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MARYLAND
Governor's Workforce Investment Board

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Career Preparation Expansion Act: Supplement on Manufacturing Sector

Annual Report to the Governor and General Assembly

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EXECUTIVE SUMMARY

This report is a supplement to the *Career Preparation Expansion Act (CPEA) Report*. The CPEA report provides an analysis of wages earned, the hours worked per week, and the industry of employment for high school graduates five years after they graduate. The full CPEA report is available on the Maryland Longitudinal Data System Center's website: https://mldscenter.maryland.gov/CenterReports.html. This supplement provides additional data analysis on one sector within Goods-Producing industry: Manufacturing.

Over 4,000 manufacturing businesses operate in Maryland. Collectively, in 2019, these business employed over 111,000 workers (around 4% of the Maryland labor force), generated over $8 billion in wages, and contributed $24.9 billion to Maryland's gross domestic product (5.85% of total GDP). The manufacturing labor sector is comprised of a wide array of manufacturers. Some manufacturers focus on consumable goods, such as dairy, grains, meats, and food. Others produce durable goods used in the home such as fabrics, apparel, cabinets, cutlery and appliances, or goods used to fabricate and maintain homes, such as plumbing supplies, glass, steel, adhesives, and paint. Finally, other manufacturers provide commodities, specialized goods, or life-saving equipment, including oil and plastics, motor vehicles, ships and air craft, and pharmaceuticals and medical equipment. The manufacturing industry in Maryland relies on a highly-skilled professional and technical labor force to produce and distribute high quality goods to meet the demands of the global economy. This supplement provides data on the number of high school graduates visible in the Goods-Producing industry overall, and its sub-sector of Manufacturing, five years after high school graduation.

Table of Contents

EXECUTIVE SUMMARY 3
INTRODUCTION 5
Report Requirements 5
Population Groups 5
Methodology 6
ANALYSIS AND RESULTS 7
Wage Outcomes for High School Graduates 7
Wage Outcomes for High School Graduates by Demographic and Economic Characteristics 12
Results: Sector Distributions by Demographic and Economic Characteristics 13
Results: Median Quarterly Wages by Sector for Demographic and Economic Groups 16
APPENDICES 22
Appendix 1: Contextual Data 22
MIT Living Wage Calculator 22
American Community Survey 5 Year Estimates 22
Minimum Wage in Maryland 22
Appendix2: Educational Attainment Methodology 23
Appendix 3: Free or Reduced-Price Meals Eligibility 25

INTRODUCTION

Report Requirements

The Career Preparation Expansion Act Report is submitted annually in fulfillment of the requirement in *The Career Preparation Expansion Act* (CPEA), Chapter 695 of 2017 (see Education Article § 21-205, Annotated Code of Maryland). The Maryland Longitudinal Data System (MLDS) Center and the Governor's Workforce Development Board (GWDB) collaborate to produce this report. The full CPEA report for 2020 as well as prior CPEA reports are available on the MLDS Center's website (https://mldscenter.maryland.gov/CenterReports.html). The full report provides information on the state agencies that produce the report, the MLDS and the GWDB, as well as the data available within the MLDS to support the CPEA report.

Population Groups

The population of interest for this report was high school students who graduated from a Maryland public high school with a diploma between January and October of 2014 and are between the ages of 16 and 24 at the time of graduation[1]. This is the latest year that high school graduates had five years of available wage data post-high school graduation. Almost 60,000 students graduated from Maryland public high schools in 2014 under this definition. See **Table 1**. The graduating class was majority female, white, and non-economically disadvantaged (Non-FARMS). **Appendix 3** provides a definition of the FARMS indicator used to evaluate economic status.

Table 1. High School Graduates, State of Maryland, 2014, Distribution by Demographic and Economic Characteristics

Education Level		All High School Graduates	Same-Employer Wages	
			All Sectors	Manufacturing Sector
All High School Graduates		***58,136***	***19,860***	***296***
Gender	Female	29,663	10,464	100
	Male	28,473	9,396	196
Ethnicity	Hispanic, Any Race	5,913	2,124	24
Race	African-American/ Black Alone	20,182	6,267	94
	Asian Alone	3,765	1,015	11
	White Alone	29,031	10,741	172
Economic Status	FARMS	18,612	6,449	119
	Non-FARMS	39,524	13,411	177

Note: Race is reported independent of Ethnicity therefore summed values do not equal the total. Some races are omitted to protect small populations.

[1]This definition of high school graduate was selected to align to reporting definitions used by the National Center for Education Statistics (NCES) and the U. S. Bureau of Labor Statistics (BLS).

Methodology

The industry of employment was determined by evaluating the North American Industry Classification System (NAICS) code reported with each wage record. NAICS codes were grouped according to standard reporting categories.[2] The U.S. Census Bureau Stable or Full-Quarter Employment Methodology[3] was used as a basis for selecting high school graduates to include in the analysis with the requirement that they must have been employed by the same employer for nine months or three consecutive fiscal quarters (Q1 of 2019, Q2 of 2019 and Q3 of 2019) before deriving median wage calculations from data for fiscal quarter 2 of 2019[4] (referenced as Same-Employer throughout this report).

Wage bands were constructed to align to the contextual wage indicators selected for this report. See **Appendix 1** for information on the contextual indicators. The wages earned in the 20th quarter or fiscal quarter 2 of 2019 for those with full-quarter same-employer wages were used to assign each high school graduate to one of four wage groups. See **Table 2**.

Table 2. Wage Bands

Income Band	20th Fiscal Quarter Wage
Less than Minimum Wage	$1 to $3,939
Between Minimum Wage and Living Wage	$3,940 to $7,686
Between the Living Wage and ACS Wage	$7,687 to $10,984
Greater than or equal to the ACS Wage	>= $10,985

The population of interest was grouped by educational attainment. See **Table 3**. Wages differences may occur when using a common point in time (five years after high school graduation) as a measure for a population who has had different amounts of time in the workforce and different levels of educational attainment. See **Appendix 2** for information on educational group assignment.

Table 3. High School Graduates, State of Maryland, 2014, Distribution by Educational Attainment, Five Years after High School Graduation

Education Attainment	Totals	
All High School Graduates	***58,136***	
High School Graduates, No College	13,497	23%
Some College	20,456	35%
Still in College	11,210	19%
Lower Division Degree	1,786	3%
Certificate	218	<1%
Associate's	1,568	3%
Bachelor's Degree or Higher	11,187	19%
Bachelor's	11,134	19%
Other Degree	53	<1%

[2]The 20 NAICS codes were grouped based upon industry sector as aligned to U. S. Bureau of Labor Statistics and U.S. Statistical Agencies Office of Management and Budget (Federal), Economic Classification Policy Committee.

[3]The Full-Quarter Employment (Stable) methodology is utilized by the U.S. Census Bureau to calculate average monthly earnings for individuals engaged in stable employment with the same employer. The methodology applied here derives quarterly, rather than monthly, median earnings. https://lehd.ces.census.gov/doc/QWI_101.pdf.

[4]For the NAICS quarterly median wage calculation, some individuals had wages in a quarter from more than one employer and more than one NAICS. Only wages from the employer that covered all three quarters were used in median wage calculations.

ANALYSIS AND RESULTS

Wage Outcomes for High School Graduates

The Full-Quarter Same-Employer Methodology (Same-Employer) yielded 19,860 high school graduates or 34% of all high school graduates. See **Table 4**. This means that 73% of high school graduates with full-quarter employment (wages for three consecutive quarters) remained with the same employer for all three fiscal quarters; 27% of high school graduates with full-quarter employment changed employers at least once during this period. Ten percent of high school graduates with same-employer wages were in the *Goods-Producing* sector, with 1.5% of high school graduates with same-employer wages in the Goods-Producing sub-sector of *Manufacturing*.

Table 4. High School Graduates, State of Maryland, 2014, Graduates with Full-Quarter and Same-Employer Wages, Five Years after High School Graduation

All High School Graduates	Total with Full-Quarter Wages	Total with Same-Employer Wages		Total in Goods-Producing		Total in Manufacturing	
58,136	27,330	19,860	73% of Full-Quarter	1,900	10% of Same-Employer	296	1.5% of Same-Employer

The *Good-Producing* sector in Maryland ranks fifth in size[5] (after *Trade, Transportation, & Utilities*, *Professional & Business Services*, *Health Care & Social Assistance*, and *Leisure & Hospitality*) and also was fifth for the share of same-employer high school graduates. The *Goods-Producing* sector is comprised of two sub-sectors: Construction and Manufacturing. Overall, *Goods-Producing* in Maryland is split 60%/40% with slightly more Marylanders in construction than in manufacturing. This split was more pronounced for same-employer high school graduates, 85%/15%, also with more graduates in construction than in manufacturing. See **Table 5**. Overall, the median quarterly wage was above the living wage for *Goods-Producing* as well as its sub-sector of *Manufacturing*.

