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# Factors associated with the completion of apprenticeship training in Canada

by Hyeongsuk Jin, Manon Langevin, André Lebel and Michael Haan

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## Overview of the study

Apprenticeship training is the key pathway for an individual to become a skilled tradesperson in Canada. This study uses data from the Education and Labour Market Longitudinal Platform from 2008 to 2016 to examine which factors affect the certification rates of registered apprentices in Canada. This study also examines the impact of employment conditions during on-the-job training (the paid portion of the training) on program completion.

- Among apprentices who had registered in an apprenticeship training since 2008, few completed their program on time. At the end of the expected program duration, only 16% of apprentices had obtained their certificate, while 64% were still in their program and 20% had left their program.
- Even after including those who took up to twice as long as the expected program duration to complete their training, the proportion of apprentices who obtained their certificate was just over the third of all apprentices (36%).
- Apprentices who were credited for previous work experience or training were more likely to complete their program: apprentices who benefited from these credits were 13 percentage points more likely to obtain a certificate (44%) than apprentices who did not receive these credits (31%).
- The type of work experience acquired during apprenticeship training was also significant. Apprentices who were working in a field closely related to their trade were more likely to earn their certificate (38%) than those who were not (32%).
- Working conditions during training, such as job-related benefits and wages, also played an important role in apprentices' success. For example, apprentices who received their certificate had higher employment incomes throughout their training than those who did not complete their program.

## Introduction

Apprenticeship training is the key pathway toward the expertise needed to become a skilled tradesperson. However, there are growing concerns about the potential lack of skilled tradespeople in the coming years since trades workers are aging at a faster rate than the rest of the workforce.<sup>1</sup> In response to these concerns, the federal government,<sup>2</sup> as well as provincial and territorial apprenticeship training authorities make annual investments to train future tradespeople to help address the labour demands of specific industries.<sup>3</sup>

Despite the increasing need for skilled tradespeople, data suggest that the overall certification rate has declined over time. Over the past three decades, the number of certificates awarded to apprentices has been growing at a slower rate than the number of new registrations in apprenticeship programs. Indeed, the number of new registrations per year has more than doubled during this period—increasing from 31,368 in 1991 to 77,573 in 2019—while the number of certificates granted has increased by only 47% during the same period (from 35,634 to 52,368).<sup>4</sup>

Registered apprentices benefit from completing their programs and obtaining their certificate since this entitles them to the full wages and benefits related to their trade. Nonetheless, many apprentices will never complete their program. According to data from the National Apprenticeship Survey, apprentices who left their training cited job instability and receiving a better job offer as the main reasons for abandoning their apprenticeship, followed by financial constraints and personal or family issues.<sup>5</sup>

Because an apprenticeship is primarily work-based training, apprentices are particularly vulnerable to economic shocks. In the context of the current COVID-19 pandemic, some apprentices likely had to be temporarily laid off because of economic difficulties encountered by their employers and because of public health related shut downs. Furthermore, apprentices who have been able to continue their training may have experienced difficulty completing it because of reduced working hours or the cancellation of the in-class portion of their training. In this context, it remains important to understand the factors associated with completing an apprenticeship certificate.

Data on employment show that tradespeople were hit hard during the pandemic. From February to April 2020, employment and number of hours worked fell for the vast majority of trades and had not yet returned to pre-pandemic levels by September 2020. Workers in trades groups such as hairstylists and estheticians (-72%), early childhood educators and assistants (-47%), food service (-47%) and sheet metal workers (-44%) were the hardest hit from February to April 2020. Although employment has recovered

with the reopening of businesses, employment in these trades had not yet returned to pre-pandemic levels by September 2020. In contrast, employment for landscape and horticulture technicians and specialists increased from February to September 2020 (+30%). However, the number of landscape and horticultural technicians and specialists in September 2020 was lower than the one recorded a year earlier (13,300 in 2020 compared to 19,300 in 2019).

This study uses data from the Education and Labour Market Longitudinal Platform (ELMLP) from 2008 to 2016 to examine factors that influence the certification rates and employment characteristics of registered apprentices during their apprenticeship. Studies conducted prior to the introduction of the ELMLP were limited by the lack of an adequate longitudinal data source to track the trajectories of apprentices over time.<sup>6</sup> This study adds to the existing literature on apprentices by using new longitudinal administrative data to shed light on the pathways to apprenticeship certification. This study also examines the impact of apprentices' working conditions on apprenticeship completion.

As many apprentices take longer than the expected program duration to obtain their certificate, outcomes in this paper are measured at one-and-a-half times the program duration. Three different outcomes were measured and each apprentice was assigned to one of the following three categories:

1. **certified journeypersons** — apprentices who completed their apprenticeship program and received their certificates within one and a half times their program duration;

2. **long-term continuers** — apprentices who were still registered in their program after one and a half times the length of their program had elapsed;
3. **discontinuers**<sup>7</sup> — apprentices who left their program, without receiving a certificate, within one and a half times their program duration.

Data are restricted to apprentices who had registered in an apprenticeship program since 2008 and whose “one and a half times the normal program duration” period had passed by 2016. For example, for apprentices registered in four-year programs, only those who registered in 2008, 2009 and 2010<sup>8</sup> were included in the sample. The analytical sample includes 244,820 apprentices across 165 programs<sup>9</sup> (See [Data sources, methods and definitions](#)).

### Most apprenticeship programs rely on work-based training

The educational pathway of apprentices is quite different and not as structured as that of postsecondary students. To become an apprentice, a person must first find an employer who is willing to provide the required training and who employs journeypersons to train and mentor apprentices. Both parties have to then sign an agreement that outlines the terms of the apprenticeship, and the contract must be registered with the apprenticeship authority of the respective province or territory to be valid. The major part of apprenticeship training is completed on-the-job (approximately 80%). The remainder is technical training, completed in-class. The apprentice is remunerated for the on-the-job portion of their training, but at a

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lower rate than a journeyman in the trade would be. After completing the required training, the apprentice is invited to write a qualification exam. Those who pass the exam receive a certificate and then become journeymen.

Electricians (14%), carpenters (12%), and automotive service workers (11%) are the most popular trades groups among apprentices. In 2019, new registrations in these trade programs accounted for 40% of all new male registrations while they accounted for 15% of new female registrations.

Women are under-represented in trade programs. In 2019, for example, women accounted for only 14% of all new registrations in an apprenticeship program. They are also found in greater numbers in training programs related to sales and service occupations. In 2019, almost half of them were registered in the hairstylists and estheticians (25%) or food service (19%) programs.

