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April 2020

Educational and Workforce Outcomes for Associate's Degree Graduates from Maryland's Community Colleges

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Suggested Citation
MLDS Center. (2020). *Educational and Workforce Outcomes for Associate's Degree Graduates from Maryland's Community Colleges.* Baltimore, MD: Maryland Longitudinal Data System Center.

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EXECUTIVE SUMMARY

This report is the third in a series of reports that began with the *Career Preparation Expansion Act (CPEA) Report*. The *CPEA Report* focused on the workforce outcomes of high school graduates five years after graduation. The second report in the series provided an analysis of the workforce outcomes of GED® and NEDP® diploma earners five years after receiving their diplomas. Now, this report analyzes the workforce outcomes of Associate's degree graduates five years after graduation. All of these reports provide important clues about the value of the respective degrees and how that value is impacted by subsequent educational attainment and industry of employment.

The population under consideration for this report are the 12,609 students who graduated from a Maryland Community College with an Associate's degree during the 2013 Academic Year (July 2012 through June 2013). Unlike the high school graduate population, this cohort varies in age from 18 to 65 and over, with 50% between the ages of 18 to 24 and another 29% between the ages of 25 to 34. The varying ages undoubtedly has an impact on outcomes. For example, an older Associate's degree graduate may have had prior work experience or a prior degree that may impact his or her subsequent earnings. Due to data limitations, the analysis cannot account for factors prior to graduation. However, the data clearly show that age has an impact on the decision to seek further education. Of the Associate's degree graduates who continued their education, nearly 60% were between the ages of 18 to 24.

As in the prior reports, this report groups the Associate's degree graduates based on their educational attainment, i.e. whether they continued college and received additional degrees, attempted college but exited without another degree, are still in college, or bypassed college altogether and went straight into the workforce. While each pathway yielded different workforce outcomes, those outcomes did not have the same degree of variation as found in the other reports. For example in the *CPEA Report*, high school graduates who went on to earn a bachelor's degree had a median quarterly income that was nearly $4,000 more than the median wages for all high school graduates. In this report, the variation between the median quarterly wage for bachelor's degree earners was only $280 more than the median quarterly wage for all Associate degree earners. One reason that there is so little variation in wages is that this entire population has a postsecondary degree, something that translates to higher wages for all types of degrees. In fact, with the exception of the graduates who were still in college or attempted college but did not complete another degree, the graduates earned a median quarterly wage that was above the living wage and above the median earnings for all Maryland workers (as reported in the American Community Survey 5-year estimates, see page 10 below). While those who went directly to the workforce and those who were still in college or attempted college but exited without a subsequent degree were not above the ACS median wage, their wages were still approximately $2,000 above the living wage.

Another distinct finding of this report compared to the other two reports is that the Associate's degree graduates have increased visibility in the wage data. On average, 62% of all Associate's degree graduates were visible in the wage data in any one quarter over the five year period - with a low of 58%

and a high of 63%. In comparison, the *CPEA Report* showed that for high school graduates, on average, only 50% were visible in the wage data in any quarter, with a low of 37% and a high of 57%. One reason for this difference may be due to the fact that 27% of high school graduates leave the state to attend college. Another reason may be that the Associate's degree may make these students more employable in sectors that are subject to unemployment insurance filings and therefore more likely to be visible in the wage data. Finally, the Associate's degree conferred by a Maryland Community College may be more transferable in state, resulting in students not leaving the state to further their education and therefore they remain a part of the Maryland workforce even after completing another college degree.

In addition to wages, the report also explores the industry of employment of the Associate's degree earners five years after graduating. For this analysis, in order to be counted as employed in a sector, the graduate has to be working for the same employer for three consecutive quarters (quarter 20 - five years after graduation - and quarters 19 and 21). The *Education and Health Services* sector employs the most graduates, which is true regardless of educational attainment category. Similarly the second largest sector, *Professional and Business Services,* and the third largest sector, *Trade, Transportation, and Utilities*, are also the same regardless of educational attainment. Notably, over 75% of all graduates employed in the *Education and Health Services* and *Professional and Business Services* sectors had a median quarterly wage at or above the living wage. This is a significant and positive finding considering that these two sectors employ 59% of all graduates with the same employer.

The third largest sector, *Trade, Transportation, and Utilities,* had more mixed results. For example, graduates who were still in college and those with some college had median quarterly wages below the living wage. In general, the still in college and with some college groups have lower wages, likely due to their delaying their career-track employment to prioritize education. The impact on the some college group may be significant since they will not have the benefit of another degree to offset the lower pay and delayed entry into career-track employment.

Finally, the report discusses and utilizes new methodologies for analyzing wages, reviews the gaps in the wage data and how those gaps impact the analysis, and discusses the implications of the report and direction for future research.

