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

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Abstract

We utilize a multinomial probit model and the 2007 National Apprenticeship Survey (NAS) to investigate the persistence behaviour of individuals enrolled in apprenticeship programs. These behaviours include continuing, discontinuing (or quitting) and completing programs. The NAS contains detailed demographic data as well as other data regarding respondents' backgrounds and apprenticeship characteristics. Our results show that program completion is positively related to being married, having fewer children, being non-Aboriginal and not a visible minority, not being disabled 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. Type of technical training and having a journeyman always present enhance the probability of completion. The regional unemployment rate has little effect on completion. There are also large provincial and trade group differences that are generally consistent with the sparse literature on this topic. Males and females have similar completion probabilities when we control for other influences.

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Executive Summary

Recently there has been increased interest in the topic of apprenticeship training in Canada. Much of this interest is driven by the desire to replace the current stock of skilled trades people who are nearing retirement age, and by the fact that completion rates among apprentices are low compared to those who attend other forms of post-secondary education such as colleges and universities. While the determinants of university and college access and persistence to graduation have been the topic of numerous recent studies, a similar analysis for apprentices in the skilled trades is lacking. This research attempts to fill this gap.

We use a new data set – the 2007 National Apprenticeship Survey (NAS) – to address the correlates of persistence behaviour among Canadians who were registered in apprenticeship programs at some point in the 2002-04 period. In particular, we are interested in the demographic, labour market and employer characteristics that are correlated with the three apprenticeship states given in the NAS: long-term continuation, completion, and discontinuation. Using the postal codes in the NAS as well as the Postal Code Conversion File Plus (PCCF+), we are able to link the person records to the regional unemployment rate in the Labour Force Survey (LFS). We use a multinomial probit model to estimate the relationship between these variables and the completion behaviour of apprentices.

We find that a number of demographic and job-related variables are related to the completion probability of registered apprentices. 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 apprenticeship completion. Time in apprenticeship programs, trade group, province of residence and a variety of job-related variables such as type of technical training and having a journeyman present are also important correlates of program completion. We also find that the regional unemployment rate is very weakly (but positively) related to completion.

Our results tend to be robust to different model specifications and are generally in accord with the sparse, previous Canadian literature on this topic.

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

I. Introduction

Getting young people to enter – and above all to complete – the skilled trades is an uphill battle. The Canadian Apprenticeship Forum (CAF) recently released a report which discusses nine barriers to accessing, maintaining, and successfully completing apprenticeship programs (CAF, 2009). 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 for their young children. The problems with apprenticeship programs also have to do with the perceived lack of job stability, lower incomes, and the lower status of these blue collar occupations relative to the other options open to Canadian youth (Sharpe and Gibson, 2005). Cote and Allahar (2007:172) argue 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 post-secondary 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 much 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 universities or colleges (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 apprenticeships as their terminal education choice.² Compared to the data used to study the transitions from high school to university or college, and from university or

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

² Sharpe and Gibson (2005) show that only 13 percent of PSE enrolments are apprentices, compared to 28 percent in colleges and 59 percent in universities.

college to the labour market, there are few data sets that enable researchers to study transitions through apprenticeship programs.

Here we use a new data set – the 2007 National Apprenticeship Survey (NAS) – to address the correlates of persistence behaviour among Canadians who were registered in apprenticeship programs at some point in the 2002-04 period. We are interested in the demographic, labour market and employer characteristics that are correlated with the three apprenticeship states given in the NAS: long-term continuation, completion, and discontinuation. Using the postal codes in the NAS as well as the Postal Code Conversion File Plus (PCCF+) utility, we are able to link the person records to the regional unemployment rate in the Labour Force Survey (LFS) to address the importance of this variable to the persistence choice 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 treatments of the subject. Contrary to other 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 an impact on registration, our results suggest that there is a small negative impact on long-term continuation, but no statistically significant effects on completion and discontinuation.

The paper is organized into several sections. Section 2 places the paper in the context of what we currently know about persistence in apprenticeship programs in Canada. The third section discusses the methodology employed and the fourth section the data used. Presentation and discussion of the results is the topic of the fifth section. The sixth and final section concludes the paper.

II. Background and Literature Review

The number of Canadians registered in apprenticeship programs has mushroomed over the past dozen years. Table 1 shows individuals registered in apprenticeship programs increasing by around 120 percent between 1995 and 2007. Some of this growth is the result of growth in the non-traditional trades (i.e., the “other” category) – partially the result of the addition of several new trades (Skof, 2006). But growth in traditional trades (with the exception of industrial and related mechanical) has also at least doubled. Much of this growth has come as a result of increased female involvement in the major trades. For comparison purposes, enrollments in undergraduate programs in Canada only

increased by 36 percent from the 1997/98 to the 2007/08 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

Despite the large increase in apprenticeship registrations the proportion of registered apprentices completing their programs has actually fallen, implying that the number of completers has not kept pace with the growth in registrations. Unfortunately, data on apprenticeship completion rates is not published as it is for college and universities (Statistics Canada and CMEC, 2003), so we are only able to use the ratio of completions to total registrations as an estimate. These figures likely underestimate the true completion rates since they are calculated as the number of apprenticeship completions over the number of registered apprentices, and this denominator has been growing (see Table 1). In Table 2, the overall “rate” 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 food and service and industrial and related mechanical the highest in every year.

Compared to other forms of PSE such as college and university, the requirements for apprenticeship progress 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 or hands-on 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 also can differ as well as other program requirements (e.g., some journeyman exams can be challenged without an apprenticeship, others not).

³ Full-time enrollments in undergraduate programs were 481,134 in 1997/98 and 654,403 in 2007/08. See www.statcan.gc.ca/pub/81-582-x/2009002/tbl/d.1.5.2-eng.htm (accessed November 16, 2009).

⁴ As of 31 October 2005 (the most recent year for which data are available), there were 429,243 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 www.statcan.gc.ca/pub/81-582-x/2009002/tbl/d.1.4-eng.htm (accessed April 1, 2010).

⁵ See www.ellischart.ca (accessed April 1, 2010).

Factors Behind Low Apprenticeship Completion Rates

Several reasons have been offered to explain low apprenticeship completion rates. The fact that apprentices tend to be older means that apprenticeships are not 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 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 a new dimension which is often not considered in the study of the typical high school to college or university transition.

For example, at least partially as a result of this age-experience nexus, there may be little incentive to completing apprenticeship programs since those who do so may not enjoy significant post-apprenticeship employment or earnings advantages. This differs from other forms of PSE such as university where the “sheepskin effects” can be substantial. Indeed, Ferrer and Riddell (2002) argue that the importance of credentials in terms of earnings increases with education level. Stated differently, the penalty for non-completion (in terms of forgone earnings) may be higher for other forms of PSE compared to apprenticeship training.

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 (graduation or drop-out), drop outs make 77 percent of the hourly wage of journeymen whereas graduates earn 81 percent. However, drop-outs are less likely to be employed in the trade 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 programs had an 88 percent employment rates (compared to 82 percent of those who discontinued their programs) and they were also more likely to hold permanent jobs (80 percent vs. 76 percent). Furthermore, median wages for completers were \$27 per hour in 2007 compared to \$20 per hour for individuals who discontinuers. Together, these results suggest that the penalty to withdrawing from an apprenticeship program may be substantial when both wage and non-wage factors are considered.⁶

Demographic differences may also be related to completion behaviour. U.S. evidence presented by Bilginsoy (2003) shows that women and racial minorities were more likely to cancel apprenticeship programs – and less likely to complete

⁶ Boothby and Drewes (2006) estimate the weekly earnings premium for 25-34 year-old males with trades (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, they are unable to compare those who completed trades with those who did not.

them – compared to their male and white counterparts. He also shows that union status is positively related to completion rates. In particular, apprenticeship programs in the US 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.

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 their children in the apprenticeship stream – rather than the academic stream – at high school in both Canada and Germany.

Having knowledge of the trades prior at an early age may also be a factor in successful apprenticeship completion. All provinces offer a Youth Apprenticeship Program (YAP) where young people can work towards trade 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, 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. 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.

The Business Cycle and Apprenticeship Training

The theme that has resulted in the largest volume of studies is the effect of the business cycle on apprenticeships. The cyclicity 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 or financial resources necessary to hire apprentices, especially when the required ratio of journeypersons to apprenticeships 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 is the best option and move onto other types of education (e.g., college or university) or directly to the labour market in another field. Conversely, high unemployment rates may drive individuals into apprenticeships (just as the demand for colleges and universities increases). It is possible that during economic expansions apprentices are able to find good jobs without completing their programs, thus increasing the probability of non-completion – either by discontinuing or long-term continuation.

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

The modest amount of evidence that does exist on the effects of the business cycle is mixed. Although enrollments in more formal post-secondary education (i.e., colleges and universities) are countercyclical, the opposite is true for registrations in Canadian apprenticeships where registrations tend to be procyclical (Sharpe and Gibson, 2005; Skof, 2006).

Although the number of new registrations may be sensitive to the oscillations of the business cycle, we are not sure about the persistence behaviour of those already registered and there is little evidence anywhere. Evidence for the Australian state of Queensland shows that apprenticeship quit 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 much 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 pro-cyclical 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) pro-cyclical, whereas training (not including apprentices) tends to be counter-cyclical. 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) say the anecdotal evidence suggest that when jobs are scarce, apprentices are laid off and cannot obtain the number of hours needed to complete their programs. During economic booms, they also may not be able to take time off to complete classroom requirements. Both of these obviously 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.

III. 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.⁷

After entering into an apprenticeship program, an individual has three choices⁸: 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

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

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 ϵ 's to be correlated with each other).

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

⁷ 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.

⁸ 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 2002-04 period, we do not observe switchers.

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

The probability of choosing category j can be written as:

$$P(y_i = j | x_i) = (y_{ij}^* > y_{i1}^*, \dots, y_{ij}^* > y_{i(j-1)}^*, y_{ij}^* > y_{i(j+1)}^*, \dots, y_{ij}^* > y_{iM}^*)$$

where $j=1, \dots, M$ and $i=1, \dots, N$. 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 β_j 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 youth apprenticeship program (YAP), length of time registered as an apprentice, trade group, local area economic conditions, etc. Since apprenticeship programs are regulated by provincial authorities, provincial dummy variables are included to capture any systemic differences between provinces.⁹ 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.

⁹ Due to different apprenticeship programs in different provinces, the error terms of individuals within provinces could be correlated. As such we control for clustering within provinces in all estimates.

IV. Data¹⁰

The 2007 National Apprenticeship Survey (NAS) from Statistics Canada gathers information on the training and employment of apprentices across Canada. The survey's sample frame consists of all registered apprentices on the lists of apprentices provided by the provincial and territorial jurisdictions (except for Nunavut) for the 2002, 2003 and 2004 reference years. A total of 30,572 respondents were interviewed. The survey was performed between January and May 2007.

These data are useful for studying the persistence behaviour of apprentices since they contain detailed data on three groups: long-term continuers, completers, and discontinuers.¹¹ Each respondent to the survey is classified into one of these three groups during the 2002-04 frame, and then again in 2007 at the time of the survey. Of course, there is movement between these three groups between 2002-04 and 2007. For the purpose of our analysis we use the 2007 categories as our dependent variable, although a similar analysis using the 2002-04 categories yielded similar results.

