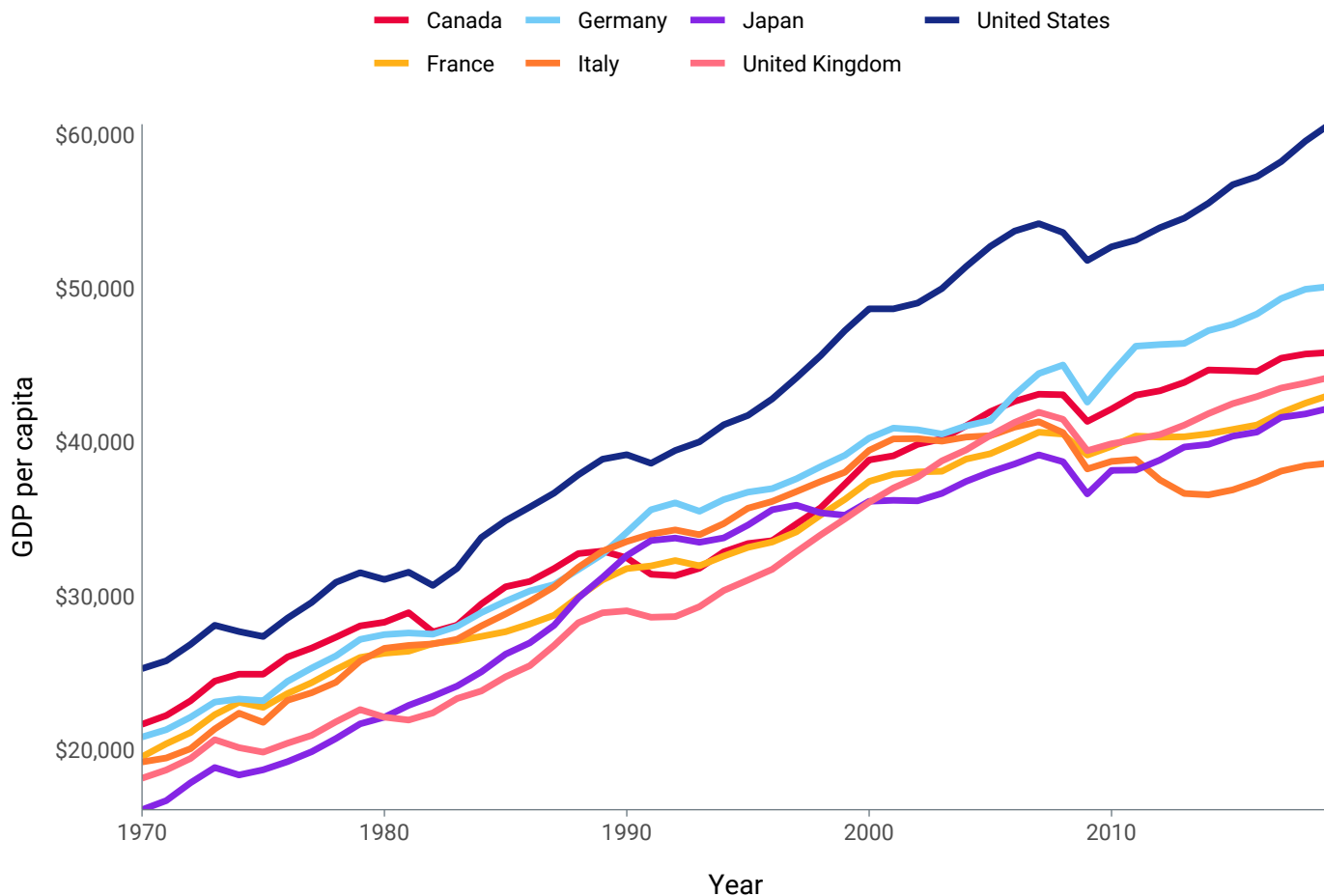
Prosperity

On the basis of GDP, Canada is the tenth-largest economy on the planet, with a fraction of the population of the other nine. On a per capita basis, Canada's economy remains one of the strongest economies in the world, but is average in the context of the OECD. In 2019, Canada's **GDP per capita** was \$45,850 USD, ranking 15th of 36 countries in the OECD. Canada's reasonably strong GDP per capita performance in the past two to three decades has as much or more to do with historically high global commodity prices as it does with innovation. Recent volatility in key commodity prices will likely squeeze future growth. To be sure, product and process innovation occurs and contributes to Canada's GDP, but it will need to make a much more substantial contribution in the years ahead to repair the emerging damage from commodity price weakness.

Regionally, the Northwest Territories had the highest GDP per capita in Canada in 2019 at \$95,960 CAD,* followed by Nunavut and Alberta, which had GDP per capita of \$81,40 CAD and \$74,645 respectively. At \$51,100 CAD per capita, Canada's largest province, Ontario, sits below the Canadian average of \$58,200 CAD.

* Using Statistics Canada chained 2012 dollars. While the GDP numbers from the OECD use the expenditure approach for calculating GDP, this metric from Statistics Canada does not.

Figure 13: GDP per capita
G7 countries from 1970 to 2019



Source: OECD, Gross domestic product (GDP)
Note: GDP is calculated through the expenditure approach, values are in constant PPP USD base year 2015

On **GDP per capita growth**, Canada performs poorly by OECD standards. From 1970 to 2019, Canada saw average growth of 1.56 percent per year, while the OECD overall experienced 2.46 percent annual growth.* The OECD average is buoyed by less developed, but rapidly growing, economies. Still, Canada lags behind every other country in the G7 except Italy in average yearly percentage growth—though not by very much. Average growth rates of G7 countries range from 1.46 percent in Italy to 2.37 percent in France, with all G7 countries below the OECD average.

