The Completion Behaviour of Registered Apprentices:
Who Continues, Quits or Completes Programs?

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Abstract

The almost 360,000 registered apprentices in Canada in 2007 is more than double the number in 1995, yet successful completion of apprenticeship programs increased by only about one third as much. Industry groups are warning of a skilled trades shortage as tradespeople retire. Uncovering the factors related to low completion rates is a necessary first step in ensuring that today's skilled labour is replaced. We utilize the 2007 National Apprenticeship Survey (NAS) to investigate the completion behaviour of individuals enrolled in apprenticeship programs. These behaviours include continuing, discontinuing (or quitting) and completing programs. The NAS contains detailed demographic information regarding respondents' backgrounds and the characteristics of apprenticeship programs. Our results show that program completion is positively related to being married, having fewer children, being able-bodied and having a higher level of education before the beginning of the program. Completion is negatively related to time in the program (beyond the normal program length) and the number of employers. The type of technical training and the presence of a journeyperson at all times enhance the probability of completion. The regional unemployment rate has little effect on completion. There are also large provincial and trade group differences. Males and females have similar completion probabilities. Future research might be directed at exploiting differences in apprenticeship requirements between provinces and trade groups to arrive at a detailed understanding of what changes could be made to enhance the probability of completion.

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Introduction

Getting young people to enter—and complete—apprenticeship programs in the skilled trades is an ongoing challenge. The Canadian Apprenticeship Forum (CAF) discusses nine barriers to accessing, maintaining and successfully completing apprenticeship programs (CAF, 2004, 2009). These reports state that entry into programs is hampered by negative attitudes, lack of information, unwelcoming workplaces, and the costs of apprenticeships to employees, employers and unions. Indeed very few parents state a trade or vocational training as an aspiration that they have for their young children. The challenges around apprenticeship programs also have to do with the perceived lack of job stability, lower income and lower status of the occupations relative to the other options open to Canadian youth (Sharpe and Gibson, 2005). Cote and Allahar (2007:172) suggest that " . . . to the extent that university is four to six years of fun, followed by years of higher salary, there is quite the incentive for people to forego other forms of post-secondary education like apprenticeships…"

This paper focuses on the pathways that registered apprentices take once they are enrolled in apprenticeship training. In many ways, this research is a logical continuation of the existing literature on access to and persistence in postsecondary education (PSE), which has largely been biased in studying only formal classroom training in colleges and universities (most often the latter). In general, these PSE studies involve addressing the determinants of (1) entering the PSE education after the completion of high school; and (2) conditional on entering, persisting through until the program is completed.[1] By definition, PSE encompasses all types of education following secondary (or high school) education, but apprenticeship training is rarely mentioned, and certainly has not been studied. This seems unfortunate, since the long-term apprenticeship completion rates remain low (Morissette, 2008), even though the growth in the number of registered apprentices has outpaced the growth of students attending university (see below).

The reasons for this dearth of research in Canada may be due, at least in part, to the lack of adequate data necessary to study the subject, as well as the fact that relatively few, albeit a growing number of Canadians, pursue an apprenticeship as their terminal education choice. Compared to the data used to study the

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[1] For recent examples and discussion of this work, see Finnie et al. (2008, 2010).

transitions from high school to university or college, and from university or college to the labour market, there are few data sets that enable researchers to study transitions through apprenticeship programs.

Specifically, we are interested in the demographic, labour market and employer characteristics that are correlated with three outcomes—or completion behaviours—of apprentices: long-term continuation, completion and discontinuation. Are there differences between trades and the provinces and territories that regulate them? What are the characteristics of programs that result in higher completion probabilities? Do changes in the business cycle affect completion? Are apprentices who have previous education most likely to complete than those who have not completed high school?

The majority of work to date has not been conducted for Canada, but rather for Europe, and to a lesser degree, the United States, Australia, etc. This is not surprising given the large numbers of young people involved in apprenticeship training relative to other types of postsecondary training in countries such as Germany, Austria and Switzerland. The work that has been done with Canadian data has largely been descriptive and has relied on somewhat more narrowly focused surveys or data.

This paper offers a more comprehensive look at apprenticeship completion behaviour using the best available data for the task: the 2007 National Apprenticeship Survey (NAS). These data allow us to address the correlates of completion behaviour of Canadians who were registered in apprenticeships at some point in the 2002–2004 period. Using the postal codes in the NAS as well as the Postal Code Conversion File Plus (PCCF+) utility, we are able the link the person records to the regional unemployment rate in the Labour Force Survey (LFS) and thus expand our analysis to address the importance of this variable to the persistence pathway of individuals.

We find that a variety of demographic and apprenticeship variables are related to completion, discontinuation or long-term continuation in programs. These results are consistent with the findings of previous studies, which were largely based on less analytical treatment of the subject. Contrary to previous work, which has generally linked the unemployment rate with apprenticeship *registrations*, we find a weak correlation between the unemployment rate and apprenticeship *completions*. Thus, while macroeconomic conditions may have a significant impact on registration, our results suggest that there is only a small negative impact on long-term continuation, and there are no measurable effects on

completion and discontinuation. We also find that the education backgrounds of apprentices are important, with those having less than a high school education less likely to complete. This suggests that a high school education is not a substitute for, but rather complementary to, apprenticeship training. Also relevant are a number of job-specific characteristics such as firm size, type of technical training, and the presence of a journeyperson during training. From this we can infer that programs with low completion rates may be designed differently to enhance completion probabilities.

The paper is organized into four sections. The first section places the paper in the context of what we currently know about persistence in apprenticeship programs in Canada. The second section discusses the data used. This is followed by a presentation and discussion of the results in the third section. The fourth section concludes the paper. Appendix A provides technical details regarding the methodology utilized, Appendix B contains figures illustrating the data and Appendix C consists of the various tables.

Background and Literature Review

Trends in Apprenticeship Registrations and Completions

The number of Canadians registered in apprenticeship programs has grown considerably over the past dozen years. Table 1 shows individuals registered in apprenticeship programs increasing by approximately 120 percent between 1995 and 2007. Some of this increase is the result of growth in the non-traditional trades (i.e. the "other" category) due partially to the addition of a number of new trades (Skof, 2006). The growth in the traditional trades (with the exception of industrial and related mechanical) has also at least doubled, with much of this increase the result of greater female involvement in the major trades.

Despite the large increase in apprenticeship registrations, the proportion of registered apprentices completing their programs has actually fallen. Thus, the increase in completions has not kept pace with the growth in registrations. In Table 2, the overall rate—calculated as the number of completers divided by the number registered—decreases from about 10.5 percent in 1995 to less than 7.0 percent in 2007. Furthermore, there is some heterogeneity in these figures with building construction trades and other trades tending to have the lowest rates, and the food and services trades and the industrial and related mechanical trades the highest in every year. For comparison purposes, among

undergraduate university students, this ratio has decreased marginally from 31.2 percent to 29.9 percent over the same period.[2]

Figure 1 shows a graphical representation of the evolution of apprenticeship registrations and completions and the comparable figures for undergraduates over the 1995–2007 period. Over this 12-year period, enrolment in undergraduate programs in Canada only grew by 36 percent from the 1995–1996 to the 2007–2008 academic years.[3] In fact, this recent growth in apprentices has put their numbers at almost 84 percent of the number of full-time college students at about the same time.[4]

Figure 1: Changes in Enrolment and Completion of Apprentices and Undergraduates

Source: Authors' calculations from Statistics Canada and Council of Ministers of Education Canada. 2009. *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program.* Catalogue no. 81-582-XIE, Table D.1.2, and CANSIM Tables 477-0013 and 477-0014.

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[2] Authors' calculations based on CANSIM Tables 477-0013 and 477-0014.

[3] Full-time enrolment in undergraduate programs was 481,053 in 1995–1996 and 654,403 in 2007–2008 (CANSIM Table 477-013).

[4] As of October 31, 2006 (the most recent year for which data are available), there were 428,805 full-time students enrolled in college programs leading to college certificates or diplomas, post-diploma programs, collaborative degree programs, university transfer programs and college preliminary year courses. See CANSIM Table 477-0015.

Compared to other forms of PSE such as college and university, the requirements for apprenticeship programs tend to be less homogenous and the path to completing these programs is not as straightforward and structured. There are 13 jurisdictions in Canada, each registering dozens of programs. Some of these programs are closely related, others not. Programs have different requirements for theoretical or classroom training and on-the-job training. The most recent version of the Ellis Chart—which compares apprenticeship programs across all 13 Canadian jurisdictions—lists close to 400 apprenticeships, some of which are related and not all of which are available in all jurisdictions (e.g. florists only in British Columbia and poissonnier/poissonnière only in Quebec).[5] The minimum number of hours and years necessary to complete programs can differ as well as other program requirements (e.g. some journeyperson exams can be challenged without an apprenticeship, others not).

Factors Behind Low Apprenticeship Completion Rates

Demographic Characteristics

The fact that apprentices tend to be older means that apprenticeships may not be considered as a school to work transition in the same way as colleges and universities (Gunderson, 2009). Related to age is often significant labour market experience before commencement of an apprenticeship program as well as family responsibilities, factors which do not likely weigh as heavily in the college or university decisions of those freshly out of high school. Thus, the analysis of apprentices presents this new dimension that is often not considered in the study of the typical high school to college or university transition.

As a result of this age-experience nexus, there may be little perceived incentive to completing apprenticeship programs since those who complete may not enjoy significant post-apprenticeship employment or earnings advantages.[6] This differs from other forms of PSE such as university, where the "sheepskin effect" can be substantial.[7] Indeed, Ferrer and Riddell (2002) argue that the importance of credentials in terms of earnings increases with education level.

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[5] See www.ellischart.ca (accessed April 1, 2010).
[6] Other research suggests this perception may not be justified. See the article "Building a Case for Pursuing and Completing Apprenticeship" (link to be inserted) in this issue for findings from a study that compared the labour market outcomes of apprenticeship completers to individuals who pursued similar postsecondary pathways.
[7] The sheepskin effect is the return to completion of a program, and this is in addition to the return to the time spent in training. For example, for apprentices, the sheepskin effect is the additional amount earned for becoming a journeyperson compared to someone who has the same training but is not a journeyperson.

The limited evidence, however, paints a different picture of the labour market disadvantages to non-completion. Akyeampong (1991) shows that 12 months following the termination of a program (completion or dropping out), dropouts make 77 percent of the hourly wage of journeypersons, whereas completers earn 81 percent. However, dropouts are less likely to be employed in the trade in which they apprenticed (52 percent vs. 96 percent) and have worked fewer months in the past 12-month period (8.5 vs. 11.5). Other evidence (Ménard, et al., 2008) is also consistent with this: apprentices who completed their program had an 88 percent employment rate (compared to 82 percent for those who discontinued their programs) and they were also more likely to hold a permanent job (80 percent vs. 76 percent). Furthermore, median wages for completers were $27 per hour in 2007 compared to $20 per hour for individuals who discontinued. Together, these results suggest that the penalty for withdrawing from an apprenticeship program may be substantial when both wage and non-wage factors are considered.[8]

Demographic differences may also be related to completion behaviour. Evidence from the U.S. presented by Bilginsoy (2003) shows that women and visible minorities were more likely to cancel apprenticeship programs after enrolling and were less likely to complete them in comparison to males not belonging to a visible minority group. Trendle (2007) finds that Indigenous Australians in Queensland have a higher probability of cancelling apprenticeship contracts compared to the non-Indigenous population.

Levels of education tend to be important predictors of apprenticeship completion. Mangan and Trendle (2008b) find evidence for Australia that males who have completed high school are more likely to complete their apprenticeship compared to those who did not. Parental education is one of the largest predictors of attendance at colleges and universities in Canada (see Finnie, et al., 2008). Lehmann (2004) also shows that parental background is important in determining apprenticeship status, as fathers with lower levels of education are more likely to have children in an apprenticeship, which is the case in both Canada and Germany. In related work, Ménard, et al. (2008) report that contact with people exposed to the trade was the most common factor influencing apprentices'

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[8] Boothby and Drewes (2006) estimated the weekly earnings premium for 25- to 34-year-old males with trade certification (and a high school diploma) to be about 15 percentage points higher than those with only a high school diploma in 2000. For females, the comparable figure is a statistically insignificant 4.5 percentage points. However, Boothby and Drewes were unable to compare those who completed certification in the trades with those who did not.

interest in that trade. While these contacts may facilitate *entry* into an apprenticeship, they appear to be of little influence on *completion*.

The Business Cycle and Apprenticeship Training

The question that has been most explored in the literature is the relationship of business cycle to apprenticeship enrolment/completion. The cyclicality of apprenticeship registrations must be viewed in a demand-supply framework. There are several reasons why the business cycle may be responsible for changing the number of apprentices.