Each group was asked a set of questions in different areas such as pre-apprenticeship education, training and work experiences, work as apprentice, reasons why discontinuers do not complete their programs, difficulties encountered during apprenticeship and general socio-demographic characteristics.

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 Québec and

¹⁰ 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 which have been shown to be important controls in the PSE literature addressing college and university choice. The Registered Apprentice Information System (RAIS) 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.

¹¹ A limitation of these data is that they only include long-term continuers, defined as those who began their programs 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.

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.

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 underreporting 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 2002-04 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 2002-04 and 2007 (i.e. those who had completed their program in 2002-04 and indicated they were “discontinuers” or “long-term continuers” in 2007), those who had different trades between 2002-04 and 2007, those who have not worked at all as apprentices between 2000 and 2007 (inclusively), those who started their apprenticeship program before age 16¹², 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. These

¹² Including those who started their apprenticeship program at ages 14 and 15 did not change the results.

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 – involved in apprenticeship programs during the 2002-04 survey frame.

V. Results

Table 3 present the summary statistics for each of the three groups. These figures are generally consistent with the literature in this area. The weighted proportion of long-term continuers (or LTCs), completers and discontinuers are 0.23, 0.64, and 0.13, respectively. While males dominate in all three categories, they are most likely to be LTCs. LTCs also tend to be older compared to either completers or discontinuers. The fact that the mean age for all three categories is well-over 30 years of age also shows apprentices tend to be much older than those who attend university or college. LTCs 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 amongst this group. Aboriginals, visible minorities and immigrants are over-represented amongst LTCs and whites in the completer category. LTCs also are more likely to have an immigrant mother and immigrant father. Completers are more likely to have at least a high school education (and higher levels of education in general) than LTCs or discontinuers.

In terms of time in the program, completers are more likely to have three to five years compared to the other two groups, whereas LTCs tend to have spent more time in their programs, and discontinuers less.¹³ 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.

A cursory look at the proportion in each of the three groups by detailed trade group implies that the completion rates between trades can differ substantially. By comparing the proportion who completed to those who were LTCs or discontinuers, carpenters/cabinet makers, heavy equipment operators and roofers, in particular, appear to have trouble completing their programs (as evidenced by the lower proportions in this state compared to the two others). By

¹³ 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 drop-out 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.

contrast, hairstylists-estheticians, millwrights and partspersons are the most likely to complete their programs.

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

Completers on average experienced lower regional unemployment rates compared to LTCS (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 youth apprenticeship programs (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.¹⁴ There is little difference between the groups regarding difficulty finding employment at the beginning of the apprenticeship. Union membership at the beginning of the program is highest amongst discontinuers, whereas having a journey person always present was highest amongst completers.

The type of technical training undertaken is related to apprenticeship continuation. About 43 percent of completers had no technical training nor did about 70 percent of discontinuers. The latter result is not surprising since most discontinuers leave their programs within the first two years, likely before undertaking any technical training. The former result suggests that a large proportion of completers are challenging the exam without technical training. In terms of type of 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

The results of the multinomial probit model are presented in Figures 1 through 11 and based on the most inclusive specification (i.e., Model 3) in Table A1. In each

¹⁴ 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 programs with one employer, coupled with the high probability of remaining with the same employer following completion, we thought this a reasonable assumption to make.

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, 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.¹⁵ The results in the figures correspond to the third and final model in Table A1. The other models in Table A1 are included for comparison purposes. We do note that most of the coefficient estimates are robust to the inclusion of additional variables as the model is built up in stepwise fashion. Any exceptions to this rule are discussed below. In all cases our dependent variable is the apprenticeship status at the time of the 2007 survey: long-term continuers (or LTCs), completers, and discontinuers.

In Figure 1, males are less likely than females to be LTCs and statistically no more likely to complete or discontinue their programs. This is largely owing to the number of women in the hairstylist-esthetician trade, where programs are relatively short and completion rates high.¹⁶ 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 programs 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. Children tend to reduce the probability of completion and increase the probability of being a LTC.

The data in Figure 2 show that Aboriginals and visible minorities are both less likely to complete than whites (the excluded category), with both groups more likely to be long-term continuers. Trendle (2007) finds similar evidence for Indigenous Australians in Queensland who also have a higher probability of canceling apprenticeship contracts compared to the non-Indigenous population. This result is also in accord with Bilginsoy's (2003) evidence for the U.S. regarding minorities. Immigrant status does not itself appear to be important in

¹⁵ As mentioned above, we initially used multinomial logit (MNL) models since they are computationally more efficient, but Hausman tests rejected the irrelevance of independent 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 (2002-04). We found reasonably similar results to those presented here. Various other model specifications were attempted. There are not reported here in the interest of parsimony, but all are in accord with the results presented here.

¹⁶ In Appendix Table A-1, 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) which excluded the hairstylist-esthetician trade group also yielded a positive coefficient on the male variables, again significant at 10 percent.

terms of completion.¹⁷ 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.

Figure 3 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 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. Mangan and Trendle (2008b) also find evidence for Australia that males who have completed high school are more likely to complete their apprenticeships compared to those who did not.

The number of years in the apprenticeship program provides an interesting – if not unexpected – correlate to each of the three states. As shown in Figure 4, 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 LTCs 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 as four to five years (Morissette, 2008).

Figure 5 presents results with the provinces added, with the exception of Quebec which was excluded as explained above.¹⁸ Compared to Ontario (the omitted

¹⁷ 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 Table A-1 for detailed results.

¹⁸ To see if there were differences between Quebec and the rest of Canada, we ran two separate multinomial logit models, one with and the other without Quebec, 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 underreported or not reported in the NAS. The results between the two models were similar as well as 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 8).

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 Territories) have completion probabilities significantly higher than Ontario. Discontinuation rates are highest in the Territories.

Figures 6a through 6c show the results of adding in the block of variables for 24 trade groups derived from the 2001 National Occupational Classification. The omitted category is carpenters and cabinet makers. Most of the other trades have completion probabilities which are higher than the omitted group (or at least no lower). 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 LTC as low or lower than carpentry and cabinet making. Several trades have very high relative completion probabilities including hairstylist-esthetician which is heavily skewed toward female participation.¹⁹

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 coworkers were involved in the individual's trade. Specifically, the NAS asks the 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; or co-workers. Respondents answered yes or no to these four separate questions. The results in Figure 7 show no obvious trend. Parents in the trade do have an influence, but not on completion, only a positive relationship exists 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. Ménard, et al. (2008) report that contact with people exposed to the trade was the most common factors which influenced apprentices' interest in that trade. While these contacts may facilitate *entry* into an apprenticeship, they appear to be of little influence on *completion*.

Figure 8 addresses various employment and other background factors that we have included in the model; factors which could influence the completion probability of apprentices. The unemployment rate²⁰ only has a small impact on the probability of long-term continuation. These results suggest that a two-

¹⁹ 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 positive 5.1 percentage points, significant at the 10 percent level. Compare Models 1 and 2 in Appendix Table A-1.

²⁰ 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).

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 Table A-1). Although most research shows that registration in apprenticeships tends to be pro-cyclical (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.²¹

All provinces offer a Youth Apprenticeship Programs (YAP) where young people can work towards trade 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, or (in Quebec only) a *diplôme d'études professionnelles* (DEP). 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. Given 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 counter-intuitive effect of decreasing the probability of completion and increasing the chance of long-term continuation.²² 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 8. The NAS asks if the individual had difficulty finding an employer willing to take on apprentices when s/he started the program, if they were union members at this time, and if there was a journeyman 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. Having a journeyman 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

²¹ When estimating these models using the apprenticeship status over the 2002-04 frame, we also found no significant relationship between any of the three states and the unemployment rate. Given the nature of the 2002-04 data, we used the average unemployment rate from 2002-04, and not the unemployment rate at the time of program completion for discontinuers and completers as we do here.

²² Arguably, this could be the result of “streaming” into these programs amongst those that may not be academically gifted. To address this, we regressed high school grades on the YAP variable (not reported) and found no evidence of streaming. In fact we found the opposite, as participation in these programs increased in grades. It is quite possible, however, 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 improved his/her grades in the new program, thus biasing the results in our simple regression. We have no way of addressing this potential endogeneity in our data.

completion by some 4.5 percentage points, although due to the construction of this variable, too much confidence should not be placed in this estimate.²³

Since technical training is an integral part of most apprenticeship programs, accessing this training should increase the probability of completion. Indeed, our preliminary work using these data showed that accessing this training greatly increased the probability of completion. Figure 9 further investigates this preliminary result by addressing the types of training undertaken. 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 is the reference group. Those who took only long-block training (more than 2 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. A larger number of employers might signal difficulties with in 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/her employer. In Figure 10, 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. Mangan and Trendle (2008b) also find that males in Australia who have worked with a single employer have a higher probability of completion.

Finally, the size of the firm where the individual last received training may be an important correlate of completion behaviour. The results in Figure 11 suggest that completion probabilities are enhanced for those working at medium sized firms (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.

The above results are generally consistent with the very limited literature on the apprentices in Canada and also with the results from the international literature.

VI. Conclusions

In this paper we use the NAS to address the statistical correlates of the three states of apprentices in a multivariate framework. The 2007 NAS contains information on whether individuals were long-term continuers, completers or discontinuers in apprenticeship programs. Using a series of multinomial probit

²³ 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.

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.

In particular, 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, 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. Our results also tend to be robust to different model specifications and are generally in accord with the sparse, previous Canadian literature on this topic.

This research is a first step in the study of apprenticeship programs in Canada. Although we have empirically verified many of the correlates of apprenticeship completion, our results are largely descriptive given the nature of the data. While the models estimated here do offer predictive power, they do not infer causality. There is clearly the need for better data to study this problem. The gathering of longitudinal data on apprentices as well as other potential education pathways of Canadians would allow researchers to answer many of the questions that remain to be answered regarding apprenticeship registration and persistence to program completion.

