The Effects of For-Profit College Training on Earnings

Chung, Anna

University of Michigan (Ann Arbor)

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Anna S. Chung*

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* University of Michigan, Office of Financial Aid.
Comments welcome. Contact: astchung@umich.edu

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Introduction

Despite the continuing controversy over the efficacy of for-profit higher education, we know little about the effects of proprietary[1] college training on individual earnings. This topic is of particular interest to education policy makers because for-profit colleges attract a disproportionate share of minority, low-income, and female students (Chung, 2008a), and this in turn raises the question of whether proprietary schools may serve as a successful labor market venue for the disadvantaged. A representative proprietary student working toward a certificate or associate degree could have instead started working or chosen a community college. Both alternatives would have been cheaper to pursue, but would they have yielded better employment opportunities or higher earnings than choosing proprietary training?

The lack of data on proprietary training has been a major obstacle to its study. To date, the most recent evaluation of proprietary training effectiveness was by Grubb (1993). The results of his OLS regression showed no substantial benefits from proprietary education for long-run wage and earning patterns of proprietary graduates from a National Longitudinal Study of the H.S. Class of 1972 (NLSY-72).

Recently available data sets allow for re-consideration of Grubb's results in a contemporary context. This project uses the National Education Longitudinal Study for the years of 1988-2000 (NELS: 2000) and the associated NELS:88/2000 Postsecondary Education Transcript Study (PETS:2000) conducted by National Center for Education Statistic (NCES). NELS is particularly well suited to this study because this dataset contains rich detail about students and their family backgrounds, including information on students' experience in the labor market. PETS is valuable because it contains transcript-reported, rather than self-reported, data on students' college going and their postsecondary credentials.

[1] In what follows, I use "for-profit" and "proprietary" as synonyms. There has been little work done in the field to identify any distinctions in these terms.

In this paper, I examine the employment outcomes for proprietary students and their counterparts with non-profit[2] postsecondary training. Then, I estimate a basic Mincer model of the effects of for-profit training on students' earnings and wages. Further, I consider the potential heterogeneity in these effects and propose a richer model of earning effects controlling for the backgrounds of students and their families. Finally, I present a model of selection into postsecondary for-profit training. From this model, I obtain the effects estimates corrected for this selectivity.

In what follows, I describe the literature related to this study and discuss the data and its limitations. Then, I describe my empirical strategy and present the findings. I conclude with discussing the implications.

Literature Review

Economics literature on labor market returns to college training has a rich tradition and is voluminous. For the thorough review of modeling issues, as well as an overview of the empirical studies, see Card (1999). In addition, Goldberg & Smith (2008) contains a review of more recent studies. Studies of sub-baccalaureate education comprise a much smaller subset of this literature. Excellent reviews of these studies on both national and state scales are delivered in Grubb (2002a, 2002b). By contrast, for-profit college training receives little attention in the existing literature. I briefly review the studies relevant to for-profit college training in this section.

Because over the time period featured in NELS & PETS the majority of proprietary students are enrolled in sub-baccalaureate training, there are several papers on sub-baccalaureate labor market returns of particular interest to this project. Grubb (1992) and Kane & Rouse (1995) provided some estimates of labor market returns to two-year colleges for the respondents of the National

[2] Non-profit institutions can be either public or private.

Longitudinal Survey of the High School Class of 1972 (NLS-72). Marcotte, Bailey, Borkoski & Kienzl (2005) drew on NELS & PETS to examine the returns to a community college education. All three studies used the national longitudinal data sets similar to (or exactly as, in case of Marcotte et al. (2005)) the data set used in this project. Grubb's estimates were reported separately for for- and non-profit students. Kane & Rouse (1995) included both for- and non-profit students in their estimating sample but did not identify the sub-baccalaureate training by its for-profit status. Marcotte et al. (2005) excluded for-profit students from their sample and reported returns for community college students only. Great similarities in data structure and its content, as well as the variety of approaches in the above mentioned papers render a useful set of comparisons and interpretations for my study.

The few targeted studies of for-profit training include Wilms (1975), Lyke , Gabe & Aleman (1991) and Grubb (1993). Wilms (1975) compared proprietary to public students labor market success in selected occupations. Lyke et al. (1991) produced logit and OLS estimates on for-profit college attendance, labor market participation, and proprietary students' hourly and monthly earnings. Grubb (1993) reported on the long-run effects of proprietary schools on wages and earnings. I provide more detail on each study below.

Wilms' results were based on a random sample of 2,270 graduates from 21 public and 29 proprietary schools in four large metropolitan areas. Respondents were drawn from six occupational groups ordered on the basis of prestige: accountant, programmer, electronic technician, dental assistant, secretary, and cosmetologist. Wilms' primary question was whether proprietary graduates would do better in the labor market than graduates from the comparable public programs. After performing t-tests on the weighted means of shorter and longer term weekly earnings and considering students' occupational matches and a host of other factors, Wilms concluded that for-profit graduates did not experience any significant advantage on the job market. The study contained rich information about students' perceptions of training and the labor market, expectations

of salary and occupational match. However, the study was not meant to be nationally representative, and the findings were of a descriptive nature.

Lyke et al. based their study on the High School and Beyond (HS&B) national longitudinal survey of the high school graduate of the class of 1980. The working sample of 9,373 respondents contained 948 students who had attended a for-profit college at any point during the 5 ½ years following their high school graduation. Students who completed a for-profit college and were not at school at the time of the 1986 survey follow-up were compared to the graduates of community and 4-year colleges, non-college goers and college non-completers. Lyke et al. obtained logit estimates of college enrollment and employment and OLS estimates of hourly and monthly earnings by gender. The authors found that compared to non-college goers, for-profit male students experienced higher hourly earnings, but due to higher social status and not proprietary training per se. Female for-profit students were more likely to be employed and experienced higher hourly earnings as well. However, the results of these earnings regressions were likely to be biased because they were not corrected for selection into proprietary training.

Grubb used NLS-72 to compare effects of proprietary training versus no college training. The study delivered OLS estimates of longer-term wages and earnings 14 years after high school graduation. Grubb did not find any significant effects for either proprietary credentials (a certificate or an associate degree) or the training that was not completed. The author concluded that the result could be due to several reasons: because the for-profit colleges specialized in training for low-paid occupations; because NLS-72 left out older respondents (who might had benefited from proprietary training more); or because of vast heterogeneity of for-profit sector (in which the students from a few low-quality institutions could have brought down the effects for the whole for-profit student population). Notably, Grubb ended up with a rather small sample: his wage regression contained 37 male and 37 female students with proprietary certificates, 7 females and 7 males with proprietary associate degrees, in addition to more proprietary students with non-completed proprietary credits.

Certain limitations are common to the data used the three studies of proprietary training discussed above. In the section that follows, I consider these limitations as they relate to my study.

Data and Limitations

The problems of small proprietary student sample size and misreporting of information are common to virtually every national longitudinal dataset existent to date. Lapses in student wage and earnings history is specific to NELS. The availability of PETS:2000 offers more reliable transcript data that offers detailed information on students' credentials and significantly reduces the potential measurement error due to self-reporting. To utilize this feature, I restricted the analysis to students with available secondary school transcripts in PETS:2000 as well as those who were participants in all four NELS survey follow-ups. In addition, to make my results comparable to those in the related literature (Kane & Rouse, 1995; Marcotte et al., 2005) I have excluded the respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were in school in 1999 and after; and the respondents who were self-employed, apprenticing, in the military, or were taking care of their household. The resulting small samples still afford an opportunity to employ basic parametric methods in the context of the complex survey nature of the data and to produce meaningful maximum likelihood estimates for some specifications of the selection model. However, the sample sizes are insufficient to employ semi- or non-parametric methods successfully.

The data limitations had an impact on how college credentials were coded. I was able to identify the highest college credential for each respondent and the sector from which a respondent obtained the credential with the exception of Bachelor's degree. As a result, the credentials were coded as sector-specific "no credential" (when a respondent received some credits or some training but no formal credential), "certificate", and "Associate's". The "Bachelor's" credential was coded as

a non-sector-specific with a conservative assumption that most workers with this credential obtained it from the non-profit sector. "No college" as a highest college credential was reserved for the respondents who never attended any post-secondary institution.

Because this project evaluates the effects of for-profit college credentials, inaccuracies in credential accounting are of particular concern. As in NLS:72, there are tangible measurement errors in the way college courses and credentials are reported by respondents. PETS delivers more credible accounting but fails to identify the credits or credentials from for-profit colleges on a few occasions. In particular, when a Bachelor's degree is the highest college credential for a student, it is not possible to identify whether a for-profit or a non-profit college awarded this degree. PETS does not provide a detailed student college-going history, and NELS' self-reported data is wrought with errors and omissions.

Perhaps the most crucial data deficiency emanated from the lapses in student wage and earnings history have been born out of the structure and the wording of NELS questionnaires. At the end of January of the year 2000, the respondents were asked to report their current job "pay" in the unit of their choice (hourly, weekly, bi-weekly, monthly or yearly). Respondents were asked about hours worked per week, but never about weeks worked per year. This information was collected for the year of 1999, but the respondents were not asked about "pay" in 1999. Instead, the respondents reported their earnings in 1999, 1998, 1997, 1994 and 1993. Therefore, no work history is available for 1992 (the year when most respondents graduated from high school), 1995 and 1996. This precludes the possibility of controlling for the students' actual working experience. Also, it is not possible to obtain the *actual* wage or earnings data for *all* the respondents for either 1999 or 2000. It is only possible to impute wage or to calculate annualized earnings combining data from 1999 and 2000.

To mitigate this problem, I have computed three versions of earnings and wages. The first version (referred to as "earnings (1)" or "wages (1)" in the regression tables) computes

earnings/wages by using the reported pay from 2000 and imputes the values where necessary by assuming the standard 40-hour work week for 52 weeks, 12 months, and 2,080 days worked per year. The second version (referred to as "earnings (2)" or "wages (2)" in the regression tables) computes earnings/wages by using the reported pay from 2000 and imputes the values where necessary by using the reported hours per week and weeks per year from 1999. The third version (referred to as "earnings (3)" or "wages (3)" in the regression tables) computes earnings/wages by using the reported pay from 2000 and imputes the values where necessary by using the reported hours per week from 1999 assuming the standard 52 weeks worked per year.

Each of these measures is likely to produce a measurement error. The first version is likely to under-estimate the wages for the salaried workers (who most likely chose annual salary as the unit of their reporting choice) and to over-estimate the earnings for the hourly workers (who may work less than full time during the survey year). The biases from the second version are harder to qualify and depend on how a respondent's working patterns in 2000 are different from those in 1999. The third version meets the first version and the second version half-way allowing for a "customized" work-week but assuming a standard work year.

There are a few more data limitations worth mentioning. A common limitation for longitudinal data sets is the time horizon of the survey. Because the students are followed up 8 years into their life after high school graduation, the time horizon is not necessarily long enough to observe a worker's growing earning potential. A number of respondents were still in school or in training in 2000. The mitigating argument is that the focus of the study is on proprietary training that is short by design. A reasonable objection to this argument is that individuals could be more likely to enroll into proprietary training later on in their life.

