

Economic and Social Reports

A comparison of immigrant and Canadian-born data scientists: Sociodemographic characteristics and earnings



by Max Stick, Feng Hou and Allison Leverage

Release date: February 26, 2025



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, 2025

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.

A comparison of immigrant and Canadian-born data scientists: Sociodemographic characteristics and earnings

by Max Stick, Feng Hou and Allison Leavage

DOI: <https://doi.org/10.25318/36280001202500200003-eng>

Advances in technology have led to the development of innovative methods for generating, collecting and storing data across various industries, including health care, media, retail and sciences. Businesses increasingly rely on data from product searches, purchasing behaviours and other preferences to make product and marketing decisions (National Academies of Sciences, Engineering, and Medicine, 2018). Raw data alone have minimal value; transforming them into usable and interpretable information requires workers with certain skills (Pereira et al., 2020). These tasks are often carried out by professionals known as data scientists.

Broadly speaking, those in the field of data science “...have a hand in many, if not all, aspects of a process that involves data” (Peng & Parker, 2022, p. 2) and typically have the capacity to use and analyze complex data resources (National Academies of Sciences, Engineering, and Medicine, 2018). Most positions in data science require experience in machine learning and deep learning, programming languages, and statistical techniques (Government of Canada, 2023; Pereira et al., 2020). Their work involves using techniques and tools to enhance data analysis, creating machine learning algorithms, and developing artificial intelligence models (Government of Canada, 2023). Data scientists are often employed by consulting firms, higher education and financial institutions, and information technology (IT) departments in the public and private sectors (Government of Canada, 2023).

While the data scientist occupation is expanding and the demand for data scientists is growing, organizations report difficulties in hiring qualified professionals (Wang et al., 2019). As an indication of high demand, data scientists earn high wages in the United States, with a median salary of \$108,000 per year (U.S. Bureau of Labor Statistics, 2024).

Similar to other occupations in science, technology, engineering and mathematics (Picot and Hou, 2020), immigrants are likely a major source of labour supply in the rapidly expanding occupation of data scientist. Previous studies suggest that in high-skill, high-demand occupations, employers may have less discretion in hiring and compensation (Grodsky & Pager, 2001; Lu & Hou, 2020). Accordingly, in occupations with a high demand for skilled workers and a limited labour pool, wage gaps between immigrants and native-born individuals tend to be smaller than in occupations with a larger labour supply and lower demand. In the late 1990s, when IT was in high demand, new immigrants and Canadian-born IT workers had identical earnings; however, when demand fell after the IT bust in the early 2000s, new immigrants earned considerably less (Hou, 2013). Because of the high demand for data scientists, the earnings gap between immigrants and Canadian-born employees in data science may be much lower than that among all workers.

Little is known about the sociodemographic characteristics and earnings profiles of data scientists in Canada because national data on data scientists were not available before the 2021 Census of Population. For the first time, the 2021 Census identified data scientists as a separate occupation group in the new National Occupational Classification.

This study uses the 2021 Census of Population to answer the following questions: (1) To what extent do immigrants contribute to the labour supply of data scientists in Canada? (2) How do immigrant and Canadian-born data scientists differ in sociodemographic characteristics (age, gender, educational level, mother tongue, field of study and industry)? (3) Given the high demand for data scientists, are the earnings gaps between immigrants and Canadian-born individuals smaller relative to those among all workers?

Sociodemographic characteristics of immigrant and Canadian-born data scientists

Immigrants comprised nearly 60% of the 12,200 data scientists aged 20 to 64 years with positive earnings in 2021 (Table 1). In comparison, immigrants accounted for 28% of earners in all occupations. Specifically, new immigrants (in Canada for two to five years)¹ comprised about 11% of data scientists, but less than 3% of all workers. Similarly, recent immigrants (in Canada for 6 to 10 years) accounted for 15% of data scientists, but 4% of all workers.

Immigrant and Canadian-born data scientists had different age structures. New and recent immigrants were primarily 30 to 39 years old, while longer-term immigrant data scientists (in Canada for more than 10 years) were more likely to be 40 to 64 years old (46%). In contrast, Canadian-born data scientists were younger, and the largest share were aged 20 to 29 years (41%).

Over two-thirds of all data scientists were men, a trend broadly observed in tech occupations (Canada's Got Tech Talent, 2024), with Canadian-born data scientists having the highest share of men (74%). Most Canadian-born data scientists' mother tongue was English or French (93%), whereas most immigrants' mother tongue was neither English nor French.

1. This study excludes immigrants who were admitted in the census year and the year before the census. Because the census collects income information in the calendar year before the census, most immigrants arriving in the census year did not have income in Canada, and most of those arriving in the year before the census did not have a full year of work.