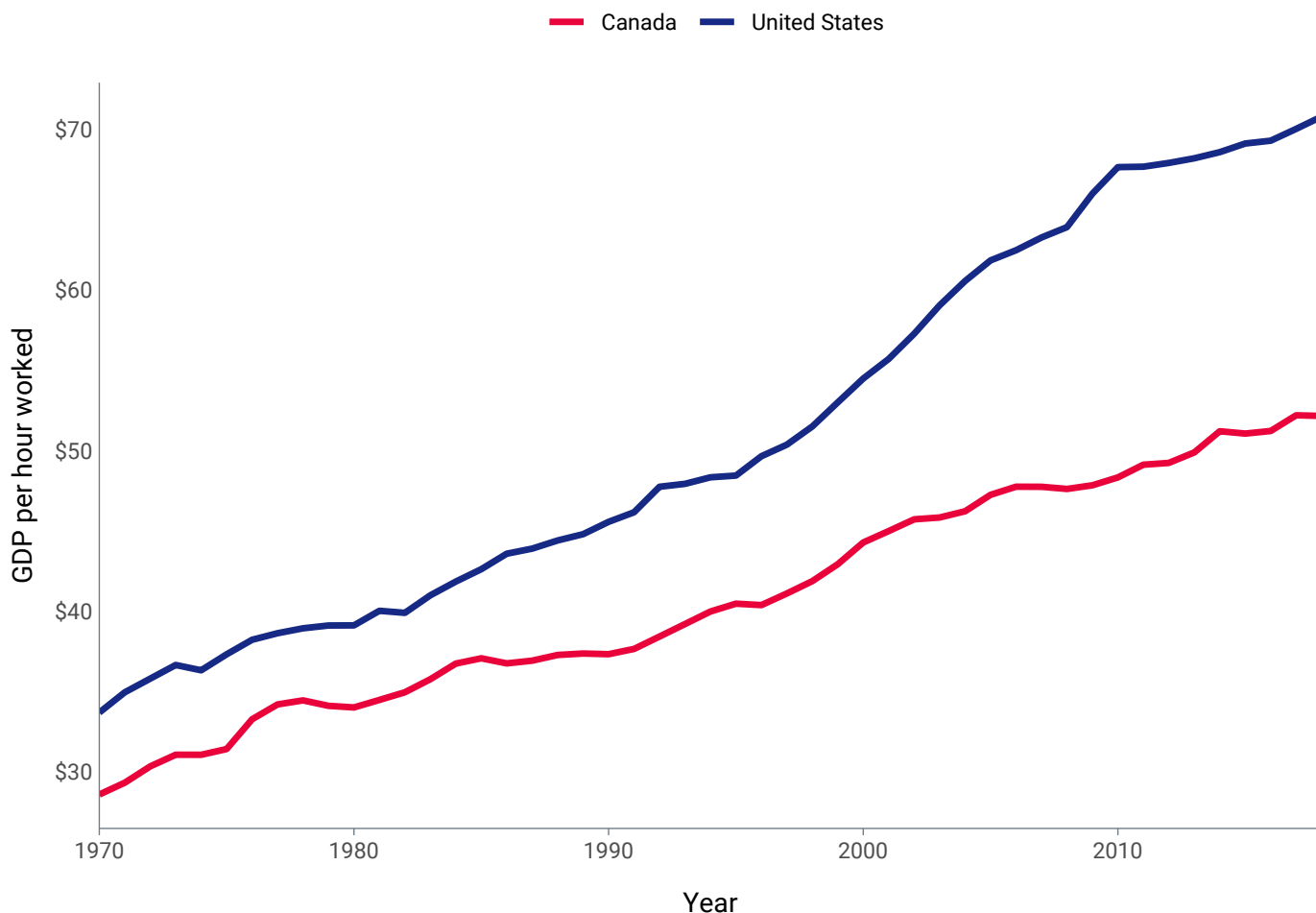
Productivity

Canadian economists and policy-makers have long been concerned with the country’s lagging productivity performance.† While we have enjoyed generally high standards of living, persistently slow productivity growth raises concerns about the long-term sustainability of those living standards. Using data comparable to peer countries, in 2018 Canada’s labour productivity was \$52.15 USD per hour, which was slightly below the OECD average

* Not all 36 OECD countries have reported GDP per capita for all years—notably previous Warsaw Pact members, as well as Chile and Israel, for which data starts between 1987 and 1996

† See, for example, Selina Chignall, “Poor Productivity Threatens Canada’s Competitiveness,” iPolitics, November 24, 2015, <https://ipolitics.ca/2015/11/24/poor-productivity-threatens-canadas-economic-competitiveness/>; Peter Nicholson, Facing the Facts: Reconsidering Business Innovation Policy in Canada, Institute for Research on Public Policy, October 2018, <https://irpp.org/research-studies/facing-facts-reconsidering-business-innovation-policy-canada/>.

Figure 14: Canadian productivity versus the United States
GDP divided by hours worked, 1970 to 2019



Source: OECD table, Level of GDP per capita and productivity, GDP per hour worked, USD, constant prices, 2015 PPPs

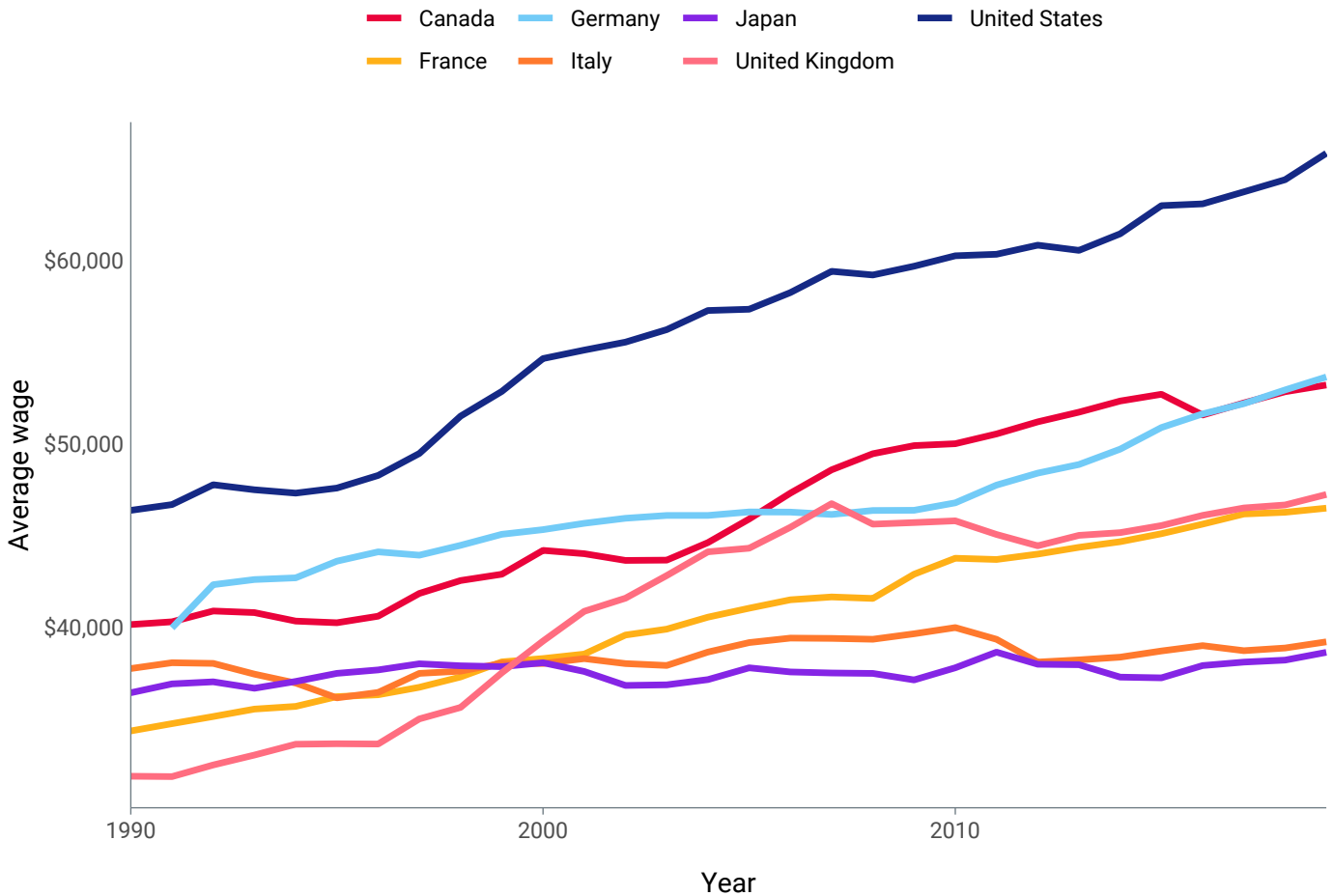
of \$54.44, earning a ranking of 19th of 36 OECD countries. Canada’s productivity growth has been a slow but steady 1.27 percent annually between 1970 and 2018, while the OECD overall experienced 2.37 percent annual productivity growth over that period.* The yearly productivity growth of the United States over the same period was 1.56 percent—that is, a significant 0.29 percentage points higher than Canada.

