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The Earnings Premium of Washington Higher Education

Gender Deficit in Earnings among Washington College Graduates

ERDC
Education Research & Data Center

AUTHORS

Greg Weeks

Education Research and Data Center

Toby Paterson

ABOUT THE ERDC

The research presented here uses data from the Education Research and Data Center, located in the Washington Office of Financial Management. ERDC works with partner agencies to conduct powerful analyses of learning that can help inform the decision making of Washington legislators, parents and education providers. ERDC's data system is a statewide longitudinal data system that includes de-identified data about people's preschool, educational and workforce experiences.

ADDRESS

Education Research and Data Center
106 11th Ave SW, Suite 2200
PO Box 43124
Olympia, WA 98504-3113

PHONE

360-902-0599

FAX

360-725-5174

EMAIL

erdc@ofm.wa.gov

Executive Summary

Directly comparing postgraduate earnings of workers with bachelor's degrees and those with only a high school diploma overstates the earnings gains of the college graduates. This bias, called selection bias, stems from the self-selection of high school graduates into college. This study explores the earnings premiums of postsecondary awards and degrees in Washington state, but corrects for this selection bias using a statistical method called propensity score matching. This method compares the earnings of those who received postsecondary awards and degrees with high school graduates who received no degree, but who were comparable in many other measurable ways.

Among other things, we discovered:

- While completing a postsecondary credential or degree generally lead to higher annual real earnings, females consistently earned less than men, regardless of educational achievement.
- The increase in earnings associated with each postsecondary degree type differs between males and females (with respect to their comparison groups).
- While the earnings gender deficit seems to grow with educational attainment, female earnings as a percentage of male earnings remains fairly static.
- The female earnings premium exceeds the male earnings premium for short- and long-term certificates, but was smaller than the male premium for the associate, bachelor's and graduate degrees.
- For most degree types, the female earnings premium decreased over time (with respect to the comparison group) while the male earnings premium did not.
- The gender deficit for workers who earned higher degrees grew over time, while the gender deficit for comparable high school graduates (who earned no degree) decreased.
- The hours worked by male and female bachelor's degree holders became more similar over the six years, even as their earnings diverged.
- For bachelor's degrees, the major categories in which females earned the most had a smallest percentage of females; the major categories with the highest percentage of females earned comparatively less.

Introduction

Evolving technology and challenging labor markets make informed education policy more important than ever. Continued prosperity depends on an educated and skilled workforce. Postsecondary education fosters economic growth and increases individual earnings by raising graduates' human capital, productivity and earnings. This paper estimates differences in earnings that are attributable to different postsecondary degrees and gender.

Method

Data sources

Data used in this report come from the data warehouse developed and maintained by the Education Research and Data Center (ERDC) housed in the Forecasting and Research division of the Washington State Office of Financial Management. The ERDC data warehouse combines data from the Office of Superintendent of Public Instruction (OSPI), the State Board for Community and Technical Colleges (SBCTC), the Student Achievement Council (WSAC), the Employment Security Department (ESD) and others. This allows ERDC to conduct longitudinal research that combines information from K-12, postsecondary and workforce sectors. The ERDC data resulted from a series of State Longitudinal Data System grants from the U.S. Department of Education and two Workforce Data Quality Initiative grants from the U.S. Department of Labor, which funded this research.

Propensity score matching

Directly comparing postgraduate earnings of workers with bachelor's degrees and those with only a high school diploma overstates the earnings gain of the college graduates. This bias, called selection bias, stems from the self-selection of high school graduates into postsecondary education. High school graduates who went on to earn a postsecondary credential or degree are distinguished from high school graduates who did not attend postsecondary education by having better average high school academic records, being more motivated, having a more developed work ethic and having a greater future orientation. To put it simply, this selection bias means that those who are most likely to pursue postsecondary degrees are already more likely to earn more in the workforce, even if they do not pursue a degree.

Workers with bachelor's degrees earn more than workers with only a high school diploma. This is due to two factors: the differences in personal characteristics and the differences in education. This study uses a technique called *propensity score matching*, which isolates the effect of college degrees on earnings from the effect of personal and background characteristics. It does this by closely matching postsecondary graduates with

workers with only a high school diploma, based on available measurable characteristics.[1] Another way to put it is this: Each student is given a score that predicts how likely they are to get a certain degree, based on their personal and background characteristics and their high school performance (their "propensity score"). Then the earnings of those who actually obtained the degree are compared with the earnings of those who were scored as *equally* likely to obtain the degree, but who received only a high school diploma.

The result is that the two groups are very similar in personal and background characteristics and high school performance. For example, students with a college degree with good high school GPAs are compared with students with only a high school diploma but who *also* have good high school GPAs. The propensity score and match are actually based on 13 personal characteristics for each high school graduate. Based on this analysis, each postsecondary graduate is closely matched to a worker with only a high school diploma, which allows us to estimate the extent to which the *college degree* affected earnings, as opposed to the dispositions and backgrounds of the students who received them.

Cohort

For both the "treatment" (workers with postsecondary credentials) and the matched comparison (otherwise similar workers with high school diplomas but no postsecondary experience) groups, the graduating classes are "stacked" to maximize the sample for each year of follow-up. This means that multiple high school graduate cohorts are included in each follow-up year reported in this study. See Appendix B for an explanation of the stacking procedure.

To be eligible for the study population, a worker must have completed high school or earned a postsecondary credential or degree. Workers who enrolled in a postsecondary program but did not graduate were excluded from the study population. There are between 57,000 and 62,000 eligible public high school graduates in each year (2005–15) covered by the study. Each of these workers has a varying number of follow-up earning years depending on their high school graduation year and their postsecondary credential. This translated to a total study population of 656,000 high school graduates, 467,000 (71 percent) of whom acquired a postsecondary credential or degree. That leaves 189,000 for the comparison group to be matched with the five groups of workers with postsecondary credential or degrees.