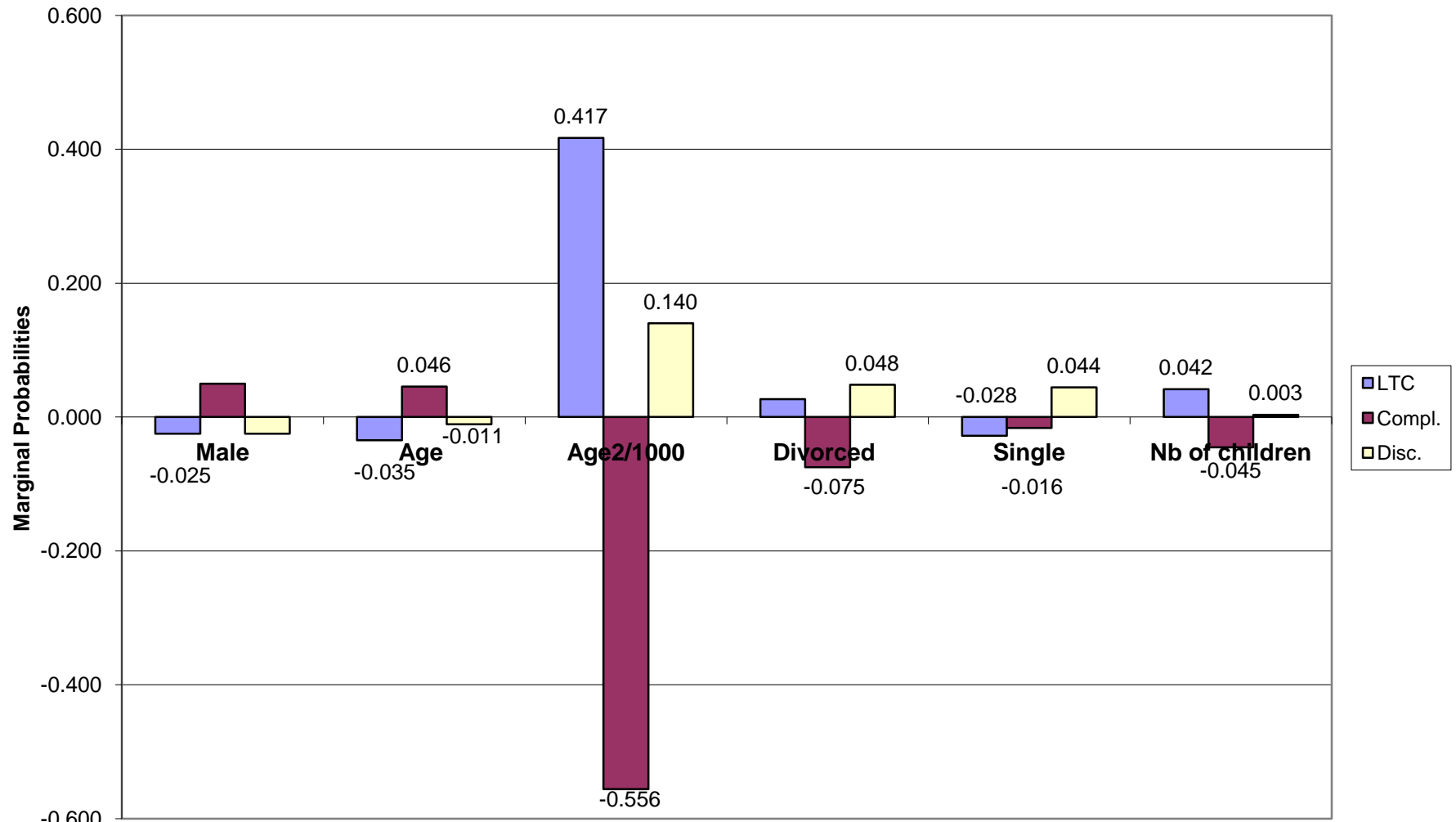
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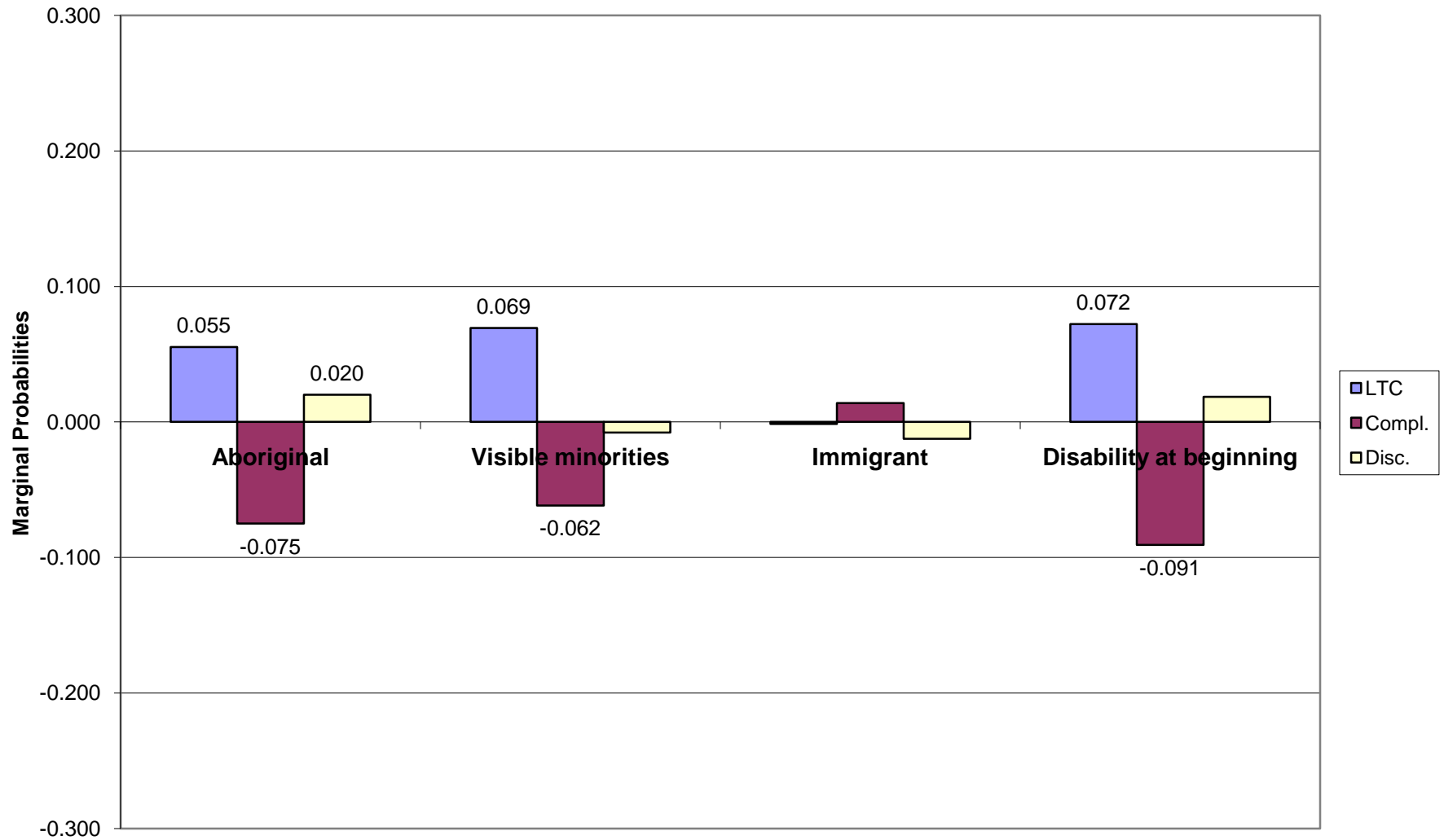
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Figure 1: Marginal Probabilities, Demographic Characteristics I



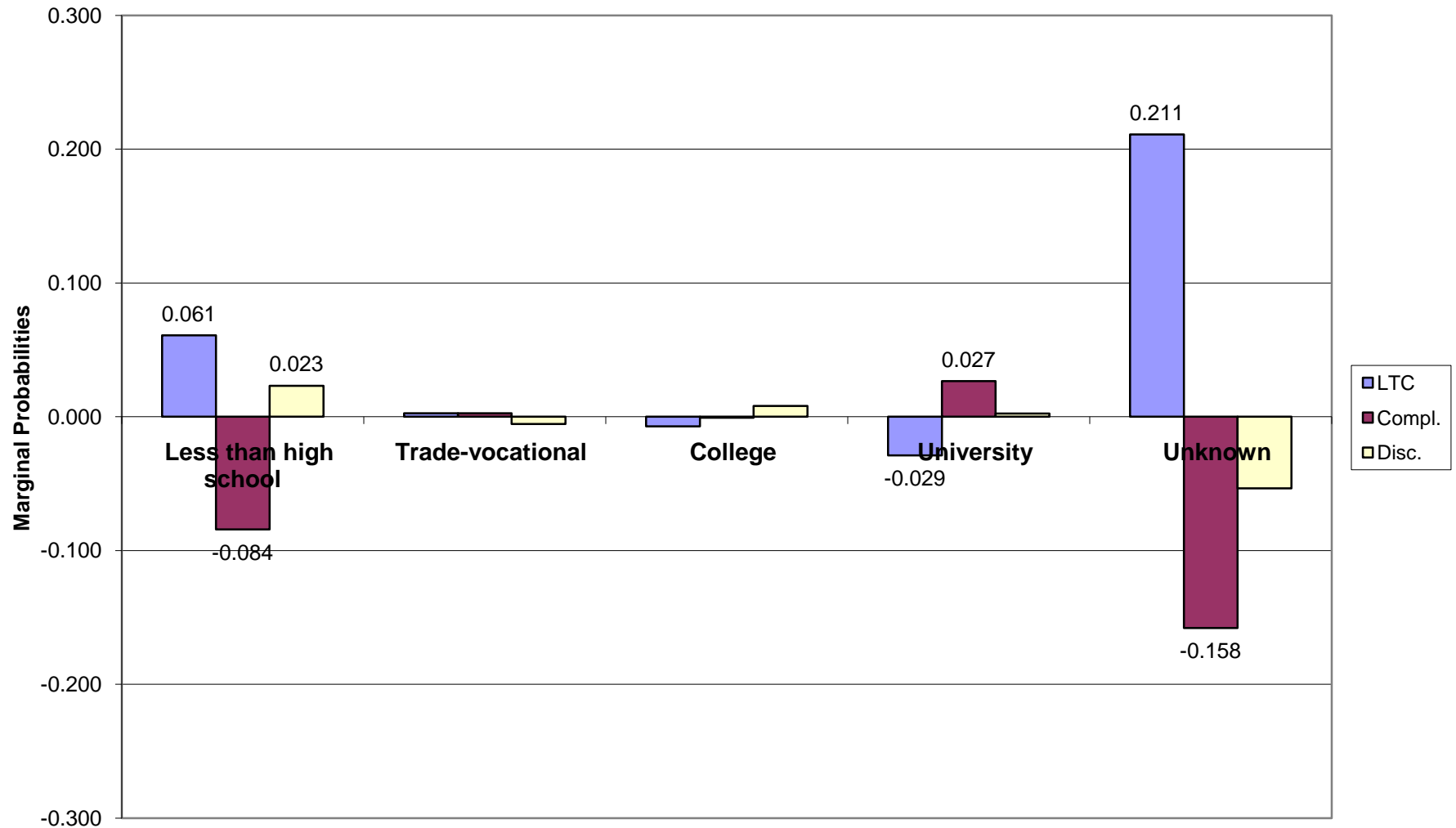
Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 1, 4 and 5 differ from the other figures.

