Catalogue no. 11-633-X — No. 054
ISSN 2371-3429
ISBN 978-0-660-74294-6

Analytical Studies: Methods and References

Multi-year Consolidated Plan for Research, Modelling and Data Development, 2024 to 2026

Release date: December 6, 2024

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

Email at infostats@statcan.gc.ca

Telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- Statistical Information Service 1-800-263-1136
- National telecommunications device for the hearing impaired 1-800-363-7629
- Fax line 1-514-283-9350

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "Contact us" > "Standards of service to the public."

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Published by authority of the Minister responsible for Statistics Canada

© His Majesty the King in Right of Canada, as represented by the Minister of Industry, 2024

Use of this publication is governed by the Statistics Canada Open Licence Agreement.

An HTML version is also available.

Cette publication est aussi disponible en français.

Multi-year Consolidated Plan for Research, Modelling and Data Development, 2024 to 2026

by

Analytical Studies and Modelling Branch
Statistics Canada

11-633-X No. 054
2024005
ISSN 2371-3429
ISBN 978-0-660-74294-6

December 6, 2024

Analytical Studies: Methods and References

Papers in this series provide background discussions of the methods used to develop data for economic, health, and social analytical studies at Statistics Canada. They are intended to provide readers with information on the statistical methods, standards and definitions used to develop databases for research purposes. All papers in this series have undergone peer and institutional review to ensure that they conform to Statistics Canada's mandate and adhere to generally accepted standards of good professional practice.

The papers can be downloaded free at www.statcan.gc.ca.

Table of contents

Executive summary

Canada is at a crossroads, with rapid economic, social, environmental and demographic changes underway. Addressing economic and social pressures, such as access to housing, health care and social services, while removing barriers to economic opportunities, can lead to major improvements for Canadians. Innovative research, data development and modelling are critical for guiding today's generation of policy makers in tackling these challenges.

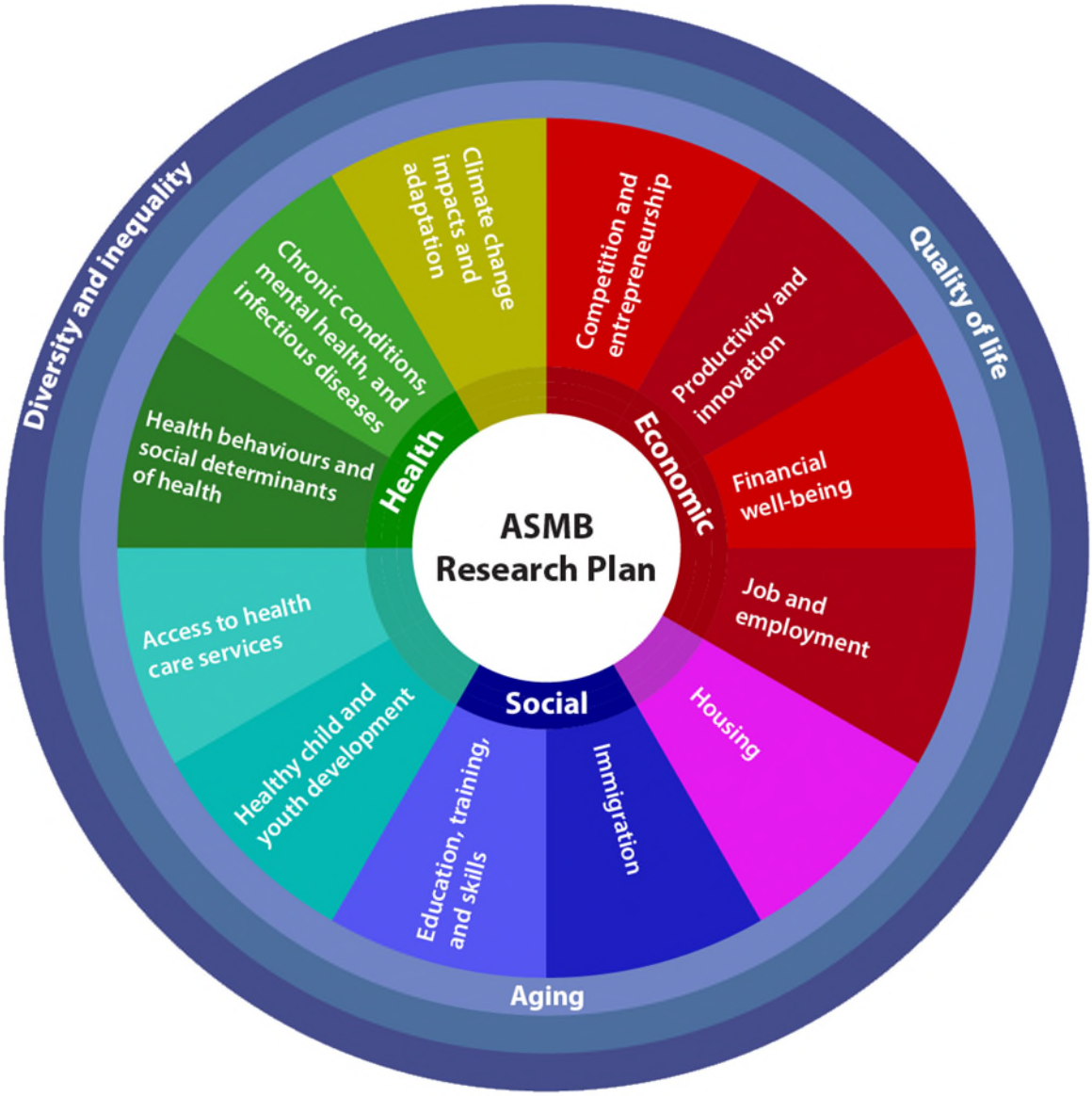
The Analytical Studies and Modelling Branch—Statistics Canada's research arm—is a group of interdisciplinary researchers, subject-matter experts and modellers who are passionate about enabling evidence-based policy and improving outcomes for Canadians. Research helps national statistical offices progress and adapt, with dedicated teams addressing emerging information gaps and strengthening ties with policy and academic communities.