allowed the United States to widen its productivity advantage over Canada from \$5.06 USD in 1970 to \$18.62 USD by 2018. To improve productivity—and thus to generate a more secure foundation for long-term prosperity and well-being—Canadians will have to become more innovative.

The productivity growth difference between Canada and the United States has varied over the years. Between 2008 and 2018, the United States outperformed Canada by a substantial 0.58 percentage points. That difference in growth has

* Not all 36 OECD countries have reported productivity for all years—notably previous Warsaw Pact members, as well as Chile, Israel, Greece, and Mexico, for which data starts between 1982 and 2001.

Figure 15: Average wages over time
G7 countries from 2000 to 2019



Source: OECD table, Average annual wages
Note: Values are in constant PPP USD base year 2015

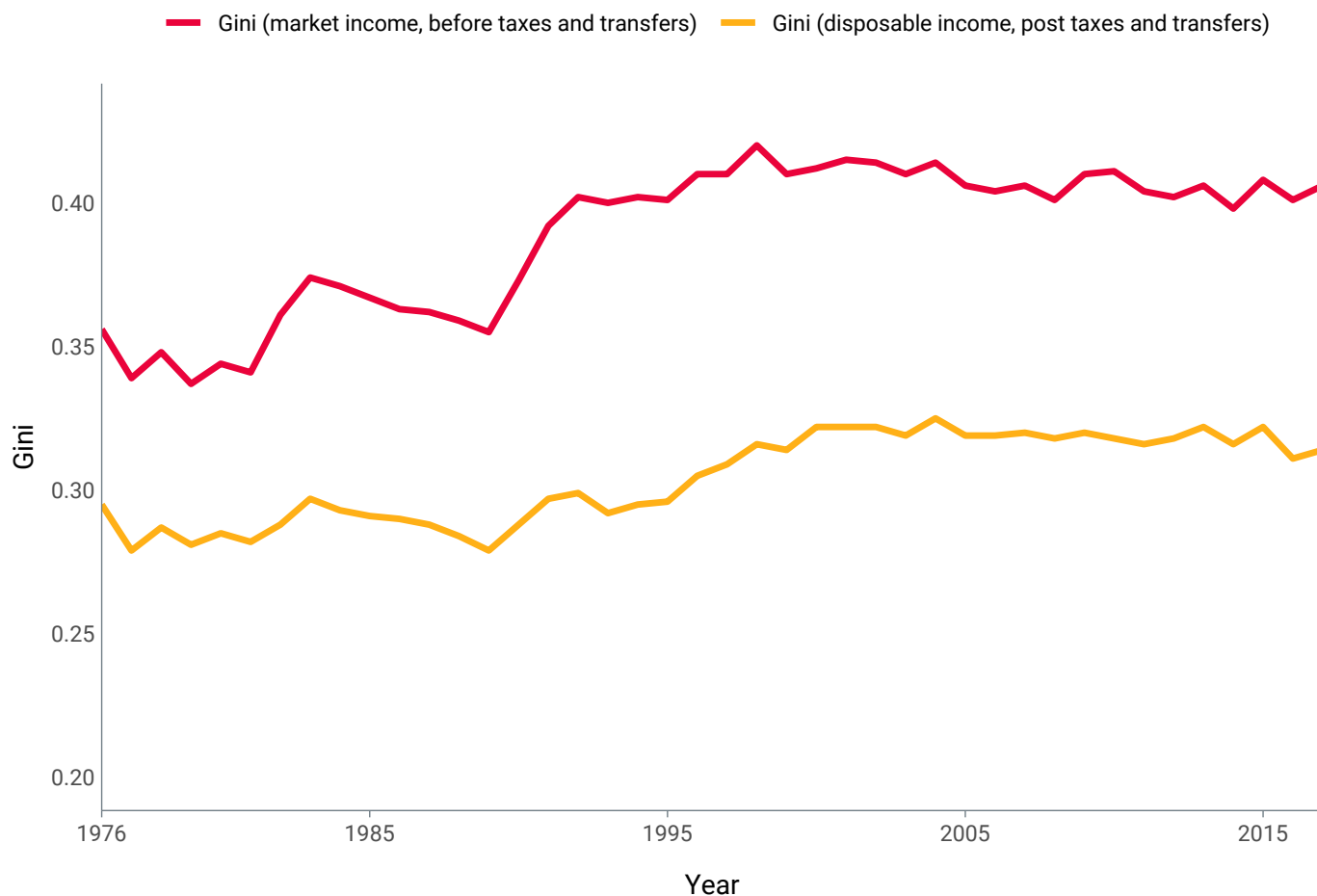
Wages

Canada has higher average wages than citizens of most other OECD countries. In 2019, the average Canadian annual wage was \$53,198 USD,* while in the OECD it was \$43,595 USD. Of 36 countries, Canada has the 12th highest average annual wages. Average annual wages of workers in the United States were \$65,836 USD (which includes incomes of very high-earning corporate executives), placing it fourth in the OECD, behind Luxembourg, Iceland, and Switzerland.

Canada's average annual wage growth rate has lagged the OECD average since 2000, with Canada posting average annual wage growth of 1.09 percent and the OECD at 1.51 percent. Canada's wages are higher to begin with, so a lower growth rate on a higher base means that, in absolute terms, Canada's wages have grown by \$516 USD per year versus \$470 USD per year in the OECD overall since 2000.

* The calculation for average annual wages is done by the OECD, and is obtained "by dividing the national-accounts-based total wage bill by the average number of employees in the total economy, which is then multiplied by the ratio of the average usual weekly hours per full-time employee to the average usually weekly hours for all employees." theOECD. "Earnings and Wages - Average Wages - OECD Data." Accessed October 20, 2020. <http://data.oecd.org/earnwage/average-wages.htm>.

