

Note from the Editorial Board: While this issue of the Canadian Apprenticeship Journal focuses on programs and initiatives that seek to attract youth to apprenticeships, the following research paper provides valuable insight into labour market outcomes of apprentices, sharing information that may help explain why effort, resources and time should continue to be spent engaging youth in apprenticeship programs. Beyond addressing skilled trades workforce shortages, apprenticeship completion and certification benefit individuals on multiple levels as well. By exploring one facet linked to the advantages of pursuing and completing apprenticeship training, namely wages, this paper contributes to a fuller understanding of why ongoing work is needed to engage youth in apprenticeship training.

Is Certification and Apprenticeship Completion Worthwhile? Evidence from the 2007 National Apprenticeship Survey

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Using the 2007 National Apprenticeship Survey (NAS), we address the wages of individuals who completed or discontinued a registered apprenticeship program, and either became certified or not in their trade. Compared to those who discontinued an apprenticeship program and did not become certified, we find that those who completed and/or became certified in their trade have higher hourly wages, with those who both completed and became certified having the highest average hourly wages.

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A longer version of this paper, which includes a multivariate analysis of wage differences, was circulated as Laporte and Mueller (2012).

Introduction

Recently there has been growing interest in apprenticeship programs in Canada. This is likely due to a number of factors, which include concerns about current and possible future shortages of skilled tradespersons and increasing emphasis on the capacity of apprenticeship programs to offer rewarding careers to young Canadians, including those who are not university-bound.

The number of Canadians registered in apprenticeship programs more than doubled, from 163,370 to 358,555, between 1995 and 2007.¹ However, over the same period, the number of successful apprenticeship completions increased by only about one-third, raising questions about what might account for the widening gap. The earnings gains associated with apprenticeship completion are one consideration.

The traditional way for workers to become skilled tradespeople in Canada is through apprenticeship programs, whereby employers agree to train workers on the job and give release time for classroom training. Workers in return accept lower wages. Individuals often enter apprenticeship programs when they are older, have family responsibilities, and possess significant labour market experience. They may complete several years of a program, becoming a third- or fourth-year apprentice, for example, and earn the wages commensurate with that level of training. If satisfied with earnings and working conditions at that level, the apprentice may have little incentive to complete the program. Similarly, apprentices with family responsibilities or financial obligations may be reluctant to take time away from paid employment to complete the classroom training required for program completion. Apprentices may also face a disincentive to completing their programs if they are concerned their employer will be unable or unwilling to continue employing them once they are journeypersons given the higher hourly wage rate.

In this context, a small, but growing, body of research on apprentices and apprenticeship programs in Canada is emerging. Nonetheless, information on the earnings of registered apprentices — particularly the hourly wages of those who complete or those who do not complete their apprenticeship program — remains sparse, and wage differences between individuals with different completion and certification statuses have yet to be examined.

¹ C. Laporte and R.E. Mueller, "The Completion Behaviour of Registered Apprentices: Who Continues, Who Quits, and Who Completes Programs?" *Analytical Studies Branch Research Paper Series, No.333*. Statistics Canada Catalogue no. 11F0019M. 2011.

Using the 2007 National Apprenticeship Survey (NAS), hourly wage differences observed between apprentices who complete their programs and apprentices who discontinue their programs are compared. The primary objective is to show the magnitude of the wage difference between these groups. Furthermore, wage comparisons are refined by disaggregating apprentices into four mutually exclusive groups, defined on the basis of program completion and certification. Compared to individuals who neither completed their apprenticeship programs nor obtained certification, individuals who either completed their programs or obtained certification (but not both) received wages that were 2.6 per cent and 17.0 per cent higher, respectively. Individuals who both completed and obtained certification had wages that were 20.5 per cent higher.²

Compared to individuals who neither completed their apprenticeship programs nor obtained certification, individuals who either completed their programs or obtained certification (but not both) received wages that were 2.6 per cent and 17.0 per cent higher, respectively.