Another shortcoming of NELS (as well as NLS:72 and other similar surveys following up a cohort of high school students) is that by design it contains relatively young people, most of whom are around 26 at the time of the last follow-up in 2000. A sizeable share of proprietary students

enrolls into for-profit programs later in their adult lives. In 2000, average student age in Title-IV eligible for-profit colleges was approximately 27 years old (Chung, 2008a). Therefore, the NELS for-profit student sample may not generalize well to the entire true, nationally representative proprietary student population.

Regardless of these few shortcomings, no other recent data provides the information NELS & PETS do for analyzing the effects of proprietary training. The wealth of information on students' backgrounds provides a researcher with necessary individual controls, and the nature of complex survey data enables us to obtain the estimates that can be generalized in the closest way to the national for-profit student population.

Empirical Strategy

I start out by producing a set of descriptive statistics for the unemployment rates and earnings and wages received by the workers with no college credentials, non-profit and for-profit college credentials. I conduct the tests of the equality of population proportions and means to produce some evidence on whether selection into the employment merits concern. As discussed in Chung (2008a), for-profit schools enroll a distinctly different population containing high numbers of low-income and otherwise disadvantaged students. It is reasonable to expect that for-profit credential holders may be more likely to self-select into unemployment and experience factors that are known to negatively affect earnings (racial and gender discrimination, poor health, family-related adversities, etc.). Descriptive statistics help to explore the magnitude of this problem.

Then, I follow the traditional approach on evaluating the labor effects of education featured in the work of Kane & Rouse (1995) Jaeger & Page (1996), Ferrer & Riddell (2002), Blundell, Dearden & Sianesi (2005). First, I estimate a variant of the basic model of Mincer (1974):

$$\ln earn_i = \alpha + CRED_i\beta_1 + age_i\beta_2 + age_i^2\beta_3 + \min ority_i\beta_4 + HS_i\beta_5 + CEN_i\beta_6 + \varepsilon_i \quad (1)$$

where $\ln earn_i$ is the natural log of an individual worker's earnings. I estimate a set of models for the three different versions of annualized earnings and a set of models for the three different versions of imputed wages. $\boldsymbol{CRED_i}$ consists of the dummy variables denoting the highest college credential achieved by the student: no credential (some training), a certificate, an Associate's degree in for-profit or non-profit sector, or a non-sector-specific Bachelor's degree. The coefficients in the vector β_1 measure adjusted differences in earnings/wages for the workers with college credentials (including some college training without formal credential) in for-profit and non-profit sectors compared to the workers with no college enrollment. These differences could be associated with the benefits college credentials produce in the market, or with the benefits college enrollment generates, or with the benefits due to the other omitted factors correlated with attaining the highest credential. . age_i and age_i^2 are respectively worker's age and age squared in months. $minority_i$ is a dummy variable denoting worker's non-Asian minority status. $\boldsymbol{HS_i}$ is a vector of dummy variables measuring the high school credential obtained by the respondent consisting of GED, no high school diploma or equivalency, and high school credential missing with regular high school diploma as the reference group. $\boldsymbol{CEN_i}$ contains the census region dummies controlling for the worker's location.

The classical Mincer model renders a useful point of reference and is theoretically justified (J. J. Heckman, Lochner, & Todd, 2006). To move beyond the non-causal associations obtained in the basic Mincer model, I build a richer model to employ a "selection on observables" (J. J. Heckman & Robb, 1986) strategy. I control for the workers' heterogeneity arising from the differences in their family background and academic skills -- factors that affect earning outcomes through schooling. The new rich specification is of the form:

$$\ln earn_i = \alpha + CRED_i\beta_1 + age_i\beta_2 + age_i^2\beta_3 + \min ority_i\beta_4 + HS_i\beta_5 + CEN_i\beta_6 + FAM_i\beta_7 + ACAD_i\beta_8 + \varepsilon_i \quad (2)$$

where in addition to the variables previously described, $\boldsymbol{FAM_i}$ includes the dummy variables measuring respondent's family's income (when the respondent was in high school) and mother's education dummies. Mother's education is measured as less than high school, some college, Bachelor's degree or higher, and missing with high school as a reference group. $\boldsymbol{ACAD_i}$ contains the categories for the test scores obtained on the standardized math and reading tests administered by NELS to all respondents while in high school. Both family income and mother's education control for differences in the educational, monetary, and informational resources available to the individual and affecting the individual's probabilities of enrolling in college and attaining the credential. Test scores control for the differences in academic preparedness and proxy for the differences in academic ability. Controlling for such observable characteristics has been found to mitigate the biases in schooling effects resulting from non-random selection into different schooling levels (Card, 1999; Kane & Rouse, 1995).

However, even selection on observables is not sufficient to correct for the biases generated by selection into the for-profit sector and attaining a for-profit sector credential. As a final step of my empirical strategy, I model this selection. To do this, I employ the multinomial logit-based selection model developed by Dubin & McFadden (1984). The selection bias correction method based on this model is discussed in detail in Bourguignon, Fournier & Gurgand (2004) who constructed a Stata algorithm producing the maximum likelihood estimates of the coefficients on the variables of interest in the final selection stage. The procedure was further featured in De Hoyos (2006) who adapted the algorithm for the complex survey analysis environment.

The multinomial logit selection model follows the traditional setup. In what follows, I keep in line with the model exposition in Bourguignon, Fournier & Gurgand (2004) . I assume a latent utility function of the form

$$y_j^* = Z\gamma_j + u_j \qquad \text{with} \quad j = nc, nfp, fp \tag{3}$$

where y^* is the utility a student derives for choosing among 3 *j* college alternatives: *nc*-no college; *nfp* – a non-profit college; and *fp* – a for-profit college. ***Z*** is the vector of the explanatory variables for the utility derived from any given choice. Along with the elements contained in ***X*** (age, age^2, ***CRED***, *minority*, ***HS***, ***CEN***, ***FAM***, ***ACAD***) ***Z*** also contains two exclusion restrictions – the local community college tuition in 2000 year thousands of dollars and the concentration of 2-year non-profit colleges as a share of all colleges in student's county. u_j is a random error that is assumed to be independent and Gumbell-distributed so that its cumulative function is $G(u) = \exp\left(-e^{-u}\right)$ and its density function is $g(u) = \exp\left(-u - e^{-u}\right)$.

The actual choice of for-profit sector

$$y_{fp} = X\beta_{fp} + \varepsilon_{fp} \tag{4}$$

is observed when $y^*_{fp} > \max_{j \neq fp}\left(y^*_j\right)$ or, using (3) and (4) when $\max_{j \neq fp}\left(Z\gamma_j + u_j - X\beta_{fp} - \varepsilon_{fp}\right) > 0$. As shown by McFadden (1973) this specification along with the distributional assumptions on u_j leads to the multinomial logit model with the probability

$$P\left(\max_{j \neq fp}\left(Z\gamma_j + u_j - X\beta_{fp} - \varepsilon_{fp}\right) < 0 \,\middle|\, Z\right) = \frac{\exp\left(Z\gamma_{fp}\right)}{\sum_j \exp\left(Z\gamma_j\right)} \tag{5}$$

The goal here is to estimate β_{fp} when ε_{fp} may not be independent of all u_j. In this case, a possible correlation of ***X*** and the disturbance terms may not yield a consistent estimate of β_{fp}. According to Heckman (1979) model, the bias correction can be achieved through the conditional mean of ε_{fp}:

$$E\left(\varepsilon_{fp}\left|\max_{\substack{j\neq fp\\ j\neq fp}}\left(y_j^*-y_{fp}^*\right)<0,\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}\right.\right)=$$

$$=\int_{-\infty}^{0}\frac{\varepsilon_{fp}\ f\left(\varepsilon_{fp},\ \max_{j\neq fp}\left(y_j^*-y_{fp}^*\right)\middle|\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}\right)}{P\left(\max_{j\neq fp}\left(y_j^*-y_{fp}^*\right)<0\middle|\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}\right)}= \tag{6}$$

$$=\lambda\left(\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}\right)$$

Where $f(\ \cdot)$ is the conditional joint density of ε_{fp} and $\max_{j\neq fp}\left(y_j^*-y_{fp}^*\right)$. Given that the relation between $\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}$ and the probabilities of choosing no college, non-profit, or for-profit college (P_{nc}, P_{nfp}, or P_{fp}) is invertible, there is a unique function ψ such that

$$E\left(\varepsilon_{fp}\left|\max_{\substack{j\neq fp\\ j\neq fp}}\left(y_j^*-y_{fp}^*\right)<0,\left\{Z\gamma_{nc},Z\gamma_{nfp},Z\gamma_{fp}\right\}\right.\right)=\psi\left(P_{nc},P_{nfp},P_{fp}\right) \tag{7}$$

The consistent estimate of β_{fp} can be obtained from

$$y_{fp}=X_{fp}\beta_{fp}+\psi\left(P_{nc},P_{nfp},P_{fp}\right)+\xi_{fp} \tag{8}$$

where ξ_{fp} is mean-independent of the regressors.

As the semi-parametric estimation of this model faces the curse of dimensionality (Dahl, 2002), I keep the number of alternatives small. Also, I adopt the approach by Dubin and McFadden (1984) based on the restriction on the linearity of the joint distribution of the residuals (ε_{fp}, u_{nc}, u_{nfp}, u_{fp}):

$$E\left(\varepsilon_{fp}\left|u_{nc},u_{nfp},u_{fp}\right.\right)=\sigma\sum_{j=nc,nfp,fp}r_j\left(u_j-E\left(u_j\right)\right)\qquad\text{where}\qquad\sum_{j=nc,nfp,fp}r_j=0$$

and hence

$$E\left(\varepsilon_{fp}\left|u_{nc},u_{nfp},u_{fp}\right.\right)=\sigma\sum_{j=nc,nfp}r_j\left(u_j-u_{fp}\right) \tag{9}$$

Given this assumption and the multinomial model presented by Dubin and McFadden (1984), y_{fp} can be estimated by least squares based on:

$$y_{fp} = X_{fp}\beta_{fp} + \sigma \sum_{j=nc,nfp} r_j \left(\frac{P_j \ln(P_j)}{1-P_j} + \ln(P_{fp}) \right) + \xi_{fp} \qquad (10)$$

Bourguignon, Fournier & Gurgand (2004) perform a two-step semi-parametric estimation of such model in addition to the models based on the approaches of Lee (1983) and Dahl (2002). The performed Monte-Carlo simulation results favor Durbin and McFadden's approach. The authors demonstrate that "Selection bias correction based on this multinomial logit model provides fairly good correction for the outcome equation even when the IIA hypothesis is violated…".

