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Gender and Educational Variations in Earnings Premiums of Occupational Credentials

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Jeounghee Kim, MSW, Ph.D.*
Associate Professor, School of Social Work
Rutgers, the State University of New Jersey

Sangeeta Chatterji, Ph.D.,
Postdoctoral Fellow
Bloomberg School of Public Health
Johns Hopkins University



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Center for Women and Work
Rutgers, The State University of New Jersey
School of Management and Labor Relations
94 Rockefeller Road
Piscataway, NJ 08854

www.cww.rutgers.edu

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GENDER AND EDUCATIONAL VARIATIONS

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Jeounghee Kim, MSW, Ph.D.*

Associate Professor

School of Social Work

Rutgers, the State University of New Jersey

jeoukim@sww.rutgers.edu

Sangeeta Chatterji, Ph.D.

Postdoctoral Fellow

Johns Hopkins Bloomberg School of Public Health

sangeetachatterji@gmail.com

*Corresponding author

GENDER AND EDUCATIONAL VARIATIONS

Abstract

Occupational credentials such as professional licenses and certifications are known to generate significant earnings premiums. Based on this, the federal workforce development policy focuses on industry-recognized occupational credentials for less-educated adults to help them obtain family-supporting jobs without having to invest in a postsecondary degree. This study used the Survey of Income and Program Participation's wave 13 data to examine if the earnings premiums significantly vary by gender and education. Series of regression analyses revealed that a significant earnings premium of license-holding was largely concentrated on women rather than on men. Moreover, for women, the earnings premium was mostly concentrated on those with at least an associate degree while for men they were concentrated on those below an associate degree level. These findings point out that the evidence in the extant literature masks important gender and educational variations in the earnings premium of occupational credentials.

Keywords: License, Certification, Occupational Credential, Female middle-skilled employees,
Survey of Income and Program Participation

GENDER AND EDUCATIONAL VARIATIONS

Gender and Educational Variations in Earnings Premiums of Occupational Credentials

In the recent decades, occupational credentials such as licenses and certifications have become as prevalent and in demand as educational credentials, and in 2012 nearly 22 percent of U.S. adults (46.3 million) was reported to hold a license or a certification (Ewart & Kominski, 2014). Licenses and certifications are embedded in trade, industry, and professional associations outside the formal education system and signal that workers possess the required skills and abilities for a particular occupation. A license is legally required to practice in certain occupations (e.g. teaching, cosmetology, etc.) and is typically issued by state governments based on a degree requirement or the completion of a state-administered exam. A certification, on the other hand, is not a legal mandate to practice an occupation and usually issued by professional or industry organizations to individuals who are assessed or documented to have achieved the required level of skill and knowledge. Compared to a license, it generally requires less time and financial investment for individuals with the requisite knowledge to acquire a certification.

In fact, both licenses and certifications, compared to a 4-year college degree, are considered to take less time and financial investment but can produce earnings gains as big as or even greater than some college degrees. A high school graduate who is a licensed electrician, for example, may make a similar or even greater earning than some college graduates who majored in Humanity. This is a particularly good news for low-income adults without a postsecondary degree who look for family-supporting jobs but cannot afford to invest in a college degree because of time and financial constraints.

These credentials are not distributed evenly across education and gender. As occupations differ in their skill requirements, the prevalence of licensing and certification differs by occupation, and as occupations differ in their educational requirements, the prevalence of

GENDER AND EDUCATIONAL VARIATIONS

credentialing also differs by education. In 2015, for example, only 8% of workers with less than a high school diploma had a certification or license as compared to 52% of workers with an advanced degree (U.S. Bureau of Labor Statistics, 2016). Licensing, in particular, is more prevalent in occupations that require a postsecondary education such as healthcare and law as compared to those that don't. Prevalence of occupational credentials also varies greatly by gender particularly among those without a postsecondary degree because of occupational gender segregation in the sub-baccalaureate labor market (Hegewisch & Hartmann, 2014).