On the demand side, employers may not have the physical capacity nor the resources necessary to hire apprentices, especially when the required ratio of journeypersons to apprentices is fixed. They may also worry that their investment in training could be lost if trained apprentices are "poached" by competing firms. Alternatively, they may find that taking on more apprentices is an economical way to train workers—in general, and to the firm's specifications—thus ensuring a supply of journeypersons when the economy improves. Apprentices may also provide flexibility in staffing for employers if they are able to work when needed, and pursue their classroom training at other times.

On the supply side, lower demand for their services may cause individuals to rethink completing their program as the best option and move on to other types of education (e.g. college or university) or directly to the labour market in another field. Conversely, it could be theorized that high unemployment rates may drive individuals into apprenticeships (just as demand for colleges and universities increases). It is possible that during economic expansions apprentices are able to find good jobs without completing their program, thus increasing the probability of non-completion—either by discontinuing or long-term continuation.

In sum, existing labour market theory does not really give any definitive direction of change in response to the macroeconomic conditions. Compared to colleges and universities, the confounding factor in apprenticeship training is a dynamic interaction of demand and supply that determines the number of apprenticeships available. In the case of universities and colleges, the number of students may increase, whereas the availability of spots may adjust only slowly and passively in response to demand changes.

The modest amount of evidence that does exist on the effects of the business cycle is mixed. Although enrolment in other postsecondary education ventures

(i.e. colleges and universities) is countercyclical, the opposite is true for registration in Canadian apprenticeships where registrations tend to be procyclical (Sharpe and Gibson, 2005; Skof, 2006, 2010).

Although the number of new registrations may be sensitive to the oscillations of the business cycle, we are not sure about the completion behaviour of those already registered and there is little evidence available. Evidence for the Australian state of Queensland shows that apprenticeship dropout rates increase when regional employment growth is high (Mangan and Trendle, 2008a). These authors argue that economic growth provides more opportunities for apprentices, increasing the probability that they will terminate their training. However, they limit their sample to youth apprentices (ages 15 to 24), so these results may not generalize to the Canadian case, where apprentices tend to be older.

In contrast, Bilginsoy (2003) provides evidence for the U.S., which suggests that the number of apprentices is higher during a downturn. More specifically, both cancellations and completions are procyclical, as an expanding economy means a higher opportunity cost of remaining in an apprenticeship program. Furthermore, poaching of employees is likely to be a bigger problem during economic expansions. However, in other countries (such as Switzerland), apprentice contracts are binding and cannot be terminated unilaterally, making this outcome less likely (Mühlmann, Wolter and Wüest, 2009).

In his review of the apprenticeship and on-the-job-training literature, Brunello (2009) notes that most studies indicate that the apprenticeship-employee ratio is (at least mildly) procyclical, whereas training (not including apprentices) tends to be countercyclical. He explains this apparent contradiction by noting that firms may have incentives to train incumbent workers during a downturn at the same time that they reduce the investment in training new employees (i.e. apprentices).

For Canada, Sharpe and Gibson (2005) note that anecdotal evidence suggests that when jobs are scarce, apprentices are laid off and cannot obtain the number of hours needed to complete their program. During economic booms, they also may not be able to take time off to complete classroom requirements. Both of these situations can affect completion probabilities. For example, the authors note that while the number of apprenticeship registrations grew by 90.8 percent between 1991 and 2002 (an expansionary period), the number of completions actually declined by 5.3 percent.

Other Factors Related to Low Apprenticeship Completion

Bilginsoy (2003) shows that union status is positively related to completion rates. In particular, apprenticeship programs in the U.S. that are jointly sponsored by trade unions and employers have higher completion rates compared to those operated unilaterally by employers. Sweet and Lin (1999) also find a positive relationship between unionization and apprenticeship completion in Canada. This may be owing to more formal agreements and contracts between unions and employers, which reduce apprentice turnover.

Having knowledge of the trades at an early age may also be a factor in successful apprenticeship completion. Most provinces offer some sort of youth apprenticeship program (YAP) where young people can work in a trade while completing their high school diploma. High school students may not be registered in a YAP but may still be exposed to various trades by taking trade and vocational courses, co-op or high school work experience programs, or (in Quebec only) a diplôme d'études professionnelles (DEP). These programs allow high school students to "get their feet wet" in trades-related programs and may provide a transition to the labour market for a number of Canadian youth, although participation in these programs is rather low (CAF, 2010). In fact, some have viewed these programs as alternatives—not to college or university—but to unskilled labour and unemployment (Lehmann, 2000). Based on qualitative evidence, however, Taylor and Watt-Malcolm (2007) question if high school vocational programs adequately prepare students for apprenticeship learning.

Data[9]

These NAS data are useful for studying the persistence behaviour of apprentices since they contain detailed data on three groups: long-term continuers, completers, and discontinuers.[10] Each respondent to the survey is classified into one of these three groups during the 2002–2004 frame, and then again in 2007 at the time of the survey. Of course, there was movement between these three groups between 2002–2004 and 2007. For the purpose of our analysis, we use the 2007 categories as our dependent variable, although analysis using the 2002–2004 categories yielded similar results.

The survey also comprises information on postal code at the time of registration and also at the time of the survey. Using Statistics Canada's Postal Code Conversion File Plus (PCCF+) and the Labour Force Survey, we are able to match individuals with their local unemployment rates (using economic region as the reference).

An important limitation of these data is the lack of comprehensive coverage in Quebec. There is a major difference in the scope of the survey in Quebec and the other provinces and territories. According to the *Microdata User Guide* for the NAS (Statistics Canada, 2008), comparisons of estimates between the province of Quebec and other provinces should be avoided unless the comparison is made with similar trades. For this reason, Quebec is dropped from the main analysis that follows.

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[9] For details on the 2007 National Apprenticeship Survey, please see "Overview of Key Findings from the 2007 National Apprenticeship Survey" *(link to be inserted)* in this issue. Other data were considered as well. The Youth in Transition Survey (YITS) is very rich in family background, school experience, and aptitude variables, but it is difficult to identify those in apprenticeship programs. The 2006 Census did ask specific questions regarding apprenticeship training and completion, and has a large sample size for analysis. Unfortunately, it lacks the richness of background variables that have been shown to be important controls in the PSE literature addressing college and university choice. The Registered Apprentice Information System is useful for the fact that it is administrative—not survey—data and therefore is likely to have fewer measurement errors. However, these data have limited background variables.

[10] A limitation of these data is that they only include long-term continuers, defined as those who began their program before 2000 and who had not completed their certification by the end of survey date in 2004. Short-term continuers were not in the scope of the survey. Statistics Canada randomly selected the survey respondents from lists provided by the provincial apprenticeship authorities and compiled from these administrative data. Some of these lists may not have been up to date so that a number of short-term continuers were contacted and interviewed by Statistics Canada. These individuals are also included in the analysis.

As with any survey data, there is the possibility that there exists non-random error in the responses to the questionnaire. According to Warburton and Warburton (2004: 251) this "could be caused by sampling bias, non-response bias, recall bias, measurement error, weighting errors, attrition bias . . ., deliberate inaccuracy by respondents, lack of knowledge by respondents (for proxy reports), or (most probably) some combination of these."

These authors do find significant differences in responses to survey questionnaires compared to administrative data. The focus on their analysis is on welfare recipients, where they do find a great deal of under-reporting of welfare incidence and benefit amounts in the Survey of Labour and Income Dynamics (SLID).

We are less concerned about this type of error in the NAS for two reasons. First, the survey respondents are drawn from provincial administrative data and our reading of the NAS codebook is that all individuals in the survey did indeed participate in apprenticeship training in the 2002–2004 period. In other words, non-response bias should be nil, as is attrition bias (since we are using a cross-section). Second, the variables that we utilize are drawn from survey questions that are arguably less "sensitive" for respondents compared to questions regarding social assistance participation, and thus respondents should be more likely to provide correct answers. For example, Kapsalis (2001) shows that the survey data accuracy of employment insurance reporting rates, spells and benefits are more accurate than those for social assistance when comparing the SLID to administrative data. We do acknowledge that the other types of biases could be problematic, but there is little that can be done beyond recognizing this possibility.

Restrictions on the sample used in the analysis are kept to a minimum in order to make the analysis as representative as possible. We delete only those who indicated inconsistent status between 2002–2004 and 2007 (i.e. those who had completed their program in 2002–2004 and indicated they were discontinuers or long-term continuers in 2007), those who had 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 program before age 16,[11] and those who gave unclear responses, or who had missing, "don't know," or "do not apply" responses for the key variables used in the analysis.

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[11] When including those who started their apprenticeship program at age 14 or 15, the results did not change.

These amount to a limited number of deletions. Survey weights provided by Statistics Canada are used in the analysis.

Our final sample consists of 21,939 observations—representing about three times that many Canadians—in apprenticeship programs during the 2002–2004 survey frame.

Results

Summary statistics

Table 3 presents the summary statistics for each of the three groups: long-term continuers, completers and discontinuers. These figures are generally consistent with the literature in this area. The weighted proportion of long-term continuers, completers and discontinuers is 0.23, 0.64, and 0.13, respectively. While males dominate in all three categories, they are most likely to be long-term continuers. Long-term continuers also tend to be older compared to either completers or discontinuers. The fact that the mean age for all three categories is over 30 years of age also shows that apprentices tend to be much older than those who attend university or college. Long-term continuers are also more likely to be married or divorced than the other two groups and also have more children on average— both likely a function of the higher average age in this group. Aboriginals, visible minorities and immigrants are over-represented among long-term continuers and those not belonging to a visible minority group in the completer category. Long-term continuers are also more likely to have immigrant parents. Completers are more likely to have at least a high school education (and higher levels of education in general) than long-term continuers or discontinuers.

In terms of time in the program, completers are more likely to be in the program for three to five years compared to the other two groups. Obviously, long-term continuers tend to have spent more time in their program and discontinuers less time.[12] Regarding provincial differences, Ontario has about 49 percent of all long-term continuers, but only 38 percent of the completers and 25 percent of all discontinuers in our sample. Alberta has almost as many completers (30 percent), more discontinuers (42 percent of the total), but only 19 percent of all long-term continuers.

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[12] Some 63 percent of those who discontinued a program as of 2004 had returned to an apprenticeship program by 2007 (Ménard et al., 2008). This result suggests that contemporaneous dropout rates should not imply discontinuation in the long term. These results are similar to those obtained by Finnie and Qiu (2008), who show a similar phenomenon occurring at universities and colleges.

A cursory look at the proportion in each of the three groups by detailed trade group shows that the completion rates between trades can differ substantially. By comparing the proportion who completed to those who were long-term continuers or discontinuers, carpenters/cabinetmakers, heavy equipment operators and roofers, in particular, appear to have challenges completing their program (as evidenced by the lower proportions in this state compared to the two others). By contrast, hairstylists-estheticians, millwrights and partspersons are the most likely to complete their program.

Having parents, siblings or co-workers in the same trade does not show any clear pattern of completion behaviour, at least using these unconditional measures. Interestingly, having friends in the trade is related to lower completion probability.

Completers experienced lower regional unemployment rates compared to long-term continuers (but slightly higher than discontinuers) and these rates were also less volatile (i.e. lower standard deviations). Completers were less likely to be involved in YAPs compared to discontinuers, although they were more likely to have taken trade, vocational or technical programs during high school. Completers were also less likely to have spoken a different language on the job and at home.[13] There is little difference between the groups regarding difficulty finding employment at the beginning of the apprenticeship. There is a correlation between union membership and discontinuation.[14] Having a journeyperson always present was highest among completers.

The type of technical training[15] undertaken is related to apprenticeship continuation. About 43 percent of completers reported having no technical training during their apprenticeship program[16] nor did about 70 percent of discontinuers. The latter result may be because most discontinuers leave their

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[13] It should be noted that this variable is coded as one (zero otherwise) if a person speaks a different language at home than at the worksite, where the worksite is the most recent job held. This may or may not reflect the language most often spoken at the worksite during the apprenticeship period. Given the number of apprentices who complete their program with one employer, coupled with the high probability of remaining with the same employer following completion, we thought this a reasonable assumption to make.

[14] More research is needed to determine why this correlation occurs.

[15] In the NAS, technical training is defined as "a period of training/instruction provided to apprentices in a classroom setting away from the job site. The emphasis is on teaching the theory component of the trade or occupation, reinforced where appropriate with shop/lab training. The training is intended to supplement the on-the-job training" (Statistics Canada, 2008: 32).

[16] This finding is surprising given that apprenticeship consists of technical/in-class training and on-the-job training. The data does not specify if these individuals were trades qualifiers.

program within the first two years and may not have had an opportunity to begin the technical training component of their apprenticeship. The former result suggests that a considerable proportion of completers are challenging the exam without technical training as part of their learning, although they may have undertaken such training prior to registration. In terms of type of technical training, long-block release shows a greater association with completion than with continuation and discontinuation.

Completers are most likely to have worked for only one employer (rather than multiple employers) during training. About one half of all apprentices worked for firms with less than 20 employees, rising to about 77 percent when we include firms up to 99 employees.

The regression results in the next section will offer more definite estimates of the relationship of these variables to completion probabilities.