A complication brought by working with NELS and PETS is that these are complex survey data so the estimation must incorporate the stratum, panel frequency, and primary sampling unit weights. Concentrating on a particular population in NELS may reduce sample size significantly (as it happens in the case of for-profit student sample). This can in turn result in getting a number of "singletons" (strata with single primary sampling units) in the sample. To obtain correctly weighted estimates, one must either drop the singletons or combine them with other primary sample units in a different stratum (which can possibly lead to misrepresentation of the survey clustering). The singletons problem is not serious for producing the descriptive statistics and the OLS regressions in this study, but it becomes more acute for the selection runs. The reported standard errors in the selection equation do not account for the two-step nature of the procedure (that is they are not consistent), and their empirical distribution is obtained through using the bootstrap methods that in the context of the complex survey data must account for stratification and clustering. In the small sample of for-profit workers featured in the selection equation, there are too many singleton observations so dropping these observations would result in the sample not enough for producing meaningful results.

To resolve this complication, I look at three sets of estimates: estimates generated by the complex survey procedure with second stage uncorrected errors; non-complex survey estimates with second stage uncorrected errors; and non-complex survey estimates with errors corrected by the bootstrap using Monte-Carlo simulations with 1,000 replications. The comparison of these three sets of estimates can help us detect if the effects estimates are due to the small sample at hand and whether the results would hold in the presence of consistent errors.

Findings

The first set of findings is on unemployment statistics for for-profit students. The employment statistics can be found in Table 1, and the t-tests of the population employment proportions – in Table 2. The weighted unemployment rates for males and females with for-profit credentials are respectively 3.2% and 9.4%. The unemployment rates for for-profit and non-profit male credential holders are close, 3.2% vs. 2.9% respectively. For-profit female credential holders are unemployed at a higher rate than non-profit credential female holders 9.4% vs. 1%. For further comparison, women with no college credentials (who have not attended any college) are unemployed at 4.7%. However, the t-statistics do not indicate significant differences in unemployment rates for non-profit and for-profit credentialed workers (Table 2). The differences in unemployment rates for the workers with no college and workers with non-profit credentials are significant at 5% level. For this non-experimental data, it is difficult to find an instrumental variable for employment. The unemployment statistics for this sample indicate that selection into employment may not be prominent. Instead, I can concentrate on modeling selection into the post-secondary education sector, or rather into the sector of the highest college credential attainment.

The second set of findings comes from obtaining the means of earnings and wages (Table 3 and 4). Both men and women with for-profit college credentials experienced earnings and wages

appreciably lower than the workers with non-profit college credentials and somewhat higher earnings and wages than the workers with no college training. For example, the weighted means for the different specification of earnings of the men with for-profit college training are in the range of $29,648-$29,987 compared to the weighted means for non-college trained men of $27,293-$28,092 (Table 3). As expected, the t-tests (Table 5) indicate a large significant difference between earnings and wages of non-profit and for-profit trained workers. However, the differences in means of for-profit and non-college trained workers are not significant, particularly so for females.

The latter descriptive finding is interesting in the context of the estimates of the effect of the highest sector-specific college credentials on the natural logarithm of earnings and wages for males. The simple OLS estimates render weakly significant positive coefficients of non-profit 4-year credits on male earnings and wages and highly significant positive coefficients of Bachelor's degree on male wages, but no significant effects from for-profit or non-profit 2-year training (Table 8 and 9). According to the estimates from this basic Mincer model, having some non-profit 4-year training increases earnings by 40%-49%, and has a weakly significant effect on wages at about 14%. The effect of attaining Bachelor's degree on wages ranges from 22% to 27% but has no significant effect on earnings. For both earnings and wages, being a non-Asian minority has a significant negative effect.

For females, the findings are quite different. Having some non-profit 2-year or 4-year training or a non-profit certificate is weakly significant for earnings and wages (Table 10 and 11). There are significant positive effects of the for-profit Associate's degree on female earnings. The effects of Bachelor's degree are highly significant for both female earnings and wages. Having some non-profit 2-year training raises female earnings by 27%-34% and wages by 10%-13%. Obtaining the non-profit 4-year credits leads to a 31%-39% increase in earnings and 16%-18% in wages. The weak effect of having a non-profit certificate is on the order of 42% on earnings and 33% on wages. The effect of the for-profit Associate's degree is significant only for earnings and is

in the range of 48%-60%. The coefficient on Bachelor's degree is highly significant for both earnings and wages and measures from 46%-61% for female earnings and 40%-48% for female wages.

The differences in the results for both sexes grow larger in the rich-covariate OLS regressions controlling for the observable heterogeneity among the workers. For males, there are positive effects of non-profit and for-profit training (with the exception of the negative estimates on for-profit certificates) on earnings and wages, but they are not precise enough to be statistically significant (Table 12). There are weakly significant positive effects from 15% to 19% of Bachelor's degree on male wages (Table 13). Also, higher family income has a significant positive effect on male's wages.

Rich-covariate OLS regression estimates for females are similar to those from the simple OLS model. Non-profit 2-year credits have weakly significant positive effect on both earnings (27%-33%) and weaker positive effect on wages (11%) (Tables 14 and 15). There are highly significant positive effects of Bachelor's degree on earnings (41%-57%) and wages (32%-39%). For-profit Associate's degree is only significant for female earnings (48%-63%). Overall, the model fit appears to favor the regressions on female rather than male respondents as the adjusted R-squared varies from 0.24 for the rich-covariate regression on female wages to 0.11 for the rich-covariate regression on male wages.

The final set of results comes from the 3 sets of the final stage[3] of multinomial logit selection regression evaluating the effects of the for-profit credentials on the natural logarithm of earnings (Tables 16 through 18). Across all three sets of estimates there is a large positive significant overall earnings effect in the range of 141%-158% of the for-profit certificate. This is a very high estimate, but it is measured in comparison to the workers with some for-profit training but no formal for-profit credential (that is for-profit training dropouts) who must experience particularly low earnings. To

[3] The first stage of the multinomial logit selection regression can be found in Appendix, Table A1.

translate this result into actual dollars, compared to a for-profit dropout with average earnings around $16,000, a similar for-profit certificate recipient would obtain about $24,000 earnings.

Discussion

The findings presented above uncover some new facts and confirm some previously established facts about the labor market outcomes for the workers with for-profit training. For example, I find that employment of for-profit trainees is high but not significantly different from that of workers with no college training. Male workers with for-profit college training experience a higher employment rate (96.7%) than men with no postsecondary training (93.5%), almost equal to the employment rate of men trained in a non-profit college (97.1%) (Table 1). Conversely, women with for-profit college training are employed at 90.6%, which is a smaller rate than that for the women with no college training (95.3%) that is in turn smaller than the employment rate of 99% for the women trained in non-profit colleges (Table 1). However, the Wald tests on the equality of population proportions (Table 2) do not discern any statistical difference between the employment rates of for-profit or non-college trained men or women. This finding is relevant because for-profit schools often market their programs as the ticket to employment. For-profit training may give access to employment in certain fields but there is no evidence that for-profit training "moves" its students into employment compared to the workers who chose no college training. It is nevertheless the case that non-profit college training does so, particularly for its female trainees.

The descriptive findings on both earnings and wages do not indicate a significant difference between the earnings and wages of non-college and for-profit trained workers (Tables 3 and 4). There is no statistical difference between them and the wages and earnings of non-profit trained workers are significantly higher than those of no-college or for-profit trained workers (Table 5). Both of these findings run counter to the marketing claims by the for-profit institutions which

promise "better" employment and higher pay. *On aggregate*, descriptive statistics do not offer evidence that for-profit trainees perform "better" compared to their non-college trained counterparts.

Of course, among for-profit trainees there are non-completers and workers with the attributes that bias their wages and earnings down. In particular, there are 23% GED holders among for-profit college trained workers compared to 14% among non-college trained workers and 4% among non-profit college trained workers (Table 7). Also, for-profit trained workers are comprised of 33% non-Asian minorities compared to 22% minority non-profit-trained workers (Table 7). Controlling for these factors would yield less biased effects of for-profit training on wages and earnings. Indeed, being non-White and non-Asian has a large negative and significant effect on male earnings, but the effects of for-profit college training are too variable and imprecise to yield any statistical significance (Table 8).

For women, controlling for the particular credential, race, age, and high school credential makes an appreciable difference. No individual control is significant but there are large positive effects of the for-profit Associate degree on the order of 48% - 60% on earnings and no significant effects on wages (Tables 10 and 11). Also, non-completers of for-profit training do not realize any significant effects. Female recipients of for-profit certificates experience even larger negative (but imprecise) effects. The effects of for-profit training on women's wages are not significant. The fact that there are some effects on earnings but not on wages suggests that the receipt of a for-profit Associate's degree provides women with access to hours worked but not necessarily to increased wages. Marcotte (2006) obtained a similar result for community college trained workers in NELS:2000. He found that the effects of community college credentials were higher for annual earnings than hourly wages. Marcotte also found that most benefits of community college training accrued to women, not men.

Adding controls for the former students' family income, test scores, and parents' education in the rich specification does not change the substantive results. This is an interesting finding because

it suggests that the effects of the for-profit college training are not an artifact of heterogeneity. The result again aligns with Marcotte's finding on the effects of community college training. He found that little of the observed wage and earnings premium could be attributed to heterogeneity.

Finally, even though selection on observables is not of consequence, selection on unobservables may be. Tables 16-18 report the effects estimates that account for the selection into the for-profit college training. First, on aggregate it appears that workers with for-profit certificates in the regression sample do realize significantly positive effects on earnings on the order of 141%-158% compared to the non-completers of for-profit training. Second, earnings for men are much higher than those for women. However, male workers with characteristics and credentials comparable to those of female workers do not realize the earnings advantage. In fact, the interactions of for-profit certificate and Associate's degree with being male yield non-significant coefficients. A similar result appears in Grubb (1992) with regard to the effects of occupational certificates and Associate degrees on males' wages and earnings.

There are several possible explanations for the sharp differences in the effects of for-profit training on men's versus women's earnings. Marcotte (2006), who obtains the same results for the community college trainees, suggests two such explanations. The first one is about the non-random female workers' sample: women who self-select into post-secondary training forgo starting a family, so they must have a higher opportunity cost of not going to college. This argument may work in the context of "traditional" college training in a 4-year non-profit school, but many female students choose to attend community colleges and particularly for-profit schools because they perceive that these choices facilitate going to school while having a family. In 2000, about 27% of all students in for-profit colleges were single parents compared to 16% in non-profit 2-year and less-than-2-year schools and only 9% in non-profit 4-year schools (Chung, 2008a). In fact, one of the reasons why women often choose for-profit schools is their flexible course scheduling and an overall shorter course of study – both viewed as "family-friendly" features of for-profit training.

The second explanation offered by Marcotte reflects on the nature of occupations chosen by different sexes. Women may be more likely to choose the occupations for which the formal training is of relevance (e.g., nursing and health fields). In occupations most frequently chosen by men, actual work experience or apprenticeship may be more important (e.g., electronics or automotive repair). This line of thinking is also similar to Grubb's explanation of his finding of negative effects of occupational certificates on men's earnings and positive effects of occupational certificates on women's earnings. Grubb (1992) suggests that positive certificate effects come from specializing in the technical subjects, trades in industry and health-related fields, and negative effects from trades in business (such as secretaries) and agriculture. Grubb also proposes that the skills in sub-baccalaureate occupations may better be learned in informal settings. He references the US Department of Labor bulletin containing the workers' interviews to illustrate the argument that the higher-paid occupations (such as precision production) often provide employer-specific training.