The analysis was also conducted separately by gender. Of the 320,000 male high school graduates in the study population, 218,000 (68 percent) earned a postsecondary credential or degree, leaving 102,000 in the high school-only comparison group. For females, there were 336,000 high school graduates, 249,000 (74 percent) of whom acquired a postsecondary certificate or degree, leaving 87,000 in the potential comparison group.

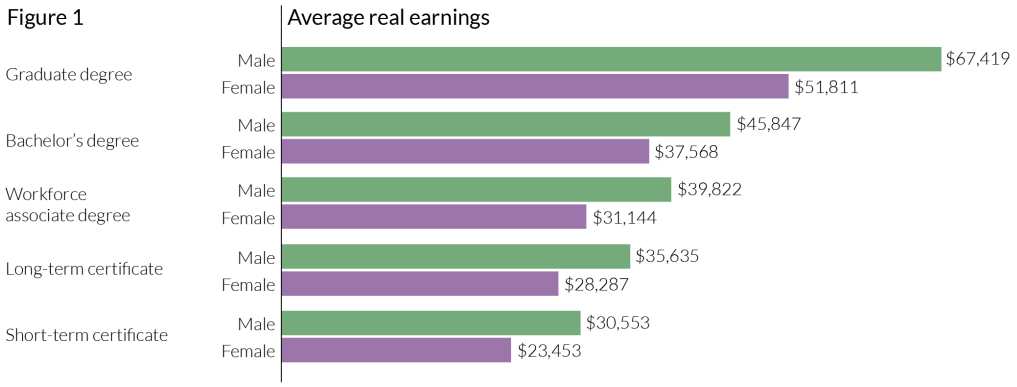
1 Although students may differ in unmeasured ways.

Findings

(1) While completing a postsecondary credential or degree generally leads to higher annual real earnings, females consistently earned less than men, regardless of educational achievement.

Higher degrees were associated with higher average real earnings; the longer and more advanced the degree, the higher the earnings. The workers with graduate degrees are the highest earners among those with certificates and degrees examined in this paper. However, for each degree type, female workers consistently had lower median earnings than male workers with the same degree or credential. See also Table B1 in Appendix B.

Figure 1



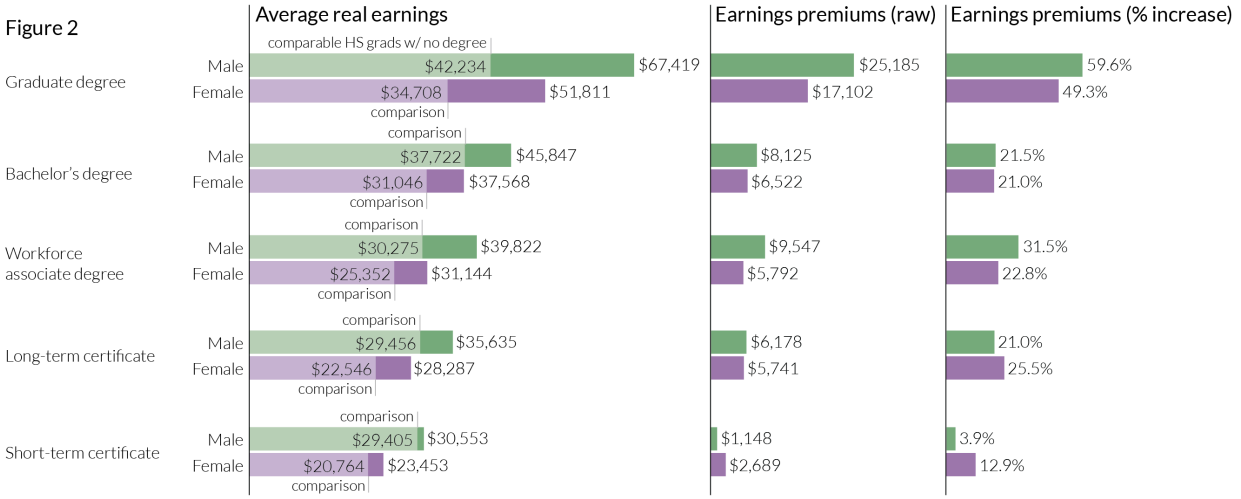
(2) The increase in earnings associated with each postsecondary degree type differs between male and females (with respect their comparison groups).

Workers who received each degree type were compared with high school students who did not receive any postsecondary degree, but who were comparable other measurable respects. This was determined through propensity score matching, as described earlier. In Figure 2 (see also Table B2 in Appendix B), we can see that the comparison groups for more advanced degree types earned more than the comparison groups for less advanced degree types. This implies that workers who do *not* receive any degree, but who have similar backgrounds and experiences as those who receive advanced degrees, earn more than their peers in the workforce.

Also, the difference in earnings between those who received postsecondary degrees and their comparison groups was higher for more advanced degrees than less advanced degrees. The middle column of Figure 2 displays these values. However, the upward trend was less evident when we considered the difference as a percentage of the earnings of the comparison group. The column on the far right of Figure 2 displays these percentages.

For example, male workers who received a bachelor's degree earned 21.5 percent more than comparable high school peers who earned no degree, whereas male workers who

Figure 2

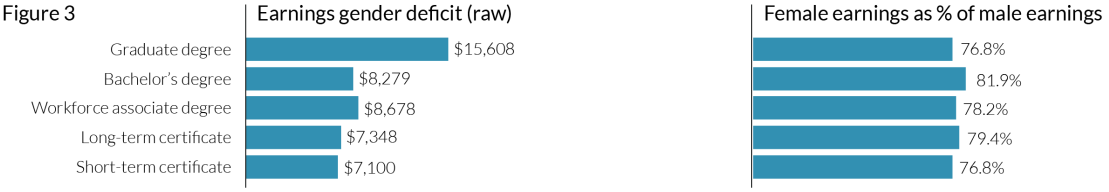


earned a workforce associate degree earned 31.5 percent more than their own comparison group. This does *not* mean that males who received a workforce associate earned more than males who received a bachelor's. However, *as a percentage of the earnings of their comparison group*, workforce associate degrees were associated with a larger increase in earnings than bachelor's degrees for male students.