Developed in collaboration with stakeholders, this research plan speaks to the current and emerging information needs of policy makers at all levels of government, the academic community and, most importantly, Canadians. Enabled by the vast data holdings of Statistics Canada, innovative methods will be applied to address complex policy questions and forecast different scenarios and outcomes. It is expected that the plan will evolve, in line with the realities of Canadians, priorities of collaborators and availability of resources.

The way the branch delivers on its plan demonstrates its commitment to open science—enabling access to its research findings, integrated data, interactive tools and models. This access empowers decision makers to better understand and evaluate policy options and the impact of behaviours on outcomes. The COVID-19 pandemic shone a spotlight on vulnerabilities; inequalities; and the interconnectedness of the economic, social and health spheres. Furthermore, critical structural changes, such as the demographic shift toward an aging population, will impact all facets of Canadian life. To ensure that the branch's research reflects these realities, it will prioritize three key analytical lenses: **diversity and inequality**, **aging**, and **quality of life**.

The plan is focused on 12 themes reflecting the key social, economic, health and environmental issues facing Canadians (see Figure 1). One of Canada's major structural economic challenges will be to improve living standards over the longer term. This will require sustained increases in **productivity**, particularly strategies to bolster investment and innovation. The branch's research will be critical to understanding whether those strategies are effective, and to examining policies and structural factors to improve **competition and entrepreneurship**, key drivers of productivity and innovation.

Figure 1:
Analytical Studies and Modelling Branch research plan



Source: Statistics Canada.

Playing a vital role in Canada's economy and society, **immigration** will be centre stage in policy discussions to ensure the successful integration of newcomers. The branch's research will continue to help evaluate the effectiveness of immigration selection policies, while informing on labour market conditions for immigrants. Topics will include the increasingly important role of temporary residents and international students in the economy, as well as broader social integration and economic well-being considerations for immigrants.

As Canada is an open economy, its labour market will continue to be transformed by global economic conditions and automation, influencing **jobs and employment**. The branch will prioritize research on the changing nature of work, including whether telework has influenced well-being and productivity since the pandemic. Addressing the recent acceleration in the shift toward non-routine, cognitive work, future research on **education, training and skills** will explore the

decisions and benefits of workers who are retraining, along with inequities in skill acquisition across the Canadian population.

In today's context of populating aging, disability and high levels of household debt, **financial well-being** research will study how decisions and saving behaviours are evolving and how older workers are transitioning to retirement, while also helping to inform poverty reduction measures. Escalating homeownership and rental costs are creating barriers to economic and social mobility. Therefore, **housing** will also require a greater focus, such as evaluating the experiences of newcomers seeking housing in the current demographic context.

Like many countries, Canada's population is aging—a key factor affecting both the demand and supply of health and social services. There will be an increase in chronic conditions, which typically occur as a result of aging and can significantly impact daily living. The branch's research on **chronic conditions, mental health and infectious diseases** will support public health policy makers in evaluating risks and protective factors, while its prediction and projection models on chronic diseases will inform future health policies and resource planning.

Health is determined by a complex set of factors experienced throughout the life course, including social determinants of health (e.g., education, income, housing) and structural systems of oppression, such as racism. Understanding the complexities and interrelationships between **health behaviours** (e.g., physical activity), substance use **and other health determinants** is an essential research priority that will lead to improvements in the health of Canadians.

Early years have a long-lasting impact on future health, social and economic conditions. Research exploring **child and youth physical and mental health** will be critical to understanding mental health challenges for Canada's youth and to identifying potential policy levers. More broadly, studying **access to both social and health care services, barriers, and use** will also be a priority, particularly for vulnerable groups such as immigrants, seniors and other populations.

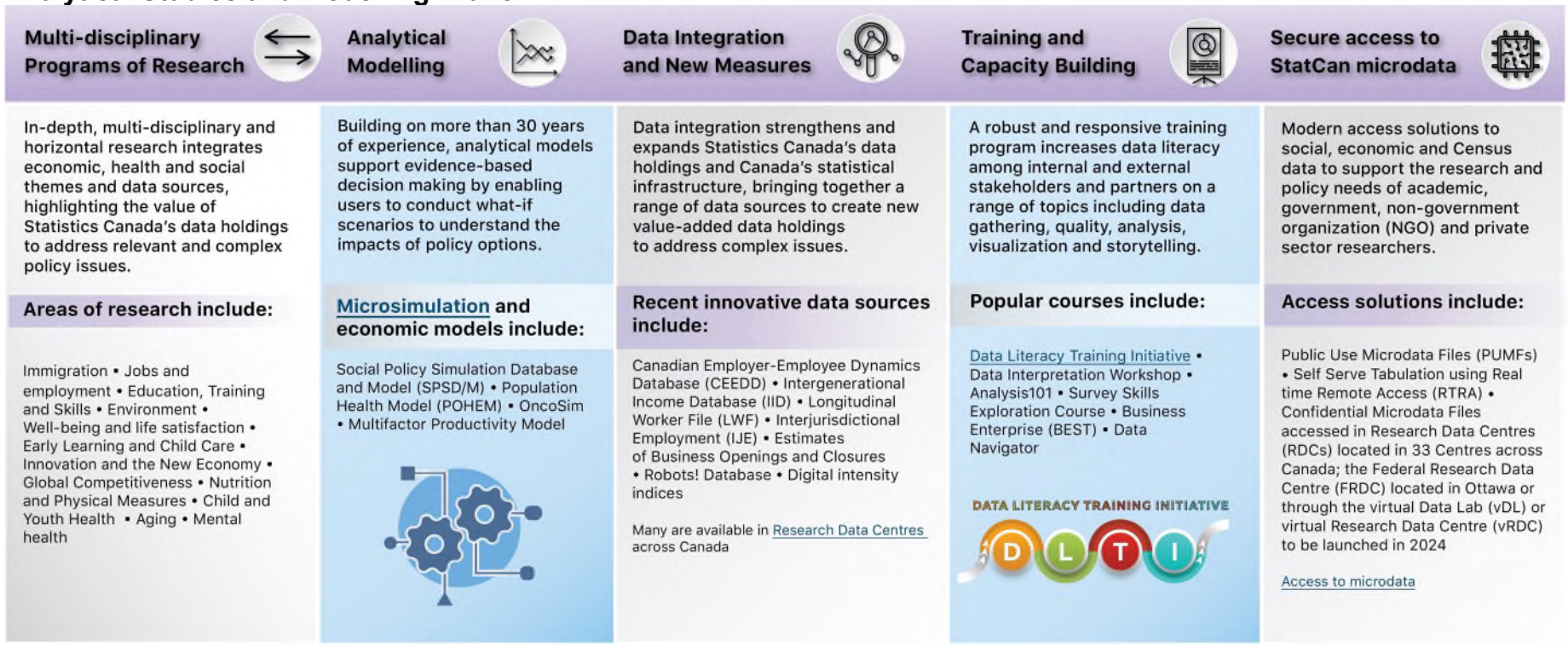
Finally, while environmental and clean technology products account for a small share of economic activity, investments have been increasing, and the potential health benefits of adaptation are significant. Responding to today's information needs, the branch will develop a new body of research on **climate change impacts and adaptation**, prioritizing insights at a detailed geographic level.