Figure 2: Marginal Probabilities, Demographic Characteristics II



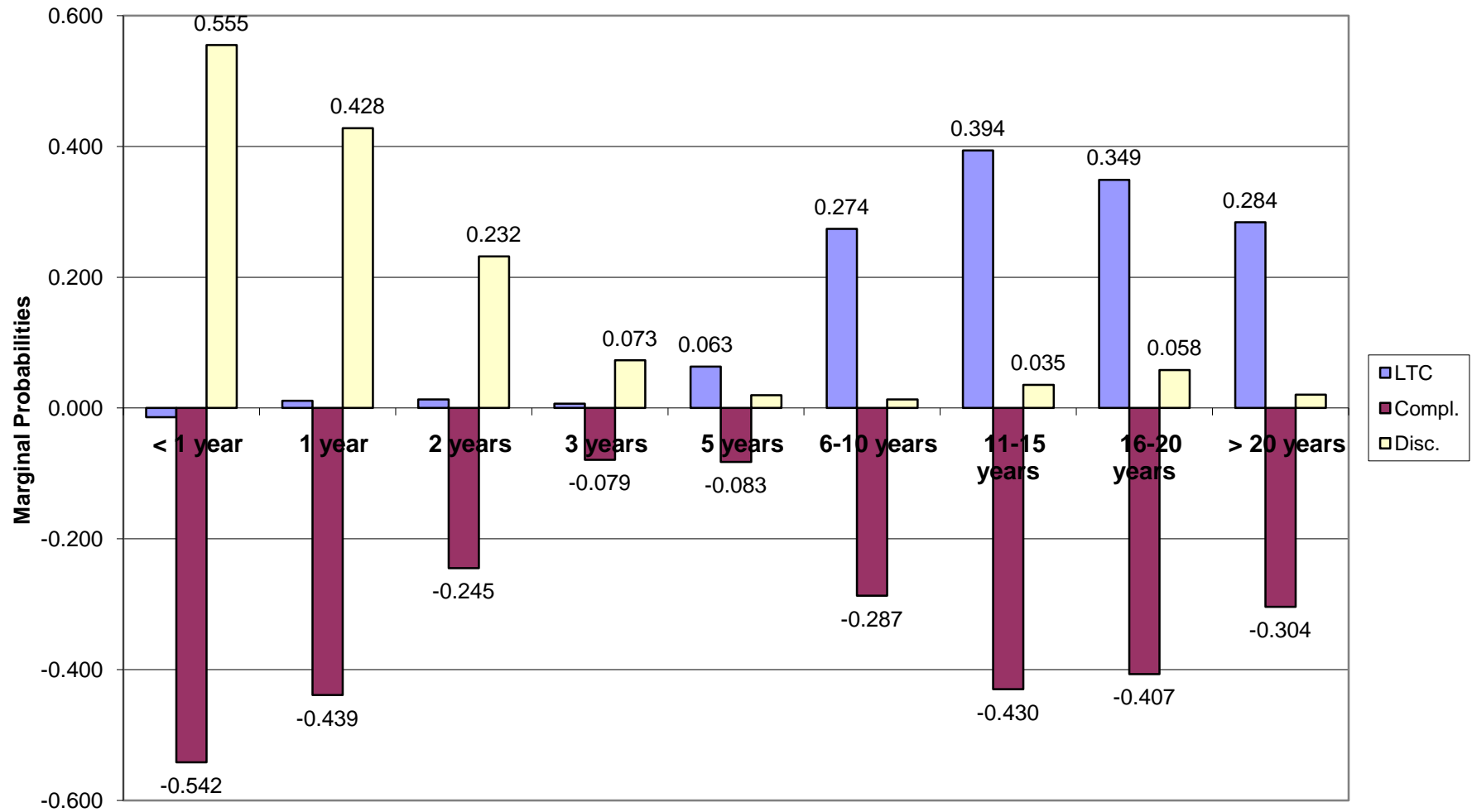
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 3: Marginal Probabilities, Previous Education Level



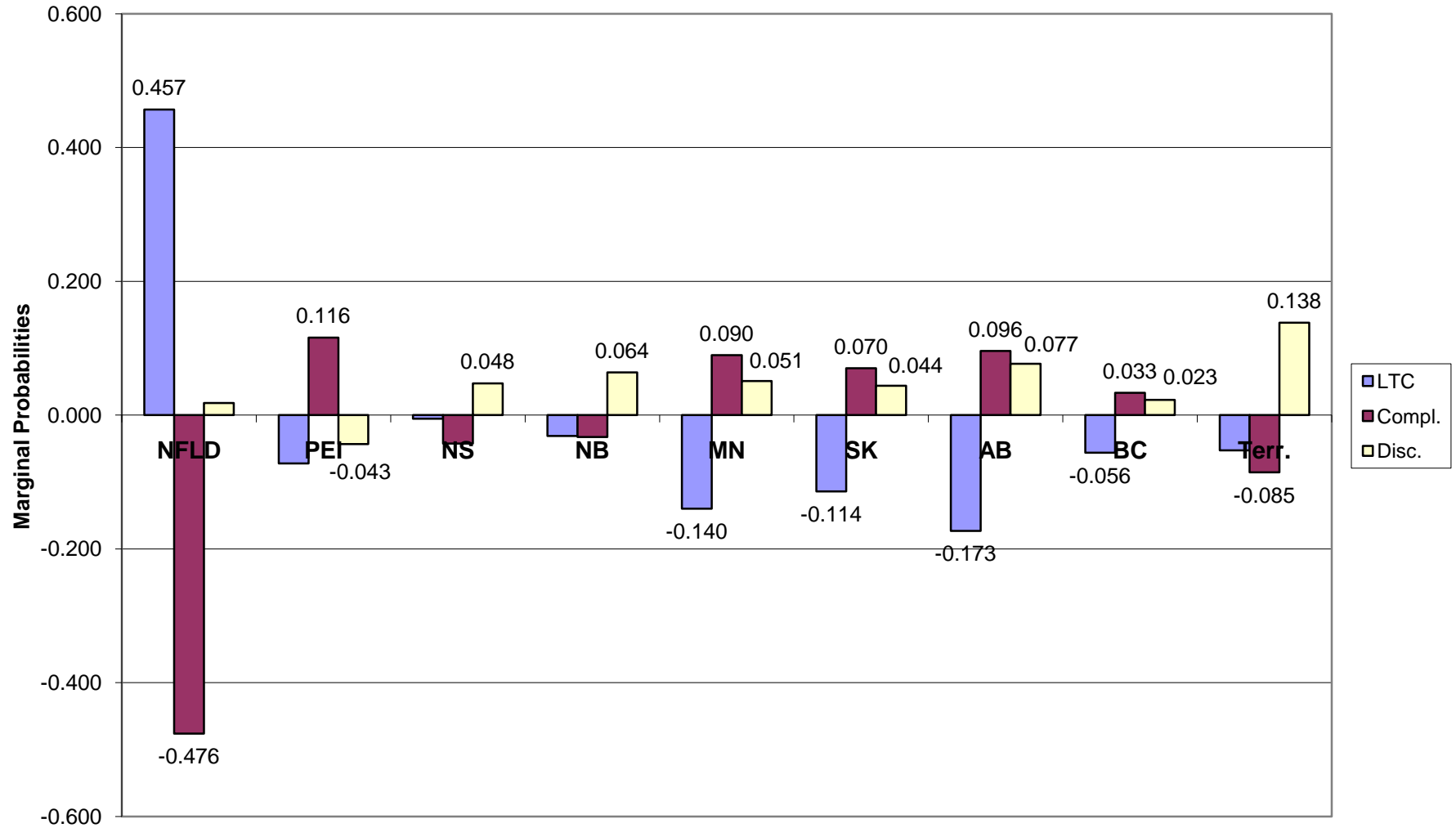
Note: Bars with labels denote statistical significance at at least the 5 percent level. High school is the omitted category.

Figure 4: Marginal Probabilities, Years in Apprenticeship Program



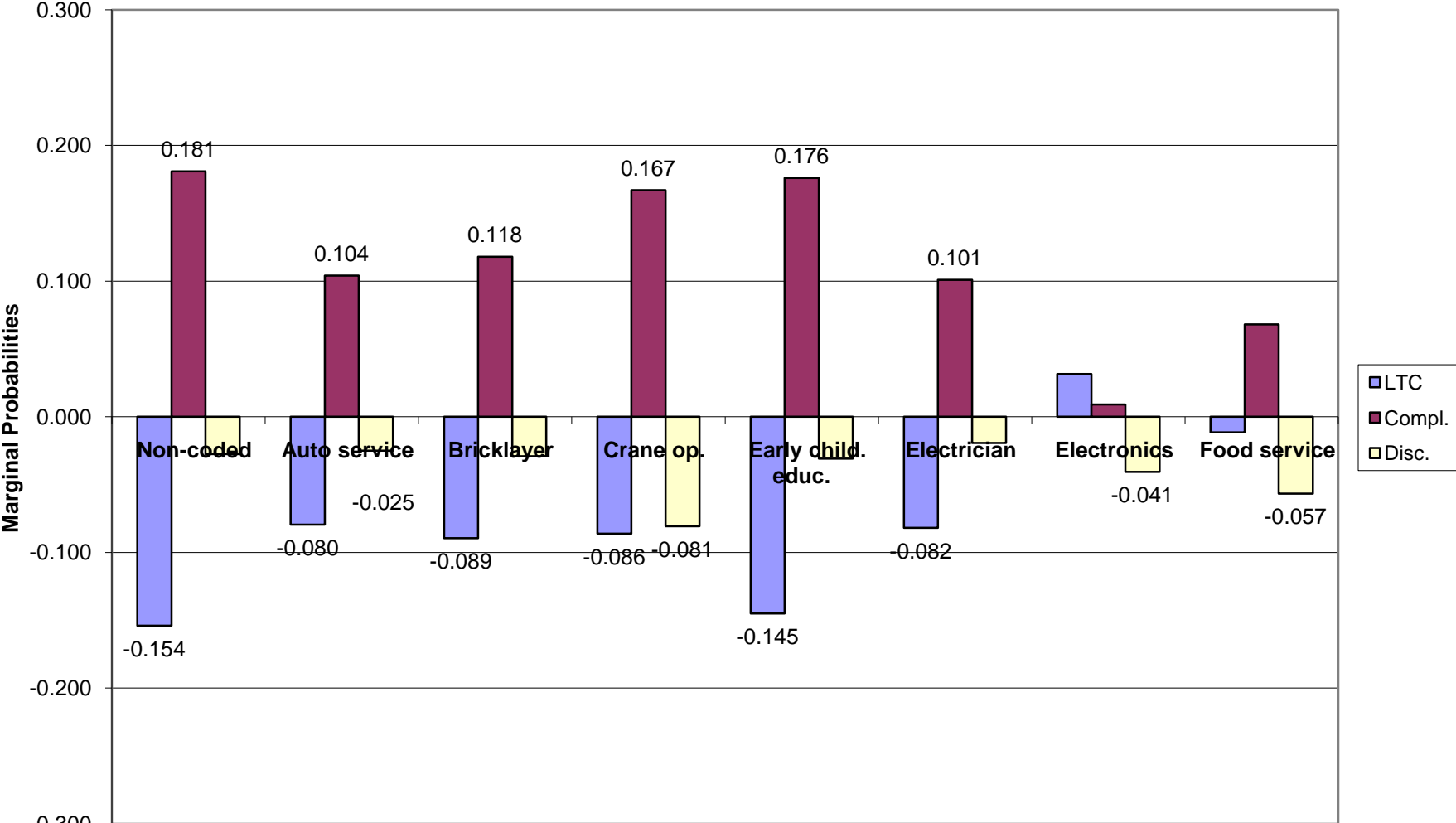
Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 1, 4 and 5 differ from the other figures. 4 years is the omitted category.