### Most apprentices take longer than the expected program duration to receive their certificate

In Canada, apprenticeship programs are administered by provinces and territories. The apprenticeship authority of each jurisdiction is responsible for designating a trade as apprenticeable and for setting the training standards of each program. As a result, apprenticeship programs are not homogenous, and characteristics and requirements can differ across jurisdictions. For instance, to receive a certificate in the same trade, one jurisdiction may offer a four-year program and another may offer a three-year program.<sup>10</sup> In British Columbia, for example, the cook trade program is a three-year program, whereas, in Ontario, it is a four-year program.

Program durations vary across programs and jurisdictions and can last from one to five years. Among apprentices who had registered in an

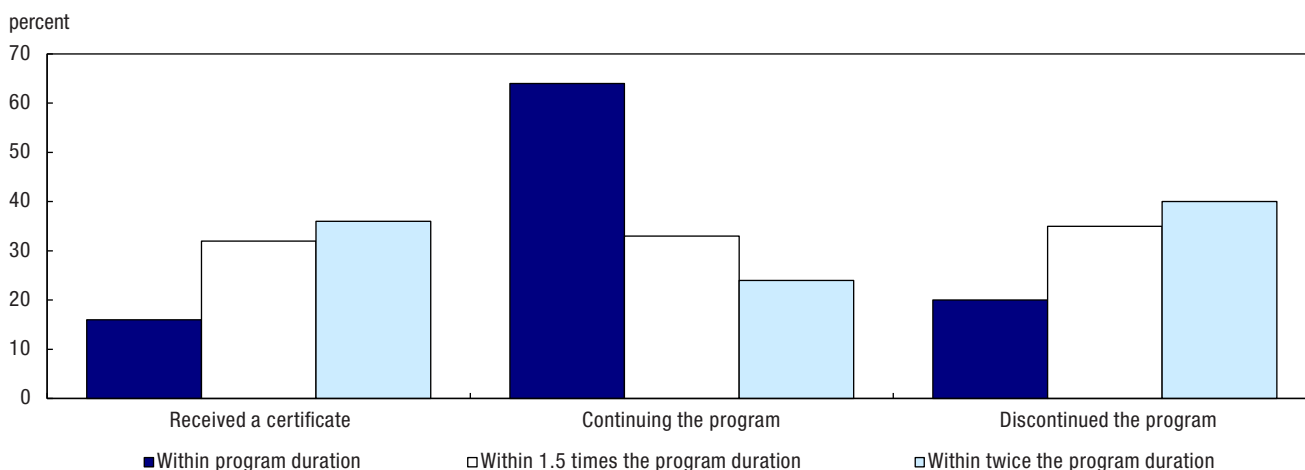
apprenticeship program since 2008, most had registered in four-year (38%) and three-year programs (33%). One-year (18%), two-year (8%) and five-year (3%) programs were less common.

Among those who had registered in an apprenticeship program since 2008, most took longer than the expected program duration to receive their certificate. By the end of the expected program duration, 16% had received their certificate, while 64% were continuing their program and 20% had left their program (Chart 1).

The number of apprentices who obtain their certificate continues to increase beyond the expected length of the program. Indeed, the proportion of apprentices who received their certificate was 32% when adding those who took up to one and a half times the expected length of the program to complete their training.<sup>11</sup> However, the proportion of apprentices who

**Chart 1**

**Proportion of apprentices who received a certificate, were continuing their program or discontinued their program, within the expected program duration and one and a half times and twice the program duration, 2008 to 2016**



**Note:** Includes apprentices who registered in an apprenticeship program between 2008 and 2014 and whose "twice the program duration" period had passed by 2016.  
**Source:** Education and Labour Market Longitudinal Platform, 2008 to 2016.

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received their certificate only marginally increases between one and a half times and twice the program duration. Over this period, the proportion of apprentices who obtained a certificate only rose from 32% to 36%. Only a few apprentices obtained a certificate after twice the normal program duration.

Chart 2 shows the distribution of apprentices who obtained their certificate within twice the program duration, by the time it took to obtain the certificate relative to the program duration. Of apprentices who received a certificate within twice the expected program duration, about four in ten (44%) obtained it within the expected program duration. Many certificates were issued around the expected program duration; about 2 in 10 (22%) certificates were issued only a few months before or after this time (i.e., between 0.9 and 1.1 times the program duration). Most certificates

(73%) were issued from half to one and half times the program duration. As a result, 84% of all certificates were issued by one and half times the program duration.

### **Apprentices who received credits for training or work experience prior to registration were more likely to receive their certificate**

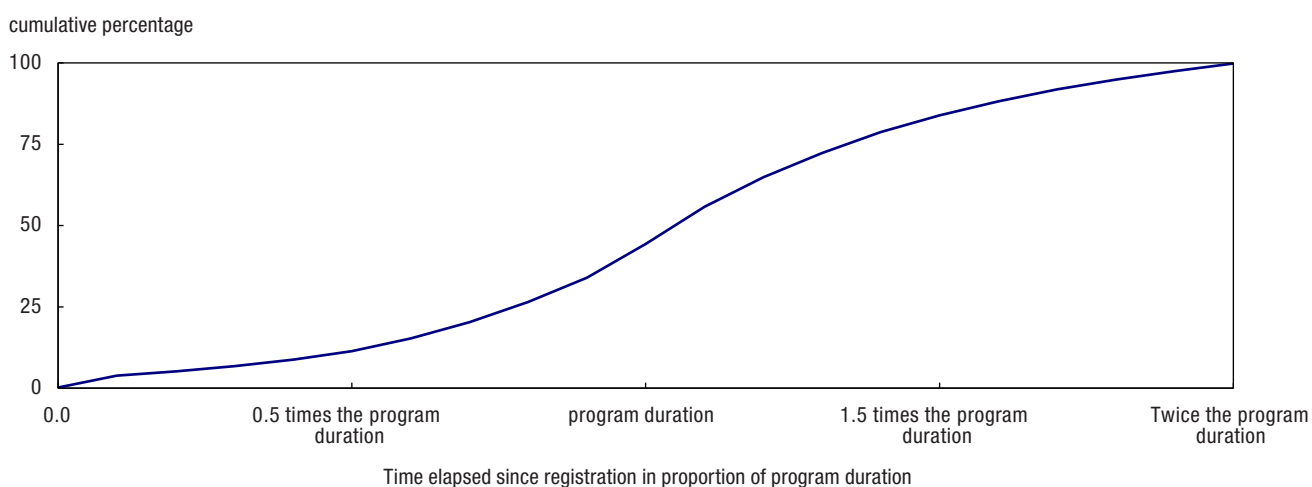
In this section, multinomial logistic regression models are used to study the association between the completion of an apprenticeship program within one and half times the program duration and various factors, including program characteristics and personal factors. Results are presented as predicted probabilities and the three outcomes studied are the following: those who completed their program, those who were still in their program (“long-term continuers”) and those who left their program (“discontinuers”).