Table 5. High School Graduates, State of Maryland, 2014, Sector of Employment and Median Quarterly Wage for Graduates with Same-Employer Wages, Five Years after High School Graduation

Sector	Total with Same-Employer Wages	%of all Same-Employer Graduates	Median Quarterly Wage
Goods-Producing	1,900	10%	↑ $10,120
Manufacturing	*296*	*1.5%*	↑ *$8,797*
Trade, Transportation, & Utilities	4,864	24%	↓ $6,023
Information	230	1%	↓ $7,600
Financial & Real Estate	893	5%	↑ $9,137
Professional & Business Services	3,056	15%	↑ $8,934
Educational Services	1,290	7%	↑ $8,334
Health Care & Social Assistance	2,992	15%	↓ $6,881
Leisure & Hospitality	3,035	15%	↓ $5,114
Other Services	950	5%	↓ $6,665
Public Administration	650	3%	↑ $9,465
Total	**19,860**		**↓ $7,086**

↑value is above living wage, ↓ value is below living wage

[5]Maryland Department of Labor. (2020). *Maryland - Second Quarter 2019 - Industry Series - Maryland's Quarterly Census of Employment and Wages (QCEW) – OWIP*. https://www.dllr.state.md.us/lmi/emppay/tab1md22019.shtml

The majority of high school graduates with same-employer wages had *Some College* beyond high school graduation but did not finish a college degree. The second largest groups was *No College*. This pattern reverses when looking at just those in *Goods-Producing* and its sub-sector *Manufacturing*. *No College* had the largest share of same-employer high school graduates, followed by *Some College.* See **Table 6.**

Table 6. High School Graduates, State of Maryland, 2014, Graduates with Same-Employer Wages by Educational Attainment with Median Quarterly Wage, Five Years after High School Graduation

Educational Attainment	Total	Same-Employer Median Quarterly Wages					
		All Sectors		Goods-Producing		Manufacturing	
		n	$	n	$	n	$
All High School Graduates	*58,136*	*19,860*	↓ *$7,086*	*1,900*	↑ $10,120	*296*	↑ *$8,796*
High School Graduates, No College	13,497	4,597	↓ $7,228	769	↑ $9,864	105	↑ $8,710
Some College	20,456	7,409	↓ $6,324	544	↑ $9,101	92	↑ $8,153
Still in College	11,210	3,667	↓ $5,921	229	↑ $10,419	37	↓ $7,010
Lower Division Degree	1,786	815	↓ $7,829	85	↑ $9,933	15	↑ $7,949
Bachelor's Degree or Higher	11,187	3,372	↑ $10,871	273	↑ $15,074	47	↑ $12,138

↑value is above the living wage, ↓ value is below the living wage

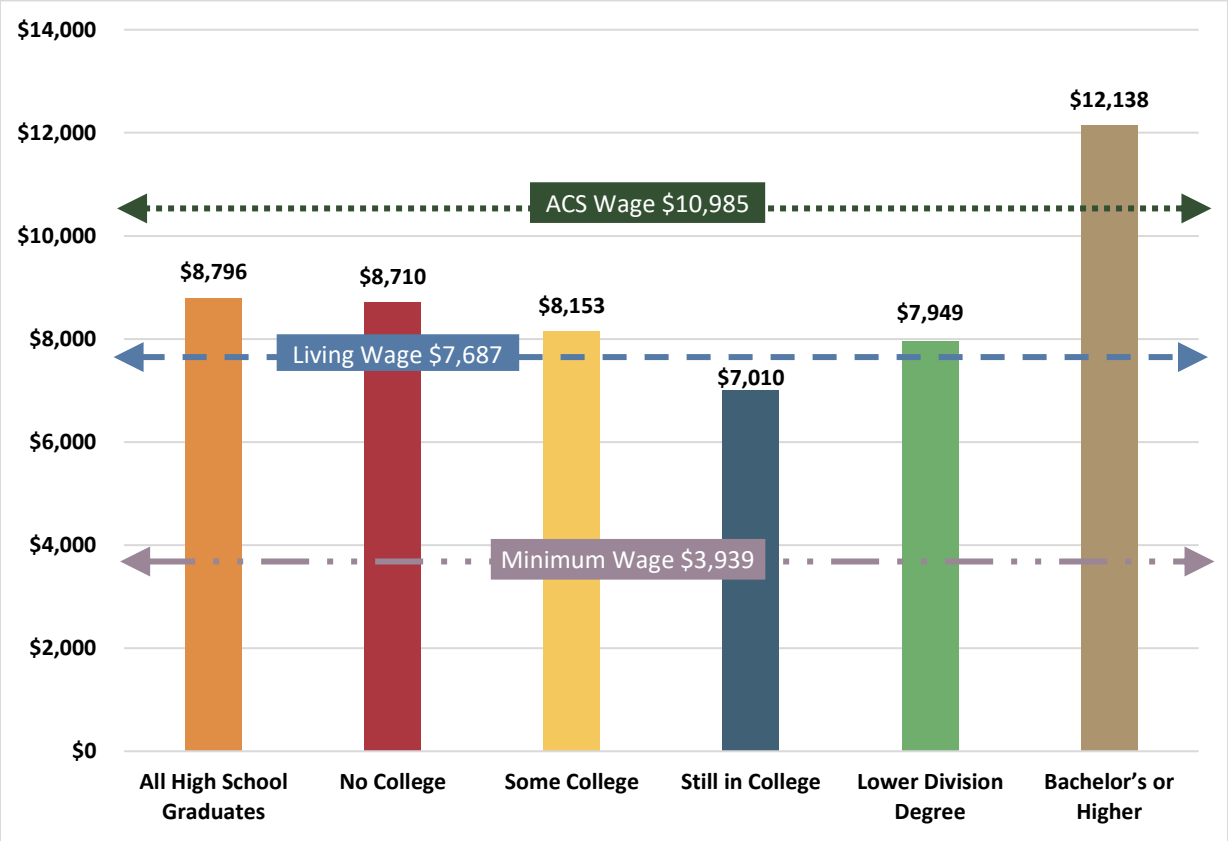
Only two sectors, *Goods-Producing* and *Public Administration,* had median quarterly wages above the living wage for all educational attainment groups. See **Table 7**. The median quarterly wage for high school graduates in *Manufacturing* was above the living wage for all groups except *Still in College* in *Manufacturing*. See **Chart 1**. One sector, *Leisure & Hospitality,* did not have a median quarterly wage above the living wage for any educational attainment group.

Table 7. High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Educational Attainment for Same-Employer Graduates, Five Years after High School Graduation

Industry	All High School Graduates	No College	Some College	Still in College	Lower Division Degree	Bachelor's Degree or Higher
Goods-Producing	↑ $10,120	↑ $9,864	↑ $9,101	↑ $10,419	↑ $9,933	↑ $15,074
Manufacturing	↑ *$8,797*	↑ *$8,710*	↑ *$8,153*	*$7,010*	↑ *$7,949*	↑ *$12,138*
Trade, Transportation, & Utilities	$6,023	$6,724	$5,706	$4,679	$5,964	↑ $7,773
Information	$7,600	$7,566	$7,054	$5,377	↑ $8,359	↑ $9,191
Financial & Real Estate	↑ $9,137	↑ $8,540	↑ $8,201	$ 7,256	↑ $9,154	↑ $12,829
Professional & Business Services	↑ $8,934	$7,444	$7,419	↑ $8,298	↑ $9,216	↑ $11,835
Educational Services	↑ $8,334	$6,079	$5,757	$6,897	$6,709	↑ $12,051
Health Care & Social Assistance	$6,881	$6,655	$6,413	$6,433	↑ $7,993	↑ $10,191
Leisure & Hospitality	$5,114	$5,199	$5,251	$4,427	$5,800	$5,720
Other Services	$6,665	$7,350	$6,428	$5,130	$7,076	↑ $8,993
Public Administration	↑ $9,465	↑ $9,400	↑ $8,511	↑ $7,698	↑ $12,405	↑ $9,974
Total	**$7,086**	**$7,228**	**$6,324**	**$5,921**	↑ **$7,829**	↑ **$10,871**

↑value is above living wage

Chart 1. High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Educational Attainment for Same-Employer Graduates in the Manufacturing Sector, Five Years after High School Graduation



Wages in each sector were also analyzed to determine the number of graduates with same-employer wages that fell into the wage bands constructed from the wage indicators. The median quarterly wage identifies the quarterly wage for the exact middle wage; half the records have a quarterly wage above this value, and half the records have a quarterly wage below this value. Identifying the number of high school graduates with quarterly wages at different levels of income helps quantify the number of graduates who were engaged in the workforce in each sector at a level that provides for or exceeds the basic cost of living in Maryland.