Most middle-skill occupations in the sub-baccalaureate labor market (that do not require a postsecondary education) are predominantly occupied by men (e.g., electrical and electronics repairers, telecommunications equipment installers and repairers, aircraft mechanics and service technicians, law enforcement officials, and commercial pilots). Middle-skill jobs prevalent among women are in health and service industries (e.g., radiation therapists, dental hygienists, registered nurses, diagnostic medical sonographers, radiologic technicians, respiratory therapists)(Torpey, 2013), and they typically require at least an associate degree. This suggests that occupational credentials for adults without any postsecondary degree are more likely to benefit men than women. Women's chances of securing well-paying middle-skilled jobs through occupational credentials are limited without a two-year associate or higher degree (or switch to male dominant occupations). While occupational credentials are known to be associated with a 6.5-20% increases in earnings (e.g., Kleiner, 2000; Kleiner & Park, 2010, Kleiner & Krueger, 2010), less is known about gender differentials in earnings premiums associated with occupational credentials. This study fills the gap in the literature and found that earnings premiums of license-holding were in fact largely concentrated on women rather than on men and that for women the credential related earnings premiums were mostly concentrated on those with

GENDER AND EDUCATIONAL VARIATIONS

at least an associate degree while for men they were largely concentrated on those below an associate degree level.

Literature Review

Earnings Premiums of Occupational Credentials: Explanation

Literature provides multiple explanations as to why occupational credentials would be associated with increased earnings. Licenses and certifications can increase earnings by efficiently signaling to potential employers that candidates have occupation-specific skills, commitment, and values (Kleiner & Krueger, 2010). Earnings premiums can also come from the government's restrictions on credential-based entry, that is, by limiting the supply of qualified applicants that can enter a particular occupation (Albert, 2017). This entrance regulation is understood as part of monopoly rents that help generate earnings premiums for the credential holders (Kleiner & Krueger, 2010). The premiums can also be explained by actual, genuine increase in human capital developed through training and certification process. They may be associated with systemic differences in both unobservable and observable characteristics of workers with and without a credential (e.g., motivation or self-selection) (Albert, 2017; Pizzola & Tabarrok, 2017) or even with the power of advocacy by occupational organizations to preserve the premiums.

Empirical Evidence

Several studies have found that occupational credentials lead to an increase in earnings by 6.5%-20% for workers across different educational levels (Gittleman, Klee & Kleiner, 2015). Kleiner & Krueger (2013), who offered the first national analysis of the prevalence and effects of occupational licensing using a national Gallup survey, reported that occupational licensing was associated with 15% higher wages for licensed workers after controlling for education,

GENDER AND EDUCATIONAL VARIATIONS

experience, gender, union affiliation, and sector of employment. The result was nearly equivalent to the 13-14% wage premiums related to union affiliation and surprisingly robust regardless of occupational controls. In 2013, Kleiner and Krueger used a random digit dialing telephone survey and found that occupational licensing was associated with an 18% wage premium while certification was related to a much lower premium of 8%. In the study by Albert (2017) who used the Educational Longitudinal Study of Young Adults, occupational certifications were associated with 18.3% increases in annual earnings even after controlling for background characteristics (race/ethnicity, English use at home, etc.), motivation, efforts and persistence, career stability, number of weeks worked, average weekly work hours, and occupation. Gittleman, Klee & Kleiner (2015), who separated licensed workers from certified workers using data from the wave 13 topical module of the Survey of Income and Program Participation, found that licensed workers earned approximately 6.2 % higher wages on average than unlicensed and uncertified workers. Similarly, certified workers earned 7.3% higher wages on average than unlicensed and uncertified workers (Gittleman, Klee & Kleiner, 2015). In general, studies discussed above tested the effects of occupational credentials on earnings or wages with OLS regression models or series of nested regression models using a sample of workers with occupational controls. They commonly found the results robust regardless of occupational controls (i.e., no occupational controls, 2- or 3-digit occupation fixed effects) (e.g., Albert, 2017; Kleiner, 2010; Gittleman, Klee, & Kleiner, 2015).

