Modeling Enrollment in and Completion of Vocational Education: The role of academic achievement and program type

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Abstract: Vocational training (VET) programs constitute an important alternative to academic programs of study in many countries. Our study provides evidence of the importance of academic achievement to completion of VET programs. The data consist of two nine year panel cohorts of compulsory school-leavers in Denmark. Using these register data, we recover correlations between language and math skills and enrollment in and completion of three different types of VET programs: social and health, technical, and mercantile. Estimation net of selection and right censoring of students who are still enrolled proceeds separately by gender and controls for a broad array of background characteristics. Our results indicate that math and language skills have effects that vary substantially by program and hence may provide valuable guidance to schools preparing students for VET programs. We also find evidence that it is important to allow for censoring, as many individuals do not immediately enter VET training, and that in some cases selection is correlated with completion.

Introduction

A substantial body of research has examined the decision to enroll in and the decision to drop out of high school and college. Here we examine enrollment in and dropout from an important alternative educational route – vocational education and training (VET). This type of education is particularly prevalent in economies that rely on industry-specific and firm-specific skills and thus need workers with these workplace qualifications (Hall and Soskice 2001). VET programs enroll a significant population and provide valuable skills to the labor market, particularly when coupled with well-developed apprenticeship systems (Carneiro, Dearden and Vignoles 2010). However, little is known about how academic achievement affects enrollment and dropout decisions in VET, despite the wealth of evidence linking it to high school and college continuation decisions (Rivkin 1995; Bishop 1992; Hanushek, Rivkin and Taylor 1996). Furthermore, while VET programs provide a diverse set of skills, most of the existing literature on VET tends not to distinguish between program types.

About 29% of persons age 25 to 34 in the OECD report their highest education to be vocational (OECD 2011). Thus, VET constitutes a significant private and social investment. A better understanding of the factors associated with success in VET could better target candidates for such training, reduce program costs, and increase returns. VET programs are, however, both quite different from purely academic programs of study and quite heterogeneous themselves. Students who perform the best in their academic studies are more likely to pursue an academic degree, but it would be of interest to know how academic achievement is related to completion of VET study. Math skills may be greater asset for those pursuing technical programs, while communication skills may be more important for those taking a business track. Or it may turn out that academic skills are not useful at all in terms of enrolling and competing VET programs.

We use register data on two cohorts of graduates from compulsory school in Denmark to examine the role academic achievement has on completion of different types of VET programs.

This research advances the literature on VET in several ways. First, we distinguish between three types of VET programs: technical programs that attract more men and may require more math skills, social/health related programs that attract more women, and business oriented programs that attract both men and women and may require more communication skills. Second, unlike most studies in the literature, we have test scores after compulsory school that allow us to control for academic achievement in math and language. These scores allow us to recover correlations between these math and language scores and completion of different types of VET programs, net of selection (point three) and right censoring of students who are still in the program (point four). Failure to control for selection on unobservables will yield biased coefficients in the completion equation if the unobservables driving enrollment are correlated with those driving completion, as has been observed in the case of sequential academic programs of study (Holm and Jæger 2009). Treatment of those still enrolled may be important in light of the frequency with which vocational education is pursued by older persons. While our estimates of the relation between test scores and completion are not causal, we believe we are the first to provide evidence of the importance of academic skills to enrollment in and completion of VET programs. More interestingly, we provide evidence that different skills matter differently in different VET programs. These results may provide valuable guidance to students, parents, and educators seeking to improve VET training outcomes.

An analysis of VET in Denmark is of particular interest for two reasons. First, rich data from administrative records are available from that country that include academic performance. The large sample size also allows us to distinguish between different types of VET programs.

Second, a large fraction of Danes report having a vocational education and the dropout rate from VET in Denmark is unusually high. Almost 40% of Danes age 25 to 64 report that their highest level of education is vocational (OECD 2011). Statistics Denmark reports that only 35% of men and 24% of women complete VET studies within set time limits (Statistics Denmark, 2010). Furthermore, dropout seems also to have markedly increased since the 1990s (Koudahl 2005, Juul and Jørgensen 2011). When those still enrolled are treated as failures, dropout rates range from 25-26% for mercantile and technical training to 36% for social/health related programs in our population sample. When those still enrolled are treated as censored observations (neither dropouts nor completers), dropout rates fall to between 17 and 24%, still substantial. With such a large enrollment and a significant dropout, Danish data are very well suited for identifying the separate determinants of VET dropout and enrollment.

The returns to this analysis could be considerable. The Danish government provides substantial subsidies to VET education (5.9 billion DKK (USD 1 billion) in 2008 amounting to about 103,000 DKK (approx. USD 17,500) per pupil, an increase of 17% since 2001, Danish Ministry of Finance). Students also bear a cost. Policy makers, school counselors, and students would all benefit from the better understanding of the factors related to successful completion of VET that this analysis provides. Our results suggest that controlling for selection is important when modeling completion of certain types of VET programs; that many individuals enroll in these programs later in life and results are sensitive to the treatment of those still enrolled when last observed; and that outcomes are very sensitive to academic ability but in different ways for different programs.

Literature review

There is an extensive literature on the decision to attend school based on human capital theory (Becker 1964, Mincer 1974). According to human capital theory, individuals act to maximize their lifetime utility, attending higher education if the expected marginal benefits from doing so exceed the expected marginal costs. Key variables used to model enrollment include academic background and ability, parental education, and household income. Labor market conditions, age, gender, and race/ethnicity also play a role. Generally speaking more academically prepared students find the cost of continuing their education to be lower, students with more educated parents have more support for and understanding of the educational system, and higher household income reduces the cost burden of higher education. In this analysis, household income is likely to play a much smaller role as higher education is fully subsidized in Denmark. Theory suggests that labor market conditions affect both the opportunity cost of enrollment and the subsequent returns to education. See Stratton (2014) for a review.

Human capital theory can also be used to explain dropout from higher education (see Bound and Turner 2011 for a review of this literature). Changing market conditions can alter the expected return from higher education, and college experience provides information about the expected costs associated with continuing that path. Market conditions and program experience likely affect students enrolled in VET programs similarly.

Much of the literature models the dropout decision by focusing only on those who have enrolled (see Smith and Naylor 2001 and Demeulemeester and Rochat 1999 and all literature based off the Beginning Post-Secondary Surveys in the US such as Stratton and Wetzel 2013). However, research has demonstrated that taking into account prior educational decisions can be important in modeling subsequent outcomes (see, for example, Cameron and Heckman 1998;

Colding 2006a; Colding, Husted, and Hummelgaard 2009; and Holm and Jæger 2011). We propose employing this approach to jointly model enrollment in a VET program and completion of that program.

Another aspect not generally considered in the dropout literature is the possibility that students may still be enrolled. Most studies of educational outcomes take a black or white view: students have either graduated at a particular point in time or they have not. Those who have not graduated are classified as dropouts. It has been demonstrated in the case of college education in the United States that 36% of those who begin college before the age of 23 and have not graduated six years following matriculation are actively enrolled at the six year mark (Stratton and Wetzel 2013). Data on a sample of US college graduates from the 2001 Baccalaureate and Beyond Survey indicate that only 80% graduated within six years. In Italy, Garibaldi et al. (2012) find that 83% of those graduating in 1999-2000 took more than the required length of time to do so. Stratton and Wetzel (2013) further find that those still enrolled constitute a different population from either the successful graduates or the non-graduates who are no longer enrolled. Analysis of VET program completion is likely to be even more sensitive to the treatment of those still enrolled as these programs are often marketed as opportunities for continuing education and so are likely to be more attractive to an older population. As our data follow individuals for about nine years following completion of ninth grade, we are able to document the extent of delayed enrollment. To address this concern, we censor the completion data by including those still enrolled while modeling enrollment but not completion. These results are compared with those obtained from a more standard treatment that codes those still enrolled as having not completed. In this respect, we add to the understanding of the effects of right censoring educational paths.

Most of the education literature focuses on academic programs of study. There are decidedly fewer studies focusing on VET completion and it is a current research question to what extent the findings from academic programs can be transferred to the VET sector. Exceptions include Lopez-Mayan (2010) who examines the choice between vocational and academic tracks in Spain and Colding (2006a, 2006b) and Colding, Husted, and Hummelgaard (2009) who examine the choice between vocational and academic tracks in Denmark with a focus on comparing native and immigrant populations. None of these works includes controls for academic ability. Dickerson and McIntosh (2013) find such controls to be critically important in their analysis of the choice of post-compulsory education in England. Holm and Jæger (2009) find that failure to control for academic ability in a selection model results in substantially higher estimates of the correlation between the unobservables in the enrollment and completion equations. We improve upon the extant literature by including such controls in our analysis.

Finally, while several authors have recognized that there exist many different types of VET training, little research has distinguished among them. Lopez-Mayan (2010) distinguishes between vocational programs of study in Spain based on their length, but not their field of study. Colding, Husted, and Hummelgaard (2009) document that the characteristics of those choosing different fields of VET study differ, but do not include controls for field in their analysis. Colding (2006b) includes dummy variables for field in her analysis of dropout from VET programs. This approach closely mimics work in the higher education field in which researchers control for major (for example, Bradley and Lenton 2007). However, it seems logical to suppose that both the decision to enter different types of VET programs and the likelihood of completion may differ for individuals with different abilities and characteristics. We begin to address this here by distinguishing between three types of VET training that we expect to appeal to different

populations: technical training to provide skills for the construction and production industries, health care and social work training, and general business training.

Thus, our analysis contributes to the current literature in several ways. We model jointly the decision to enroll in and completion of three different types of VET programs using a bivariate probit specification to allow for correlation in the unobservables. Munk (2013) finds that while traditional factors such as parental education and occupation are important for educational attainment, so is the content and quality of parental upbringing (cultural capital). In our framework we control for parental education and income but assume that cultural capital is captured (at least, in part) by allowing for common unobservables to affect both the enrollment and completion decisions.

A strength of the current study compared to much of the previous literature is the availability of excellent measures of academic achievement (the official primary level test scores in Mathematics and Danish for almost all students in Denmark). Of particular interest here is whether the skills necessary for success differ by type of VET program. In the next section, we give a brief overview of the post-compulsory school educational system in Denmark including the VET program.

Post-Compulsory School Education and VET

Upon completion of compulsory school (grades 1-9, typically from age 6-16), students in Denmark can choose between three educational options: they can leave school, enter vocational education (VET), or enter upper secondary education (see Figure 1). A peculiarity of the Danish educational system is that an optional 10th grade is offered to students to prepare them (both

academically and socially) to enter VET or upper secondary education. Typically this option is used by academically weaker students (Glavind, 2006) although not the very weakest, who generally choose not to study any further. Thus, for many, 10th grade serves as a sort of preparatory year for upper secondary education in terms of boosting both cognitive and non-cognitive skills. In our data, 56% of students chose to enter 10th grade.

Upper secondary education normally takes three years and is the academically oriented track in Danish secondary education (it is similar to high school in the US, Gymnasium in Germany, and A-levels in the UK). The purpose of upper secondary education is to prepare students for higher education. There are two main routes in upper secondary education: the traditional academic track (gymnasium) and two vocationally oriented tracks (a mercantile and a technical track). Having successfully completed upper secondary education provides eligibility for higher education but it should be noted that these tracks are not exclusive. Some upper secondary graduates enter the VET system and VET students also have the possibility of continuing onto higher education without acquiring an upper secondary degree.

VET programs in Denmark (see e.g. The Danish Ministry of Education, and Juul and Jørgensen, 2011) are structured into a basic course (20-25 weeks) and a main course (on average 3 years). Our focus here is on the main course, an important component of which is practical training in a company. This training is fully subsidized and financed by the government. There are 111 different main VET programs offered by 117 approved institutions and each of these programs can lead to one or more vocational specializations. The Ministry of Children and Education aggregates VET in Denmark into 12 main program clusters, see Appendix A. During the time period focused on in this study, there were 11 clusters which we further aggregated into

three broad groups: SOHR, social and health-related; TECH or technical; and MERC or mercantile specializations (see appendix 1).

Data

The data consist of a population sample of individuals born between 1983 and 1989 inclusive, who graduate from compulsory education in Denmark in either the 2002 or the 2003 academic year when they are between the ages of 14 and 18.[1] These cohorts were selected in order to obtain as long a post-compulsory enrollment history as possible for students with the official elementary level exam grades first recorded in 2002. After excluding less than 1000 individuals due to peculiar enrollment patterns (such as entering tertiary education without any prior education or completing multiple types of VET), the final sample includes 111,982 individuals. The data are truncated in September 2011 for those graduating from ninth grade in 2002 and in September 2012 for those graduating in 2003 so that the observation period does not differ by graduation date. Enrollment behavior is observed for a period of at minimum 100 months, with the majority observed for 111 months. Given that register data do not suffer from nonresponse or panel attrition, this data source is ideally suited for the analysis of completion decisions.

Enrollment behavior is illustrated in Figures 1 and 2. Figure 1 illustrates the month-by-month enrollment pattern or time-o-gram of this sample by general program type for 111 months or just over 9 years following completion of compulsory education. The fraction of the population that is not enrolled is illustrated first, followed by tenth grade, vocational, high

[1] Enrollment data are missing for about five percent of the sample, while another five percent of this birth cohort either fails to graduate from primary school within this time frame or was last observed in eighth rather than ninth grade.

school, and tertiary enrollment. Individuals who are enrolled in a single program for multiple years are recorded as enrolled during the summer. Nevertheless, summer breaks are clearly visible as spikes in the number not enrolled and attest to the frequency with which students in Denmark switch programs.

The illustration shows that youth generally enroll in tenth grade immediately after ninth grade. Thus, the decision to enroll in tenth grade precedes other enrollment decisions, allowing us to estimate the effect of tenth grade attendance on later educational decisions. In particular, since 10th grade is viewed as a sort of remedial intervention for boosting upper secondary preparedness and we are controlling for grades, attending tenth grade may serve as a proxy for lower non-cognitive skills at the outset. Prior work has found that non-cognitive factors such as the ability to focus on schoolwork are important for whether an individual starts on an upper secondary educational track (Munk 2013).

High school in Denmark is typically initiated soon after compulsory education and typically completed in three years. Only about 4% are enrolled in high school more than four years (48 months) after completing compulsory education. As a high school degree is required for most students entering tertiary education, it is not surprising to see that enrollment in tertiary education picks up only after students have had the opportunity to complete high school.

Of particular interest here is enrollment in vocational education or VET. VET enrollment is substantially more spread out over time as compared to any other type of enrollment. The fraction enrolled in VET peaks at 26% in month 14, but does not fall below 20% until five years after completing compulsory education and is still 7% nine years following 9th grade. This illustration is suggestive of the importance of addressing those still enrolled when last observed.