Overall, 44% of high school graduates with same-employer wages had a quarterly wage at or above the living wage. See **Chart 2 and Table 8**. Distributions by wage indicator varied by sector. The majority of high school graduates in *Goods-Producing, Financial & Real Estate, Professional & Business Services, Educational Services,* and *Public Administration* had quarterly wages at or above the living wage. The majority of graduates in the remaining five sectors had a quarterly wage below the living wage. Three of these five sectors, *Trade, Transportation & Utilities, Health Care & Social Assistance, and Leisure & Hospitality,* had the largest shares of high school graduates.

Chart 2. High School Graduates, State of Maryland, 2014, Sector of Employment by Wage Band for Graduates with Same-Employer Wages, Five Years after High School Graduation

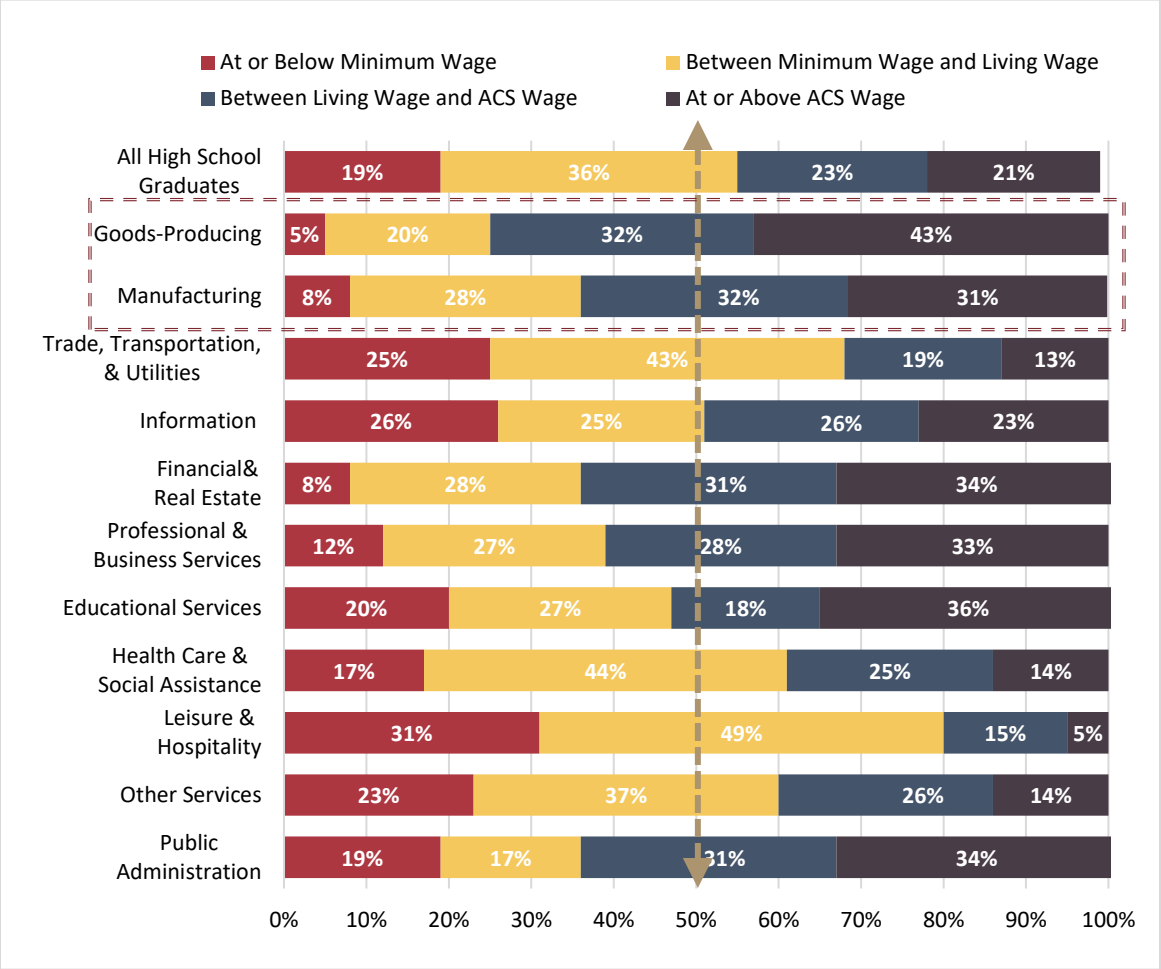


Table 8. High School Graduates, State of Maryland, 2014, Sector of Employment by Wage Band for Graduates with Same-Employer Wages, Five Years after High School Graduation

Education Level	Total Same-Employer Wages	At or Below Minimum Wage		Between Minimum Wage and Living Wage		Between Living Wage and ACS Wage		At or Above ACS Wage	
		#	%	#	%	#	%	#	%
All High School Graduates	*19,860*	*3,869*	*19%*	*7,220*	*36%*	*4,586*	*23%*	*4,185*	*21%*
Goods-Producing	1,900	101	5%	384	20%	606	32%	809	43%
Manufacturing	*296*	*24*	*8%*	*83*	*38%*	*96*	*32%*	*93*	*31%*
Trade, Transportation, & Utilities	4,864	1,238	25%	2,097	43%	907	19%	622	13%
Information	230	59	26%	58	25%	60	26%	53	23%
Financial & Real Estate	893	69	8%	248	28%	276	31%	300	34%
Professional & Business Services	3,056	367	12%	831	27%	852	28%	1,006	33%
Educational Services	1,290	255	20%	342	27%	233	18%	460	36%
Health Care & Social Assistance	2,992	503	17%	1,315	44%	742	25%	432	14%
Leisure & Hospitality	3,035	940	31%	1,483	49%	459	15%	153	5%
Other Services	950	215	23%	354	37%	250	26%	131	14%
Public Administration	650	122	19%	108	17%	201	31%	219	34%

See the full **Career Preparation Expansion Act report** for median quarterly wages and percentage of graduates above the living wage by educational attainment for each industry.

Wage Outcomes for High School Graduates by Demographic and Economic Characteristics

This section of this supplement explores the sector-level wages for high school graduates, five years after high school graduation, for select demographic and economic groups. This section focuses on two questions. The first question considers the rates in which each group appears in each labor sector. Are some groups concentrated in some sectors? Are group-sector distributions similar to the overall sector distributions? The second question examines sector-specific median quarterly wages for each group. What differences, if any, exist in the median quarterly wages between each group within the same sector? This section focuses on Good-Producing and Manufacturing. See the full **Career Preparation Expansion Act report** for analysis for other sectors.

Methodology

All same-employer graduates were assigned to one gender category and one economic category (See **Appendix 3** for a discussion on economic indicators)[6]. All same-employer graduates were also assigned to one racial group and one ethnic group. Assignment to racial and ethnic groups were made based upon the methodology used by the U. S. Census for its Current Population Survey (CPS) which reports race independent of ethnicity. The racial and ethnic groups included in this supplement and the appendices align to standard reporting practices employed by the U.S. Bureau of Labor Statistics (BLS). BLS reports labor data for three racial groups: White alone, Black or African-American alone, and Asian alone. Each racial group consists of individuals that identify with a single race but may be of any ethnicity. All other racial groups, including individuals identifying with two or more races, are omitted from BLS reports due to the small population size[7]. Small populations limit the conclusions that can be drawn from the data and may compromise the quality of any research.

[6]Economic status was determined through a student's Free or Reduced Price Meals (FARMS) eligibility in their final year of high school. FARMS indicates that a student is eligible to receive low-cost or no-cost meals each school day. Students may be eligible for free or reduced-price meals through participation in certain Federal Assistance Programs or based on their family's income falling below a specified poverty threshold. The education community and this report rely on FARMS eligibility to identify economically disadvantaged students. See Appendix 8 for a discussion on FARMS.