(3) While the earnings gender deficit seems to grow with educational attainment, female earnings as a percentage of male earnings remain fairly static.

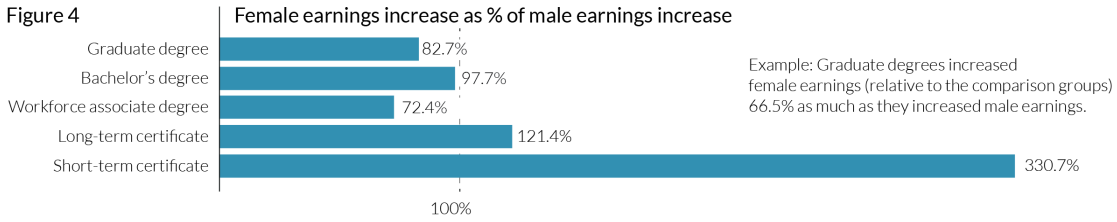
In Figure 3 (see also Table B3 in Appendix B), we can see that the differences between male and female earnings was larger for more advanced degrees than less advanced degrees. For example, the difference between male and female earnings for workers with graduate degrees is more than *twice* that of workers who receive short-term certificates. However, the female earnings as a percentage of male earnings was the same for both groups. This implies that the gender deficit remains relatively constant in percentage terms regardless of degree type, even as the raw difference in dollars increases for more advanced degrees.

Figure 3



(4) The female earnings premium exceed the male earnings premium for short- and long-term certificates, but was smaller than the male premium for the associate, bachelor's and graduate degrees.

Figure 4 (see also Table B4 in Appendix B) highlights the *ratio* of the increase in earnings for each degree type, by gender. For example, graduate degrees increased female earnings relative to their comparison group 66.5 percent as much as they increased male earnings. This percentage is larger for less advanced degrees; short-term certificates increased female earnings more than *three times* — 330.7 percent — as much as they increased male earnings. This is a noteworthy trend, but it is also important to contextualize this in terms of the raw value of those increases, seen in Figure 2.



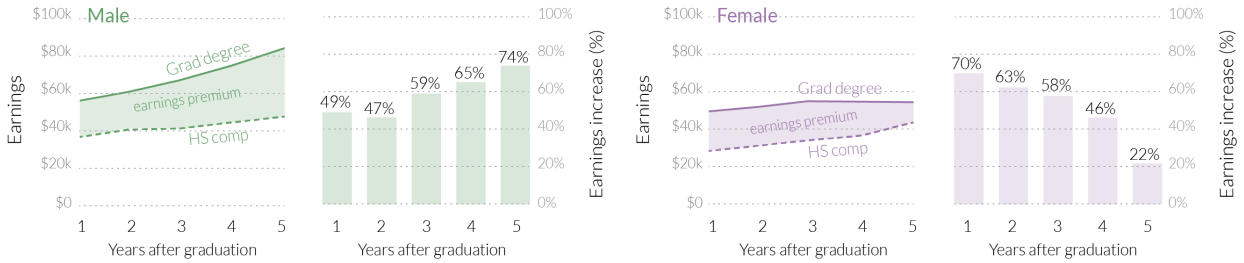
(5) For most degree types, female earnings premium decreased over time (with respect to the comparison group) while the male earnings premium did not diminish over time.

Figure 5 (see also Table B5 in Appendix B) shows post-graduation median annual real earnings for workers with each degree type and their matched comparison group of workers with only a high school diploma. The earnings premium for male workers who received a graduate degree increased over the five years following graduation, starting at 49 percent and ending at 74 percent. This means that the difference between their earnings and those of their matched comparison group grew over time (as a percentage of the earnings of the comparison group). The opposite was true for female workers with graduate degrees: Their earnings premium *decreased* over the five years following graduation (starting at 70 percent and ending at 22 percent).

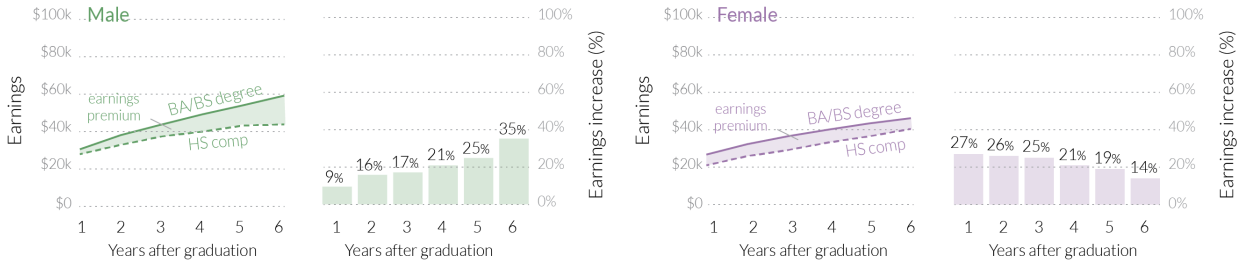
A similar pattern held true for bachelor's degrees. For workforce associate degrees, the earnings premiums for female workers started at 57 percent, but then *dipped below zero* by year seven while the earnings premium for male workers remained relatively stable over the same time period. Note this does not necessarily mean that earnings of female workers with a workforce associate degree decreases over time; their earnings actually remain fairly stable. Rather, the earnings of comparable female workers with only a high school diploma increased more dramatically over that same time. It is noteworthy that the earnings premium for females increased over time for none of the degree types examined.