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INTRODUCTION

Community College Overview

There are sixteen community colleges in Maryland which collectively enrolled over 138,000 students in the Fall 2013 term.[1] Maryland's community colleges are predominantly open enrollment, providing access to a college education to high school graduates and adult learners at all levels of academic preparation. Collectively, these colleges serve a diverse population of degree-seeking and non-degree seeking students.[2]

In 2012-13, Maryland's community college system conferred approximately 14,000 Associate's degrees[1]. A typical Associate's degree requires 60 credits and 2 years of full-time study to complete. These degree programs are offered in a wide range of majors, including engineering, teaching, business, information technology, nursing, design, and general studies. Some Associate's degrees are intended to prepare students to directly enter a career, while others are intended to prepare students to transfer to a four-year institution to complete a Bachelor's degree. For many Associate's degree graduates, this is their first college degree. For others, the degree may either supplement skills from a prior degree, enhance skills to advance in an existing career, or provide the education necessary to change careers.

Community colleges are noted for affordability and flexibility. Many classes are offered in the evenings or on weekends to accommodate working adults. The average tuition and fees for Maryland's community colleges was $123 per credit hour in the 2012-2013 academic year for full-time in-county students, or about $7,400 to complete a 60 credit program.[1] Comparatively, in the 2012-2013 academic year, the average annual tuition and fees at a Maryland public four-year institution was $8,073 for full-time in-state undergraduates for one year of study, or approximately $32,000 for the four years required to complete a bachelor's degree.[1] In the 2012-2013, the national average for in-state tuition and fees at two-year colleges was $2,792 or $5,584 for two years of full-time study.[2] Maryland's community colleges may, on average, have higher tuition rates than national averages; however, by comparison to the average annual tuition at a Maryland public four-year institution, Maryland's community colleges are an affordable option for many students. For those graduates continuing on to a Bachelor's, completing an Associate's degree a Maryland community college before pursuing a bachelor's degree can reduce the overall cost of a bachelor's degree by around $10,000.

Making college affordable for Marylander's is a hallmark of the Maryland Higher Education Commission's 2017-2021 State Plan for Postsecondary Education[3]. This plan focuses on increasing access to college, reducing costs to attend college, supporting student success during college, and partnering with businesses and researchers to explore educational practices that can improve career

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[1]Maryland Higher Education Commission. (2015). Data Book.

[2]NCES. Digest of Education Statistics. **Table 330.20**. *Average undergraduate tuition and fees and room and board rates charged for full-time students in degree-granting postsecondary institutions, by control and level of institution and state or jurisdiction: 2012-13 and 2013-14.*

[3]2017-2021 Maryland State Plan for Postsecondary Education.
https://mhec.state.md.us/About/Pages/2017StatePlanforPostsecondaryEducation.aspx

readiness. The state plan is critical to Maryland achieving its goal for having at least 55% of Maryland residents between the ages of 25 and 64 holding at least an Associate's degree by 2025[4].

More information on Maryland's community colleges can be found on the Maryland Higher Education Commission's website: https://mhec.state.md.us/institutions_training/Pages/default.aspx

Report Objective

This report explores the outcomes for Associate's degree graduates from Maryland's community colleges five years after degree attainment. Specifically, this study explores the

1. Wages earned; and
2. Industry of employment.

Research Agenda Questions

All research conducted by the MLDS Center focuses on what happens to students before and after critical transitions between education and workforce pathways. All research and analysis using the MLDS is cross-sector. MLDS Center research is guided by a Research Agenda. This report is responsive to the following Maryland Longitudinal Data System Center research agenda questions:

- What happens to students who start at community colleges and do not go on to 4-year institutions?
- Are exiters of Maryland colleges successful in the workforce?

MLDS Data

The MLDS is the State's central repository for student and workforce data. The MLDS Center develops and maintains the System in order to provide analyses, produce relevant information, and inform choices to improve student and workforce outcomes in the State of Maryland.
The MLDS System connects data from across Maryland's education and workforce agencies. These data are subject to strict data management, security, and privacy requirements. The MLDS may only report aggregated, de-identified data.

This analysis focuses on the employment of individuals as they move from earning their Associate's degree into the workforce, including whether or not any of the graduates enrolled in college or earned another college degree subsequent to graduation. Below is an overview of the available data within the System to support this analysis:

Education Data

The MLDS System contains education data on all students from Maryland's public schools, community colleges, 4-year public institutions and state-aided independent institutions. Education data begin with the 2007-2008 academic year and are current through the 2018-2019 academic year. The System does not contain education data on

[4]This goal is codified in The College and Career Readiness and College Completion Act of 2013 (SB740).

students in private high schools or private institutions of higher education. Nor does the System contain data on postsecondary students in continuing education or non-credit programs. The System contains limited information out-of-state college enrollment and graduation for Maryland public high school graduates.