The branch will increase and expand its knowledge mobilization efforts so that its work reaches more Canadians and decision makers, by engaging with stakeholders and translating research findings into plain language. The branch will continue to invest in improving data literacy for Canadians and analytical capacity among its stakeholders, enabling evidence-based policy making and access to data.

1 Mandate

The Analytical Studies and Modelling Branch (ASMB) is the research, modelling, training and access hub of Statistics Canada. It focuses on leveraging the agency's vast data holdings to generate in-depth insights that support evidence-based policy making and to enable others to do so through analytical training and data access (see Figure 2). The ASMB, like other program areas in the agency, works to support Statistics Canada's overall mission of delivering insights through data for a better Canada.

Figure 2
Analytical Studies and Modelling Branch



Source: Statistics Canada.

The ASMB publishes forward-thinking research that addresses complex policy questions through data development, modelling and predictive analytics. The branch collaborates with government, academic, public sector and internal partners to understand their information needs and address major knowledge gaps. ASMB researchers publish through various channels, including internal and external scientific publications. They offer training, expert workshops and data literacy content to invest in the analytical skills of their data users and stakeholders.

Given its adeptness in research and analysis, the ASMB also plays a leadership role in developing data skills and strengthening subject-matter expertise within Statistics Canada, across policy communities and, more broadly, for all Canadians. Its training reaches everyone, from new recruits to policy colleagues, all the way to upskilling executives. Advocating for open learning and the improvement of data literacy for everyone, the ASMB's Data Literacy Training Initiative team offers accessible and engaging learning content on wide-ranging topics for Canadians (e.g., statistical bias, storytelling and data ethics). Researchers across the branch also provide critical support to external researchers who access Statistics Canada data through a broad range of access solutions.

2 Delivering on the plan

Rooted in expert knowledge from diverse fields, this research plan speaks to the current and emerging information needs of federal and provincial policy makers, scientists in the academic community, and Canadians. Given Canada's current health, economic and social pressures, the plan anticipates future needs, while showcasing the value and potential of Statistics Canada's data to research and policy communities. The ASMB's commitment to interdisciplinary collaboration is demonstrated in its leadership of research programs that go beyond disciplinary and organizational boundaries.

2.1 Modelling and advanced analytics

Through cutting-edge analytic work, predictive algorithms and advanced modelling, ASMB researchers innovate every day, exploring new data development and integration opportunities and applying sophisticated analytic tools. The ASMB has a unique skill set and advantage in transforming complex research models into interactive tools for stakeholders to develop their own actionable insights. With over 30 years of experience, microsimulation models remain a cornerstone of the ASMB's work, supporting evidence-based policy making and enabling nuanced "what-if" scenarios. Examples include the development of the Social Policy Simulation Database and Model, used by decision makers to assess the impacts of new tax programs, and OncoSim, used to examine those of new cancer screening programs.

2.2 Data integration and new measures

ASMB researchers pioneered the wide use of linked and integrated datasets to address complex policy questions and derive new insights. Consulting and conducting record linkages continue to be key components of the branch's data development efforts. Thanks to the ASMB's subject-matter expertise, researchers are able to identify early data development opportunities that will yield great insights and, more broadly, improve Canada's statistical infrastructure. These efforts include the continued integration of individual and firm-level data through the Canadian Employer–Employee Dynamics Database, as well as the integration of environmental information and health and economic outcomes using geographic location. New data sources are made accessible to policy and academic researchers through various access solutions, including the research data centres.

2.3 Partnerships and collaborations

ASMB researchers plan and implement their research by working with a broad range of internal and external collaborators, including federal, provincial and territorial governments; academic researchers; and non-governmental organizations. This approach ensures that their research addresses issues relevant to policy and meets the information needs of Canadians.

3 Analytical lenses

To yield information on the wide range of outcomes and experiences of Canadians, and to better understand current vulnerabilities, ASMB research will prioritize the following analytical lenses: **diversity and inequality**, **aging**, and **quality of life**. These lenses will be applied where appropriate to guide the branch's research, data development and modelling activities.