Figure 5: Marginal Probabilities, Provinces



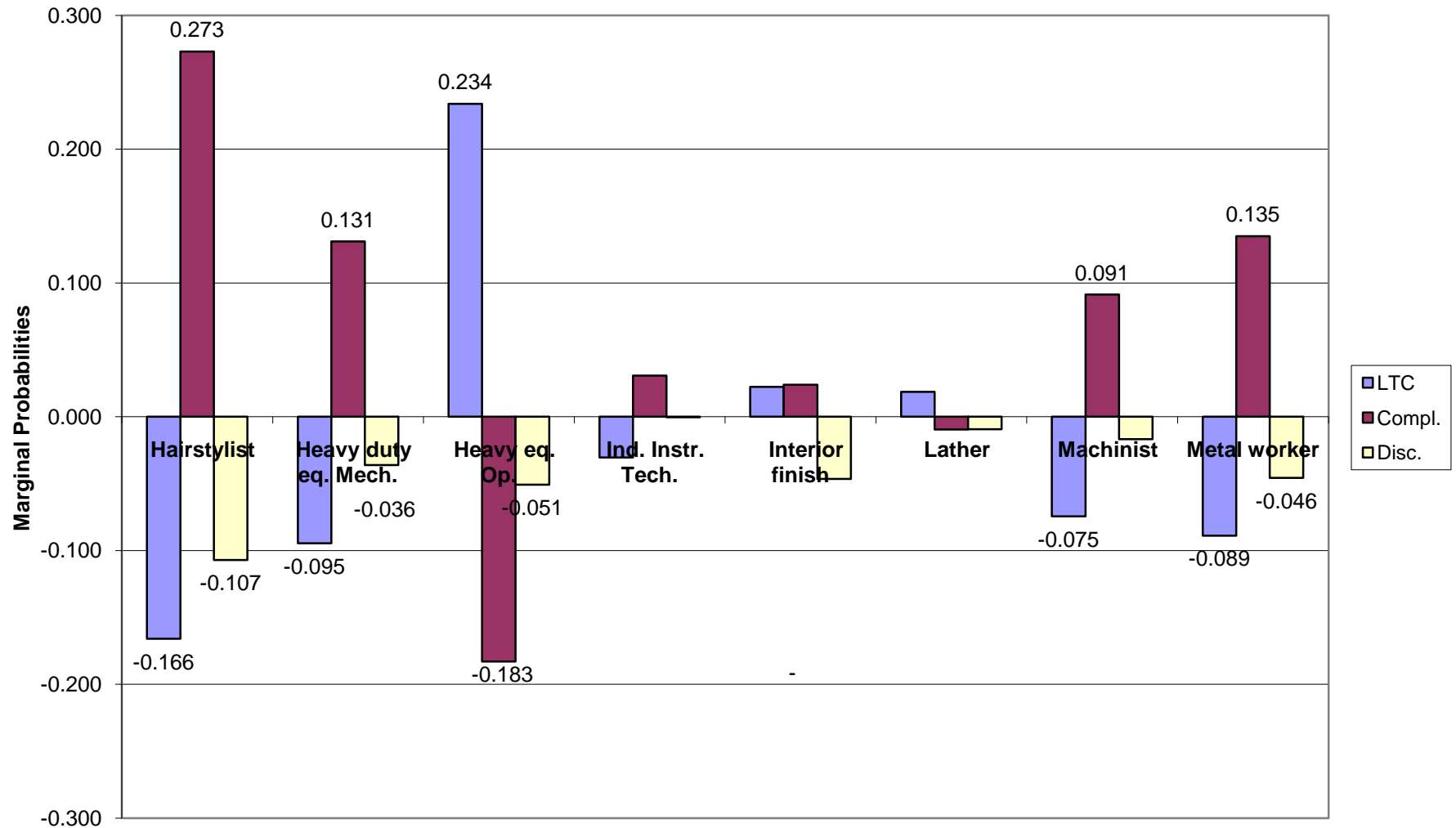
Notes: Bars with labels denote statistical significance at at least the 5 percent level. The vertical axis on Figures 1, 4 and 5 differ from the other figures. Ontario is the omitted category.

Figure 6a: Marginal Probabilities, Major Trade Group I



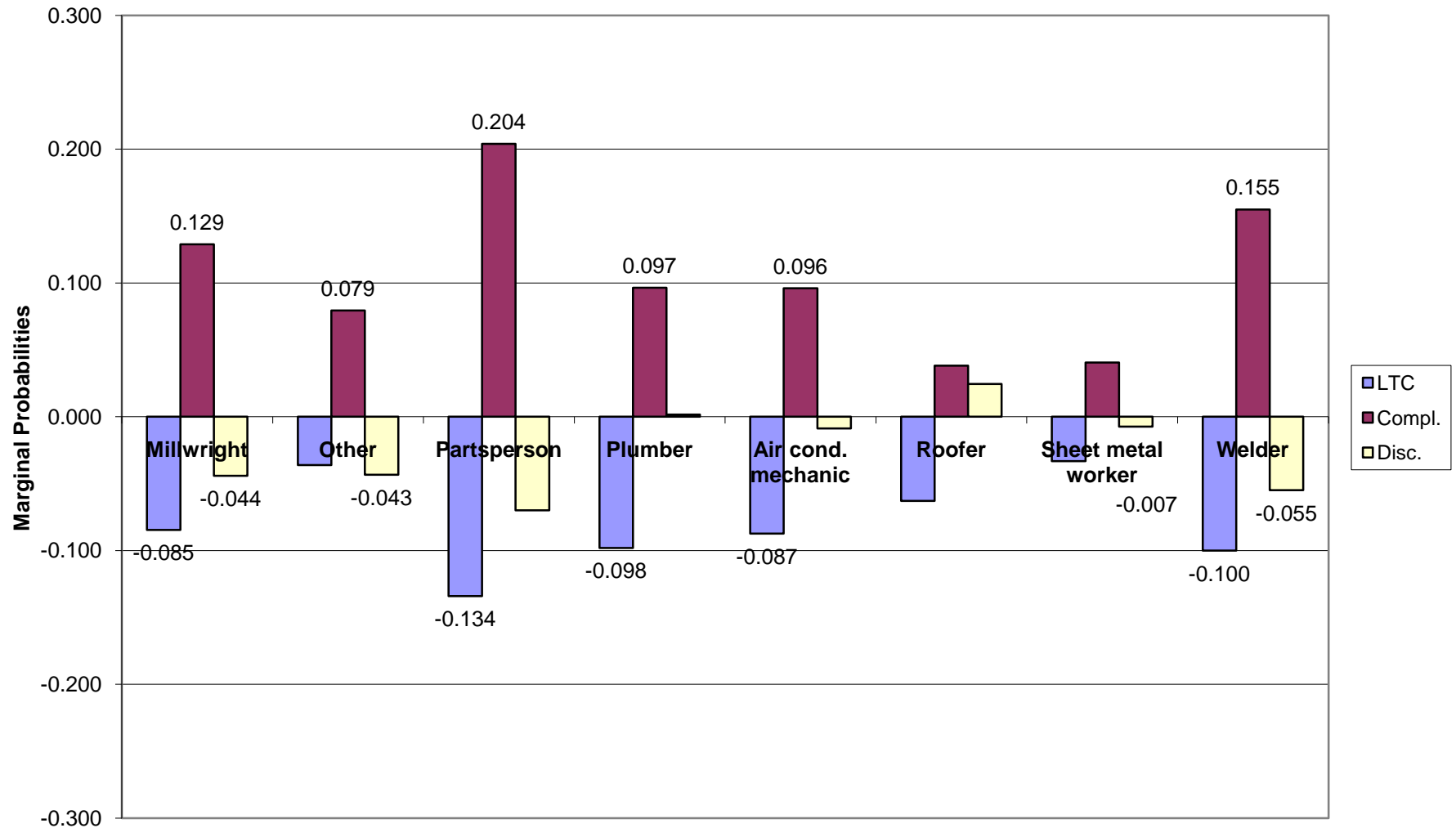
Note: Bars with labels denote statistical significance at at least the 5 percent level. Carpenter/cabinet maker is the omitted category.

Figure 6b: Marginal Probabilities, Major Trade Group II



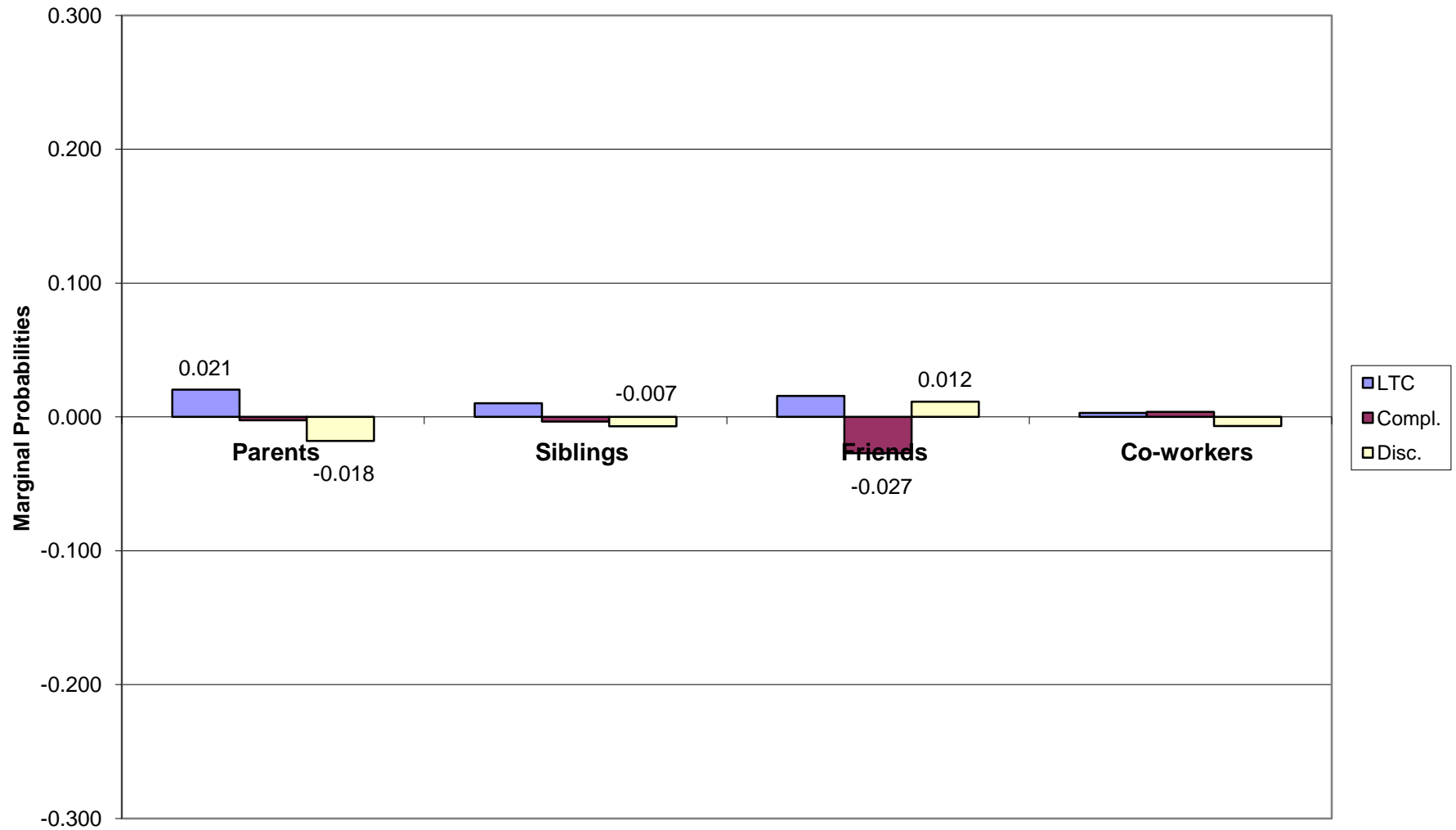
Note: Bars with labels denote statistical significance at at least the 5 percent level. Carpenter/cabinet maker is the omitted category.