Wage Data

The MLDS workforce data include quarterly Unemployment Insurance (UI) wages from 2008 through the third quarter of 2019. Unemployment Insurance (UI) filings are only available for employees who work for a business required to file UI. UI wages reflect the sum of all compensation. For some records, wages include bonuses, commissions, tips and other forms of compensation. Bonuses and other forms of compensation are periodic and may cause fluctuations in earnings. Wages reflect the period the compensation was paid, not when the compensation was earned. The wage data contained in the System cannot distinguish between part-time and full-time employment, hourly and salaried wages, regular wages and commissions, bonuses and other incentive pay. The UI data provided do not indicate the number of days a person worked in a particular quarter or the number of hours a person worked in a week.

The federal government (including the military), certain non-profits, and self-employed and independent contractors are not subject to Maryland UI filings. Individuals working in temporary employment, including federal postsecondary work-study programs, are also not subject to UI filings. MLDSC data do not include information on out-of-state employment. These data gaps mean it is incorrect to assume that individuals not counted as "employed" in this report are unemployed.

Wage data in the System include North American Industry Classification System (NAICS) codes for employers. This system classifies employers by sector rather than identifies the specific jobs performed by employees.

Contextual Data

Five sources of data were selected to provide context for the results and guide the analysis. Collectively, these sources provide comparison points between the quarterly wage data, Maryland minimum wage, the cost of living in Maryland, overall worker earnings in Maryland, and contribution of each industry sector to Maryland's economy.

MIT Living Wage Calculator

The Living Wage Calculator developed by the Massachusetts Institute of Technology[5] 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,

[5]Glasmeier, Amy K. (2018). Living Wage Calculator. (http://livingwage.mit.edu/) Massachusetts Institute of Technology.

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. More information on the MIT Living Wage Calculator is available on their website. The measure selected from the Living Wage Calculator was "required annual income before taxes" for one adult with no dependent children which was $31,365 annually or $7,841[6] per fiscal quarter in 2018. 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 is the American Community Survey (ACS) 5-Year Estimates, 2012 to 2016.[7] 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 $43,488 annually or $10,872 quarterly in 2018.[8]

Minimum Wage in Maryland

The minimum wage in Maryland from July 2017 to June 2018 was $9.25 per hour. A minimum wage worker employed for 30 hours per week earns $3,608 per quarter[9]. The 30 hours per week threshold was selected to calculate earnings as employment at 30 hours is the minimum to be qualified as full-time.

U. S. Bureau of Economic Analysis

The U. S. Bureau of Economic Analysis (BEA) is an agency within the U. S. Department of Commerce. BEA produces statistics on gross domestic product (GDP), personal income and other measures of the U. S. economy to support government policy. The measure selected from BEA is the Gross Domestic Product by State for all industries in fiscal

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[6]Values reported in the Living Wage Calculator were $31,365 annually in 2018 dollars. This was divided to a quarterly wage of $7,841 in 2018 dollars. This value did not need to be adjusted for inflation as it is contemporary to the period under study.

[7]United States Census Bureau. (2016). 2012-2016 American Community Survey 5-Year Estimates. U.S. Census Bureau's American Community Survey Office. https://factfinder.census.gov

[8]Values reported in the ACS were $40,893 annually in 2016 dollars. This was divided to a quarterly wage of $10,223 in 2016 dollars. The values were inflation adjusted to 2018 dollars 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.

[9]This quarterly wage was derived by multiplying (($9.25 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 contemporary to the period under study.

quarter 2 of 2018 for Maryland[10]. GDP is a measure of the total dollar value of all goods and services produced and sold, and it represents a measure of the contribution of each industry (NAICS) to the Maryland economy. The GDP is used to provide context for the percentage of graduates employed in a NAICS as compared to that NAICS' contribution to the Maryland economy.

Maryland Department of Labor

The Maryland Department of Labor collects and analyzes data related to the Maryland labor market to provide information to individuals, businesses, and policy makers on the Maryland economy and its workforce. Two statistical tables were selected from the Maryland Department of Labor.

1. *2017 employment and wage data from the Maryland Industry Series*[11]. This table provides data on the number of employees in each NAICS and the average weekly wages for all employees in each NAICS. The first measure provides context for the workforce size of each NAICS relative to total employment and is compared to the total population of graduates employed in each NAICS. The second measure is weekly wages. The Maryland Department of Labor derives weekly wages by summing all the wages paid to all employees subject to UI reporting within a NAICS and then calculates the average weekly wage. The weekly wage was converted to a quarterly wage by multiplying the value by 52 and dividing the product by four. The average quarterly wage provides a snapshot of the wages paid in that NAICS across all types and classifications of employment and is compared to the quarterly median for Maryland graduates employed in the NAICS.
2. Workforce projected growth from 2018 to 2020 by NAICS[12]. These data provide the projected growth for each NAICS and allow for a comparison of the percentage of graduates entering the NAICS to the NAICS projected growth.

