Expanded Measures of Education and their Labor Market Outcomes

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INTRODUCTION

The well-established link between educational attainment and socioeconomic outcomes is based on social science research using data sources that effectively measure traditional educational credentials that result in a degree, including high school diplomas, 2- and 4- year degrees, and advanced degrees. However, with the expanding and changing landscape of the education system and labor market, alternatives to traditional degrees have emerged with labor market value that must be considered when examining social and economic outcomes and inequality therein. Policy makers and researchers have begun to recognize the labor market value of alternative credentials, including educational certificates and professional certifications and licenses. President Obama's call for all adults to obtain at least one year of post-secondary education reflects this growing recognition. However, there is a dearth of relevant data that comprehensively captures information about these alternative credentials.

This paper analyzes data from the Survey of Income and Program Participation (SIPP), which collects data on educational attainment and receipt of vocational certificates, to examine differences by sex, age, race and Hispanic origin in combinations of conventional educational attainment and vocational certificates, as well as how these different combinations of attainment affect labor market outcomes and inequality between demographic groups. This paper also utilizes recent data from the Re-Engineered SIPP field test (SIPP-EHC), which contains new measures of educational certificates and professional certifications and state and industry licenses, to examine the relationship between educational attainment, alternative credentials, and labor market outcomes. These analyses will demonstrate the value of expanded measures of attainment beyond conventional measures of education from most surveys.

BACKGROUND

There has been growth in sub-baccalaureate degrees at both the vocational certificate and associate's degree level. Only 1.8 percent of the adult population reported a vocational certificate as their highest level of educational attainment in 1984 compared to 10.9 percent in 2009 (Ewert 2012). Some research suggests that men and women have equal shares of educational certificates but that such alternative credentials are more prevalent among Blacks and possibly Hispanics than among Whites and Asians (Carnevale et al. 2012). Professional certifications and licenses are also consequential alternative credentials with labor market that require examination.

Accurately measuring these alternative credentials matters for several reasons. Time spent on education and training develops human capital, or skills and competencies, which can increase productivity and returns in the labor market. Furthermore, sub-baccalaureate education can develop vocational skills that provide access to higher paying occupations (Grubb 1993). Therefore, growth in the number of alternative credentials, including educational certificates and professional certifications and licenses warrants an examination of not only their prevalence in the adult population but also their relationship with labor market outcomes. To the extent that rates of receipt and returns to these credentials vary by subgroups, alternative credentials may contribute to socioeconomic inequality in the U.S.

Previous research has found a relationship between sub-baccalaureate degrees and labor market outcomes. Grubb (1999) and Crissey and Bauman (2010) found positive effects of sub-baccalaureate degrees on labor market outcomes, but Crissey and Bauman (2010) also showed that the effect of vocational certificates and associate's degrees on earnings depend on field of training and whether people work in an occupation related to their field of training.

Vocational certificates represent one type of alternative credential with possible labor market value, but professional certifications and licenses may also benefit recipients in the labor market.[1] Although limited research has examined these credentials, there is evidence of positive effects on labor market outcomes. Kleiner and Krueger (2010) found that 29 percent of the workforce is required to hold a license, and that licenses are associated with higher wages. In additional research, they found that licenses have a larger effect on earnings than professional certifications (Kleiner and Krueger 2011).

Kerckhoff and Bell (1998) concluded there is a need for more systematic data collection on the topic. They argued that limited research on educational certificates stems partly from inadequate data. Kleiner and Krueger (2011) also note the lack of data on licensing and certification. This paper uses data from the SIPP and SIPP-EHC to examine the complex relationship between conventional educational attainment, alternative credentials, demographic characteristics, and labor market outcomes.

DATA AND METHODS

I use data from the 2008 SIPP Panel and the 2012 SIPP-EHC Field Test. The 2008 SIPP Panel is a nationally representative longitudinal survey of the U.S. that began in 2008 with follow-up interviews every four months. The SIPP includes a measure of conventional educational attainment as well as separate items that capture information on the receipt of vocational certificates and field of degree, thereby enabling an examination of the combination of educational credentials.[2] I use data from Wave 2 of the 2008 Panel, collected between May and August 2008, since this contains the Education and Training History topical module with information on educational attainment and field of degree.

[1] For working definitions of types of alternative credentials developed by the GEMEnA interagency working group, see Appendix A.
[2] See Appendix B for the exact questions and response categories.