Multinomial probit results[17]

The results of the multinomial probit model are presented in Figures 2 through 12 and based on the full results in Table 4 (see appendices for all). In each case, the coefficients are the marginal effects calculated at the means of the independent variables (or by changing the indicator variable from zero to one). For ease of exposition and interpretation, we elected to use charts rather than tables in this work. We do note again, however, that the model is built up in a stepwise fashion, beginning with basic demographic information and then adding in a variety of regional and job-related variables in blocks.[18] The results in the figures correspond to the third and final model in Table 4. The other models in Table 4 are included for comparison purposes. The results are all robust to the inclusion of additional variables as the model is built up in stepwise fashion. In all cases, our dependent variable is the apprenticeship status at the time of the 2007 survey: long-term continuer, completer and discontinuer.

Demographic characteristics

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[17] See Appendix A for details on the methodology used in this paper.
[18] As mentioned above, we initially used multinomial logit (MNL) models since they are computationally more efficient, but Hausman tests rejected the independence of irrelevant alternatives (IIA) assumption in a number of cases. Despite this, the results from the MNL models were very similar to the results presented here. In addition, we also estimate these models using the apprenticeship status during the survey frame (2002–2004). We found reasonably similar results to those presented here. Various other model specifications were attempted. These are not reported here in the interest of parsimony, but all are in accord with the results presented here.

In Figure 2 (see Appendix B), males are less likely than females to be long-term continuers and statistically no more likely to complete or discontinue their program. This is largely owing to the number of women in the hairstylist-esthetician trade, where programs are relatively short and completion rates high.[19] Age is positively related to completion at a declining rate whereas the other two states show an opposite pattern. A quick calculation reveals that the probability of completion peaks at about age 41. This seems reasonable given that apprentices tend to start their program later in life and many take a long time to complete (Table 3). These estimates also control for length of time in the apprenticeship program so this result is a net age effect. Being divorced or single at the end of the program is negatively related to program completion but positively related to discontinuation. Having children tends to reduce the probability of completion and increase the probability of being a long-term continuer.

The data in Figure 3 show that Aboriginals and visible minorities are both less likely to complete than those not belonging to a visible minority group (the excluded category), with both groups more likely to be long-term continuers. Immigrant status does not itself appear to be important in terms of completion.[20] Having a disability at the beginning of the program (that has lasted or was expected to last for six months or longer) has a positive relationship to continuation but is negatively related to completion. Given the probabilities of being in any of these states, these marginal effects are large.

Education prior to program commencement and years in program

Figure 4 addresses the effects of education prior to registering for the apprenticeship program. The general pattern here is that completion rates are significantly different from zero at both tails of the education distribution. Someone with less than high school is 8.4 percentage points less likely to have completed than someone with a high school education. Those with at least some

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[19] In Table 4, the coefficient on male is significantly negative in the first specification but then becomes positive and significant at the 10 percent level in the second specification when major trade group controls are added. A separate regression (not shown) that excluded the hairstylist-esthetician trade group also yielded a positive coefficient on the male variables, again significant at 10 percent.

[20] Variables for having an immigrant mother and/or an immigrant father were also included as variables in the model. The rationale for this was that we have no information on parental educational background and many immigrant groups (e.g. Eastern Europeans) are heavily involved in the trades. Given the heritability of education in general, we included this variable to pick up this effect. The results are generally small and/or statistically insignificant. See Appendix C, Table 4 for detailed results.

university training, by contrast, have a positive 2.7 percentage point completion differential relative to high school graduates. Those with trade-vocational or college education are observationally the same as high school graduates. This result is broadly consistent with Gunderson (2009), who noted that training tends to be more effective when it involves the upskilling of already skilled and educated workers.

The number of years in the apprenticeship program provides an interesting—if expected—correlate to each of the three states. As shown in Figure 5, the probability of program completion monotonically increases until four years (the omitted category) and then decreases thereafter. Thus, there is an inverted "v-shaped" pattern in these data. A different pattern emerges for discontinuers as the probability generally decreases with program length, before increasing again for program lengths greater than 10 years. For long-term continuers, the probability of remaining in the program increases with time (as expected). These results are not surprising given the normal length of most programs in these data is three to four years (Paquin, 2009) and the median length to completion has been estimated at four to five years (Morissette, 2008).

Provincial and trade group differences

Figure 6 (see Appendix B) presents results with the provinces added, with the exception of Quebec, which was excluded as explained above.[21] Compared to Ontario (the omitted province), only Newfoundland and Labrador has a higher long-term continuation probability, with all other provinces being lower than Ontario. Conversely, Newfoundland and Labrador has a negative probability of completion compared to Ontario. All other regions (with the exception of the Northwest Territories) have completion probabilities significantly higher than Ontario. Discontinuation rates are highest in the Northwest Territories.

Figures 7a through 7c show the results of adding in the block of variables for 24 trade groups derived from the 2001 National Occupational Classification. The

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[21] To see if there were differences between Quebec and the rest of Canada, we ran two separate multinomial probit models, one with Quebec and the other without, but limiting the sample to only those in construction trades (not reported here). We did so since the non-construction trade groups in Quebec were either under-reported or not reported in the NAS. The results between the two models were consistent with the main results presented here. An interesting difference was that the unemployment rate in both estimates was positively and statistically related to completion behaviour. Thus, the probability of completion could be positively influenced by the regional unemployment rate in the construction trades, whereas we cannot say this for the main estimates, which include all trades but exclude Quebec (see Figure 9).

omitted category is carpenters and cabinetmakers. Most of the other trades have completion probabilities that are higher (or at least not lower) than the omitted group. The exception is heavy equipment operators, where the probability is 18.3 percentage points lower. Conversely, all other trades (again with the exception of heavy equipment operators) have discontinuation and long-term continuer probabilities as low or lower than those for carpentry and cabinetmaking. Several trades have very high relative completion probabilities, including hairstylist-esthetician, which is heavily skewed toward female participation.[22]

Friends and family in the trade

We know from the extensive literature on college and university attendance that parental education is positively associated with the educational outcomes of children. Unfortunately, the NAS does not contain details on parental education, but it does contain variables on whether one's parents, close relatives, friends and/or co-workers were involved in the individual's trade. Specifically, the NAS asks the following question:

> Did any of the following people ever work in that trade?
> - parents (mother, father)
> - other close relatives (brother, sister, spouse, aunt, uncle, etc.)
> - friends
> - co-workers

Respondents answered yes or no for each of these four groups. The results in Figure 8 show no obvious trend. Parents in the trade do have an influence, but not on completion. Results suggest there is a positive relationship with long-term continuation and a negative association with discontinuation. Friends in the trade are associated with a lower probability of completion, and a higher probability of discontinuation. These marginal probabilities are all fairly small in magnitude compared to many of the other variables included in the model.

Other background influences

Figure 9 addresses various employment and other background factors that we have included in the model, factors that could influence the completion probability

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[22] It is worthwhile to note that the inclusion of trade groups changes the coefficient on male completion from a highly significant -10.5 percentage points to a +5.1 percentage points, significant at the 10 percent level. Compare Models 1 and 2 in Table 4.

of apprentices. The unemployment rate[23] only has a small impact on the probability of long-term continuation. These results suggest that a two-percentage point increase in this regional rate would reduce the probability of long-term continuation by about five percentage points. The marginal effect of the unemployment rate on completion is positive and of the same magnitude, but is only significant at the 10 percent level (see Appendix C, Table 4). Although most research shows that registration in apprenticeships tends to be procyclical (see above), we find little evidence of an unemployment-rate effect. Thus, program *entry* may indeed be procyclical but these results suggest that *completion* is neither procyclical nor countercyclical.[24]

Provinces and territories offer various types of YAPs where young people can work in the trades (and perhaps towards certification) while completing their high school diplomas. High school students may not be registered in a YAP but may still be exposed to various trades by taking trade and vocational courses, co-op or high school work experience programs. A dummy variable was coded to one if individuals took part in a YAP and another dummy included for participation in any of these other programs. Early exposure to trades via these channels may ultimately have an impact on program completion. Being involved in a YAP during high school has the counterintuitive effect of decreasing the probability of completion and increasing the chance of long-term continuation.[25] The final column of results in this figure shows that taking part in trade-related or co-op programs during high school has no relationship to program completion behaviour in this model. These results are also supportive of the qualitative evidence of Taylor and Watt-Malcolm (2007).

A variety of job-related characteristics are also included in Figure 9. The NAS asks if they had difficulty finding an employer willing to take on apprentices when they started the program, if they were union members at this time, and if there was a journeyperson present at all times during the apprenticeship. We also include a dummy variable if the individual spoke a different language at home and on the job. Many of the results here are small and not statistically significant.

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[23] This is defined for every respondent as the annual unemployment rate in the last year of their apprenticeship program by economic region (according to their postal code).

[24] When estimating these models using the apprenticeship status over the 2002–2004 frame, we also found no significant relationship between any of the three states and the unemployment rate. Given the nature of the 2002–2004 data, we used the average unemployment rate from 2002–2004, and not the unemployment rate at the time of program completion for discontinuers and completers as we do here.

[25] It is possible that high school grades are endogenous to the simple model. If the grades as reported were tallied after the student moved into the YAP, and the student improved his or her grades in the new program, this would bias the results in our simple regression. We have no way of addressing this potential endogeneity in our data.

Having a journeyperson always present during training does have a small positive influence on completion. Speaking a different language at home and at the (most current) job reduces the probability of completion by some 4.5 percentage points, although due to the construction of this variable, little confidence should be placed in this estimate.[26]

Technical training, number of employers and firm size

Since technical training is an integral part of apprenticeship programs, accessing this training should increase the probability of completion. Indeed, our preliminary work using these data showed that accessing any type of technical training during the program greatly increased the probability of completion. Figure 10 further investigates this preliminary result by addressing the specific types of training undertaken while registered as an apprentice. The other category includes those few individuals who took multiple types of technical training as well as types of technical training not elsewhere categorized. Taking no technical training during the apprenticeship program is the reference group.[27] Those who took only long-block training (more than two weeks per year) show higher probabilities of completion, although those with day training (a day or two per week) and self-paced training (including alternative forms of training such as distance education) also have higher completion probabilities.

We also address the number of employers an apprentice had during the time of the apprenticeship. Having a larger number of employers might signal difficulties with finding steady employment, obtaining technical training, working with journeypersons, a lack of commitment to the trade, etc. It may also indicate that the apprentice was seeking a better match with his or her employer. In Figure 11, increasing the number of employers beyond one increases the probability of long-term continuation and decreases the probability of completion. Conversely, an increase in the number of employers has no effect on the probability of discontinuation.

Finally, the size of the firm where the individual last received training may be an important correlate of completion behaviour. The results in Figure 12 show that completion probabilities are enhanced for those working at medium-sized firms

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[26] Unfortunately, the NAS does not ask a question regarding the language most often spoken during the apprenticeship program, which may be different (especially in the case of completers and discontinuers) from the language currently spoken on the job. See footnote 13.

[27] Those who drop out or discontinue their program tend to do so early in the program before technical training is undertaken, which is why there can be a reference group with no technical training during an apprenticeship program.

(i.e. between 20 and 500 employees), but decrease thereafter, although the lack of statistical significance on the larger firm coefficients may be due to their relatively small numbers.

Conclusion

The 2007 NAS contains information on individuals who were registered as apprentices in the 2002–2004 period and then surveyed about their experiences in 2007, including whether these individuals were long-term continuers, completers or discontinuers at the time of the survey. Using a series of multinomial probit models, we find a great deal of consistency between our results and the existing Canadian literature, which generally uses qualitative data or simple cross tabulations. Our results also tend to be robust to different model specification.

We find that a wide array of demographic and job-related variables are related to the three states contained in the NAS. We find divorced and single individuals, the number of children, Aboriginal or visible minority status, having a disability, and low education levels are all negatively related to completion. Time in apprenticeship programs, type of technical training, having a journeyperson present during training, trade group and province of residence are also all important correlates of program continuation, completion and discontinuation. We also find evidence that the regional unemployment rate is only weakly (but positively) related to program completion. This may be the result of apprentices being able to complete their technical training or having better access to trained journeypersons during an economic slowdown.

Further research might address the differences in completion probabilities by trade group and by province. Apprenticeship training in Canada is the domain of the provinces, and often program requirements for the same trade differ by province. Researchers could exploit these differences to ascertain what program designs constitute the best practices in terms of increasing the probability of program completion. Looking specifically at the Red Seal trades—those for which provincial credentials are accepted nationally—might be particularly useful in this regard. Similarly, research might focus on the benefits to program completion. While many trades are compulsory (i.e. one needs to be an apprentice or a journeyperson to work in the trade), others are not. This implies that there may be little or no benefit to completing training in some trades. An analysis of wages of completers versus non-completers might help explain some low completion

rates in some trades. In a related matter, the probability of employment may not be enhanced by completion in certain trades, thus reducing the incentive for attaining the status of journeyperson. Finally, a more detailed examination of the variety of obstacles encountered by apprentices during training may be useful in redesigning programs with the goal of increasing the number of completions.