[10]GDP calculations for 2017 and 2018 are reported in current (2019) dollars. The values have not been inflation adjusted to 2017 and/or 2018. https://apps.bea.gov.

[11]Maryland 2017 - Industry Series - Maryland's Quarterly Census of Employment and Wages (QCEW) - OWIP https://www.dllr.state.md.us/lmi/emppay/md2017ep.shtml

[12]Maryland Industry Projections - 2018-2020 - Workforce Information and Performance https://www.dllr.state.md.us/lmi/iandoprojshort/industryshort.shtml

Population of Interest

The population of interest was graduates of Maryland's community colleges who earned their Associate's degree between July 2012 and June 2013. Slightly more than 12,000 unique students earned their Associate's degree during this period. See **Table 1**[13].

The Associate's degree graduates were disaggregated into educational attainment groups based upon subsequent educational experiences. Analyzing wage data by educational attainment is critical to any exploration of wage and industry of employment for the following reasons:

1. Research suggests that employment outcomes and wages may vary by level of educational attainment[14];
2. Variation in length of degree program impacts the length of time in the workforce post-degree, which in turn impacts employment outcomes and wages; and
3. Enrollment in school negatively impacts amount of hours available for work each week.

Table 1. Associate's Degree Graduates, State of Maryland, 2012-2013, Distribution by Educational Attainment

Educational Attainment	Total	Percentage
Associate's Degree Only	4,453	35%
Associate's Degree with Some College	2,036	16%
Associate's Degree Still in College	2,126	17%
Associate's Degree with Additional Lower Division Degree	583	5%
Certificate	*297*	
Associate's	*286*	
Associate's Degree with Bachelor's or Higher Degree	3,411	27%
Bachelor's Degree	*3,189*	
Graduate Degree	*222*	
Total	**12,609**	

Approximately two-thirds of Associate's degree graduates, five years after graduation, continued their postsecondary education, with 27% of the graduates earning a bachelor's degree or higher within five years and 17% still actively pursuing an additional degree. A small number of graduates, 5%, completed an additional Associate's degree or postsecondary Certificate. Over 2,000 Associate's degree graduates,

[13]Educational attainment should not be interpreted as college graduation rates as this report does not provide data on the number of students starting each degree, 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 is outside the scope of this report. See **Appendix 1** for the definitions used to for group assignment.

[14]For example, see:

Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

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

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

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

16% of the total pool, started an additional degree but discontinued their education without earning a degree. Over one-third of the graduates, five years after graduation, had not pursued any additional degree-seeking postsecondary education in Maryland.

The majority (51%) of Associate's degree graduates were between the ages of 18 and 24 at the time of graduation. See **Table 2**. Individuals in this group were between 23 years old and 29 years old at the time wages were evaluated five years after graduation. The second largest group (29%) were between the 25 and 34 at the time of graduation, and between the ages of 30 and 39 when wage data were evaluated. The remaining 20% were 35 years or older at the time of graduation.

Table 2. Associate's Degree Graduates, State of Maryland, 2012-2013, Distribution by Age at Time of Degree and Educational Attainment

Educational Attainment	All Associate's Degrees	Associate's Degree Only	Associate's Degree with Some College	Associate's Degree Still in College	Associate's Degree with Additional Lower Division Degree	Associate's Degree with Bachelor's or Higher Degree
18 to 24	6,406	1,651	1,047	1,155	208	2,345
25 to 34	3,661	1,554	571	607	182	747
35 to 44	1,510	705	252	242	98	213
45 to 64	990	521	*	*	*	*
65 and over	19	*	*	*	*	*
Unknown	23	*	*	*	*	*
Total	**12,609**	**4,453**	**2,036**	**2,126**	**583**	**3,411**

*To protect student privacy, values of 10 or fewer are masked. Additional values are masked to prevent calculating masked values when group totals and sub-totals are provided.

Exploring the age distribution of this group is important for two reasons. First, if the Associate's degree is earned later in life, graduates may not have as many years in the workforce to experience a return to their educational investment. An individual graduating with an Associate's degree at age 24 has over forty years to build a career. An individual graduating with an Associate's degree at age 45 has twenty years remaining until reaching traditional retirement age. These two individuals may experience very different wage trajectories and life time earnings. Second, individuals that were 25 years old in 2012-2013 graduated from high school around 2005, which predates MLDS Center data by three years. Accordingly, for graduates age 25 and older (49% of the population) it is not possible to know if the Associate's degree earned in 2012-2013 was the first degree earned or if another degree pre-dated the Associate's degree. If the Associate's degree was subsequent to other degrees, like a Bachelor's degree, the earnings observed five years after the Associate's degree may be attributable to earlier education rather than the degree that is part of this study. Data limitations, such as these, mean that all results should be interpreted with caution.