Certification is an important consideration in the discussion of wages earned by apprentices. In most cases, registered apprentices who complete the requisite hours of experience and classroom training must also pass a final examination in order to obtain a Certificate of Qualification. This conveys the title of journeyperson, permits them to train other apprentices, and entitles them to earn a wage rate at the journeyperson level. However, not all individuals who obtain certification have completed an apprenticeship program. This is because individuals – usually those with significant work experience – who have not formally acquired the requisite hours of experience and training can challenge the final examination and, if successful, obtain their Certificate of Qualification. These individuals are called “trade qualifiers.” In some cases, trade qualifiers have never been registered in an apprenticeship program.

Using the Registered Apprenticeship Information System^{3,4} (RAIS) for 2007, Desjardins reported that 18,341 persons obtained a Certificate of Qualification as trade qualifiers in 2007.⁵

² C. Laporte and R.E. Mueller, “Certification, Completion, and the Wages of Canadian Registered Apprentices.” *Analytical Studies Branch Research Paper Series, No. 345*. Statistics Canada Catalogue no. 11F0019M. 2012. Laporte and Mueller estimate differences within a multivariate model and their estimated wage differentials are similar to those outlined here.

³ For more information see the *Registered Apprenticeship Information System (RAIS): Data Element Manual* at www.statcan.gc.ca/imdb-bmdi/document/3154_D1_T4_V2-eng.htm#ftn1.

⁴ The data collected in Quebec by the RAIS come from only two sources: the Commission de la construction du Québec and Emploi-Québec. The data from Emploi-Québec include only information on regulated trades. Also, the RAIS has no information on programs in the automotive sector. As a consequence, there is under-coverage of the

This compares with 24,000 persons who obtained a Certificate of Qualification after having completed an apprenticeship program. Although it would be informative to estimate wage differentials between individuals who obtain their Certificate of Qualification as trade qualifiers and those who do so through a registered apprenticeship program, information making it possible to do so is not available. The RAIS is the only data source in Canada that includes all trade qualifiers, but it does not contain information on their hourly wages or other socio-demographic characteristics. Consequently, this paper examines only individuals who have been registered in an apprenticeship program.

The paper is organized into several sections. A review of the Canadian literature on the earnings of apprentices is presented in Section 2. The data used in the analysis are explained in Section 3. Several descriptive statistics are presented in Section 4. Section 5 concludes the paper.

Background and literature review

Compared to those requirements for other forms of postsecondary education, such as college and university, the requirements for advancing through and completing apprenticeship programs tend to be highly varied. The most recent version of the Ellis Chart – which compares apprenticeship programs across all 13 Canadian jurisdictions – lists more than 300 designated trades in which apprenticeship opportunities are available.⁶ Different programs have different requirements for technical and on-the-job training. Minimum hours and years of training and work experience required for program completion vary as well. Other program requirements may also differ. For example, some trades are compulsory in that one must be a registered apprentice or a journeyman in order to work in that field (e.g. electricians).

The Canadian literature on the earnings differences between individuals who do and individuals who do not complete apprenticeship programs is sparse. Akyeampong used the 1989–1990 National Apprenticeship Survey (NAS) and showed that, 12 months following program completion or termination, apprentices who had completed their programs earned about five per

apprentices and trade qualifiers in that province.

⁵ L. Desjardins, “Trade Qualifiers in the Skilled Trades in Canada: An Overview.” *Education Matters: Insights on Education, Learning and Training in Canada*. Vol. 7. No. 5. Statistics Canada Catalogue No. 81-004-X. 2010.

⁶ According to the Ellis Chart on the Red Seal website, the number of designated trades in Canada is more than 300. See: www.ellischart.ca/h.4m.2@-eng.jsp.

cent more per hour than those who had not.⁷ Using the 2007 NAS, Ménard *et al.* found larger differences, including median wages of apprentices who had completed their programs 35 per cent higher than those of apprentices who had discontinued their programs (\$27 and \$20 per hour, respectively). In terms of earnings, Ménard *et al.* showed that apprenticeship completers are more likely than discontinuers to have annual earnings above various thresholds.⁸ Also using the 2007 NAS, Malatest *et al.* found that apprentices who complete their programs and receive a Certificate of Qualification earn \$61,900 per year on average, compared with \$51,200 for those who complete without certification and \$55,100 for those who do not complete their apprenticeships.⁹ However, hourly wages provide a more useful measure of compensation than annual earnings, since wages do not include the confounding effects of annual hours worked.