The SIPP-EHC is the product of the U.S. Census Bureau's current re-engineering of SIPP to reduce burden on respondents, reduce program costs, and improve accuracy and timeliness. It shifts from the current every-four-month data collection schedule of traditional SIPP to an annual data collection in the SIPP-EHC. There have been annual field tests of the SIPP-EHC since 2010, with the first panel expected to commence in 2014. Beginning with the 2012 field test, the SIPP-EHC includes a measure of conventional educational attainment as well as two additional questions about alternative credentials. In these two questions, the SIPP-EHC collects information on receipt of educational certificates and professional certifications and licenses. An interagency working group tasked with improving federal data collection on alternative credentials developed these measures.[3] The SIPP-EHC measure of educational certificates and the SIPP measure of vocational certificates are related but not identical.

In this paper, I use data from the 2012 SIPP-EHC field test since it is the first wave to include questions on alternative credentials. The 2012 SIPP-EHC field test oversampled high poverty strata and was geographically matched to the SIPP 2008 Panel, and there are not currently available weights. Therefore, estimates from SIPP-EHC field tests are not nationally representative. The majority of respondents in the 2012 SIPP-EHC field test were Wave 2 respondents first interviewed during the 2011 SIPP-EHC field test, but the 2012 sample was supplemented with some additional Wave 1 respondents interviewed for the first time in 2012. With Wave 1 and Wave 2 combined, the 2012 SIPP-EHC sample covers about 20 states and includes approximately 9,000 people.

This paper will first present a typology of combinations of conventional educational attainment and alternative credentials and examine this distribution of educational credentials by

[3] For more information on Interagency Working Group on Expanded Measures of Enrollment and Attainment, please visit http://nces.ed.gov/surveys/gemena/

sex, age, race and Hispanic origin using SIPP and SIPP-EHC data. Weighted crosstabulations using SIPP data will document who has various combinations of conventional educational attainment and vocational certificates. Unweighted crosstabulations using SIPP-EHC data will show the prevalence of educational certificates, professional certifications, and licenses in the high poverty sample.

The paper will then use SIPP data to concentrate on how these combinations of conventional attainment and vocational certificates pay off in the labor market and whether the pay off varies by demographic group. The outcome variables highlighted in this paper include any employment in the last four months, full-time employment in the last four months, and monthly earnings. This examination of the payoff to combinations of educational credentials will begin by exploring variation in the outcome variables by combinations of credentials for different subgroups. The paper will then use a modeling framework in order to isolate how combinations of credentials affect outcomes net of other relevant factors. I analyze log monthly earnings using linear regression and the dichotomous measures of any and full-time employment using logistic regression. I log monthly earnings to account for the right skewness of the earnings distribution. These parametric models provide the opportunity to examine interactions between vocational certificates and demographic variables to determine whether the effects of vocational certificates operate differently for various subgroups of the U.S. population[4].

RESULTS

Descriptive results

Who holds vocational certificates? Table 1 shows the percentage of adults with a vocational certificate within educational attainment, sex, race, Hispanic origin, age, and nativity

[4] I use SAS procedures and replicate weights to calculate variances that accurately reflect the complex survey design.

groups.[5] Sixteen percent of people age 18 and over had vocational certificates.[6] People of all levels of conventional educational attainment earned vocational certificates. They were especially common among those whose highest levels of educational attainment were high school completion, some college but no degree, or an associate's degree. Overall, men were more likely than women to hold vocational certificates, but this sex difference was driven by a greater percentage of men than women holding vocational certificates at the associate's and bachelor's degree levels of educational attainment. A greater percentage of Blacks than Whites held vocational certificates overall and at every education level.[7] A smaller proportion of Hispanics held vocational certificates than did Whites and Blacks. Up until the age 45 to 54 category, a greater percentage of a given age group held vocational certificates than the age group directly younger. Overall, a greater percentage of native born than foreign born held certificates. However, at the bachelor's and advanced degree levels of educational attainment, more foreign born than native born held vocational certificates. This finding might reflect that some foreign born who were highly educated in their countries of origin pursue certificates in the U.S. in order to work in some fields.

Table 2 shows the median monthly earnings of full-time workers for combinations of educational credentials by sex, race, and Hispanic origin. Median earnings were higher for those with a vocational certificate than for those without among people whose highest level of educational attainment was less than high school, high school completion, and some college but

[5] The data are subject to error arising from a variety of sources. For information on sampling and nonsampling error, see http://www.census.gov/sipp/sourceac/S&A08_W1toW6%28S&A-13%29.pdf.
[6] The standard error for the percent with a vocational certificate is 0.18.
[7] Race categories include both Hispanics and non-Hispanics.

no degree.[8] The difference was especially large at the less than high school level where median earnings were about $2,800 with a vocational certificate and about $1,900 without one.