ANALYSIS AND RESULTS

Question 1. Wages Earned Five Years after Graduation

This section outlines the approach used to analyze wage data, calculate median quarterly wages, and construct income bands for Associate's degree graduates five years after graduating from a Maryland community college. This section also considers the variation in wage visibility by educational attainment and its relationship to wages five years after graduation.

Part 1. Median Wage Methodology

The Associate's degree graduates included in the wage analysis were selected by using the U. S. Census Bureau Stable or Full-Quarter Employment Methodology (referenced as Full-Quarter throughout this report)[15]. This methodology excludes individuals from analysis who do not have wage data in both the fiscal quarters before and after the period of interest. The Full-Quarter Employment Methodology was selected because it provides a standardized method of determining whose wages to include in the analysis. Restricting the analysis to full-quarter wage earners provides a clear picture of wage outcomes for workers fully engaged in the workforce and eliminates the potential to deflate median wage calculations by including the wages, or lack of wages, for workers who are absent, transient, or not fully engaged in the workforce. Other sections of this report will identify and analyze issues related to Associate's degree graduates that may not be fully engaged in the workforce or have limited wage data available for analysis.

For this study, the period of interest was the 20th quarter, or five years, after earning an Associate's degree from a Maryland community college. Accordingly, graduates were included in the wage analysis[16] if, in addition to having wages in the 20th quarter, they also had wages in the 19th and 21st quarters. The median quarterly wage was then derived from the 20th quarter wage. The median quarterly wage was derived for the entire cohort of graduates with full-quarter wages as well as for each educational attainment group. See **Appendix 3** for a comparison of medians for graduates with full-quarter employment to that of all graduates with wages in quarter 20.

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

[16] Some individuals have wages in a quarter from more than one employer. Those wages were summed and then the sum was used in the median quarterly wage calculation.

Associate's degree graduation dates occurred throughout the entire 12 month period of July 2012 to June 2013. The table below provides the alignment of degree date to the 20th quarter used for this report. This alignment means that some graduates who completed their degree in the first or second month of the fiscal quarter have an additional 4 to 8 weeks of time between degree attainment and the start of the 20th fiscal quarter to secure post-degree employment as compared to those who earn their degrees at the end of period. See **Table 3.**

Table 3. Associate's Degree Graduation Date to Fiscal Quarter Alignment

Associate's Degree Graduation Semester	20th Fiscal Quarter	Months in Fiscal Quarter
Summer 2012 (Graduation July to September)	Q2 2017	April-May-June
Fall 2012 (Graduation October to December	Q3 2017	July-August-September
Spring 2013 (Graduation January to March)	Q4 2017	October-November-December
Spring 2013 (Graduation April to June)	Q1 2018	January-February-March

Wage bands were constructed to align to the contextual indicators selected for this report. The wages earned in the 20th quarter for those with full-quarter employment were used to assign each graduate to one of four wage groups. See **Table 4**.

Table 4. Quarterly Wage Bands

Income Band	20th Fiscal Quarter Wage
Less than Minimum Wage	$1 to $3,608
Between Minimum Wage and Living Wage	$3,609 to $7,841
Between the Living Wage and ACS Wage	$7,842 to $10,872
Greater than or equal to the ACS Wage	>= $10,872

Part 1. Results

Median Quarterly Wages by Educational Attainment

There were 7,228 Associate's degree graduates, or 57% of all graduates, who met the definition for full-quarter employment and were therefore included in this wage analysis. See **Table 5**[17]. Graduates excluded from this calculation include individuals who may have had wage data for some but not all of the quarters required to meet the full-quarter employment definition, who may have had wages from a source not reported to the MLDS (contractors, military personnel and federal employees), who may have been working out-of-state, or who may have been unemployed. The percentage of graduates meeting the definition for full-quarter employment varied by educational attainment.

Table 5. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wages by Educational Attainment Compared to Living Wage, Five Years after Graduation

Educational Attainment	Total	Total with Full-Quarter Employment	% with Full Quarter Employment	Median Wage for Quarter 20	Variation to Living Wage ($7,841)
All Associate's Degrees	*12,609*	*7,228*	*57%*	*$10,967*	↑ *$3,126*
Associate's Degree Only	4,453	2,195	49%	$11,780	↑ $3,939
Associate's Degree with Some College	2,036	1,144	56%	$9,874	↑ $2,033
Associate's Degree Still in College	2,216	1,404	63%	$9,734	↑ $1,893
Associate's Degree with Additional Lower Division Degree	583	375	64%	$12,711	↑ $4,870
Associate's Degree with Bachelor's or Higher Degree	3,411	2,110	62%	$11,247	↑ $3,406

Overall, the median quarterly wage for all Associate's degree graduates with full-quarter employment was $10,967 in the 20th quarter. This quarterly wage was approximately $7,000 above the quarterly minimum wage, $3,000 above the quarterly living wage[18] and almost equal to the quarterly ACS wage[19]. The difference between the median quarterly wage and the contextual wage indicators varied by educational attainment. See **Table 5** and **Chart 1.** Associate's degree graduates who did not continue their postsecondary education had a median quarterly wage that was $5,000 above the quarterly minimum wage, $4,000 above the quarterly living wage and $1,000 above the quarterly ACS wage.