Figure 5

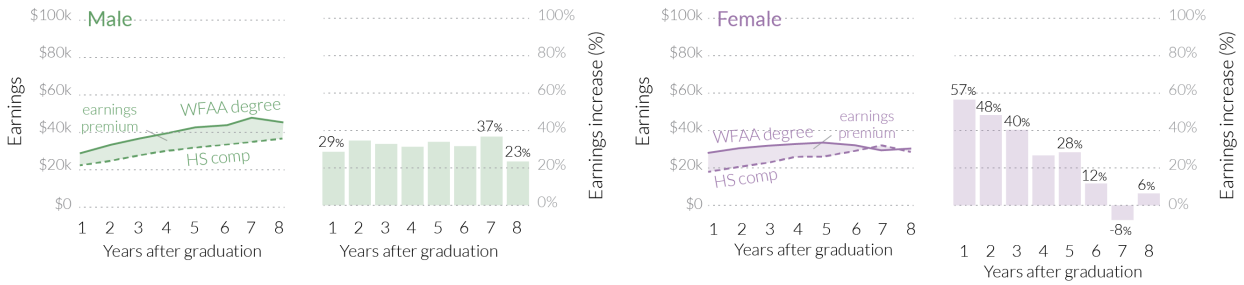
Graduate degree



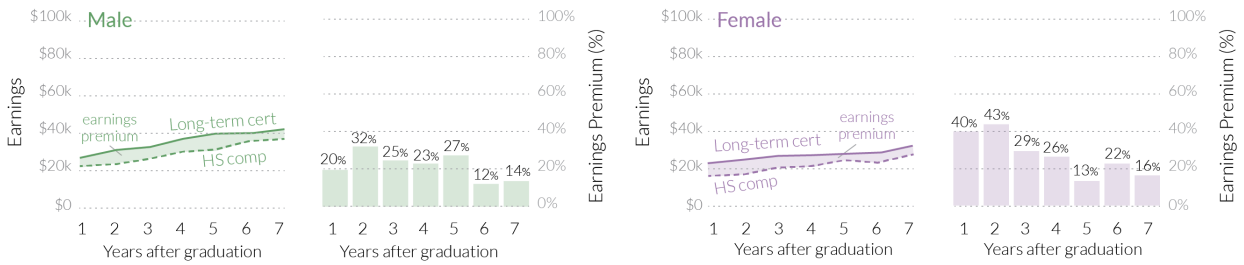
Bachelor's degree



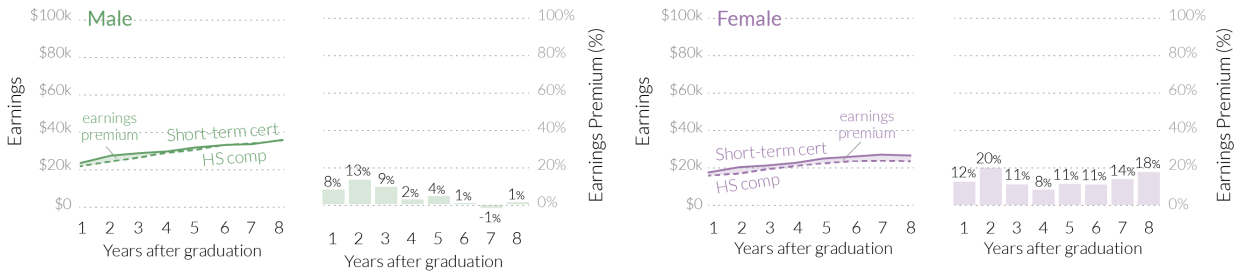
Workforce associate's degree



Long-term certificate



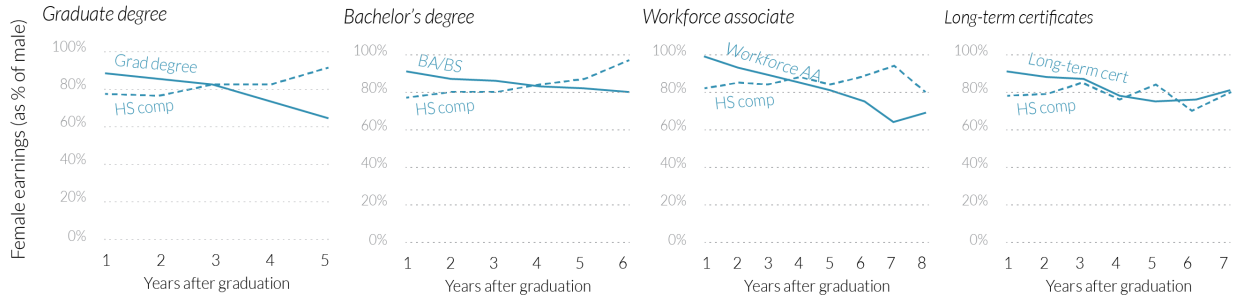
Short-term certificate



(6) The gender deficit[2] for workers who earned higher degrees grew over time while the gender deficit for comparable high school graduates (who earned no degree) decreased over time.

During the first year after graduation, female workers who received graduate degrees earned 87.7 percent of what their male counterparts earned. However, by the fifth year after graduation, they earned 64.0 percent of what their male counterparts earned. In contrast, comparable female high school graduates (who received no postsecondary degree) started at 76.9 percent of what their male counterparts earned and five years later earned 91.4 percent of what their male counterparts earned. A similar trend holds true for workers with bachelor's and workforce associate degrees, and less so for long-term certificates. (The percentage remained stable for workers with short-term certificates and their comparison group.) See Figure 6 and Table B6 in Appendix B.

Figure 6

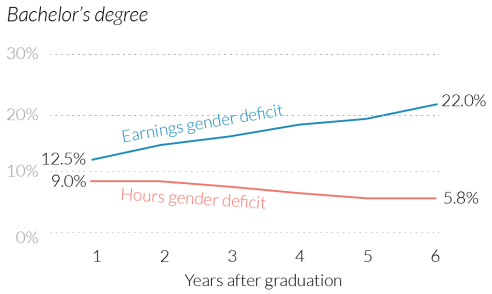


(7) The hours worked by male and female bachelor's degree holders became more similar over the six years, even as their earnings diverged.