When registering for an apprenticeship program, some apprentices receive credits for (in-class or on-the-job) training completed prior registration or for work-related experience in the trade. These apprentices have already completed some of their training and are therefore closer to certification than those who received no credits.

Among apprentices who had registered in an apprenticeship program since 2008, close to four in ten (38%) received credits upon registration. Data show that apprentices who received credits were more likely to complete their apprenticeship program than those who had no credits (44% vs. 31%) [Table 1]. They were also less likely to leave their program (29% vs. 37%) and less likely to be long-term continuers (28% vs. 32%).

**Chart 2**

**Cumulative proportion of apprentices who received an apprenticeship certificate within twice the program duration, by time taken to obtain the certificate in proportion of program duration, 2008 to 2016**



**Note:** Only includes certified journeypersons who obtained their certificate within twice the program duration.

**Source:** Education and Labour Market Longitudinal Platform, 2008 to 2016.

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**Table 1**  
**Predicted probabilities of obtaining a certificate, continuing or discontinuing an apprenticeship program within one and a half times the program duration, 2007 to 2016**

Characteristic	Obtaining a certificate	Continuing in the program	Discontinuing the program
	predicted probability		
Male (ref.)	0.357	0.309	0.334
Female	0.404**	0.279**	0.317**
<b>Age at registration</b>			
18 to 20 years (ref.)	0.400	0.312	0.293
21 to 25 years	0.381**	0.303**	0.316**
26 to 35 years	0.350**	0.303*	0.347**
36 to 45 years	0.324**	0.306	0.370**
46 years or older	0.305**	0.285**	0.411**
<b>Immigration status</b>			
Non-immigrant (ref.)	0.363	0.300	0.337
Immigrant	0.362	0.348**	0.291**
<b>Marital status in registration year</b>			
Single (ref.)	0.358	0.312	0.331
Married or common-law	0.378**	0.290**	0.332
Divorced, separated or widowed	0.338**	0.306	0.357**
<b>Registered outside the province or territory of residence</b>			
No (ref.)	0.365	0.303	0.332
Yes	0.329**	0.333**	0.339
<b>Received credits for pre-registration training</b>			
No (ref.)	0.310	0.321	0.369
Yes	0.438**	0.277**	0.285**
<b>Employment income in registration year<sup>1</sup></b>			
Less than \$15,000	0.220**	0.345**	0.435**
\$15,000 to \$29,999 (ref.)	0.348	0.323	0.329
\$30,000 to \$44,999	0.444**	0.282**	0.275**
\$45,000 to \$59,999	0.458**	0.266**	0.276**
\$60,000 to \$74,999	0.440**	0.261**	0.299**
\$75,000 or more	0.401**	0.269**	0.330
<b>Union membership in registration year<sup>2</sup></b>			
No (ref.)	0.361	0.293	0.346
Yes	0.367*	0.321**	0.312**
<b>Had a registered pension plan in registration year</b>			
No (ref.)	0.359	0.308	0.333
Yes	0.375**	0.295**	0.329
<b>Received employment insurance benefits in registration year</b>			
No (ref.)	0.360	0.304	0.336
yes	0.370**	0.306	0.325**
<b>After-tax low-income status in registration year<sup>3</sup></b>			
Not in low income (ref.)	0.366	0.305	0.329
In low income	0.306**	0.316**	0.378**
<b>Number of industries worked in registration year</b>			
One (ref.)	0.392	0.315	0.293
Two	0.355**	0.298**	0.347**
Three or more	0.300**	0.285**	0.415**
<b>Worked in one the three most common sectors in registration year<sup>4</sup></b>			
No (ref.)	0.315	0.304	0.381
Yes	0.382**	0.305	0.313**
<b>Red Seal endorsement and type of certification</b>			
Compulsory Red Seal trade (ref.)	0.394	0.304	0.302
Voluntary Red Seal trade	0.347**	0.314**	0.340**
Compulsory non-Red Seal trade	0.290**	0.388**	0.322**
Voluntary non-Red Seal trade	0.340**	0.271**	0.390**



**Table 1**  
**Predicted probabilities of obtaining a certificate, continuing or discontinuing an apprenticeship program within one and a half times the program duration, 2007 to 2016**

Characteristic	Obtaining a certificate	Continuing in the program	Discontinuing the program
	predicted probability		
<b>Program duration</b>			
One year	0.339**	0.529**	0.131**
Two years	0.302**	0.465**	0.233**
Three years	0.315**	0.282**	0.403**
Four years (ref.)	0.392	0.213	0.395
Five years	0.425**	0.073**	0.502**

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

\*\* significantly different from reference category ( $p < 0.01$ )

1. Any income from self-employment is excluded. All values are expressed in 2016 constant dollars.

2. Union membership is derived from union dues paid, according tax data.

3. Low-income individuals are those whose family income falls below half of the adjusted median family income. See Income Statistics Division (2016) for further details on the low-income measure.

4. Common sectors related to the trade are defined as the three most common industrial sectors in the province or territory in which certified journeypersons of the trade work.

**Note:** In addition to the variables listed in the table, the jurisdiction and year of registration are included in the model to control for differences in local labour market conditions.

**Source:** Education and Labour Market Longitudinal Platform, 2007 to 2016.

## Apprentices registered in compulsory Red Seal trade programs have a higher probability of certification

In a given province or territory, trades are either regulated (compulsory trades) or unregulated (voluntary trades). To practise in a regulated trade, an individual must become a certified journeyperson or register as an apprentice. In contrast, certification is voluntary in unregulated trades. The number and type of trades designated as compulsory greatly vary across jurisdictions. For example, carpentry is a compulsory trade in Quebec, while it is a voluntary trade in other jurisdictions.

To help set common standards across trades and facilitate the mobility of skilled workers across Canada, the Canadian Council of Directors of Apprenticeship administers the Red Seal Program. Apprentices registered in Red Seal trades programs who successfully pass the Red Seal examination receive the Red Seal endorsement. The endorsement is recognized across

the country and apprentices who receive it can work in any of the provinces and territories in Canada.