Table 3 shows employment rates (as measured by at least one month of any employment within the last four months) for combinations of educational credentials by demographic characteristics. For those with an associate's degree or lower, there were higher employment rates for those with vocational certificates than for those without vocational certificates at a given level.[9] The difference was greater for women than men for those with some college but no degree and lower levels of educational attainment. For those with less than high school completion, the difference in employment rates for those with and without a vocational certificate was larger for Blacks than Hispanics.[10] The difference for both groups was larger than for Whites.[11] Among employed people whose highest level of education was some college but no degree, a greater percentage those with a vocational certificate were employed full time than those without (Table 4).

Regression results

Table 5 reports the coefficient estimates from the logistic regression of any employment on demographic characteristics, education, and interactions between vocational certificates and demographic characteristics. Model 2 accounts for conventional educational attainment and vocational certificates net of demographic characteristics. As expected, the likelihood of employment increases with educational attainment. People with vocational certificates are more

[8] The difference was not significant at the associate's and bachelor's degree levels.
[9] The difference was not significant at the bachelor's and advanced degree levels.
[10] At the high school and associate's degree levels, there were no significant differences between Blacks and Hispanics. At the some college, bachelor's, and advanced degree levels, the difference was greater for Hispanics than Blacks.
[11] The difference between Hispanics and Whites was not significant at the high school level and was greater for Hispanics at all other education levels. The difference between Blacks and Whites was not significant at the high school and some college levels and was greater for Blacks at all other education levels.

likely to be employed than those without such credentials. Model 3 includes interactions between having a vocational certificate and key characteristics such as sex and educational attainment. Significant interactions between having a vocational certificate and educational attainment of less than high school, high school completion, or an associate's degree shows that the positive effect of vocational certificates on the likelihood of employment is especially notable at these education levels. The negative interaction between having a vocational certificate and being male shows that having a vocational certificate improves women's likelihood of employment relative to men's. Interactions between race, ethnicity, and vocational certificates are not significant.[12]

Table 6 shows the results of the logistic regression of full-time employment, given any employment. Among adults with any employment, those with a vocational certificate are less likely to be employed full-time than those without. This negative effect of vocational certificates remains after controlling for occupation. None of the interactions with race, ethnicity, sex, or educational attainment are significant.

The results of the regression of log monthly earnings in Table 7 show that vocational certificates do not have a main effect on earnings net of educational attainment. However, a significant negative effect of vocational certificates on earnings emerges after accounting for interactions between vocational certificates and certain demographic groups. Significant interactions show that the effect of vocational certificates on earnings varies for some subgroups. Vocational certificates have a positive effect on earnings for Hispanics and men compared to non-Hispanics and women, respectively. Men enjoy a 5 percent monthly earnings boost for a vocational certificate compared to women and Hispanics enjoy an 8 percent boost compared to

[12] I ran sensitivity analyses that restricted the sample to adults age 25 to 64 but the substantive conclusions did not change.

non-Hispanics.[13] Vocational certificate holders with less than high school completion, high school completion, and some college but no degree earn more than their counterparts without vocational certificates. The effect is particularly large for those with less than high school completion.

Figures 1 and 2 show the predicted earnings for men and women with various combinations of educational credentials, holding other characteristics constant.[14] Both men and women with less than high school completion earn more with a vocational certificate. Men with less than high school completion without a vocational certificate earn $2500 per month while those with vocational certificates earn $2900 per month, and women with less than high school completion without a vocational certificate earn $1900 per month compared to vocational certificate holders who earn $2100. For women at the associate's, bachelor's, and advanced degree levels, and men at the bachelor's degree level, those with vocational certificates earn less than their counterparts without vocational certificates.[15] It is important to remember that the model does not claim causality, and the apparent negative effect of vocational certificates on earnings at the associate's degree level and above may reflect unmeasured characteristics of people who earn vocational certificates or educational pathways that involve vocational certificates.