Table 1
Selected sociodemographic characteristics of data scientists with positive earnings by immigrant status, aged 20 to 64, 2021

| | Immigrants in Canada for 2 to 5 years | Immigrants in Canada for 6 to 10 years | Immigrants in Canada for more than 10 years | Canadian-born individuals |
|---|---|--|---|------------------------------|
| Estimated population | 1,350 | 1,860 | 4,040 | 4,950 |
| Age | | | | |
| 20 to 29 years | 19.6 | 23.1 | 19.5 | 40.5 |
| 30 to 39 years | 70.0 | 58.5 | 34.7 | 31.5 |
| 40 to 64 years | 10.4 | 18.4 | 45.9 | 28.0 |
| Gender¹ | | | | |
| Women+ | 32.8 | 33.2 | 31.5 | 25.7 |
| Men+ | 67.3 | 66.8 | 68.5 | 74.3 |
| Education | | | | |
| Below a bachelor's degree | 2.4 | 4.4 | 6.5 | 18.5 |
| Bachelor's degree | 19.2 | 20.7 | 34.6 | 41.8 |
| Above a bachelor's degree; includes master's degree | 65.9 | 56.1 | 39.7 | 30.7 |
| Doctoral degree | 12.5 | 18.8 | 19.2 | 9.0 |
| Mother tongue | | | | |
| English or French | 29.7 | 19.4 | 23.2 | 92.5 |
| Other | 70.3 | 80.7 | 76.8 | 7.5 |
| Field of study | | | | |
| Social and behavioural sciences and law | 3.6 | 5.1 | 6.6 | 12.3 |
| Business, management and public administration | 16.0 | 11.3 | 10.8 | 17.2 |
| Physical and life sciences and technologies | 6.5 | 9.1 | 11.1 | 12.5 |
| Mathematics, computer and information sciences | 48.7 | 43.9 | 42.3 | 33.4 |
| Architecture, engineering, and related trades | 22.9 | 27.2 | 24.3 | 17.0 |
| Other | 2.3 | 3.4 | 4.9 | 7.6 |
| Industry | | | | |
| Information and cultural industries | 10.3 | 10.1 | 10.2 | 9.9 |
| Finance and insurance | 20.2 | 23.6 | 24.1 | 16.4 |
| Professional, scientific and technical services | 42.3 | 35.8 | 29.2 | 32.4 |
| Public administration | 2.1 | 5.0 | 10.3 | 14.4 |
| Other | 25.1 | 25.5 | 26.2 | 26.9 |

1. The term "men+" includes men and some non-binary people, and the term "women+" includes women and some non-binary people.

Note: Indigenous people and non-permanent residents and immigrants who landed less than two years before the 2021 Census are excluded.

Source: Statistics Canada, 2021 Census of Population.

Regardless of years since arrival in Canada, immigrant data scientists had higher levels of education than Canadian-born data scientists. The share of immigrant data scientists with advanced degrees was largest among new immigrants, with 78% holding a degree above a bachelor's, followed by 75% for recent immigrants and 59% for longer-term immigrants, compared with about 40% of Canadian-born data scientists. Despite differences in educational attainment among immigrant and Canadian-born data scientists, the most common fields of study for all data scientists were mathematics, computer and information sciences, followed by architecture, engineering, and related trades.

Data scientists are concentrated in specific industries. Across all groups, professional, scientific and technical services had the largest share of data scientists. The highest concentration was observed for new immigrants, about 42% of whom were employed in this sector. Finance and insurance was the

second-largest sector hiring data scientists. Compared with immigrants, Canadian-born data scientists were much more likely to work in public administration.

Earnings gap between immigrant and Canadian-born workers

The observed results show that among data scientists, new immigrants (\$85,200) earned slightly less than Canadian-born individuals (\$87,800), but the difference was not statistically significant (Table 2, left panel). However, recent and longer-term immigrants had significantly higher annual earnings than Canadian-born workers. Specifically, recent immigrants had an 8% earnings advantage over Canadian-born workers, while longer-term immigrants had a 19% advantage.

Multivariate analysis was used to determine whether sociodemographic characteristics (age, gender, education, mother tongue and racialized group), working time (number of weeks worked and full-time status) and geographic location (province and population size of urban areas) explained these observed differences in earnings among data scientists. Once differences in these characteristics were considered, earnings increased among Canadian-born workers but decreased among longer-term immigrants. The adjusted results show that new immigrants' earnings (\$86,600) were still lower than those of Canadian-born workers (\$95,000), a gap of almost 9%, and this difference was statistically significant. Recent and longer-term immigrants had similar adjusted earnings as Canadian-born workers.

The earnings patterns by immigrant status were very different among all workers (Table 2, right panel). New and recent immigrants had large and statistically significant earnings gaps relative to Canadian-born workers. Both groups' earnings were lower than those of Canadian-born workers; the gap was 31% for new immigrants and 20% for recent immigrants. There was relative parity between longer-term immigrants and Canadian-born workers.

When sociodemographic characteristics, working time and geographic location were adjusted for, the earnings gap for new and recent immigrants decreased slightly but remained large. New immigrants earned about 27% less, while recent immigrants earned 19% less, compared with Canadian-born workers. Longer-term immigrants also earned about 6% less than Canadian-born workers with similar sociodemographic characteristics.