Among apprentices who had registered in an apprenticeship program since 2008, most were registered in a compulsory (41%) or a voluntary (29%) Red Seal trade program. The remainder were registered in a non-Red Seal trade program (compulsory [6%]; voluntary [24%]).

In general, apprentices registered in compulsory trades, both Red Seal and non-Red Seal programs, were less likely to be discontinuers. In addition, those registered in compulsory Red Seal trade programs had the highest probability of certification (39%) and the lowest probability of leaving (30%) among the four program categories.

## Younger apprentices were more likely than older apprentices to obtain a certificate

The majority of apprentices register for an apprenticeship program later in life compared with undergraduate

students. According to the Postsecondary Student Information System, half of students who enrolled in a bachelor's degree program between 2008 and 2014 were 21 years old or younger (55%). This same proportion was 24% among apprentices.

Since apprentices tend to be older at registration than undergraduate students, they tend to have work experience before they start their apprenticeship training. They may also have more family responsibilities and financial obligations than typical undergraduate students, which could make them less inclined to take time away from paid employment to complete the classroom portion of their training, which is required to complete their apprenticeship program.

In general, results from Table 1 show that older apprentices were less likely to obtain their certificate and were more likely to leave their program than their younger counterparts. For example, apprentices who were 46 years or older were nine percentage points less likely to obtain a certificate (31% vs. 40%) and 12 percentage points more likely to leave their



program (41% vs. 29%) than those aged 18 to 20. The same result is found for all age groups.

Results according to age seem to indicate that apprentices who decided to pursue or continue<sup>12</sup> a career in trades later in life are more likely to face a variety of challenges associated to family responsibilities and financial obligations. In addition, younger apprentices may be more motivated to obtain their certificate than their older counterparts, knowing they can expect a greater number of years of gainful employment.

### **Working conditions and wages play an important role in an apprentice's success**

Generally speaking, apprentices who completed their programs, long-term continuers and discontinuers share similar demographic characteristics at registration (for more information, see the section Program and demographic characteristics of certified journeypersons, long-term continuers and discontinuers).<sup>13</sup> However, they often experience different working conditions during their apprenticeship.

For instance, not all apprentices are able to train in the most prevalent industries of their trade. Although apprentices work in jobs directly connected to their training, apprentices in the same program can work in different sectors. For example, carpenters can both work in the construction sector and in the furniture manufacturing sector. Both sectors involve a different set of skills and responsibilities, and thus provide different types of work experiences, which can in turn affect the apprentice's success and their chances of obtaining their certificate.

Data from Table 1 show that working in a field closely related to the trade was associated with better outcomes. Indeed, apprentices who were working in one of the three most common industrial sectors of their trade during the registration year<sup>14</sup> were more likely to earn their certificate (38%) than those who worked in less prevalent sectors (32%).

Union membership was also associated with better outcomes for apprentices. Apprentices who were union members in the registration year were less likely to leave their program than those who were not union members (31% vs. 35%). In addition, union members were more likely than non-union members (32% vs. 29%) to continue beyond the period examined in this study. Because job instability is the most commonly cited reason for leaving an apprenticeship program,<sup>15</sup> union members—whose jobs are potentially more secure than those of non-union members—might be less likely to work part-time or to be laid off than non-union members. In addition, they may be more likely to benefit from flexible work arrangements to complete the classroom portion of their training.

The number of sectors in which an apprentice worked was used as a proxy for job switching. The relationship between the number of sectors in which apprentices worked during the registration year and their training outcomes also suggests that job stability is important.<sup>16</sup> Compared with apprentices who worked in only one industry, apprentices who worked in multiple industries during the registration year were less likely to obtain their certificate and more likely to leave their program.

Similarly, data in Table 1 show that those who had well-paying

apprenticeship positions were also more likely to become certified. The probability of eventually becoming a certified journeyperson increased as the apprentice's employment income in the registration year increased. For example, apprentices who earned between \$45,000 and \$59,999 in the registration year (46%) were 11 percentage points more likely to become certified than those who earned between \$15,000 and \$29,999 (35%).

Lastly, apprentices who were in low-income<sup>17</sup> families in the registration year were also less likely than those who were not in low-income families to complete their program (31% vs. 37%). Combined with the fact that employment income is positively related with the probability of certification, these results support the finding that financial conditions are closely associated with program completion for apprentices.<sup>18</sup>

### **Women registered in a male-dominated trade program were less likely to obtain a certificate than their male counterparts**

Approximately 15% of apprentices who had registered in an apprenticeship program since 2008 were women.<sup>19</sup> Although female apprentices have registered in a more diverse range of apprenticeship programs in recent years, they tend to be concentrated in a small number of trades in sales and service occupations, such as the hairstylist trade. Therefore, most apprenticeship programs are male-dominated. Of male-dominated trades, the electrician, automotive services, carpenter, welder and plumber, pipefitter and steamfitter trades are the most popular among female apprentices. Altogether, these five training programs accounted for

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12% of female apprentices who had registered in an apprenticeship program since 2008.<sup>20</sup>

On average, more men than women obtained a certificate within one and a half times their program duration. About 37% of male apprentices obtained certificates within one and a half times the program duration, compared with 32% of female apprentices.

Part of the gender gap in program completion rates can be explained by differences in individual and program characteristics. Compared with male apprentices, female apprentices were less likely to receive credits for training completed prior registration or for work-related experience in the trade. About two in five male apprentices (43%) had received such credits at registration, compared with approximately one in four female apprentices (26%). In addition, women were more concentrated in non-Red Seal trades, for which the overall certification rate (28%) is lower compared with

Red Seal trades (40%). While most male apprentices (77%) registered in one of the Red Seal trades, only two out of five female apprentices had done the same (38%).