These occupation-based explanations can be evaluated in the context of this study. Tables 19-22 present the information on the occupations of the for-profit trainees in the selection regression sample. In terms of weighted proportions, top occupations for the female workers with for-profit certificates are non-farm laborer, medical and personal service occupations, and secretaries (Table 19). For for-profit certificate male holders, the top occupations are skilled operative, mechanic, transport operative, and non-farm laborer. Some of these occupations (such as medical and personal service occupations for women and skilled operative and mechanic for men) agree with Marcotte's and Grubb's prognoses, but some (such as secretary for women and laborer for women and men) are not on the "list" of higher-paying occupations that would yield positive earnings effects.

Table 22 lists the occupations for top- and bottom-paid men and women with for-profit certificate in the sample. The top-paid men are skilled operatives, transport operatives, managers, and mechanics. The bottom-paid men are customer service representatives, medical licensed professionals, clerks, and cashiers. The top-paid women are in personal services, work as

secretaries, skilled operatives, and managers. The bottom-paid women are non-farm laborers, perform medical services, personal services, and business support services. These occupations are similar to the top occupations for the workers with for-profit training non-completers and those with no college training (Tables 20 and 21). The occupational explanations suggested by Grubb and Marcotte do not work well for this data. Higher earnings for women with for-profit certificates are not due to occupations in medical services and technical fields, and lower earnings for men with for-profit certificates are not due to being engaged in occupations that benefit from on-the-job training.

The findings on the effects of for-profit Associate degrees are more difficult to interpret because the sample sizes are so small. However, a casual look at the occupations of men and women with for-profit Associate degrees reveals some interesting artifacts. First, the top occupations for the female workers in the sample are in business/financial support services and in financial services. This aligns well with the obtained positive significant effects of for-profit Associate degrees on women's earnings. Second, the top occupations for the male workers with for-profit Associate degrees in the sample are cashier and manager. These are somewhat unexpected occupations for a holder of an Associate degree. A detailed look at the data reveals that the students with these occupations have trained in different fields (computer programming and drafting). This artifact goes along with the unrelated vocational training hypothesis pointed out by Grubb (1992). In his data, he found that although among male workers with for-profit certificates 76% were related to their occupation, only 25% of Associate degrees were.

This unrelated training hypothesis works for this sample and can be a plausible explanation for the lack of positive significant effects on for-profit Associate degree for men. However, with the small sample size, it is not clear whether this phenomenon is characteristic of the general population

of male for-profit Associate degree holders or is simply an artifact of the small sample or NELS sampling strategy[4].

Finally, there is an argument reflecting on the differences in effects of for-profit certificates and for-profit Associate degrees. Historically, for-profit colleges have been involved in short-term specialized occupational training, so it may be the case that for-profit colleges still have a comparative advantage in training for certificates that are short-term programs by design. This argument may work in the context of NELS, but as the number of students enrolled in for-profit 2-year and 4-year programs have grown dramatically over the years (Chung, 2008a), I would expect the effects on for-profit Associate degrees change for the future cohorts of for-profit trainees.

Conclusion

This study undertook an effort to evaluate the effects of for-profit postsecondary training on earnings. Although complicated by the small size of for-profit trained workers sample, the task was made possible by the availability of rich background data in NELS:88 and detailed transcript records in PETS:2000. I was able to produce relevant descriptive statistics on the employment, earnings, and wages of for-profit college trainees and verify that selection into employment was not a pressing issue with for-profit college trained workers. I found that for-profit college trained workers were employed at high rates which were however not statistically different from those of non-college trained workers.

I further estimated a basic Mincer model of the effects of for-profit credentials on earnings and then an enriched model accounting for heterogeneous worker population. I found some evidence for positive significant effects of for-profit Associate degree on women's earnings, but this

[4] There are 3 males with unrelated training out of 8 male with for-profit Associate's degree in the sample weighted as 59% of the total population-representative population.

evidence is limited due to the small sample size. Also, the effects of for-profit training on earnings were not the artifact of heterogeneity in the sample. Finding of effects on earnings but not on wages suggested that for-profit training may give access to more worked hours but not increased wages.

As Chung (2008b) found, for-profit students self-selected into for-profit sector. I built a multinomial model of selection into for-profit training and obtained the selection-corrected estimates of the effects of for-profit certificates and Associate degrees on the earnings of for-profit trainees. I found some evidence on the overall positive and significant effects of for-profit certificates on for-profit trainees' earnings. Even though for-profit college trained men experienced earnings significantly higher than women's, the insignificant interaction terms of for-profit certificates and Associate degrees with being male showed that this premium was not due to for-profit credentials.

A few of these findings align with those in Marcotte (2006) and Grubb (1992). The latter studies are particularly relevant to this evaluation. Marcotte's results pertain to the effects of community college training on earnings of the workers cohort from NELS:88, and Grubb's results to the effects of for-profit training on the earnings of the workers cohort from High School and Beyond study of 1986 and NLS72. In comparing my results with those and examine the hypotheses by Marcotte and Grubb related to the occupational gender differences in the effects of for-profit training, I find that occupational differences by gender are not systematically related to the differences in earnings effects between men and women.

Finally, there may be some merit to the claim that the lack of the significant effects of for-profit Associate degrees are due to the unrelated vocational training. The small sample of for-profit Associate degree holders contains some workers with the occupations that are not related to the fields of their Associate degrees.

Based on the data for the 1972 high school cohort of NLS, Grubb concluded that because the estimates of the effects of for-profit college training were so varied, we could not be certain that there were any effects. In this study, I found that once controlled for the selection into for-profit

training, there is some evidence for an overall positive effect of for-profit certificates, particularly for women. As the National Center for Educational Statistics is launching new surveys of high school and college graduates, further evaluations of the labor-market outcomes for-profit trained workers are in order to build on the findings of these studies.

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Table 1: Employment in the Student Working Sample, by Sector of Highest College Credential

Sector of Highest College Credential	Males			Females		
	Proportion	*N*	*Weighted Population*	*Proportion*	*N*	*Weighted Population*
Unemployed						
No college	0.065	56	23,000	0.047	21	9,804
Non-profit college	0.029	44	16,000	0.010	25	5,261
For-profit college	0.032	2	443	0.094	4	3,331
All	0.043	102	39,000	0.023	50	18,000
Employed						
No college	0.935	808	330,000	0.953	615	200,000
Non-profit college	0.971	1,734	530,000	0.990	1,908	540,000
For-profit college	0.968	63	14,000	0.906	102	32,000
All	0.957	2,605	870,000	0.977	2,625	770,000

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes: The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. The students from "No college" category have never attended college. "Non-profit college" category includes both private and public 4-year and less-than-4-year non-profit colleges. "For-profit college" category includes either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 2: P-Values for the Wald Tests of the Equality of Population Proportions for Employment

	Males		
	No college vs. For-profit	*No college Vs. Non-profit*	*Non-profit vs. For-profit*
Employed	0.233	0.036	0.918
	Females		
	No college vs. For-profit	*No college Vs. Non-profit*	*Non-profit vs. For-profit*
Employed	0.485	0.015	0.212

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes: The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. The students from "No college" category have never attended college. "Non-profit college" category includes both private and public 4-year and less-than-4-year non-profit colleges. "For-profit college" category includes either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 3: Observed Earnings in the Student Working Sample, by Sector of Highest College Credential

Males						
Sector of Highest College Credential	**Earnings (1)**		**Earnings (2)**		**Earnings (3)**	
	Amount, in $	*Standard Error*	*Amount, in $*	*Standard Error*	*Amount, in $*	*Standard Error*
No college	27,293	[1283.29]	27,938	[1275.99]	28,092	[1260.19]
Non-profit college	35,556	[858.40]	36,293	[1095.85]	36,372	[1097.82]
For-profit college	29,684	[2152.36]	29,773	[2135.15]	29,987	[2128.44]
Females						
Sector of Highest College Credential	**Earnings (1)**		**Earnings (2)**		**Earnings (3)**	
	Amount, in $	*Standard Error*	*Amount, in $*	*Standard Error*	*Amount, in $*	*Standard Error*
No college	16,000	[719.86]	17,967	[623.52]	17,177	[676.36]
Non-profit college	25,757	[529.40]	26,948	[569.88]	26,329	[500.56]
For-profit college	16,106	[2417.64]	18,849	[1753.40]	17,471	[2350.10]

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) earnings computed by using the reported hours per week and weeks per year from 1999.
(3) earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. The students from "No college" category have never attended college. "Non-profit college" category includes both private and public 4-year and less-than-4-year non-profit colleges. "For-profit college" category includes either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 4: Observed Wages in the Student Working Sample, by Sector of Highest College Credential

Males						
Sector of Highest College Credential	**Wages (1)**		**Wages (2)**		**Wages (3)**	
	Amount, in $	*Standard Error*	*Amount, in $*	*Standard Error*	*Amount, in $*	*Standard Error*
No college	12.83	[0.45]	13.43	[0.61]	12.52	[0.43]
Non-profit college	16.14	[0.43]	17.45	[0.53]	15.36	[0.39]
For-profit college	13.89	[1.09]	14.31	[1.03]	13.46	[0.98]
Females						
Sector of Highest College Credential	**Wages (1)**		**Wages (2)**		**Wages (3)**	
	Amount, in $	*Standard Error*	*Amount, in $*	*Standard Error*	*Amount, in $*	*Standard Error*
No college	9.13	[0.32]	8.64	[0.30]	8.89	[0.29]
Non-profit college	13.40	[0.28]	12.96	[0.27]	12.76	[0.26]
For-profit college	9.56	[0.92]	9.06	[0.84]	9.46	[0.91]

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) wages computed by using the reported hours per week and weeks per year from 1999.
(3) wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. The students from "No college" category have never attended college. "Non-profit college" category includes both private and public 4-year and less-than-4-year non-profit colleges. "For-profit college" category includes either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 5: P-Values for the Wald Tests of the Equality of Population Means for Earnings and Wages

Earnings/Wages Specification	Males		
	No college versus For-profit	*No college versus Non-profit*	*Non-profit versus For-profit*
Earnings (1)	0.455	0.000	0.007
Earnings (2)	0.333	0.000	0.012
Earnings (3)	0.438	0.000	0.008
Wages (1)	0.455	0.000	0.007
Wages (2)	0.372	0.000	0.055
Wages (3)	0.377	0.000	0.072
Earnings/Wages Specification	**Females**		
	No college versus For-profit	*No college versus Non-profit*	*Non-profit versus For-profit*
Earnings (1)	0.637	0.000	0.000
Earnings (2)	0.967	0.000	0.000
Earnings (3)	0.905	0.000	0.000
Wages (1)	0.637	0.000	0.000
Wages (2)	0.667	0.000	0.000
Wages (3)	0.553	0.000	0.001