[7]U.S. Bureau of Labor Statistics. (2020). Labor Force Statistics from the Current Population Survey: Concepts and Definitions. https://www.bls.gov/cps/definitions.htm#race

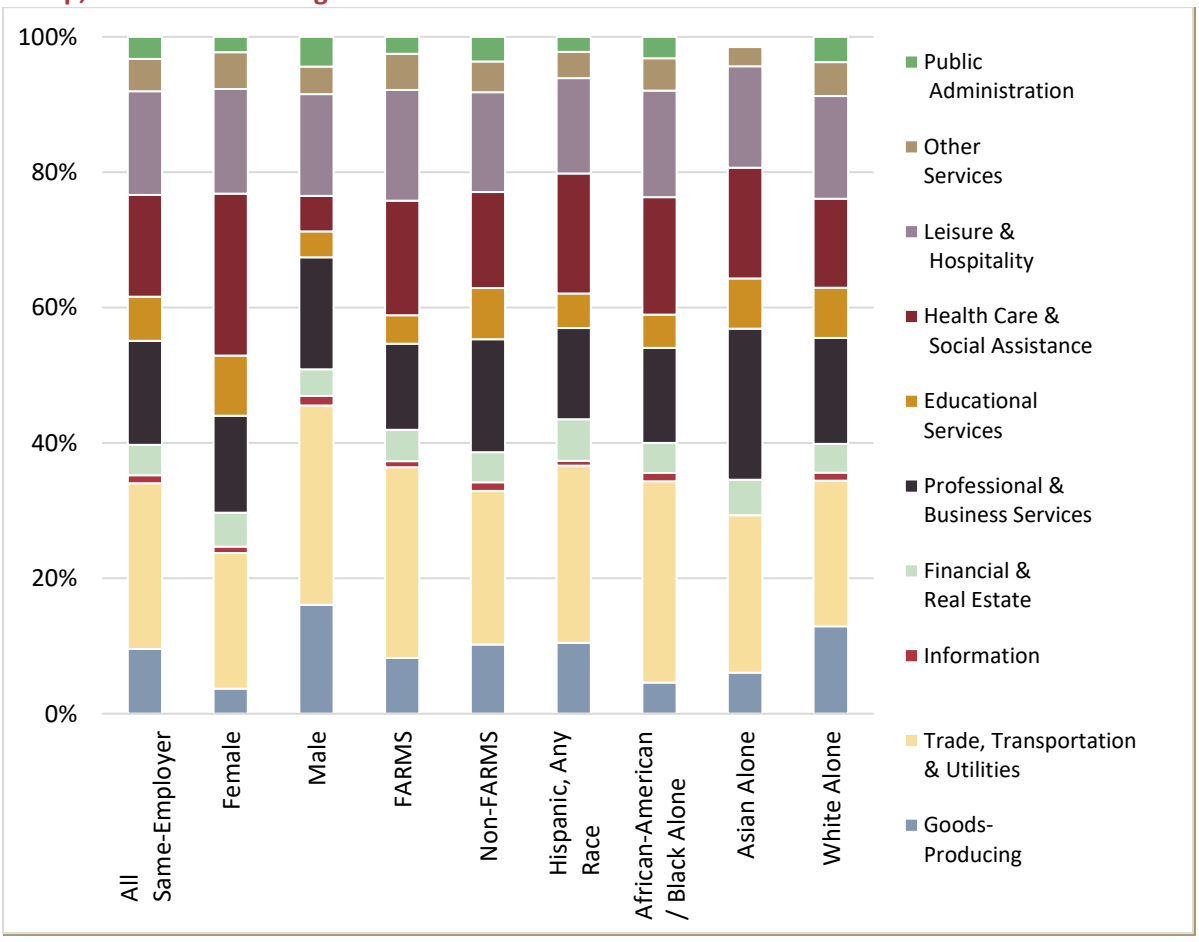
Results: Sector Distributions by Demographic and Economic Characteristics

The sector distributions for each demographic and economic group of high school graduates with same-employer wage as compared to the overall industry distribution are provided in **Chart 3**. Distributions by educational attainment for each demographic and economic group are provided in the full CPEA report.

Differences are visible in the demographic and economic group distributions as compared to the overall distribution of all same-employer high school graduates. For example, *Trade, Transportation & Utilities* which had the largest share of same-employer high school graduates was also the largest sector for all groups except *Female*. Only 20% of *Female* had same-employer wages in this sector, which is four percentage points lower than the overall group and nine percentage points lower than *Male*. *Hispanic, Any Race* (26%) and *African-American/Black Alone* (30%) same-employer high school graduates were more heavily concentrated in this sector, compared to *White Alone* (22%) and *Asian Alone* (23%).

The *Goods-Producing* sector had similar patterns. *Males* (16%) were concentrated in the *Goods-Producing* sector at three times the rate of *Females* (4%), and six percentage points higher than the overall rate. *White Alone* (13%) and *Hispanic, Any Race* (10%) were concentrated in this sector at twice the rate of *African-American/Black Alone* (5%) and *Asian Alone* (6%).

Chart 3. Same-Employer High School Graduates, State of Maryland, 2014, Sector of Employment by Group, Five Years after High School Graduation



Almost three-quarters of all same-employer graduates in *Goods-Producing* were *White Alone* and *Male.* See **Table 9.** The distribution patterns for *Manufacturing* were similar to *Goods-Producing*. While only 1%-2% of each group were in *Manufacturing*, twice as many *Male* same-employer graduates were in *Manufacturing* compared to *Female* and over half the total number of same-employer graduates in *Manufacturing* were *White Alone.*

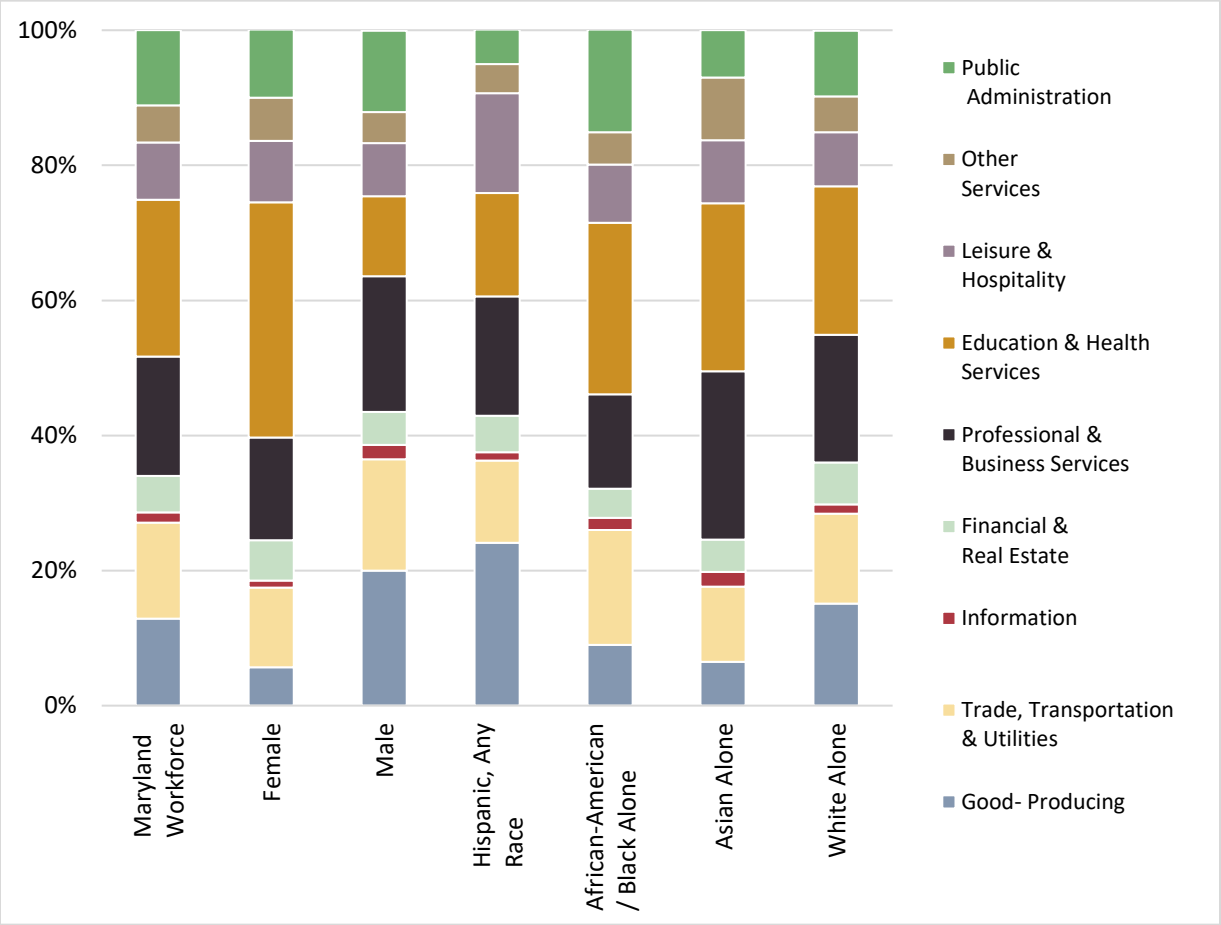
Table 9. High School Graduates, State of Maryland, 2014, Sector of Employment by Group for Same-Employer Graduates with Median Quarterly Wage, Five Years after High School Graduation