In contrast to the simple comparisons noted above, Boothby and Drewes estimated a multivariate model of weekly earnings using 2001 Census data. They estimated the weekly earnings of 25- to 34-year-old males with a trades certificate (and a high school diploma) to be about 15-percentage points higher than the weekly earnings of those with only a high school diploma. For females, the comparable figure is 4.5 percentage points, statistically insignificant. However, because of data limitations, Boothby and Drewes were not able to compare the earnings of individuals who completed apprenticeship programs and those of individuals who did not.¹⁰ In more recent work, Boothby and Drewes used the 2006 Census to compare the earnings of individuals with a trades certificate to the earnings of individuals with other levels of education, ranging from less than high school to post-graduate university degrees. Their multivariate model contains a set of independent variables commonly used in this type of analysis. They found that men with a trades certificate have weekly earnings 17 per cent higher than those of men with only high school, but that women with a trades certificate have weekly earnings about 3.5 per cent lower than those of their counterparts with high school. As a result

⁷ E.B. Akyeamong, "Apprentices: Graduate and drop-out labour market performances." *Perspectives on Labour and Income*. Vol. 3. No. 1. Statistics Canada Catalogue No. 75-001-X. p. 1-19. 1991.

⁸ Ménard, M., F. Menezes, C.K.Y. Chan and M. Walker, "National Apprenticeship Survey: Canada Overview Report, 2007." *Statistics Canada Catalogue no. 81-598-X. No. 1*. 2008.

⁹ Malatest, R., A. Rose and A. McCann. "Building a Case for Pursuing and Completing Apprenticeship." *The Canadian Apprenticeship Journal*. Vol. 4. Spring 2011. See: www.caj-jca.ca/index.php/caj-jca/article/view/50/95 (accessed March 7, 2012). It is unclear whether those who did not complete their programs did or did not have certification. The former option is the most likely given the results below and the fact that the same data are used in both cases.

¹⁰ Boothby, D., and T. Drewes. "Postsecondary Education in Canada: Returns to University, College and Trades Education." *Canadian Public Policy*. Vol. 32. No. 1. p. 1-22. 2006.

of data limitations again, Boothby and Drewes were not able to compare the weekly earnings of individuals who completed an apprenticeship program and those of individuals who did not.¹¹

Overall, apprenticeship wage studies have presented either descriptive statistics or comparisons across broad educational categories. Given the many questions regarding the wage premium to apprenticeship completion, closer inspection of individuals who complete their programs and individuals who do not is warranted. Similarly, differences in earnings between those who become certified and those who do not also provide useful insights. As such, the analysis below focuses on four groups: those who complete their programs and become certified; those who complete but do not become certified; those who do not complete (or discontinue) but become certified; and those who neither complete nor become certified.

Data

Statistics Canada's 2007 National Apprenticeship Survey (NAS) contains information on the training and employment of apprentices across Canada. The sampling frame consists of all apprentices on the apprenticeship registration lists for the years 2002, 2003 and 2004, provided by 12 of the 13 provincial and territorial jurisdictions (Nunavut being the exclusion). A total of 30,572 respondents were interviewed. The survey was conducted between January and May 2007.¹²

The survey comprised apprentices in three states: those who had completed apprenticeship program requirements (completers); those whose were registered in 2004 and had begun their programs in 1999 or earlier (long-term continuers); and those who were registered at some point, but withdrew from their programs prior to completion (discontinuers). The status of these individuals could (and often did) change between the 2002–2004 frame and the 2007 survey. Completers and discontinuers are included in this analysis since wage and income data were collected only from these two groups. Each individual in the sample was also asked questions about his or her socio-demographic characteristics, pre-apprenticeship education, training and work experience, types of work, difficulties encountered during his or her apprenticeship program, and other experiences and characteristics.

¹¹ Boothby, D., and T. Drewes, "Returns to Apprenticeship in Canada." Canadian Labour Market and Skills Researcher Network, University of British Columbia. Working paper no. 70. 2010.

¹² The 2006 census did ask specific questions regarding apprenticeship training and wages, and has a large sample size for analysis. However, it lacks the information on completion and discontinuation of apprenticeship programs. The RAIS is useful for the fact that it is administrative—not survey—data and therefore is likely to have fewer measurement errors and broader coverage. However, these data have limited background variables.