Figure 7 (see also Table B7 in Appendix B) provides evidence against the idea that female workers earn less because they work fewer hours. While the earnings gender deficit for bachelor's degree holders increases over time, the *hours* gender deficit *decreases* over time. For example, female workers with a bachelor's degree earned 12.5 percent less than their male peers the first year after graduation and worked 9.0 percent fewer hours. However, by the fifth year, they earned 22.0 percent less than their male peers, but worked only 5.8 percent fewer hours. This implies that "hours worked" becomes less of an explanation for the earnings gender deficit as workers gain more experience in the workforce after graduation. The more years after graduation, the more likely male and female workers work similar number of hours, and the larger the earnings gender deficit.

2 Gender deficit refers to the difference between male and female median annual real earnings for a given credential or degree.

Figure 7



(8) For bachelor's degrees, the major categories in which females earned the most had a smallest percentage of females; the major categories with the highest percentage of females earned comparatively less.

Figure 8 (see also Table B8 in Appendix B) explores another possible explanation for the observed gender deficit. It presents findings from a PSM analysis of workers with bachelor's degrees in 18 majors based on two-digit Classification of Instructional Programs (CIP) codes (a taxonomy that allows accurate tracking of fields of study across institutions). Eighteen of the majors had a sufficient sample to permit a PSM-based analysis. The major categories which had the lowest percentage of females — engineering & tech, and computer science — were also the ones that had the highest female earnings. In contrast, the majors with the highest percentage of females had comparatively lower earnings.

For example, 85.5 percent of workers who majored in the health professions were female (the highest percentage of the 18 major categories included in this study), and together all workers earned an average of $48,263. This is 61 percent of what females in the highest earning major category (computer science) earned, where only 19.2 percent of workers were female. In both major categories, however, women earned more than men (on average).

Figure 8

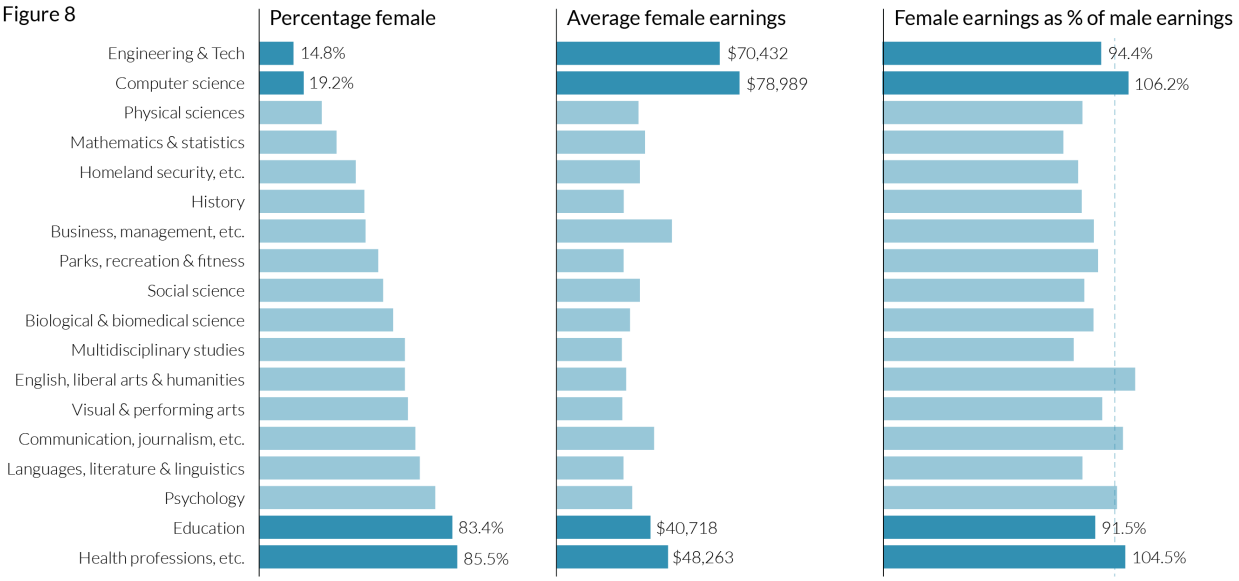
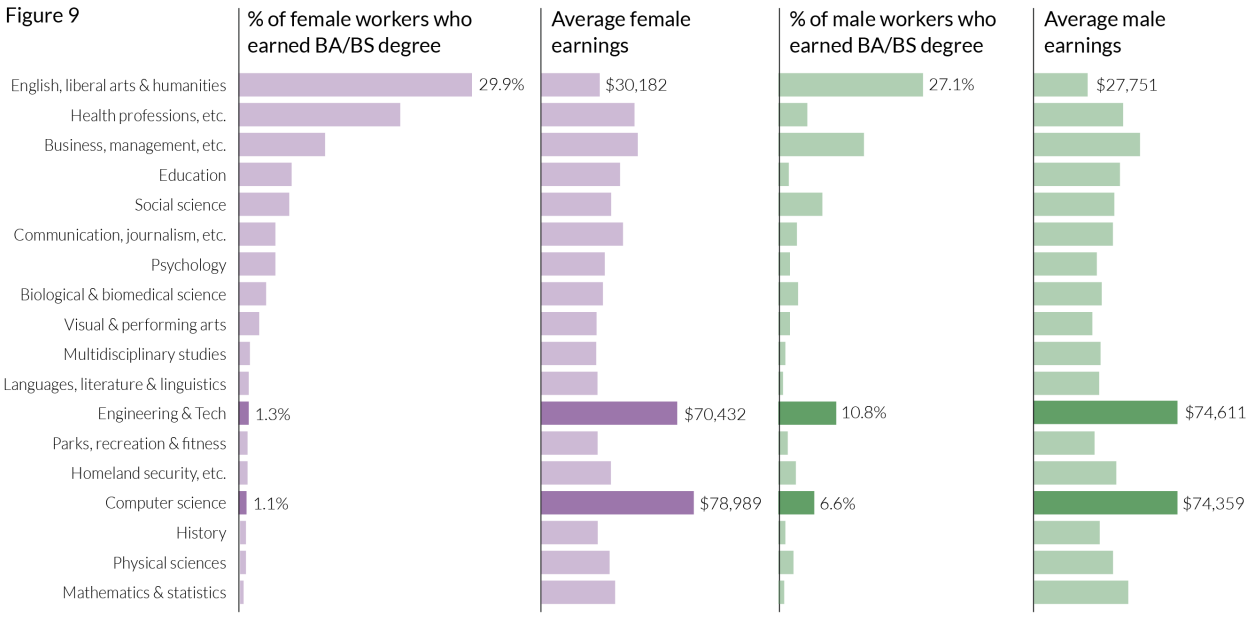