Figure 16: Canadian Gini
Before and after taxes and transfers, 1976 to 2018



Source: OECD table, Average annual wages
Note: Values are in constant PPP USD base year 2015

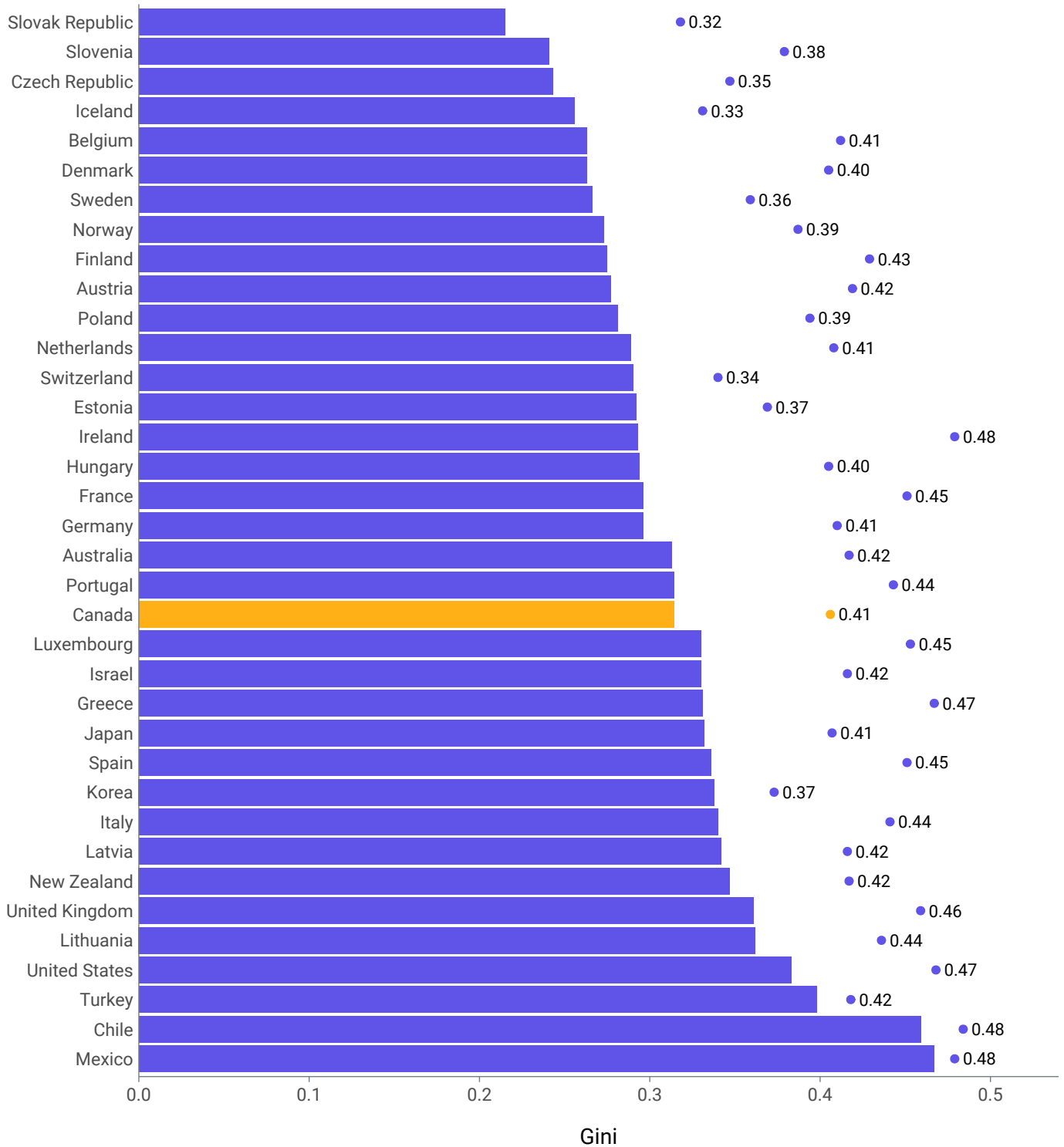
Income distribution

While per capita GDP and average wages are useful indicators of overall income and prosperity, how that income and wealth is distributed is equally important—not only for the health and well-being of people generally, but also as a foundation for future opportunities in education, the labour market, and the innovation economy more specifically. That is, when more people have resources to meet their needs, acquire an education, and start a business if they choose, the more robust the innovation ecosystem becomes. How are income and wealth distributed in Canada? And what patterns of inclusion and exclusion do we see in that distribution?

Inequality can be measured many ways but two objectives are central. The first is to determine how unequal a distribution is overall. The second is to identify patterns, if any, in the demographic characteristics of who gets more and who gets less.

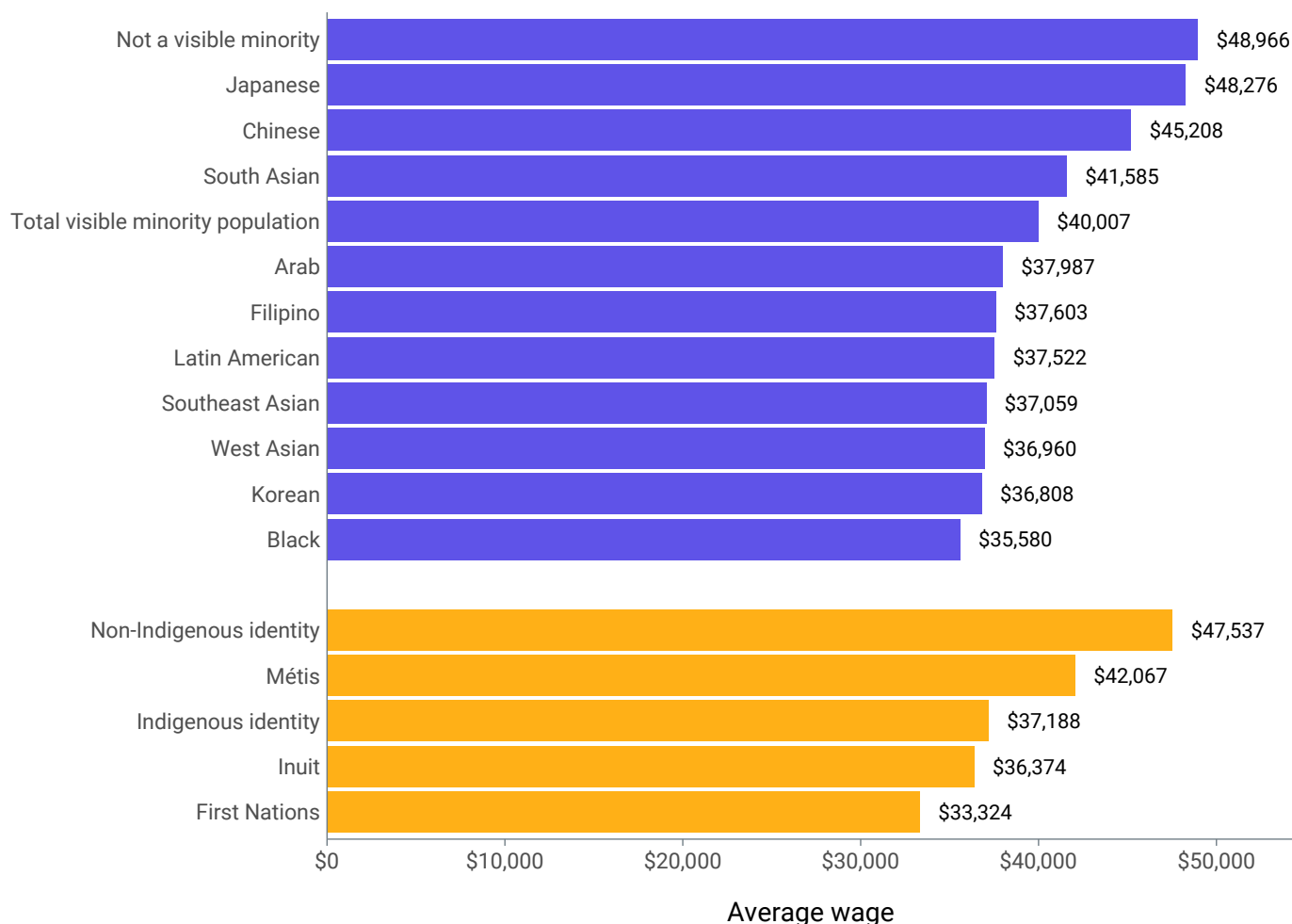
A common way to measure **inequality** is the Gini coefficient. The measure ranges from 0 to 1, with 0 indicating perfect equality (everyone has exactly the same income) and 1 indicating perfect *inequality* (one person earns all the income). And we can determine the Gini coefficient of different kinds of income distribution, including *market income*—the income received before transfers are added to incomes and income taxes deducted—and *disposable income*—the income after income taxes and transfers have been accounted for.