A limitation of the NAS data is the limited coverage of registered apprentices in Quebec, since only the construction trades in that province are represented on the sampling frame. According to the *Microdata User Guide: National Apprenticeship Survey 2007*, comparisons between Quebec and the other provinces should be avoided unless restricted to similar trades.¹³ This analysis takes specific trades into account.

[...] about 74 per cent of completers complete their programs within three to ten years, with most completing in three to five years.

A number of restrictions were imposed on the sample. Respondents who indicated an inconsistent apprenticeship status between 2002–2004 and 2007 were removed,¹⁴ as were those who reported different trades between 2002–2004 and 2007, those who had not worked at all as apprentices between 2000 and

2007 inclusively, those who started their apprenticeship programs before age 16 or were over age 80 at the time of the survey, and those who had missing values on key variables used in the analysis. Furthermore, since wages are the focus of this analysis, respondents who held no job in the week prior to the survey,¹⁵ those employed as unpaid family workers, and those with unknown, very low (i.e., less than \$500) or very high annual income (i.e., more than \$500,000) were removed, as were those with unknown or very high hourly wages (i.e., more than \$500). The final sample consists of 18,399 observations—representing about three times that many Canadians registered in apprenticeship programs between 2002 and 2004 who had either completed or discontinued their programs by 2007.

Comparisons of apprenticeship groups

Summary statistics comparing the characteristics of completers and discontinuers are presented in Table 1.¹⁶ In the sample, females comprise a larger share of completers, perhaps because females are overrepresented in relatively short programs such as hairstyling. Completers are considerably more likely than discontinuers to be married (55.1 per cent and 43.7 per cent, respectively) and have, on average, more children under 18 years of age. Completers also tend

¹³ Statistics Canada. *Microdata User Guide: National Apprenticeship Survey 2007*. See: www.statcan.gc.ca/imdb-bmdi/document/3160_D2_T1_V1-eng.pdf (accessed March 7, 2012).

¹⁴ For example, individuals who said they had completed their programs in 2002–2004, but reported they were “discontinuers” in 2007. Around 900 observations were deleted from the sample because of inconsistency in the change in their status between 2002–2004 and 2007. The difference could be attributable to a real change in status, errors in the administrative data from the 13 jurisdictions, or errors on voluntary survey responses from apprentices.

¹⁵ Around 2,500 observations were deleted from the sample as a result of this restriction.

¹⁶ The results presented in this paper are simply comparisons between different groups of apprentices. Laporte and Mueller (2012) present comparisons of these same groups using more sophisticated multivariate analysis.

to have higher levels of pre-apprenticeship education, as evidenced by the proportions with high school or above.

Discontinuers have spent fewer years in their programs on average, with about 64 per cent spending two years or less in their apprenticeships before leaving. In contrast, about 74 per cent of completers complete their programs within three to ten years, with most completing in three to five years. Notable trade groups are carpenters and cabinetmakers, which have a relatively large proportion of discontinuers (compared to this group's proportion of completers), and hairstyling, which has a relatively large proportion of completers (compared to this group's proportion of discontinuers).¹⁷ Provincial differences are also evident, with completers overrepresented (relative to discontinuers) in Ontario and underrepresented in Quebec and Alberta.¹⁸

Table 1: Summary Statistics, Completers and Discontinuers, 2007

Variable	Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.
Male	0.897	0.304	0.914	0.280
Female	0.103	0.304	0.086	0.280
Age in 2007	33.35	7.502	33.42	8.705
Marital status at end				
Married	0.551	0.497	0.437	0.496
Divorced	0.041	0.198	0.054	0.226
Single	0.408	0.492	0.509	0.500
Nb of children <18	0.690	1.027	0.627	1.023
Aboriginal	0.037	0.189	0.054	0.226
Visible minorities	0.054	0.226	0.044	0.204
White	0.909	0.288	0.902	0.297

¹⁷ This result for carpenters and cabinetmakers is due in part to the fact that all observations from Quebec are from this trade group. Excluding Quebec yields a similar result, with this trade group having a disproportionately low share of completers.