SIPP-EHC

The final analyses examine new unweighted SIPP-EHC field test data to show the prevalence of educational certificates, professional certifications, and licenses in the high poverty

[13] Since the dependent variable is logged, the interpretation of a coefficient B is that a unit change in characteristic X would result in an $(e^{B1}-1)*100$ percent change in earnings.
[14] The predicted earnings are based on Model 3 and are for White non-Hispanics who are 40 years old.
[15] For women at the high school and some college levels, the difference in predicted earnings for those with and without vocational certificates is not significant. For men at the high school, some college, associate's, and advanced degree levels, the difference in predicted earnings for those with and without vocational certificates is not significant.

sample. Table 8 compares the educational distributions in the SIPP and unweighted SIPP-EHC data, showing that the SIPP-EHC field test oversamples from populations with low levels of education. While the SIPP data show that 14 percent of the U.S. population age 18 and older have less than a high school education and 26 percent hold a Bachelor's degree or higher, 30 percent of the SIPP-EHC sample has less than a high school education while only 15 percent of the sample holds a Bachelor's degree or higher. Although the SIPP-EHC data oversample from areas with low levels of education, it is instructive to briefly look at the prevalence of educational certificates, professional certifications, and licenses.

In the SIPP, the greatest proportions of people with a vocational certificate are those with high school completion, some college but no degree, or an Associate's degree while in the SIPP-EHC, the greatest proportion of people with an educational certificate are those with some college but no degree or an Associate's degree. [16] Higher proportions of people with associate's, bachelor's, and advanced degrees have a professional certification or license than those with lower levels of educational attainment. The final column shows that 26 percent of adults have at least one alternative credential measured in the SIPP-EHC. The variation in receipt of educational certificates, professional certifications, and licenses across education levels and other characteristics suggests that labor market returns to these credentials may also vary across subgroups. More in depth analyses of these relationships with the full-scale 2014 SIPP-EHC data will illuminate how alternative credentials interact with conventional educational attainment to shape labor market outcomes for various subgroups of the population.

CONCLUSIONS

[16] These are not direct comparisons since the vocational certificate question in SIPP and the educational certificate question in SIPP-EHC differ.

The results show that vocational certificates affect labor market outcomes such as employment and monthly earnings, but that the effects vary by demographic group. Overall, adults with vocational certificates are more likely to be employed than those without vocational certificates, and this is particularly the case for those with less than high school completion, high school completion, and associate's degrees. Significant interactions in the regression analyses show that vocational certificates increase the likelihood of employment for women relative to men. The effect of vocational certificates on earnings varies by subgroup. Significant interactions in the regression analyses show that vocational certificate holders with less than high school and high school completion earn more than their counterparts without these alternative credentials. Men and Hispanics get a larger earnings boost from a vocational certificate than do women and non-Hispanics.

Although prior research has shown that vocational certificates affect labor market outcomes, this research adds to the existing literature by examining interaction terms and documenting how effects vary for different subgroups of the population. Furthermore, by showing that alternative credentials, and not just conventional educational attainment, affect labor market outcomes, this research supports the need for more data on alternative credentials with labor market value. Future data from a 2008 SIPP Wave 13 topical module and the 2014 SIPP-EHC with information on educational certificates, professional certifications, and licenses will enable further exploration of the relationship between conventional educational attainment, alternative credentials, and labor market outcomes.

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APPENDIX A

Working Definitions of Alternative Credentials Developed by GEMEnA

Certification: A credential awarded by a certification body based on an individual demonstrating through an examination process that he or she has acquired the designated knowledge, skills, and abilities to perform a specific job. The examination can be either written, oral, or performance-based. Certification is a time-limited credential that is renewed through a recertification process.

License: A credential awarded nu a licensing agency based on pre-determined criteria. The criteria may include some combination of degree attainment, certifications, certificates, assessment, apprenticeship programs, or work experience. Licenses are time-limited and must be renewed periodically.

Educational certificate: A credential awarded by a training provider or educational institution based on completion of all requirements for a program of study, including coursework and test or other performance evaluations. Certificates are typically awarded for life (like a degree). Certificates of attendance or participation in a short-term training (e.g., 1 day) are not in the definitional scope for educational certificates.

For more information, see the GEMEna website at: http://nces.ed.gov/surveys/gemena/

APPENDIX B

The SIPP measures conventional educational attainment and vocational certificates with the following questions:

What is the highest level of school completed or the highest degree received?