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) earnings/wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) earnings/wages computed by using the reported hours per week and weeks per year from 1999.
(3) earnings/wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. The students from "No college" category have never attended college. "Non-profit college" category includes both private and public 4-year and less-than-4-year non-profit colleges. "For-profit college" category includes either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 6: Descriptive Statistics for the Ordinary Least Squares Regressions of Effects of Highest College Credential on *Ln* of Earnings/Wages, By Sex

Variables	Males		Females	
	Proportion	*N*	*Proportion*	*N*
No credential, for-profit	0.004	16	0.013	33
No credential, non-profit 2yr	0.199	447	0.162	427
No credential, non-profit 4yr	0.075	259	0.074	215
Certificate, for-profit	0.009	35	0.022	50
Certificate, non-profit 2yr	0.015	48	0.036	57
Associate's, for-profit	0.003	11	0.008	12
Associate's, non-profit 2yr	0.034	104	0.053	132
Bachelor's	0.197	676	0.312	831
Non-Asian minority	0.263	556	0.245	564
GED	0.074	140	0.073	128
No high school diploma or equivalency	0.107	168	0.068	110
High school credential missing	0.018	33	0.011	30
Family income $15-<25k	0.152	375	0.157	362
Family income $25-<35k	0.112	336	0.120	350
Family income $35-<50k	0.176	460	0.145	395
Family income $50k+	0.252	653	0.256	657
Family income missing	0.166	363	0.180	351
Composite test score 40.01-45	0.195	445	0.149	404
Composite test score 45.01-50	0.145	388	0.124	363
Composite test score higher than 50	0.366	1,076	0.455	1,218
Composite test not completed	0.023	80	0.042	87
Mother's education less than high school	0.130	326	0.146	419
Mother's education some college	0.167	396	0.198	477
Mother's education Bachelor's degree or higher	0.150	508	0.154	437
Mother's education missing	0.225	416	0.191	345
	Mean	*SE*	*Mean*	*SE*
Age in months	313.591	0	310.891	0
Observations	0.502	2,510	0.499	2,488

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 7: Descriptive Statistics for the Ordinary Least Squares Regressions of Effects of Highest College Credential on *Ln* of Earnings/Wages, By Sector

Variables	No College		For-Profit		Non-Profit	
	Proportion	*N*	*Proportion*	*N*	*Proportion*	*N*
No credential, for-profit	0.000	0	0.278	49	0.000	0
No credential, non-profit 2yr	0.000	0	0.000	0	0.273	866
No credential, non-profit 4yr	0.000	0	0.000	0	0.116	469
Certificate, for-profit	0.000	0	0.540	85	0.000	0
Certificate, non-profit 2yr	0.000	0	0.000	0	0.035	89
Associate's, for-profit	0.000	0	0.182	23	0.000	0
Associate's, non-profit 2yr	0.000	0	0.000	0	0.062	230
Bachelor's	0.000	0	0.000	0	0.393	1,500
Non-Asian minority	0.313	379	0.325	58	0.220	649
GED	0.139	152	0.226	20	0.036	93
No high school diploma or equivalency	0.251	238	0.028	5	0.015	33
High school credential missing	0.032	54	0.000	0	0.008	9
Family income $15-<25k	0.191	287	0.262	26	0.135	414
Family income $25-<35k	0.131	214	0.131	27	0.109	431
Family income $35-<50k	0.107	175	0.114	22	0.190	649
Family income $50k+	0.111	130	0.118	26	0.324	1,138
Family income missing	0.217	228	0.216	26	0.150	443
Composite test score 40.01-45	0.213	318	0.205	35	0.152	475
Composite test score 45.01-50	0.138	225	0.135	27	0.121	480
Composite test score higher than 50	0.214	266	0.427	51	0.511	1,958
Composite test not completed	0.035	58	0.048	6	0.029	99
Mother's education less than high school	0.247	370	0.176	32	0.077	324
Mother's education some college	0.108	119	0.258	24	0.208	712
Mother's education Bachelor's degree or higher	0.048	86	0.057	10	0.210	843
Mother's education missing	0.258	251	0.108	27	0.193	470
	Mean	*SE*	*Mean*	*SE*	*Mean*	*SE*
Age in months	315.522		312.935		310.780	0.233
Observations	0.317	1,343	0.030	157	0.653	3,415

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 8: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Earnings for Males, Simple Specification

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	0.255	[0.69]	0.311	[0.70]	0.259	[0.69]
No credential, non-profit 2yr	0.031	[0.28]	0.033	[0.29]	0.03	[0.28]
No credential, non-profit 4yr	0.489*	[0.23]	0.401	[0.21]	0.483*	[0.23]
Certificate, for-profit	0.074	[0.38]	0.087	[0.38]	0.08	[0.38]
Certificate, non-profit 2yr	0.316*	[0.16]	0.265	[0.18]	0.313	[0.16]
Associate's, for-profit	0.451	[0.26]	0.468	[0.27]	0.445	[0.26]
Associate's, non-profit 2yr	0.053	[0.19]	0.034	[0.19]	0.039	[0.19]
Bachelor's	0.249	[0.19]	0.243	[0.20]	0.24	[0.19]
Non-Asian minority	-0.618*	[0.25]	-0.632*	[0.25]	-0.618*	[0.25]
Age in months	0.357	[0.46]	0.422	[0.48]	0.356	[0.46]
Age in months squared	-0.001	[0.00]	-0.001	[0.00]	-0.001	[0.00]
GED	-0.046	[0.28]	-0.121	[0.29]	-0.051	[0.28]
No high school diploma or equivalency	-0.317	[0.41]	-0.366	[0.42]	-0.321	[0.41]
High school credential missing	-0.025	[0.66]	-0.139	[0.66]	-0.025	[0.66]
Observations	2,510		2,483		2,508	
R-squared	0.068		0.073		0.068	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 9: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Wages for Males, Simple Specification

Variables	Wages (1)		Wages (2)		Wages (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	0.031	[0.09]	0.074	[0.08]	0.074	[0.08]
No credential, non-profit 2yr	0.066	[0.05]	0.013	[0.05]	0.019	[0.05]
No credential, non-profit 4yr	0.163	[0.09]	0.128	[0.07]	0.141*	[0.07]
Certificate, for-profit	-0.041	[0.08]	-0.074	[0.09]	-0.064	[0.08]
Certificate, non-profit 2yr	-0.029	[0.06]	-0.035	[0.06]	-0.01	[0.06]
Associate's, for-profit	-0.006	[0.20]	-0.016	[0.20]	-0.007	[0.20]
Associate's, non-profit 2yr	-0.035	[0.06]	0.049	[0.06]	0.066	[0.06]
Bachelor's	0.269***	[0.04]	0.224***	[0.04]	0.224***	[0.04]
Non-Asian minority	-0.128**	[0.05]	-0.05	[0.05]	-0.044	[0.05]
Age in months	-0.05	[0.07]	-0.081	[0.09]	-0.09	[0.09]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
GED	0.051	[0.07]	0.095	[0.07]	0.091	[0.07]
No high school diploma or equivalency	0.07	[0.11]	-0.03	[0.08]	-0.021	[0.08]
High school credential missing	0.085	[0.18]	0.133	[0.20]	0.153	[0.20]
Observations	2,412		2,398		2,404	
R-squared	0.097		0.083		0.082	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of wages computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 10: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Earnings for Females, Simple Specification

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	-0.546	[0.58]	-0.754	[0.60]	-0.55	[0.61]
No credential, non-profit 2yr	0.274*	[0.13]	0.335*	[0.13]	0.299*	[0.13]
No credential, non-profit 4yr	0.274	[0.15]	0.391*	[0.16]	0.305*	[0.15]
Certificate, for-profit	-0.891	[1.08]	-1.244	[1.02]	-1.143	[1.03]
Certificate, non-profit 2yr	0.423*	[0.19]	0.221	[0.16]	0.196	[0.15]
Associate's, for-profit	0.477***	[0.13]	0.597***	[0.14]	0.505***	[0.13]
Associate's, non-profit 2yr	0	[0.25]	0.115	[0.25]	0.056	[0.25]
Bachelor's	0.464***	[0.14]	0.607***	[0.14]	0.515***	[0.14]
Non-Asian minority	-0.21	[0.14]	-0.239	[0.14]	-0.221	[0.14]
Age in months	0.356	[0.31]	0.316	[0.31]	0.355	[0.31]
Age in months squared	-0.001	[0.00]	-0.001	[0.00]	-0.001	[0.00]
GED	-0.372	[0.38]	-0.383	[0.38]	-0.355	[0.37]
No high school diploma or equivalency	-0.254	[0.52]	-0.392	[0.54]	-0.313	[0.52]
High school credential missing	-0.031	[0.29]	-0.135	[0.33]	-0.004	[0.29]
Observations	2,488		2,447		2,486	
R-squared	0.097		0.118		0.102	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 11: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Wages for Females, Simple Specification

Variables	Wages (1)		Wages (2)		Wages (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	-0.08	[0.14]	0.005	[0.11]	0.023	[0.11]
No credential, non-profit 2yr	0.125**	[0.04]	0.110*	[0.04]	0.096*	[0.04]
No credential, non-profit 4yr	0.183***	[0.05]	0.167***	[0.05]	0.159***	[0.05]
Certificate, for-profit	0.126	[0.11]	0.058	[0.11]	0.063	[0.11]
Certificate, non-profit 2yr	0.330*	[0.17]	0.249	[0.16]	0.267	[0.16]
Associate's, for-profit	0.047	[0.10]	-0.069	[0.10]	-0.045	[0.09]
Associate's, non-profit 2yr	-0.095	[0.24]	-0.152	[0.25]	-0.14	[0.25]
Bachelor's	0.484***	[0.04]	0.426***	[0.03]	0.401***	[0.03]
Non-Asian minority	-0.029	[0.06]	-0.048	[0.06]	-0.04	[0.06]
Age in months	-0.033	[0.08]	-0.032	[0.07]	-0.037	[0.07]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
GED	0.057	[0.06]	0.048	[0.05]	0.052	[0.05]
No high school diploma or equivalency	-0.092	[0.07]	-0.130**	[0.05]	-0.130*	[0.05]
High school credential missing	-0.116	[0.10]	-0.088	[0.06]	-0.071	[0.06]
Observations	2,440		2,425		2,436	
R-squared	0.202		0.204		0.2	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of wages computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 12: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Earnings for Males, Rich Specification