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Appendix A: Methodology

The well-established methodology in the literature addressing persistence in programs is the multinomial logit model (e.g. Finnie and Qiu (2008) on the persistence of young Canadians in colleges and universities). However, multinomial logit models impose the inconvenient "independence of irrelevant alternatives" (IIA) restriction. IIA implies that adding another alternative does not affect the relative odds between all alternatives. This implication is implausible for applications with similar alternatives (see MacFadden (1974) for the famous "red-bus-blue-bus" example of modes of transportation). Following Hausman and Wise (1978), we will use a multinomial probit model to avoid imposing this IIA assumption.[28]

After entering into an apprenticeship program, an individual has three choices:[29] stay in the program, leave the program (with or without certification) or complete the program (with or without certification).

We can write the general model for the latent variable y^*_{ij} as

$$y^*_{ij} = x'_i \beta_j + \varepsilon_{ij}.$$

In the multinomial probit model, it is assumed that the ε_{ij}s follow a multivariate normal distribution with covariance matrix Σ, where Σ is not restricted to be a diagonal matrix (i.e. it allows the εs to be correlated with each other).

Category j is chosen by individual i if y^*_{ij} is highest for j, i.e.,

$$y_i = \begin{cases} j & \text{if } y^*_{ij} = \max(y^*_{i1}, y^*_{i2}, \ldots, y^*_{iM}) \\ 0 & \text{otherwise.} \end{cases}$$

The probability of choosing category j can be written as

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[28] Multinomial logit models were used at first, but Hausman tests rejected the independence of irrelevant alternatives (IIA) assumption in a number of cases. Despite the higher computational costs of obtaining marginal effects from multinomial probit models compared to multinomial logit models, we elected to use the former. In practice, however, the results from the multinomial logit models were similar to those presented below.

[29] A fourth choice is also theoretically possible: individuals can switch from one trade to another. Since our data are specific to the trade in which the apprentice is registered in the 2002–2004 period, we do not observe switchers.

$$P(y_i = j \mid x_i) = (y^*_{ij} > y^*_{i1}, \ldots, y^*_{ij} > y^*_{i(j-1)}, y^*_{ij} > y^*_{i(j+1)}, \ldots, y^*_{ij} > y^*_{iM})$$

where $j=1,\ldots,M$ and $i=1,\ldots,N$. The variable y_i is the persistence measure of interest at the time of the survey in 2007. The x_i's are vectors of covariates that influence y_i, and the ☐ are the coefficients associated with each set of x. In our case, M=3 and j=1 indicates a long-term continuer, j=2 indicates a completer and j=3 indicates a discontinuer.

The x_i variables contain demographic information on the individual as well as the most conventional background variables that have been shown to have an impact on persistence in apprenticeship. This includes variables such as age, marital status, highest level of education prior to beginning the apprenticeship program, etc. Additional x_i variables are added in a blockwise fashion and include the wider range of variables available in the NAS. This set is comprised of various ability measures such as the individual's high school grades, registration in a YAP, length of time registered as an apprentice, the trade group, the local area economic conditions (from the LFS), etc. Since apprenticeship programs are regulated by provincial authorities, provincial dummy variables are included to capture any systemic differences between provinces.[30] The NAS does contain information on the involvement of parents in the trade in which the apprenticeship is registered. These types of variables are used as a proxy for parental education in the models. Finally, we add various job-related characteristics such as firm size to the estimated model.

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[30] Due to different apprenticeship programs in different provinces, the error terms of individuals within provinces could to be correlated. As such, we control for clustering within provinces in all estimates.

Appendix B: Figures

Figure 2: Marginal Probabilities, Demographic Characteristics I

Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 2, 5 and 6 differ from the other figures.
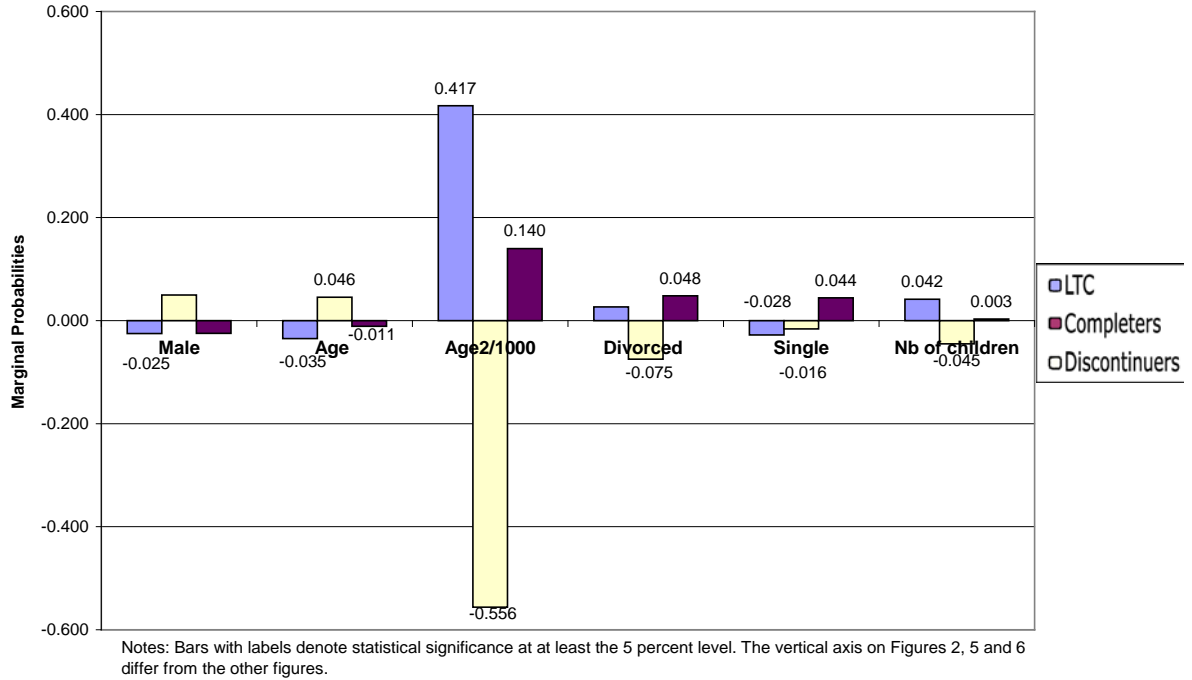
Figure 3: Marginal Probabilities, Demographic Characteristics II

Note: Bars with labels denote statistical signficance at at least the 5 percent level.
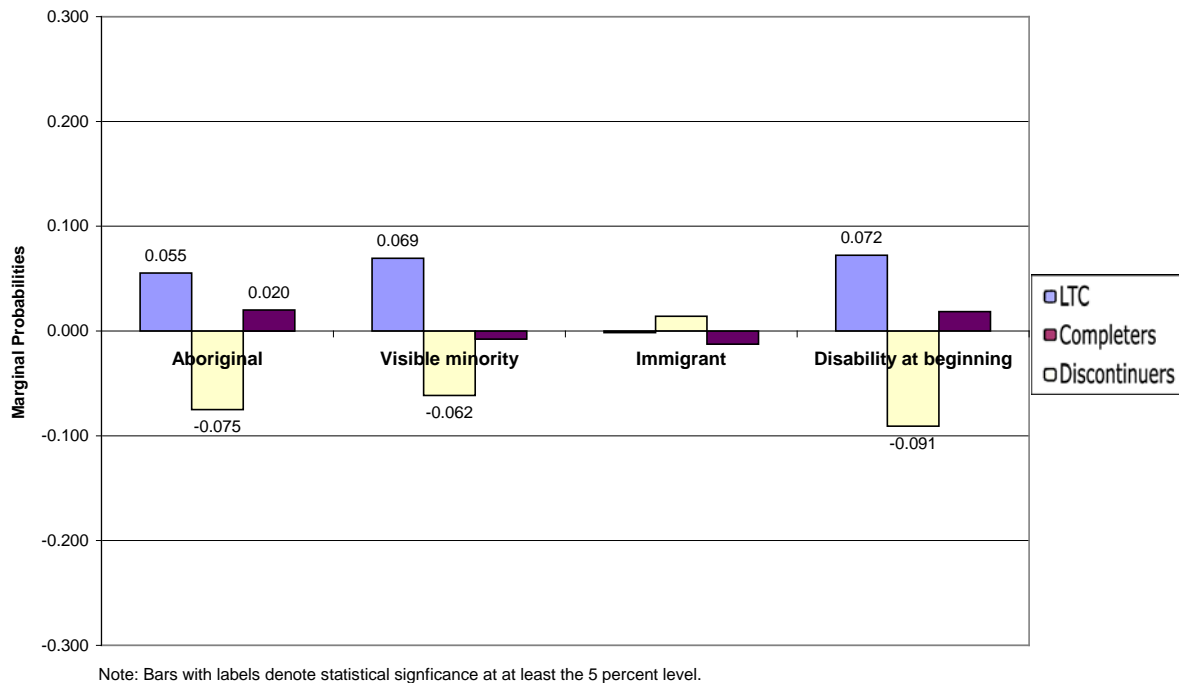
Figure 4: Marginal Probabilities, Previous Education Level
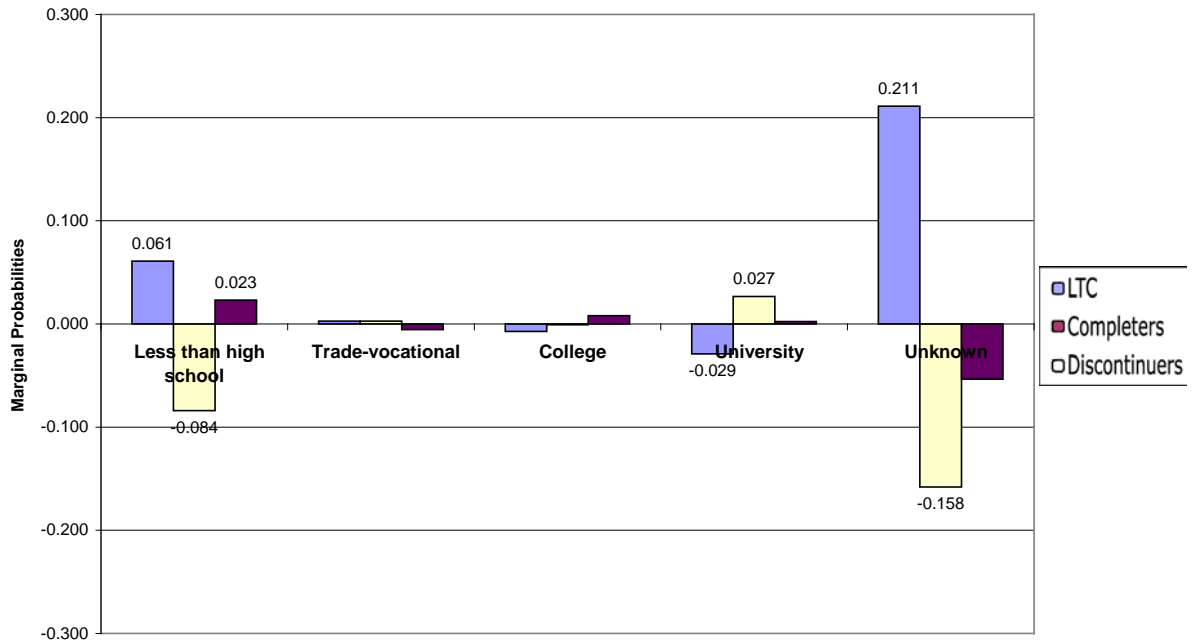
Note: Bars with labels denote statistical significance at at least the 5 percent level. High school is the omitted category.

Figure 5: Marginal Probabilities, Years in Apprenticeship Program
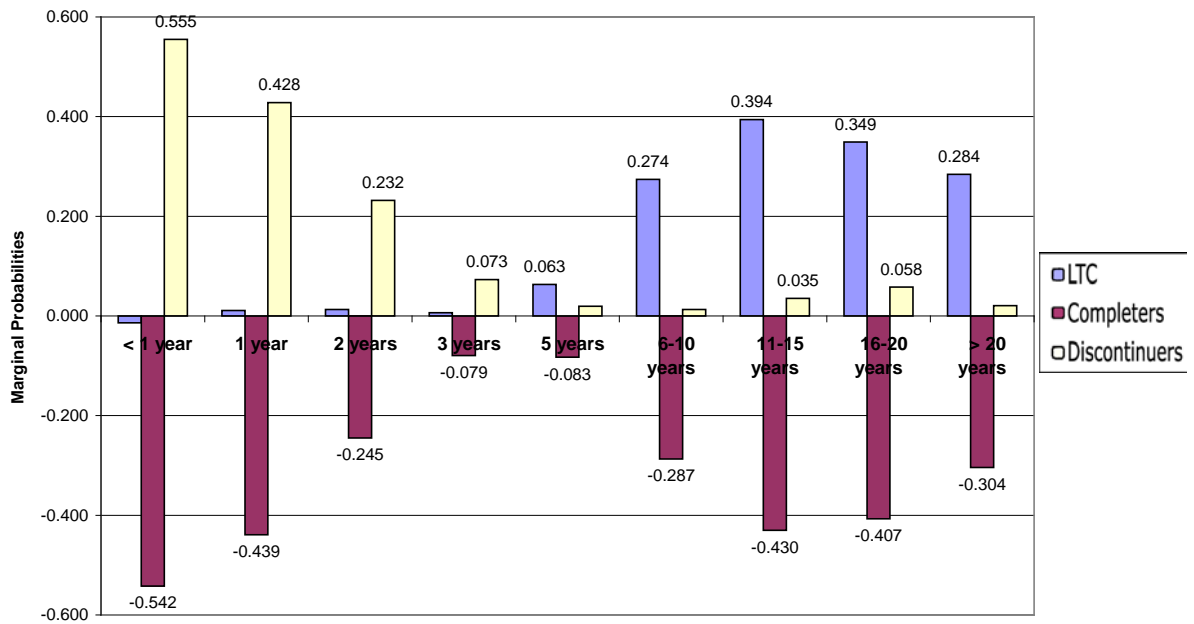
Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 2, 5 and 6 differ from the other figures. 4 years is the omitted category.