A few studies that focused on specific occupations - massage therapists, funeral service directors, cosmetologists and barbers, dentists and dental hygienist - also documented similar ranges of earnings premiums associated with occupational credential holding. Using 10 years of data from the American Community Survey for 2000-2009, Thornton and Timmons (2013)

GENDER AND EDUCATIONAL VARIATIONS

showed that changes in licensing legislation of massage therapists in 10 states were associated with an earnings premium of 15% after controlling for demographic characteristics. Pizzola & Tabarrok (2017) made use of the natural experiment of occupational de-licensing in the funeral services industry in Colorado in 1983 by comparing wages in Colorado's funeral services industry to wages in the funeral services industry in the rest of the United States using Difference-in-Difference (DD) and Difference-in-Difference-in-Difference (DDD) models. They found that occupational licensing brought about a wage premium of 11-12% in the funeral services industry. Kleiner and Park (2010) also showed that state licensing regulations can increase dental hygienists' wages by about 10% by allowing them to work independently of dentists.

Variations by Gender and Education

Although evidence implies that the earnings premiums of occupational licenses and certifications would be distributed unevenly across gender as well as education, few studies have examined them empirically. Despite women's advancement in the labor market, occupational gender segregation has been persistent and is most pronounced for workers without a bachelor's degree (Hegewisch & Hartmann, 2014). As briefly stated above, middle-skilled women with occupational credentials tend to work in allied healthcare service, basic office work, and cosmetology while their male counterparts work in more lucrative fields as mechanics, construction, electronics, transportation, HVAC, and refrigeration (Carnevale, Rose & Hanson, 2013). To the best of our knowledge, no research has investigated whether this existing gender segregation in occupations is reflected in a gender variation in earnings premium of occupational licenses and certifications (Blau, & Kahn, 2017).

Similarly, there seems little evidence on educational variations in earnings premiums of

GENDER AND EDUCATIONAL VARIATIONS

occupational credentials. According to Ewert and Kominski (2014), the median weekly earnings of adults with less than a high school diploma who held an occupational credential was about 25% higher than the earnings of adults with the same level of education who did not obtain any credential (\$620 vs. \$498). College graduates with the credentials, on the other hand, earned only 4% more than those without credentials (\$1,296 vs. \$1,242) (Bureau of Labor Statistics, 2017)¹. Findings from a multivariate analysis, however, suggest that the wage premium of license is actually greater for occupations that require a higher education (Kleiner, 2000). Low education occupations, for example, such as cosmetologists and barbers receive a smaller wage premium (or no wage gains at all) than dentists, whose were estimated to reap more than 30% increase in hourly wages due to a license (Kleiner, 2000). The present study furthers this line of inquiry to assess the extent to which the earnings premiums of credentials differ by education for each gender.

Methods

Data and Sample

This study used the wave 13 core and topical module data files of the 2008 Survey of Income and Program Participation (SIPP). SIPP is a nationally representative longitudinal survey of individuals aged 15 years and older, conducted by the U.S. Census Bureau. The core data file contains information on the survey respondents' income, employment history, program participation, and demographics (e.g., citizenship, nativity, language proficiency). The topical module of wave 13 contains detailed information on the professional certifications, licenses, and educational certificates, along with demographic information that referred to the year 2012. The core and topical module data files were merged to include all demographic variables important

¹ Table 6 at <https://www.bls.gov/cps/certifications-and-licenses.htm#highlights>)

GENDER AND EDUCATIONAL VARIATIONS

for labor market outcomes. SIPP is indeed the first national survey to collect detailed information on credential attainment. Its large sample makes it possible to compare the relative advantages of occupational credentials across diverse demographic groups including the lowest educated.

Nevertheless, one drawback of the data file is that the topical module does not include information on the date or year that participants received their occupational credentials, making it difficult to take advantage of its longitudinal design in estimating the labor market effects on the credentials. Due to this limitation, we resort to cross-sectional analyses to answer our research questions. We assume that the occupational credential was obtained before the participant secured her current job. Another important limitation is that the data files do not permit the linkage of an individuals' occupational credential with their current job. Although the topical module data file has information on the credential requirement of respondents' jobs, there is no way to ascertain which job, among multiple job holders, required the occupational credential (a very small percentage of SIPP held multiple jobs). To address this issue, individuals who held multiple jobs were excluded from this study. Following previous studies that confined their samples to adults with jobs and earnings, this study included workers aged 25-64 years, with valid information about their most recent license or certification. We further placed many restrictions on our sample in order to estimate the effects of credentials on monthly earnings while avoiding potential measurement errors in all the variables as much as possible. For the sample restriction, we excluded individuals who were (1) former armed force or married but spouses were absent, (2) whose gross pay and hours of work were imputed; (3) in farming, fishing, and forestry industries; (6) business owners; (7) who reported irregular hours of work; and (8) who reported positive work hours but no earnings (about n=300). We derived at 14,852 employees, 7,369 women, and 7,483 men, for our final analytic sample.