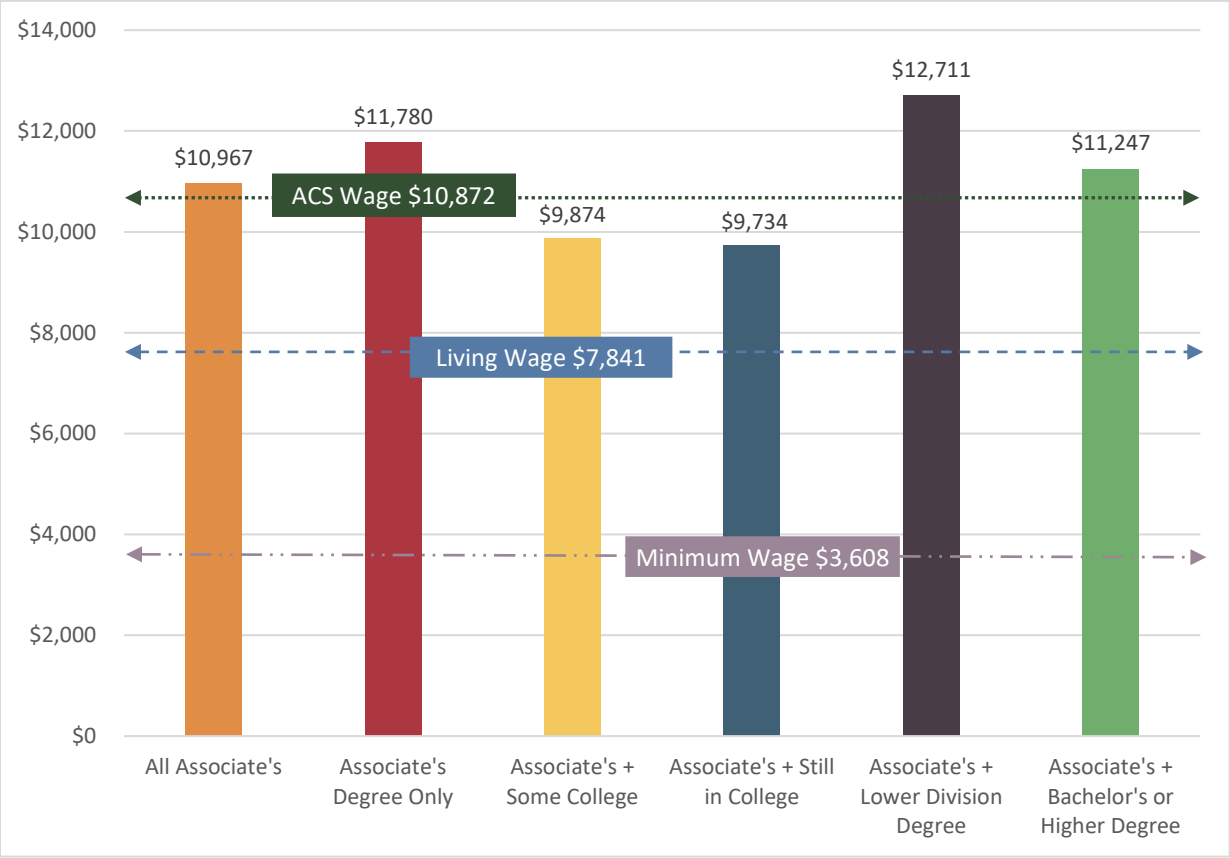
[17]Wages are actual for Q2 2017, Q3 2017, Q4 2017 and Q1 2018 and not inflation adjusted to current day values. If an individual had more than one source of wages for the period those sources were summed to a personal quarterly wage and that value was used in determining the median.

[18]Glasmeier, Amy K. (2018). Living Wage Calculator. Massachusetts Institute of Technology.

[19]United States Census Bureau. (2016). 012-2016 American Community Survey 5-Year Estimates. U.S. Census Bureau's American Community Survey Office.

These large differentials were also true for Associate's degree graduates who obtained an additional lower division degree or obtained a Bachelor's degree or higher. Conversely, those with *Some College* and those *Still in College* had a median quarterly wage slightly above ($2,000) the living wage and slightly below the ACS wage ($1,000).