- Less than 1st grade
- 1st, 2nd, 3rd or 4th grade
- 5th or 6th grade
- 7th or 8th grade
- 9th grade
- 10th grade
- 11th grade
- 12th grade, no diploma
- High school graduate (diploma or GED equivalent)
- Some college credit, but less than 1 year
- 1 or more years of college, no degree (regular junior college/college/university)
- Associate (2-year) college degree (include academic/occupational degree)
- Bachelor's degree (for example: BA, AB, BS)
- Master's degree (for example: MA, MS, MENG, Med, MSW, MBA)
- Professional degree (for example: MD (doctor), DDS (dentist), JD (lawyer))
- Doctorate (for example: Ph.D.. Ed.D.)

Have [you] ever attended a vocational, technical, trade, or business school beyond high school?

- Yes
- No

Have [you] received a diploma or certificate from a vocational, technical, trade, or business school?

- Yes
- No

The SIPP-EHC measures conventional educational attainment and alternative credentials with the following questions:

What is the highest level of school completed or the highest degree received?

- Less than 1st grade
- 1st, 2nd, 3rd or 4th grade
- 5th or 6th grade
- 7th or 8th grade
- 9th grade
- 10th grade

11th grade
12th grade, no diploma
High school graduate (diploma or GED or equivalent)
Some college credit, but less than 1 year
1 or more years of college, no degree (regular junior college/college/university)
Associate's degree (2-year)
Bachelor's degree (for example: BA, AB, BS)
Master's degree (for example: MA, MS, MBA, MSW)
Professional degree (for example: MD (doctor), DDS (dentist), JD (lawyer))
Doctorate (for example: Ph.D.. Ed.D.)

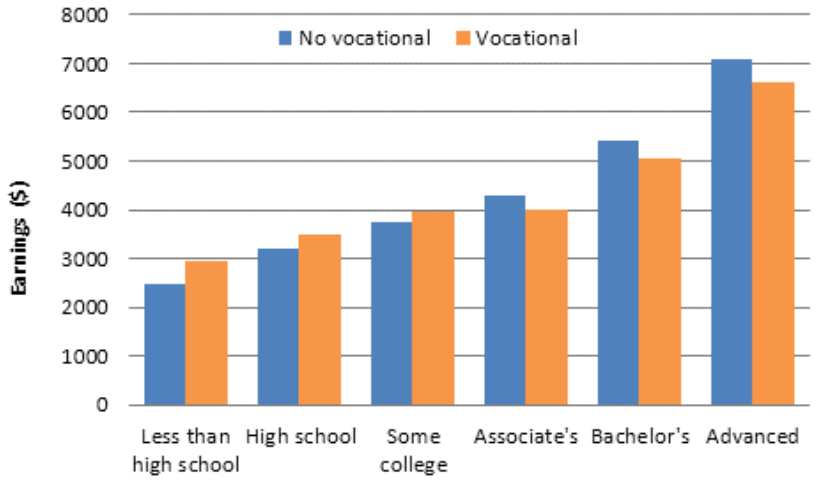
Now I'd like to ask about professional certification and licensure. Do [you] have a professional certification or a state or industry license? Mark all that apply.

Yes, professional certification
Yes, license
Yes, unsure of type [do not read]
No professional certification or license

Some people decide to enroll at a college, university, community college, or trade school to earn a certificate rather than a degree. Have [you] ever earned this type of certificate?

Yes
No

Figure 1. Predicted Monthly Earnings for Men by Combinations of Educational Credentials



Note: Holding other characteristics constant at 40 year-old White non-Hispanic
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Figure 2. Predicted Monthly Earnings for Women by Combinations of Educational Credentials

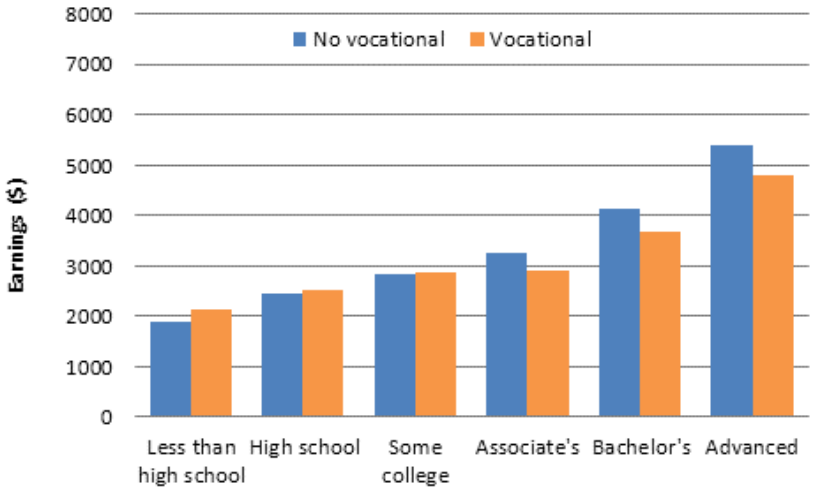


Table 1. Percent of Sex, Race, Hispanic Origin, and Educational Attainment Groups with a Vocational Certificate Among Adults 18 Years and Over: SIPP 2008
(weighted, numbers in thousands)