GENDER AND EDUCATIONAL VARIATIONS

Variables and Measures

The main independent variable of this study was license and certification. Because SIPP topical module variable of occupational credential does not distinguish license from certification, we adopted the approach used by Gittleman, Klee, & Kleiner (2014) and assumed that the credential was a license if it was issued by a federal, state, or local government and a certification, if it was issued by a private agency². The dependent variable in this study was monthly gross earnings, log-transformed to correct for this skewness. Unlike most previous studies reviewed above that used hourly wage rates, we chose the monthly gross earnings as the dependent variable, while controlling for weekly hours of work that would affect the amount of earning. Because SIPP provides hourly wage rates only for hourly wage earners, we would have to estimate hourly wage rates for salary earners, which would introduce unknown errors.

Control variables included a variety of demographic and employment characteristics that could potentially influence an individual's monthly earnings. These include four race/ethnicity categories (White, African American, Hispanics, and other races), six levels of educational attainment (less than high school or GED, high school graduate, some college course but no degree, an associate degree, bachelor's degree, master's degree or more), three marital status categories (currently married, previously married, and never married), number of children (none, one, two, and at least three), immigration and citizenship status (U.S.-born citizen, naturalized citizen, and noncitizen), English proficiency (native, fluent, and not fluent), eleven occupational categories (professional, management, professional, service, protective, food, building, personal, sales, office, production, and transportation), regions of residence (Northeast, Midwest, west, and

² This approach may bring in measurement errors if workers have both a license and a certification (Gittleman, Klee, & Kleiner, 2014).

GENDER AND EDUCATIONAL VARIATIONS

south), and union membership.

Statistical Analyses

This study examined the effects of license and certification holding on employee's monthly gross earnings and how the effects vary by gender and educational attainment. The analysis first observes the prevalence of license and certification by educational attainment, women, and men separately, and then compares the demographic characteristics of those with and without a credential to detect any differences in the demographic characteristics between the groups that may explain the earnings premiums of a credential.

A series of Ordinary Least Squared regression (OLS) regression analyses were conducted to answer the research questions following previous studies by Kleiner (2000, 2010, 2013) and Albert (2017). The first OLS regression model tested the earnings premiums of license and certification with the basic human capital model that included educational attainment, gender, age, union membership, weekly hours of work, and eleven occupational categories. This *Base Model* was extended in an *Interaction Model* that added two interaction terms - female by license and female by certification - to examine if the effects of credential holding on earnings differ by gender. The last model, termed a *Full Model*, added to the *Interaction Model* other demographic characteristics such as race/ethnicity, immigration, and citizenship status, English proficiency, work-limiting disabilities, marital status, number of children, and region of residence that may affect earnings. The *Full Model* was intended to examine the extent to which each gender's earnings premiums of licenses and certifications can be explained away by important demographic characteristics that some previous research did not include.

The second research question, educational variations in earnings premiums, was tested for men and women separately to control for occupations segregated by gender especially for

GENDER AND EDUCATIONAL VARIATIONS

those without a postsecondary degree. The same series of *Base*, *Interaction*, and *Full Models* were repeated for each gender, and the *Interaction Model* was used to examine if and how much the earnings premium of license and certification vary by educational attainment for each gender.

Findings

Prevalence of Credential Holding

Table 1 indicates that 19.45% and 7.96% of our analytic sample held a license and a certification in 2012. In general, the percentage holding a license or a certification increased with more years of education. While only 6.25% of adults with less than a high school education or a GED held a license, more than 38% of adults with at least a master's degree had a license. Nearly 84% and 67% of the sample reported that their licenses and certifications were required for their jobs.