After controlling for these differences, and for other individual characteristics, women were four percentage points more likely than men with the same characteristics to obtain a certificate (40% vs. 36%) (Table 1). However, the gender gap varied across programs. Based on the proportion of female apprentices in the trade, trades can be grouped into three categories: male-dominated trades, female-dominated trades and mixed trades (neither male-dominated nor female-dominated).<sup>21</sup>

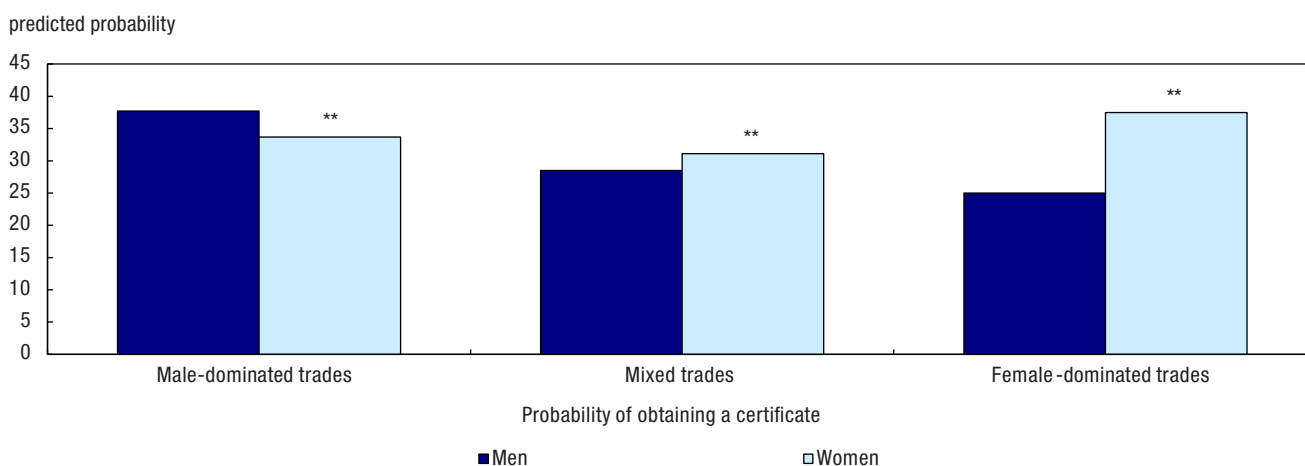
A trade program was classified as male-dominated if less than 25% of registered apprentices in the program were women. Most construction-related trade programs (carpenter, electrician, welder, etc.) were male-dominated trades. Conversely, female-dominated trades were programs in which

more than 75% of apprentices were women. Hairstylist and early childhood educator<sup>22</sup> programs are examples of female-dominated trades. The remaining programs (for which the percentage of registered female apprentices varied between 25% and 75%) were defined as mixed trades. Many service-related trades, such as cook and information technology support associate<sup>23</sup> programs were mixed trades.

Regression models were estimated for each program grouping (male-dominated, female-dominated and mixed trades) using the same set of control variables. After controlling for many factors, women registered in male-dominated trades were found to be less likely to obtain their certificate and more likely to leave their program than men with the same characteristics (Chart 3). Conversely, women in female-dominated trades had a higher probability of certification and a lower probability of leaving their program than their male

**Chart 3**

**Predicted probabilities of obtaining a certificate within one and a half times the program duration for male-dominated, female-dominated and mixed trades, by sex, 2008 to 2016**



\*\* significantly different from reference category (men) ( $p < 0.01$ )

Source: Education and Labour Market Longitudinal Platform, 2008 to 2016.

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counterparts. The same was also true for mixed trades.

### Employment income increased at a faster pace for apprentices who obtained their certificate

The progression of employment income and benefits for apprentices throughout their programs is further analyzed in Table 2. All

apprentices saw an improvement in their earnings and employment conditions over the course of their training, regardless of whether they completed their program. On average, the employment income of all apprentices increased by about 14% per year (Table 2).

However, apprentices who completed their program experienced the largest gains throughout their

training.<sup>24</sup> Even one year before registration, they earned about \$5,000 more than long-term continuers and discontinuers. In the registration year, the difference in income between apprentices who received a certificate and long-term continuers and discontinuers rose to \$7,000 and \$9,000, respectively.

Furthermore, apprentices who completed their program experienced

**Table 2**  
Median employment income,<sup>1</sup> low-income status<sup>2</sup> and selected employment characteristics of certified journeypersons, long-term continuers and discontinuers,<sup>3</sup> one year before registration, at registration and at the end of the expected program duration, 2007 to 2016

Employment characteristic	All apprentices	Certified journeypersons	Long-term continuers	Discontinuers
	One year before registration			
	dollars			
Median employment income	21,250	24,370	19,640	19,070
	percent			
Union membership <sup>4</sup>	29.9	29.4	32.1	28.3
Had a registered pension plan	15.6	14.4	18.1	14.5
Received employment insurance benefit	23.4	22.4	25.3	22.8
Low-income status, after tax	11.8	8.2	13.0	14.7
	In the registration year			
	dollars			
Median employment income	27,610	32,510	25,080	23,570
	percent			
Union membership <sup>4</sup>	38.8	39.8	42.3	34.5
Had a registered pension plan	23.6	24.1	27.6	19.5
Received employment insurance benefit	30.1	31.8	31.3	27.4
Low-income status, after tax	8.5	4.2	9.7	11.8
Worked in one of the common sectors related to their trade <sup>5</sup>	70.4	76.5	68.3	66.0
	At the end of the expected program duration <sup>6</sup>			
	dollars			
Median employment income	39,980	51,920	33,350	32,710
	percent			
Employment income growth rate per year, from the registration to the end of the program, average growth rate	13.7	14.6	13.6	12.5
Union membership <sup>4</sup>	38.7	44.8	42.0	29.3
Had a registered pension plan	24.6	28.3	28.4	17.4
Received employment insurance benefit	37.3	46.8	39.5	25.4
Low-income status, after tax	6.8	2.1	8.0	10.6
Worked in one of the common sectors related to their trade <sup>5</sup>	59.5	77.2	62.6	38.2

1. Any income from self-employment is excluded. All values are expressed in 2016 constant dollars.

2. Low-income individuals are those whose family income falls below half of the adjusted median family income. See Income Statistics Division (2016) for further details on the low-income measure.

3. Outcomes regarding apprenticeship completion are measured at one-and-a-half times the program duration. For example, the completion outcome of apprentices registered in a two-year program is measured three years after registration. For three-year and five-year programs, the period is rounded up to the nearest whole number and the training outcome is measured at five and eight years, respectively.

4. Union membership is derived from union dues paid, according tax data.

5. Common sectors related to the trade are defined as the three most common industrial sectors in the province or territory in which certified journeypersons of the trade work.

6. Refers to the year the program is expected to end, not the year the certificate was granted or the year the apprentice left the program.