Previous work has generally examined vocational education as a whole. As noted above, there exist different types of vocational education. As is the case for different majors in higher education (Arcidiacono 2004), these diverse vocational program types are likely to attract different individuals and require different skills. We focus here on three types of VET training: SOHR, Technical, and Mercantile. SOHR training provides skills for health care workers, teachers, and social service workers. A majority of those entering SOHR programs do not have any education beyond compulsory or tenth grade. Technical training provides skills used in construction trades, transportation, and production. Over 85% of those entering Technical training have completed a technical-focused Basic program. Mercantile training focuses on business trades and just under 85% of those entering Mercantile training have completed either mercantile Basic or mercantile high school. As these prerequisites are not clearly laid out and students often bounce between programs and between VET and academic high school, we are unable to simultaneously model enrollment in high school and each type of VET. Instead, we examine each type of VET training separately.

Figure 2 illustrates enrollment by type of VET training. Enrollment in SOHR training is illustrated in Figure 2a. These programs have the smallest and most stable average enrollment. As a significant number of students enroll first to earn the designation of 'helper' and later return to earn the more senior designation of 'assistant', some of the extended SOHR enrollment might be attributable to these second enrollment spells. Our analysis focuses on the first completion, so we recalculated enrollment spells (see the dotted line) to exclude enrollment following the first completion. Enrollment in SOHR remains quite stable even after enrollments following the first completion are excluded. The fraction enrolled hovers between 1.5 and 1.7% for the period 26 to 54 months after compulsory schooling, and remains around 1% through 2012.

Enrollment in technical programs is illustrated in Figure 2b. These programs have much higher enrollments with more than 10% of the population enrolled in technical VET about two years after finishing primary school. The fraction peaks only slightly higher at almost 12.8% in the fourth year, falls below 10% at the five year mark, and continues to fall, ending around 2.6%.

Enrollment in mercantile training is even more delayed (see Figure 2c). Less than 1% are enrolled in a mercantile VET program in the first three years following completion of compulsory schooling. Enrollment peaks at 5.7% of the population five years after compulsory schooling and remains above 1.5% for the duration.

While Figure 2 illustrates enrollment by type of vocational education, it provides an incomplete picture of such programs as not all those who ever enroll actually complete their training. The fraction of those beginning high school who complete their degree is approximately 85%. Completion rates are significantly lower for vocational training programs (see the top of Table 1), ranging from almost 75% for Technical and Mercantile to 64% for SOHR. However, these numbers are misleading given the large fraction (over 10%) still enrolled when last observed. If those still enrolled nine years later are unlikely to complete VET, then treating them as failures is appropriate; however, if they are late starters who are progressing towards certification, then treating them as failures will bias the results. The final two columns in Table 1 suggest that they are late starters. Those still enrolled on average first entered VET training six to seven years after completing ninth grade and have been enrolled for over twice as long as those no longer enrolled, but still three to eight months short of the average time enrolled by completers. We will examine the sensitivity of our results to alternative treatments of those still enrolled, but favor a specification that treats these individuals as censored observations.

Our goal here is to model jointly the decision to enroll in and completion of each of these types of vocational education to take into account selection on unobservables. The data includes a rich set of covariates, the most important for this analysis being individual performance on math and language tests. Sample statistics for these variables are reported in Table 2 for the full sample and for the subsamples who attempt each of the three types of main VET programs we model. Those pursuing VET perform less well on both math and language tests than the full cohort. Those attempting SOHR are least well prepared academically; those attempting mercantile VET are the best prepared academically. All are more likely to attend tenth grade, than the full cohort. Those who perform best go on to high school.

Rather standard information on nationality, family background, and parental characteristics (age, income, and education) is available. Information on peer enrollment and distance to high schools is constructed in order to identify the equations modeling selection into programs as compared with completion. Peer enrollment is intended to capture peer pressure and neighborhood partiality for particular educational paths. Using the sample of students (not including the respondent him/herself) in the respondent's ninth grade class or (in order to increase the size of the reference group) the two previous graduating classes at the same institution, we identify the first type of education each student's peers enroll in within five years of completing primary school. Variables identifying the fraction of peers pursuing SOHR, Mercantile, and Technical VET as well as the fraction pursuing a more academic line of study at regular gymnasiums, technical gymnasiums, and mercantile gymnasiums are created.[2] Distance to each of the three different types of academic high schools is also incorporated in order to

[2] Basic VET programs are categorized as either mercantile or technical for the purposes of this classification and tenth grade is ignored. This information is missing primarily for individuals who appear to have been home schooled or enrolled in primary schools with fewer than 10 students per graduating class.

capture one element of the cost associated with such education. The distance to different types of vocational schools is not available in our sample. Dickerson and McIntosh (2013) found that distance to the nearest academic high school was a significant factor in a study of vocational training using English data, more so even than distance to the nearest vocational school.

Other variables sometimes included in models of educational enrollment and/or attainment are those related to local labor market conditions. Such variables would help capture the opportunity cost of enrollment. Denmark, however, is a relatively small country geographically and the sample consists of only two cohorts, thus limiting this source of variation. A dummy variable for cohort year and four for region are incorporated to control for market factors.

Methodology

Completion or not of a VET program is only observed for the subset of individuals who choose to enroll in that program, which is unlikely to be a randomly selected group. Because individuals may be self-selecting into educational tracks on the basis of unobservable traits unknown to the researcher, limiting the sample to only those observed enrolling in a program can result in sample selection bias. For instance, students choosing that VET track may possess more or less of a trait that correlates with completion, such as diligence or ambition, and this is not something that is captured via the observed covariates. Being unable to take account of this, researchers would wrongly conclude that completion rates of the subset selecting a particular VET program can be applied also to those who did not enroll in these programs.

To take account of the potential sample selection bias, we estimate a Heckman selection model. Both the decision to enroll in a VET program and the decision to complete or drop-out are binary variables. Thus, the resulting empirical model is that of a bivariate probit selection model. This model jointly estimates how factors affect initial enrollment and how factors affect dropout. Individuals enroll in a program if: $y_1^* = x_1\beta_1 + \varepsilon_1 > 0$. We do not observe the latent variable y_1^*, only a binary variable $y_1 = 1$ if $y_1^* > 0$ and 0 otherwise. Given that they enroll, individuals will complete if $y_2^* = x_2\beta_2 + \varepsilon_2 > 0$. Again, we do not observe y_2^*, just the binary variable $y_2 = 1$ if $y_2^* > 0$ and 0 otherwise. Completion status is observed if and only if individuals enroll in the program, i.e. y_2 is observed iff $y_1 = 1$. Individuals who are still enrolled when last observed are treated as censored observations, used to estimate parameters in the enrollment but not the completion equation.

The log-likelihood function for this model is given as:

$$lnL = \sum_{i=1}^{N} \{y_{i1}y_{i2} ln[\Phi_2(x_1\beta_1, x_2\beta_2, \rho)] + y_{i1}(1 - y_{i2}) ln[\Phi_2(x_{i1}\beta_{i1}, -x_{i2}\beta_{i2}, -\rho)] + (1 - y_{i1}) ln[\Phi(-x_{i1}\beta_{i1})]\}$$

Identification is achieved without relying on the assumption of normality as long as there is a variable in the selection equation that does not appear in the outcome equation. We treat peer behavior (of one's compulsory school classmates) and distance to high schools unrelated to the type of VET being modeled as factors that affect enrollment but not completion given that one enrolls. Theoretically these factors should become less important once the decision to enroll in VET is made. Technically these restrictions generally hold when tested using specifications that are identified only off the assumption of normality.

The estimate of ρ tells us whether the error terms ε_1 and ε_2 are correlated. If ρ is not significantly different from zero, then a simple probit model of completion estimated on the sample of individuals who have ever enrolled will yield consistent estimates. If ρ is significantly different from zero, joint estimation is necessary. As these are nonlinear models, interpretation of the magnitude of the coefficients is difficult. We present marginal effects conditional upon enrollment (Greene 1996), in order to more effectively compare our results to analyses of dropout rates. In the case of the bivariate specifications, these marginal effects have both a direct component measuring the impact each variable has via its association with completion and an indirect component measuring its association with enrollment. To save computing time given our large sample, we present analytic marginal effects. In our experience, these rarely differ substantially from numerical or simulated marginal effects. These marginal effects are calculated for an individual who did not choose to attend tenth grade, has sample mean parental age and income, sample mean distance to high school, parents and peers with only a primary level education and otherwise sample modal characteristics.

Results Censoring those Still Enrolled

Results are presented separately for the three types of VET identified in this analysis. Our focus is upon the relation between academic achievement and completion and how this relation varies by type of VET program. As is indicated in Table 2, men and women are attracted to different types of VET. Approximately 90% of those attempting SOHR training are women as compared with only 20% of those attempting technical VET. Analysis indicates that

there are significant differences by gender[3], hence where possible results are presented separately by gender. While estimates of rho will indicate whether estimation of a bivariate probit model to account for selection into training improves upon a simple probit of completion conditional upon having attempted training, results of both bivariate (column one) and simple probits (column 2) are presented for comparison purposes. These results treat individuals who are still enrolled as censored observations, neither dropouts nor completed. This is our preferred specification. To gauge the sensitivity of our results to this treatment, results that treat those still enrolled as failures are presented in the third column. In each case, coefficient estimates, standard errors, and conditional marginal effects are presented. Results censoring those still enrolled are discussed first.

Social and Health-related Training

Parameter estimates for the variables pertaining to academic achievement from the models for completion of SOHR training are presented in Table 3. This is clearly a type of training that disproportionately attracts women. There are too few men who pursue SOHR training to obtain estimates from the full model. Thus, only results for the full sample and the sample of women are presented. Results for the other parameters from the completion equations are presented in Appendix Table B1. Those from the selection or enrollment equations are presented in Appendix Table B2. As described above, to identify the selection equation, we exclude all the distance measures and all but the peer information on SOHR training when modeling completion.[4] While peer enrollment in SOHR is positively and significantly associated

[3] P-values for these tests are 0.0000 for each type of program.

[4] When this model is estimated for the full sample (women) off only the assumption of normality, the p-value associated with the variables we exclude in our preferred specification is 0.11 (0.14) in the second stage and 0.00 (0.00) in the first stage.

with enrollment in SOHR, this variable is weakly negatively associated with completion of SOHR.

An analysis of the correlation term from the bivariate probit specification indicates it is not significantly different from zero. A simple probit of completion conditional upon entrance is sufficient to model SOHR training. In our discussion of the results, therefore, we focus on the simple probit.

Individuals who have completed tenth grade are significantly and substantially more likely to complete SOHR VET. The marginal effect is on the order of three percentage points in the case of the full sample and two percentage points in the case of women. These results suggest that tenth grade provides students with some skills that are valuable in SOHR training.

Academic achievement is also important, but the effect of math skills is quite different from the effect of language skills. Having below average math scores has a significant and substantial negative impact on completion, reducing the expected probability of completion conditional on enrollment by 5 to 6 percentage points. Having above average math scores has a positive relation to completion, but one that is at best marginally statistically significant and is largest for those just above rather than substantially above average.[5] As regards language skills, lower than average achievement is positively related to completion, but the effect is neither significant nor substantial. Higher achievement is, however, significantly and substantially negatively related to completion. Those with the highest language scores are actually predicted to have a 13 to 20 percentage point lower probability of completing as compared to those with the lowest language scores. Possibly these individuals have an inclination towards the humanities

[5] Those relatively few for whom math scores are not reported are also significantly and substantially less likely to complete, a relation that holds for all types of VET.

or languages and only take up vocational training until they find a program that better suits their interests.

The other parameter estimates have the effect theory generally predicts. Students coming from broken homes are significantly less likely to complete. Those whose fathers are older and have higher incomes are more likely to complete, while those whose parents have some university education are less likely to complete. Somewhat surprisingly, having parents with a vocational education is not significantly associated with completion of SOHR.

Technical Training

Table 4 presents, separately by gender, the results pertaining to academic achievement from the equations modeling completion of technical training. The other covariates from the second stage model are reported in Appendix table C1, while results from the bivariate models' enrollment equations are provided in Appendix table C2. The selection equation is identified by excluding from the completion equation all the distance measures and peer measures not related to technical training.[6] Peer enrollment in technical high school is positively correlated with completion of technical VET training for women, while distance to technical high school is significantly positively related to completion for men. These findings suggest that some technically-oriented men may opt for VET rather than high school training when they live far from a technical high school. Enrollment in technical VET is also positively related to peer enrollment in technical VET and, for men, positively associated with both enrollment in and distance to technical high school (see Appendix Table C1).

[6] Results from specifications identified only off normality assumptions indicate that for men (women) the excluded variables have a p-value of 0.00 (0.19) in the completion equation and 0.00 (0.00) in the enrollment equation. The exclusion restriction fails for men because peer enrollment in mercantile high schools is highly significantly positively related to completion. When this variable is included in the completion equation, the results (including the conditional marginal effects) are substantially the same and the relevant test statistics are 0.53 for the completion equation and 0.00 for the enrollment equation.

Our estimates indicate there is a statistically significant negative correlation between the unobservables from the enrollment and completion equations for men but not women. This finding suggests that the simple probit models of completion estimated on the sample of men who ever enroll will be biased as those most likely to enroll in technical VET for unobserved reasons will also be less likely to succeed for unobserved reasons. The discussion below focuses on the bivariate results for men and the simple probit results for women.

The effect of academic achievement is quite different from that observed for SOHR. Completing tenth grade is not found to be significantly associated with completion of technical training. Indeed men completing tenth grade are significantly less likely to enroll in technical training (see Appendix C1). Math exam scores are highly statistically significant in the second stage equation (p-value 0.00 for both men and women) and indicate a positive relation to completion. This relation is strongest when scores fall below the median, but men with higher than average math test scores do have a higher probability of completing than those with median scores. Both men and women with higher than median math scores are significantly less likely to enroll in technical VET (see Appendix C2); they likely attend high school instead. Those with the very lowest math scores are also less likely to attempt technical training (significantly so for men), a finding that highlights the importance of math skills for technical training. The marginal conditional probability calculated here is such that the direct positive effect of math achievement on completion outweighs the indirect negative effect of math achievement on enrollment. The observed spread in the marginal conditional probability created by math scores is about 10 percentage points for women and 14 percentage points for men, with all of the effect for women and the majority for men associated with lower than median scores.

The marginal effect of language scores on the probability of completing technical VET conditional upon enrolling is much smaller. The coefficients to language scores in the equation modeling completion are not jointly statistically significant (p-value 0.14 for men, 0.67 for women). Language scores are, however, highly statistically significantly associated with enrollment in technical training; those with better language scores are less likely to enroll in technical VET, as high school is more attractive. This strong negative selection effect causes the signs of the conditional marginal effects to differ from the coefficient signs observed in the bivariate completion equations in six of eight cases. In these cases the indirect contribution of language skills via the enrollment decision overpowers their direct contribution via the completion equation. The negative association between test scores and completion is directly evident in the simple probit results for women. Women with the lowest language scores have a 3.0 percentage point higher probability of completing technical VET conditional upon enrolling than women with modal test scores; women with the highest language scores have a 6.3 percentage point lower probability. To the extent that language skills are associated with completion of technical training, the association is negative. Better language skills reduce completion.