	Total number	Total percent	Sex		Race and Hispanic origin		
			Men	Women	White	Black	Hispanic
Total	226,249	15.9	16.2	15.6	15.4	19.5	12.1
Educational Attainment							
Less than high school	32,183	6.0	6.4	5.6	5.7	7.9	3.3
High school	71,644	19.2	19.6	18.8	18.7	22.1	16.8
Some college, no degree	44,362	20.3	20.0	20.6	19.7	23.5	19.2
Associate's degree	18,429	32.5	36.2	29.7	31.9	39.2	29.9
Bachelor's degree	38,782	10.2	11.2	9.2	9.4	13.9	10.6
Advanced degree	20,850	6.5	6.4	6.5	5.9	10.7	6.6

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 1 Continued. Percent of Sex, Race, Hispanic Origin, and Educational Attainment Groups with a Vocational Certificate Among Adults 18 Years and Over: SIPP 2008
(weighted, numbers in thousands)

	Age						Native born	Foreign born
	18 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65+		
Total	6.5	14.1	18.3	19.7	18.9	15.2	16.4	13.1
Educational Attainment								
Less than high school	1.3	4.3	7.3	7.5	8.2	7.2	7.2	3.5
High school	9.5	17.7	22.6	22.0	22.9	18.2	19.4	18.2
Some college, no degree	5.5	17.2	26.8	29.7	28.0	23.4	20.3	20.4
Associate's degree	18.1	34.0	35.4	34.6	32.8	29.6	32.6	31.8
Bachelor's degree	3.7	7.8	9.5	13.4	12.4	10.5	9.6	13.3
Advanced degree	4.9	4.3	6.2	7.0	7.6	6.9	6.1	8.7

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 2. Median Monthly Earnings by Sex, Race and Hispanic Origin, and Eductational Credentials
Among the Population Aged 18 and Older with Earnings: SIPP 2008
(Earnings in dollars. Earners have been employed full-time for the 4 months before the survey.)

	Total	Men	Women	White	Black	Hispanic
Total	3333	3750	2917	3,429	2,667	2,376
Typology of attainment						
No vocational certificate						
Less than high school	1,845	2,078	1555	1,890	1,800	1,732
High school completion	2,550	2,808	2,222	2,600	2,160	2,200
Some college but no degree	2,917	3,400	2,572	3,000	2,598	2,511
Associate's degree	3,464	4,062	3,139	3,500	3,125	3,333
Bachelor's degree	4,367	5,150	3,800	4,500	3,833	3,467
Advanced degree	5,833	6,667	5,000	5,833	5,400	5,417
Vocational certificate						
Less than high school	2,765	2,951	(B)	2864	(B)	(B)
High school	2,846	3,308	2,375	3000	2,400	2,592
Some college but no degree	3,167	4,000	2,613	3,291	2,740	2,808
Associate's degree	3,372	3,984	2,907	3,500	2,917	3,031
Bachelor's degree	4,330	5,000	3,500	4,583	3,358	(B)
Advanced degree	5,000	7,000	4,320	5,196	(B)	(B)

(B) Base less than 200,000.
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 3. Percent Employed at Least One Month by Sex, Race, Hispanic Origin and Eductational Credentials Among the Population Aged 18 and Older: SIPP 2008

	All	Men	Women	White	Black	Hispanic
All	64.3	70.3	58.6	64.9	60.6	65.5
Typology of attainment						
No vocational certificate						
Less than high school	44.0	54.3	33.4	46.5	32.3	56.3
High school completion	58.4	67.4	49.8	58.4	58.9	67.1
Some college but no degree	66.0	70.0	62.3	66.4	65.8	69.7
Associate's degree	72.0	74.6	70.2	72.2	70.6	69.1
Bachelor's degree	75.9	81.4	70.9	75.9	79.1	78.1
Advanced degree	77.4	80.5	74.2	76.8	77.7	81.0
Vocational certificate						
Less than high school	48.4	55.2	40.4	48.6	45.5	65.8
High school	63.2	67.3	59.1	63.0	63.3	71.3
Some college but no degree	68.5	72.2	65.3	68.5	68.3	77.3
Associate's degree	77.7	81.2	74.4	77.9	78.8	76.4
Bachelor's degree	76.1	78.5	73.6	77.4	77.0	84.4
Advanced degree	75.9	78.6	73.2	74.2	(B)	(B)

(B) Base less than 200,000.