¹⁸ Again, this result for Quebec is driven entirely by the fact that all observations from Quebec are for the construction trades and that carpenters and cabinetmakers have a high rate of discontinuation in all jurisdictions.

Variable	Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.
Immigrant	0.075	0.263	0.061	0.240
Disability at beginning	0.025	0.155	0.033	0.180
Education				
Less than high school	0.114	0.318	0.154	0.361
High school	0.490	0.500	0.448	0.497
Trade-vocational	0.112	0.315	0.132	0.339
College	0.223	0.416	0.208	0.406
University	0.062	0.240	0.057	0.233
Number of years in program				
Less than 1 year	0.027	0.163	0.266	0.442
1 year	0.056	0.231	0.224	0.417
2 years	0.096	0.295	0.150	0.357
3 years	0.173	0.378	0.084	0.278
4 years	0.214	0.410	0.057	0.232
5 years	0.143	0.350	0.044	0.205
6-10 years	0.208	0.406	0.104	0.305
11-15 years	0.048	0.213	0.036	0.186
16-20 years	0.020	0.141	0.021	0.142
> 20 years	0.014	0.119	0.016	0.124
Detailed trade groups				
Non-coded	0.010	0.100	0.009	0.092
Automotive service	0.119	0.324	0.092	0.289
Bricklayer/mason	0.015	0.121	0.032	0.175
Carpenter / Cabinetmaker	0.093	0.290	0.171	0.377
Crane operator	0.016	0.125	0.011	0.103

Variable	Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.
Early childhood educator	0.005	0.071	0.005	0.074
Electrician	0.175	0.380	0.150	0.357
Electronics	0.006	0.077	0.011	0.103
Food service	0.036	0.185	0.039	0.194
Hairstylist – esthetician	0.074	0.262	0.031	0.173
Heavy duty equipment mechanic	0.065	0.246	0.047	0.211
Heavy equipment operator	0.009	0.092	0.010	0.099
Industry instrument technician	0.011	0.102	0.023	0.149
Interior finish	0.013	0.113	0.036	0.185
Lather	0.008	0.089	0.024	0.154
Machinist	0.055	0.227	0.036	0.186
Metal worker (other)	0.022	0.147	0.020	0.139
Millwright	0.050	0.217	0.027	0.163
Other	0.021	0.142	0.021	0.145
Partsperson	0.009	0.097	0.007	0.082
Plumber/pipefitter/steamfitter	0.086	0.281	0.094	0.291
Refrigeration and air conditioning mechanic	0.023	0.149	0.018	0.132
Roofer	0.008	0.087	0.020	0.140
Sheet metal worker	0.022	0.148	0.027	0.161
Welder	0.051	0.220	0.042	0.200
Province				
Newfoundland and Labrador	0.014	0.118	0.018	0.133
Prince Edward Island	0.003	0.059	0.001	0.028
Nova Scotia	0.024	0.154	0.018	0.132
New Brunswick	0.023	0.151	0.023	0.151

Variable	Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.
Quebec	0.164	0.370	0.278	0.448
Ontario	0.312	0.463	0.176	0.381
Manitoba	0.037	0.188	0.029	0.167
Saskatchewan	0.047	0.211	0.036	0.187
Alberta	0.260	0.439	0.311	0.463
British Columbia	0.113	0.316	0.105	0.307
Northwest Territories	0.003	0.057	0.005	0.067

Various background/employment factors

Annual income	59,203.17	31,413.66	49,429.25	33,674.51
Hourly wage	27.67	12.29	23.70	13.57
Certification	0.904	0.295	0.101	0.302
Self-employment	0.121	0.326	0.147	0.354
Part-time work	0.023	0.149	0.056	0.231
Multiple jobs	0.096	0.294	0.082	0.275

Job status

Permanent	0.807	0.394	0.753	0.431
Temporary	0.049	0.215	0.054	0.227
Seasonal	0.021	0.144	0.042	0.200
Don't know	0.002	0.043	0.003	0.059
Union member at end	0.315	0.464	0.325	0.468
Different language at home and work	0.068	0.251	0.087	0.282
Same employer as apprenticeship	0.464	0.499	0.202	0.401
Sample size - unweighted	15,553		2,846	
Sample size - weighted	50,222		11,103	
Proportion of total	0.819		0.181	