Figure 6c: Marginal Probabilities, Major Trade Group III



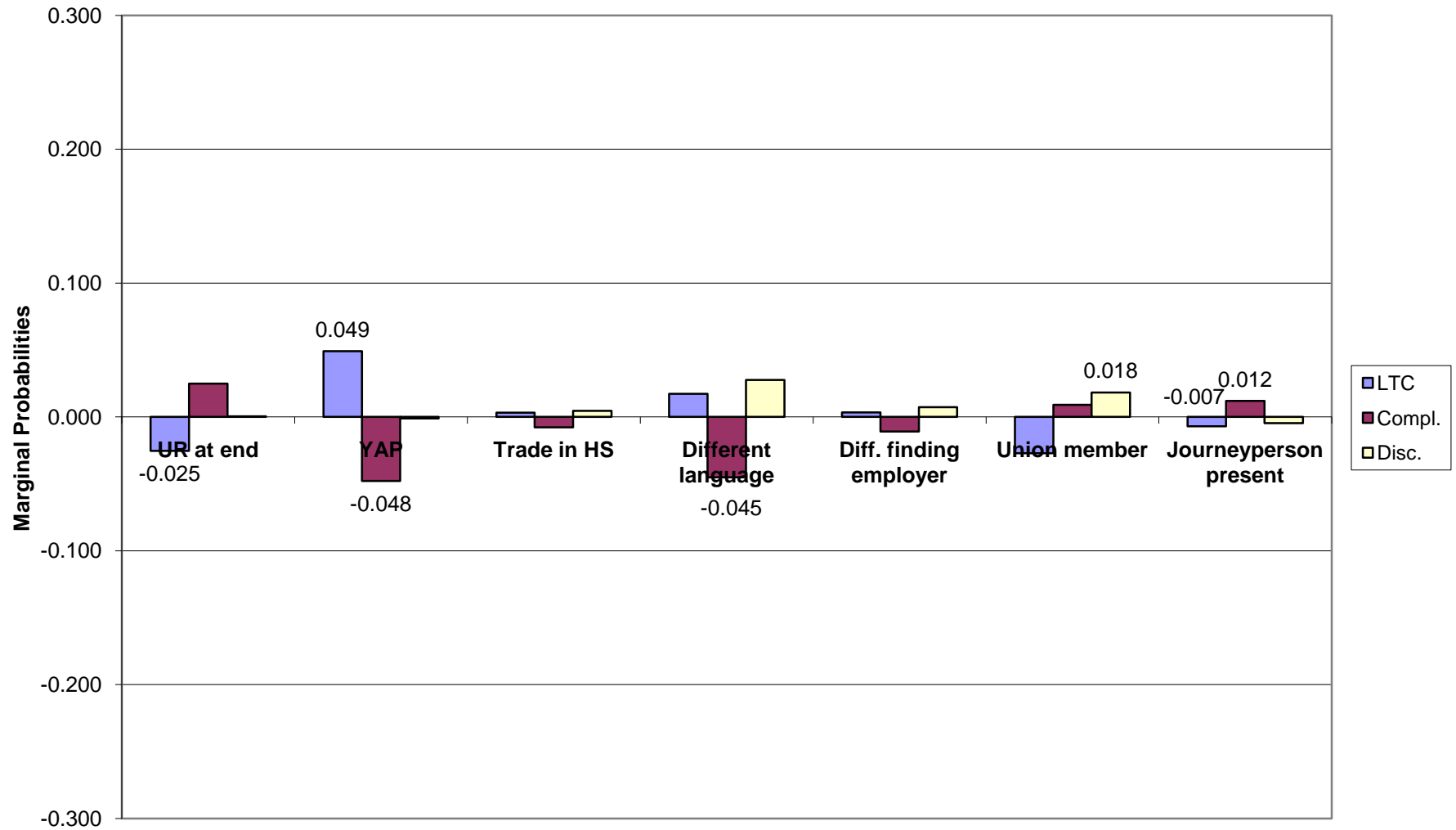
Note: Bars with labels denote statistical significance at at least the 5 percent level. Carpenter/cabinet maker is the omitted category.

Figure 7: Marginal Probabilities, Others Involved in Trade



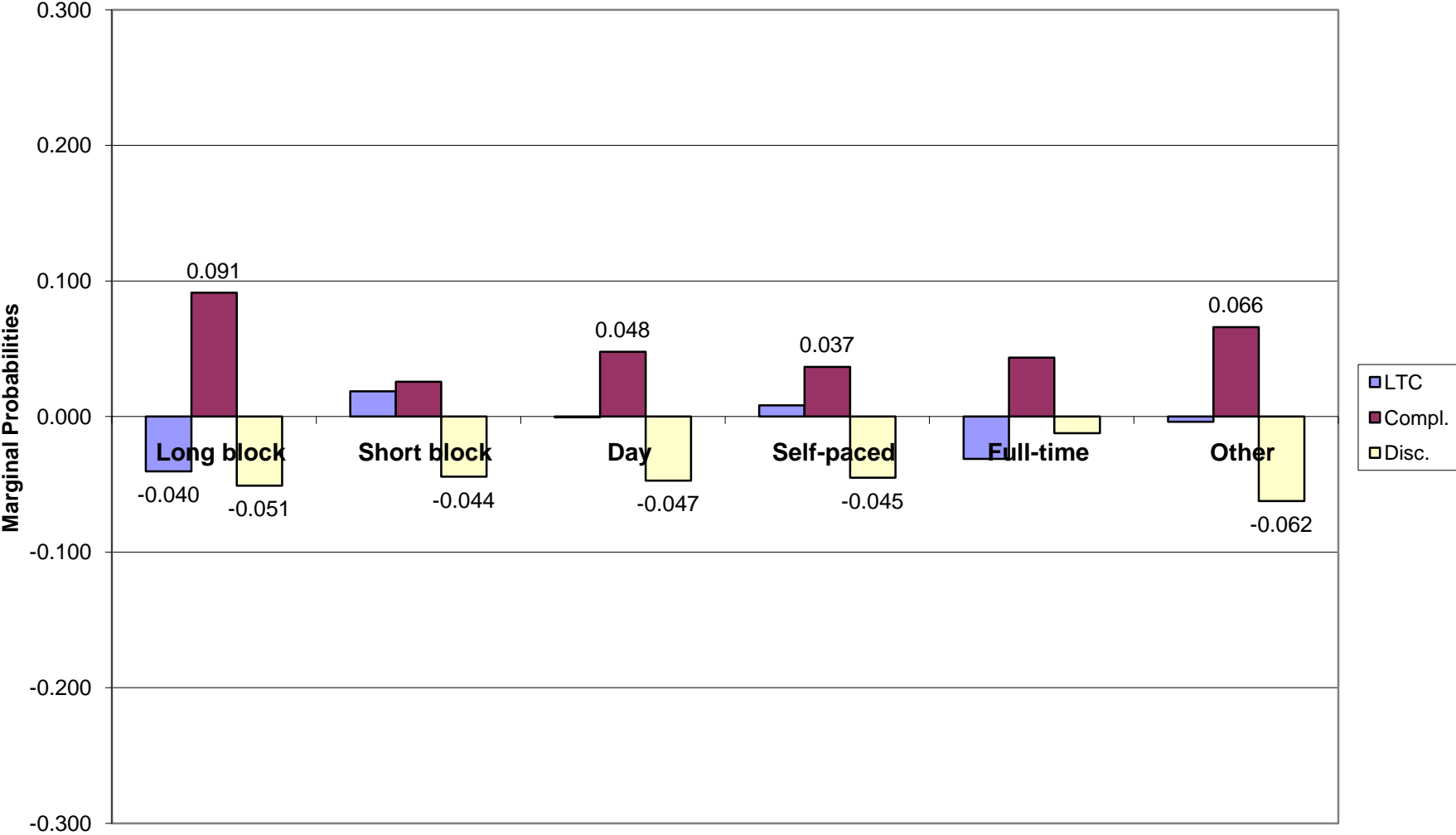
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 8: Marginal Probabilities, Various Employment and Background Factors