Figure 9 (see also Table B8 in Appendix B) shows the percentage of male and female workers included in this study who pursued each major. We can see that while a combined 2.4 percent of female workers pursued the two most-lucrative majors included, 17.4 percent of male workers pursued the two most-lucrative majors. That represents more than seven times more males than females (percentage-wise) pursuing the two most-lucrative majors. Figure 8 further highlights that, although the gender deficit is larger for some majors than others, women earn comparably to (or more than) men in the most-lucrative majors. However, we see large disparities in the percentage of men and women who pursue those majors.

A more detailed analysis of similar trends — although confined to STEM majors — was explored in a recent ERDC report. That study also found that students from STEM majors with the most females earned less than students from STEM majors with the fewest females, regardless of gender. These results hint that some of the observed gender deficit may relate to the majors selected by female workers. More research needs to be conducted to understand the sociology of how students select majors, and how and why those selections differ between male and female students.

Figure 9



Appendices

Appendix A: Propensity Score Matching Methodology

Data

Data used in this report come from the data warehouse developed and maintained by the Education Research and Data Center (ERDC) housed in the Forecasting and Research division of the Washington State Office of Financial Management. The ERDC data are the result of a series of State Longitudinal Data System grants from the U.S. Department of Education and two Workforce Data Quality Initiative grants from the U.S. Department of Labor, which funded this research. The ERDC data warehouse combines data from numerous Washington state education and workforce related sources, including these Washington state agencies:

- The Office of Superintendent of Public Instruction (OSPI)
- The State Board for Community and Technical Colleges (SBCTC)
- The Washington Student Achievement Council
- The Office of Financial Management, including the Public Centralized Higher Education Enrollment System (PCHEES) data
- The Department of Early Learning[3]
- The Department of Licensing
- The Employment Security Department

Using strict confidentiality standards, the ERDC conducts "identity matching" using administrative records from each agency. This allows researchers to link K-12 data, early learning data, postsecondary data and workforce data to individuals across the data warehouse. The current research starts with K-12 data and uses OSPI data for Washington state public high school graduates from 2005 through 2015. Three postsecondary data sources are also used: SBCTC, public four-year institutions and the National Student Clearinghouse (NSC). (Those who attended a postsecondary institution but did not achieve a degree from a Washington state public institution are dropped from the analysis.)

High school students represented in the database who did not attend any postsecondary institution compose the potential comparison group. Indicators of postsecondary attendance may include a student's presence in one of the ERDC postsecondary data sources (SBCTC or PCHEES) or the NSC data. For the purposes of this paper, only high school graduates are included as comparison group members. The public high school graduates who attended public postsecondary institutions covered by the ERDC data compose the analysis or treatment groups for this paper.

3 Will be part of the Department of Children, Youth, and Families effective July 1, 2018.

The outcomes for this analysis are annual earnings from the state unemployment insurance (UI) program, often called the wage record file. The file includes an entry for each worker by employer covered by UI in the state by quarter. Earnings are summed for each worker for all jobs in every quarter, and then summed again over the four quarters that compose the calendar year. Each worker has earnings data for each year they worked in covered employment in Washington state from 2005 through 2015. These earnings are converted to real, constant dollar earnings using the Consumer Price Index for urban wage earners and clerical workers (CPI-W). The annual price indices are from the www.bls.gov website. The latest full year with CPI data, 2016, was used as the base year. Earnings data are calibrated by follow-up year based on the year of high school graduation for both the potential comparison groups and the postsecondary treatment groups. This measure of earnings includes virtually all employees in Washington state, but excludes earnings from self-employment and out-of-state work of all types. This measure should be considered a partial lower-bound estimate.

Methodology

A strength of this study is that it includes high school students who did not experience any postsecondary education. This is an ideal comparison pool for an observational study of postsecondary educational achievement using PSM methods. Treatment and comparison group members should have the same distributions of observed and unobserved attributes and come from similar economic environments to reduce selection bias (Heckman, Ichimura, Todd, 1997, p. 606). To a considerable extent, the high school-only group had the same primary and secondary educational experiences and opportunities as the bachelor's degree group. These similarities reduce the differences between the two groups and enhance the likelihood that the PSM technique corrects for selection bias.

While the availability of data from the high school years is a strength of this study, a lack of data about family incomes and parents' educational levels are the most significant weaknesses in the available data. The variable indicating whether a student used the free and reduced price meals program is our best available indicator of low income status, so that is included in all propensity score estimates. In addition, the students' GPA is included as a proxy for many unmeasurable factors, including support from home, ability, work ethic and others. GPA is a highly significant independent variable in all 10 logistic regressions (five credentials, two genders) used to estimate propensity scores in this analysis.