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	0.212	[0.70]	0.267	[0.71]	0.214	[0.70]
No credential, non-profit 2yr	0.082	[0.29]	0.085	[0.29]	0.08	[0.29]
No credential, non-profit 4yr	0.415	[0.26]	0.317	[0.25]	0.408	[0.26]
Certificate, for-profit	-0.048	[0.37]	-0.037	[0.37]	-0.039	[0.37]
Certificate, non-profit 2yr	0.27	[0.17]	0.212	[0.19]	0.266	[0.17]
Associate's, for-profit	0.281	[0.38]	0.29	[0.39]	0.28	[0.38]
Associate's, non-profit 2yr	0.154	[0.25]	0.133	[0.25]	0.138	[0.25]
Bachelor's	0.168	[0.24]	0.149	[0.24]	0.159	[0.24]
Non-Asian minority	-0.663*	[0.26]	-0.670*	[0.27]	-0.661*	[0.26]
Age in months	0.218	[0.49]	0.274	[0.50]	0.22	[0.49]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
GED	-0.077	[0.27]	-0.156	[0.27]	-0.081	[0.27]
No high school diploma or equivalency	-0.33	[0.37]	-0.38	[0.38]	-0.334	[0.37]
High school credential missing	-0.073	[0.62]	-0.184	[0.63]	-0.073	[0.62]
Family income $15-<25k	0.174	[0.25]	0.19	[0.26]	0.189	[0.25]
Family income $25-<35k	-0.028	[0.25]	-0.014	[0.26]	-0.014	[0.25]
Family income $35-<50k	-0.548	[0.45]	-0.545	[0.45]	-0.533	[0.45]
Family income $50k+	-0.054	[0.26]	-0.065	[0.26]	-0.046	[0.26]
Family income missing	-0.243	[0.32]	-0.239	[0.32]	-0.231	[0.32]
Composite test score 40.01-45	0.284	[0.32]	0.313	[0.32]	0.285	[0.32]
Composite test score 45.01-50	-0.112	[0.36]	-0.087	[0.36]	-0.109	[0.36]
Composite test score higher than 50	0.392	[0.28]	0.441	[0.29]	0.398	[0.28]
Composite test not completed	0.551	[0.28]	0.591*	[0.29]	0.553	[0.29]
Mother's education less than high school	-0.534	[0.40]	-0.564	[0.40]	-0.519	[0.40]
Mother's education some college	-0.204	[0.27]	-0.191	[0.27]	-0.199	[0.27]
Mother's education Bachelor's degree or higher	-0.219	[0.14]	-0.206	[0.14]	-0.214	[0.14]
Mother's education missing	0.122	[0.21]	0.14	[0.21]	0.134	[0.21]
Observations	2,510		2,483		2,508	
R-squared	0.093		0.099		0.093	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* p<0.05, ** p<0.01, *** p<0.001
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma; family income less than $15k; composite test score less than 40; mother's education high school. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 13: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Wages for Males, Rich Specification

Variables	Wages (1)		Wages (2)		Wages (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	-0.033	[0.08]	0.02	[0.08]	0.028	[0.08]
No credential, non-profit 2yr	0.025	[0.05]	-0.016	[0.04]	-0.01	[0.04]
No credential, non-profit 4yr	0.111	[0.09]	0.077	[0.07]	0.096	[0.07]
Certificate, for-profit	-0.063	[0.08]	-0.084	[0.09]	-0.07	[0.09]
Certificate, non-profit 2yr	-0.018	[0.06]	-0.028	[0.06]	-0.003	[0.06]
Associate's, for-profit	0.021	[0.19]	0.007	[0.19]	0.039	[0.18]
Associate's, non-profit 2yr	-0.071	[0.06]	0.012	[0.06]	0.029	[0.06]
Bachelor's	0.194***	[0.05]	0.148**	[0.05]	0.158***	[0.04]
Non-Asian minority	-0.073	[0.04]	-0.014	[0.04]	-0.005	[0.04]
Age in months	-0.059	[0.06]	-0.084	[0.09]	-0.094	[0.09]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
GED	0.086	[0.06]	0.09	[0.06]	0.087	[0.07]
No high school diploma or equivalency	0.042	[0.09]	-0.059	[0.07]	-0.05	[0.07]
High school credential missing	0.084	[0.17]	0.13	[0.19]	0.147	[0.19]
Family income $15-<25k	0.103	[0.06]	0.092	[0.07]	0.11	[0.07]
Family income $25-<35k	0.094	[0.05]	0.083	[0.06]	0.1	[0.06]
Family income $35-<50k	0.142**	[0.05]	0.104	[0.06]	0.123*	[0.06]
Family income $50k+	0.202**	[0.07]	0.167**	[0.06]	0.172**	[0.06]
Family income missing	0.165**	[0.05]	0.134*	[0.06]	0.136*	[0.06]
Composite test score 40.01-45	-0.101*	[0.05]	-0.112*	[0.05]	-0.107*	[0.05]
Composite test score 45.01-50	-0.1	[0.06]	-0.077	[0.05]	-0.072	[0.05]
Composite test score higher than 50	-0.001	[0.06]	0.038	[0.06]	0.025	[0.06]
Composite test not completed	-0.083	[0.09]	-0.065	[0.08]	-0.133	[0.08]
Mother's education less than high school	-0.071	[0.05]	-0.007	[0.06]	-0.014	[0.06]
Mother's education some college	-0.091	[0.05]	-0.076	[0.04]	-0.076	[0.04]
Mother's education Bachelor's degree or higher	-0.021	[0.05]	-0.009	[0.04]	-0.029	[0.04]
Mother's education missing	-0.033	[0.05]	-0.013	[0.04]	-0.039	[0.04]
Observations	2,411		2,398		2,404	
R-squared	0.134		0.115		0.113	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of wages computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 14: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Earnings for Females, Rich Specification

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	-0.551	[0.56]	-0.754	[0.59]	-0.553	[0.60]
No credential, non-profit 2yr	0.269*	[0.13]	0.328*	[0.13]	0.294*	[0.13]
No credential, non-profit 4yr	0.208	[0.14]	0.329*	[0.14]	0.248	[0.14]
Certificate, for-profit	-0.916	[0.99]	-1.257	[0.95]	-1.154	[0.95]
Certificate, non-profit 2yr	0.333	[0.18]	0.148	[0.17]	0.118	[0.15]
Associate's, for-profit	0.475***	[0.14]	0.627***	[0.17]	0.507***	[0.15]
Associate's, non-profit 2yr	-0.065	[0.23]	0.059	[0.23]	0	[0.23]
Bachelor's	0.412**	[0.13]	0.568***	[0.14]	0.480***	[0.13]
Non-Asian minority	-0.177	[0.16]	-0.212	[0.15]	-0.192	[0.15]
Age in months	0.361	[0.30]	0.325	[0.30]	0.361	[0.31]
Age in months squared	-0.001	[0.00]	-0.001	[0.00]	-0.001	[0.00]
GED	-0.429	[0.38]	-0.452	[0.37]	-0.422	[0.37]
No high school diploma or equivalency	-0.262	[0.50]	-0.401	[0.51]	-0.331	[0.50]
High school credential missing	-0.071	[0.30]	-0.172	[0.35]	-0.056	[0.30]
Family income $15-<25k	-0.001	[0.15]	-0.07	[0.15]	-0.028	[0.15]
Family income $25-<35k	-0.008	[0.13]	0.011	[0.13]	-0.001	[0.13]
Family income $35-<50k	-0.038	[0.16]	-0.057	[0.17]	-0.058	[0.16]
Family income $50k+	-0.096	[0.22]	-0.097	[0.21]	-0.101	[0.22]
Family income missing	-0.279	[0.21]	-0.247	[0.21]	-0.3	[0.21]
Composite test score 40.01-45	0.479**	[0.18]	0.522**	[0.19]	0.491**	[0.18]
Composite test score 45.01-50	0.371	[0.19]	0.400*	[0.19]	0.384*	[0.19]
Composite test score higher than 50	0.359	[0.20]	0.372	[0.21]	0.356	[0.20]
Composite test not completed	0.598**	[0.23]	0.639*	[0.25]	0.621**	[0.23]
Mother's education less than high school	0.311	[0.20]	0.316	[0.20]	0.33	[0.20]
Mother's education some college	0.087	[0.14]	0.077	[0.14]	0.065	[0.14]
Mother's education Bachelor's degree or higher	0.207	[0.16]	0.149	[0.16]	0.153	[0.16]
Mother's education missing	0.4	[0.22]	0.389	[0.22]	0.375	[0.21]
Observations	2,488		2,447		2,486	
R-squared	0.114		0.134		0.119	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma; family income less than $15k; composite test score less than 40; mother's education high school. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 15: Ordinary Least Squares Regression of Effects of Highest College Credential on *Ln* of Wages for Females, Rich Specification

Variables	Wages (1)		Wages (2)		Wages (3)	
	b	*se*	*b*	*se*	*b*	*se*
No credential, for-profit	-0.079	[0.14]	0.014	[0.11]	0.03	[0.11]
No credential, non-profit 2yr	0.112**	[0.03]	0.071	[0.05]	0.058	[0.04]
No credential, non-profit 4yr	0.140**	[0.05]	0.109*	[0.05]	0.098*	[0.04]
Certificate, for-profit	0.116	[0.09]	0.062	[0.09]	0.064	[0.09]
Certificate, non-profit 2yr	0.244*	[0.11]	0.182	[0.11]	0.2	[0.11]
Associate's, for-profit	0.062	[0.09]	-0.058	[0.08]	-0.031	[0.08]
Associate's, non-profit 2yr	-0.154	[0.21]	-0.2	[0.22]	-0.189	[0.22]
Bachelor's	0.387***	[0.04]	0.342***	[0.04]	0.316***	[0.04]
Non-Asian minority	-0.002	[0.06]	0.006	[0.07]	0.01	[0.06]
Age in months	-0.004	[0.06]	-0.017	[0.05]	-0.016	[0.06]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
GED	0.082	[0.06]	0.059	[0.05]	0.062	[0.05]
No high school diploma or equivalency	-0.036	[0.06]	-0.09	[0.05]	-0.065	[0.05]
High school credential missing	-0.068	[0.10]	-0.024	[0.06]	-0.01	[0.07]
Family income $15-<25k	-0.104	[0.08]	-0.047	[0.08]	-0.068	[0.08]
Family income $25-<35k	0.043	[0.04]	0.085*	[0.04]	0.072*	[0.04]
Family income $35-<50k	0.057	[0.04]	0.129**	[0.05]	0.104**	[0.04]
Family income $50k+	0.101*	[0.04]	0.168***	[0.04]	0.146***	[0.04]
Family income missing	0.033	[0.04]	0.043	[0.04]	0.043	[0.04]
Composite test score 40.01-45	0.039	[0.04]	0.052	[0.04]	0.042	[0.04]
Composite test score 45.01-50	0.051	[0.04]	0.066	[0.05]	0.062	[0.04]
Composite test score higher than 50	0.077	[0.05]	0.079	[0.06]	0.077	[0.06]
Composite test not completed	0.084	[0.06]	0.104	[0.07]	0.078	[0.06]
Mother's education less than high school	-0.038	[0.03]	-0.042	[0.03]	-0.043	[0.03]
Mother's education some college	0.037	[0.06]	-0.006	[0.06]	0.007	[0.06]
Mother's education Bachelor's degree or higher	0.114**	[0.04]	0.078	[0.04]	0.083*	[0.04]
Mother's education missing	0.02	[0.04]	0.005	[0.04]	-0.014	[0.04]
Observations	2,431		2,424		2,434	
R-squared	0.251		0.241		0.238	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of wages computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of wages computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of wages computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
The regression also includes census region dummies. Reference categories are: no college; White or Asian; regular high school diploma. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. Non-profit colleges include both private and public 4-year and less-than-4-year non-profit colleges. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 16: Final Stage of Multinomial Logit Selection Regression of Effects of For-Profit College Credential on *Ln* of Earnings with Uncorrected Errors