Group	All Sectors		Goods-Producing			Manufacturing		
	n	$	n	%	$	n	%	$
Overall	19,860	$7,086	1,900	9.5%	$10,120	296	1.5%	$8,797
Female	10,464	$6,657	387	4%	$9,226	100	1%	$8,085
Male	9,396	$7,597	1,513	16%	$10,387	196	2%	$9,327
FARMS	6,449	$6,682	532	8%	$9,524	119	2%	$8,630
Non-FARMS	13,411	$7,321	1,368	10%	$10,522	177	1%	$8,960
Hispanic, Any Race	2,124	$7,277	222	10%	$10,031	24	1%	$8,241
African-American/Black Alone	6,267	$6,315	288	5%	$8,642	94	1%	$8,539
Asian Alone	1,015	$6,878	61	6%	$15,962	11	1%	$12,082
White Alone	10,741	$7,690	1,389	13%	$10,378	172	2%	$9,063

These same-employer group distributions reflect patterns that are consistent with the overall distribution of the Maryland workforce for some sectors. See **Chart 4**[8]. In Maryland, overall, *Females* appear less frequently in sectors such as *Goods-Producing* and *Trade, Transportation & Utilities* and more frequently in *Education & Health Services* as compared to *Males.* Other industries exhibited distinctly different distributions for Maryland workforce compared same-employer high school graduates. For example, the share of same-employer graduates in *Public Administration, Leisure & Hospitality* and *Professional & Business Services* exhibited little variation between groups for same-employer high school graduates, but distinct differences between racial and ethnic groups for the full workforce.

[8]U.S. Bureau of Labor Statistics. (2020). Geographic Profile of Employment and Unemployment, 2019. Table 20. Percent distributions of employed people by industry, gender, race, and Hispanic or Latino ethnicity, 2019 annual averages. https://www.bls.gov/opub/geographic-profile/home.htm. Note, FARMS is not a sub-group for the Bureau of Labor Statistics (BLS) therefore no comparisons can be directly made to the overall Maryland workforce distributions and FARMS distributions. BLS reports on Educational Services and Health Care and Social Services under Education and Health Services. Data were not available on the individual groups from the geographic profile report.

Chart 4. State of Maryland, 2019, Industry of Employment by Group for Maryland Workforce

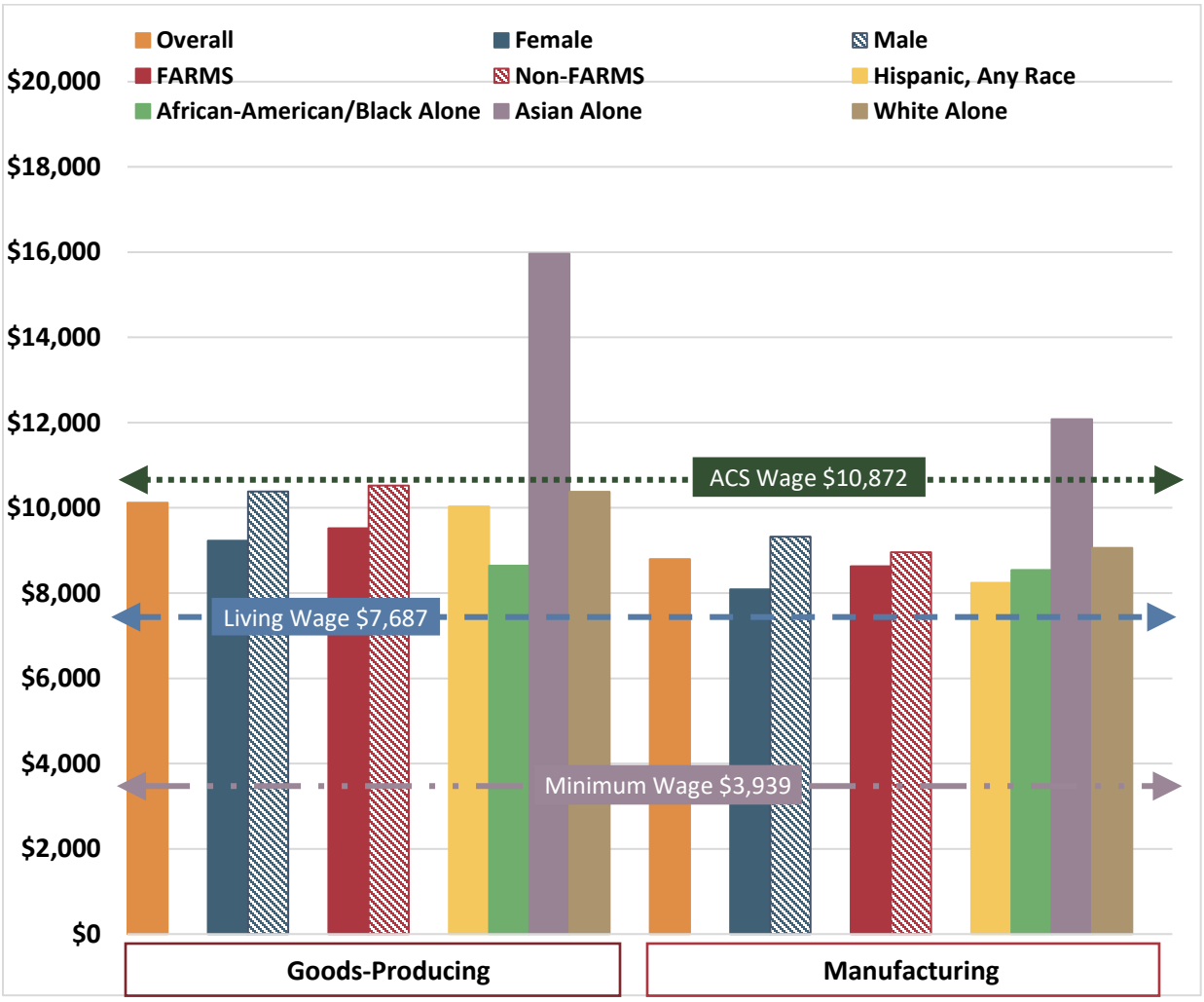


Results: Median Quarterly Wages by Sector for Demographic and Economic Groups

The median quarterly wages for each demographic and economic group for the *Goods-Producing* sector and its *Manufacturing* sub-sector for same-employer graduates are provided in **Chart 5.** The median quarterly wages for all demographic and economic groups for sectors by educational attainment are provided in **the full CPEA report.**

Overall, there were differences in the median quarterly wages for each group within both sectors. Generally, the median quarterly wages were higher for *Male* and *Non-FARMS* same-employer high school graduates compared to the medians for *Female* and *FARMS.* The racial group *Asian Alone* had much higher median quarterly wage than other racial and ethnic groups; however, this group had only 61 graduates in *Goods-Producing* and 11 graduates in *Manufacturing*. The differences in median quarterly wages between *White Alone, African-American/Black Alone,* and *Hispanic, Any* Race were more pronounced in the overall *Goods-Producing sector* than in the *Manufacturing* sub-sector. The gap between the median quarterly wage for *Females* and *Males* is the same in both the *Goods-Producing* sector and its sub-sector *Manufacturing,* around $1,100 to $1,200.