Source: Education and Labour Market Longitudinal Platform, 2007 to 2016.

improvements in their employment conditions at a faster rate than long-term continuers and discontinuers. For example, their employment income increased by 15% per year, on average, compared with 14% and 13%, respectively, for long-term continuers and discontinuers (for more information on the progression of apprentices' incomes, see the section, [Income gaps by program duration](#)). By the end of the expected program duration,<sup>25</sup> the median income of apprentices who completed their program (\$51,920) was approximately \$20,000 higher than that of long-term continuers (\$33,350) or discontinuers (\$32,710).

In addition, they were less likely to be in a low-income situation<sup>26</sup> (4%) in the year of registration compared with long-term continuers (10%) and discontinuers (12%). By the end of the expected program duration, these apprentices (2%) were from four to five times less likely to be in a low-income situation than long-term continuers (8%) and discontinuers (11%). They were also more likely than discontinuers to be working in a unionized workplace (45% vs. 29%) and to be covered by a pension plan (28% vs. 17%).

### Conclusion

Apprenticeship training is the key pathway to acquire skills and knowledge to become a skilled tradesperson. Despite the financial benefits associated with becoming certified in a trade, many apprentices leave their program without receiving a certificate of qualification.

Using data from the ELMLP, this study examined the working and training conditions of apprentices from the time they registered in a program, as well as the impact of these conditions on program completion. All apprentices saw an increase in their earnings over the course of their training, regardless of whether they completed their program. However, apprentices who completed their program experienced the largest gains.

This study's findings emphasize the importance of having an appropriate job for apprenticeship. Apprentices who had stable and well-paying jobs with benefits were more likely to become certified than those who did not. The employment sector also matters. Apprentices who worked in sectors related to their trades

were more likely to obtain their certificates than those who worked in less prevalent sectors.

This study shed a light on hurdles faced by apprentices and its findings can contribute to apprenticeship-related policy discussions. In the current context of the COVID-19 pandemic, where many apprentices might work fewer hours than usual or might be unable to continue or start the in-class portion of their training, such discussions need to be undertaken among apprenticeship stakeholders to determine how best to address the additional challenges and barriers to apprentice certification.

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### Data sources, methods and definitions

#### Data sources

This study used data from the Education and Labour Market Longitudinal Platform (ELMLP). The ELMLP was developed at Statistics Canada to combine anonymized information from the Registered Apprenticeship Information System (RAIS), the Postsecondary Student Information System and information from other administrative datasets. The RAIS provides information on individuals who registered for training and those who obtained certification within a trade where apprenticeship training is being offered. This study used tax data from the T1 Family File and immigration information from the Longitudinal Immigration Database combined with data from the RAIS for 2008 to 2016.

The RAIS includes trade qualifiers (trade challengers) and registered apprentices. A trade qualifier is someone who worked in a specific trade for an extended period without becoming a registered apprentice, and who became a certified journeyman by challenging the qualification exam. Because this study focused on registered apprentices, trade qualifiers were excluded from the analysis.

The sample excludes apprentices for whom program outcome could not be measured because the timeframe required for one and a half times the nominal program duration would have been completed after 2016. This introduces restrictions on registration cohorts, depending on the program duration. For apprentices registered in one-year programs, those who registered between 2008 and 2014 inclusive, were included in the analytical sample. For apprentices registered in two-year, three-year, and four-year programs, those who registered by 2013, 2011 and 2010, inclusive, are included in the sample, respectively. For apprentices registered in five-year programs, only those who registered in 2008 were considered.

Additional sample selection restrictions were applied to ensure there were enough apprentices by program. A program was included only if there were more than 20 apprentices registered and if all certification, continuation and discontinuation rates by one and a half times the program duration were between 10% and 90%. The resulting analytical sample contained 244,820 apprentices in 165 programs.

#### Methods

Multinomial logistic regression models were estimated to examine the relationship between apprentices' characteristics and their program outcomes. The program outcome (whether an apprentice received a certificate within one and a half times the program duration, left their program or continued to be registered beyond the period) was used as the dependent variable.

The model includes control variables on the apprentice's registration information (year and jurisdiction of registration,

whether they lived in the jurisdiction and received credit for prior training, whether the trade was a Red Seal trade, whether the trade was a compulsory certified trade), the apprentice's sociodemographic characteristics (age at registration, sex, immigration status, marital status in the registration year), and on income and work-related variables from the tax data (employment income, whether they paid union dues, whether they had a registered pension plan, whether they received employment insurance benefits, low-income status, and industries they apprenticed in).

The model uses the year and the jurisdiction of registration as control variables. These variables help control the effects of business cycles and local labour market conditions on apprenticeship training. The reported results should be interpreted as associations of the characteristics and the likelihood of each program outcome, not causal relationships.

Since apprenticeship programs are administered by provinces and territories, programs for the same trade may have different requirements and administrative practices across jurisdictions, which can affect the outcomes. As a robustness check, a regression model, with group fixed effects that treated each jurisdiction's programs as distinct, was estimated. The fixed-effect model showed similar results.

#### Definitions

**(Certified) journeymen** are defined in this study as apprentices who completed and received their certificates within one and a half times their program duration.

**Long-term continuers** are apprentices who were still registered in their program after one and a half times the length of their program had elapsed. Note that some long-term continuers might have received their certificate eventually. However, in this analysis, they are considered long-term continuers even if they obtained their certification and it is recorded in the RAIS after one and a half times the program duration.

**Discontinuers** are apprentices who left their program, without receiving a certificate, within one and a half times the program duration.

**Common (relevant) sectors related to the trade** are defined as the three most common industrial sectors in which certified journeymen of the trade work. Using the North American Industry Classification System (NAICS) information from tax data, the number of certified journeymen is counted for each three-digit-level industry by trade and jurisdiction. If an apprentice worked in one of the three most common sectors, they were classified as having worked in the common sectors to their trade. Because of the nature of the tax data, it is possible that some apprentices worked in one of the industries while performing jobs unrelated to their trade.