Figure 6: Marginal Probabilities, Provinces/Territories
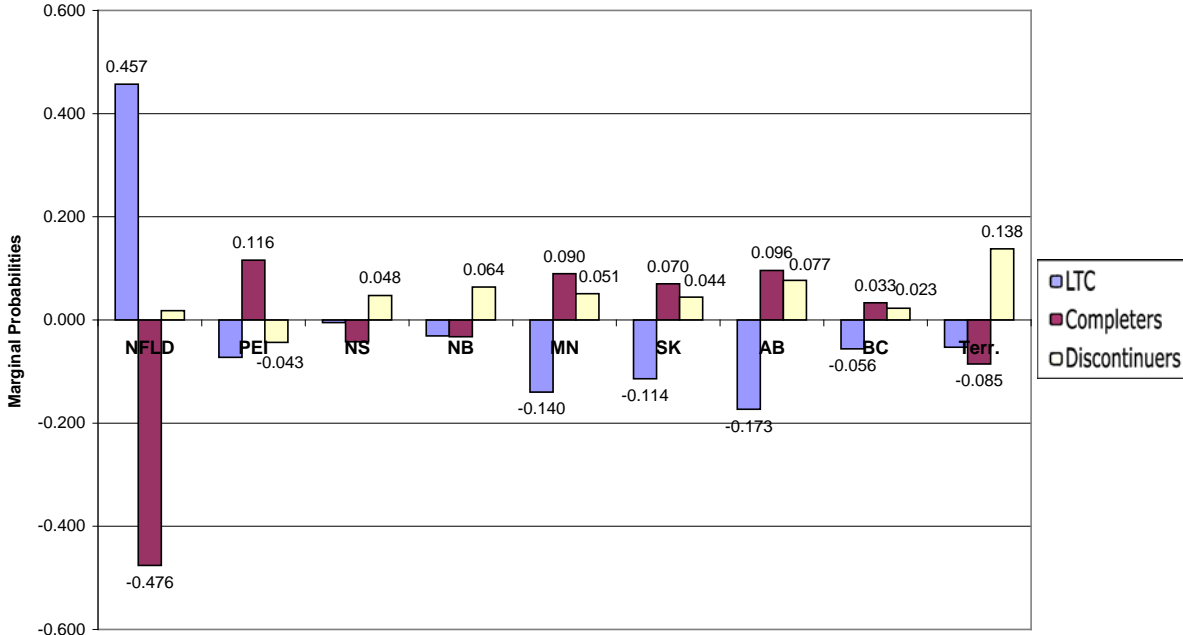
Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 2, 5 and 6 differ from the other figures. Ontario is the omitted category.

Note: Bars with labels denote statistical significance at at least 5 percent level. Carpenter/cabinetmaker is the omitted category.

Figure 7b: Marginal Probabilities, Major Trade Group II
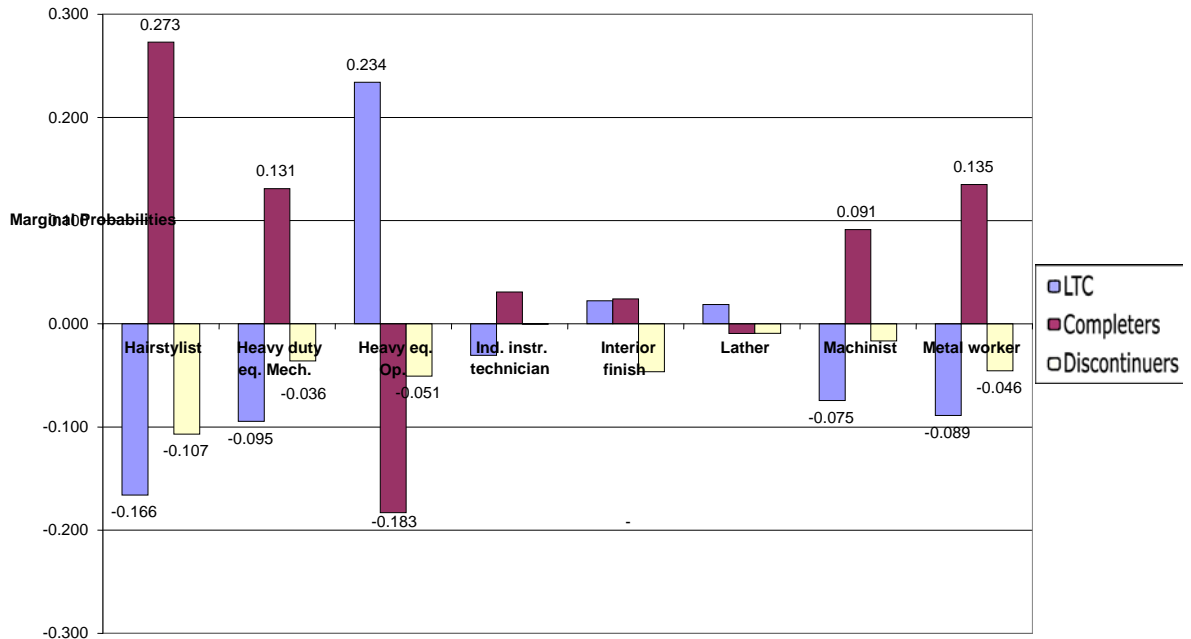
Note: Bars with labels denote statistical significance at at least 5 percent level. Carpenter/cabinetmaker is the omitted category.

Figure 7c: Marginal Probabilities, Major Trade Group III
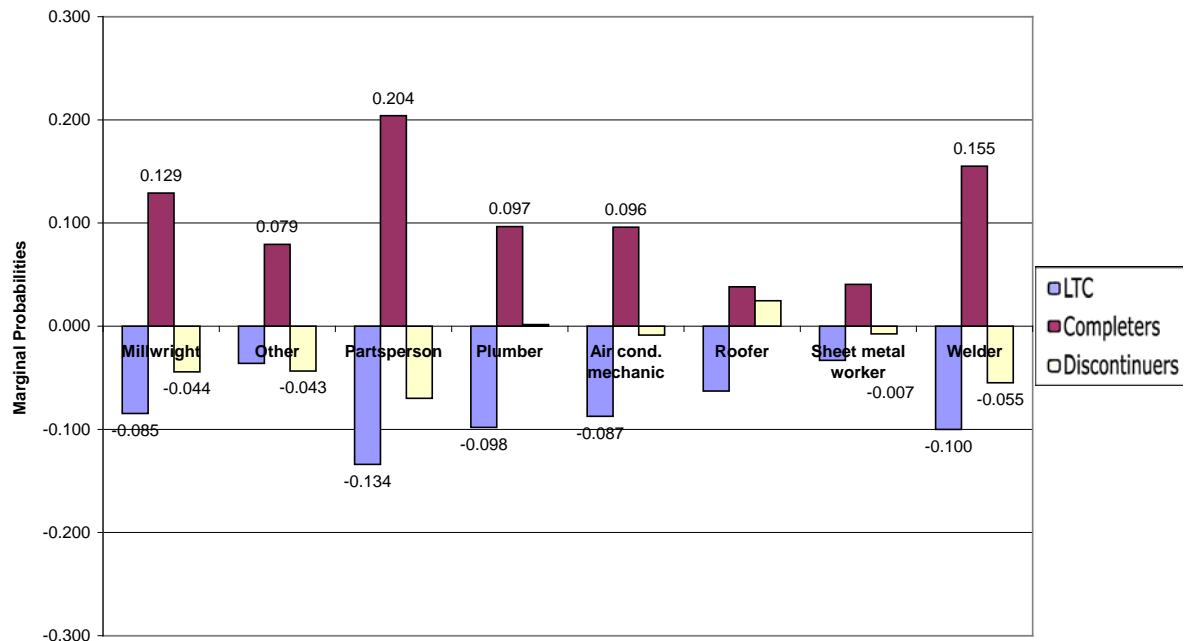
Note: Bars with labels denote statistical significance at at least 5 percent level. Carpenter/cabinetmaker is the omitted category.