Chart 5. Same-Employer High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Group, Five Years after High School Graduation



The wage gaps, which may appear small, when annualized can be meaningful. For example, the difference between *Female* and *Male* in *Goods-Producing* and *Manufacturing* was $1,100-$1,200 per quarter, a difference that translates to $4,400 to $4,800 per year. Or, considered another way, this difference covers the cost of transportation ($4,322) or close to the combined cost of food ($3,010) and medical expenses ($2,603) in the State of Maryland for one working adult according to the MIT Living Wage Calculator.

Table 10. Same-Employer High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Group, Five Years after High School Graduation

Group	Goods-Producing		Manufacturing	
	n	$	n	$
Overall	1,900	$10,120	296	$8,797
Female	387	$9,226	100	$8,085
Male	1,513	$10,387	196	$9,327
FARMS	532	$9,524	119	$8,630
Non-FARMS	1,368	$10,522	177	$8,960
Hispanic, Any Race	222	$10,031	24	$8,241
African-American/Black Alone	288	$8,642	94	$8,539
Asian Alone	61	$15,962	11	$12,082
White Alone	1,389	$10,378	172	$9,063

Note: Categories do not total due to omitted groups.

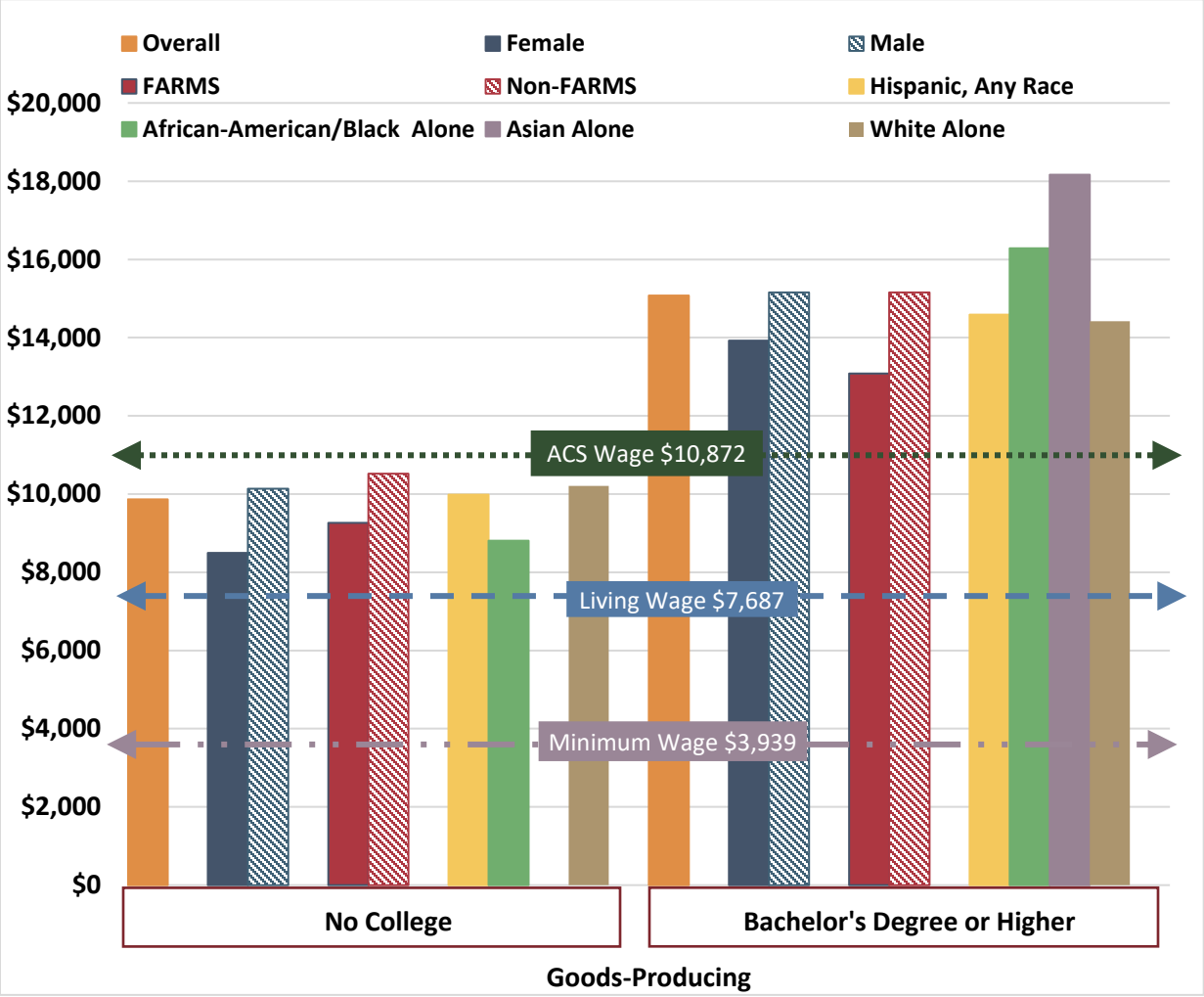
The wage gaps between groups for same-employer high school graduates, five years after graduation, are approximately the gaps present between groups in the overall Maryland workforce. For example, in Maryland in 2019, the median annual wage was for $46,057 *Males* and $40,080 for *Females* in *Trade, Transportation & Utilities*, or about $1,500 per quarter[9]. The U.S. Census does not provide wage data by race and ethnicity at the sector level; however, the median earnings in 2019 for *White Alone Males* was $72,578, while it was $51,856 for *African-American/Black Alone Males,* a difference of over $5,000 per quarter[10]. It is important to note that the gaps between these last two groups does not account for wage differentials that occur between labor sectors and is comprehensive of all workers, those in entry-level, minimum wage jobs in lower paying industries and those with extensive work histories in high-paying salaried fields.

The medians presented in **Chart 5** and **Table 10** do not account for educational attainment. It is possible the differences in wages between groups reflects differences in educational attainment and thus different types of employment within each sector. **Charts 6 and 7** and **Table 9** present the median quarterly wages for the *Goods-Producing* and *Manufacturing* same-employer graduates for those with *No College* and those with *Bachelor's Degree or Higher* to further explore wages between demographic and economic groups when considering the two extreme ends of the educational attainment spectrum.

[9]U.S. Census Bureau. (2020). *Industry by Sex and Median Earnings in the Past 12 Months (In 2019 Inflation-Adjusted Dollars) For the Civilian Employed Population 16 Years and Over*. American Community Survey. State of Maryland. Table S2413.
[10]U.S. Census Bureau. (2020). *Selected Population Profile in the United States. 2019: ACS 1-Year Estimates.* American Community Survey. State of Maryland. Table S0201.

This analysis demonstrated some interesting patterns for wages. First, the median wage gaps were larger between gender groups at lower levels of education, with a difference of $1,600 for *No College* and a gap of $1,200 for *Bachelor's Degree or Higher*. Also noteworthy, the gap seen between *White Alone* and *African-American/Black Alone* in *No College* reverses in *Bachelor's Degree or Higher*. White Alone with No College is $1,736 higher than African American/Black Alone with no college, while African American/Black Alone with a Bachelor's Degree or Higher is $1,861 higher than White Alone.