## Factors associated with the completion of apprenticeship training in Canada

**Table 3**  
**Program and demographic characteristics of certified journeypersons, long-term continuers and discontinuers,<sup>1</sup> 2008 to 2016**

Characteristic	All	Certified journeypersons	Long-term continuers	Discontinuers
<b>Total number of apprentices</b>	<b>244,820</b>	<b>81,990</b>	<b>76,270</b>	<b>86,560</b>
	number			
	percent			
Proportion of all apprentices	100.0	33.5	31.2	35.4
Women	14.6	12.7	14.9	16.1
Immigrants	8.5	8.1	9.2	8.2
<b>Marital status in the registration year</b>				
Married or common-law	29.4	30.2	28.9	29.0
Divorced, separated or widowed	4.0	3.1	4.1	4.7
Single	66.6	66.7	67.0	66.3
<b>Age at registration</b>				
	years			
Average	28.0	27.0	28.0	28.0
Median	24.0	24.0	24.0	25.0
	percent			
16 to 20	27.2	24.3	29.1	28.4
21 to 25	27.4	31.6	25.6	25.0
26 to 35	26.4	27.7	25.3	26.1
36 to 45	11.4	10.5	11.8	11.9
46 or older	7.6	6.0	8.2	8.7
	percent			
Received credit for pre-registration training	37.6	50.5	29.1	32.8
Registered outside their province or territory of residence	5.9	5.3	5.6	6.8
<b>Red Seal endorsement and type of certification</b>				
Compulsory Red Seal trade	41.4	46.8	37.7	39.4
Voluntary Red Seal trade	28.5	28.5	24.6	31.9
Compulsory non-Red Seal trade	5.9	4.0	10.7	3.5
Voluntary non-Red Seal trade	24.2	20.6	27.0	25.2
<b>Program duration</b>				
One-year programs	18.0	16.3	27.5	11.1
Two-year programs	8.4	6.9	11.8	6.7
Three-year programs	33.0	29.4	30.6	38.5
Four-year programs	37.5	42.3	28.7	40.8
Five-year programs	3.2	5.1	1.4	2.9

1. Includes apprentices who registered between 2008 and 2014 and whose "one and a half times program duration" period passed by 2016.

Source: Education and Labour Market Longitudinal Platform, 2008 to 2016.



## Factors associated with the completion of apprenticeship training in Canada

### Income gaps by program duration

The employment income gaps among apprentices throughout their programs are further analyzed in this section.

Table 4 shows the median incomes of journeypersons, long-term continuers and discontinuers by program duration, up to five years after registration. Outcomes regarding completion are measured at one and a half times the program duration. As a result, median incomes can include incomes earned outside of the training period, particularly for apprentices registered in shorter programs (one-year and two-year programs).

Data show that certified journeypersons have higher employment incomes than long-term continuers and discontinuers over the course of their training. In addition, the income gaps between journeypersons, long-term continuers and discontinuers widened over time, reaching more than \$25,000 five years after registration for those registered in longer programs (four-year and five-year programs).

In contrast, the income gaps between apprentices registered in two-year programs (about half of which were hairstylists) were the smallest. Five years after registration, there was no difference between the median income of certified journeypersons, long-term continuers and discontinuers.

These results hold true even after controlling for program, training and personal characteristics.<sup>27</sup> Chart 4 shows adjusted employment income gaps, between journeypersons and long-term continuers,<sup>28</sup> from registration to five years after registration.

After controlling for a variety of characteristics, the largest income gaps were found in longer programs. For example, among apprentices who registered in a four-year program, the predicted income gap was \$14,210, five years after registration; the same gap was about \$1,500 among those who registered in a two-year program.

**Table 4**  
**Median employment income<sup>1</sup> of certified journeypersons, long-term continuers and discontinuers,<sup>2</sup> by program duration, 2008 to 2011 registration cohorts**

	In registration year	One year after registration	Two years after registration	Three years after registration	Four years after registration	Five years after registration
	dollars					
<b>Certified journeypersons</b>						
One-year program	41,750	46,900	52,010	54,170	55,500	55,810
Two-year program	19,080	23,530	25,100	26,040	26,960	27,070
Three-year program	33,380	37,740	41,370	44,870	47,240	48,140
Four-year program	32,990	38,380	44,720	52,030	60,410	67,710
Five-year program	33,160	36,140	42,130	49,270	57,270	66,590
<b>Long-term continuers</b>						
One-year program	37,960	39,510	42,990	46,490	47,870	49,590
Two-year program	16,860	20,320	22,220	24,120	25,760	27,130
Three-year program	27,380	29,490	32,160	34,320	36,370	37,680
Four-year program	23,230	26,170	30,130	34,750	38,060	40,300
Five-year program	22,010	23,700	29,130	33,680	37,460	40,670
<b>Discontinuers</b>						
One-year program	23,640	27,880	32,960	36,320	38,350	39,240
Two-year program	17,350	18,040	20,890	23,530	25,810	27,050
Three-year program	24,400	25,000	27,500	30,450	32,520	33,730
Four-year program	25,040	26,160	30,240	34,870	38,130	40,000
Five-year program	20,550	21,620	27,380	33,060	37,580	41,560

1. Any income from self-employment is excluded. All values are expressed in 2016 constant dollars.

2. Outcomes regarding apprenticeship completion are measured at one and a half times the program duration. For example, the completion outcome of apprentices registered in a two-year program is measured three years after registration. For three-year and five-year programs, the period is rounded up to the nearest whole number and the training outcome is measured after five and eight years, respectively.

**Note:** Data are restricted to apprentices who could be followed for a period of five years or more from the year of registration.

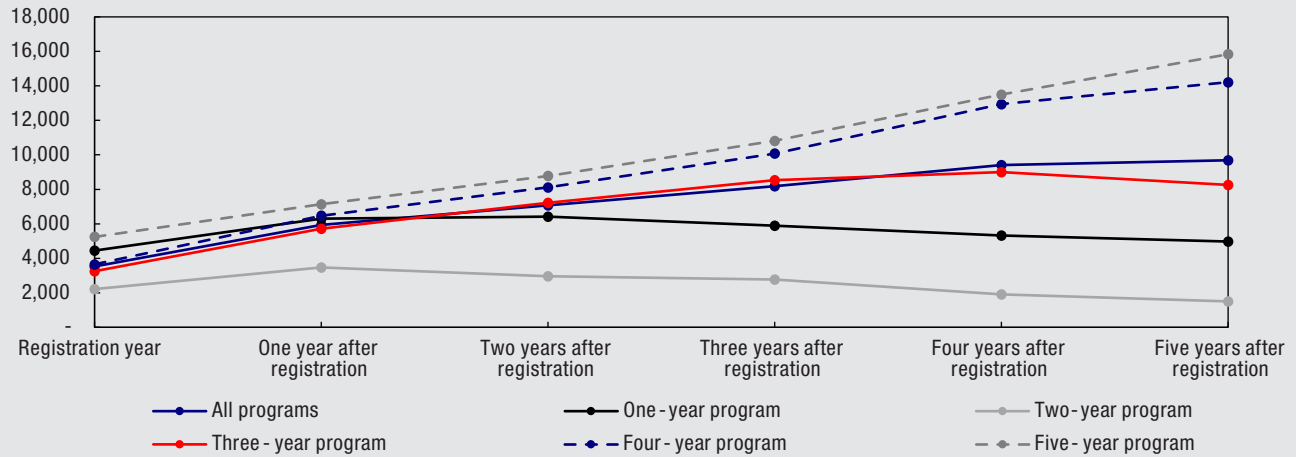
**Source:** Education and Labour Market Longitudinal Platform, 2008 to 2016.