Figure 17: Gini of OECD countries
Before and after taxes and transfers, 2018 or latest year available



Source: OECD table, Average annual wages
 Note: Points represent gini before taxes and transfers, bars represent gini after
 Note: Values are in constant PPP USD base year 2015

Figure 18: Average wages of racialized groups
Average wages by Visible minority and indigenous identity, 2016



Source: Statistics Canada Census 2016 tables 98-400-X2016210 and 98-400-X2016175

On *market income* distribution among the working-age population in 2018, Canada posted a Gini coefficient of 0.406, while the OECD saw an average of 0.414, earning Canada the 13th spot among the 36 OECD countries—better than the average, but arguably far below the picture of egalitarian distribution many might have in mind. Interestingly, while Canada’s Gini coefficient for *disposable income* drops to 0.314—meaning that taxes and transfers reduce the inequality generated by *market income*—Canada falls to 20th among OECD countries on this measure, which means that our redistributive activities are not as robust as those of other countries.

While the Gini coefficient gives us a measure of overall inequality in the distribution of income, additional granularity can give us a more useful picture of where income is going. **Distribution by income decile** is an exercise in which we order all individuals by their adjusted* after-tax income and divide them into 10 equal groups. We then ask what portion of the income earned in Canada goes to each of these groups. In 2018, 28.8 percent of income earned in Canada went to people in the top decile, and 16.8 percent to people in the next highest decile. In other words, nearly half of all income earned in Canada goes to just 20 percent of the population. Each decile below the top two earns a little more than two percentage points less on

* “Adjusted” refers to how Statistics Canada handles households, by dividing the household income by the square root of the household size.

average than the one before. The third decile earns 13.5 percent; the fourth earns 11.1 percent, and so on until we reach the second-lowest decile, which earns only 2.4 percent, and the lowest, which earns 0.3 percent. Distribution by decile has been fairly constant since the 1970s with the exception of a significant increase in the 1990s from 25 percent to 30 percent in the proportion of income earned by those in the highest decile.

Income distribution: Who gets what?

Income distribution patterns track demographic characteristics in troubling ways. Those who earn more or less are not distributed randomly by gender, race, and other characteristics. Rather, who earns more or less often tracks these identities.

Income inequalities by gender are stark. In 2016, men in Canada earned an average of \$17,954 CAD or 47 percent more in wages, salaries, and commissions than women in Canada. The differences were largest in Alberta (with men earning \$32,525 CAD more on average than women) and Newfoundland and Labrador (\$23,446 CAD).

Racialized minorities tend to earn less than non-racialized people in Canada. Canadians whom Statistics Canada refers to as “visible minorities” earned \$8,959 CAD less than those not considered visible minorities in 2016. The largest difference was seen in Alberta, where “visible minorities” earned \$16,849 CAD less than those not considered visible minorities in 2016. These differences were much lower in the Atlantic provinces, with Newfoundland and Labrador recording a difference of just \$1,315 CAD.

But the category of racialized or “visible minorities” masks substantial differences across specific identities. Those who identify as Black earned just \$35,580 CAD on average in 2016, which is \$13,386 CAD less than those who do not identify as a visible minority. Those who identify as Korean, West Asian, Southeast Asian, Latin American, Filipino, or Arab had incomes in 2016 that were \$10,000 CAD or

more less than incomes for those not identifying as minorities. **Indigenous people** made \$10,349 CAD less than non-Indigenous people on average, with differences varying by region—highest in Nunavut (\$57,645 CAD), the Northwest Territories (\$31,568 CAD), and Alberta (\$15,888 CAD)—and by specific Indigenous identity—with the gap reaching \$14,213 CAD for First Nations, \$11,163 CAD for Inuit and \$5,470 CAD for Métis.