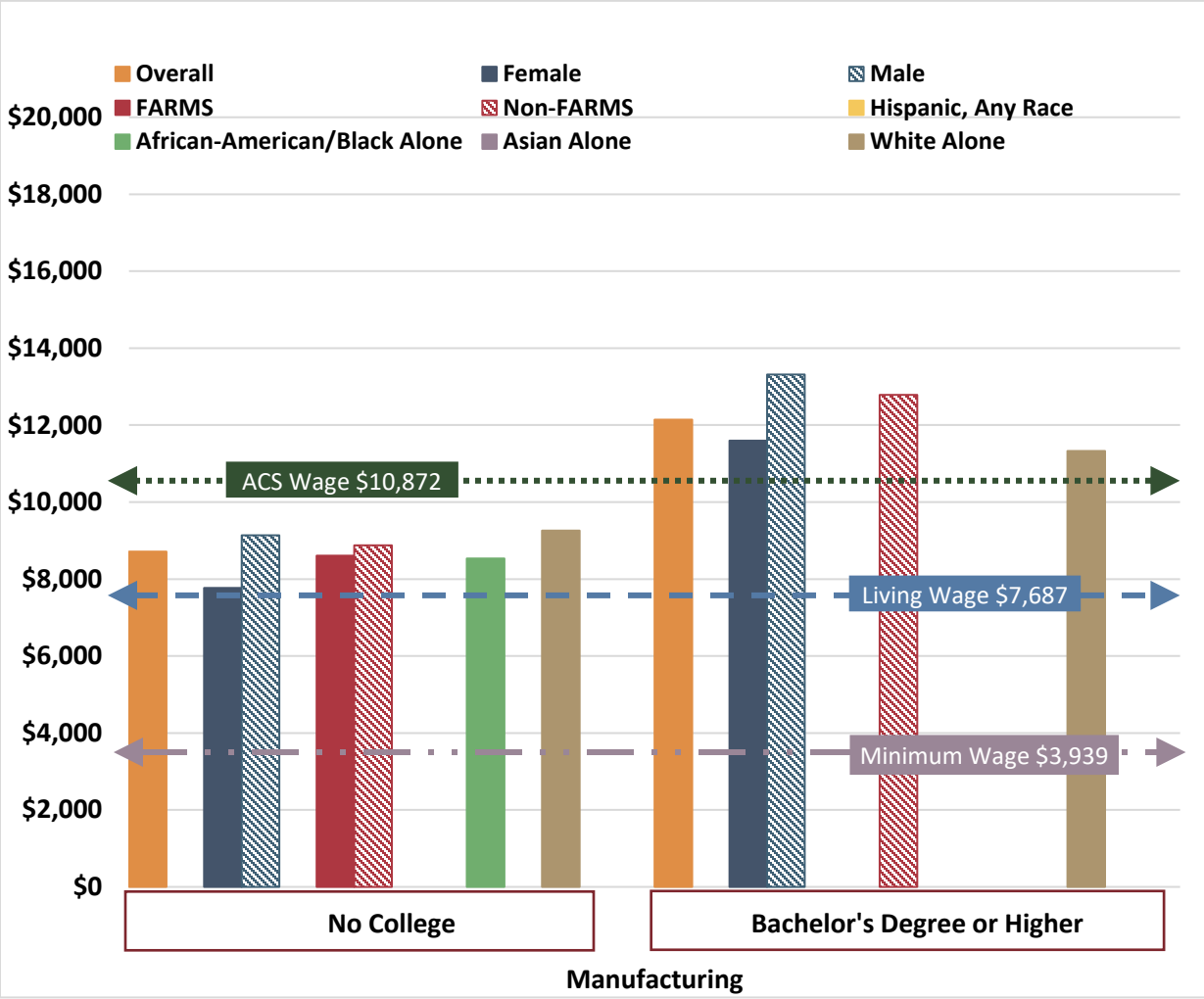
Chart 6. Same-Employer High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Group for Goods Producing, Five Years after High School Graduation



Note: Data for *Asian Only* in *No College* have been suppressed to protect unauthorized disclosure of protected information.

Manufacturing wage gaps are difficult to evaluate. The small populations require data suppression. **See Chart 7** and **Table 11**. The gap between median quarterly wages for gender is again present, this time, the gap is larger at higher levels of education ($1700 vs $1300). The populations are too small to analyze gaps between other groups.

Chart 7. Same-Employer High School Graduates, State of Maryland, 2014, Median Quarterly Wages by Group for Professional & Business Services, Five Years after High School Graduation



Note: Data for *Hispanic, Any Race* and *Asian Only* in *No College* and for *Hispanic, Any Race, FARMS, African/American-Black Alone* and *Asian Alone* in *Bachelor's or Higher* have been suppressed to protect unauthorized disclosure of protected information.

Table 11. Same-Employer High School Graduates, State of Maryland, 2014, Median Quarterly Wage by Group and Industry

Goods-Producing						
	Overall		No College		Bachelor's Degree or Higher	
Group	n	$	n	$	n	$
Overall	1,900	$10,120	769	$9,864	273	$15,074
Female	387	$9,226	58	$8,497	107	$13,923
Male	1,513	$10,387	711	$10,138	166	$15,156
FARMS	532	$9,524	288	$9,260	22	$13,081
Non-FARMS	1,368	$10,522	481	$10,520	251	$15,159
Hispanic, Any Race	222	$10,031	89	$9,981	14	$14,589
African-American/Black Alone	288	$8,642	118	$8,808	19	$16,282
Asian Alone	61	$15,962	*	*	29	$18,162
White Alone	1,389	$10,378	584	$10,204	210	$14,421

Manufacturing						
	Overall		No College		Bachelor's Degree or Higher	
Group	n	$	n	$	n	$
Overall	296	$8,797	105	$8,710	47	$12,138
Female	100	$8,085	21	$7,767	21	$11,598
Male	196	$9,327	84	$9,136	26	$13,314
FARMS	119	$8,630	56	$8,605	*	*
Non-FARMS	177	$8,960	49	$8,876	44	$12,787
Hispanic, Any Race	24	$8,241	*	*	*	*
African-American/Black Alone	94	$8,539	37	$8,534	*	*
Asian Alone	11	$12,082	*	*	*	*
White Alone	172	$9,063	59	$9,259	34	$11,330

Note: Categories do not sum to overall total due to omitted groups.
*indicates value is suppressed to protect unauthorized disclosure of protected information.

The limitations of the wage data make it difficult to interpret the differences between group median quarterly wages identified in this supplement. Wage data provide the sector of the employer rather than the job of the employee. The wage differentials that appear to exist between groups may be attributable to the wide range of positions within each industry. For example, all industries require specialized skills, such as accounting, or technical skills, such as network security, these positions require specific training or expertise like are likely to have higher pay. Other positions within the same industry require general skills, such as managers or sales representatives, and are likely to pay less, especially at entry level. The between group wage gaps within a sector may really reflect a concentration of demographic or economic groups within lower-paying positions within that sector rather than lower pay for the same job.

The between group wage differentials for *Bachelor's Degree or Higher* may be attributable to a second factor: college major. College majors provide a conduit to career pathways. Some career pathways have lower entry-level wages, such as account representative, and others have higher entry level wages, such as software developer, yet both require a Bachelor's degree. As with *No College*, if a demographic or economic group is concentrated in a major and that major corresponds to an entry-level position with lower pay, then the wage differential may reflect that major-position concentration rather than pay disparities between groups for the same job or same degree.

This latter point may further explain why the wage differentials between groups are larger at higher levels of education. At lower levels of education, there may be less variation in entry-level career pathways. In short, those who do not continue on to college are engaged in entry-level jobs that require similar levels skills resulting in smaller pay gaps, while those who continue on to college are engaged in entry-level jobs that exhibit a wider range of skills, some of which provide a wage premium.

The patterns discussed here are not necessarily true for all sectors. In some sectors, the gaps reverse. **The full CPEA report** provides median quarterly wage data on all demographic and economic groups for all industries and levels of education. Additionally, two groups, *Asian Alone* and *Hispanic, Any Race* are much smaller than *African-American/Black Alone* and *White Alone.* Small populations may provide too little data for conclusive results and should be interpreted with caution.

Finally, in considering the wage data presented in this supplement, it is important to remember that these high school graduates are approximately 23 years old at the point of wage observation, in entry-level positions, and unlikely to have extensive work histories that would translate to wage premiums, *yet differences are present*. Differences that could have significant implications for lifetime earnings. More research is required to understand and contextualize the between group wage gaps. When do they appear in career pathways? Are they due to pay disparities or the concentration of demographic and economic groups in certain careers and majors? How do issues of access limit or overcome these concentrations? And, do the gaps close over time with career progression?

Please review **the full CPEA report** for conclusions and policy implications related to the patterns highlighted in this brief supplement.

APPENDICES

Appendix 1: Contextual Data

Three sources of data were selected to provide context for the results and guide the analysis.

MIT Living Wage Calculator

The Living Wage Calculator developed by the Massachusetts Institute of Technology[11] provides data on the cost of living in various geographic areas across the United States. The living wage calculator incorporates the cost of food, housing, health insurance, transportation, taxes, clothing, and other personal items to derive the minimum annual income required for basic self-sufficiency. It is more comprehensive than traditional poverty measures, which do not incorporate these broader costs of living. The measure selected from the Living Wage Calculator was *required annual income before taxes for one adult with no dependent children* which was $30,749 annually or $7,687[12] per fiscal quarter in 2019. This income was converted to a quarterly income to align to the MLDS quarterly wage data and is referred to as the "living wage" in the remainder of this analysis.