Source: Authors' calculations from Statistics Canada, National Apprenticeship Survey

Annual incomes and hourly wages are both higher, on average, among completers than among discontinuers, although more variance is evident among the latter. Completers are less likely than discontinuers to be self-employed, are more likely to work in permanent jobs, and are less likely to work part-time. Completers are more likely than discontinuers to have the same employer upon exiting their apprenticeship programs. This is to be expected since many trades are compulsory and since one must be either a registered apprentice or a journeyman in order to work in the field. Thus, the discontinuation of an apprenticeship program can mean automatic removal from the trade. Of the apprentices who completed their programs, 90 per cent also obtained certification, while 10 per cent did not. Conversely, 90 per cent of apprentices who discontinued their programs did not obtain certification, while 10 per cent of apprentices who discontinued their programs did obtain certification.

In Table 2, average hourly wages are shown for completers and discontinuers in detailed trade groups, disaggregated by whether or not certification was obtained. Across the entire sample, average hourly wages are highest among individuals who completed their programs and obtained certification (\$28.07), and only slightly lower among those who discontinued their programs but obtained certification nonetheless (\$27.25). Individuals who completed their programs, but did not obtain certification had average hourly wages \$3 to \$4 lower than those of these two groups (at \$23.92), while individuals who discontinued their programs and were not certified had the lowest average hourly wage (at \$23.30).

Table 2: Average Hourly Wages by Major Trades, Completers and Discontinuers

	Certification				No Certification			
	Completers		Discontinuers		Completers		Discontinuers	
	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Detailed trade groups								
Non-coded	27.16	9.30	X	x	26.14	10.92	27.14	7.75
Automotive service	23.63	9.57	21.77	7.85	21.25	11.79	19.72	9.97
Bricklayer/mason	29.49	12.75	20.60	10.26	23.47	9.14	23.55	14.66
Carpenter / Cabinetmaker	27.88	9.52	24.19	7.48	26.79	12.66	23.69	14.31
Crane operator	35.82	15.15	X	x	30.62	16.46	32.28	13.95
Early childhood educator	18.32	6.10	X	x	x	x	15.41	7.79
Electrician	31.13	9.55	30.91	16.88	26.95	13.95	24.24	13.89
Electronics	27.33	8.72	X	x	24.25	16.26	19.72	8.54
Food service	17.51	6.72	16.95	7.65	18.40	11.50	17.67	7.51
Hairstylist – esthetician	15.34	7.96	17.99	18.03	13.79	7.01	15.76	7.43
Heavy duty equipment mechanic	28.89	11.60	28.53	8.82	28.41	14.17	23.16	14.31
Heavy equipment operator	25.74	7.90	26.33	15.43	20.89	5.56	28.97	29.60
Industry instrument technician	40.99	20.90	X	x	40.14	20.03	37.90	16.02
Interior finish	27.40	10.50	X	x	23.39	8.00	20.83	7.77
Lather	28.77	9.74	20.61	7.15	27.35	7.08	20.98	12.72
Machinist	26.73	8.17	21.92	4.24	22.94	6.88	20.88	9.20
Metal worker (other)	31.48	11.46	30.67	6.81	28.59	15.25	22.02	8.51
Millwright	31.59	9.68	29.65	4.89	26.77	14.13	26.60	11.34
Other	23.93	8.73	26.60	12.09	20.35	8.27	20.64	10.24
Partsperson	25.09	9.41	X	x	25.78	8.87	25.10	9.01
Plumber/pipefitter/steamfitter	31.94	11.24	38.23	20.98	30.41	24.53	24.42	13.63
Refrigeration & air cond. Mechanic	31.66	9.22	28.38	10.82	28.71	16.04	23.09	9.87
Roofer	28.34	8.98	24.05	10.89	29.11	22.81	20.27	7.27
Sheet metal worker	29.15	7.46	27.41	10.18	26.54	9.20	23.28	11.94
Welder	35.83	20.89	46.61	31.77	29.83	15.74	29.20	16.41
Total	28.07	12.07	27.25	15.43	23.92	13.69	23.30	13.29
Number of observations	14,288		312		1,265		2,534	