Once again, the results indicate that those from broken homes are less likely, while those (particularly men) with older and higher income parents are more likely to complete training. In this case, men whose parents' and women whose mother's report a vocational education are significantly more likely to complete.

Mercantile Training

Table 5 provides comparable estimates from the analysis of Mercantile VET. Appendices D1 and D2 provide the other results from the second stage model and those from the

enrollment equations. To identify the selection equation, we exclude all the distance measures and peer measures not related to mercantile VET or mercantile high school education.[7] Peer enrollment in mercantile VET is negatively correlated with completion of mercantile VET training for women, while distance from the nearest mercantile high school is positively related to mercantile VET for men. These findings suggest that following the lead of one's peers is not necessarily optimal for women in the case of mercantile training and that, as was the case with technical VET, cost factors may be important for men. Peer enrollment in mercantile VET and mercantile high school is, by contrast, positively associated with enrollment in mercantile VET for both men and women.

We find a negative correlation between the unobservables from the enrollment and completion equations that is significant and close to negative one for women but close to zero and not statistically significant for men. The marginal effect of completing conditional upon entering mercantile training is substantially the same for men whether one models enrollment or not. For women, estimation of a two equation model is clearly preferred. Thus, we focus on the simple probit results for men and the bivariate results for women.

Experience in tenth grade is positively associated with completion, significantly so for men. Men who have completed tenth grade are about three percentage points more likely to complete mercantile training conditional upon beginning such training. As was the case with SOHR training, tenth grade appears to provide valuable skills.

We find again that math achievement is positively and significantly associated with success. Lower than average math scores strongly predict failure for both men and women,

[7] When this model is estimated only off the assumption of normality, we find that the p-value for all the variables not related to mercantile training is for men (women) 0.11 (0.05) in the enrollment equation and 0.00 (0.00) in the enrollment equation.

higher than average math scores predict success for women. The latter relation is not visible in the simple probit specification and has a muted effect on the conditional marginal effect given the significant negative correlation between higher math scores and enrollment. The magnitude of the effect of math scores on the marginal conditional probability is nevertheless substantial, yielding a 10-12 percentage point spread. Overall, the direct effect of math scores on completion dominates the indirect effect via enrollment.

Language skills, by contrast, have a non-linear impact on completion. Very low and very high language scores are associated with lower completion for men, but only marginally so. Language scores are generally positively associated with completion for women, but both very low and very high language scores are also associated with a four percentage point lower conditional marginal probability of completion. While the probability of enrollment in both SOHR and technical VET programs is negatively related to language scores at all levels, business programs appear not to be particularly attractive to those with the lowest language achievement. Thus, the lower conditional probability with which those scoring below average on their Danish exams complete mercantile training is primarily attributable to the direct impact of language scores on completion. The negative conditional marginal effect observed for women who score the highest on the language exam occurs because the negative selection effect dominates the positive completion effect. The magnitude of the impact of language scores on the conditional probability of completing mercantile training is a modest five to six percentage points.

Further analysis (see Appendix D1) indicates that women who graduate from compulsory school at an older age and men from broken homes are less likely to complete mercantile training. Men with older fathers who have higher earnings and women with higher income

mothers are more likely to complete. Having a father with a vocational education increases men's odds of completing whereas for women having parents with some college education is associated with greater success. Once again, the indirect effect of a covariate on enrollment outweighs the direct effect. While the dummy variables identifying women whose mothers have some college education are positive and significant in the completion equation, the marginal effect of having such educated mothers on the probability of completing mercantile training conditional upon having attempted it is negative.

Summary

Overall these results provide evidence that the factors associated with success in vocational education differ substantially by type of vocational education. Having completed a tenth grade education was, for example, associated with a higher probability of completing SOHR training and, for men, of completing mercantile training, but had no substantial or significant association with success in technical training. Math achievement is significantly positively associated with completion of all three types of VET, but high math achievers are not likely to enroll in VET. Those with the lowest math scores are more likely than those with modal scores to enroll in SOHR VET, but no more likely to enroll in mercantile and less likely to enroll in technical VET. The signs of the conditional marginal probability measures show that the direct positive effect of higher math scores on completion generally outweighs the indirect negative effect on enrollment, but the magnitude of the net effect differs by program type. In the case of SOHR training, the difference is just over six percentage points. In the case of technical and mercantile VET, the spread is between 12 and 13.5% for men and around 10% for women.

The role of language achievement is different altogether by program type. Higher language test scores are associated with a lower probability of enrolling in both SOHR and

technical VET. Mercantile VET appears not to attract either those with high or those with the lowest language scores. In the case of SOHR training, better language skills are associated with substantially lower conditional probabilities of success (the spread for women is 13 percentage points). In the case of technical training, language skills are not significantly associated with success but the conditional marginal effect of language skills on success is fairly substantial (at between six and eight percentage points) because of the indirect negative association with enrollment. Finally, in the case of mercantile training, language skills were more closely related to women's completion than to men's though in both cases those with the lowest language skills were significantly less likely to complete by three to four percentage points. Taking into account enrollment in mercantile training, those with language skills only somewhat above normal had the highest conditional probability of completing. Those with the highest language test scores have lower predicted probabilities of completing conditional upon attempting than those with the lowest language test scores because of the strong negative selection effect – alternative opportunities are more attractive. It is worth noting, however, that men with the lowest language scores were not only less likely to complete but also less likely to enroll in a mercantile program.

Some evidence that controlling for the decision to enroll can be important in modeling the outcome was also obtained. In the case of technical training for men and in the case of mercantile training for women, a bivariate model of enrollment and completion is strictly preferred to a simple probit of completion on the sample of those who ever enrolled. Individuals who were more likely to enroll in such training for unobserved reasons were also less likely to complete.

Sensitivity Analysis with Respect to Those Still Enrolled

To analyze the sensitivity of these results to the classification of those still enrolled, we compare the results of the preferred specification that excludes them in estimating the parameters related to program completion, to the results of a specification that treats those still enrolled as failures (columns 3 and 6 in Table 3, 4 and 5). All these models were estimated with a bivariate specification and as before the hypothesis that the cross-equation correlation is zero could not be rejected for SOHR VET and, for men, mercantile VET. In these cases, a simple probit is sufficient and it is the coefficients from the simple probit that are reported in the tables. In the case of technical training for women, the magnitude of the correlation term increases such that it becomes statistically significant and a bivariate probit specification is preferred. In the cases where a bivariate probit is preferred, the results of the first stage enrollment equation are virtually unchanged as all those still enrolled were included in estimates of the first stage. Thus, differences in the conditional marginal effects between models that exclude and treat as failures those still enrolled in training are attributable primarily to differences in the second stage model of completion.

Social and Health-related Training

Classifying those still enrolled in SOHR VET programs as failures does alter the estimated marginal effects. Having completed tenth grade continues to have a significant positive association with completion. The magnitude of the effect increases over 30%, to between 3 and 4.5 percentage points. The conditional marginal effect of math scores on completion increases almost 50%, from about 6.5 to about 9.4 percentage points for women. The negative relation between higher than average language scores and SOHR completion becomes insignificant (p-value 0.13 for men and 0.11 for women), with a corresponding decrease

in the magnitude of the conditional marginal effect from 20 (13) percentage points to 15 (10) percentage points for the full sample (the sample of women). In other results, the relation between parental characteristics - age, income, and education – and success appears to weaken and second generation immigrants appear to have greater success when those still enrolled are treated as failures.

Technical Training

Again, the relation between parental characteristics (except mother's education for women) and program completion appears to weaken and diminish in magnitude when those still enrolled are treated as failures. The association between math scores and success is of the same magnitude for men, but the negative association is even more dominant. Higher math scores become significantly positively associated with success for women, but the negative selection effect dominates and the conditional marginal effect of having the highest math scores on success reaches -7%. Thus, the conditional marginal effect of math scores for women ranges from -16.7 percentage points for those with the lowest math scores to zero for those with just above average values to -7% for those with the highest math scores. The coefficients to language skills become jointly statistically significant in the completion equations (p-value of 0.02 for men and 0.00 for women), having a positive association. However, the indirect and negative association between language skills and enrollment still dominates the direct effect, and the conditional marginal effects indicate that higher language scores are associated with lower marginal conditional probabilities of completion. These conditional marginal effects are over twice as large in magnitude when those still enrolled are treated as failures (increasing from a spread of 6 percentage points to 12 percentage points for men and from 9 to over 30 percentage

points for women). Having attended tenth grade is still not significantly associated with completion.

Mercantile Training

In the case of Mercantile VET, completing tenth grade is no longer significantly or substantially related to success for men when those still enrolled are treated as failures. The significance of parental characteristics generally weakens in the second stage equation. Math skills become less significant in the second stage equations, but have approximately the same conditional marginal impact on success. Language skills become less significant in the second stage equations. This weakens the marginal impact for men and weakens the direct marginal effect of language skills for women. For women, the generally negative association between enrollment in mercantile VET and language skills dominates, causing the condition probability of completing mercantile VET to be consistently negatively associated with language scores rather than nonlinear.

Summary

Results do appear to be sensitive to the treatment of those still enrolled. The most consistent result is that parental characteristics matter somewhat less when these individuals are treated as failures rather than censored in the second stage or completion equation. Logically, if parents' characteristics are important because of the support and advice that parents offer their children, these characteristics should matter less when the children are older and likely no longer living at home. However in this context, the evidence suggests that the standard approach classifying those still enrolled as failures will underestimate the association between parental characteristics and program completion.

The controls included here for academic achievement are derived from tests taken at approximately age 16. Knowledge and skills change over time with real life experiences. Thus, it is not surprising that the association between test scores and VET completion changes when persons entering VET training at older ages are coded differently. It is of some interest to note that the usual classification of those still enrolled as failing will tend to overestimate the association between academic achievement and completion for some VET programs (technical) and underestimate the association in others (mercantile).

Conclusion

The aim of this paper was to shed light on the relation between academic achievement and vocational training. To this end, we use nine years of register data on the two cohorts of graduates from compulsory school in Denmark for whom official elementary level exam grades were first recorded. Specifically, we focus on math and language scores. We also observe whether each individual attended tenth grade, an optional program that less prepared students may take to boost both cognitive and non-cognitive skills.

A substantial fraction of this population does enroll in a VET program – at one point in time over a quarter are so engaged. However, not all who enroll graduate. Fifteen to twenty percent clearly drop out. If unobservable factors that influence the decision to enroll are also associated with completion, failure to jointly model enrollment and completion will yield biased results. We address this concern by estimating a bivariate regression model of completion conditional on enrollment. Peer enrollment behavior is used to identify the enrollment equation. In doing so, we made a methodological contribution to the literature on VET attainment that has largely focused on completion alone without taking into account selection. The results indicate

that there is, in fact, a significant negative correlation between the unobservables associated with enrollment and those associated with completion in half our specifications.

Another ten to fifteen percent of those who ever enroll are still enrolled nine years after completing primary school. Evidence suggests that this population entered vocational training three to four years after those who have completed or dropped out. This finding is not surprising given that VET training often attracts an older audience. However, the standard approach, which treats those still enrolled as failures, introduces bias. We treat these individuals as censored in the completion equation to avoid such misclassification bias. Our results indicate that treating these individuals as failures leads the association between completion and parental characteristics to be understated and the association between completion and academic achievement to be biased – though not always in the same direction.

Most importantly, while much of the previous literature treats VET as a single course of study, we recognize the heterogeneous nature of VET programs. We distinguish between three types of programs: SOHR or social and health-related, technical, and mercantile or business. We allow for further heterogeneity by modeling completion separately by gender by program. Certainly it is the case that women are disproportionately represented in SOHR programs and men in technical programs, but the fact that estimates differ significantly by gender suggests there may be further differentiation not captured by the three programs we recognize.

Academic achievement may have a different association with success in different programs. Ex-ante we expected math skills to be most important for technical programs of study and language skills to be most important for mercantile. Our findings indicate that the marginal effect of math scores on success conditional upon enrollment is largest for men in the technical area, but are significantly and substantially positively associated with success for men and

women in all three types of vocational training. Language scores, on the other hand, have more highly variable associations. Language scores are significantly negatively related to success in SOHR training, have little association with success in technical training, and have a nonlinear association with success in mercantile training – being negative at both the upper and lower tail of the distribution. Better academic achievement is generally associated with reduced enrollment in all VET programs, presumably because the returns to a more academically oriented degree are higher. The exceptions are notable: men with extremely low math scores are less likely to enroll in technical programs and men with low language scores are less likely to enroll in mercantile programs. Having completed tenth grade is a predictor of success in SOHR training and, for men, mercantile training, but is not significantly associated with success in technical programs.

In conclusion, this paper makes some substantial contributions to the study of vocational education and training. The implications for researchers are threefold. First, our results suggest that researchers should jointly model enrollment and completion in order to control for negative selection bias. Second, we find the results depend upon the classification of those still enrolled when last observed. This suggests the need to document the frequency with which older persons enter vocational training and their success rates. Further research may reveal that the association between family background and academic achievement and program success differs for this population. Third, the results indicate that it is very important to recognize that VET programs are heterogeneous and that different programs may require different skills. This area of research is critical because it can provide students, parents, educators, and policy makers valuable information on the factors that are important for success in different VET programs.