Table 2
Observed and adjusted annual earnings among employees aged 20 to 64 years

| | Data scientists (NOC code 21211) | | All workers | |
|---|-------------------------------------|-----------------------|-------------|-----------------------|
| | Observed | Adjusted ¹ | Observed | Adjusted ¹ |
| Immigrant status | 2020 dollars | | | |
| Immigrants in Canada for 2 to 5 years | 85,200 | 86,600 * | 41,300 *** | 45,200 *** |
| Immigrants in Canada for 6 to 10 years | 94,500 * | 95,800 | 47,600 *** | 49,800 *** |
| Immigrants in Canada for more than 10 years | 104,200 *** | 97,500 | 60,400 *** | 58,000 *** |
| Canadian-born individuals (reference) | 87,800 | 95,000 | 59,800 | 61,800 |
| Earnings gap relative to Canadian-born workers | percent | | | |
| Immigrants in Canada for 2 to 5 years | -3.0 | -8.8 * | -30.9 *** | -26.9 *** |
| Immigrants in Canada for 6 to 10 years | 7.6 * | 0.8 | -20.4 *** | -19.4 *** |
| Immigrants in Canada for more than 10 years | 18.7 *** | 2.6 | 1.0 *** | -6.1 *** |

* significantly different from reference category ($p < 0.05$)

*** significantly different from reference category ($p < 0.001$)

1. Adjusted earnings are based on an ordinary least squares regression model that controls for racialized group, gender, education, age (continuous), age squared, mother tongue, province, population size of urban areas, number of weeks worked, and part-time or full-time employment.

Notes: NOC = National Occupational Classification. Indigenous people and non-permanent residents and immigrants who were admitted less than two years before the 2021 Census are excluded. Annual earnings are rounded to the nearest \$100.

Source: Statistics Canada, 2021 Census of Population.

In sum, this article shows that immigrants are a vital source of labour supply for data scientists—an occupation in high demand that requires high levels of education. Immigrant data scientists were more highly educated than their Canadian-born counterparts. Among data scientists, new immigrants had similar earnings as those born in Canadian, and recent immigrants earned more than their Canadian-born counterparts. Even after adjusting for sociodemographic characteristics, working time and geographic location, the earnings gap was small for new immigrants and not significant for recent immigrants. In contrast, among all workers, new and recent immigrants had a much more substantial earnings gap with Canadian-born workers, with and without adjusting for sociodemographic characteristics. These results are consistent with earlier studies that found occupational labour demand to be a key factor affecting immigrants' earnings relative to native-born workers.

Authors

Max Stick, Feng Hou and Allison Leauge are with the Analytical Studies and Modelling Division at Statistics Canada.

References

- Canada's Got Tech Talent. (2024). *Chapter 2: Diversity of Canada's tech workers*. The Dais. <https://dais.ca/reports/canadas-got-tech-talent-chapter-2/>
- Government of Canada. (2023, June 2). 21211 – Data scientists. <https://noc.esdc.gc.ca/Structure/NocProfile?objectid=Wt6Z86FW%2BKGbL5LxTbTIk3RWI%2FESRf%2F6w3WD3NDapBI%3D>
- Grodsky, E., & Pager, D. (2001). The structure of disadvantage: Individual and occupational determinants of the black-white wage gap. *American Sociological Review*, 66(4), 542–567. <https://doi.org/10.2307/3088922>
- Hou, F. (2013). Immigrant entry earnings over the past quarter-century: The roles of changing characteristics and returns to skills. *Canadian Studies in Population*, 40(3–4), 149–163.
- Lu, Y., & Hou, F. (2020). Immigration System, Labor Market Structures, and Overeducation of High-Skilled Immigrants in the United States and Canada. *International Migration Review*, 54(4), 1072–1103. <https://doi.org/10.1177/0197918319901263>
- National Academies of Sciences, Engineering, and Medicine. (2018). *Data Science for Undergraduates: Opportunities and Options*. Washington, D.C.: The National Academies Press. <https://doi.org/10.17226/25104>
- Peng, R. D., & Parker, H. S. (2022). Perspective on Data Science. *Annual Review of Statistics and Its Application*, 9, 1–20. <https://doi.org/10.1146/annurev-statistics-040220-013917>
- Pereira, P., Cunha, J., & Fernandes, J. P. (2020). *On Understanding Data Scientists*. Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing, VL/HCC, 2020-August. <https://doi.org/10.1109/VL/HCC50065.2020.9127269>
- Picot, G., & Hou, F. (2020). *A Canada-U.S. comparison of the economic outcomes of STEM immigrants*. (Analytical Studies Branch Research Paper Series no. 453). Statistics Canada. <https://www150.statcan.gc.ca/n1/en/pub/11f0019m/11f0019m2020016-eng.pdf?st=uhxOPqnh>
- U.S. Bureau of Labor Statistics. (2024, April 17). *U.S. Department of Labor, Occupational Outlook Handbook, Data Scientists*. <https://www.bls.gov/ooh/math/data-scientists.htm>
- Wang, D., Weisz, J. D., Muller, M., Ram, P., Geyer, W., Dugan, C., Tausczik, Y., Samulowitz, H., & Gray, A. (2019). *Human-AI collaboration in data science: Exploring data scientists' perceptions of automated AI*. Proceedings of the ACM on Human-Computer Interaction, 3(CSCW). <https://doi.org/10.1145/3359313>