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se†*	*b*	*se†*	*b*	*se†*
Certificate, for-profit	1.455**	[0.50]	1.518**	[0.56]	1.405*	[0.54]
Associate's, for-profit	0.888	[0.60]	1.422*	[0.69]	1.145	[0.65]
Male with for-profit certificate	-2.067*	[1.04]	-2.160*	[1.07]	-2.073	[1.06]
Male with for-profit Associate's degree	-0.647	[0.92]	-1.238	[0.97]	-0.984	[0.94]
Male	4.133**	[1.29]	4.108**	[1.33]	4.109**	[1.32]
Non-Asian minority	-0.159	[0.58]	0.02	[0.61]	-0.045	[0.59]
Non-Asian minority male	-1.683	[1.08]	-1.731	[1.09]	-1.735	[1.08]
Age in months	-2.506	[2.03]	-2.507	[2.04]	-2.516	[2.03]
Age in months squared	0.004	[0.00]	0.004	[0.00]	0.004	[0.00]
Standard HS diploma	-4.334*	[1.77]	-3.708*	[1.83]	-4.130*	[1.79]
Family income $15-<25k	-1.404	[0.75]	-1.264	[0.85]	-1.458	[0.82]
Family income $25-<35k	-1.539	[0.95]	-1.12	[1.00]	-1.411	[0.98]
Family income $35-<50k	-1.737	[0.89]	-0.96	[0.98]	-1.441	[0.92]
Family income $50k+	-1.134	[1.14]	-0.382	[1.23]	-0.834	[1.18]
Family income missing	-1.971*	[0.93]	-1.495	[1.00]	-1.78	[0.97]
Composite test score 40.01-45	-1.026	[0.79]	-0.933	[0.88]	-0.966	[0.85]
Composite test score 45.01-50	-2.355	[1.21]	-2.073	[1.27]	-2.192	[1.25]
Composite test score higher than 50	-2.391*	[1.18]	-2.274	[1.27]	-2.373	[1.23]
Composite test not completed	-1.673	[0.92]	-1.138	[0.96]	-1.4	[0.94]
Student has 3 or more siblings	0.147	[0.65]	0.188	[0.69]	0.147	[0.67]
Student is second-born	-0.427	[0.37]	-0.2	[0.38]	-0.295	[0.37]
Student is third-born	-0.077	[0.48]	0.115	[0.51]	0.097	[0.49]
Student is fourth- or later-born	0.009	[0.83]	0.015	[0.83]	0.123	[0.82]
Student's parents foreign-born	0.268	[0.50]	0.277	[0.55]	0.292	[0.52]
Mother's education some college, Bachelor's degree or higher	-1.048*	[0.44]	-1.350**	[0.49]	-1.213*	[0.48]
Observations	128		127		127	
R-squared	0.42		0.43		0.42	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
Standard errors in this regression are not corrected for the two-step procedure. The regression also includes census region dummies. The exclusion restrictions for this selection regression are public 2-year school tuition, in-state (in 2000 hundreds dollars) and concentration of non-profit 2-year colleges in the student's county. Reference categories are: no credential, for-profit; female, White or Asian; no regular high school diploma; family income less than $15k; composite test score less than 40; students has fewer than 3 siblings; student is first-born; students' parents are native-born; mother's education no college. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 17: Final Stage of Non-Weighted Multinomial Logit Selection Regression of Effects of For-Profit College Credential on *Ln* of Earnings with Uncorrected Errors

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se†*	*b*	*se†*	*b*	*se†*
Certificate, for-profit	1.429**	[0.53]	1.577**	[0.55]	1.475**	[0.55]
Associate's, for-profit	1.04	[0.82]	1.095	[0.84]	1.062	[0.83]
Male with for-profit certificate	-1.731*	[0.87]	-1.858*	[0.88]	-1.783*	[0.87]
Male with for-profit Associate's degree	-0.826	[1.27]	-0.844	[1.30]	-0.868	[1.28]
Male	4.081***	[1.20]	4.165**	[1.24]	4.185***	[1.22]
Non-Asian minority	-1.829	[0.97]	-1.633	[0.99]	-1.764	[0.98]
Non-Asian minority male	-1.854*	[0.82]	-1.852*	[0.83]	-1.903*	[0.83]
Age in months	0.119	[1.36]	-0.072	[1.38]	0.081	[1.37]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
Standard HS diploma	-3.858*	[1.68]	-3.429*	[1.71]	-3.753*	[1.69]
Family income $15-<25k	0.977	[0.83]	1.054	[0.87]	0.972	[0.86]
Family income $25-<35k	-0.202	[0.63]	-0.031	[0.66]	-0.174	[0.65]
Family income $35-<50k	-0.516	[0.89]	-0.138	[0.92]	-0.407	[0.91]
Family income $50k+	-0.726	[1.13]	-0.231	[1.16]	-0.556	[1.14]
Family income missing	-0.669	[0.73]	-0.444	[0.75]	-0.58	[0.74]
Composite test score 40.01-45	-0.593	[0.62]	-0.474	[0.65]	-0.556	[0.64]
Composite test score 45.01-50	-1.837*	[0.77]	-1.632*	[0.78]	-1.729*	[0.77]
Composite test score higher than 50	-2.121	[1.36]	-1.883	[1.39]	-2.083	[1.37]
Composite test not completed	-1.105	[1.09]	-0.855	[1.11]	-1.001	[1.09]
Student has 3 or more siblings	0.056	[0.68]	0.039	[0.70]	0.06	[0.69]
Student is second-born	-0.389	[0.45]	-0.369	[0.46]	-0.384	[0.46]
Student is third-born	0.278	[0.61]	0.099	[0.64]	0.206	[0.64]
Student is fourth- or later-born	0.24	[0.68]	0.124	[0.70]	0.247	[0.69]
Student's parents foreign-born	-0.287	[0.71]	-0.232	[0.73]	-0.274	[0.72]
Mother's education some college, Bachelor's degree or higher	-1.082	[0.82]	-1.176	[0.85]	-1.184	[0.84]
Observations	128		127		127	
Adjusted R-squared	0.13		0.12		0.12	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
Standard errors in this regression are not corrected for the two-step procedure. The regression also includes census region dummies. The exclusion restrictions for this selection regression are public 2-year school tuition, in-state (in 2000 hundreds dollars) and concentration of non-profit 2-year colleges in the student's county. Reference categories are: no credential, for-profit; female, White or Asian; no regular high school diploma; family income less than $15k; composite test score less than 40; students has fewer than 3 siblings; student is first-born; students' parents are native-born; mother's education no college. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 18: Final Stage of Non-Weighted Multinomial Logit Selection Regression of Effects of For-Profit College Credential on *Ln* of Earnings with Corrected Errors

Variables	Earnings (1)		Earnings (2)		Earnings (3)	
	b	*se†*	*b*	*se†*	*b*	*se†*
Certificate, for-profit	1.429*	[0.67]	1.577**	[0.71]	1.475*	[0.70]
Associate's, for-profit	1.04	[0.77]	1.095	[0.81]	1.062	[0.80]
Male with for-profit certificate	-1.731	[1.15]	-1.858	[1.16]	-1.783	[1.16]
Male with for-profit Associate's degree	-0.826	[1.15]	-0.844	[1.19]	-0.868	[1.18]
Male	4.081*	[1.78]	4.165**	[1.77]	4.185*	[1.78]
Non-Asian minority	-1.829	[1.35]	-1.633	[1.33]	-1.764	[1.33]
Non-Asian minority male	-1.854	[1.54]	-1.852	[1.51]	-1.903	[1.53]
Age in months	0.119	[2.51]	-0.072	[2.50]	0.081	[2.51]
Age in months squared	0	[0.00]	0	[0.00]	0	[0.00]
Standard HS diploma	-3.858	[2.54]	-3.429	[2.50]	-3.753	[2.51]
Family income $15-<25k	0.977	[1.11]	1.054	[1.13]	0.972	[1.13]
Family income $25-<35k	-0.202	[1.16]	-0.031	[1.14]	-0.174	[1.16]
Family income $35-<50k	-0.516	[1.21]	-0.138	[1.19]	-0.407	[1.20]
Family income $50k+	-0.726	[1.49]	-0.231	[1.47]	-0.556	[1.47]
Family income missing	-0.669	[1.16]	-0.444	[1.15]	-0.58	[1.15]
Composite test score 40.01-45	-0.593	[1.04]	-0.474	[1.03]	-0.556	[1.04]
Composite test score 45.01-50	-1.837	[1.53]	-1.632	[1.53]	-1.729	[1.54]
Composite test score higher than 50	-2.121	[1.97]	-1.883	[1.98]	-2.083	[1.98]
Composite test not completed	-1.105	[1.63]	-0.855	[1.59]	-1.001	[1.62]
Student has 3 or more siblings	0.056	[0.98]	0.039	[0.97]	0.06	[0.97]
Student is second-born	-0.389	[0.68]	-0.369	[0.66]	-0.384	[0.67]
Student is third-born	0.278	[0.95]	0.099	[0.94]	0.206	[0.95]
Student is fourth- or later-born	0.24	[1.17]	0.124	[1.15]	0.247	[1.15]
Student's parents foreign-born	-0.287	[1.04]	-0.232	[1.02]	-0.274	[1.03]
Mother's education some college, Bachelor's degree or higher	-1.082	[1.13]	-1.176	[1.15]	-1.184	[1.15]
Observations	128		127		127	
Implied residual standard error		1.623		1.641		1.623

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* $p<0.05$, ** $p<0.01$, *** $p<0.001$
Standard errors in this regression are corrected for the two-step procedure by Monte-Carlo bootstrap simulation with 1,000 replications. The regression also includes census region dummies. The exclusion restrictions for this selection regression are public 2-year school tuition, in-state (in 2000 hundreds dollars) and concentration of non-profit 2-year colleges in the student's county. Reference categories are: no credential, for-profit; female, White or Asian; no regular high school diploma; family income less than $15k; composite test score less than 40; students has fewer than 3 siblings; student is first-born; students' parents are native-born; mother's education no college. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.