3.1 Diversity and inequality

Canada is a diverse country and the ASMB's data reflect who Canadians are. Since the onset of the pandemic, Statistics Canada has launched and implemented the Disaggregated Data Action Plan, collecting and publishing more data that consider the diversity of communities, including racialized status, Indigenous identity and gender. These groups, whether big or small, may experience inequities in health, social and economic outcomes, such as mental health challenges; differential access to services; poverty; and economic well-being. Geographically disaggregated data are becoming increasingly important as Canadians from coast to coast to coast experience different economic, social and environmental challenges.

3.2 Aging

Canada, like many other developed countries, is experiencing a demographic shift, with an increasingly aging population. Under the high-growth scenario, by 2043, 21.9% of the population will be aged 65 years and older, and 4.3% will be 85 years and older. While the ASMB will continue to take a life course approach, highlighting outcomes for children and youth, working-age adults, and older adults, this shift warrants greater focus on the aging population. It will be critical to understand the social and economic well-being of young and older seniors as a distinct and growing population group, as well as the impacts of an aging population on important sectors such as health care and the labour market.

3.3 Quality of life

Over the past several years, events such as the pandemic and environmental disasters have further highlighted the interconnectedness of economic, social, health and environmental impacts on the quality of life of Canadians. Putting a spotlight on vulnerabilities and inequities, Statistics Canada has invested—along with partners—in the development of the Quality of Life Framework to track progress on a range of indicators. Understanding the intersectionality of these factors and the differential impacts on the quality of life of specific population groups can help tailor policy supports to communities that need them the most, while also ensuring that broader measures meet the needs of different groups.

4 Research themes

The following provides a brief description of the major research themes that address critical social, health, economic and environmental issues. The summaries provide context and highlights of

research previously published by ASMB researchers. The potential research questions within each theme are meant to provide examples of the range of research questions that may be addressed by ASMB researchers over the next three years. The specific research projects that will be undertaken will be determined based on relevance, related to current and future information needs, collaborations and partnerships, organizational priorities, and resource availability.

4.1 Productivity and innovation

Productivity growth is the main driver of rising living standards. Over the last few decades, nearly the entire increase in gross domestic product (GDP) per capita in Canada stemmed from labour productivity growth. Research and analysis in this area will examine recent trends in productivity, including a comparative analysis with the United States and other advanced economies. It will examine the determinants of Canada's productivity growth, such as innovation, technology adoption, investment in fixed and knowledge capital, and investment in human capital. The impacts of productivity growth on the income gains and well-being of Canadians will also be studied through the three analytical lenses that guide ASMB research: diversity and inequality, aging, and quality of life.

Digitalization and artificial intelligence (AI) are fundamentally changing the way goods and services are produced and delivered to individuals. It is important that digital transformation is reflected in the way the economy is measured and informs the analysis of underlying movements in aggregate statistics (e.g., GDP). Moreover, having a longer time series to measure digitalization and AI will be key to understanding their impacts on labour productivity.

Measurement of both desirable and undesirable outputs from economic activity is crucial as economic and environmental outcomes become increasingly intertwined. It is critical to consider the environmental impact of economic activities when examining productivity and economic growth.

Potential research questions:

- What is the intensity of digitalization at the firm level and at the industry level? This measure will be used to provide insights on the impact of digitalization on patterns of firm entry and survival, firm productivity, firm productivity distributions, industry output and productivity growth.

- What are the factors (e.g., knowledge capital, education and training, innovation, and technological progress) contributing to Canada's productivity growth and relatively poor productivity performance, compared with the United States? How does Canada's productivity growth compare with that of other countries?

- Given that Canada has a larger share of small (less productive) firms, what is the role of industry structure and firm size distribution in Canada's productivity performance and in its performance relative to the United States?

- What are the challenges and barriers that small firms face regarding scaling up and improving their productivity performance?

- Why is Canada's strong record of scientific innovation not translating into improved productivity performance?

- How does AI influence and shape production processes, product innovation, organizational changes, firm performance, employment earnings, job losses and gains, and job quality?

- Are gains in productivity passed onto workers of different types (low skills vs. high skills, young vs. old, immigrants vs. Canadian-born people) as real wage gains? How does labour reallocation impact productivity growth?

4.2 Competition and entrepreneurship

Competition and entrepreneurship spur innovation and productivity growth, yet there are ongoing concerns about Canada on account of lower business entry rates over time. Studies in this area will focus on trends in competitive intensity and entrepreneurship in Canada, on barriers to competition and entrepreneurship, and on the effect of competition and entrepreneurship on innovation and productivity.

As Canada is a small open economy, its economic performance is greatly affected by external factors, including its trading and investment relationships with key partners. Canada's participation in international trade and foreign direct investment is a key driver of both competition and innovation, leading to research questions about the impact of international trade and foreign investment on research and development, intellectual property, and innovation in Canada.

Moreover, changes in the competitive environment are not felt equally across regions, firms and individuals, and the strategies that enable certain types of firms to succeed may not be useful for other firms. When trade and investment flows are analyzed, workers also need to be considered. Immigrants to Canada bring knowledge about markets in their home countries and may also play a role in trade creation, innovation and technological diffusion.

The competitive process is associated with the entry of new firms that are productive and the exit of those that are less productive. New firms entering the market are a significant channel for greater innovation, new ideas and new products. Moreover, the reallocation of resources from exiting and declining firms to those that are entering and growing is an important source of aggregate productivity growth. Business supports related to COVID-19—like the Canada Emergency Wage Subsidy—may have had the unintended consequence of supporting weak firms and inhibiting reallocation.

Research in this area will be supported by continuous investment in the development of data files that track industry and enterprise performance over time. Measures of the economy at the scale of 1 km x 1 km grid squares are being developed from tax data and a wide variety of other sources. These measures range from business counts to employment to GDP and can be used to understand the impacts of climate change, including floods and wildfires, on economic activity at a very detailed geographical level.