Figure 8: Marginal Probabilities, Others Involved in Trade
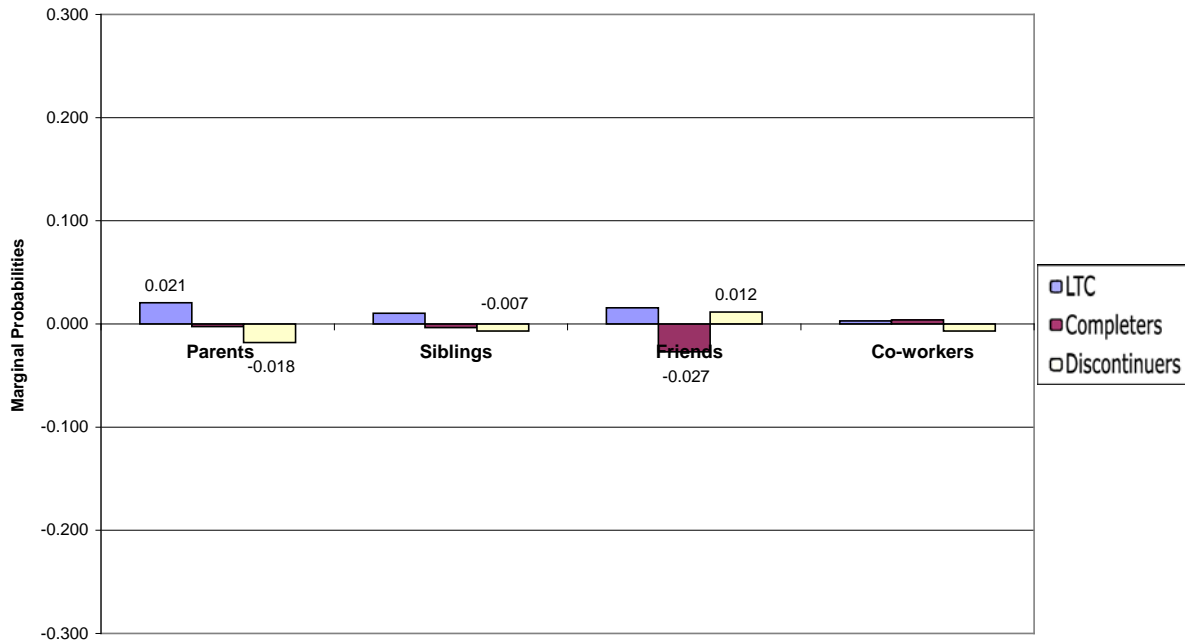
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 9: Marginal Probabilities, Various Employment and Background Factors
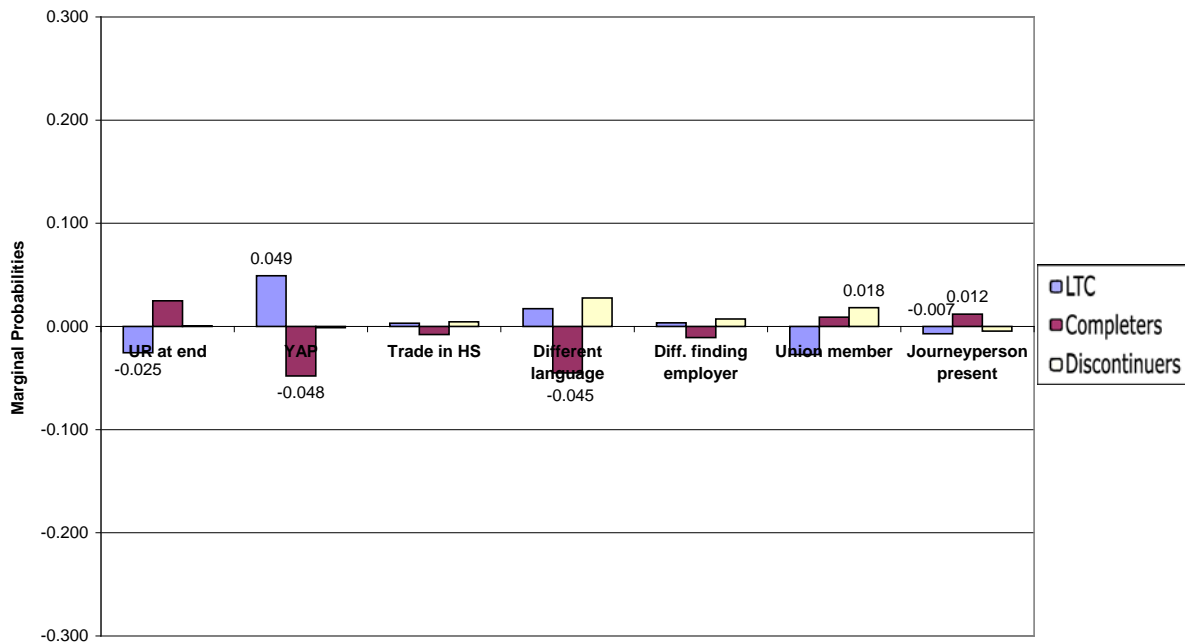
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 10: Marginal Probabilities, Number of Employers
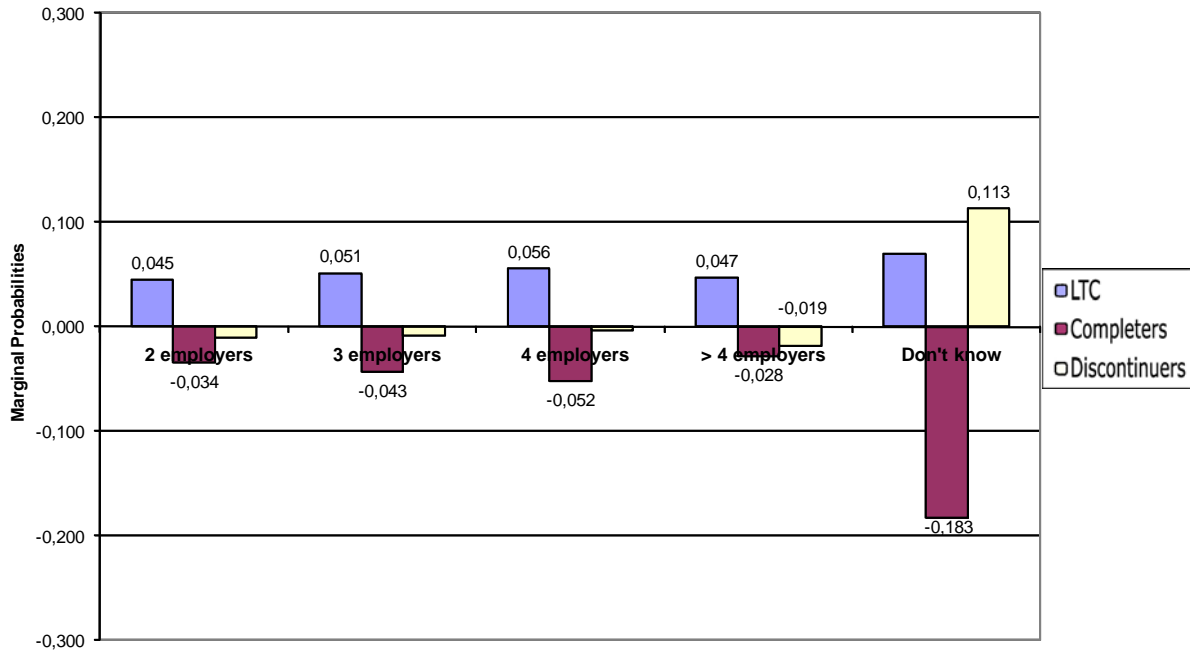
Note: Bars with labels denote statistical significance at at least the 5 percent level. One employer is the omitted category.

Figure 11: Marginal Probabilities, Firm Size
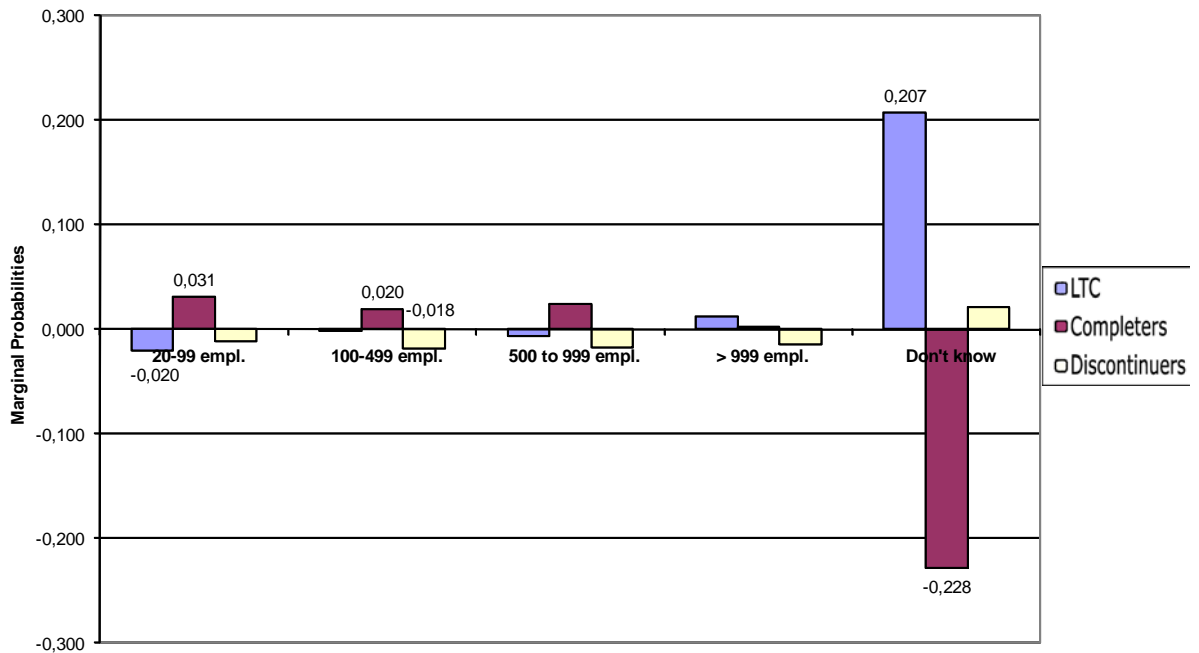
Note: Bars with labels denote statistical significance at at least the 5 percent level. . Less than 20 employees is the omitted category.

Appendix C: Tables

Table 1: Number of Registered Apprentices, by Sex and Major Trade Group, Canada, 1995 and 2007

	Building construction	Electrical, electronics and related	Food and services	Industrial and related mechanical	Metal fabricating	Motor vehicle and heavy equipment	Other	**Total, major trade groups**
1995								
Both sexes	**34,785**	**29,215**	**15,100**	**13,550**	**33,465**	**34,390**	**2,860**	**163,370**
Male	33,910	28,685	6,875	13,340	33,070	33,775	2,290	**151,945**
Female	875	525	8,225	215	400	620	570	**11,425**
Percent female	3	2	54	2	1	2	20	7
2007								
Both sexes	**80,205**	**59,945**	**32,100**	**24,125**	**76,685**	**69,875**	**15,615**	**358,555**
Male	77,260	58,175	11,365	23,655	74,575	67,960	7,495	**320,485**
Female	2,950	1,770	20,735	470	2,110	1,915	8,115	**38,070**
Percent female	4	3	65	2	3	3	52	11
Growth, 1995–2007								
Both sexes	130.57	105.19	112.58	78.04	129.15	103.18	445.98	**119.47**
Male	127.84	102.81	65.31	77.32	125.51	101.21	227.29	**110.92**
Female	237.14	237.14	152.10	118.60	427.50	208.87	1,323.68	**233.22**

Source: Authors' calculations from Statistics Canada and Council of Ministers of Education Canada. *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program*. Catalogue no. 81-582-XIE, Table D.1.2, 2009.

Table 2: Percentage of Completions to Registered Apprentices, by Sex and Major Trade Group, Canada, 1995, 2000, and 2003 to 2007

	Building construction	Electrical, electronics and related	Food and services	Industrial and related mechanical	Metal fabricating	Motor vehicle and heavy equipment	Other	**Total, major trade groups**
1995								
Both sexes	**7.20**	**10.44**	**15.86**	**12.03**	**10.40**	**10.92**	**9.09**	**10.45**
Male	7.30	10.48	11.20	11.96	10.43	11.03	9.39	**10.03**
Female	3.43	8.57	19.76	16.28	7.50	4.84	7.89	**16.11**
2000								
Both sexes	**5.18**	**8.29**	**12.92**	**10.09**	**9.57**	**11.60**	**6.84**	**9.24**
Male	5.23	8.30	9.30	10.18	9.65	11.68	7.43	**8.94**
Female	2.58	7.48	15.22	5.88	4.96	7.88	5.90	**12.34**
2003								
Both sexes	**4.74**	**6.68**	**8.43**	**9.80**	**8.43**	**8.57**	**5.15**	**7.38**
Male	4.78	6.75	5.69	9.88	8.51	8.63	4.26	**7.28**
Female	3.38	4.27	10.02	5.71	4.37	6.45	6.04	**8.32**
2004								
Both sexes	**4.27**	**7.75**	**8.58**	**10.33**	**8.78**	**7.82**	**4.43**	**7.36**
Male	4.31	7.77	5.31	10.42	8.82	7.88	4.12	**7.24**
Female	3.04	6.76	10.52	5.63	6.82	5.19	4.62	**8.48**
2005								
Both sexes	**4.31**	**7.60**	**8.39**	**9.30**	**7.86**	**7.74**	**4.04**	**7.00**
Male	4.38	7.66	5.67	9.35	7.90	7.79	3.88	**6.91**
Female	2.21	4.98	9.90	7.79	6.02	5.15	4.17	**7.74**
2006								
Both sexes	**4.22**	**7.56**	**7.09**	**8.57**	**6.70**	**6.82**	**3.80**	**6.36**
Male	4.29	7.59	4.31	8.65	6.74	6.88	3.14	**6.31**
Female	2.17	5.96	8.58	4.49	5.11	4.26	4.43	**6.78**
2007								
Both sexes	**4.88**	**7.64**	**8.43**	**8.81**	**6.98**	**7.64**	**3.04**	**6.83**
Male	4.98	7.75	4.97	8.90	7.07	7.72	2.40	**6.78**
Female	2.37	3.95	10.32	4.26	4.03	4.96	3.64	**7.30**

Source: Authors' calculations from Statistics Canada and the Council of Ministers of Education Canada.
Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program. Catalogue no. 81-582-X, Tables D.1.2 & D.2.2, 2009.

Table 3: Summary Statistics for Long-Term Continuers, Completers and Discontinuers, 2007

Variable	Long-term continuers		Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Male	0.894	(0.308)	0.867	(0.339)	0.879	(0.327)
Female	0.106	(0.308)	0.133	(0.339)	0.121	(0.327)
Age in 2007	33.490	(8.074)	33.043	(7.563)	32.363	(8.648)
Marital status at end						
Married	0.569	(0.495)	0.530	(0.499)	0.396	(0.489)
Divorced	0.062	(0.242)	0.043	(0.202)	0.054	(0.226)
Single	0.369	(0.483)	0.428	(0.495)	0.550	(0.498)
Number of children <18	0.936	(1.143)	0.664	(1.018)	0.593	(1.027)
Aboriginal	0.066	(0.248)	0.045	(0.206)	0.071	(0.257)
Visible minority	0.088	(0.284)	0.063	(0.243)	0.061	(0.239)
Caucasian	0.846	(0.361)	0.893	(0.310)	0.868	(0.339)
Immigrant	0.101	(0.302)	0.086	(0.280)	0.080	(0.271)
Immigrant father	0.255	(0.436)	0.219	(0.414)	0.199	(0.399)
Immigrant mother	0.231	(0.422)	0.204	(0.403)	0.187	(0.390)
Disability at beginning	0.046	(0.209)	0.026	(0.158)	0.038	(0.191)
Education						
Less than high school	0.175	(0.380)	0.107	(0.309)	0.152	(0.360)
High school	0.517	(0.500)	0.529	(0.499)	0.512	(0.500)
Trade-vocational	0.059	(0.236)	0.073	(0.261)	0.075	(0.264)
College	0.199	(0.399)	0.221	(0.415)	0.196	(0.397)
University	0.049	(0.216)	0.069	(0.253)	0.064	(0.244)
Unknown	0.001	(0.033)	0.001	(0.025)	0.000	(0.012)
Number of years in program						
Less than 1 year	0.038	(0.191)	0.031	(0.174)	0.272	(0.445)
1 year	0.053	(0.224)	0.062	(0.242)	0.233	(0.423)
2 years	0.062	(0.241)	0.105	(0.307)	0.150	(0.357)
3 years	0.081	(0.274)	0.177	(0.382)	0.091	(0.287)
4 years	0.086	(0.281)	0.219	(0.413)	0.056	(0.231)
5 years	0.090	(0.286)	0.146	(0.353)	0.051	(0.219)
6–10 years	0.404	(0.491)	0.199	(0.400)	0.094	(0.292)
11–15 years	0.121	(0.326)	0.034	(0.182)	0.030	(0.171)
16–20 years	0.041	(0.198)	0.014	(0.117)	0.015	(0.122)
> 20 years	0.023	(0.151)	0.012	(0.108)	0.008	(0.087)
Province						
Newfoundland and Labrador	0.081	(0.273)	0.020	(0.140)	0.028	(0.166)
Prince Edward Island	0.002	(0.043)	0.004	(0.065)	0.001	(0.037)
Nova Scotia	0.033	(0.178)	0.031	(0.172)	0.025	(0.157)
New Brunswick	0.023	(0.149)	0.029	(0.169)	0.036	(0.185)
Ontario	0.492	(0.500)	0.376	(0.484)	0.251	(0.433)
Manitoba	0.027	(0.161)	0.044	(0.204)	0.042	(0.201)
Saskatchewan	0.041	(0.198)	0.057	(0.231)	0.052	(0.221)
Alberta	0.187	(0.390)	0.304	(0.460)	0.416	(0.493)
British Columbia	0.109	(0.312)	0.132	(0.339)	0.141	(0.348)
Northwest Territories	0.006	(0.076)	0.004	(0.063)	0.008	(0.087)

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Table 3: Summary Statistics for Long-Term Continuers, Completers and Discontinuers, 2007, cont.