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Figure 1
Enrollment Time-O-Gram

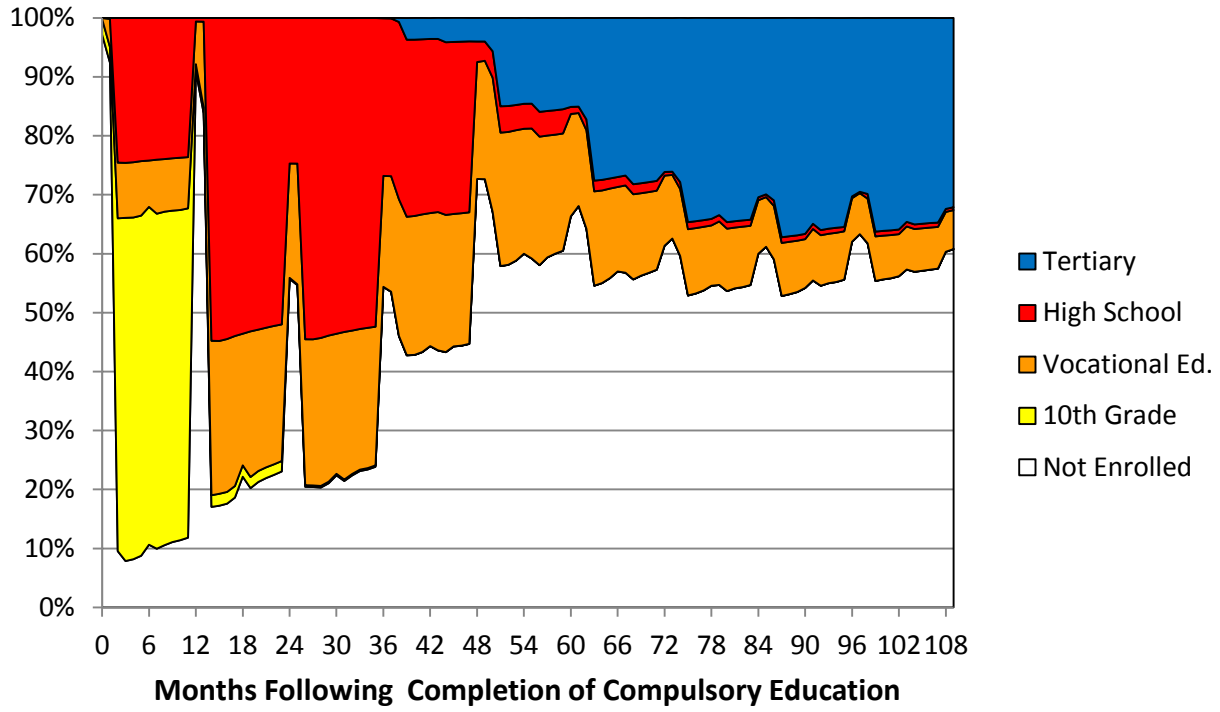

Figure 2A
SOSU Education

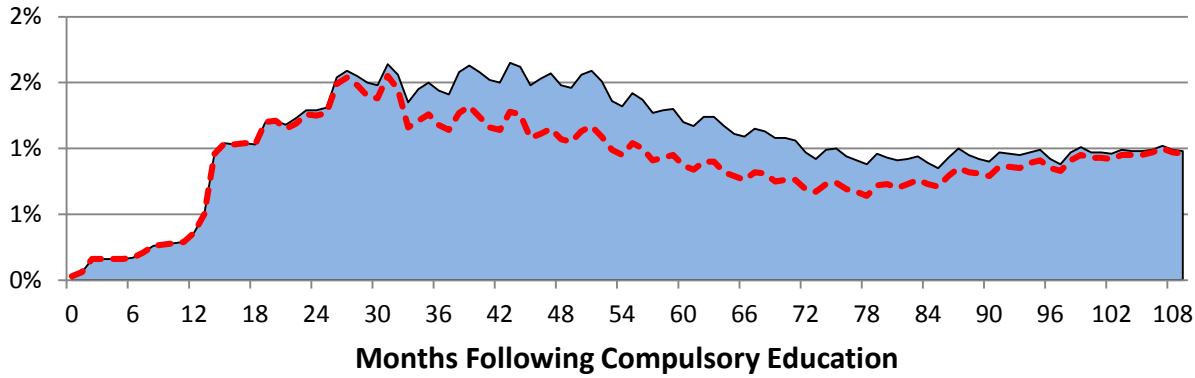

Figure 2B
Technical Vocational Education

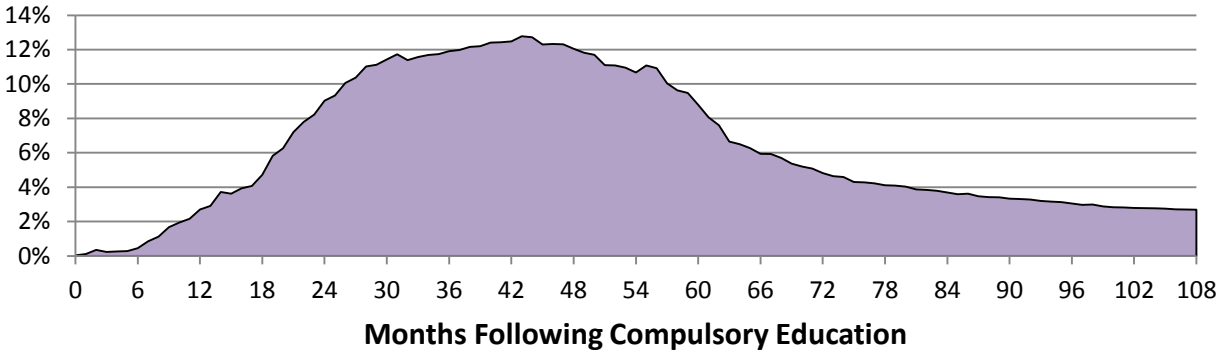

Figure 2C
Mercantile Vocational Education

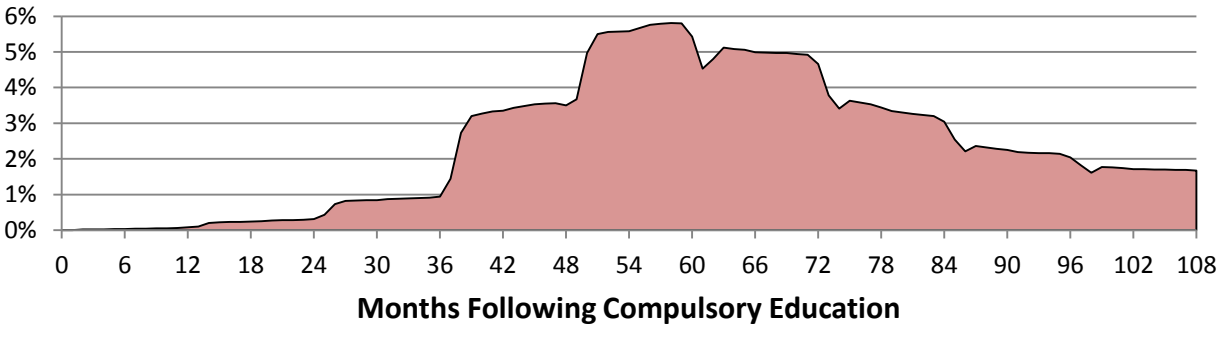

Table 1
Educational Outcomes

	%	% of Ever Enrolled	Months prior to Attempt	Months in Training
SOHR Training				
Ever Enrolled	5.4%			
Completed	3.4%	64.0%	47.4	26.5
Still Enrolled	0.9%	16.1%	88.2	19.7
No Longer Enrolled	1.1%	19.9%	49.5	9.6
Technical Training				
Ever Enrolled	22.0%			
Completed	16.4%	74.5%	27.6	35.7
Still Enrolled	2.3%	10.4%	79.1	27.3
No Longer Enrolled	3.3%	15.2%	37.4	12.6
Mercantile Training				
Ever Enrolled	12.3%			
Completed	9.0%	73.2%	54.6	24.2
Still Enrolled	1.4%	11.1%	87.4	21.9
No Longer Enrolled	1.9%	15.7%	48.8	9.5
Population Size	111,982			

Table 2
Population Means

	Full Sample	SOHR	Technical	Mercantile
Completed Tenth Grade	0.581	0.703	0.606	0.642
Academic Achievement:				
Math Exam Scores				
< 2 but > 0	0.083	0.218	0.113	0.093
2-4	0.162	0.289	0.235	0.195
4-6	0.381	0.291	0.405	0.435
6-8	0.155	0.043	0.092	0.129
> 8	0.101	0.008	0.027	0.049
Missing	0.117	0.151	0.127	0.100
Danish Exam Scores				
< 2 but > 0	0.075	0.123	0.158	0.062
2-4	0.191	0.311	0.318	0.233
4-6	0.429	0.398	0.348	0.498
6-8	0.128	0.036	0.037	0.089
> 8	0.064	0.006	0.008	0.025
Missing	0.113	0.126	0.130	0.093
Individual Characteristics				
Female	0.490	0.903	0.201	0.603
Age - 16	0.099	0.181	0.152	0.089
First Gen. Immigrant	0.056	0.090	0.035	0.040
Second Gen. Immigrant	0.090	0.137	0.053	0.067
Family Characteristics				
Broken Family	0.322	0.407	0.334	0.303
Missing Family Info	0.013	0.015	0.008	0.006
Parental Characteristics				
Mother's Age	27.768	26.343	27.116	27.342
Mother's Age Missing	0.003	0.005	0.002	0.002
Father's Age	30.137	28.813	29.683	29.793
Father's Age Missing	0.025	0.036	0.019	0.019
Mother's Real Income	281.571	243.145	265.289	269.134
Mother's Income Missing	0.029	0.032	0.023	0.022
Father's Real Income	383.576	289.738	353.624	372.893
Father's Income Missing	0.122	0.159	0.111	0.108

Mother's Education				
Primary	0.137	0.197	0.185	0.167
Vocational	0.362	0.448	0.456	0.479
Academic Gymnasium	0.060	0.033	0.050	0.058
Short	0.241	0.119	0.168	0.150
Long	0.048	0.007	0.013	0.010
Missing	0.152	0.196	0.127	0.136
Father's Education				
Primary	0.106	0.161	0.135	0.127
Vocational	0.370	0.408	0.474	0.469
Academic Gymnasium	0.048	0.021	0.030	0.044
Short	0.129	0.068	0.089	0.084
Long	0.081	0.013	0.023	0.026
Missing	0.264	0.327	0.248	0.251
Information Regarding Primary School Peers				
% Not Enrolled	4.732	5.331	4.732	4.549
% in SOHR VET	1.686	2.039	1.776	1.711
% in Technical VET	25.549	28.428	28.795	27.018
% in Mercantile VET	8.894	9.922	9.427	9.614
% in Academic High School	33.788	29.735	30.009	31.786
% in Technical High School	9.531	9.345	9.513	9.881
% in Mercantile High School	11.307	10.563	11.337	12.438
Peer Info - Missing	0.045	0.046	0.044	0.030
Distance to Nearest … :				
Academic High School	6.186	5.641	6.847	6.826
Technical High School	9.459	8.618	10.065	10.236
Mercantile High School	8.576	7.804	9.173	9.285
Missing	0.152	0.198	0.185	0.134
Region				
Capital Region	0.266	0.275	0.214	0.203
Zealand Region	0.154	0.162	0.166	0.161
Southern Denmark	0.235	0.242	0.250	0.243
Mid Jutland	0.232	0.227	0.238	0.258
Northern Jutland	0.114	0.095	0.132	0.135
2003 Cohort	0.504	0.487	0.492	0.494
Number of Observations	111,982	6,016	24,665	13,820

Table 3
Academic Achievement and Completion of SOHR VET
Conditional upon Attempting

	Full Sample						Women					
	Bivariate Probit		Simple Probit		Including Still Enrolled		Bivariate Probit		Simple Probit		Including Still Enrolled	
Completed 10th grade	0.0700		0.1037	**	0.1152	***	0.0835		0.0999	**	0.1018	***
	(0.0724)		(0.0438)		(0.0374)		(0.0635)		(0.0460)		(0.0395)	
	[0.0363]		[0.0337]		[0.0456]		[0.0232]		[0.0227]		[0.0317]	
Math Exam Scores												
< 2 but > 0	-0.3098	*	-0.2029	***	-0.1838	***	-0.2905		-0.2152	***	-0.1904	***
	(0.1604)		(0.0603)		(0.0518)		(0.1858)		(0.0637)		(0.0547)	
	[-0.0616]		[-0.0660]		[-0.0727]		[-0.0483]		[-0.0489]		[-0.0593]	
-4	-0.1887		-0.1027	*	-0.0886	*	-0.1996		-0.1385	**	-0.1008	**
	(0.1338)		(0.0537)		(0.0454)		(0.1533)		(0.0568)		(0.0482)	
	[-0.0299]		[-0.0334]		[-0.0351]		[-0.0311]		[-0.0315]		[-0.0314]	
6-8	0.2766	*	0.2013	*	0.2411	***	0.1894		0.1382		0.1728	*
	(0.1496)		(0.1099)		(0.0935)		(0.1657)		(0.1139)		(0.0961)	
	[0.0639]		[0.0654]		[0.0954]		[0.0315]		[0.0314]		[0.0538]	
> 8	0.2786		0.1218		0.1095		0.1884		0.0736		0.1108	
	(0.3112)		(0.2200)		(0.1917)		(0.3636)		(0.2426)		(0.2189)	
	[0.0400]		[0.0396]		[0.0433]		[0.0185]		[0.0167]		[0.0345]	
Danish Exam Scores												
< 2 but > 0	-0.0440		0.0045		0.0015		-0.0321		0.0149		-0.0046	
	(0.1008)		(0.0711)		(0.0606)		(0.1373)		(0.0763)		(0.0651)	
	[0.0035]		[0.0014]		[0.0006]		[0.0041]		[0.0034]		[-0.0014]	

2-4	0.0220	0.0746		0.0597		0.0369	0.0790		0.0651
	(0.0966)	(0.0491)		(0.0420)		(0.1172)	(0.0514)		(0.0443)
	[0.0272]	[0.0243]		[0.0236]		[0.0185]	[0.0179]		[0.0203]
6-8	-0.1114	-0.2314	**	-0.1450		-0.1711	-0.2457	**	-0.1542
	(0.2270)	(0.1072)		(0.0951)		(0.2236)	(0.1104)		(0.0979)
	[-0.0791]	[-0.0752]		[-0.0574]		[-0.0553]	[-0.0558]		[-0.0480]
> 8	-0.3973	-0.6115	***	-0.3684	*	-0.4378	-0.5632	**	-0.3247
	(0.4386)	(0.2252)		(0.2178)		(0.4129)	(0.2309)		(0.2220)
	[-0.2051]	[-0.1988]		[-0.1458]		[-0.1269]	[-0.1279]		[-0.1011]
Rho	-0.3249					-0.2132			
	(0.5069)					(0.5299)			
Number of observations	111,982	5,049		6,016		54,923	4,639		5,431
Number attempting	6,016	5,049		6,016		5,431	4,639		5,431
Number not completing	1,199	1,199		2,166		1,051	1,051		1,843

Also included in the completion equation are dummy variables for missing test scores; controls for gender, age, cohort, immigrant status, family composition, and region of residence; measures for both mother's and father's age, income, and education; % of peers in SOHR VET and a constant term. All these measures as well as the full complement of peer behaviors and measures of distance to nearest high schools are included in the enrollment equations estimated jointly for the bivariate probits.

Standard errors are reported in parentheses.

Marginal effects on completion for an individual with approximately modal characteristics (mean age, income, distance, and peer characteristics) are reported in brackets. These are conditional upon enrollment.

Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Table 4
Academic Achievement and Completion of Technical VET
Conditional upon Attempting

	Men						Women					
	Bivariate Probit		Simple Probit		Including Still Enrolled		Bivariate Probit		Simple Probit		Including Still Enrolled	
Completed 10th grade	0.0257		0.0045		-0.0316		0.0151		0.0206		-0.0165	
	(0.0249)		(0.0244)		(0.0208)		(0.0405)		(0.0455)		(0.0255)	
	[0.0004]		[0.0009]		[-0.0190]		[0.0065]		[0.0068]		[0.0119]	
Math Exam Scores												
< 2 but > 0	-0.4162	***	-0.4647	***	-0.3433	***	-0.2214	**	-0.2802	***	-0.0696	
	(0.0464)		(0.0408)		(0.0382)		(0.1120)		(0.0705)		(0.0563)	
	[-0.0925]		[-0.0923]		[-0.1127]		[-0.0929]		[-0.0928]		[-0.1675]	
2-4	-0.2081	***	-0.2100	***	-0.1695	***	-0.1579	***	-0.1643	***	-0.0881	**
	(0.0308)		(0.0316)		(0.0257)		(0.0577)		(0.0579)		(0.0360)	
	[-0.0413]		[-0.0417]		[-0.0459]		[-0.0547]		[-0.0544]		[-0.0877]	
6-8	0.1699	***	0.1073	**	0.0958	**	0.1146		0.0380		0.1315	***
	(0.0507)		(0.0486)		(0.0382)		(0.0904)		(0.0829)		(0.0437)	
	[0.0213]		[0.0213]		[0.0003]		[0.0129]		[0.0126]		[-0.0096]	
> 8	0.3770	***	0.2327	**	0.2800	***	0.2225		0.0051		0.3150	***
	(0.0975)		(0.0905)		(0.0664)		(0.2220)		(0.1605)		(0.0869)	
	[0.0484]		[0.0462]		[0.0226]		[0.0061]		[0.0017]		[-0.0706]	
Danish Exam Scores												
< 2 but > 0	-0.0610		0.0858	**	-0.0323		-0.1239		0.0897		-0.2046	**
	(0.0648)		(0.0385)		(0.0466)		(0.2074)		(0.0820)		(0.0901)	
	[0.0188]		[0.0170]		[0.0531]		[0.0316]		[0.0297]		[0.1350]	

2-4	-0.0590		0.0477		-0.0431		-0.1201		0.0292		-0.1512	***
	(0.0489)		(0.0312)		(0.0351)		(0.1337)		(0.0537)		(0.0543)	
	[0.0099]		[0.0095]		[0.0316]		[0.0110]		[0.0097]		[0.0772]	
6-8	-0.0689		-0.2272	***	-0.0548		0.0919		-0.0448		0.1612	***
	(0.0954)		(0.0769)		(0.0706)		(0.1412)		(0.0901)		(0.0606)	
	[-0.0399]		[-0.0451]		[-0.0672]		[-0.0137]		[-0.0148]		[-0.0734]	
> 8	0.2169		-0.0017		0.1928		0.0991		-0.1892		0.3043	**
	(0.1874)		(0.1778)		(0.1315)		(0.3119)		(0.1805)		(0.1312)	
	[0.0071]		[-0.0003]		[-0.0192]		[-0.0539]		[-0.0627]		[-0.1864]	
Rho	-0.3686	***			-0.5276	***	-0.5916				-0.9264	**
	(0.1416)				(0.0841)		(0.5045)				(0.1152)	
Number of observations	57,059		17,908		57,059		54,923		4,204		54,923	
Number attempting	19,714		17,908		19,714		4,951		4,204		4,951	
Number not completing	2,653		2,653		4,459		1,087		1,087		1,834	

Also included in the completion equation are dummy variables for missing test scores; controls for gender, age, cohort, immigrant status, family composition, and region of residence; measures for both mother's and father's age, income, and education; % of peers in Technical VET, % of peers in Technical high school, % of peers in Mercantile high school, and a constant term. All these measures as well as the full complement of peer behaviors and measures of distance to nearest high schools are included in the enrollment equations estimated jointly for the bivariate probits.

Standard errors are reported in parentheses.

Marginal effects on completion for an individual with approximately modal characteristics (mean age, income, distance, and peer characteristics) are reported in brackets. These are conditional upon enrollment.

Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Table 5

Academic Achievement and Completion of Mercantile VET
Conditional upon Attempting

	Men			Women		
	Bivariate Probit	Simple Probit	Including Still Enrolled	Bivariate Probit	Simple Probit	Including Still Enrolled
Completed 10th grade	0.1395 **	0.1333 ***	0.0214	0.0425	0.0686 *	-0.0186
	(0.0700)	(0.0464)	(0.0403)	(0.0271)	(0.0390)	(0.0282)
	[0.0300]	[0.0301]	[0.0061]	[0.0147]	[0.0154]	[-0.0053]
Math Exam Scores						
< 2 but > 0	-0.4482 ***	-0.4476 ***	-0.3335 ***	-0.2035 ***	-0.3362 ***	-0.1970 *
	(0.0851)	(0.0850)	(0.0759)	(0.0452)	(0.0627)	(0.1035)
	[-0.1011]	[-0.1011]	[-0.0944]	[-0.0691]	[-0.0754]	[-0.0721]
2-4	-0.1909 ***	-0.1906 ***	-0.0977 *	-0.0827 **	-0.0816	-0.0570
	(0.0620)	(0.0622)	(0.0534)	(0.0363)	(0.0502)	(0.0354)
	[-0.0430]	[-0.0431]	[-0.0277]	[-0.0184]	[-0.0183]	[-0.0123]
6-8	0.0016	0.0108	0.0787	0.1101 **	0.0681	0.0538
	(0.1146)	(0.0751)	(0.0632)	(0.0435)	(0.0623)	(0.0536)
	[0.0025]	[0.0024]	[0.0223]	[0.0171]	[0.0153]	[0.0018]
> 8	0.0669	0.0910	0.1461	0.2481 ***	0.1326	0.1891 **
	(0.2481)	(0.1094)	(0.0944)	(0.0659)	(0.0983)	(0.0956)
	[0.0205]	[0.0206]	[0.0414]	[0.0302]	[0.0297]	[0.0199]
Danish Exam Scores						
< 2 but > 0	-0.1622	-0.1393 *	-0.0473	-0.1391 **	-0.2084 **	0.0108
	(0.2225)	(0.0844)	(0.0756)	(0.0576)	(0.0811)	(0.0634)

	[-0.0316]	[-0.0315]	[-0.0134]	[-0.0404]		[-0.0467]		[0.0070]
2-4	-0.0139	-0.0082	-0.0097	-0.0939	***	-0.0470		-0.0336
	(0.0762)	(0.0578)	(0.0490)	(0.0349)		(0.0482)		(0.0540)
	[-0.0019]	[-0.0019]	[-0.0027]	[-0.0110]		[-0.0105]		[0.0058]
6-8	0.0367	0.0443	-0.0146	0.1917	***	0.0412		0.1307
	(0.1195)	(0.0968)	(0.0802)	(0.0461)		(0.0671)		(0.1031)
	[0.0100]	[0.0100]	[-0.0041]	[0.0112]		[0.0092]		[-0.0013]
> 8	-0.2893	-0.2651	-0.1391	0.1170	*	-0.2837	***	0.0391
	(0.2719)	(0.1746)	(0.1593)	(0.0644)		(0.1027)		(0.2593)
	[-0.0601]	[-0.0599]	[-0.0394]	[-0.0460]		[-0.0636]		[-0.0640]
Rho	0.0956			-0.9501	***			-0.7102
	(0.8617)			(0.0539)				(0.4897)
Number of observations	57,059	4,913	5,482	54,923		7,373		54,923
Number attempting	5,482	4,913	5,482	8,338		7,373		8,338
Number not completing	916	916	1,485	1,236		1,236		2,201

Also included in the completion equation are dummy variables for missing test scores; controls for gender, age, cohort, immigrant status, family composition, and region of residence; measures for both mother's and father's age, income, and education; % of peers in Mercantile VET, % of peers in Mercantile high school, distance to the nearest Mercantile high school, and a constant term. All these measures as well as the full complement of peer behaviors and measures of distance to nearest high schools are included in the enrollment equations estimated jointly for the bivariate probits.

Standard errors are reported in parentheses.

Marginal effects on completion for an individual with approximately modal characteristics (mean age, income, distance, and peer characteristics) are reported in brackets. These are conditional upon enrollment.

Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table A

Aggregation of VET Main Program clusters

Basic courses[a]	Aggregation
1. Mercantile	MERC
2. Building and construction	TECH
3. Iron and Metal	TECH
4. Graphics	TECH
5. Other technics and industry	TECH
6. Food and housekeeping	TECH
7. Agriculture and fishing	TECH
8. Transport	TECH
9. Safety	TECH
10. Pedagogical	SOHR
11. Health	SOHR

[a] Source: The Danish Ministry of Children and Education.

Appendix Table B1
Completion of SOHR VET

	Full Sample						Women					
	Bivariate Probit		Probit		Including Still Enrolled		Bivariate Probit		Simple Probit		Including Still Enrolled	
Individual Characteristics:												
Female	0.0510		0.3935	***	0.5385	***						
	(0.5633)		(0.0689)		(0.0564)							
	[0.1384]		[0.1280]		[0.2131]							
Age - 16	-0.0569		-0.0169		-0.0174		-0.0338		-0.0084		-0.0189	
	(0.0723)		(0.0438)		(0.0367)		(0.0758)		(0.0467)		(0.0393)	
	[-0.0035]		[-0.0055]		[-0.0069]		[-0.0015]		[-0.0019]		[-0.0059]	
First Gen. Immigrant	0.0879		0.1150		-0.0241		0.1054		0.1226		-0.0018	
	(0.1262)		(0.1208)		(0.1045)		(0.1332)		(0.1259)		(0.1094)	
	[0.0411]		[0.0374]		[-0.0095]		[0.0289]		[0.0279]		[-0.0006]	
Second Gen. Immigrant	0.2125	*	0.1828		0.2434	**	0.1834		0.1585		0.2195	**
	(0.1146)		(0.1137)		(0.0991)		(0.1291)		(0.1193)		(0.1039)	
	[0.0566]		[0.0594]		[0.0964]		[0.0353]		[0.0360]		[0.0683]	
2003 Cohort	-0.0315		-0.0401		-0.1496	***	-0.0432		-0.0521		-0.1628	***
	(0.0414)		(0.0397)		(0.0339)		(0.0473)		(0.0417)		(0.0358)	
	[-0.0136]		[-0.0130]		[-0.0592]		[-0.0119]		[-0.0118]		[-0.0507]	
Family Characteristics:												
Broken Family	-0.1835	***	-0.1844	***	-0.1443	***	-0.1726	***	-0.1719	***	-0.1457	***
	(0.0447)		(0.0439)		(0.0375)		(0.0459)		(0.0461)		(0.0396)	
	[-0.0613]		[-0.0600]		[-0.0571]		[-0.0394]		[-0.0390]		[-0.0454]	
Missing Family Info	0.1147		0.0421		-0.0990		0.2532		0.2085		-0.0554	
	(0.2135)		(0.1925)		(0.1585)		(0.2308)		(0.2105)		(0.1656)	

	[0.0115]		[0.0137]		[-0.0392]		[0.0466]		[0.0473]		[-0.0173]	
Parental Characteristics:												
Father's Age	0.0149	***	0.0157	***	0.0105	**	0.0158	***	0.0161	***	0.0117	**
	(0.0056)		(0.0053)		(0.0044)		(0.0057)		(0.0056)		(0.0046)	
	[0.0052]		[0.0051]		[0.0042]		[0.0037]		[0.0037]		[0.0036]	
Father's Age Missing	-0.1861		-0.1833		-0.1134		-0.2583	**	-0.2618	**	-0.1979	*
	(0.1189)		(0.1232)		(0.1074)		(0.1291)		(0.1296)		(0.1139)	
	[-0.0593]		[-0.0596]		[-0.0449]		[-0.0597]		[-0.0595]		[-0.0616]	
Mother's Age	-0.0016		-0.0041		-0.0058		-0.0054		-0.0074		-0.0086	
	(0.0073)		(0.0060)		(0.0050)		(0.0083)		(0.0064)		(0.0053)	
	[-0.0015]		[-0.0013]		[-0.0023]		[-0.0017]		[-0.0017]		[-0.0027]	
Mother's Age Missing	0.1728		0.2286		0.1679		0.2440		0.2713		0.2685	
	(0.3191)		(0.3130)		(0.2520)		(0.3433)		(0.3382)		(0.2757)	
	[0.0803]		[0.0743]		[0.0664]		[0.0628]		[0.0616]		[0.0836]	
Father's Real Income	0.0003	*	0.0003	*	0.0001		0.0004	**	0.0004	**	0.0002	*
	(0.0002)		(0.0001)		(0.0001)		(0.0002)		(0.0002)		(0.0001)	
	[0.0001]		[0.0001]		[0.0000]		[0.0001]		[0.0001]		[0.0001]	
Father's Income Missing	0.0248		0.0324		0.0135		0.0318		0.0362		0.0275	
	(0.0635)		(0.0643)		(0.0544)		(0.0681)		(0.0679)		(0.0579)	
	[0.0108]		[0.0105]		[0.0053]		[0.0082]		[0.0082]		[0.0085]	
Mother's Real Income	0.0003		0.0002		0.0003		0.0005	*	0.0005	*	0.0004	
	(0.0002)		(0.0002)		(0.0002)		(0.0003)		(0.0003)		(0.0002)	
	[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]	
Mother's Income Missing	0.0231		0.0112		-0.0011		-0.0845		-0.0906		-0.0811	
	(0.1287)		(0.1325)		(0.1116)		(0.1358)		(0.1367)		(0.1144)	
	[0.0024]		[0.0036]		[-0.0004]		[-0.0210]		[-0.0206]		[-0.0252]	
Father's Education:												
Vocational	-0.0147		-0.0218		-0.0338		-0.0208		-0.0271		-0.0536	
	(0.0580)		(0.0589)		(0.0505)		(0.0625)		(0.0613)		(0.0529)	