Potential research questions:

- What is the current state of competition and entrepreneurship, such as concentration ratios, firm entry and exit, or market power? How do they differ at the national, regional and local levels? What is the impact of competition and regulations on productivity growth?

- In shaping the competition landscape in Canada, what is the impact of structural factors and policies on firm innovation and growth? And how much does regulatory competitiveness matter?

- How does global value chain integration influence costs and competitiveness for Canadian firms? What are the risks to Canadian industries that are well integrated during periods of rising trade tensions?

- What is the impact of growing geopolitical tension on Canada's international trade, investment in Canada and direct investment abroad? How do changing patterns of international trade and foreign direct investment affect research and development, intellectual property, and innovation?

- What is the role of foreign direct investment, mergers and acquisitions in shaping the competitive landscape in Canada?

- What is the role of multinational enterprises in the services trade, given the rapid growth of services as a share of total trade? How did the COVID-19 pandemic influence trends in the growth of the services trade?

- How has the pandemic changed where businesses choose to be located?

4.3 Immigration

Immigration continues to play a vital role in shaping Canada's society and economy, particularly in the context of current demographic shifts. It is projected that, by 2041, 34% of the Canadian population could be born outside Canada. Immigration levels and selection criteria continue to be centre stage in policy discussions, and the social, economic and health outcomes and contributions of immigrants are key for settlement and inclusion.

With the introduction of the Express Entry system and subsequent modifications, Canada has significantly altered the selection of economic immigrants. The ASMB continues to examine and monitor the effectiveness of selection criteria in predicting the labour market outcomes of economic immigrants, as well as their impact on the health and well-being of immigrants at the time of landing and following settlement. The work of the branch will also continue to provide analytical insights for consideration in future immigration policies.

The recent increase in the immigration level is expected to help address labour and skill demands and partly mitigate the impact of population aging. Meanwhile, it is essential to consider the potential effects of the immigration level on the labour market outcomes of new immigrants and the ensuing pressures on housing, health care and infrastructure.

Immigrants comprise a large share of labour force participants with university degrees, offering the capacity to contribute to an innovative and dynamic economy. However, the level of skill utilization remains low among highly educated recent immigrants relative to Canadian-born youth. Studies in this area are investigating the role that supply and demand factors play in the skill–job match among recent immigrants and youth in Canada. Gender differences in the skill–job match among recent immigrants are also being investigated.

The role that temporary residents (TRs) play in the Canadian economy, particularly in addressing short-term labour and skill shortages, continues to be critical. TRs are also an increasingly important pool from which permanent residents (PRs) are selected. The ASMB is refining measurement in this area and documenting the extent to which TRs are contributing to industries with labour shortages and the growing role of international students in the labour force. At the same time, the health and health care needs of TRs have not been well understood. Given that health complications could affect the ability of TRs to continue working or studying while in

Canada, the branch will continue to examine the health status and use of health care services among TRs, PRs and the non-immigrant population.

Ongoing research examines the social and political participation of immigrants, including recent changes in the citizenship acquisition of immigrants, their sense of belonging in Canada, and the relationship between social integration and subjective well-being. Research on immigrant health will examine outcomes and the use of health services, based on individual characteristics such as type of immigrant, world region of origin, time since immigration and location of landing. The record linkage between immigration and health administrative data sources has amplified research possibilities, enabling a deeper look at these topics, including issues such as mental health among immigrants, health outcomes and causes of hospitalization for TRs.

Potential research questions:

- How will employment conditions for new immigrants respond to changes in regional and occupational job demand and skill shortages? Do the trends in the economic outcomes of new immigrants in terms of employment rates, job security and earnings differ from those of the Canadian-born population?

- What role has immigration played in shifting the occupational structure in the Canadian labour market?

- What are the roles of supply and demand factors in the skill–job match among recent immigrants and youth in Canada? Are there differences across major fields of study and occupations (e.g., health, and science, technology, engineering and mathematics)?

- Are there recent changes in the transition to permanent residency by TR program? Do temporary foreign workers stay in their region and industry after the transition to permanent residency? And how does retention vary by region and industry?

- What are the major fields of study among international students who are admitted as PRs, and do they find jobs in their field of study after immigration?

- Did the self-reported mental health of immigrants differ from that of non-immigrants prior to the pandemic? Does this vary by different immigrant-specific characteristics (e.g., duration of time in Canada, country of origin)?

- What are the implications and roles of immigrants as both providers and users of the health care system?

4.4 Jobs and employment

The Canadian labour market undergoes continuous shocks, influenced by technological shifts, globalization and automation. These changes can impact the nature of work and employer–employee relationships and influence wage growth through bargaining power. Automation, driven by increased computing power and AI, will further transform work, while labour demand shocks from population aging and the shift to a low-carbon economy add even greater complexity. Evaluating the changing nature of work in light of these changes is a priority.

The surge in telework triggered by the COVID-19 pandemic has reshaped work structures in Canada and Organisation for Economic Co-operation and Development countries. Beyond its effect on employees' well-being and productivity, it raises questions about public transit demand, unions' role in supporting telework, and the alignment between workers' preferences and remote hours.

Potential research questions:

- Has population aging weighed on productivity and wage growth in Canada, and, if so, what are the future implications across sectors?
- To what extent does taking care of senior parents reduce the labour supply of core-aged workers?
- As declines in manufacturing employment have been largely offset by employment growth in the construction and the oil and gas sectors, how have wages evolved across these industries over the past two decades?
- How has the wage structure evolved over the last four decades? Has the percentage of low-paid or well-paid jobs declined during this period?
- To what extent are Canadian workers exposed to AI-related job transformation?
- To what extent do employees in nursing and residential care facilities tend to leave this industry, and what are the personal and job characteristics associated with retention?