[Insert Table 1 About Here]

Overall a higher percentage of women than men held a license (23.11% vs. 16.10%), although at a high school or some college level slightly more men than women had a license. The gender gap was obvious among adults with at least an associate or higher degree, and the gender gap increases with an increase in education. Among those with a bachelor's degree, for example, the percentage point difference between women and men was 12 (29.11% vs. 16.84%), and for those with at least a master's degree, the difference increased to almost 17 (46.31% for women vs. 29.43% for men). This finding was consistent with the findings of the SIPP analyses reported by Ewert & Kominski (2014). As for certification, slightly higher percentages of men than women (7.04% for women vs. 8.79% for men) had the credential across all educational levels, except at the masters' degree or above.

Prevalent occupations for each gender were examined although not presented in a table.

GENDER AND EDUCATIONAL VARIATIONS

Women with any occupational credentials across all educations predominantly held health care and educational occupations; health care service jobs were more popular at the sub-baccalaureate level and teaching professionals were more prevalent among women with at least a bachelor's degree. Men with credentials appeared to hold more variety of jobs across all educations. The occupations ranged from those in transportation, logistics, and machinery, mechanic/technician, teachers, to lawyers and physicians. At the sub-baccalaureate level particularly, popular occupations for women included teacher assistants, nursing, psychiatric and home health aides, medical assistants, and other healthcare support occupations, cooks, maids, and housekeeping cleaners, and personal and home care aides. The compatible occupations for men included cooks, janitors, and building cleaners, ground maintenance workers, first-line supervisors/managers or retail sales workers, carpenters, construction laborers, driver or sales workers and truck drivers, and laborers and freight, stock, and material movers. As briefly mentioned above, occupational gender segregation appears to be clearly pronounced among adults without a postsecondary degree.

Sample Characteristics

Compared to adults without any credential or a certification, those with a license were represented by some of the most advantageous sociodemographic characteristics for both men and women: largest shares of White, U.S.-born citizens, native English speakers, in professional occupations, and with the highest median monthly earnings. More than 74% of women and 77% of men with a license were White, compared to 63-4% of those without any credential. And 90% of both genders with a license were U.S. born citizens while the percentages were 84% for women and 80% for men among those without any credential. Most of all, as high as 60.4% of licensed women had a professional occupation, a much higher than 30% for licensed men. As

GENDER AND EDUCATIONAL VARIATIONS

Table 2 presents, the distributions of demographic characteristics of adults with a certification fell in between those of adults without any credential and with a license.

[Insert Table 2 About Here]

There were clear differences in the median monthly earnings by credential holding for both genders. Women without any credential had a median of \$2,500, much lower than \$3,333 and \$3,750 for those with a certification and a license, respectively. Similarly, men without any credential had a median of \$3,464, again much lower than the medians of \$4,583 and \$4,175 for men with a license and a certification, respectively.

Gender Variations in Earnings Premiums of Credentials

Before testing for the gender and credential interaction, the *Base Model* tested the earnings premiums of credentials for the entire analytic sample first controlling for educational attainment, age, union membership, weekly hours of work, and eleven occupational categories. As shown in the second column of Table 3, license- and certification-holding was associated with increases in earnings by 5.9% ($p < 0.001$) and 10.3% ($p < 0.001$) respectively controlling for gender, education, union membership, weekly work hours, age, and occupations. Similar to findings from previous studies, union membership was associated with about a 16% increase in earnings for all, and this effect was larger than the effects of occupational credentials. The *Base Model* explained about 54.65% in the variance of log monthly gross earnings.

[Insert Table 3 About Here]

The *Interaction Model* presented in the third column of Table 3 shows that the above finding from the *Base Model* masks an important gender variation in the effects of licenses and certifications on monthly earnings. License-holding was associated with a 3.4% ($p < 0.05$) increase in monthly earnings for men, and for women, the increase was significantly more at

GENDER AND EDUCATIONAL VARIATIONS

8.1%. Certification-holding was associated with an 8.6% increase in monthly earnings for men and a 12.4% increase for women, but the gender difference was insignificant.