	[-0.0069]		[-0.0071]		[-0.0134]		[-0.0060]		[-0.0062]		[-0.0167]	
High School	-0.0816		-0.1348		-0.0938		-0.0848		-0.1339		-0.0823	
	(0.1658)		(0.1441)		(0.1236)		(0.2007)		(0.1587)		(0.1387)	
	[-0.0450]		[-0.0438]		[-0.0371]		[-0.0301]		[-0.0304]		[-0.0256]	
Short	-0.0466		-0.0787		-0.0390		-0.0602		-0.0887		-0.0617	
	(0.1056)		(0.0943)		(0.0806)		(0.1234)		(0.1007)		(0.0867)	
	[-0.0262]		[-0.0256]		[-0.0154]		[-0.0201]		[-0.0201]		[-0.0192]	
Long	-0.3203		-0.4251	**	-0.2709	*	-0.4241		-0.4993	***	-0.3625	**
	(0.2572)		(0.1764)		(0.1592)		(0.2825)		(0.1932)		(0.1725)	
	[-0.1409]		[-0.1382]		[-0.1072]		[-0.1128]		[-0.1134]		[-0.1128]	
Missing	-0.1105		-0.1255	*	-0.0934		-0.1003		-0.1074		-0.0830	
	(0.0776)		(0.0733)		(0.0629)		(0.0788)		(0.0765)		(0.0662)	
	[-0.0419]		[-0.0408]		[-0.0369]		[-0.0244]		[-0.0244]		[-0.0258]	
Mother's Education:												
Vocational	-0.0557		-0.0431		-0.0353		-0.0520		-0.0432		-0.0467	
	(0.0545)		(0.0542)		(0.0460)		(0.0584)		(0.0561)		(0.0482)	
	[-0.0133]		[-0.0140]		[-0.0140]		[-0.0096]		[-0.0098]		[-0.0145]	
High School	0.0313		-0.0009		-0.0110		-0.0540		-0.0854		-0.0947	
	(0.1328)		(0.1259)		(0.1039)		(0.1569)		(0.1333)		(0.1114)	
	[-0.0011]		[-0.0003]		[-0.0044]		[-0.0192]		[-0.0194]		[-0.0295]	
Short	-0.1718		-0.2239	***	-0.1976	***	-0.1718		-0.2127	***	-0.2007	***
	(0.1221)		(0.0768)		(0.0658)		(0.1372)		(0.0822)		(0.0706)	
	[-0.0746]		[-0.0728]		[-0.0782]		[-0.0482]		[-0.0483]		[-0.0625]	
Long	-0.0712		-0.1728		-0.1092		-0.1305		-0.2014		-0.2037	
	(0.2830)		(0.2334)		(0.2110)		(0.3219)		(0.2630)		(0.2267)	
	[-0.0592]		[-0.0562]		[-0.0432]		[-0.0454]		[-0.0457]		[-0.0634]	
Missing	-0.0905		-0.1005		-0.0482		-0.0507		-0.0575		-0.0293	
	(0.0837)		(0.0835)		(0.0704)		(0.0888)		(0.0876)		(0.0742)	
	[-0.0333]		[-0.0327]		[-0.0191]		[-0.0130]		[-0.0131]		[-0.0091]	

Academic Achievement:												
Math Exam Scores Missing	-0.4656	***	-0.3843	***	-0.3479	***	-0.4852	***	-0.4407	***	-0.3940	***
	(0.1447)		(0.1096)		(0.0938)		(0.1484)		(0.1171)		(0.1001)	
	[-0.1230]		[-0.1250]		[-0.1377]		[-0.1005]		[-0.1001]		[-0.1226]	
Danish Exam Scores Missing	0.0977		0.0586		0.0722		0.1062		0.0988		0.1253	
	(0.1274)		(0.1178)		(0.1006)		(0.1262)		(0.1261)		(0.1080)	
	[0.0167]		[0.0191]		[0.0286]		[0.0223]		[0.0224]		[0.0390]	
Region Dummies:												
Zealand Region	0.0466		0.0317		0.0591		0.0361		0.0229		0.0630	
	(0.0636)		(0.0629)		(0.0544)		(0.0717)		(0.0666)		(0.0579)	
	[0.0106]		[0.0103]		[0.0234]		[0.0051]		[0.0052]		[0.0196]	
Southern Denmark	-0.0126		-0.0300		0.0319		-0.0349		-0.0424		0.0336	
	(0.0613)		(0.0560)		(0.0488)		(0.0613)		(0.0588)		(0.0514)	
	[-0.0097]		[-0.0098]		[0.0126]		[-0.0097]		[-0.0096]		[0.0105]	
Mid Jutland	0.0444		0.0399		-0.0220		0.0489		0.0481		-0.0061	
	(0.0560)		(0.0581)		(0.0492)		(0.0605)		(0.0615)		(0.0523)	
	[0.0140]		[0.0130]		[-0.0087]		[0.0111]		[0.0109]		[-0.0019]	
Northern Jutland	-0.0921		-0.1348	*	-0.2130	***	-0.0782		-0.1043		-0.1873	***
	(0.1039)		(0.0771)		(0.0648)		(0.1041)		(0.0814)		(0.0686)	
	[-0.0473]		[-0.0438]		[-0.0843]		[-0.0247]		[-0.0237]		[-0.0583]	
Peer Behavior:												
% in SOHR VET	-0.0173		-0.0093		-0.0005		-0.0093		-0.0040		0.0009	
	(0.0157)		(0.0108)		(0.0093)		(0.0172)		(0.0114)		(0.0098)	
	[-0.0031]		[-0.0030]		[-0.0002]		[-0.0009]		[-0.0009]		[0.0003]	
Constant	0.9032		0.1072		-0.1683		0.7689		0.4815	***	0.3847	**
	(1.2397)		(0.1864)		(0.1556)		(0.7137)		(0.1833)		(0.1544)	

Standard errors are reported in parentheses. Conditional marginal effects are reported in brackets.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table B2

Selection into SOHR VET from Bivariate Probit Specification

	Full Sample		Women	
Individual Characteristics:				
Female	1.1848	***		
	(0.0201)			
Age - 16	0.1587	***	0.1547	***
	(0.0165)		(0.0191)	
First Gen. Immigrant	0.1060	**	0.1091	**
	(0.0441)		(0.0494)	
Second Gen. Immigrant	-0.1643	***	-0.1782	***
	(0.0421)		(0.0465)	
Completed 10th grade	0.1193	***	0.0920	***
	(0.0156)		(0.0176)	
Family Characteristics:				
Broken Family	0.0200		0.0167	
	(0.0165)		(0.0185)	
Missing Family Info	-0.2757	***	-0.2980	***
	(0.0712)		(0.0789)	
Parental Characteristics:				
Father's Age	0.0004		-0.0002	
	(0.0018)		(0.0020)	
Father's Age Missing	0.0483		0.0060	
	(0.0470)		(0.0527)	
Mother's Age	-0.0092	***	-0.0109	***
	(0.0021)		(0.0024)	
Mother's Age Missing	0.2030	*	0.1508	
	(0.1149)		(0.1312)	
Father's Real Income	-0.0004	***	-0.0004	***
	(0.0000)		(0.0001)	
Father's Income Missing	0.0223		0.0210	
	(0.0240)		(0.0267)	
Mother's Real Income	-0.0002	*	-0.0003	***
	(0.0001)		(0.0001)	
Mother's Income Missing	-0.0551		-0.0346	
	(0.0486)		(0.0536)	
Father's Education:				
Vocational	-0.0178		-0.0288	
	(0.0222)		(0.0250)	

Academic Gymnasium	-0.1648	***	-0.2534	***
	(0.0487)		(0.0547)	
Short	-0.0993	***	-0.1496	***
	(0.0331)		(0.0368)	
Long	-0.2974	***	-0.3513	***
	(0.0565)		(0.0620)	
Missing	-0.0373		-0.0280	
	(0.0275)		(0.0309)	
Mother's Education:				
Vocational	0.0585	***	0.0607	***
	(0.0207)		(0.0232)	
Academic Gymnasium	-0.1168	***	-0.1641	***
	(0.0407)		(0.0453)	
Short	-0.1506	***	-0.2029	***
	(0.0280)		(0.0307)	
Long	-0.3399	***	-0.3689	***
	(0.0721)		(0.0807)	
Missing	-0.0201		-0.0305	
	(0.0307)		(0.0342)	
Primary School Performance:				
Math Exam Scores:				
< 2 but > 0	0.4445	***	0.4671	***
	(0.0246)		(0.0279)	
2-4	0.3458	***	0.3721	***
	(0.0199)		(0.0221)	
6-8	-0.3096	***	-0.3038	***
	(0.0302)		(0.0322)	
> 8	-0.5509	***	-0.6163	***
	(0.0582)		(0.0635)	
Missing	0.3693	***	0.2975	***
	(0.0492)		(0.0534)	
Danish Test Scores:				
< 2 but > 0	0.1831	***	0.2832	***
	(0.0286)		(0.0346)	
2-4	0.1919	***	0.2423	***
	(0.0196)		(0.0216)	
6-8	-0.3987	***	-0.3805	***
	(0.0324)		(0.0336)	
> 8	-0.6662	***	-0.6177	***
	(0.0658)		(0.0675)	

Missing	-0.1669	***	-0.0566	
	(0.0523)		(0.0569)	
Peer Behavior:				
% in Academic High School	0.0034	***	0.0047	***
	(0.0013)		(0.0015)	
% in Technical High School	0.0030		0.0047	**
	(0.0019)		(0.0021)	
% in Mercantile High School	0.0012		0.0035	*
	(0.0017)		(0.0019)	
% in Mercantile VET	0.0104	***	0.0110	***
	(0.0021)		(0.0025)	
% in Technical VET	0.0062	***	0.0082	***
	(0.0015)		(0.0018)	
% in SOHR VET	0.0280	***	0.0310	***
	(0.0047)		(0.0054)	
Peer Info - Missing	0.4084	***	0.5800	***
	(0.1211)		(0.1427)	
Distance to Nearest … :				
Academic High School	-0.0031	*	-0.0028	
	(0.0017)		(0.0020)	
Technical High School	-0.0012		-0.0001	
	(0.0012)		(0.0013)	
Mercantile High School	-0.0003		-0.0011	
	(0.0016)		(0.0016)	
Missing	-0.0154		0.0012	
	(0.0277)		(0.0291)	
Other Control Variables:				
2003 Cohort	-0.0269	*	-0.0464	***
	(0.0145)		(0.0162)	
Zealand Region	-0.0538	**	-0.0812	***
	(0.0243)		(0.0274)	
Southern Denmark	-0.0527	**	-0.0383	
	(0.0225)		(0.0253)	
Mid Jutland	-0.0130		-0.0050	
	(0.0232)		(0.0263)	
Northern Jutland	-0.1525	***	-0.1589	***
	(0.0295)		(0.0333)	
Constant	-2.5155	***	-1.3904	***
	(0.1350)		(0.1545)	

Number of observations	111982	54923
Wald chi2(41)	155.39	123.94
Prob > chi2	0	0
Pseudo R2		
Log pseudolikelihood	-20996.78	-17544.5

Standard errors are reported in parentheses.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table C1
Completion of Technical VET

	Men						Women					
	Bivariate Probit		Simple Probit		Including Still Enrolled		Bivariate Probit		Simple Probit		Including Still Enrolled	
Individual Characteristics:												
Age - 16	-0.0444	*	-0.0456	*	-0.0412	*	-0.0696		-0.0445		-0.0535	*
	(0.0265)		(0.0273)		(0.0223)		(0.0476)		(0.0528)		(0.0295)	
	[-0.0088]		[-0.0091]		[-0.0112]		[-0.0144]		[-0.0147]		[-0.0121]	
First Gen. Immigrant	0.0185		0.0409		0.0454		-0.3055		-0.1826		-0.2479	**
	(0.0930)		(0.0966)		(0.0793)		(0.2160)		(0.2355)		(0.1215)	
	[0.0065]		[0.0081]		[0.0184]		[-0.0649]		[-0.0605]		[-0.0577]	
Second Gen. Immigrant	0.0656		-0.1047		0.0938		0.2116		-0.1847		0.3881	**
	(0.1044)		(0.0859)		(0.0807)		(0.4080)		(0.2148)		(0.1887)	
	[-0.0161]		[-0.0208]		[-0.0319]		[-0.0517]		[-0.0612]		[-0.2245]	
2003 Cohort	-0.0614	**	-0.0789	***	-0.1257	***	-0.0022		-0.0233		-0.0267	
	(0.0242)		(0.0239)		(0.0204)		(0.0421)		(0.0430)		(0.0287)	
	[-0.0159]		[-0.0157]		[-0.0429]		[-0.0081]		[-0.0077]		[-0.0212]	
Family Characteristics:												
Broken Family	-0.2353	***	-0.2653	***	-0.2040	***	-0.1249	**	-0.1499	***	-0.0620	*
	(0.0300)		(0.0265)		(0.0247)		(0.0594)		(0.0470)		(0.0347)	
	[-0.0525]		[-0.0527]		[-0.0669]		[-0.0491]		[-0.0497]		[-0.0854]	
Missing Family Info	0.0179		-0.0142		-0.0434		0.4213	*	0.4163		0.3405	**
	(0.1336)		(0.1392)		(0.1097)		(0.2387)		(0.2651)		(0.1642)	
	[-0.0073]		[-0.0028]		[-0.0348]		[0.1231]		[0.1379]		[0.1716]	
Parental Characteristics:												

Father's Age	0.0064	**	0.0064	**	0.0046	*	-0.0013		0.0003		-0.0019	
	(0.0031)		(0.0032)		(0.0026)		(0.0050)		(0.0054)		(0.0031)	
	[0.0013]		[0.0013]		[0.0012]		[0.0000]		[0.0001]		[0.0005]	
Father's Age Missing	0.0282		0.0324		0.0122		0.2712		0.3349	**	0.1566	
	(0.0887)		(0.0923)		(0.0733)		(0.1735)		(0.1681)		(0.1060)	
	[0.0072]		[0.0064]		[0.0062]		[0.1105]		[0.1109]		[0.1959]	
Mother's Age	0.0074	**	0.0067	*	0.0048		0.0076		0.0065		0.0037	
	(0.0036)		(0.0038)		(0.0030)		(0.0055)		(0.0064)		(0.0035)	
	[0.0013]		[0.0013]		[0.0010]		[0.0023]		[0.0022]		[0.0032]	
Mother's Age Missing	-0.0306		-0.0406		-0.0408		0.1875		0.2237		-0.0141	
	(0.2551)		(0.2659)		(0.2147)		(0.4592)		(0.5296)		(0.2751)	
	[-0.0071]		[-0.0081]		[-0.0136]		[0.0714]		[0.0741]		[0.1218]	
Father's Real Income	0.0005	***	0.0005	***	0.0003	***	0.0001		0.0001		0.0001	
	(0.0001)		(0.0001)		(0.0001)		(0.0001)		(0.0001)		(0.0001)	
	[0.0001]		[0.0001]		[0.0001]		[0.0000]		[0.0000]		[0.0000]	
Father's Income Missing	-0.0202		-0.0464		-0.0493		0.0844		0.0674		0.0315	
	(0.0420)		(0.0420)		(0.0341)		(0.0630)		(0.0728)		(0.0396)	
	[-0.0094]		[-0.0092]		[-0.0248]		[0.0225]		[0.0223]		[0.0284]	
Mother's Real Income	0.0004	***	0.0004	***	0.0002	**	0.0004	*	0.0004		0.0002	
	(0.0001)		(0.0001)		(0.0001)		(0.0002)		(0.0003)		(0.0001)	
	[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0002]	
Mother's Income Missing	-0.0173		-0.0308		0.0081		-0.0291		-0.0352		-0.0117	
	(0.0779)		(0.0808)		(0.0652)		(0.1243)		(0.1422)		(0.0796)	
	[-0.0068]		[-0.0061]		[-0.0040]		[-0.0119]		[-0.0117]		[-0.0211]	
Father's Education:												
Vocational	0.0755	**	0.1057	***	0.0635	**	0.0434		0.0739		-0.0085	
	(0.0370)		(0.0364)		(0.0307)		(0.0656)		(0.0631)		(0.0375)	
	[0.0212]		[0.0210]		[0.0296]		[0.0254]		[0.0245]		[0.0524]	
High School	-0.0286		-0.0906		-0.0540		0.0133		-0.0722		0.0472	