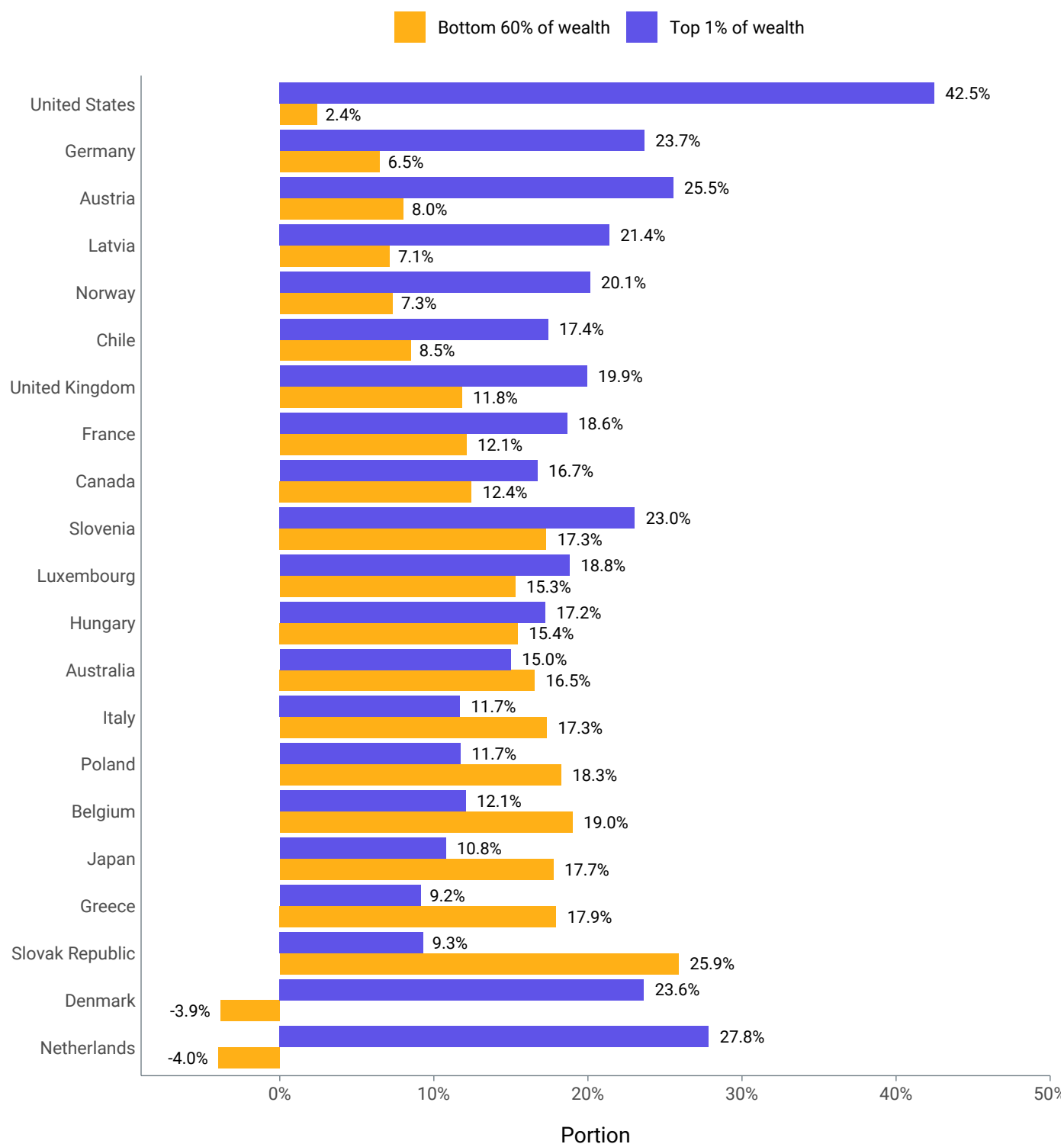
Wealth distribution

While income is the amount one earns in a given time period—usually a year—net wealth refers to one’s accumulated assets over time, including savings, investments, real estate, and other assets, minus one’s debts. Theoretically, one could have a high income but low wealth, low income but high wealth, low income and low wealth, or high income and high wealth. The distinction matters, because differences in accumulated wealth can provide a longer-term picture of financial security and future opportunity. While the contribution of innovation to wealth inequality is not clear, differences in wealth do affect future opportunity, including participation in education, employment and innovation. For that reason, it is worth examining the differences.

Canada exhibits substantial inequality in wealth. By 2016 the richest 1 percent of the population in Canada held 16.4 percent of all wealth, while the bottom 60 percent held just 12.4 percent. Wealth inequality in Canada is less extreme than what we see in the United States, where the richest 1 percent hold a whopping 42.5 percent of all wealth while the bottom 60 percent holds just 2.4 percent. Nevertheless, wealth inequality in Canada is much starker than in about half of all countries in the OECD, and a great distance from the less unequal distributions seen in Japan, Greece, and the Slovak Republic.

Figure 19: Wealth distribution

Percentage of wealth held by the top 1% and bottom 60%, 2016 or latest year available

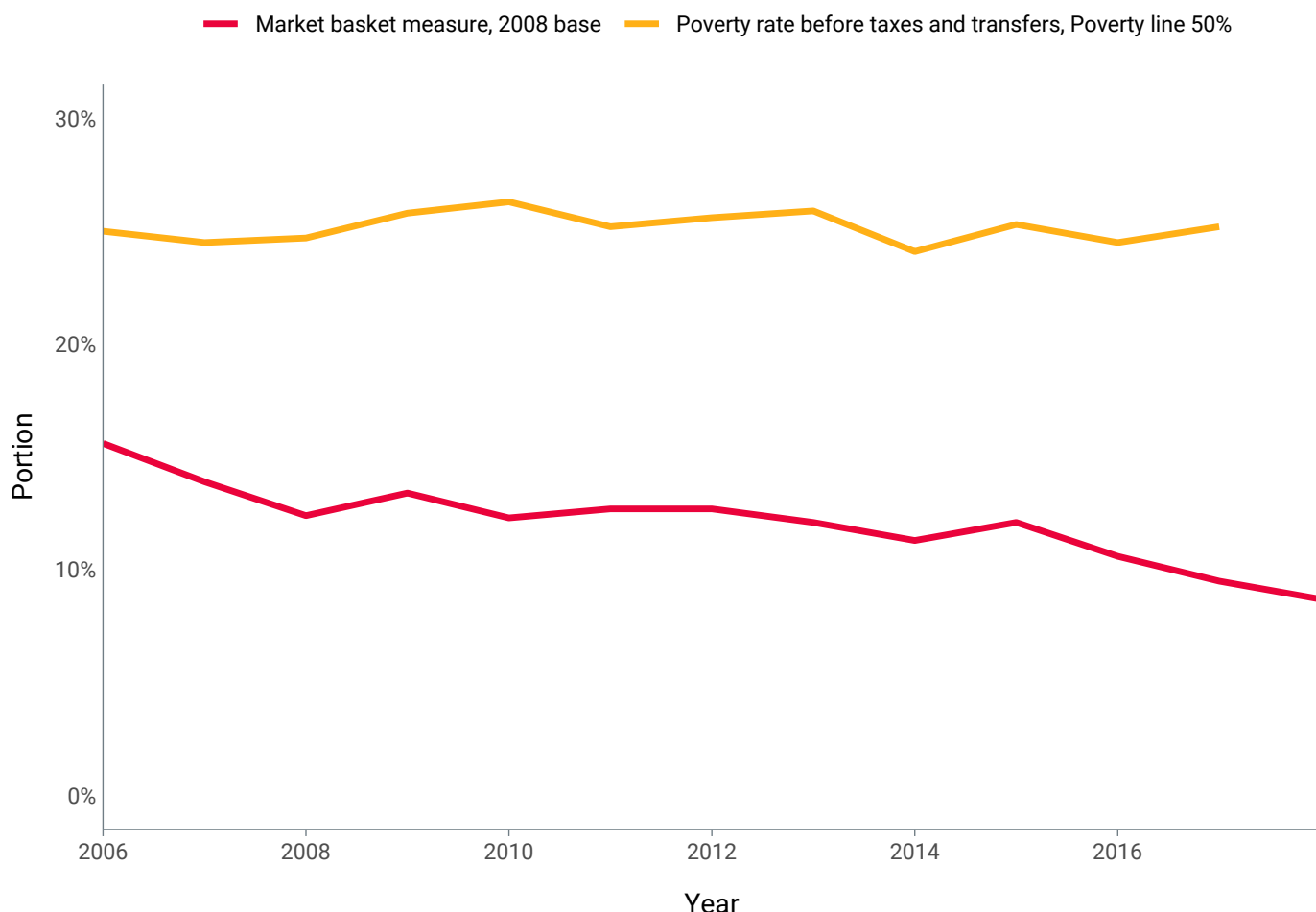


Source: OECD, Wealth Database

Note: the negative values for Denmark and Netherlands represent debt held by the bottom 60%