Notes: Statistics are weighted.

x - suppressed to meet the confidentiality requirements of the Statistics Act

Source: Authors' calculations from Statistics Canada, National Apprenticeship Survey

Table 3 presents the data in Table 2 somewhat differently by looking at the percentage wage differences between the four groups of interest. Viewed in this way, those who are both certified and have completed their apprenticeship programs have average hourly wages about 20.5 per cent higher than those who did neither. Those who became certified, but did not complete have wages almost 17 per cent higher. Completing, but not becoming certified, is rewarded with only a 2.6 per cent hourly wage premium compared to the base group of those who neither complete nor become certified. Among those who completed, attaining certification yields average wages that are about 17.4 per cent higher compared to those who did not become certified. Comparing those who discontinued, those who are certified have almost 17 per cent higher wages.

Regardless of program completion, these data show that average hourly wages are highest among individuals who have received a Certificate of Qualification. These averages also suggest that it is certification rather than completion that results in the larger wage premium. Of course, about 10 per cent of those who did not complete became certified in our data (see Table 1).¹⁹

Table 3: Percentage Wage Differences Between Groups

	Certification		No Certification	
	Completers	Discontinuers	Completers	Discontinuers
	<i>Per cent differences</i>			
Certified, Completers	0.00	3.03	17.39	20.49
Certified, Discontinuers		0.00	13.94	16.95
Not Certified, Completers			0.00	2.64
Not Certified, Discontinuers				0.00

Note: Authors' calculations using the average mean wage values from Table 2.

Table 4 also uses the data from Table 2, but now to look at differences within each of the 25 major trades groups. The differences at the bottom of the table are the same as those in Table 3 and again show that completing a program is related to higher wages, but certification is related

¹⁹ Desjardins (2010), using the Registered Apprenticeship Information System (RAIS) from 2007, reported that 18,341 persons obtained a Certificate of Qualification as trade qualifiers compared to the 24,000 persons who obtained a Certificate of Qualification after having completed an apprenticeship program. Thus, about 43.4 per cent of those who obtained certification in that year did so by challenging the exam without completing an apprenticeship program. Our lower figure is accounted for by the fact that everyone in the sample participated in an apprenticeship program at some time, whereas the data used by Desjardins includes **all** individuals who obtained certification, not just those registered as apprentices.

to even higher wages. Often these percentage differences are based on relatively few observations, so these results should be interpreted as being instructive rather than definitive.

That said, some interesting patterns do emerge. For some trades, neither completing nor becoming certified seems to be related to higher wages, but not for other trades. For example, in food services and industry instrument technicians, there is very little percentage difference in wages between the four groups. Other trades, such as electrician, electronics, metal workers and plumbers, appear to pay handsome wage premiums for completion and/or certification. Still others, such as roofer, appear to reward completion more than certification.

Table 4: Percentage Wage Differences Relative to Discontinuers with no Certification, by Major Trades

	Wage of discontinuers without certification	Certification		No Certification
		Completers	Discontinuers	Completers
		Per cent differences		
Detailed trade groups	Mean			
Non-coded	27.14	0.05	X	-3.70
Automotive service	19.72	19.82	10.39	7.76
Bricklayer/mason	23.55	25.22	-12.53	-0.35
Carpenter / Cabinetmaker	23.69	17.67	2.12	13.08
Crane operator	32.28	10.96	X	-5.16
Early childhood educator	15.41	18.90	X	x
Electrician	24.24	28.42	27.52	11.20
Electronics	19.72	38.62	X	23.02
Food service	17.67	-0.91	-4.07	4.16
Hairstylist – esthetician	15.76	-2.63	14.13	-12.52
Heavy duty equipment mechanic	23.16	24.75	23.20	22.68
Heavy equipment operator	28.97	-11.15	-9.12	-27.89
Industry instrument technician	37.90	8.15	X	5.90
Interior finish	20.83	31.56	X	12.29
Lather	20.98	37.18	-1.72	30.41
Machinist	20.88	28.05	5.00	9.91
Metal worker (other)	22.02	42.93	39.25	29.82
Millwright	26.60	18.74	11.45	0.62

Other	20.64	15.93	28.90	-1.40
Partsperson	25.10	-0.03	X	2.73
Plumber/pipefitter/steamfitter	24.42	30.79	56.55	24.54
Refrigeration & air cond. Mechanic	23.09	37.10	22.93	24.33
Roofer	20.27	39.77	18.64	43.58
Sheet metal worker	23.28	25.21	17.74	14.00
Welder	29.20	22.72	59.65	2.16
Total	23.30	20.49	16.95	2.64
Number of observations	2,534	14,288	312	1,265

Notes: Authors' calculations using the mean wage values from Table 2.

x - suppressed to meet the confidentiality requirements of the Statistics Act.