	(0.0778)		(0.0770)		(0.0612)		(0.1510)		(0.1454)		(0.0858)	
	[-0.0173]		[-0.0180]		[-0.0384]		[-0.0230]		[-0.0239]		[-0.0682]	
Short	-0.0427		-0.0898	*	0.0040		0.1060		0.0759		0.0080	
	(0.0548)		(0.0528)		(0.0439)		(0.0871)		(0.0994)		(0.0586)	
	[-0.0172]		[-0.0178]		[-0.0155]		[0.0265]		[0.0251]		[0.0309]	
Long	-0.0862		-0.2297	**	-0.0521		-0.0779		-0.2267		0.0427	
	(0.1085)		(0.0946)		(0.0811)		(0.2144)		(0.1595)		(0.1172)	
	[-0.0411]		[-0.0456]		[-0.0615]		[-0.0677]		[-0.0751]		[-0.1548]	
Missing	-0.0061		-0.0096		0.0037		-0.0209		-0.0462		-0.0148	
	(0.0454)		(0.0469)		(0.0380)		(0.0773)		(0.0816)		(0.0509)	
	[-0.0020]		[-0.0019]		[-0.0004]		[-0.0141]		[-0.0153]		[-0.0303]	
Mother's Education:												
Vocational	0.0669	**	0.0816	**	0.0727	***	0.1176	**	0.1155	**	0.0684	**
	(0.0321)		(0.0326)		(0.0271)		(0.0511)		(0.0558)		(0.0327)	
	[0.0164]		[0.0162]		[0.0262]		[0.0372]		[0.0383]		[0.0556]	
High School	0.0004		-0.0248		0.0306		0.1393		0.1115		0.0756	
	(0.0599)		(0.0615)		(0.0487)		(0.0962)		(0.1111)		(0.0584)	
	[-0.0051]		[-0.0049]		[-0.0015]		[0.0360]		[0.0369]		[0.0438]	
Short	0.1019	**	0.0693		0.0461		0.1648	**	0.0878		0.1580	***
	(0.0428)		(0.0431)		(0.0345)		(0.0835)		(0.0771)		(0.0441)	
	[0.0137]		[0.0138]		[-0.0013]		[0.0285]		[0.0291]		[0.0132]	
Long	-0.1781		-0.3004	***	-0.1445		0.3860	**	0.2942		0.2745	**
	(0.1148)		(0.1103)		(0.0900)		(0.1927)		(0.2224)		(0.1070)	
	[-0.0556]		[-0.0597]		[-0.0794]		[0.0969]		[0.0974]		[0.1138]	
Missing	-0.0733		-0.0885	*	-0.04934		0.0877		0.0726		0.0945	*
	(0.0510)		(0.0521)		(0.0423)		(0.0773)		(0.0893)		(0.0507)	
	[-0.0176]		[-0.0176]		[-0.0193]		[0.0233]		[0.0241]		[0.0293]	
Academic Achievement:												
Math Exam Scores Missing	-0.4026	***	-0.5261	***	-0.3531	***	-0.2577	**	-0.2907	**	-0.1613	*

	(0.0964)		(0.0843)		(0.0767)		(0.1270)		(0.1213)		(0.0845)	
	[-0.1061]		[-0.1045]		[-0.1485]		[-0.0965]		[-0.0963]		[-0.1629]	
Danish Exam Scores Missing	0.0960		0.2269	***	0.1543	**	0.0978		0.1175		0.1359	
	(0.0955)		(0.0849)		(0.0763)		(0.1205)		(0.1324)		(0.0892)	
	[0.0465]		[0.0451]		[0.0982]		[0.0371]		[0.0389]		[0.0630]	
Region Dummies												
Zealand Region	0.0402		0.0471		0.0329		0.0665		0.1137	*	0.0199	
	(0.0376)		(0.0389)		(0.0314)		(0.0812)		(0.0691)		(0.0458)	
	[0.0066]		[0.0093]		[0.0059]		[0.0333]		[0.0377]		[0.0651]	
Southern Denmark	0.1160	***	0.1310	***	0.0990	***	0.1510	**	0.1794	***	0.0535	
	(0.0355)		(0.0359)		(0.0293)		(0.0760)		(0.0660)		(0.0420)	
	[0.0236]		[0.0260]		[0.0276]		[0.0553]		[0.0594]		[0.0922]	
Mid Jutland	0.1546	***	0.1698	***	0.1266	***	0.0571		0.0792		0.0131	
	(0.0361)		(0.0364)		(0.0297)		(0.0634)		(0.0652)		(0.0381)	
	[0.0315]		[0.0337]		[0.0355]		[0.0215]		[0.0262]		[0.0363]	
Northern Jutland	0.1318	***	0.1526	***	0.1218	***	0.1209		0.1719	**	0.0333	
	(0.0435)		(0.0438)		(0.0358)		(0.0951)		(0.0776)		(0.0496)	
	[0.0270]		[0.0303]		[0.0348]		[0.0506]		[0.0569]		[0.0910]	
Peer Behavior:												
% in Technical High School	0.0028		0.0035		0.0039	**	0.0106	***	0.0098	**	0.0067	***
	(0.0024)		(0.0025)		(0.0020)		(0.0040)		(0.0045)		(0.0025)	
	[0.0013]		[0.0007]		[0.0025]		[0.0042]		[0.0032]		[0.0073]	
% in Technical VET	-0.0001		0.0021	**	0.0039	**	-0.0013		0.0014		-0.0028	**
	(0.0012)		(0.0009)		(0.0020)		(0.0028)		(0.0016)		(0.0012)	
	[0.0010]		[0.0004]		[0.0025]		[0.0014]		[0.0005]		[0.0044]	
Distance to Nearest:												
Technical High School	0.0061	***	0.0072	***	0.0050	***	-0.0004		-0.0003		0.0008	
	(0.0013)		(0.0013)		(0.0011)		(0.0020)		(0.0023)		(0.0014)	

	[0.0014]		[0.0014]		[0.0017]		[-0.0004]		[-0.0001]		[-0.0009]	
Constant	0.6817	***	0.3217	***	0.7774	***	1.1179		0.1552		1.5649	***
	(0.1718)		(0.1129)		(0.1179)		(0.8044)		(0.1921)		(0.1678)	

Standard errors are reported in parentheses. Conditional marginal effects are reported in brackets.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Distance to Nearest:									
Technical High School	0.0061	***	0.0072	***	0.0050	***	-0.0004	-0.0003	0.0021
	(0.0013)		(0.0013)		(0.0011)		(0.0020)	(0.0023)	(0.0020)
	[0.0014]		[0.0014]		[0.0017]		[-0.0004]	[-0.0001]	[0.0007]
Constant	0.6817	***	0.3217	***	0.7774	***	1.1179	0.1552	0.1031
	(0.1718)		(0.1129)		(0.1179)		(0.8044)	(0.1921)	(0.1693)

Standard errors are reported in parentheses. Conditional marginal effects are reported in brackets.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table C2
Selection into Technical VET from Bivariate Probit Specification

	Men		Women	
Individual Characteristics:				
Age - 16	0.0066		0.0687	***
	(0.0137)		(0.0198)	
First Gen. Immigrant	0.0687	***	0.2926	***
	(0.0198)		(0.0726)	
Second Gen. Immigrant	-0.6094	***	-0.7237	***
	(0.0396)		(0.0668)	
Completed 10th grade	-0.1008	***	0.0033	
	(0.0122)		(0.0172)	
Family Characteristics:				
Broken Family	-0.0813	***	-0.0021	
	(0.0137)		(0.0183)	
Missing Family Info	-0.2261	***	-0.2221	**
	(0.0645)		(0.0947)	
Parental Characteristics:				
Father's Age	-0.0016		0.0026	
	(0.0015)		(0.0021)	
Father's Age Missing	0.0275		0.0254	
	(0.0450)		(0.0601)	
Mother's Age	-0.0037	**	-0.0037	
	(0.0018)		(0.0024)	
Mother's Age Missing	-0.0157		-0.0094	
	(0.1211)		(0.1876)	
Father's Real Income	-0.0001	***	0.0000	
	(0.0000)		(0.0000)	
Father's Income Missing	-0.1068	***	-0.0563	**
	(0.0209)		(0.0272)	
Mother's Real Income	0.0000		-0.0002	**
	(0.0001)		(0.0001)	
Mother's Income Missing	-0.0653		-0.0029	
	(0.0404)		(0.0565)	
Father's Education:				
Vocational	0.1151	***	0.0455	*
	(0.0198)		(0.0254)	

Academic Gymnasium	-0.2349	***	-0.1519	***
	(0.0339)		(0.0492)	
Short	-0.1720	***	-0.0800	**
	(0.0257)		(0.0351)	
Long	-0.4788	***	-0.2014	***
	(0.0358)		(0.0504)	
Missing	-0.0158		-0.0319	
	(0.0244)		(0.0321)	
Mother's Education:				
Vocational	0.0530	***	-0.0470	**
	(0.0178)		(0.0227)	
Academic Gymnasium	-0.1064	***	-0.0990	**
	(0.0291)		(0.0401)	
Short	-0.1503	***	-0.1930	***
	(0.0213)		(0.0286)	
Long	-0.3857	***	-0.2892	***
	(0.0431)		(0.0631)	
Missing	-0.0509	*	-0.0588	*
	(0.0263)		(0.0347)	
Primary School Performance:				
Math Exam Scores:				
< 2 but > 0	-0.1362	***	-0.0355	
	(0.0237)		(0.0305)	
2-4	0.0339	**	0.0373	
	(0.0168)		(0.0228)	
6-8	-0.2827	***	-0.1713	***
	(0.0190)		(0.0263)	
> 8	-0.6033	***	-0.4350	***
	(0.0274)		(0.0436)	
Missing	-0.4718	***	0.0218	
	(0.0464)		(0.0576)	
Danish Test Scores:				
< 2 but > 0	0.6438	***	0.4308	***
	(0.0216)		(0.0375)	
2-4	0.4539	***	0.3119	***
	(0.0153)		(0.0222)	
6-8	-0.5282	***	-0.2669	***
	(0.0267)		(0.0277)	
> 8	-0.7740	***	-0.4990	***
	(0.0487)		(0.0475)	

Missing	0.5475	***	-0.0059	
	(0.0465)		(0.0622)	
Peer Behavior:				
% in Academic High School	0.0093	***	0.0033	**
	(0.0011)		(0.0016)	
% in Technical High School	0.0140	***	0.0002	
	(0.0015)		(0.0021)	
% in Mercantile High School	0.0121	***	0.0044	**
	(0.0013)		(0.0021)	
% in Mercantile VET	0.0132	***	0.0025	
	(0.0017)		(0.0025)	
% in Technical VET	0.0216	***	0.0103	***
	(0.0013)		(0.0018)	
% in SOSU VET	0.0110	***	-0.0072	
	(0.0041)		(0.0056)	
Peer Info - Missing	1.2142	***	0.4724	***
	(0.1042)		(0.1500)	
Distance to Nearest … :				
Academic High School	0.0053	***	0.0036	**
	(0.0014)		(0.0018)	
Technical High School	0.0020	**	-0.0011	
	(0.0009)		(0.0015)	
Mercantile High School	0.0017		0.0006	
	(0.0011)		(0.0016)	
Missing	0.1181	***	0.0523	*
	(0.0204)		(0.0297)	
Other Control Variables:				
2003 Cohort	-0.0657	***	-0.0388	**
	(0.0117)		(0.0158)	
Zealand Region	-0.0349	*	0.0398	
	(0.0203)		(0.0270)	
Southern Denmark	-0.0078		-0.0191	
	(0.0187)		(0.0256)	
Mid Jutland	-0.0087		-0.0043	
	(0.0194)		(0.0265)	
Northern Jutland	-0.0036		0.0185	
	(0.0229)		(0.0310)	
Constant	-1.4373	***	-1.5662	***
	(0.1136)		(0.1655)	

Number of obs	57059	54923
Wald chi2(44)	789.89	171.45
Prob > chi2	0	0
Pseudo R2		
Log pseudolikelihood	-38335.52	-17750.53

Standard errors are reported in parentheses.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table D1
Completion of Merchantile VET

	Men						Women					
	Bivariate Probit		Simple Probit		Including Still Enrolled		Bivariate Probit		Simple Probit		Including Still Enrolled	
Individual Characteristics:												
Age - 16	-0.0079		-0.0076		-0.0319		-0.1045	***	-0.1704	***	-0.0877	*
	(0.0512)		(0.0514)		(0.0459)		(0.0329)		(0.0484)		(0.0526)	
	[-0.0018]		[-0.0017]		[-0.0090]		[-0.0346]		[-0.0382]		[-0.0313]	
First Gen. Immigrant	0.1192		0.1230		-0.0129		-0.0676		-0.0915		-0.0440	
	(0.1594)		(0.1549)		(0.1392)		(0.0967)		(0.1482)		(0.1027)	
	[0.0278]		[0.0278]		[-0.0037]		[-0.0157]		[-0.0205]		[-0.0096]	
Second Gen. Immigrant	-0.1168		-0.1147		-0.0549		0.1928	**	-0.0562		0.1099	
	(0.1361)		(0.1359)		(0.1205)		(0.0893)		(0.1322)		(0.1762)	
	[-0.0255]		[-0.0259]		[-0.0155]		[0.0036]		[-0.0126]		[-0.0166]	
2003 Cohort	-0.1466	***	-0.1459	***	-0.2536	***	-0.0130		-0.0510		-0.1504	*
	(0.0436)		(0.0438)		(0.0378)		(0.0252)		(0.0359)		(0.0827)	
	[-0.0330]		[-0.0330]		[-0.0718]		[-0.0103]		[-0.0114]		[-0.0576]	
Family Characteristics:												
Broken Family	-0.2081	***	-0.2040	***	-0.1861	***	-0.0180		-0.1245	***	-0.0374	
	(0.0574)		(0.0501)		(0.0435)		(0.0273)		(0.0403)		(0.0788)	
	[-0.0462]		[-0.0461]		[-0.0527]		[-0.0241]		[-0.0279]		[-0.0299]	
Missing Family Info	0.5967		0.6257	**	0.6391	**	0.1964		0.0854		-0.0240	
	(0.4050)		(0.2935)		(0.2666)		(0.1440)		(0.2413)		(0.2081)	
	[0.1397]		[0.1413]		[0.1810]		[0.0425]		[0.0191]		[-0.0276]	