Variable	Long-term continuers Mean	Std. Dev.	Completers Mean	Std. Dev.	Discontinuers Mean	Std. Dev.
Detailed trade groups						
Non-coded	0.005	(0.072)	0.012	(0.107)	0.012	(0.109)
Automotive service	0.164	(0.371)	0.137	(0.344)	0.130	(0.337)
Bricklayer/mason	0.007	(0.082)	0.007	(0.081)	0.008	(0.088)
Carpenter/cabinetmaker	0.117	(0.322)	0.065	(0.247)	0.119	(0.324)
Crane operator	0.013	(0.113)	0.017	(0.129)	0.015	(0.120)
Early childhood educator	0.004	(0.066)	0.006	(0.079)	0.007	(0.086)
Electrician	0.144	(0.351)	0.149	(0.356)	0.139	(0.346)
Electronics	0.009	(0.096)	0.007	(0.083)	0.012	(0.109)
Food services	0.070	(0.254)	0.044	(0.205)	0.051	(0.220)
Hairstylist/esthetician	0.061	(0.238)	0.099	(0.299)	0.054	(0.226)
Heavy duty equipment mechanic	0.058	(0.234)	0.073	(0.261)	0.061	(0.239)
Heavy equipment operator	0.008	(0.087)	0.001	(0.024)	0.002	(0.040)
Industry instrument technician	0.012	(0.107)	0.012	(0.109)	0.029	(0.167)
Interior finish	0.010	(0.101)	0.005	(0.072)	0.007	(0.081)
Lather	0.007	(0.081)	0.004	(0.061)	0.007	(0.082)
Machinist	0.063	(0.243)	0.063	(0.243)	0.049	(0.216)
Metal worker (other)	0.017	(0.129)	0.021	(0.145)	0.017	(0.129)
Millwright	0.048	(0.213)	0.056	(0.230)	0.033	(0.179)
Other	0.027	(0.162)	0.023	(0.151)	0.028	(0.165)
Partsperson	0.004	(0.061)	0.011	(0.105)	0.008	(0.090)
Plumber/pipefitter/steamfitter	0.069	(0.254)	0.086	(0.280)	0.108	(0.311)
Refrigeration and air cond. mechanic	0.017	(0.130)	0.019	(0.136)	0.016	(0.127)
Roofer	0.004	(0.062)	0.003	(0.051)	0.008	(0.088)
Sheet metal worker	0.025	(0.156)	0.019	(0.136)	0.023	(0.150)
Welder	0.039	(0.193)	0.061	(0.240)	0.057	(0.232)
Peers in trade						
Parents	0.223	(0.416)	0.188	(0.391)	0.159	(0.366)
Siblings	0.331	(0.471)	0.295	(0.456)	0.281	(0.449)
Friends	0.393	(0.488)	0.371	(0.483)	0.415	(0.493)
Co-workers	0.217	(0.412)	0.223	(0.416)	0.224	(0.417)
Various background/employment factors						
Unemployment rate at end	6.720	(3.307)	6.424	(2.431)	6.383	(2.804)
Youth apprenticeship program	0.109	(0.312)	0.075	(0.264)	0.108	(0.310)
Trade in high school	0.483	(0.500)	0.503	(0.500)	0.479	(0.500)
Different language at home and work	0.076	(0.264)	0.062	(0.242)	0.070	(0.255)
Difficulty finding employer at start	0.188	(0.391)	0.179	(0.383)	0.187	(0.390)
Union member at beginning	0.140	(0.347)	0.151	(0.358)	0.170	(0.376)
Journeyperson present always	0.798	(0.401)	0.821	(0.383)	0.802	(0.399)

…cont.

Table 3: Summary Statistics for Long-Term Continuers, Completers and Discontinuers, 2007, cont.

Variable	Long-term continuers Mean	Std. Dev.	Completers Mean	Std. Dev.	Discontinuers Mean	Std. Dev.
Type of training						
No technical training	0.481	(0.500)	0.434	(0.496)	0.695	(0.460)
Long block release (>2 weeks/year)	0.300	(0.458)	0.377	(0.485)	0.214	(0.410)
Short block release (1–2 weeks/year)	0.020	(0.141)	0.018	(0.132)	0.012	(0.107)
Day release	0.078	(0.268)	0.069	(0.254)	0.033	(0.177)
Self-paced, distance ed., etc.	0.074	(0.262)	0.063	(0.242)	0.031	(0.172)
Full-time/full-year (high school or college)	0.004	(0.063)	0.003	(0.057)	0.004	(0.061)
Other training	0.041	(0.199)	0.034	(0.182)	0.011	(0.106)
Number of employers						
1 employer	0.423	(0.494)	0.534	(0.499)	0.637	(0.481)
2 employers	0.233	(0.422)	0.218	(0.413)	0.175	(0.380)
3 employers	0.139	(0.346)	0.107	(0.309)	0.073	(0.261)
4 employers	0.067	(0.250)	0.050	(0.218)	0.034	(0.182)
More than 4 employers	0.126	(0.332)	0.088	(0.284)	0.051	(0.220)
Don't know # of employers	0.013	(0.113)	0.003	(0.059)	0.030	(0.171)
Firm size						
Less than 20	0.501	(0.500)	0.472	(0.499)	0.492	(0.500)
20–99 employees	0.265	(0.442)	0.303	(0.460)	0.276	(0.447)
100–499 employees	0.137	(0.343)	0.149	(0.356)	0.126	(0.331)
500–999 employees	0.023	(0.150)	0.027	(0.161)	0.022	(0.148)
More than 999 employees	0.038	(0.190)	0.039	(0.194)	0.036	(0.187)
Don't know size	0.037	(0.188)	0.011	(0.103)	0.047	(0.211)
Sample size - unweighted	4,706		14,694		2,539	
Sample size - weighted	16,703		46,206		9,439	
Proportion of total	0.231		0.639		0.130	

Table 4: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Male	0.040 ***	-0.105 ***	0.065 ***	-0.025 ***	0.051 *	-0.025	-0.025 **	0.050	-0.025
	[0.011]	[0.014]	[0.006]	[0.008]	[0.028]	[0.026]	[0.010]	[0.033]	[0.028]
Age in 2007	-0.038 ***	0.046 ***	-0.008 ***	-0.040 ***	0.050 ***	-0.010 ***	-0.035 ***	0.046 ***	-0.011 ***
	[0.003]	[0.004]	[0.002]	[0.002]	[0.005]	[0.003]	[0.001]	[0.003]	[0.003]
Age2/1000	0.442 ***	-0.554 ***	0.112 ***	0.467 ***	-0.597 ***	0.131 ***	0.417 ***	-0.556 ***	0.140 ***
	[0.030]	[0.054]	[0.028]	[0.029]	[0.059]	[0.033]	[0.011]	[0.037]	[0.032]
Marital status at end (married)									
Divorced	0.030	-0.081 ***	0.051 ***	0.029	-0.076 **	0.047 ***	0.027	-0.075 ***	0.048 ***
	[0.023]	[0.025]	[0.0064]	[0.024]	[0.031]	[0.010]	[0.022]	[0.028]	[0.009]
Single	-0.024 **	-0.025 ***	0.048 ***	-0.027 ***	-0.019 **	0.045 ***	-0.028 ***	-0.016 **	0.044 ***
	[0.0092]	[0.007]	[0.003]	[0.010]	[0.008]	[0.003]	[0.009]	[0.007]	[0.002]
Nb of children <18	0.042 ***	-0.046 ***	0.004 ***	0.043 ***	-0.047 ***	0.004 ***	0.042 ***	-0.045 ***	0.003 ***
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.003]	[0.001]
Aboriginal	0.059 ***	-0.086 ***	0.027 ***	0.054 ***	-0.076 ***	0.023 ***	0.055 ***	-0.075 ***	0.020 ***
	[0.017]	[0.012]	[0.008]	[0.018]	[0.015]	[0.007]	[0.015]	[0.001]	[0.008]
Visible minorities	0.071 ***	-0.055 ***	-0.016	0.075 **	-0.070 ***	-0.005	0.069 ***	-0.062 ***	-0.008
	[0.024]	[0.009]	[0.017]	[0.031]	[0.022]	[0.012]	[0.027]	[0.019]	[0.008]
Immigrant	0.005	0.002	-0.006 ***	0.008	-0.002	-0.006 ***	-0.001	0.014	-0.013 *
	[0.012]	[0.012]	[0.002]	[0.012]	[0.013]	[0.002]	[0.010]	[0.011]	[0.008]
Immigrant father	0.022 **	-0.020 **	-0.002	0.024 ***	-0.021 ***	-0.003	0.025 ***	-0.022 ***	-0.003
	[0.009]	[0.009]	[0.009]	[0.009]	[0.007]	[0.009]	[0.008]	[0.006]	[0.007]
Immigrant mother	-0.003	-0.007 *	0.010	-0.001	-0.008 **	0.010	0.001	-0.008	0.007
	[0.016]	[0.004]	[0.015]	[0.017]	[0.0039]	[0.016]	[0.017]	[0.005]	[0.014]
Disability at beginning	0.086 ***	-0.101 ***	0.015	0.086 ***	-0.105 ***	0.019	0.072 ***	-0.091 ***	0.019
	[0.013]	[0.024]	[0.013]	[0.016]	[0.029]	[0.015]	[0.015]	[0.028]	[0.015]
Education (high school)									
Less than high school	0.063 ***	-0.081 ***	0.018 **	0.062 ***	-0.086 ***	0.024 ***	0.061 ***	-0.084 ***	0.023 ***
	[0.017]	[0.020]	[0.008]	[0.019]	[0.023]	[0.009]	[0.020]	[0.024]	[0.009]
Trade-vocational	-0.001	0.012	-0.011	0.005	0.000	-0.005	0.003	0.003	-0.005
	[0.024]	[0.030]	[0.009]	[0.022]	[0.025]	[0.007]	[0.018]	[0.021]	[0.008]
College	-0.010	-0.001	0.012	-0.011 **	0.004	0.007	-0.007	-0.001	0.008
University	-0.021	0.015	0.006	-0.030 *	0.031 **	-0.001	-0.029 **	0.027 ***	0.002
	[0.016]	[0.013]	[0.006]	[0.017]	[0.015]	[0.004]	[0.014]	[0.010]	[0.006]
Unknown	0.203 **	-0.141 **	-0.062	0.234 **	-0.179 ***	-0.055	0.211 ***	-0.158 ***	-0.054
	[0.093]	[0.071]	[0.039]	[0.092]	[0.067]	[0.043]	[0.081]	[0.053]	[0.040]