The "high school only" students identified above composed the pool from which the matched comparison groups are selected. For each of the five credentials, students with that credential are matched using PSM methodology to high school-only workers without that credential, separated by gender. The dependent variable in the logistic regression is a binary indicator of whether the students had graduated with the postsecondary credential. The independent variables were selected to meet two somewhat competing objectives: a robust estimate of the dependent variable (propensity score) and substantial areas of common support (overlapping propensity score values

in the comparison and treatment groups). All the PSM logistic regressions used these independent variables to meet these goals:

- High school GPA
- Whether the student received free or reduced priced meals in high school
- The unemployment rate for the graduation year for the county in which the graduating high school is located
- Whether the student was listed as homeless in school records
- Whether the student attended three or more high schools in Washington
- Whether the student was listed as disabled in school records
- The student race was listed as white
- The size of the labor force in the year of graduation for the county in which the graduating high school is located
- The high school is located in an Eastern Washington rural county
- The high school is located in an Eastern Washington urban county
- The high school is located in an Western Washington rural county
- Whether the high school graduation year coincided with the Great Recession

The logistic regression estimates the probability of completing the postsecondary degree or certificate. This probability is the propensity score. The propensity scores of the treatment group (credential graduates) are matched with those from the comparison group. Comparison group members are eligible for multiple matches, so the match is considered with replacement.

Further, students were matched to the high school comparison group based on high school graduation year. For example, a person who graduated from high school in 2007 and earned an associate degree in 2009 would have a revised first follow-up year using earnings data from 2010, the third year after high school graduation. Similarly, the matched comparison group member would also include earnings data for the third year after high school graduation.

For workers with a bachelor's degree, the two-digit CIP code for their area of study was also analyzed. Of the 31 distinct two-digit CIP codes (32 for males), 18 had sufficient sample to permit a PSM analysis of post-graduation earnings. For these 18 CIP categories, a separate PSM analysis was conducted by gender. The methodology was identical to that used for the individual credentials and degrees described above. The results of this analysis are presented in Tables 8 and 9 above as well as in the associated discussion.

Data stacking

For each graduation year, each worker is eligible for a limited number of follow-up years of earnings. For example, a 2009 graduate has only six years between high school graduation and the end of the earnings data in 2015 while a 2005 graduate has the full 10 years of follow-up eligibility. Table B1 below illustrates how the data were stacked to maximize sample sizes for each follow-up year. This example is for a two-year degree such as an associate degree. The data are stacked separately for each observation, first by year of high school graduation and then by year of award. To follow the first row, a 2005 high school graduate took two years to complete an associate degree. Her first follow-up year would be her earnings from 2008. Her second follow-up year would be her earnings from 2009. This progresses until follow-up year eight, which are her earnings from 2015.

Table A1. Stacking process.

	Earnings data year							
High School Grad Year	2008	2009	2010	2011	2012	2013	2014	2015
2005	Follow-up year 1	Follow-up year 2	Follow-up year 3	Follow-up year 4	Follow-up year 5	Follow-up year 6	Follow-up year 7	Follow-up year 8
2006		Follow-up year 1	Follow-up year 2	Follow-up year 3	Follow-up year 4	Follow-up year 5	Follow-up year 6	Follow-up year 7
2007			Follow-up year 1	Follow-up year 2	Follow-up year 3	Follow-up year 4	Follow-up year 5	Follow-up year 6
2008				Follow-up year 1	Follow-up year 2	Follow-up year 3	Follow-up year 4	Follow-up year 5
2009					Follow-up year 1	Follow-up year 2	Follow-up year 3	Follow-up year 4
2010						Follow-up year 1	Follow-up year 2	Follow-up year 3
2011							Follow-up year 1	Follow-up year 2
2012								Follow-up year 1

The same process applies to other high school graduation years and other sample members. The diagonals are stacked together to represent the total samples of earnings by follow-up year. The median earnings for these follow-up years compose the reported earnings in the findings section of the paper. Median earnings are presented instead of average earnings throughout to limit the influence of extreme values. Also, the median is the better measure of central tendency for earnings because the distribution of earnings is typically positively skewed.

Appendix B. Tabular versions of figures.

Table B1

	Average earnings over follow-up period	
	Female	Male
Graduate degrees	$51,811	$67,419
Bachelor's degrees	$37,568	$45,847
Workforce associate degrees	$31,144	$39,822
Long-term certificates	$28,287	$35,635
Short-term certificates	$23,453	$30,553

Table B2a

	Female		Male	
	Grads	Comparison	Grads	Comparison
Graduate degrees	$51,811	$34,708	$67,419	$42,234
Bachelor's degrees	$37,568	$31,046	$45,847	$37,722
Workforce associate degrees	$31,144	$25,352	$39,822	$30,275
Long-term certificates	$28,287	$22,546	$35,635	$29,456
Short-term certificates	$23,453	$20,764	$30,553	$29,405

Table B2b

	Female		Male	
	$ earnings premium	% earnings premium	$ earnings premium	% earnings premium
Graduate degrees	$17,102	49.3%	$25,185	59.6%
Bachelor's degrees	$6,522	21.0%	$8,125	21.5%
Workforce associate degrees	$5,792	22.8%	$9,547	31.5%
Long-term certificates	$5,741	25.5%	$6,178	21.0%
Short-term certificates	$2,689	13.0%	$1,148	3.9%

Table B3

	Gender deficit ($)	Female earnings as % of male earnings
Graduate degrees	$15,608	76.8%
Bachelor's degrees	$8,279	81.9%
Workforce associate degrees	$8,677	78.2%
Long-term certificates	$7,348	79.4%
Short-term certificates	$7,100	76.8%

Table B4

	Female earnings increase as % of male earnings increase (average over follow-up period)
Graduate degrees	82.7%
Bachelor's degrees	97.7%
Workforce associate degrees	72.4%
Long-term certificates	121.4%
Short-term certificates	330.7%

Table B5

	Earnings by follow-up year				% earnings increase by follow-up year	
	Female		Male			
Follow- up years	Grads	Comparison	Grads	Comparison	Female	Male
Graduate degrees						
1	$48,230	$28,318	$54,953	$36,833	70.3%	49.2%
2	$50,623	$31,152	$59,738	$40,786	62.5%	46.5%
3	$53,659	$33,986	$65,720	$41,291	57.9%	59.2%
4	$53,413	$36,498	$73,648	$44,566	46.3%	65.3%
5	$53,130	$43,588	$83,038	$47,695	21.9%	74.1%
Bachelor's degrees						
1	$26,763	$21,005	$30,584	$27,965	27.4%	9.4%
2	$32,328	$25,693	$38,160	$32,969	25.8%	15.7%
3	$36,581	$29,211	$43,809	$37,433	25.2%	17.0%
4	$40,155	$33,290	$49,273	$40,800	20.6%	20.8%
5	$43,378	$36,605	$53,989	$43,288	18.5%	24.7%
6	$46,205	$40,472	$59,270	$43,878	14.2%	35.1%