Parental Characteristics:												
Father's Age	0.0127	*	0.0129	**	0.0063		-0.0052		-0.0117	**	-0.0058	
	(0.0065)		(0.0059)		(0.0051)		(0.0034)		(0.0049)		(0.0057)	
	[0.0029]		[0.0029]		[0.0018]		[-0.0023]		[-0.0026]		[-0.0026]	
Father's Age Missing	0.0339		0.0296		0.1882		0.1074		0.1342		0.1354	
	(0.1608)		(0.1567)		(0.1450)		(0.0972)		(0.1456)		(0.1140)	
	[0.0067]		[0.0067]		[0.0533]		[0.0338]		[0.0301]		[0.0461]	
Mother's Age	-0.0130	*	-0.0131	*	-0.0069		0.0027		0.0061		0.0041	
	(0.0071)		(0.0068)		(0.0059)		(0.0040)		(0.0058)		(0.0052)	
	[-0.0030]		[-0.0030]		[-0.0019]		[0.0015]		[0.0014]		[0.0020]	
Mother's Age Missing	-0.5860		-0.6030		-0.6216	*	-0.0335		-0.1421		0.0242	
	(0.4108)		(0.3756)		(0.3771)		(0.2452)		(0.4002)		(0.3064)	
	[-0.1361]		[-0.1362]		[-0.1760]		[-0.0156]		[-0.0319]		[0.0037]	
Father's Real Income	0.0004	***	0.0004	***	0.0002	***	0.0000		0.0001		0.0001	
	(0.0001)		(0.0001)		(0.0001)		(0.0001)		(0.0001)		(0.0001)	
	[0.0001]		[0.0001]		[0.0001]		[0.0000]		[0.0000]		[0.0000]	
Father's Income Missing	-0.2010	***	-0.1996	***	-0.1841	***	-0.0450		-0.1241	**	-0.0493	
	(0.0753)		(0.0754)		(0.0664)		(0.0407)		(0.0606)		(0.0652)	
	[-0.0452]		[-0.0451]		[-0.0521]		[-0.0247]		[-0.0278]		[-0.0266]	
Mother's Real Income	0.0003		0.0003		0.0003		0.0004	***	0.0006	***	0.0004	*
	(0.0002)		(0.0002)		(0.0002)		(0.0001)		(0.0002)		(0.0002)	
	[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0002]	
Mother's Income Missing	-0.1132		-0.1117		-0.0403		-0.0948		-0.1700		-0.0604	
	(0.1429)		(0.1431)		(0.1310)		(0.0757)		(0.1163)		(0.0949)	
	[-0.0255]		[-0.0252]		[-0.0114]		[-0.0374]		[-0.0381]		[-0.0269]	
Father's Education:												
Vocational	0.1509	*	0.1457	**	0.0810		0.0569		0.1148	**	0.0544	
	(0.0811)		(0.0698)		(0.0621)		(0.0385)		(0.0541)		(0.0543)	
	[0.0329]		[0.0329]		[0.0229]		[0.0257]		[0.0257]		[0.0257]	

High School	0.0208		0.0129		-0.0231		0.0565		-0.0381		0.0781	
	(0.1370)		(0.1160)		(0.1000)		(0.0727)		(0.1060)		(0.0837)	
	[0.0030]		[0.0029]		[-0.0065]		[0.0003]		[-0.0085]		[0.0102]	
Short	-0.1111		-0.1013		-0.1500	*	0.1983	***	0.0675		0.1693	*
	(0.1293)		(0.0969)		(0.0845)		(0.0562)		(0.0827)		(0.0906)	
	[-0.0229]		[-0.0229]		[-0.0425]		[0.0209]		[0.0151]		[0.0190]	
Long	0.0643		0.0815		0.0255		0.3663	***	0.0056		0.2843	
	(0.2134)		(0.1432)		(0.1223)		(0.0880)		(0.1438)		(0.2223)	
	[0.0183]		[0.0184]		[0.0072]		[0.0259]		[0.0013]		[0.0135]	
Missing	0.0849		0.0842		0.0257		0.0285		0.0287		-0.0089	
	(0.0896)		(0.0898)		(0.0788)		(0.0485)		(0.0699)		(0.0507)	
	[0.0190]		[0.0190]		[0.0073]		[0.0071]		[0.0064]		[-0.0050]	
Mother's Education:												
Vocational	0.0551		0.0502		0.0628		0.0431		0.1109	**	0.0084	
	(0.0768)		(0.0644)		(0.0559)		(0.0343)		(0.0482)		(0.0473)	
	[0.0114]		[0.0113]		[0.0178]		[0.0234]		[0.0249]		[0.0119]	
High School	0.0381		0.0400		0.0119		0.0407		-0.0596		-0.0160	
	(0.1095)		(0.1080)		(0.0924)		(0.0620)		(0.0884)		(0.0950)	
	[0.0090]		[0.0090]		[0.0034]		[-0.0065]		[-0.0134]		[-0.0240]	
Short	-0.0759		-0.0632		-0.0507		0.1682	***	-0.1091	*	0.0619	
	(0.1386)		(0.0804)		(0.0695)		(0.0455)		(0.0660)		(0.1896)	
	[-0.0143]		[-0.0143]		[-0.0144]		[-0.0115]		[-0.0245]		[-0.0395]	
Long	-0.0560		-0.0177		-0.2298		0.2389	*	-0.5000	**	0.0190	
	(0.4034)		(0.2086)		(0.1651)		(0.1417)		(0.2025)		(0.4648)	
	[-0.0042]		[-0.0040]		[-0.0651]		[-0.0465]		[-0.1121]		[-0.1082]	
Missing	-0.0577		-0.0576		-0.0189		0.2129	***	0.2803	***	0.1833	***
	(0.0951)		(0.0955)		(0.0830)		(0.0582)		(0.0802)		(0.0693)	
	[-0.0130]		[-0.0130]		[-0.0054]		[0.0549]		[0.0628]		[0.0516]	

Academic Achievement:												
Math Exam Scores Missing	-0.8257	***	-0.8385	***	-0.6720	***	-0.2011	**	-0.5022	***	-0.2752	
	(0.2180)		(0.1657)		(0.1435)		(0.0944)		(0.1279)		(0.2244)	
	[-0.1891]		[-0.1894]		[-0.1903]		[-0.0872]		[-0.1126]		[-0.1176]	
Danish Exam Scores Missing	-0.0161		0.0016		0.0223		-0.0404		-0.0432		0.0498	
	(0.2315)		(0.1688)		(0.1462)		(0.0918)		(0.1353)		(0.1017)	
	[0.0000]		[0.0004]		[0.0063]		[-0.0167]		[-0.0097]		[0.0147]	
Region Dummies												
Zealand Region	-0.0019		-0.0053		0.0515		-0.0495		-0.0191		-0.0442	
	(0.0804)		(0.0740)		(0.0642)		(0.0421)		(0.0610)		(0.0460)	
	[-0.0015]		[-0.0012]		[0.0146]		[-0.0080]		[-0.0043]		[-0.0085]	
Southern Denmark	0.1836	**	0.1805	***	0.2188	***	-0.0221		-0.0350		0.0052	
	(0.0720)		(0.0682)		(0.0594)		(0.0402)		(0.0575)		(0.0405)	
	[0.0403]		[0.0408]		[0.0620]		[-0.0098]		[-0.0078]		[-0.0010]	
Mid Jutland	-0.0635		-0.0695		-0.0325		-0.1414	***	-0.1596	***	-0.1097	***
	(0.0876)		(0.0674)		(0.0586)		(0.0390)		(0.0571)		(0.0406)	
	[-0.0160]		[-0.0157]		[-0.0092]		[-0.0347]		[-0.0358]		[-0.0285]	
Northern Jutland	0.0406		0.0356		0.0398		-0.0299		0.0391		0.0508	
	(0.0949)		(0.0827)		(0.0711)		(0.0473)		(0.0674)		(0.0893)	
	[0.0077]		[0.0080]		[0.0113]		[0.0051]		[0.0088]		[0.0308]	
Peer Behavior:												
% in Mercantile High School	0.0128		0.0119	***	0.0113	***	-0.0006		0.0076	**	0.0044	
	(0.0086)		(0.0036)		(0.0031)		(0.0021)		(0.0031)		(0.0070)	
	[0.0027]		[0.0027]		[0.0032]		[0.0022]		[0.0017]		[0.0037]	
% in Mercantile VET	0.0026		0.0021		0.0031		-0.0084	***	-0.0029		-0.0069	*
	(0.0069)		(0.0045)		(0.0039)		(0.0026)		(0.0039)		(0.0040)	
	[0.0005]		[0.0005]		[0.0009]		[-0.0004]		[-0.0007]		[-0.0003]	

Distance to Nearest:												
Mercantile High School	0.0062	*	0.0064	**	0.0041	*	-0.0007		0.0019		-0.0002	
	(0.0032)		(0.0027)		(0.0023)		(0.0015)		(0.0021)		(0.0021)	
	[0.0014]		[0.0014]		[0.0012]		[-0.0000]		[0.0004]		[0.0001]	
Constant	0.4002		0.5829	***	0.4366	**	1.9268	***	0.9831	***	1.5435	***
	(1.6827)		(0.2044)		(0.1781)		(0.1166)		(0.1696)		(0.5052)	

Standard errors are reported in parentheses. Conditional marginal effects are reported in brackets.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.

Appendix Table D2
Enrollment in Merchantile VET from Bivariate Probit Specification

	Men		Women	
Individual Characteristics:				
Age - 16	-0.0020		-0.0070	
	(0.0175)		(0.0179)	
First Gen. Immigrant	-0.0447		0.0308	
	(0.0547)		(0.0520)	
Second Gen. Immigrant	-0.0529		-0.3043	***
	(0.0477)		(0.0457)	
Completed 10th grade	0.0892	***	0.0061	
	(0.0156)		(0.0146)	
Family Characteristics:				
Broken Family	-0.0575	***	-0.0966	***
	(0.0175)		(0.0160)	
Missing Family Info	-0.2462	**	-0.1056	
	(0.0966)		(0.0851)	
Parental Characteristics:				
Father's Age	-0.0020		-0.0036	**
	(0.0020)		(0.0018)	
Father's Age Missing	0.0563		-0.0018	
	(0.0573)		(0.0529)	
Mother's Age	0.0010		0.0033	
	(0.0023)		(0.0021)	
Mother's Age Missing	0.1819		-0.0259	
	(0.1494)		(0.1587)	
Father's Real Income	0.0001	***	0.0001	**
	(0.0000)		(0.0000)	
Father's Income Missing	-0.0236		-0.0545	**
	(0.0271)		(0.0239)	
Mother's Real Income	0.0001		0.0001	
	(0.0001)		(0.0001)	
Mother's Income Missing	-0.0116		-0.0382	
	(0.0523)		(0.0486)	
Father's Education:				
Vocational	0.0721	***	0.0401	*
	(0.0256)		(0.0221)	

Academic Gymnasium	0.0974	**	-0.0931	**
	(0.0406)		(0.0394)	
Short	-0.1266	***	-0.2223	***
	(0.0341)		(0.0309)	
Long	-0.2070	***	-0.4779	***
	(0.0455)		(0.0464)	
Missing	0.0143		-0.0105	
	(0.0315)		(0.0277)	
Mother's Education:				
Vocational	0.0630	***	0.0512	**
	(0.0227)		(0.0200)	
Academic Gymnasium	-0.0193		-0.1023	***
	(0.0364)		(0.0336)	
Short	-0.1623	***	-0.3427	***
	(0.0280)		(0.0256)	
Long	-0.4716	***	-0.6456	***
	(0.0597)		(0.0635)	
Missing	-0.0040		-0.0679	**
	(0.0338)		(0.0301)	
Primary School Performance:				
Math Exam Scores:				
< 2 but > 0	-0.0313		-0.0228	
	(0.0313)		(0.0272)	
2-4	-0.0171		0.0418	**
	(0.0216)		(0.0200)	
6-8	-0.1186	***	-0.0944	***
	(0.0236)		(0.0211)	
> 8	-0.2952	***	-0.2570	***
	(0.0319)		(0.0309)	
Missing	0.1040	*	-0.1220	**
	(0.0628)		(0.0531)	
Danish Test Scores:				
< 2 but > 0	-0.2898	***	0.0204	
	(0.0298)		(0.0363)	
2-4	-0.0709	***	0.0993	***
	(0.0197)		(0.0199)	
6-8	-0.0949	***	-0.2623	***
	(0.0293)		(0.0220)	
> 8	-0.3073	***	-0.4384	***
	(0.0521)		(0.0341)	

Missing	-0.2044	***	-0.0200	
	(0.0631)		(0.0563)	
Peer Behavior:				
% in Academic High School	-0.0013		0.0019	
	(0.0014)		(0.0013)	
% in Technical High School	0.0009		0.0073	***
	(0.0029)		(0.0017)	
% in Mercantile High School	0.0114	***	0.0125	***
	(0.0016)		(0.0015)	
% in Mercantile VET	0.0077	***	0.0119	***
	(0.0022)		(0.0020)	
% in Technical VET	-0.0006		0.0071	***
	(0.0015)		(0.0014)	
% in SOHR VET	-0.0026		-0.0037	
	(0.0054)		(0.0045)	
Peer Info - Missing	0.0103		0.4061	***
	(0.1264)		(0.1202)	
Distance to Nearest … :				
Academic High School	-0.0059	***	0.0002	
	(0.0018)		(0.0015)	
Technical High School	-0.0001		0.0005	
	(0.0012)		(0.0010)	
Mercantile High School	-0.0007		0.0011	
	(0.0014)		(0.0013)	
Missing	-0.1423	***	-0.0522	**
	(0.0273)		(0.0223)	
Other Control Variables:				
2003 Cohort	-0.0137		-0.0325	**
	(0.0149)		(0.0136)	
Zealand Region	0.0592	**	0.0409	*
	(0.0264)		(0.0238)	
Southern Denmark	0.0735	***	-0.0143	
	(0.0241)		(0.0223)	
Mid Jutland	0.0872	***	0.0543	**
	(0.0245)		(0.0226)	
Northern Jutland	0.0829	***	0.0770	***
	(0.0293)		(0.0268)	
Constant	-1.3657	***	-1.3842	***
	(0.1421)		(0.1304)	

Number of obs	57059	54923
Wald chi2(42)	421.45	385.76
Prob > chi2	0	0
Pseudo R2		
Log pseudolikelihood	-19591.47	-24942.68

Standard errors are reported in parentheses.
Asterisks indicate statistical significance at the: *** 1%, ** 5%, and * 10% level.