4.5 Financial well-being

Financial decision-making and savings behaviours are important issues in Canada's current context of population aging, increasing life expectancy and high levels of household debt. As such, employment dynamics for older workers and transitions into retirement will be a focus of research, including inter-cohort differences in the income replacement rates of seniors, joint retirement decisions between spouses and labour supply decisions of older workers with different socioeconomic characteristics.

Research about financial vulnerability that identifies target groups, such as families with children and financially vulnerable Canadians with disabilities and their families, for policy interventions will also help inform poverty reduction measures.

Potential research questions:

- Have Canadian families become more financially vulnerable because of job loss or income interruptions over the last two decades?
- To what extent have recent increases in minimum wages reduced the financial vulnerability of lower-income families?
- How do the financial effects of family dissolution vary by gender? Does family dissolution prior to age 65 lead to a reduction in retirement income?

- What are the income trajectories of families with adults displaced from greenhouse gas (GHG) intensive industries? To what extent do income taxes and transfers mitigate income losses following job displacement?

- To what extent do eligible newcomers receive the Canada child benefit (CCB)? How does the CCB take-up rate differ by socioeconomic characteristics of immigrant families?

The Social Policy Simulation Database and Model is a static model used by governments and researchers to assess the distributional impacts of changes to tax and transfer policy on Canadian households. Model updates will continue to reflect policy and tax changes announced in the federal and provincial budgets and to provide input to Statistics Canada's Distribution of Household Economic Accounts.

Recognizing the impact of an aging population on retirement income, ASMB modelling experts have also been working with key partners and a consortium of academics to develop a new dynamic microsimulation model that will allow users to explore the impacts of policy changes over the life course. The first version of the PASSAGES model, designed to model changes to the Canada Pension Plan, was recently released. This microsimulation model can be used to support policy analysis and research related to retirement income at the individual and family levels. Old Age Security and the Guaranteed Income Supplement are expected to be added in the next few years.

4.6 Education, training and skills

In the branch's broader body of research evaluating the changing nature of work, specific attention will be given to retraining and skills. The shift away from routine, non-cognitive tasks and toward non-routine, cognitive work has accelerated since the pandemic, with greater gains for younger workers, who may be better positioned to pivot at this point in their careers. Very few workers choose to retrain by attending a postsecondary institution, but for those who do after job displacement, the decision generally pays off. Future research will explore workers' decisions and the benefits of retraining for workers seeking career advancement or a change in occupation.

One of the main barriers to lifelong learning is the opportunity cost associated with retraining rather than working. However, workers who were directly affected by the pandemic did not face this barrier because government supports were in place to assist individuals in upgrading their skills. Future work may explore what role, if any, these supports had in enabling the transition to learning of affected workers.

The pandemic may also have influenced educational decisions among younger individuals. The same may be true for rapidly advancing AI, which is now capable of performing work previously only performed by humans (e.g., composing long texts easily, researching facts and summarizing them very quickly). Therefore, students in certain programs may consider switching to other programs deemed to be more resilient to these new realities. Future work may examine these patterns.

Skill development plays a key role in the economic well-being of workers and their families. However, skill acquisition (or education) does not necessarily reflect the diversity of the Canadian population because certain subgroups (e.g., Black and Latin American population groups) generally have less formal education than others. Ongoing work is exploring the detailed educational pathways of various population groups.

Regional economic development will also be influenced by differences in skills. Provinces and territories invest heavily in the education of youth through primary, secondary and postsecondary

schooling, yet some regions may experience greater challenges in retaining and recruiting skilled youth than others. The issue is particularly important in light of key labour shortages (e.g., in health care). There are also sociocultural considerations, especially in regions with a large official language minority population (e.g., Franco-Ontarians, Acadians in New Brunswick, Anglo-Quebecers).

Potential research questions:

- What share of continuously employed, long-tenured workers opt to pursue short-term postsecondary education training opportunities even if they did not get laid off? Do such investments in lifelong learning pay off in the labour market?

- Were government supports put in place to assist workers in retraining during the pandemic associated with increased training uptake?

- Was the pandemic associated with more program switching in universities and colleges relative to earlier periods?

- How do the postsecondary education pathways, including graduation rates, of various population groups compare (e.g., White compared with Black or Latin American)?

- Which provinces and territories fare better or worse in terms of retaining and recruiting young, skilled talent? Are there any implications for official language minority communities in certain areas?

4.7 Housing

Escalating housing costs are creating barriers to economic and social mobility, particularly for young Canadians and vulnerable population groups. Disparities in the trajectories of homeownership among these groups persist throughout the lifetime. Therefore, research will focus on affordability and core housing need more broadly, including housing-related social benefits and well-being. The interdependence of labour markets and housing will also be studied, as housing shortages in some regions may increase labour shortages, while high housing costs in some provinces (or regions) might conversely reduce the “brain drain” of young graduates from Atlantic Canada. Exploring the experiences of new immigrants, temporary foreign workers and international students in finding housing will also be critical in the current demographic context.

Potential research questions:

- Are there differences in dwelling, neighbourhood and life satisfaction between homeowners and renters? What is the role of homeownership in satisfaction if differences in household, dwelling and neighbourhood characteristics are taken into account?

- What is the impact of immigration on housing prices? How is the growth in immigration levels related to changes in house values and rents across different municipalities?

- What are the housing conditions of international students across municipalities and major source countries?

- What are the characteristics of younger adults who live with their parents? How have the living arrangements of the "constellation family" changed over time?

4.8 Health behaviours and social determinants of health

Health is determined by a complex set of factors experienced throughout life at the individual, family and geographic levels, including structural systems of oppression such as racism and colonialism. Social determinants of health—education, income, work and housing—can influence outcomes, as well as individuals' physical environments. Health behaviours (e.g., substance use, oral health, nutrition, physical activity) have a direct impact on well-being, while access to health care services and preventative measures also influence health outcomes.