When the *Full Model* introduced additional demographic controls for age, race/ethnicity, marital status, number of children, immigration/citizenship, English proficiency, and disability, and the region of residence, license-related earnings premium for men was reduced to 2.3% and became non-significant. For women, the premiums associated with license-holding, however, was significantly greater and sizable at 7.0% ($p < 0.05$). The premiums related to certification-holding shrank to 6.8% ($p < .001$) for men and not significantly different for women. These findings, when considered along with those from the *Base Model*, indicate that the significant earnings premiums of license-holding were in fact largely concentrated on women rather than on men. This was not necessarily the case for certification-holding.

Educational Variations in Earnings Premiums of Credentials for Each Gender

The *Base Models* ran separately for women and men confirmed the findings from the *Interaction Model* discussed above that for women, license holding was associated with a 9.6% increase ($p < .001$) and certification holding with a 13.1% increase ($p < .001$) in earnings. For men, license-holding was not significantly associated with an earnings increase but certification was associated with 7.9% in earnings increase ($p < .001$).

[Insert Table 4 About Here]

The results of *Interaction* clearly show that earnings premium related to license-holding varied by educational attainment. For women, holding a license at an Associate degree level was associated with as much as a 25.2% increase in monthly earnings ($p < .001$) and at a bachelor's degree level, with an 11.2% increase ($p < .10$). In the *Full Model* that controlled for demographic characteristics, the premiums remained nearly the same at 24.7% for associate degree holders

GENDER AND EDUCATIONAL VARIATIONS

and 11.8% for bachelor's degree holders. For women license holding was not associated with significant earnings premiums at other educational levels. Interestingly, certification-holding was associated with a large earnings premium (a 17.2% increase in earning) only for those with at least a master's degree. An important finding from these models was that for women earnings premiums related to credential holding was mostly concentrated on those with a postsecondary degree (i.e., at the associate degrees or beyond), as speculated above in the review of prior studies.

On the contrary, for men license-holding was associated with significant earnings increases only for those with up to an associate degree. The premium was 17.7% (=23.4%-5.7%) for those without a high school degree; 8.6% for those with a high school degree; 5% with some college coursework without a degree, and 10.8% with an associate degree. License holding did not have any significant earnings premium for men with a 4-year college degree or more in the *Interaction Model*. When demographic characteristics were added to the *Full Model*, the earnings premium associated with a license remained significant only for men with less than a high school diploma (a 14% increase in earning) and for those with an associate degree (a 10% increase in earning). Similar results were found for certification-holding among men; certification holding was significantly related to earnings premiums for men only at a high school graduation level. The overall observation was that the earnings premium associated with credential holding for men was concentrated on those without a four-year college degree, particularly on those without a high school diploma and those with an associate degree.

Conclusions & Implications

This study confirmed findings from previous studies that occupational credentials were associated with earnings premiums. It also extended the literature by revealing that significant

GENDER AND EDUCATIONAL VARIATIONS

earnings premiums of license-holding were in fact largely concentrated on women rather than on men. This was, however, not necessarily the case for certification-holding. The other important finding of this study was that for women earnings premiums related to credential-holding was mostly concentrated on those with at least an associate degree while for men they were largely concentrated on those below an associate degree level. In case of certification, significant earnings premium existed only for those with at least a master's degree for women and only at a high school degree for men. These findings were from multivariate analyses that controlled for eleven major occupational categories, union membership, weekly work hours, and a range of demographic factors including age, race/ethnicity, marital status, number of children, immigration/citizenship status, English proficiency, disability, and the region of residence. They were, in general, in line with the descriptive findings that women were more likely to hold licenses than men and that men without a postsecondary education were more likely to obtain a license whereas women with a postsecondary education were more likely to have a license.

Findings of this study have important policy implications. The fact the significant educational variations in the economic effects of occupational credentials for each gender suggests that the federal workforce development policy that promotes occupational credentialing for adults without a postsecondary education is more likely to be effective for men than for women. Federal workforce programs need different programs for men and women if both genders are to benefit from occupational credentials. These programs either need to devise strategies to enable women to enter male-dominated occupations at the sub-baccalaureate level or they must aid women in obtaining (at least) an associate degree if they are to benefit from obtaining an occupational credential.