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Table 4: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Number of years in program (4 years)									
Less than 1 year	-0.034	-0.543 ***	0.577 ***	-0.043 *	-0.563 ***	0.607 ***	-0.014	-0.542 ***	0.555 ***
	[0.023]	[0.009]	[0.025]	[0.022]	[0.012]	[0.019]	[0.031]	[0.014]	[0.030]
1 year	-0.004	-0.419 ***	0.422 ***	-0.008	-0.457 ***	0.465 ***	0.011	-0.439 ***	0.428 ***
	[0.036]	[0.024]	[0.030]	[0.035]	[0.024]	[0.021]	[0.042]	[0.022]	[0.030]
2 years	0.007	-0.234 ***	0.226 ***	0.006	-0.251 ***	0.246 ***	0.013	-0.245 ***	0.232 ***
	[0.017]	[0.014]	[0.013]	[0.018]	[0.017]	[0.011]	[0.021]	[0.018]	[0.012]
3 years	0.006	-0.076 ***	0.069 ***	0.005	-0.082 ***	0.076 ***	0.006	-0.079 ***	0.073 ***
	[0.007]	[0.020]	[0.020]	[0.008]	[0.014]	[0.016]	[0.007]	[0.016]	[0.018]
5 years	0.073 **	-0.090 ***	0.017	0.073 **	-0.090 ***	0.017	0.063 ***	-0.083 ***	0.019
	[0.030]	[0.021]	[0.020]	[0.029]	[0.018]	[0.019]	[0.023]	[0.012]	[0.018]
6-10 years	0.300 ***	-0.307 ***	0.007	0.299 ***	-0.307 ***	0.008	0.274 ***	-0.287 ***	0.013
	[0.019]	[0.011]	[0.010]	[0.018]	[0.011]	[0.010]	[0.014]	[0.009]	[0.008]
11-15 years	0.422 ***	-0.449 ***	0.027 ***	0.421 ***	-0.449 ***	0.027 ***	0.394 ***	-0.430 ***	0.035 ***
	[0.022]	[0.027]	[0.010]	[0.022]	[0.025]	[0.011]	[0.034]	[0.033]	[0.011]
16-20 years	0.381 ***	-0.434 ***	0.052 **	0.382 ***	-0.434 ***	0.052 **	0.349 ***	-0.407 ***	0.058 **
	[0.041]	[0.023]	[0.026]	[0.040]	[0.022]	[0.026]	[0.054]	[0.033]	[0.028]
>20 years	0.308 ***	-0.326 ***	0.018	0.303 ***	-0.325 ***	0.022	0.284 ***	-0.304 ***	0.021
	[0.020]	[0.017]	[0.023]	[0.023]	[0.014]	[0.023]	[0.027]	[0.012]	[0.025]
Province (Ontario)									
Newfoundland and Labrador	0.167 ***	-0.234 ***	0.067 ***	0.148 ***	-0.229 ***	0.081 ***	0.457 ***	-0.476 ***	0.018
	[0.003]	[0.005]	[0.007]	[0.007]	[0.007]	[0.010]	[0.140]	[0.120]	[0.025]
Prince Edward Island	-0.138 ***	0.179 ***	-0.040 ***	-0.147 ***	0.194 ***	-0.047 ***	-0.072	0.116 **	-0.043 ***
	[0.002]	[0.005]	[0.003]	[0.001]	[0.003]	[0.004]	[0.047]	[0.051]	[0.006]
Nova Scotia	-0.075 ***	0.020 ***	0.054 ***	-0.080 ***	0.035 ***	0.045 ***	-0.005	-0.042	0.048 ***
	[0.002]	[0.007]	[0.005]	[0.003]	[0.006]	[0.005]	[0.035]	[0.040]	[0.007]
New Brunswick	-0.090 ***	0.016 **	0.074 ***	-0.097 ***	0.032 ***	0.064 ***	-0.031	-0.033	0.064 ***
	[0.001]	[0.007]	[0.007]	[0.002]	[0.007]	[0.007]	[0.028]	[0.036]	[0.010]
Manitoba	-0.120 ***	0.066 ***	0.055 ***	-0.121 ***	0.061 ***	0.061 ***	-0.140 ***	0.090 ***	0.051 ***
	[0.001]	[0.002]	[0.002]	[0.003]	[0.003]	[0.004]	[0.011]	[0.013]	[0.004]
Saskatchewan	-0.100 ***	0.052 ***	0.048 ***	-0.101 ***	0.054 ***	0.046 ***	-0.114 ***	0.070 ***	0.044 ***
	[0.001]	[0.005]	[0.005]	[0.003]	[0.002]	[0.0051]	[0.013]	[0.012]	[0.004]
Alberta	-0.134 ***	0.054 ***	0.080 ***	-0.134 ***	0.055 ***	0.080 ***	-0.173 ***	0.096 ***	0.077 ***
	[0.003]	[0.002]	[0.003]	[0.008]	[0.008]	[0.003]	[0.025]	[0.028]	[0.006]
British Columbia	-0.057 ***	0.025 ***	0.032 ***	-0.072 ***	0.050 ***	0.022 ***	-0.056 ***	0.033 ***	0.023 ***
	[0.003]	[0.001]	[0.002]	[0.006]	[0.004]	[0.003]	[0.004]	[0.004]	[0.002]
Northwest Territories	-0.051 *	-0.096 ***	0.147 ***	-0.064 ***	-0.064	0.129 **	-0.053 *	-0.085 **	0.138 **
	[0.028]	[0.031]	[0.057]	[0.021]	[0.045]	[0.064]	[0.029]	[0.035]	[0.061]

. . . cont.

Table 4: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Trade groups (Carpenter / cabinet maker)									
Non-coded				-0.158 ***	0.184 ***	-0.026	-0.154 ***	0.181 ***	-0.028
				[0.022]	[0.058]	[0.036]	[0.023]	[0.057]	[0.035]
Automotive service				-0.081 ***	0.107 ***	-0.026 **	-0.080 ***	0.104 ***	-0.025 **
				[0.023]	[0.018]	[0.012]	[0.020]	[0.013]	[0.012]
Bricklayer/mason				-0.090 ***	0.116 ***	-0.026	-0.089 ***	0.118 ***	-0.029
				[0.018]	[0.033]	[0.022]	[0.019]	[0.034]	[0.021]
Crane operator				-0.091 ***	0.172 ***	-0.081 ***	-0.086 ***	0.167 ***	-0.081 ***
				[0.016]	[0.017]	[0.005]	[0.016]	[0.018]	[0.005]
Early childhood educator				-0.149 ***	0.174 ***	-0.024	-0.145 ***	0.176 ***	-0.031
				[0.005]	[0.025]	[0.023]	[0.004]	[0.023]	[0.021]
Electrician				-0.084 ***	0.106 ***	-0.023	-0.082 ***	0.101 ***	-0.019
				[0.020]	[0.023]	[0.016]	[0.021]	[0.023]	[0.018]
Electronics				0.012	0.030	-0.042 ***	0.032	0.009	-0.041 ***
				[0.030]	[0.029]	[0.006]	[0.023]	[0.024]	[0.007]
Food service				-0.013	0.072 *	-0.059 ***	-0.012	0.068 *	-0.057 ***
				[0.032]	[0.039]	[0.019]	[0.027]	[0.036]	[0.019]
Hairstylist - esthetician				-0.165 ***	0.274 ***	-0.109 ***	-0.166 ***	0.273 ***	-0.107 ***
				[0.011]	[0.014]	[0.007]	[0.008]	[0.011]	[0.007]
Heavy duty equipment mechanic				-0.098 ***	0.138 ***	-0.040 ***	-0.095 ***	0.131 ***	-0.036 ***
				[0.031]	[0.033]	[0.013]	[0.029]	[0.033]	[0.013]
Heavy equipment operator				0.237 *	-0.193 *	-0.044 ***	0.234 **	-0.183 **	-0.051 ***
				[0.13]	[0.11]	[0.016]	[0.110]	[0.093]	[0.014]
Industry instrument technician				-0.033	0.024	0.009	-0.031	0.031	0.000
				[0.029]	[0.029]	[0.013]	[0.027]	[0.024]	[0.012]
Interior finish				0.033	0.009	-0.042	0.022	0.024	-0.046 *
				[0.088]	[0.11]	[0.026]	[0.095]	[0.120]	[0.026]
Lather				0.001	-0.002	0.001	0.019	-0.009	-0.009
				[0.035]	[0.031]	[0.017]	[0.028]	[0.024]	[0.019]
Machinist				-0.079 ***	0.100 ***	-0.022 **	-0.075 ***	0.091 ***	-0.017
				[0.016]	[0.012]	[0.011]	[0.012]	[0.009]	[0.012]
Metal worker (other)				-0.093 ***	0.139 ***	-0.047 ***	-0.089 ***	0.135 ***	-0.046 ***
				[0.010]	[0.021]	[0.018]	[0.012]	[0.023]	[0.017]
Millwright				-0.093 ***	0.140 ***	-0.047 ***	-0.085 ***	0.129 ***	-0.044 ***
				[0.022]	[0.022]	[0.007]	[0.020]	[0.021]	[0.010]
Other				-0.036 *	0.078 ***	-0.042 ***	-0.036	0.079 ***	-0.043 ***
				[0.018]	[0.019]	[0.010]	[0.024]	[0.023]	[0.010]
Partsperson				-0.137 ***	0.209 ***	-0.072 ***	-0.134 ***	0.204 ***	-0.070 ***
				[0.012]	[0.0044]	[0.012]	[0.009]	[0.005]	[0.011]

. . . cont.

Table 4: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Plumber/pipefitter/steamfitter				-0.102 ***	0.101 ***	0.001	-0.098 ***	0.097 ***	0.002
				[0.021]	[0.033]	[0.015]	[0.020]	[0.032]	[0.016]
Refrigeration & air cond. mechanic				-0.096 ***	0.107 ***	-0.011	-0.087 ***	0.096 ***	-0.009
				[0.013]	[0.029]	[0.022]	[0.016]	[0.031]	[0.021]
Roofer				-0.053	0.018	0.035	-0.063	0.038	0.025
				[0.060]	[0.035]	[0.057]	[0.051]	[0.032]	[0.049]
Sheet metal worker				-0.044	0.0502**	-0.007	-0.033	0.041	-0.007
				[0.028]	[0.025]	[0.020]	[0.031]	[0.028]	[0.021]
Welder				-0.105 ***	0.163 ***	-0.058 ***	-0.100 ***	0.155 ***	-0.055 ***
				[0.010	[0.014]	[0.010]	[0.009]	[0.014]	[0.010]
Peers in trade (no peers in trade)									
Parents							0.021 ***	-0.002	-0.018 ***
							[0.007]	[0.006]	[0.003]
Siblings							0.010	-0.003	-0.007 **
							[0.008]	[0.010]	[0.003]
Friends							0.016 *	-0.027 **	0.012 **
							[0.009]	[0.013]	[0.005]
Co-workers							0.003	0.004	-0.007
							[0.012]	[0.008]	[0.005]
Various backgroud/employment factors									
Unemployment rate at end							-0.025 **	0.025 *	0.000
							[0.013]	[0.013]	[0.002]
Youth apprenticeship program							0.049 ***	-0.048 ***	-0.001
							[0.010]	[0.006]	[0.008]
Trade in high school							0.003	-0.008	0.005
							[0.004]	[0.013]	[0.009]
Different language at home and work							0.017	-0.045 ***	0.028
							[0.019]	[0.012]	[0.024]
Difficulty finding employer at start							0.003	-0.011	0.007
							[0.012]	[0.014]	[0.007]
Union member at beginning							-0.027	0.009	0.018 ***
							[0.018]	[0.020]	[0.006]
Journeyperson present always							-0.007 **	0.012 ***	-0.005
							[0.003]	[0.004]	[0.004]
Type of training (no training)									
Long block release (> 2 weeks/year)							-0.040 ***	0.091 ***	-0.051 ***
							[0.006]	[0.013]	[0.007]
Short block release (1-2 weeks/year)							0.019	0.026	-0.044 ***
							[0.027]	[0.028]	[0.009]

Table 4: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Day release							-0.001	0.048 ***	-0.047 ***
							[0.007]	[0.014]	[0.014]
Self-paced, distance ed., etc.							0.008	0.037 **	-0.045 ***
							[0.009]	[0.015]	[0.008]
Full-time/full-year (high school or college)							-0.031	0.044	-0.012
							[0.023]	[0.043]	[0.040]
Other training							-0.004	0.066 ***	-0.062 ***
							[0.013]	[0.015]	[0.004]
Number of employers (1 employer)									
2 employers							0.045 ***	-0.034 **	-0.011
							[0.008]	[0.016]	[0.009]
3 employers							0.051 ***	-0.043 **	-0.008
							[0.007]	[0.018]	[0.015]
4 employers							0.056 ***	-0.052 ***	-0.004
							[0.013]	[0.011]	[0.013]
>4 employers							0.047 ***	-0.028 ***	-0.019 **
							[0.013]	[0.009]	[0.009]
Don't know # of employers							0.070	-0.183 ***	0.113 ***
							[0.051]	[0.030]	[0.028]
Firm size (less than 20)									
20-99 employees							-0.020 ***	0.031 ***	-0.011
							[0.004]	[0.007]	[0.007]
100-499 employees							-0.001	0.020 ***	-0.018 **
							[0.007]	[0.004]	[0.009]
500 to 999 employess							-0.006	0.024	-0.018
							[0.025]	[0.021]	[0.011]
>999 employees							0.012	0.003	-0.015
							[0.034]	[0.018]	[0.020]
Don't know size							0.207 ***	-0.228 ***	0.021
							[0.027]	[0.041]	[0.018]
Observations		21939			21939			21939	

Notes: Omitted variables are in parentheses. Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.