Table 19: Occupations of Workers with For-Profit Credentials in the Regression Sample

Occupations of Males With For-Profit Certificates

Occupation	Weighted %	N
Skilled operatives	0.171	3
Mechanic, repairer, service technicians	0.161	6
Transport operatives (not pilots)	0.100	4
Laborers (other than farm)	0.090	4
Managers-midlevel	0.080	2
Clerical other	0.070	2
Customer service	0.066	2
Medical licensed professionals	0.044	1
Sales/purchasing	0.041	2
Cashiers, tellers, sales clerks	0.040	2
Financial services professionals	0.040	1
Craftsmen	0.026	1
Research assistants/lab technicians	0.025	1
Personal services	0.023	1
Medical services	0.012	1
Cooks, chefs, bakers, cake decorators	0.012	1
Total		34

Occupations of Females With For-Profit Certificates

Occupation	Weighted %	N
Laborers (other than farm)	0.296	2
Medical services	0.134	6
Personal services	0.116	6
Secretaries and receptionists	0.100	6
Clerical other	0.067	4
Business/financial support services	0.051	4
Managers-supervisory, office, other Administration	0.036	3
Sales/purchasing	0.032	3
Medical licensed professionals	0.029	2
Skilled operatives	0.029	1
Managers-midlevel	0.026	2
Cashiers, tellers, sales clerks	0.022	2
Clerks, data entry	0.017	1
Financial services professionals	0.016	1
Technical/professional workers, other	0.015	1
Legal support	0.010	1
Customer service	0.005	1
Total		46

Occupations of Males with For-Profit Associate Degrees

Occupation	Weighted %	N
Cashiers, tellers, sales clerks	0.350	1
Managers-supervisory, office, other Administration	0.235	2
Mechanic, repairer, service technicians	0.150	2
Craftsmen	0.096	1
Engineers architects software engineers	0.096	1
Performers/artists	0.074	1
Total		8

Occupations of Females with For-Profit Associate Degrees

Occupation	Weighted %	N
Business/financial support services	0.597	2
Financial services professionals	0.117	1
Secretaries and receptionists	0.077	2
Medical licensed professionals	0.049	1
Research assistants/lab technicians	0.045	1
Managers-supervisory, office, other Administration	0.044	1
Protective services, criminal justice	0.043	1
Medical services	0.028	1
Total		10

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Table 20: Occupations of Workers with For-Profit Training but No Credential in the Regression Sample

Occupations of Males with For-Profit Training but No Credential

Occupation	Weighted %	N
Personal services	0.216	2
Financial services professionals	0.173	2
Clerical other	0.148	2
Laborers (other than farm)	0.104	2
Mechanic, repairer, service technicians	0.080	1
Computer systems/related professionals	0.080	1
Protective services, criminal justice	0.065	1
Managers-supervisory, office, other Administration	0.056	1
Managers-midlevel	0.040	1
Farmers, foresters, farm laborers	0.038	1
Total		14

Occupations of Females with For-Profit Training but No Credential

Occupation	Weighted %	N
Laborers (other than farm)	0.265	3
Customer service	0.145	4
Cashiers, tellers, sales clerks	0.084	3
Secretaries and receptionists	0.082	4
Medical services	0.080	3
Skilled operatives	0.065	1
Managers-supervisory, office, other Administration	0.057	2
Personal services	0.041	1
Business/financial support services	0.033	1
Managers-midlevel	0.032	2
Cooks, chefs, bakers, cake decorators	0.029	1
Computer systems/related professionals	0.028	1
Human services professionals	0.023	1
Medical licensed professionals	0.021	1
Clerks, data entry	0.015	1
Total		29

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Table 21: Occupations of Workers with No College Training in the Regression Sample

Males

Occupation	Weighted %	N
Laborers (other than farm)	0.201	229
Craftsmen	0.157	180
Skilled operatives	0.116	128
Sales/purchasing	0.068	41
Mechanic, repairer, service technicians	0.065	84
Transport operatives (not pilots)	0.062	63
Managers-supervisory, office, other Administration	0.058	80
Managers-midlevel	0.037	33
Uncodeable	0.024	17
Performers/artists	0.019	10
Protective services, criminal justice	0.018	21
Computer systems/related professionals	0.015	17
Cooks, chefs, bakers, cake decorators	0.014	15
Cashiers, tellers, sales clerks	0.014	8
Clerical other	0.014	19
Business/financial support services	0.013	16
Health/recreation services	0.012	2
Legitimate skip	0.012	10
Research assistants/lab technicians	0.011	3
Personal services	0.011	17
Customer service	0.010	13
Farmers, foresters, farm laborers	0.010	21
Managers-executive	0.009	12
Military	0.007	9
Don't know	0.005	3
Financial services professionals	0.005	6
Engineers architects software engineers	0.003	4
Technical/professional workers, other	0.003	6
Human services professionals	0.002	3
Computer/computer equipment operators	0.002	3
Medical services	0.001	3
Secretaries and receptionists	0.001	3
Educators-instructors other than K-12	0.001	1
Editors, writers, reporters	0.001	1
Clerks, data entry	0.000	1
Educators-K-12 teachers	0.000	1
Total		1,083

Females

Occupation	Weighted %	N
Personal services	0.130	119
Laborers (other than farm)	0.103	100
Cashiers, tellers, sales clerks	0.088	71
Legitimate skip	0.084	38
Secretaries and receptionists	0.078	64
Managers-supervisory, office, other Administration	0.078	76
Sales/purchasing	0.065	63
Customer service	0.050	32
Skilled operatives	0.048	52
Medical services	0.044	42
Business/financial support services	0.041	46
Managers-midlevel	0.036	32
Clerical other	0.035	37
Cooks, chefs, bakers, cake decorators	0.014	13
Clerks, data entry	0.014	18
Transport operatives (not pilots)	0.013	10
Medical licensed professionals	0.011	13
Educators-instructors other than K-12	0.010	13
Uncodeable	0.009	14
Financial services professionals	0.007	10
Craftsmen	0.006	10
Unemployed-other	0.006	3
Human services professionals	0.005	5
Farmers, foresters, farm laborers	0.004	6
Protective services, criminal justice	0.004	6
Performers/artists	0.004	6
Don't know	0.003	3
Mechanic, repairer, service technicians	0.003	4
Educators-K-12 teachers	0.002	3
Research assistants/lab technicians	0.002	4
Health/recreation services	0.002	2
Legal support	0.001	3
Computer/computer equipment operators	0.001	2
Managers-executive	0.001	2
Computer systems/related professionals	0.001	1
Computer programmers	0.000	1
Total		924

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Table 22: Occupations for Top- and Bottom-Earning Workers with For-Profit Certificates in the Regression Sample

Males with For-Profit Certificates with Top Earnings > $29,000

Occupation	Weighted %	N
Skilled operatives	0.239	1
Transport operatives (not pilots)	0.205	4
Managers-midlevel	0.163	2
Mechanic, repairer, service technicians	0.120	3
Laborers (other than farm)	0.106	2
Financial services professionals	0.082	1
Clerical other	0.060	1
Medical services	0.025	1
Total		15

Females with For-Profit Certificates with Top Earnings > $29,000

Occupation	Weighted %	N
Personal services	0.245	2
Secretaries and receptionists	0.235	2
Skilled operatives	0.125	1
Managers-supervisory, office, other Administration	0.124	2
Sales/purchasing	0.069	1
Clerical other	0.067	1
Technical/professional workers, other	0.064	1
Managers-midlevel	0.049	1
Customer service	0.023	1
Total		12

Males with For-Profit Certificates with Bottom Earnings < $20,000

Occupation	Weighted %	N
Customer service	0.231	2
Medical licensed professionals	0.153	1
Clerical other	0.142	1
Cashiers, tellers, sales clerks	0.141	2
Sales/purchasing	0.099	1
Craftsmen	0.092	1
Skilled operatives	0.082	1
Laborers (other than farm)	0.060	1
Total		10

Females with For-Profit Certificates with Bottom Earnings < $20,000

Occupation	Weighted %	N
Laborers (other than farm)	0.508	2
Medical services	0.178	4
Personal services	0.078	3
Business/financial support services	0.050	2
Secretaries and receptionists	0.045	2
Clerical other	0.042	1
Sales/purchasing	0.027	2
Managers-midlevel	0.025	1
Cashiers, tellers, sales clerks	0.025	1
Medical licensed professionals	0.021	1
Total		19

Table 23: Means of Hours and Weeks Worked for Workers with For-Profit Credentials in the Regression Sample

Weighted Means for 1999 Year	Males	Females
Hours worked per week	43.21	35.52
Weeks worked per year	49.47	43.09
Number of observations	56	83

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Appendix

Table A1: First Stage of Multinomial Logit Selection Regression of Effects of For-Profit College Credential on *Ln* of Earnings -- Selection into No College Training, For-Profit Training and Non-Profit Training

Variables	No College		For-Profit College	
	b	*se*†	*b*	*se*†
Male	0.478***	[0.15]	-0.873***	[0.33]
Non-Asian minority	-0.116	[0.23]	0.177	[0.4]
Non-Asian minority male	-0.019	[0.4]	0.261	[0.56]
Age in months	-0.22	[0.37]	-0.423	[0.27]
Age in months squared	0	[0]	0.001	[0]
Standard HS diploma	-1.767***	[0.19]	-0.827**	[0.37]
Family income $15-<25k	-0.545	[0.35]	-0.013	[0.48]
Family income $25-<35k	-0.65**	[0.28]	-0.577	[0.42]
Family income $35-<50k	-1.265***	[0.31]	-0.889**	[0.42]
Family income $50k+	-1.406***	[0.3]	-1.461***	[0.45]
Family income missing	-0.685**	[0.28]	-0.707	[0.44]
Composite test score 40.01-45	-0.334	[0.27]	0.336	[0.39]
Composite test score 45.01-50	-0.281	[0.21]	0.25	[0.37]
Composite test score higher than 50	-1.082***	[0.25]	0.114	[0.35]
Composite test not completed	-0.542	[0.36]	0.63	[0.49]
Student has 3 or more siblings	0.629***	[0.21]	0.318	[0.3]
Student is second-born	0.067	[0.2]	0.048	[0.32]
Student is third-born	-0.203	[0.2]	0.513	[0.36]
Student is fourth- or later-born	-0.431	[0.28]	-0.056	[0.43]
Student's parents foreign-born	-0.705**	[0.29]	-0.216	[0.34]
Mother's education some college, Bachelor's degree or higher	-0.671***	[0.19]	-0.046	[0.33]
Public 2-year school tuition, in-state (in 2000 hundreds dollars)	0.015	[0.02]	0.015	[0.03]
Concentration of non-profit 2-year colleges in the county	-0.002	[0]	-0.016**	[0.01]
Observations	3,795		3,795	

Sources: U.S. Department of Education National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000); U.S. Department of Education National Center for Education Statistics, NELS:88/2000 Postsecondary Education Transcript Study: 2000 (PETS:2000)

Notes:
(1) Natural log of earnings computed by imputing 40-hour week, 52 weeks, 12 months, 2080 days.
(2) Natural log of earnings computed by using the reported hours per week and weeks per year from 1999.
(3) Natural log of earnings computed by using the reported hrs per week from 1999 but (standard) 52 weeks per year.
* p<0.05, ** p<0.01, *** p<0.001
The regression also includes census region dummies. Reference group is non-profit training. Reference categories are: female, White or Asian; no regular high school diploma; family income less than $15k; composite test score less than 40; students has fewer than 3 siblings; student is first-born; students' parents are native-born; mother's education no college. The statistics were generated by the complex survey weighting procedure using primary sampling unit, stratum and panel frequency weights. For-profit colleges include either 4-year or less-than-4-year private for-profit colleges. Excluded from the total sample are: respondents with credentials beyond Bachelor's degree; respondents with degrees from the specialized institutions; respondents who were still enrolled in 1999 and after; respondents who were self-employed, in school, military or taking care of the household.