Chart 1. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wages by Educational Attainment Compared to Wage Indicators, Five Years after Graduation



Of the three educational attainment groups with wages above the ACS Wage, the *Associate's Degree Only* group, which presumably went directly into the workforce after graduation, had a median quarterly wage that was $1,000 below the *Associate's + Lower Division Degree* group and about $500 more than the *Associate's + Bachelor's or Higher Degree* group. The medians for both of these latter two groups may be slightly lower due to less time in the workforce as compared to the *Associate's Degree Only* group. The *Associate's Degree Only* group had five years to pursue successive career positions and received raises, while those in the other two groups may have only had two or three years post the subsequent degree to be promoted.

Further, as may be expected, students in the *Still in College* group were above the living wage by less than the *Associate's Degree Only, Associate's + Lower Division Degree* and the *Associate's + Bachelor's or Higher Degree* and fell below the ACS Wage. This most likely reflects that graduates in the *Still in College* group are employed in a capacity that allows them to prioritize their education rather than fully leverage their Associate's degree toward a career.

Notable is the median quarterly wage for the *Some College* group. This group enrolled in college for at least one term after earning their Associate's degree; however after five years did not earn a degree and disengaged from postsecondary education at least six months prior to the five year evaluation period. The median quarterly wage for this group was approximately $1,900 below the *Associate's Degree Only* median quarterly wage and only slightly higher than the *Still in College* median quarterly wage. This lower median wage may result from a delayed entry into career track employment while attempting an additional college degree. The lack of the additional college degree combined with a delayed entry to the labor market may have reduced starting wages, lowering the median wage, and may even possibly impact lifetime earnings.

Whether the earnings gaps between the educational attainment groups persists, narrows or widens will be determined as additional times passes in the workforce. Further, given the wide range in age for Associate's degree graduates it is difficult to predict how obtaining an Associate's degree well past age 25 (49% of the population) will impact lifetime earnings. The majority (51%) of Associate's degree graduates were less than 24 at the time they earned their degrees, placing them under age 30 at the point of wage evaluation, or having approximately 35 years remaining in the workforce until retirement. Graduates that fell into this age group and did not earn a bachelor's degree are likely to be pace to earn to earn $1.5 million in their lifetimes, while those that completed the bachelor's degree are likely to be on pace to earn $2 million in their lifetimes,[20] both of which align to research[21] on the financial returns to education.

Wage Bands by Educational Attainment

Another way to analyze wages five years after graduating with an Associate's degree is to determine the number of graduates with wages in each of the wage bands. The median quarterly wage identifies the quarterly wage for the person in the exact middle of a population; half the records in that population have a quarterly wage above this value, and half the records have a quarterly wage below this value. Identifying the number of Associate's degree graduates with quarterly wages in these four wage bands helps quantify the number of graduates that are engaged in the workforce at a level that provides for or exceeds the basic cost of living in Maryland.

Overall only 9% of all Associate's degree graduates with full-quarter employment fell below the quarterly *minimum wage* while 21% fell between the *minimum wage and the living wage*. Another 19% had wages that were above the quarterly *living wage*, but, lower than the quarterly *ACS wage*. Finally, 51% had wages at or exceeding the quarterly *ACS wage*. Collectively, this means 70% of all Associate's degree graduates with full-quarter employment had quarterly wages at or above the living wage while 30% were below the quarterly living wage. See **Table 6**.

[20]Projected lifetime earnings are based on the constructing an annual wage from the group median and multiplying it by the estimated 40 years remaining in the workforce for each education level.

[21]For example, Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

Table 6. Associate's Degree Graduates, State of Maryland, 2012-2013, Graduates by Wage Band and Educational Attainment, Five Years after Graduation

Education Level	Total with Full-Quarter Wage	At or Below Minimum Wage		Between Minimum Wage and Living Wage		Between Living Wage and ACS Wage		At or Above ACS Wage	
		#	%	#	%	#	%	#	%
All Associate's Degrees	*7,228*	*648*	*9%*	*1,505*	*21%*	*1,411*	*19%*	*3,664*	*51%*
Associate's Degree Only	2,195	160	7%	397	18%	422	19%	1,216	55%
Associate's Degree with Some College	1,144	112	10%	296	26%	237	21%	499	44%
Associate's Degree Still in College	1,404	187	13%	345	25%	272	19%	600	43%
Associate's Degree with Additional Lower Division Degree	375	27	7%	64	17%	53	14%	231	62%
Associate's Degree with Bachelor's or Higher Degree	2,110	162	8%	403	19%	427	20%	1,118	53%

Applying this measure also calls attention to difference in outcomes at each educational attainment group. See **Table 6**. Almost 26% of the Associate's degree graduates in the *Some College* group fell into the wage band *between minimum and below living wage* compared to 17% and 19% for *Associate's Degree Only*, *Associate's with Lower Division* and *Associate's with Bachelor's or Higher* groups. Further, only 65% of the *Some College* group had quarterly wages that exceeded the living wage, compared to 74% of *Associate's Degree Only,* 76% of *Associate's with Lower Division,* and 73% of *Associate's with Bachelor's or Higher.* While these differences are small, they could have an impact on lifetime earnings for the *Some College* and *Still in College* graduates who may have delayed career track employment to unsuccessfully attempt additional education or delayed entry to career track employment by requiring an extended time to degree.