Figure 20: Canadian poverty

Percentage of those in Canada who fall under two different definitions of poverty, 2006 to 2019



Source: OECD table, Income Distribution Database & Statistics Canada table Statistics Canada table 11-10-0135-01

Poverty and mobility

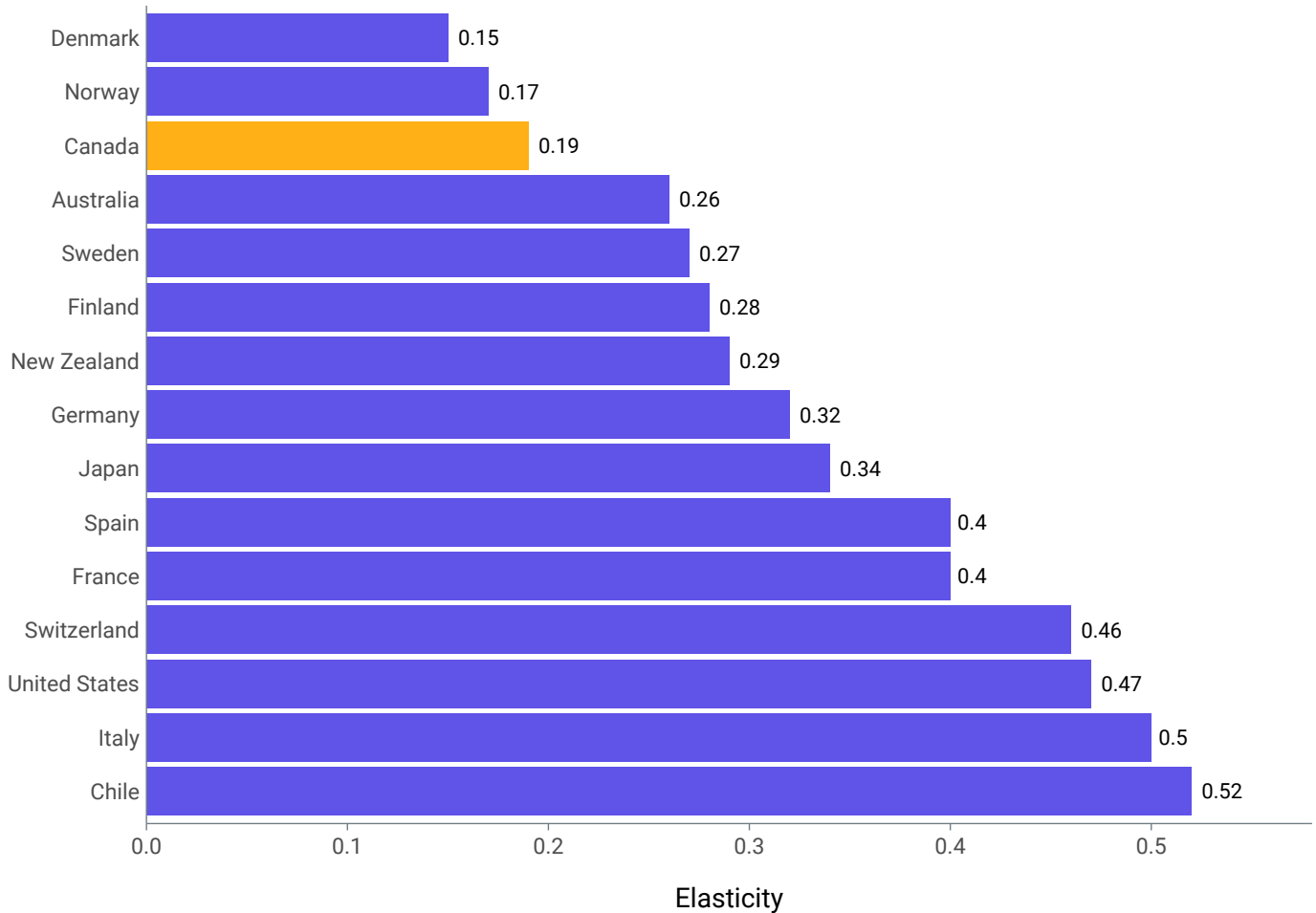
While some Canadians are able to accumulate wealth, others find themselves in poverty. Households in poverty have clearly benefited less from the contributions that innovation makes to prosperity and well-being, and face barriers to full participation in education and employment in the innovation economy.

One measure of poverty uses a “poverty line”—defined as half the median household income in a given country—to report on the proportion of households that fall below that line and are thus deemed to be in poverty. In Canada, the proportion of households in poverty before considering taxes and transfers was 25.2 percent in 2017—

slightly below the OECD rate of 28.9 percent. This proportion declines by 13.1 percentage points to 12.1 percent when taxes and transfers are considered—including, notably, the sizable impact of the Canada Child Benefit. France, Finland, and Ireland see the greatest declines in poverty rates through redistribution, lowering their rates by 28.8, 27.9, and 25.0 percentage points respectively.

Another way to measure poverty is to ask how many households could not afford a basket of goods representing what would be required for a modest, basic standard of living. When applied, this “market basket measure” (developed by Statistics Canada) shows that in 2018, 8.7 percent of Canadian households would be in poverty—a marked improvement over the 15.6 percent of

Figure 21: Intergenerational Earnings Elasticity
 Corak elasticity of select countries, 2013



Source: Corak, Miles. "Income Inequality, Equality of Opportunity, and Intergenerational Mobility." *Journal of Economic Perspectives* 27, no. 3 (August 1, 2013): 79–102. <https://doi.org/10.1257/jep.27.3.79>.

households in poverty in Canada in 2006. All provinces have experienced poverty reduction of about this magnitude over the period. Even at the city level, while progress varies, the direction is the same.

The two measures of poverty used here measure different notions of poverty, and while the market basket measure of poverty has been declining, the poverty-line based measure has been staying constant. It is important to note, however, that the poverty-line based measure is by definition tough to push down, given that it is based on a moving median target. One measure views poverty as not having access to a sufficient basket of basic goods, while the other measures how well you fare relative to your neighbours, capturing inequality as much as poverty.