To further investigate wage differences, respondents are divided into those who are self-employed and those who are paid employees. The rationale is that the incentives to completing an apprenticeship program and/or obtaining certification may be different for the self-employed and paid employees. For paid employees, program completion and certification may be important signals that demonstrate their skills to prospective employers. This may not be the case for the self-employed since they work for themselves. However, the extent to which tradespersons, including the self-employed, may forego certification is limited to non-compulsory trades. Pyper showed that rates of self-employment were much higher in non-compulsory than compulsory trades in 2007.^{20, 21} Of the respondents included in our sample, 22.5 per cent were self-employed.

Table 5 shows how wages between the self-employed and employees differ. Some interesting patterns emerge. First, the mean wages of the self-employed exceed those of employees. In some cases, the difference is substantial. Second, there is much more variation in wages for the self-employed as evidenced by the higher standard deviations. Although the self-employed comprise just over one-fifth of the sample, they account for about one-third of respondents earning less than \$10 per hour and for almost one-half of those earning more than \$100 per

²⁰ For example, carpenters, masons, and other construction trades had self-employment rates of 25.3 per cent, 31.6 per cent, and 39.2 per cent, respectively. This compares to rates for electricians of 6.8 per cent and for plumbers of 12.1 per cent (both of which are compulsory trades).

²¹ Wendy Pyper, "Skilled trades employment." *Perspectives on Labour and Income*. Vol. 9. No. 10. Statistics Canada Catalogue no. 75-001-X. p. 5-14. 2008.

hour. This is reflected by mean wages that are higher than median wages relative to paid employees in the final two columns of the table. Third, those with certification have higher mean wages than those without, regardless of self-employment or completion status. Finally, in all but one case (the certified self-employed), the wages of completers exceed those of discontinuers.

Table 5: Hourly Wages, Self-employed and Employees, by Completion and Certification Status

	Hourly wages in dollars								
	Employees			Self-employed			Total		
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
Certification									
Completers	27.79	27.90	10.12	30.24	25.00	21.64	28.07	27.53	12.07
Discontinuers	25.87	25.00	12.47	34.35	25.57	24.83	27.25	25.00	15.43
No certification									
Completers	22.96	21.00	11.57	28.81	25.50	20.83	23.92	21.31	13.69
Discontinuers	22.62	20.00	11.43	27.30	21.67	20.73	23.30	20.14	13.29
Total	26.57	26.11	10.71	29.63	24.50	21.50			

Note: Statistics are weighted.

Source: Authors' Calculations from Statistics Canada, National Apprenticeship Survey.

Conclusion

Apprenticeship completion is an important positive correlate of hourly wages among tradespersons in Canada. Previous studies have presented descriptive evidence showing that hourly wages and annual incomes are higher among apprentices who complete their programs than among those who discontinue.

This study finds that apprenticeship completers have higher hourly wages than apprentices who discontinue their programs; this is consistent with results from previous studies. Similarly, those who become certified have higher wages compared to those who do not. Disaggregating apprentices into four groups on the basis of program completion and certification refines the wage comparisons. Apprentices who complete their programs **and** obtain certification have higher wages on average than those who do neither — a difference of about 20.5 per cent.

Apprentices who either complete their programs or obtain certification (but not both) also have higher hourly wages than those who neither completed nor certified – differences of 2.6 per cent and 17 per cent, respectively. Finally, among those who completed their apprenticeship programs, those who obtained certification have hourly wages about 17.4 per cent higher than those of individuals who did not obtain certification. The same general pattern holds when the sample is disaggregated into paid employees and the self-employed.

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