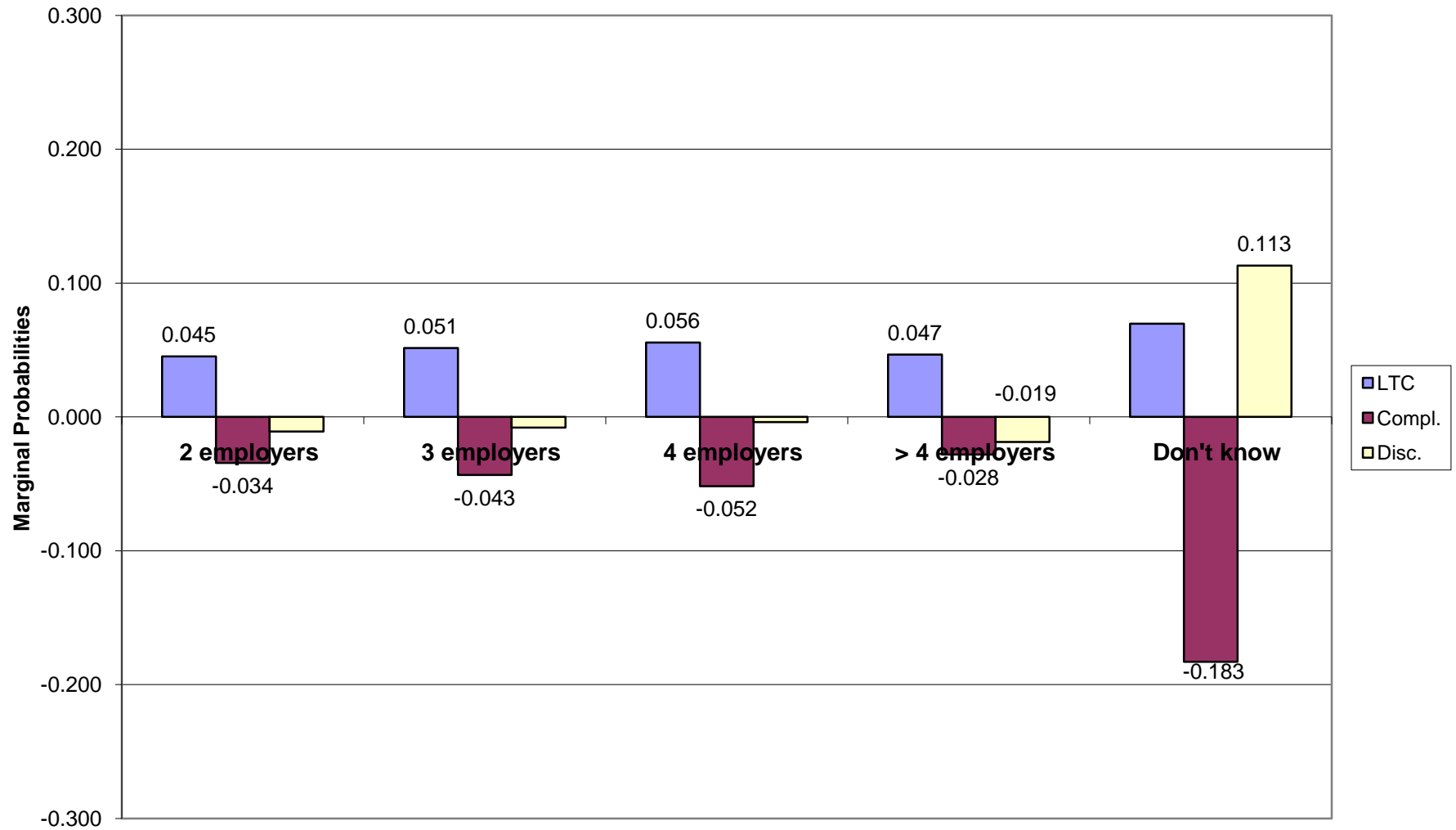
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 9: Marginal Probabilities, Type of Technical Training



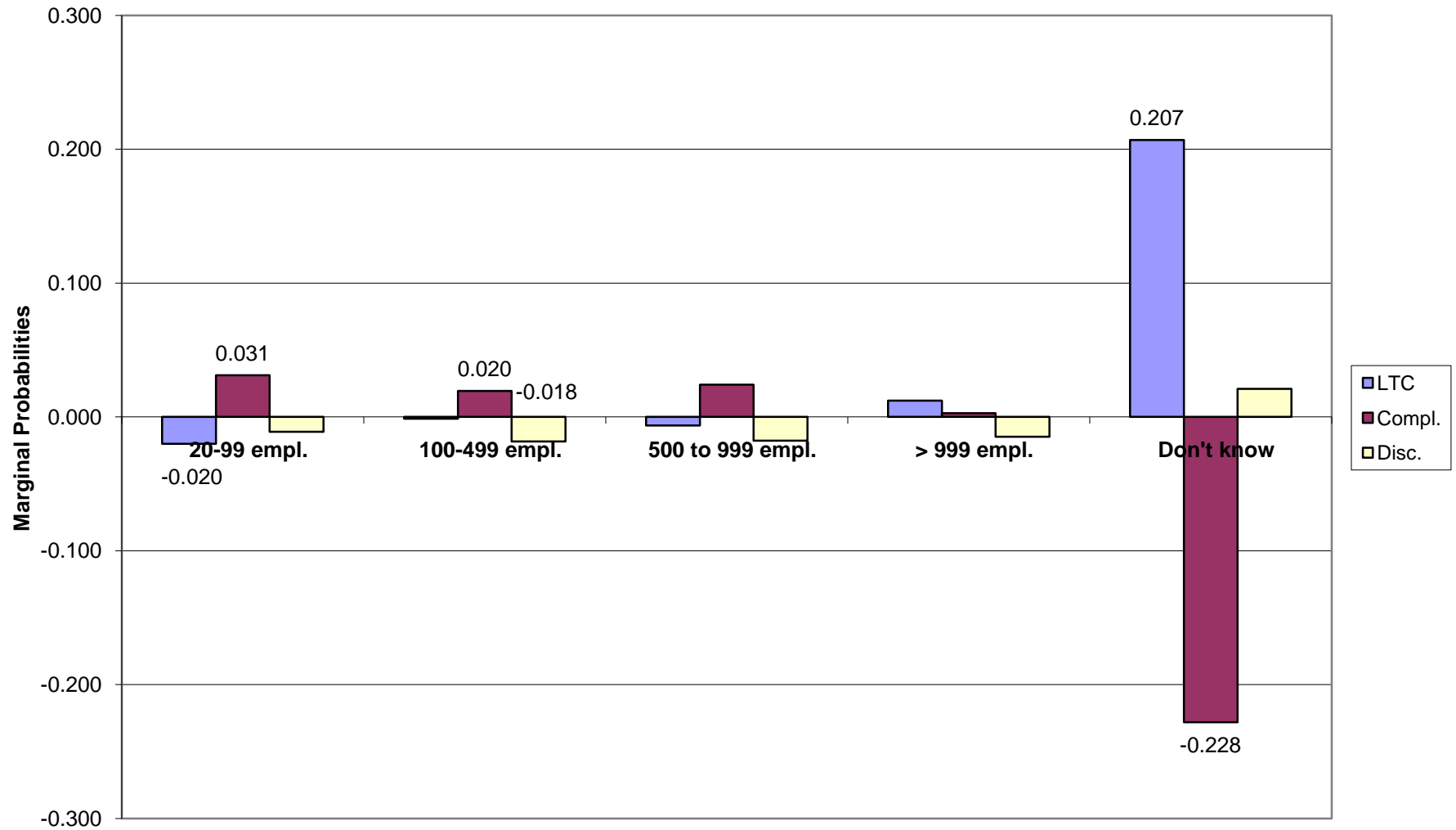
Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 10: Marginal Probabilities, Number of Employers



Note: Bars with labels denote statistical significance at at least the 5 percent level.

Figure 11: Marginal Probabilities, Firm Size



Note: Bars with labels denote statistical significance at at least the 5 percent level.

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

	Building construction	Electrical, electronics and related	Food and service	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. 2009. *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program*. Catalogue no. 81-582-X, Table D.1.2.

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 service	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 Council of Ministers of Education Canada. 2009. *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program*. Catalogue no. 81-582-X, Tables D.1.2 & D.2.2.

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

Variable	LTCs		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)
Nb 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 minorities	0.088	(0.284)	0.063	(0.243)	0.061	(0.239)
White	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	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)
Territories	0.006	(0.076)	0.004	(0.063)	0.008	(0.087)

... cont

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

Variable	LTCs		Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.	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 / Cabinet maker	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 service	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/steamfitt	0.069	(0.254)	0.086	(0.280)	0.108	(0.311)
Refrigeration & 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)
Journeyman 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	LTCs		Completers		Discontinuers	
	Mean	Std. Dev.	Mean	Std. Dev.	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/yea	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 cc	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)
> 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 to 999 employess	0.023	(0.150)	0.027	(0.161)	0.022	(0.148)
> 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 A1: 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 *** [0.011]	-0.105 *** [0.014]	0.065 *** [0.006]	-0.025 *** [0.008]	0.051 * [0.028]	-0.025 [0.026]	-0.025 ** [0.010]	0.050 [0.033]	-0.025 [0.028]
Age in 2007	-0.038 *** [0.003]	0.046 *** [0.004]	-0.008 *** [0.002]	-0.040 *** [0.002]	0.050 *** [0.005]	-0.010 *** [0.003]	-0.035 *** [0.001]	0.046 *** [0.003]	-0.011 *** [0.003]
Age2/1000	0.442 *** [0.030]	-0.554 *** [0.054]	0.112 *** [0.028]	0.467 *** [0.029]	-0.597 *** [0.059]	0.131 *** [0.033]	0.417 *** [0.011]	-0.556 *** [0.037]	0.140 *** [0.032]
Marital status at end (married)									
Divorced	0.030 [0.023]	-0.081 *** [0.025]	0.051 *** [0.0064]	0.029 [0.024]	-0.076 ** [0.031]	0.047 *** [0.010]	0.027 [0.022]	-0.075 *** [0.028]	0.048 *** [0.009]
Single	-0.024 ** [0.0092]	-0.025 *** [0.007]	0.048 *** [0.003]	-0.027 *** [0.010]	-0.019 ** [0.008]	0.045 *** [0.003]	-0.028 *** [0.009]	-0.016 ** [0.007]	0.044 *** [0.002]
Nb of children <18	0.042 *** [0.002]	-0.046 *** [0.002]	0.004 *** [0.001]	0.043 *** [0.002]	-0.047 *** [0.002]	0.004 *** [0.001]	0.042 *** [0.002]	-0.045 *** [0.003]	0.003 *** [0.001]
Aboriginal	0.059 *** [0.017]	-0.086 *** [0.012]	0.027 *** [0.008]	0.054 *** [0.018]	-0.076 *** [0.015]	0.023 *** [0.007]	0.055 *** [0.015]	-0.075 *** [0.001]	0.020 *** [0.008]
Visible minorities	0.071 *** [0.024]	-0.055 *** [0.009]	-0.016 [0.017]	0.075 ** [0.031]	-0.070 *** [0.022]	-0.005 [0.012]	0.069 *** [0.027]	-0.062 *** [0.019]	-0.008 [0.008]
Immigrant	0.005 [0.012]	0.002 [0.012]	-0.006 *** [0.002]	0.008 [0.012]	-0.002 [0.013]	-0.006 *** [0.002]	-0.001 [0.010]	0.014 [0.011]	-0.013 * [0.008]
Immigrant father	0.022 ** [0.009]	-0.020 ** [0.009]	-0.002 [0.009]	0.024 *** [0.009]	-0.021 *** [0.007]	-0.003 [0.009]	0.025 *** [0.008]	-0.022 *** [0.006]	-0.003 [0.007]
Immigrant mother	-0.003 [0.016]	-0.007 * [0.004]	0.010 [0.015]	-0.001 [0.017]	-0.008 ** [0.0039]	0.010 [0.016]	0.001 [0.017]	-0.008 [0.005]	0.007 [0.014]
Disability at beginning	0.086 *** [0.013]	-0.101 *** [0.024]	0.015 [0.013]	0.086 *** [0.016]	-0.105 *** [0.029]	0.019 [0.015]	0.072 *** [0.015]	-0.091 *** [0.028]	0.019 [0.015]
Education (high school)									
Less than high school	0.063 *** [0.017]	-0.081 *** [0.020]	0.018 ** [0.008]	0.062 *** [0.019]	-0.086 *** [0.023]	0.024 *** [0.009]	0.061 *** [0.020]	-0.084 *** [0.024]	0.023 *** [0.009]
Trade-vocational	-0.001 [0.024]	0.012 [0.030]	-0.011 [0.009]	0.005 [0.022]	0.000 [0.025]	-0.005 [0.007]	0.003 [0.018]	0.003 [0.021]	-0.005 [0.008]
College	-0.010 [0.006]	-0.001 [0.012]	0.012 [0.008]	-0.011 ** [0.005]	0.004 [0.007]	0.007 [0.007]	-0.007 [0.005]	-0.001 [0.005]	0.008 [0.006]
University	-0.021 [0.016]	0.015 [0.013]	0.006 [0.006]	-0.030 * [0.017]	0.031 ** [0.015]	-0.001 [0.004]	-0.029 ** [0.014]	0.027 *** [0.010]	0.002 [0.006]
Unknown	0.203 ** [0.093]	-0.141 ** [0.071]	-0.062 [0.039]	0.234 ** [0.092]	-0.179 *** [0.067]	-0.055 [0.043]	0.211 *** [0.081]	-0.158 *** [0.053]	-0.054 [0.040]
Number of years in program (4 years)									
Less than 1 year	-0.034 [0.023]	-0.543 *** [0.009]	0.577 *** [0.025]	-0.043 * [0.022]	-0.563 *** [0.012]	0.607 *** [0.019]	-0.014 [0.031]	-0.542 *** [0.014]	0.555 *** [0.030]
1 year	-0.004 [0.036]	-0.419 *** [0.024]	0.422 *** [0.030]	-0.008 [0.035]	-0.457 *** [0.024]	0.465 *** [0.021]	0.011 [0.042]	-0.439 *** [0.022]	0.428 *** [0.030]
2 years	0.007 [0.017]	-0.234 *** [0.014]	0.226 *** [0.013]	0.006 [0.018]	-0.251 *** [0.017]	0.246 *** [0.011]	0.013 [0.021]	-0.245 *** [0.018]	0.232 *** [0.012]
3 years	0.006 [0.007]	-0.076 *** [0.020]	0.069 *** [0.020]	0.005 [0.008]	-0.082 *** [0.014]	0.076 *** [0.016]	0.006 [0.007]	-0.079 *** [0.016]	0.073 *** [0.018]
5 years	0.073 ** [0.030]	-0.090 *** [0.021]	0.017 [0.020]	0.073 ** [0.029]	-0.090 *** [0.018]	0.017 [0.019]	0.063 *** [0.023]	-0.083 *** [0.012]	0.019 [0.018]
6-10 years	0.300 *** [0.019]	-0.307 *** [0.011]	0.007 [0.010]	0.299 *** [0.018]	-0.307 *** [0.011]	0.008 [0.010]	0.274 *** [0.014]	-0.287 *** [0.009]	0.013 [0.008]
11-15 years	0.422 *** [0.022]	-0.449 *** [0.027]	0.027 *** [0.010]	0.421 *** [0.022]	-0.449 *** [0.025]	0.027 *** [0.011]	0.394 *** [0.034]	-0.430 *** [0.033]	0.035 *** [0.011]
16-20 years	0.381 *** [0.041]	-0.434 *** [0.023]	0.052 ** [0.026]	0.382 *** [0.040]	-0.434 *** [0.022]	0.052 ** [0.026]	0.349 *** [0.054]	-0.407 *** [0.033]	0.058 ** [0.028]
> 20 years	0.308 *** [0.020]	-0.326 *** [0.017]	0.018 [0.023]	0.303 *** [0.023]	-0.325 *** [0.014]	0.022 [0.023]	0.284 *** [0.027]	-0.304 *** [0.012]	0.021 [0.025]