In addition to knowing how many households are in poverty, it is helpful to know the likelihood that someone born into poverty will leave it. Is poverty a life sentence—and possibly an intergenerational life sentence—or is it a condition that people move in and out of given sufficient opportunities and support?

There are many different lenses through which one can track mobility—the movement of people in and out of poverty or other socio-economic conditions—including education, health, and income. The time period over which one tracks mobility is important as well. In the case of individual lives, people can move in and out of poverty depending on their stage of life, while in the case of intergenerational mobility, we can track the likelihood of children or grandchildren moving out of the socio-economic

situation of their parents or grandparents. Here we focus on income, taking the assumption that income can provide a rough proxy for ability to access a range of social, cultural, and economic goods and opportunities. The measure we use is called Intergenerational Earnings Elasticity—developed by the economist Miles Corak in 2006²⁵ and updated in 2013—which measures the extent to which income levels change across generations. A score of 1 means there is no movement from one income level to another from parents to children, whereas a score of 0 indicates no relationship between a parent’s and child’s income—that is, how much your parents earn does not determine how much you will earn later in life.

Of the 15 OECD countries that Corak examined, Canada scores 0.19—the third lowest—which means that children are much less likely to be stuck at their parents’ income level than children in other countries. Norway (0.17) and Denmark (0.15) exhibit even greater social mobility, while G7 peers like Germany (0.32), France (0.4), and the United States (0.47) show much less mobility.

TRACKING OUTCOMES: COVID-19 AND AFTER

Economic outcomes have undergone drastic changes during the COVID-19 crisis, and we know that people from some groups have been more heavily affected than others. Those on the lower end of the income distribution have seen significant employment, hours, and income loss, while those on the higher end have generally experienced more security. Women and racialized minorities have been especially hard hit in the economic crisis. While support programs such as CERB, the Canadian Emergency Wage Subsidy, and suspensions of evictions in many municipalities have cushioned the blow, unemployment, lower income, and high rent debts will leave lasting scars. Inequality and poverty could be significantly worse in the years ahead and this, in turn, could further damage Canada’s innovation performance.

MONITORING INCLUSIVE INNOVATION — COVID AND AFTER

Canada has a relatively strong foundation of basic research and skills to support innovation and very high entrepreneurial initiative, but struggles to develop and adopt new technologies and innovations to achieve the productivity and prosperity we need. Moreover, opportunities to participate in and benefit from the innovation economy are unevenly distributed. Women, certain racialized minorities, recent immigrants, people with disabilities, and Indigenous peoples are frequently excluded from good jobs, entrepreneurial support, and an equitable share of income and wealth. Canada's innovation performance has been sluggish and its egalitarian aspirations unrealized. The two are profoundly intertwined.

The IIM provides an integrated picture of the state of inclusive innovation in Canada and allows us to track performance on key innovation and inclusion metrics over time. Additionally, it provides policy-makers, researchers, and leaders in education and business with a set of well-organized data for them to pursue additional analyses that suit their needs. But there are two gaps in our understanding. In the first place, the data are not available in real time, which means that the current picture does not capture the extraordinary changes in opportunities, activities, and outcomes generated by the COVID-19 pandemic and economic crisis. We have data on employment, income, and a few other indicators, but a full picture of the COVID and post-COVID state of inclusive innovation will take time to emerge.

Second, some of the data that would help us provide a more comprehensive picture are simply not collected or reported by the relevant agencies, leaving holes in our understanding. For example, data on the demographic makeup of researchers, and on who receives venture capital and research funding, would give us a better understanding of

the distribution of opportunity in the innovation economy. More timely and comparable data on technology investment and adoption, and other innovation intentions and activities, would allow us to track progress on innovation activity more precisely. Finally, there is a near-total absence of data that would help us to understand the extent to which people in the LGBTQ+ community have opportunities to participate in and benefit from an innovation economy.

Inclusive innovation in the age of COVID-19

As governments, businesses, educators, and others continue to design and implement policies, strategies, and measures to help people and businesses weather the pandemic and economic storm, Canadians should also begin to look towards the post-COVID horizon. What will it take to improve innovation and achieve a fairer distribution of opportunities for people to participate in and benefit from the innovation economy? How will we know if the measures we adopt are moving us towards or farther away from inclusive innovation? With the launch of the Inclusive Innovation Monitor we hope to make the way a little clearer.

RECOMMENDATIONS

The picture of inclusive innovation in Canada and globally is incomplete. Some of the data that would help us better understand innovation and inclusion opportunities, activities, and outcomes are not collected, collected but insufficiently granular, or simply not comparable across jurisdictions. Better data will help us to design more effective policies, programs, and interventions. While our long-term goal is to continue identifying additional data needs and to encourage relevant agencies to collect and share it, below is an initial list of what's missing and our recommendations to address these gaps:

- + **More robust demographic breakdowns for R&D data**

Statistics Canada's table, [Personnel engaged in research and development, by geography](#), should include demographic breakdowns, including sex, race, immigration, and Indigenous identity. This would improve understanding of the distribution of opportunities to participate in the research aspect of innovation.

- + **More standardized definitions and collection of VC funding data**

Data collected by the [OECD](#) and the [Canadian Venture Capital and Private Equity Association](#) (CVCA) on access to venture capital should include additional demographic breakdowns (including sex, race, Indigenous identity, sexuality) to help determine how access to capital is distributed. Efforts to standardize definitions and data collection across organizations and jurisdictions would also be welcome.

- + **More data on LGBTQ+ participation in innovation and entrepreneurship**

Data that illuminates the extent to which people in the LGBTQ+ community have opportunities to participate in and benefit

from the innovation economy is needed. Currently there is almost no aggregate, comparable information to track labour market and innovation participation by people in this community. To address this, questions should be included in the Census, Labour Force Survey, and other data collection initiatives.

- + **More frequent data on the economic participation of and outcomes for people with disabilities**

Currently, the best available information comes from the [Canadian Survey on Disability](#), but this is too infrequent and insufficiently comparable to other aggregate labour market data sources. Adding questions about disability to the Census and Labour Force Survey would help generate a better picture.

- + **More data on broadband access and computer access in rural areas**

Internationally comparable data on broadband access and computer access in rural areas is extremely out of date; the latest [OECD](#) data on Canadian broadband access is from 2013. This information forms a key piece on who gets to participate in the innovation and technology sectors in Canada. The Canadian Radio-Television and Telecommunications Commission has provided quality data on this topic for many years, with data as current as 2019; however, there are many definitions of what constitutes *rural* and what qualifies as *significant broadband access*. This might be why the data has not yet been integrated into Statistics Canada or OECD tables, however this area needs to be addressed.

WHAT'S NEXT

The *Inclusive Innovation Monitor* is a living and growing effort. There are many areas that we hope to explore moving forward. Here's what we're already working on:

- + Indicators of health outcomes
- + General access to services for different groups in Canada
- + Environmental outcomes and innovations
- + Measuring the success of government innovation programs
- + Exploring more complex measures of output and productivity

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