Follow- up years	Earnings by follow-up year				% earnings increase by follow-up year	
	Female		Male			
	Grads	Comparison	Grads	Comparison	Female	Male
Workforce associate degrees						
1	$28,065	$17,928	$28,846	$22,435	56.5%	28.6%
2	$30,551	$20,595	$33,439	$24,851	48.3%	34.6%
3	$31,893	$22,713	$36,773	$27,682	40.4%	32.8%
4	$32,835	$25,908	$39,650	$30,194	26.7%	31.3%
5	$33,574	$26,142	$42,724	$31,903	28.4%	33.9%
6	$32,172	$28,801	$43,899	$33,355	11.7%	31.6%
7	$29,638	$32,130	$47,864	$35,017	-7.8%	36.7%
8	$30,426	$28,600	$45,378	$36,762	6.4%	23.4%
Long-term certificates						
1	$23,960	$17,160	$26,836	$22,435	39.6%	19.6%
2	$25,915	$18,072	$31,077	$23,528	43.4%	32.1%
3	$27,897	$21,602	$32,636	$26,173	29.1%	24.7%
4	$28,252	$22,396	$37,022	$30,100	26.1%	23.0%
5	$28,950	$25,608	$39,780	$31,236	13.1%	27.4%
6	$29,717	$24,279	$40,089	$35,746	22.4%	12.1%
7	$33,316	$28,704	$42,002	$36,978	16.1%	13.6%
Short-term certificates						
1	$17,746	$15,806	$23,501	$21,816	12.3%	7.7%
2	$20,328	$16,980	$27,526	$24,382	19.7%	12.9%
3	$21,265	$19,173	$28,845	$26,439	10.9%	9.1%
4	$22,645	$20,952	$29,809	$29,120	8.1%	2.4%
5	$24,960	$22,437	$31,875	$30,600	11.2%	4.2%
6	$26,062	$23,519	$33,279	$33,112	10.8%	0.5%
7	$27,053	$23,778	$33,611	$34,098	13.8%	-1.4%
8	$27,564	$23,463	$35,979	$35,669	17.5%	0.9%

Table B6

Follow-up year	Grads	Comparison
Graduate degrees		
1	88%	77%
2	85%	76%
3	82%	82%
4	73%	82%
5	64%	91%
Bachelor's degrees		
1	87.50%	75.10%
2	84.70%	77.90%
3	83.50%	78.00%
4	81.50%	81.60%
5	80.30%	84.60%
6	78.00%	92.20%
Workforce associate degrees		
1	97.30%	79.90%
2	91.40%	82.90%
3	86.70%	82.00%
4	82.80%	85.80%
5	78.60%	81.90%
6	73.30%	86.30%
7	61.90%	91.80%
8	67.10%	77.80%

Follow-up year	Grads	Comparison
Long-term certificates		
1	89.30%	76.50%
2	83.40%	76.80%
3	85.50%	82.50%
4	76.30%	74.40%
5	72.80%	82.00%
6	74.10%	67.90%
7	79.30%	77.60%
Short-term certificates		
1	75.50%	72.50%
2	73.90%	69.60%
3	73.70%	72.50%
4	76.00%	72.00%
5	78.30%	73.30%
6	78.30%	71.00%
7	80.50%	69.70%
8	76.60%	65.80%

Table B7

Bachelor's degree holders

	Hours gender deficit	Earnings gender deficit
1	9.0%	12.5%
2	8.4%	15.3%
3	7.5%	16.5%
4	6.7%	18.5%
5	5.9%	19.7%
6	5.8%	22.0%

Table B8

Major category (2-digit CIP code)	Average female earnings	Average male earnings	Average gender deficit	Percent female
Communication, journalism & related (09)	$ 42,273	$ 40,848	$ (1,424)	67.4%
Computer science (11)	$ 78,989	$ 74,359	$ (4,629)	19.2%
Education (13)	$ 40,718	$ 44,501	$ 5,030	83.4%
Engineering & tech (14, 15)	$ 70,432	$ 74,611	$ 1,159	14.8%
Foreign languages, literature & linguistics (16)	$ 29,026	$ 33,748	$ 4,722	69.3%
English, liberal arts, humanities (23, 24)	$ 30,182	$ 27,751	$ (646)	62.9%
Mathematics & statistics (27)	$ 38,158	$ 48,856	$ 10,699	33.4%
Biological & biomedical sciences (26)	$ 31,857	$ 35,089	$ 3,232	57.9%
Multidisciplinary studies (30)	$ 28,343	$ 34,478	$ 6,136	62.9%
Parks, recreation, fitness (31)	$ 29,078	$ 31,360	$ 2,281	51.4%
Physical sciences (40)	$ 35,343	$ 40,940	$ 5,597	27.0%
Psychology (42)	$ 32,797	$ 32,498	$ 1,828	76.0%
Homeland security, protective services (43)	$ 35,978	$ 42,606	$ 6,628	41.7%
Social sciences (45)	$ 36,118	$ 41,600	$ 5,482	53.5%
Visual & performing arts (50)	$ 28,532	$ 30,176	$ 1,645	64.2%
Health professions & related (51)	$ 48,263	$ 46,174	$ (2,088)	85.5%
Business, management, related (52)	$ 49,936	$ 54,918	$ 4,982	45.9%
History (54)	$ 29,159	$ 34,036	$ 4,878	45.4%
All B.A.	$ 37,568	$ 45,847	$ 8,279	56.3%

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