The results of this study need to be considered in light of its limitations. Examining the net

GENDER AND EDUCATIONAL VARIATIONS

effect of certification or license is challenging because people of certain attributes and characteristics are selected into the credential holding group and credentials are more common in some occupations than others. The analysis could not tease out the effects of selection into credentials as it could not control for unobservable personal attributes and characteristics that might have influenced selection. Another limitation of this study was that because SIPP data files did not permit linking individuals' occupational credential with their current job, the extent to which their earnings were due to their occupational credentials was unclear. In the coming years, the SIPP can enable the linkage of occupational credentials and current jobs and collect more detailed information on credentials to aid future research on this important topic.

GENDER AND EDUCATIONAL VARIATIONS

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GENDER AND EDUCATIONAL VARIATIONS

Table 1

Weighted Percentages of Holding License and Certification, by Gender and Education

	All (N=14,852)		Women (N=7,369)		Men (N=7,483)	
	License	Certification	License	Certification	License	Certification
All	19.45	7.96	23.11	7.04	16.10	8.79
< High school	6.25	5.16	7.06	2.02	5.74	4.54
High school	9.54	5.32	8.62	3.29	10.27	6.93
Some college	17.45	9.37	16.83	7.93	18.01	10.68
Associate degree	25.32	11.48	29.60	9.37	20.00	14.11
Bachelor's degree	22.98	7.85	29.11	7.61	16.84	8.10
At least Master	38.15	10.38	46.31	10.49	29.43	10.26
Required	83.65	67.15	85.68	66.62	80.99	67.54

Note: 21.62% of the credential holders reported that their jobs require the credentials.

GENDER AND EDUCATIONAL VARIATIONS

Table 2

Weighted Percentage of Demographic Characteristics of the Sample, by Gender

	Women (N=7,369)			Men (N=7,483)		
	None	License	Certification	None	License	Certification
Race						
White	64.03	74.01	73.21	63.49	77.34	74.86
African American	11.87	11.39	11.25	9.42	6.82	8.06
Hispanic	16.17	7.84	7.52	19.67	9.08	11.43
Others	7.93	6.76	8.01	7.42	6.76	5.65
Work-limiting conditions	4.69	3.30	5.56	3.95	3.64	2.78
Citizen						
U.S born citizen	83.94	90.17	88.66	79.76	91.19	88.48
Naturalized citizen	8.47	7.39	6.01	8.31	5.84	7.50
Non-citizen	7.60	2.44	5.33	11.93	2.98	4.02
English Proficiency						
Native	80.75	89.87	84.82	77.28	89.02	84.45
Fluent	13.81	9.26	13.71	16.25	9.95	14.41
Not fluent	5.43	0.87	1.47	6.47	1.03	1.14
Marital Status						
Married	59.16	65.35	59.99	63.06	66.51	70.74
Previously married	19.52	18.32	21.25	13.99	14.22	11.79
Never married	21.32	16.33	18.76	22.95	19.27	17.47
Number of children						
None	55.88	53.01	56.16	55.35	58.23	51.76
One	20.30	20.30	18.62	17.55	18.05	19.69
Two	15.54	18.37	16.86	16.90	16.12	17.86
Three or more	8.28	8.32	8.36	10.20	7.61	10.69
Occupation						
Management	16.70	9.68	17.97	15.14	15.68	14.41
Professional	17.54	60.40	39.77	17.80	30.38	24.95
Service	3.07	8.13	9.71	0.22	1.66	0.62
Protective	0.95	1.08	0.33	2.29	7.98	1.65
Food	5.56	2.03	2.49	4.00	1.58	1.28
Building	4.46	0.31	1.33	4.79	2.54	3.18
Personal care	3.89	4.84	6.36	0.89	1.61	1.22
Sales	11.66	3.13	6.70	9.77	5.40	5.13
Office	27.55	8.82	13.06	8.91	3.71	4.43
Construction	0.15	0.15	0.00	8.47	8.11	12.69
Installation etc.	0.30	0.15	0.29	6.89	5.78	13.22
Production	5.96	0.23	1.21	11.63	4.37	8.81
Transportation	2.20	1.06	0.77	9.21	11.19	8.42
Age (Mean)	45.13	45.00	44.36	43.90	44.80	43.62
Hours of work (hour, Mean)	37.80	38.83	38.88	41.70	44.02	43.10
Monthly earning (\$, Median)	2,500	3,750	3,333	3,464	4,583	4,175