American Community Survey 5 Year Estimates

The second source of contextual data was the American Community Survey (ACS) 5-Year Estimates, 2014 to 2018.[13] This survey provides extensive data on demographic characteristics, housing, and wages for states and counties throughout the United States. The measure selected from the ACS was *median earnings for workers*. This income measure was converted to quarterly earnings to align to the MLDS quarterly wage data and is referred to as the "ACS wage" in the remainder of this analysis. The ACS median earnings for workers in Maryland was $43,940 annually or $10,985 quarterly in 2019.[14]

Minimum Wage in Maryland

The minimum wage in Maryland from July 2018 to June 2019 was $10.10 per hour. A minimum wage worker employed for 30 hours per week earns $3,939 per quarter[15]. The 30 hours per week threshold was selected to calculate earnings as employment at 30 hours is the minimum to be classified as full-time.

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[11]Glasmeier, A. (2020). Living Wage Calculator. (http://livingwage.mit.edu/) Massachusetts Institute of Technology.

[12]Values reported in the Living Wage Calculator were $30,287 annually in Q1 2019 dollars. This was adjusted for inflation to $30,749 to Q2 2019 using the CPI Inflation Calculator provided by the U. S. Department of Labor, Bureau of Labor Statistics. https://www.bls.gov/data/inflation_calculator.htm. The inflation adjusted wage divided to a quarterly wage of $7,687 in 2019 dollars.

[13]United States Census Bureau. (2019). 2014-2018 American Community Survey 5-Year Estimates. U.S. Census Bureau's American Community Survey Office. https://www.census.gov/programs-surveys/acs

[14]Values reported in the ACS were $42,520 annually in 2018 dollars. The was adjusted for inflation to $43,940 to Q2 2019 using the CPI Inflation Calculator provided by the U. S. Department of Labor, Bureau of Labor Statistics - https://www.bls.gov/data/inflation_calculator.htm. This inflation adjusted wage was divided to a quarterly wage of $10,985 in 2019 dollars.

[15]This quarterly wage was derived by multiplying (($10.10 x 30 hours per week) x 52 weeks in a year) and dividing by 4. This value did not need to be adjusted for inflation as it is contemporaneous to the period under study.

Appendix 2: Educational Attainment Methodology

Educational attainment has the following important implications for workforce outcomes. First, research suggests that employment outcomes and wages may vary by level of educational attainment[16]. Second, high school graduates enrolled in college may be employed in part-time entry-level minimum-wage positions so they can prioritize college; comparatively high school graduates that did not enroll in college may have been available to enter the workforce in full-time career-track employment. Finally, the time to degree widely varies based upon the type the postsecondary degree. Certificate's, Associate's and Bachelor's degree programs are designed to require one, two or four years of full-time study respectively. The length of each program impacts the amount of time graduates may have been in the workforce after earning their college degree. For example, Certificate graduates may enter the workforce three years earlier than Bachelor's degree graduates, while Associate's graduates may enter the workforce two years earlier than Bachelor's degree graduates.

Accordingly, separating the population of interest into groups by educational attainment helps identify wages differences that may occur when using a common point in time (five years after high school graduation) as a measure for a population who has had different amounts of time in the workforce. These distinctions in educational attainment should not be interpreted as college graduation rates as this report does not provide the starting number of students entering each educational attainment category, only the number of students who obtained each degree, are still enrolled in college or stop attending college without graduating. Reporting on time to degree and college completion rates is outside the scope of this report.
For this report, the following seven educational groups were created See **Figure 1** and **Table 1** for distributions. Education attainment definitions:

1. **High School Graduates**: High school graduates without an in-state or out-of-state college enrollment record by the end of spring term 2019.
2. **Some College**: High school graduates enrolled for at least one term between fall 2014 and fall 2018 but who are not actively enrolled in college in the spring 2019 or fall 2019 terms.
3. **Still in College**: High school graduates enrolled in college in-state or out-of-state in the spring 2019 and/or fall 2019 terms. These graduates may have earned a postsecondary degree by the end of the fall 2018 term; however, they are still actively pursuing additional postsecondary education.

[16]For example, see:

Baum, S., Ma, J. & Payea, K. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

Hout, M. (2012). Social and economic returns to college education in the United States. Annual Review of Sociology. 38: 379-400.

Kane, T.J. & Rouse, C. E. (1995). Labor market returns to two-year and four-year college. The American Economic Review, 85(3): 600-614

Thomas, S. & Zhang, L. (2005). Post-baccalaureate wage growth within 4 years of graduation: The effects of college quality and college major. Research in Higher Education. 46(4): 437-459.

4. **Certificate Graduates**: High school graduates who earned a postsecondary certificate by the end of the fall term 2018 and are not enrolled in college in the spring 2019 or fall 2019 terms.
5. **Associate's Graduates:** High school graduates who earned a postsecondary associate's degree by the end of the fall term 2018 and are not enrolled in college in the spring 2019 and/or fall 2019 terms.
6. **Bachelor's Graduates:** High school graduates who earned a postsecondary bachelor's degree by the end of the fall term 2018 and are not enrolled in college in the spring 2019 and/or fall 2019 terms.
7. **Other Degree Attainment:** High school graduates who earned a post-baccalaureate degree or a graduate degree by the end of fall 2018 term and are not enrolled in college in the spring 2019 or fall 2019 terms.

Note, some high school graduates received more than one degree during the five year period. Each graduate is counted only once, based upon highest degree attained. For example, if a high school graduate earned an Associate's degree and then earned a Bachelor's degree, the high school graduate is counted in the Bachelor's category. Other high school graduates earned a degree but were still progressing toward an additional degree, therefore some high school graduates in the *Still in College* category have already earned a degree.

The 20th quarter after high school graduation aligns with the postsecondary spring term which would end in May or June of 2019; however, assignment to an educational attainment category is made as of each student's status in fall 2018 (December 2018 or quarter 18 post-high school graduation). The decision to use this term for placement into an educational attainment category was made to allow students in each category time to transition from college to workforce and thus provide a more accurate picture of wages and industry of employment after college.

Appendix 3: Free or Reduced-Price Meals Eligibility

This report uses student-level data on free or reduced-price meals (FARMS) eligibility. FARMS is part of the National School Lunch Program (NSLP), administered by the United States Department of Agriculture (USDA). Students may be eligible for free or reduced-price meals through participation in certain need-based Federal Assistance Programs or if their family's income falls below a specified poverty threshold. Eligibility status may be determined through annual household applications or through direct certification. Students living in households with incomes at or below 130% of the federal poverty level are eligible for free meals, while students living in households with incomes between 130% and 185% of the federal poverty level are eligible for reduced-priced meals. Some students are directly certified based on participation in certain programs rather than exclusively on financial need (e.g., migrant education program, education of homeless children and youth, foster care).

FARMS does not measure socioeconomic status. Socioeconomic status is a complex measure that includes social status or prestige, occupation, educational attainment, income, and other factors. Many researchers use FARMS eligibility as a proxy for poverty. Using FARMS participation as a proxy for poverty may not correctly identify students experiencing poverty and treats all students as experiencing the same level of poverty. Using FARMS participation as a proxy for student poverty has limitations:

- The USDA has determined the number of children applying for FARMS declines in middle and high school due to the stigma associated with FARMS.
- Individual schools with 40% or more FARMS eligible students can elect to participate in the FARMS community eligibility provision. This election may report all students as FARMS even though some do not meet the poverty threshold.
- Student eligibility for FARMS can also change over time. Identifying FARMS participation in a single year may omit students who participated in FARMS in previous years.
- Not all students that participate in FARMS have identical levels of poverty. FARMS eligibility ranges from 130% to 185% of the federal poverty level.

A student's FARMS participation may be evaluated in a single year or based upon duration of time a student participates in FARMS. The method selected for determining FARMS participation can produce quite different results. This report evaluates FARMS status during 12th grade. As such, it likely underrepresents the number of students experiencing poverty in 2014 (the year of high school graduation), students living in poverty for longer durations, and does not include student cycling in and out of poverty throughout their elementary and secondary education.

Sources on FARMS:

- U.S. Department of Agriculture. Food and Nutrition Service. *Child nutrition programs: Income eligibility guidelines (July 1, 2019 - June 30, 2020)* https://www.fns.usda.gov/cnp/fr-032019
- Nation Center for Education Statistics. *Free or reduced price lunch: A proxy for poverty?* https://nces.ed.gov/blogs/nces/post/free-or-reduced-price-lunch-a-proxy-for-poverty
- Harwell, M., & LeBeau, B., *Student eligibility for a free lunch as an SES measure in education research*. Educational Researcher, 39(2), 120-131.