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 4. Of those Employed, Percent Employed Full-time for last 4 months by Sex, Race, Hispar Origin and Eductational Credentials Among the Population Aged 18 and Older: SIPP 2008

	All	Men	Women	White	Black	Hispanic
Typology of attainment						
No vocational certificate						
Less than high school	48.4	52	42.4	48.4	45.5	51.5
High school	58.5	62.1	53.9	58.2	61.5	58
Some college but no degree	54.3	59	49.6	54.2	57.9	63.6
Associate's degree	63.9	70.3	59.3	63.3	68.3	69.6
Bachelor's degree	67.6	73.2	61.8	66.6	73.2	71.2
Advanced degree	69.5	72.9	65.7	68.3	76.5	77.1
Vocational certificate						
Less than high school	52.4	58.6	42.4	54.4	(B)	53.3
High school	59.7	63.8	54.9	59.6	60.9	64.1
Some college but no degree	57.9	64.3	51.8	58.8	51.8	67.6
Associate's degree	62.6	67.7	57.5	62.4	63.2	56.6
Bachelor's degree	64.5	71.2	56.6	63.7	68.2	66.5
Advanced degree	66.5	68.2	64.5	63.3	(B)	(B)

(B) Base less than 200,000.

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 5. Logistic Regression of Any Employment in Last 4 Months
Population aged 18 and older: SIPP 2008

	Model 1		Model 2		Model 3	
Intercept	-3.30	*	-2.51	*	-2.50	*
Demographics						
Male	0.54	*	0.57	*	0.60	*
Age	0.24	*	0.22	*	0.22	*
Age-squared	0.00	*	0.00	*	0.00	*
Hispanic	-0.37	*	-0.03		-0.03	
Race						
White	REF		REF		REF	
Black	-0.44	*	-0.32	*	-0.32	*
Asian	-0.27	*	-0.35	*	-0.35	*
Other race	-0.43	*	-0.35	*	-0.35	*
Vocational certificate			0.14	*	0.06	
Education						
Less than high school			-1.25	*	-1.28	*
High school completion			-0.66	*	-0.69	*
Some college, no degree			-0.45	*	-0.45	*
Associate's degree			-0.19	*	-0.23	*
Bachelor's degree			REF		REF	
Advanced degree			0.28	*	0.27	*
Interactions						
Voc*male					-0.18	*
Voc*less than high school					0.34	*
Voc*high school completion					0.19	*
Voc*some college, no degree					0.10	
Voc*associate's degree					0.24	*
AIC	235382		228816		228752	

Note: *p < .05, $^{+}$P < .10
REF=reference category
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 6. Logistic Regression of Full-time Employment
Population aged 18 and older with any employment: SIPP 2008

	Model 1		Model 2		Model 3		Model 4	
Intercept	-3.80	*	-3.38	*	-3.38	*	-3.50	*
Demographics								
Male	0.40	*	0.43	*	0.43	*	0.50	*
Age	0.19	*	0.19	*	0.19	*	0.18	*
Age-squared	0.00	*	0.00	*	0.00	*	0.00	*
Hispanic	-0.02		0.17	*	0.18	*	0.21	*
Race								
White	REF		REF		REF		REF	
Black	0.10	*	0.16	*	0.21	*	0.19	*
Asian	0.26	*	0.21	*	0.23	*	0.24	*
Other race	-0.12	+	-0.08		-0.08		-0.06	
Vocational certificate			-0.10	*	-0.11	*	-0.08	*
Education								
Less than high school			-0.79	*	-0.80	*	-0.55	*
High school completion			-0.33	*	-0.33	*	-0.17	*
Some college, no degree			-0.37	*	-0.36	*	-0.27	*
Associate's degree			-0.14	*	-0.14	*	-0.06	
Bachelor's degree			REF		REF		REF	
Advanced degree			0.04		0.04		0.03	
Interactions								
Voc*less than high school					0.12		0.09	
Occupation								
Managerial							0.51	*
Professional							0.16	*
Technical							0.16	*
Service							-0.33	*
Sales							0.03	
Cleric							0.31	*
Craft							-0.19	*
Farm							0.05	
Production							REF	
AIC	186648		184965		184964		183186	