GENDER AND EDUCATIONAL VARIATIONS

Table 3

OLS Regression of Earnings Premium of Occupational Credential, Women and Men

	All: Women and Men		
	Base Model (1)	Interaction Model (2)	Full Model (3)
License	0.059***	0.034*	0.023
Certification	0.103***	0.086***	0.068**
(None)			
Female	-0.213***	-0.225***	-0.216***
License × Female		0.047*	0.047*
Certification × Female		0.038	0.053+
<High school	-0.768***	-0.768***	-0.690***
High school	-0.608***	-0.606***	-0.583***
Some college	-0.509***	-0.508***	-0.488***
Associate	-0.397***	-0.397***	-0.390***
Bachelor	-0.199***	-0.199***	-0.196***
(Master or more)			
Union	0.161***	0.161***	0.140***
Weekly work hours	1.223***	1.223**	1.200***
Age	0.006***	0.006***	0.006***
(White)			
African American			-0.079***
Hispanic			-0.075***
Others			0.000
(Native born citizen)			
Naturalized citizen			0.005
Noncitizen			-0.019
(Native English)			
Fluent English			-0.043*
Poor English			-0.205***
Work limiting disability			-0.274
11 occupational categories	Yes	Yes	Yes
Other demographic characteristics	No	No	Yes
Constant	3.845***	3.846***	4.017***
<i>N</i>	14,852	1,4852	1,4852
<i>R</i> ²	0.5465	0.5467	0.5659

* $p < .05$; $p < .01$; $p < .001$

GENDER AND EDUCATIONAL VARIATIONS

Table 4

OLS Regression of Earnings Premium of Occupational Credential for Women and Men, by Education

	Women			Men		
	Base Model (1)	Interaction Model (2)	Full Model (3)	Base Model (1)	Interaction Model (2)	Full Model (3)
License	0.096***	0.034	0.034	0.024	-0.057	-0.045
Certification	0.131***	0.164**	0.172**	0.079***	-0.017	-0.045
(None)						
<High school	-0.754***	-0.787***	-0.714***	-0.771***	-0.082***	-0.727***
High school	-0.610***	-0.630***	-0.606***	-0.602***	-0.649***	-0.613***
Some college	-0.524***	-0.542***	-0.524***	-0.502***	-0.537***	-0.508***
Associate	-0.400***	-0.475***	-0.478***	-0.401***	-0.454***	-0.438***
Bachelor	-0.223***	-0.259***	-0.261***	-0.177***	-0.196***	-0.187***
(Master or more)						
License ×						
<High school		0.109	0.082		0.234**	0.188*
High school		0.013	-0.011		0.143*	0.086
Some college		0.020	0.021		0.107*	0.079
Associate		0.218***	0.213***		0.165*	0.150*
Bachelor		0.078+	0.084+		0.002	-0.137
Certification ×						
<High school		0.024	0.042		0.142	0.122
High school		-0.171+	-0.166+		0.203*	0.207*
Some college		-0.072	-0.088		0.068	0.076
Associate		-0.022	-0.032		0.110	0.123
Bachelor		0.022	0.010		0.091	0.098
Union	0.114***	0.119***	0.090***	0.209***	0.209***	0.183***
Weekly work hours	1.188***	0.120***	1.189***	1.287***	1.282***	1.187***
11 occupational categories	Yes	Yes	Yes	Yes	Yes	Yes
Demographic characteristics	No	No	Yes	No	No	Yes
Constant	3.813***	3.829***	3.930***	3.550***	3.604***	4.049***
<i>N</i>	7,369	7,369	7,369	7,483	7,483	7,483
<i>R</i> ²	0.5627	0.5644	0.5783	0.4890	0.4904	0.5211

* Demographic characteristics: Age, race/ethnicity, marital status, number of children, immigration/citizenship status, English proficiency, disability, and the region of residence.

* Occupational categories: Professional, management, service, protective, food, building, personal, sales, office, production, transportation were controlled for in the model.

p*<.05; *p*<.01; ****p*<.001