Health determinants are interrelated and can be distal or proximal. For example, environmental factors such as pollution, the impact of climate change and extreme weather events can be considered distal, while health behaviours such as nutrition, oral health, physical activity, and substance use and individual characteristics (e.g., sex, age, gender) can be considered more proximal to health outcomes. Understanding the complexity and interrelationships of these determinants, their impacts on health, and how they differ by population group is essential to improving the health of all Canadians.

Potential research questions:

- How has the rise in the cost of living influenced food security for Canadians?

- Do Canadians meet current physical activity guidelines, and, if not, where are the largest gaps? What are the barriers to being physically active? What are the factors that promote physical activity?

- How has the legalization of cannabis impacted substance use trends, considering its connection to physical and mental health?

- Are the consequences of substance use getting worse over time and, if so, for which groups (e.g., racialized people, people of certain genders, people in certain occupations)?

- What are the patterns of oral health care use and barriers experienced by Canadians?

4.9 Chronic conditions, mental health and infectious diseases

Overall, Canadians are living longer and spending more time in good health. Yet many will experience chronic health conditions in their lifetimes, and these typically increase with age. Chronic conditions significantly impact daily functioning and reduce quality of life and well-being, while increasing the risk of hospitalization, morbidity and mortality. The diversity of the Canadian population also points to the importance of filling these information gaps in a nuanced way. Moreover, increases in chronic conditions now also include the impacts of COVID-19 or long COVID-19, conditions that remain a critical public health concern, as the demand for health care practitioners to prevent or manage these conditions continues to increase.

New and re-emerging infectious diseases continue to evolve and influence the health of Canadians in new ways. Their impact can be direct, by affecting morbidity and mortality, or indirect, by preventing or delaying screening. As infectious conditions continue to have an impact on physical and mental health outcomes, as well as health service use, monitoring them and

responding through data collection and data tool development remain a priority, particularly for the most vulnerable. Research to understand risks and protective factors, treatments, and outcomes, as well as service use and barriers to use, will inform the planning efforts of health policy makers.

Mental health conditions impact the lives of Canadians throughout the life course. Increasing numbers of youth report poor mental health, such as anxiety and depressive symptoms, including suicidal ideation. The mental health of Canadian seniors is also important, with associations to social isolation and loneliness. Health service use and barriers to care, as well as risk and protective behaviours associated with mental health, such as physical activity, social participation, screen time and cybervictimization, are policy-relevant themes.

Predictive and projection models of chronic and infectious diseases can help support health policy makers as they make decisions about future resource allocation or design effective prevention and screening programs. The OncoSim and Population Health Model (POHEM) microsimulation models were developed at Statistics Canada in collaboration with partners at the Canadian Partnership Against Cancer and the Public Health Agency of Canada, respectively. OncoSim models cancer outcomes and allows for examinations of different policy scenarios to study issues such as how different cancer screening guidelines impact cancer outcomes and mortality. Models can also address the interplay of risk factors and the impact of improving or changing treatments and interventions such as screening and roles in the reduction of the cancer burden. POHEM is generalizable to different health conditions. Predictive models address questions like the following: in the future, how many Canadians will be affected by chronic diseases such as diabetes and dementia, and how do various risk and protective behaviours such as smoking and nutrition impact these health outcomes?

These models seek to answer questions about the future prevalence of risk factors and incidence of cancer and chronic diseases. Cancer projections from OncoSim, in particular, are being increasingly used by national and provincial stakeholders to inform new cancer screening programs and guidelines. Additionally, methods to assemble and use open data for infectious disease modelling are being developed within the branch, in collaboration with public health partners.

Potential research questions:

- How are changes in health behaviours, including smoking and physical activity, associated with chronic health conditions such as obesity?
- Has the prevalence of mental health conditions such as mood and anxiety disorders and neurodevelopmental conditions such as attention deficit hyperactivity disorder changed in the last few years?
- How many Canadians may suffer from chronic conditions such as cancer, diabetes, dementia and cardiovascular disease in the future?
- Can interventions that focus on risk factors, screening, or improving or changing treatments reduce the burden of cancer and other chronic diseases in the future?
- Do health shocks, such as the COVID-19 pandemic, impact the trajectories of risk behaviours and chronic disease development?

4.10 Access to health care services

Timely, comprehensive and high-quality health care is essential for Canadians. Where and how Canadians access health care and mental health services, and any resulting unmet care needs, will have important impacts across the lifespan from early childhood to old age. The pandemic demonstrated the importance of better understanding Canadians' health care needs and their access to care, as well as the different contexts in which Canadians are impacted. Examining access to and conditions of care in long-term care facilities and seniors' residences, for example, is an important part of serving and protecting seniors—a growing segment of the Canadian population. Preparing for the future of an aging and diverse population, while keeping an eye on major policy initiatives targeting physical and oral health and mental health care services, will shape the ASMB's future research plans.

Potential research questions:

- Who reports having unmet health care needs, and how might such unmet needs overlap with other characteristics or health behaviours?
- Is virtual health care still popular after the pandemic, and what are the contributions or barriers of virtual health care in providing services?
- What barriers do Canadians face in accessing dental care? What sociodemographic or other factors determine access to and use of dental care? Have recent policy initiatives improved access to dental services and, as a result, the oral health of Canadians?
- How do overall and cause-specific hospitalization rates vary for different groups of Canadians (e.g., First Nations, Métis or Inuit; immigrants or TRs)?
- Are there disparities in access to long-term care among older Canadians, particularly for those who belong to vulnerable groups (e.g., people with low income, immigrants, sexual minorities)?