Note: *p < .05, $^{+}$P < .10
Ref=reference category
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 7. Regression of Log Monthly Earnings
Population aged 18 and older with full-time employment: SIPP 2008

	Model 1	Model 2	Model 3	Model 4
Intercept	6.37 *	6.78 *	6.81 *	6.71 *
Demographics				
Male	0.25 *	0.28 *	0.27 *	0.29 *
Age	0.07 *	0.06 *	0.06 *	0.06 *
Age-squared	0.00 *	0.00 *	0.00 *	0.00 *
Hispanic	-0.35 *	-0.13 *	-0.14 *	-0.10 *
Race				
White	REF	REF	REF	REF
Black	-0.24 *	-0.16 *	-0.16 *	-0.13 *
Asian	0.04	-0.06 *	-0.06 *	-0.03
Other race	-0.13 *	-0.08 *	-0.08 *	-0.06 *
Vocational certificate		0.01	-0.12 *	-0.12 *
Education				
Less than high school		-0.77 *	-0.79 *	-0.62 *
High school completion		-0.50 *	-0.52 *	-0.41 *
Some college, no degree		-0.36 *	-0.37 *	-0.30 *
Associate's degree		-0.26 *	-0.24 *	-0.19 *
Bachelor's degree		REF	REF	REF
Advanced degree		0.27 *	0.27 *	0.24 *
Interactions				
Voc*Hispanic			0.08 *	0.05 +
Voc*male			0.05 *	0.07 *
Voc*less than high school			0.24 *	0.18 *
Voc*high school completion			0.15 *	0.13 *
Voc*some college, no degree			0.13 *	0.12 *
Occupation				
Managerial				0.36 *
Professional				0.17 *
Technical				0.24 *
Service				-0.20 *
Sales				0.04 +
Cleric				0.08 *
Craft				0.10 *
Farm				-0.19 *
Production				REF
Adjusted R-squared	0.11	0.25	0.25	0.29

Note: *p < .05, $^{+}$P < .10
REF=reference category
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008.

Table 8. Percent of Educational Attainment Groups with Alternative Credentials Among Adults 18 and Over: SIPP 2008, SIPP-EHC 2012 (weighted, numbers in thousands)

	Education distribution		Percent of each education level with:			
			Vocational certificate	Educational certificate	Professional cert-ification/license	Any alternative credential
	SIPP (weighted)	SIPP-EHC (unweighted)	SIPP (weighted)	SIPP-EHC (unweighted)	SIPP-EHC (unweighted)	SIPP-EHC (unweighted)
Total			15.9	12.7	21.5	25.6
Educational Attainment						
Less than high school	14.2	30.2	6.0	3.1	9.2	10.4
High school	31.7	31.1	19.2	11.8	18.7	23.1
Some college but no degree	19.6	17.1	20.3	24.0	28.2	36.5
Associate's degree	8.1	6.5	32.5	26.4	37.4	44.6
Bachelor's degree	17.1	10.5	10.2	16.8	34.6	39.2
Advanced degree	9.2	4.6	6.5	18.7	51.3	54.5

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2008; SIPP-EHC 2012.

Appendix C. Percent Distribution of Independent Variables in SIPP 2008

	No vocational certificate	Vocational certificate
Unweighted N	61544	12055
Male	48.1	49.3
Race		
White	81.8	78.5
Black	11.3	14.5
Asian	4.1	3.1
Other	2.9	3.9
Ethnicity		
Hispanic	14.3	10.4
Educational attainment		
Less than high school	15.9	5.3
High school completion	30.4	38.3
Some college, no degree	18.6	25.1
Associate's degree	6.5	16.6
Bachelor's degree	18.3	11.0
Advanced degree	10.3	3.8
Age		
18-24	14.2	5.2
25-34	18.1	15.8
35-44	17.7	20.9
45-54	18.7	24.2
55-64	14.6	18.0
65+	16.8	15.9
Occupation (if employed)		
Managerial	14.7	12.1
Professional	17.9	12.4
Technical	6.4	11.5
Service	15.3	14.8
Sales	10.9	8.5
Clerical	13.5	13.8
Farm	1.0	0.5
Craft	8.7	13.3
Production	11.8	13.0

Source: U.S. Census Bureau, Survey of Income and Program Participation