**Chart 4**

**Adjusted employment income gaps,<sup>1</sup> between certified journeypersons and long-term continuers,<sup>2</sup> from registration to five years after registration, 2008 to 2011 registration cohorts**

income gap in dollars



1. Any income from self-employment is excluded. All values are expressed in 2016 constant dollars.

2. Program outcomes are measured after one and a half times the program duration.

**Note:** Data are restricted to apprentices who could be followed for a period of five years or more from the year of registration. Income gaps are estimated using a linear regression model and are all significantly different from 0 ( $p < 0.01$ ). The controls include the trade program, jurisdiction, year of registration, age, sex, marital status, immigration status, union membership, whether they received registered pension, whether they received employment insurance, low-income status, and whether they worked in one of the three common sectors for the trade.

**Source:** Education and Labour Market Longitudinal Platform, 2008 to 2016.

### Notes

1. Between 2011 and 2016, among workers who had a certificate of apprenticeship or a certificate of qualification, the proportion of people aged 55 and older increased from 23% to 26%. In comparison, that proportion rose from 17% to 18% among workers who held a university degree at the bachelor level or above. See Carey (2014) for the general discussion about skills shortages in Canada. Prism Economics and Analysis (2019) forecasts expected trends of supply and demands for tradespeople in Canada.
2. The federal government supports apprenticeship through the Apprenticeship Incentive Grant, the Apprenticeship Completion Grant and the Apprenticeship Incentive Grant for Women programs. It also helps apprentices through the Union Training and Innovation Program by supporting the purchase of training equipment. In addition, in the budget 2019, the federal government proposed to provide Skills Canada with \$40 million to continue to promoting skilled trades and technologies to young people.
3. See Government of Canada (2019).
4. Data from the Registered Apprenticeship Information System, 1991 to 2019.
5. See Frank and Jovic (2017).
6. Before the introduction of the ELMLP, the RAIS data did not support longitudinal analysis.
7. In this study, “discontinuers” and “those who left their program” are used interchangeably.
8. Multiple registration cohorts are included, and program durations may differ across cohorts.
9. The RAIS uses registration, not individuals, as the record unit. As a result, if an individual registered for multiple trade programs, they are counted in RAIS multiple times. However, the majority of apprentices (about 88%) registered in only one program. This study refers to each record as an apprentice rather than a record for ease of exposition.
10. Jurisdictions may have different practices regarding the classification of compulsory and voluntary trades, the Red Seal endorsement of a trade, or even the numbers of on-the-job hours required to complete a program. These differing administrative practices make it difficult to compare certification rates across jurisdictions and across the trades themselves.
11. Outcomes regarding apprenticeship completion are measured after one-and-a-half times the program duration. For example, the outcome of apprentices registered in a two-year program is measured three years after registration. For three-year and five-year programs, the period is rounded up to the nearest whole number, and the training outcome is measured after five and eight years, respectively.
12. It is reasonable to think that a noticeable percentage of older apprentices were working in the trade for which they started an apprenticeship before registration.
13. Although there are slightly fewer women among certified journeypersons (12.3%) than among discontinuers (14.4%), apprentices had similar overall demographic characteristics regardless of their outcomes. Certified journeypersons also tended to be slightly younger than long-term continuers and discontinuers—54.8%, 52.6% and 51.3%, respectively, were aged 25 or younger.
14. Common sectors are defined as the three most common industrial sectors in the province or territory where certified journeypersons of the trade work. For example, the three most common sectors for carpenters working in Quebec are: 1. Construction of buildings, 2. Specialty trade contractors and 3. Heavy and civil engineering construction.
15. See Frank and Jovic (2017).
16. The tax data do not contain a direct measure of job switching. The number of sectors in which an apprentice worked is used as a proxy for job switching. Although working in only one sector does not necessarily mean that the individual did not change jobs, working in multiple sectors always indicates that the person worked for multiple employers in the calendar year.
17. The low-income status in this study refers to the census family after-tax low-income measure, derived in the T1 Family File. Apprentices in a low-income family were those whose after-tax family income, adjusted for family size, was below 50% of the median family income in Canada.
18. In the 2015 National Apprenticeship Survey, “financial constraints” was the third most commonly cited reason for discontinuation, following “job instability” and “received an offer of a better job.” See Frank and Jovic (2017).

## Factors associated with the completion of apprenticeship training in Canada

19. In the entire RAIS, the fraction of female apprentices is slightly lower (14%) than that in this study's analytical sample (Statistics Canada 2019). This suggests that the sample selection process, described in "[Data sources, methods and definitions](#)," excluded more male than female apprentices.
20. In the analytical sample, the proportion of women registered in most popular male-dominated trades was lower than the one calculated using the entire RAIS data. Indeed, in 2018, 20.5% of all women who started an apprenticeship program registered as electricians (5.4%), carpenters (5.1%), automotive services (4.8%), plumbers, pipefitters and steamfitters (2.8%) or welders (2.4%).
21. Frank and Frenette (2019) introduced this classification.
22. This program is only offered in Ontario.
23. This program is only offered in Ontario.
24. For discontinuers, median income measured at the end of the program duration included income after the individuals were no longer apprentices. Furthermore, these people may not have been working in the trade in which they were apprentice.
25. The end of program refers to the year the program is expected to end, not the year the certificate was granted or the year the apprentice left the program.
26. Low-income individuals are those whose family income falls below half of adjusted median family income. See Income Statistics Division (2016) for further details on the low-income measure.
27. The controls include the trade program, jurisdiction, year of registration, age, sex, marital status, immigration status, union membership, whether they received a registered pension, whether received employment insurance, low-income status, and whether they worked in one of the three common sectors for the trade.
28. The income of journeypersons was compared with that of long-term continuers since discontinuers were more likely to include income earned after they left their training. Nonetheless, similar results were found for discontinuers.

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