... cont.

Table A1: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
Province (Ontario)									
Newfoundland	0.167 *** [0.003]	-0.234 *** [0.005]	0.067 *** [0.007]	0.148 *** [0.007]	-0.229 *** [0.007]	0.081 *** [0.010]	0.457 *** [0.140]	-0.476 *** [0.120]	0.018 [0.025]
Prince Edward Island	-0.138 *** [0.002]	0.179 *** [0.005]	-0.040 *** [0.003]	-0.147 *** [0.001]	0.194 *** [0.003]	-0.047 *** [0.004]	-0.072 [0.047]	0.116 ** [0.051]	-0.043 *** [0.006]
Nova Scotia	-0.075 *** [0.002]	0.020 *** [0.007]	0.054 *** [0.005]	-0.080 *** [0.003]	0.035 *** [0.006]	0.045 *** [0.005]	-0.005 [0.035]	-0.042 [0.040]	0.048 *** [0.007]
New Brunswick	-0.090 *** [0.001]	0.016 ** [0.007]	0.074 *** [0.007]	-0.097 *** [0.002]	0.032 *** [0.007]	0.064 *** [0.007]	-0.031 [0.028]	-0.033 [0.036]	0.064 *** [0.010]
Manitoba	-0.120 *** [0.001]	0.066 *** [0.002]	0.055 *** [0.002]	-0.121 *** [0.003]	0.061 *** [0.003]	0.061 *** [0.004]	-0.140 *** [0.011]	0.090 *** [0.013]	0.051 *** [0.004]
Saskatchewan	-0.100 *** [0.001]	0.052 *** [0.005]	0.048 *** [0.005]	-0.101 *** [0.003]	0.054 *** [0.002]	0.046 *** [0.0051]	-0.114 *** [0.013]	0.070 *** [0.012]	0.044 *** [0.004]
Alberta	-0.134 *** [0.003]	0.054 *** [0.002]	0.080 *** [0.003]	-0.134 *** [0.008]	0.055 *** [0.008]	0.080 *** [0.003]	-0.173 *** [0.025]	0.096 *** [0.028]	0.077 *** [0.006]
British Columbia	-0.057 *** [0.003]	0.025 *** [0.001]	0.032 *** [0.002]	-0.072 *** [0.006]	0.050 *** [0.004]	0.022 *** [0.003]	-0.056 *** [0.004]	0.033 *** [0.004]	0.023 *** [0.002]
Territories	-0.051 * [0.028]	-0.096 *** [0.031]	0.147 *** [0.057]	-0.064 *** [0.021]	-0.064 [0.045]	0.129 ** [0.064]	-0.053 * [0.029]	-0.085 ** [0.035]	0.138 ** [0.061]
Trade groups (Carpenter / cabinet maker)									
Non-coded				-0.158 *** [0.022]	0.184 *** [0.058]	-0.026 [0.036]	-0.154 *** [0.023]	0.181 *** [0.057]	-0.028 [0.035]
Automotive service				-0.081 *** [0.023]	0.107 *** [0.018]	-0.026 ** [0.012]	-0.080 *** [0.020]	0.104 *** [0.013]	-0.025 ** [0.012]
Bricklayer/mason				-0.090 *** [0.018]	0.116 *** [0.033]	-0.026 [0.022]	-0.089 *** [0.019]	0.118 *** [0.034]	-0.029 [0.021]
Crane operator				-0.091 *** [0.016]	0.172 *** [0.017]	-0.081 *** [0.005]	-0.086 *** [0.016]	0.167 *** [0.018]	-0.081 *** [0.005]
Early childhood educator				-0.149 *** [0.005]	0.174 *** [0.025]	-0.024 [0.023]	-0.145 *** [0.004]	0.176 *** [0.023]	-0.031 [0.021]
Electrician				-0.084 *** [0.020]	0.106 *** [0.030]	-0.023 [0.016]	-0.082 *** [0.021]	0.101 *** [0.023]	-0.019 [0.018]
Electronics				0.012 [0.030]	0.030 [0.029]	-0.042 *** [0.006]	0.032 [0.023]	0.009 [0.024]	-0.041 *** [0.007]
Food service				-0.013 [0.032]	0.072 * [0.039]	-0.059 *** [0.019]	-0.012 [0.027]	0.068 * [0.036]	-0.057 *** [0.019]
Hairstylist - esthetician				-0.165 *** [0.011]	0.274 *** [0.014]	-0.109 *** [0.007]	-0.166 *** [0.008]	0.273 *** [0.011]	-0.107 *** [0.007]
Heavy duty equipment mechanic				-0.098 *** [0.031]	0.138 *** [0.033]	-0.040 *** [0.013]	-0.095 *** [0.029]	0.131 *** [0.033]	-0.036 *** [0.013]
Heavy equipment operator				0.237 * [0.13]	-0.193 * [0.11]	-0.044 *** [0.016]	0.234 ** [0.110]	-0.183 ** [0.093]	-0.051 *** [0.014]
Industry instrument technician				-0.033 [0.029]	0.024 [0.029]	0.009 [0.013]	-0.031 [0.027]	0.031 [0.024]	0.000 [0.012]
Interior finish				0.033 [0.088]	0.009 [0.11]	-0.042 [0.026]	0.022 [0.095]	0.024 [0.120]	-0.046 * [0.026]
Lather				0.001 [0.035]	-0.002 [0.031]	0.001 [0.017]	0.019 [0.028]	-0.009 [0.024]	-0.009 [0.019]
Machinist				-0.079 *** [0.016]	0.100 *** [0.012]	-0.022 ** [0.011]	-0.075 *** [0.012]	0.091 *** [0.009]	-0.017 [0.012]
Metal worker (other)				-0.093 *** [0.010]	0.139 *** [0.021]	-0.047 *** [0.018]	-0.089 *** [0.012]	0.135 *** [0.023]	-0.046 *** [0.017]
Millwright				-0.093 *** [0.022]	0.140 *** [0.022]	-0.047 *** [0.007]	-0.085 *** [0.020]	0.129 *** [0.021]	-0.044 *** [0.010]
Other				-0.036 * [0.018]	0.078 *** [0.019]	-0.042 *** [0.010]	-0.036 [0.024]	0.079 *** [0.023]	-0.043 *** [0.010]
Partsperson				-0.137 *** [0.012]	0.209 *** [0.044]	-0.072 *** [0.012]	-0.134 *** [0.009]	0.204 *** [0.005]	-0.070 *** [0.011]
Plumber/pipefitter/steamfitter				-0.102 *** [0.021]	0.101 *** [0.033]	0.001 [0.015]	-0.098 *** [0.020]	0.097 *** [0.032]	0.002 [0.016]
Refrigeration & air cond. mechanic				-0.096 *** [0.013]	0.107 *** [0.029]	-0.011 [0.022]	-0.087 *** [0.016]	0.096 *** [0.031]	-0.009 [0.021]
Roofer				-0.053 [0.060]	0.018 [0.035]	0.035 [0.057]	-0.063 [0.051]	0.038 [0.032]	0.025 [0.049]
Sheet metal worker				-0.044 [0.028]	0.0502** [0.025]	-0.007 [0.020]	-0.033 [0.031]	0.041 [0.028]	-0.007 [0.021]
Welder				-0.105 *** [0.010]	0.163 *** [0.014]	-0.058 *** [0.010]	-0.100 *** [0.009]	0.155 *** [0.014]	-0.055 *** [0.010]

... cont.

Table A1: Multinomial Probit Estimates for Long-Term Continuers, Completers, and Discontinuers, 2007, cont.

	(1)			(2)			(3)		
	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.	LTCs	Compl.	Disc.
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 background/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]
Journeyman 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]
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 employees							-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.