4.11 Healthy child and youth development

The early years have a long-lasting impact on future health, social and economic conditions. Several initiatives are presently linked to national and international collaborations. Because of limited child and youth statistics, initial efforts have focused on developing indicators to assess outcomes and access and barriers to services in a consistent way. Notably, work that fills information gaps to understand impacts on and services for the most vulnerable children and youth is a priority, as is aligning with national programs such as the Canadian national child care strategy. The development of reporting tools for children and youth aligned with international partners has also focused on measures of childhood disability, child maltreatment and children living in alternative care arrangements. Further research on chronic conditions, social and environmental factors impacting development, and the feasibility of using modelling tools for policy scenarios will be explored.

Adolescence and early adulthood represent particularly critical periods for the onset of mental health symptoms, with many mental illnesses developing before the age of 24. Research exploring child, youth and adolescent health and health behaviours is key to understanding the mental health of Canadian youth and potential policy levers that can have an impact. For example,

online digital media use has implications for mental health, while certain subpopulations are at greater risk for poorer mental health outcomes.

Potential research questions:

- How are environmental factors such as climate change and air pollution associated with health outcomes for children and youth?
- What are the hospitalization experiences of vulnerable children? Do their hospitalizations differ by cause and length of stay?
- How does the mental health of Canadian 2SLGBTQ+ youth compare with that of their peers? How do social supports and access to mental health care impact the mental health of 2SLGBTQ+ youth?
- What barriers do Canadian parents face in accessing their preferred child care arrangement? What are the implications for parental employment? Who are the families most at risk of facing these barriers?
- What does social participation look like for young children with disabilities in Canada?

4.12 Climate change impacts and adaptation

Climate change is a long-term shift in weather conditions as measured through temperature, precipitation, wind, snow cover and other indicators. It involves changes in both average weather conditions and variability, including extreme weather events such as heatwaves, flooding, intense storms and wildfires. The accumulation of GHG emissions, driven primarily by the burning of fossil fuels, is increasing global temperatures. Many aspects of society both affect and are affected by climate change, including health, the economy and the environment, causing changes in the Canadian population. For example, as pressures to move toward a low-carbon economy intensify, studying the income trajectories of workers displaced from industries with high GHG emissions will be critical. Likewise, the impact of such job displacement on Canadian communities remains to be assessed.

Policies related to meeting emission reduction targets, growing the economy and building resilience (i.e., adaptation) are a focal point. The ASMB is working to expand on this multidisciplinary program of research focused on assessing intended outcomes, including identifying the groups, industries and geographic regions that are most at risk. Both adaptation and mitigation measures (e.g., in lowering GHG emissions) will be studied to inform policy decisions, prioritizing insights at detailed geographic levels.

Potential research questions:

- How do the interactions between heat and health differ across the country by key characteristics, such as deprivation, greenness and access to heat adaptation resources?
- How will air pollution, the primary environmental cause of death in Canada, be further influenced by climate change and the increase in wildfires? Which population groups are most at risk?

- Are different groups exposed to or impacted by events such as extreme weather, and, if so, what are the different impacts, and how prepared are these groups to adapt when such events occur?

- How will greater opportunities for telework in a post-pandemic labour market influence GHG emissions?

- Are firms using clean technology? Are firms adapting their business practices to proactively reduce their climate risks? Are government policies on climate change influencing how firms operate?

- How does technological advancement in pollution abatement, such as clean technology, influence firm performance? What is the relationship between innovation in production and innovation in pollution abatement? How do carbon pricing measures shape firm-level employment, earnings and job turnover?

5 Strategic analysis: Enhancing the branch's relevance

Beyond the branch's traditional research programs, its chief economic advisor and their team focus on timely socioeconomic issues. They provide insights to Canadians through short analytical pieces, webinars and *Research to Insights* presentations, many of which focus on emerging economic trends and structural developments in Canada's economy. This team supports the Chief Statistician in engagements with Canadians and key stakeholder groups, providing leadership in current macroeconomic analysis and interpreting complex economic trends. The team also plays a critical role in quality assurance for major economic surveys, supporting the analyst community at Statistics Canada. Its analytical priorities and research projects will emerge in real time over this plan's horizon, as the team will continue to inform on current economic issues as they reflect Canada's economic realities.

6 Communicating the branch's research

The branch communicates the results of its research, modelling and data development to a broad range of stakeholders. Applying knowledge translation principles, it uses a range of vehicles to disseminate its work. Detailed accounts of research methods, data and findings are published in branch publications, including *Health Reports*, *Economic and Social Reports*, *Analytical Studies: Methods and References*, and the *Analytical Studies Branch Research Paper Series*, as well as in external peer-reviewed academic journals.

Plain-language summaries for use by policy makers and media are also prepared and disseminated through *The Daily* and directly to senior government officials. Where appropriate, innovative data visualization techniques such as infographics and information hubs are used to communicate research findings to the general public and other stakeholders. The branch also plays a key role in taking a horizontal view, synthesizing analysis and research conducted across the agency to provide a more comprehensive picture of relevant issues and questions. Presentations are published through the *Research to Insights* series and shared at branch seminars and departmental research forums.

7 Training: Investing in the branch's future generation of talent

The branch plays a leadership role in developing analytical skills and data literacy within Statistics Canada; across policy communities; and for external researchers and, more broadly, for all Canadians. Its dedicated experts train new analysts who join the agency, helping them improve their analytical and communication skills and develop subject-matter expertise in business and economic data, along with an understanding of survey methodology and awareness of innovative methods. The branch's training reaches everyone, from students and new recruits to external researchers, all the way to upskilling executives.

The branch's Data Literacy Training Initiative was launched in 2020, as a response to great demand for learning content and stewardship from Statistics Canada. Advocating for open learning and the improvement of data literacy for everyone, the team creates short, accessible and engaging learning content on wide-ranging topics (e.g., statistical bias, analysis, storytelling and data ethics). It offers learners a full spectrum of opportunities to improve their data literacy, including short videos, self-paced online courses and instructor-led workshops for stakeholders across communities.