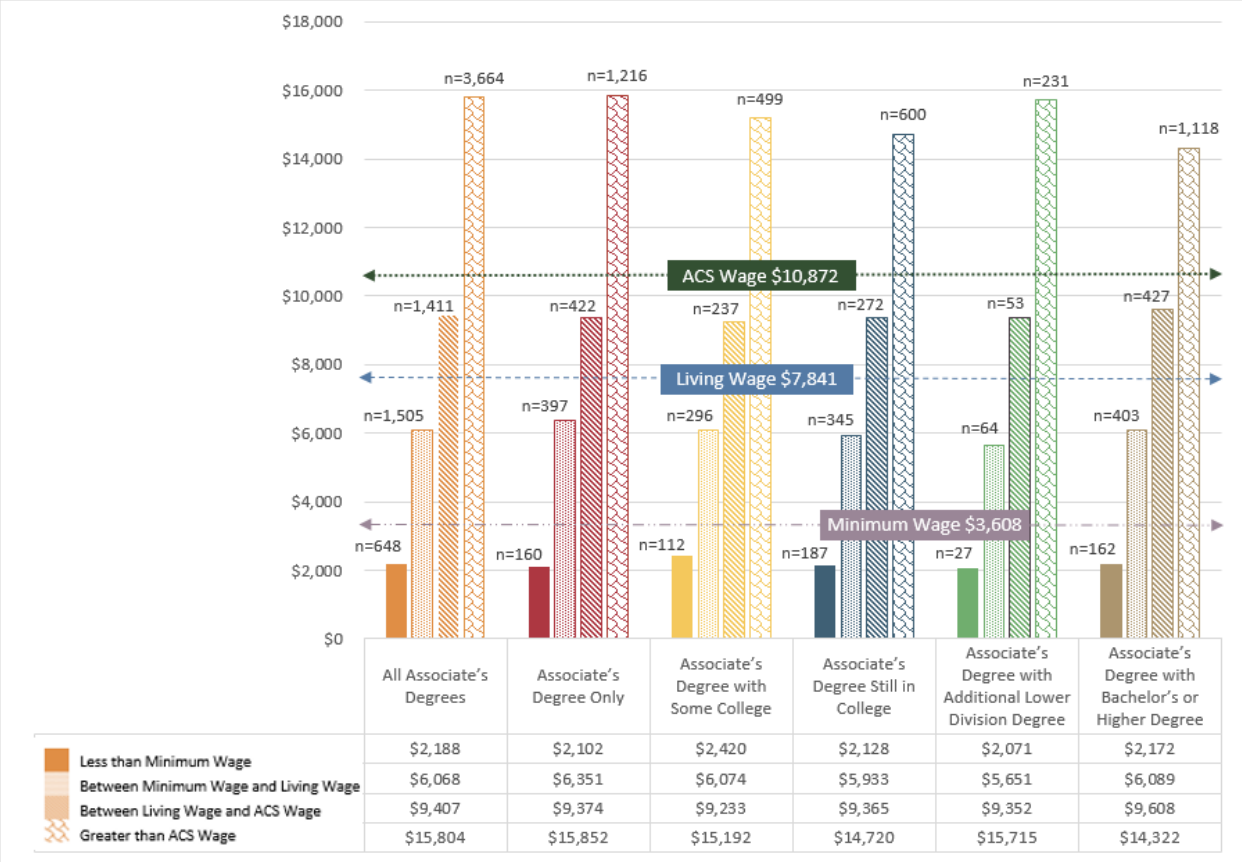
The median quarterly wage was derived for each wage band and educational attainment group. See **Table 7** and **Chart 2.** Reviewing the medians for each wage band-educational attainment group demonstrates that for the wage bands, *Between Living Wage and ACS Wage* and *Above ACS Wage,* the medians were not just above the wage indicator, but were thousands of dollars above the wage indicator. For example, the median quarterly wage for *Associate's Degree Only* in the *Between Living Wage and ACS Wage* was $9,374 or $1,893 above the living wage. This means that half of the graduates in this group (approximately 200 of the 422 graduates) were not just at the living wage, they were well above it and within $1,500 of the *ACS Wage*. Highlighting another example, the *Bachelor's Degree or Higher* group had a median wage in the *ACS Wage* band of $14,322 or $3,450 above the ACS wage indicator. In this group, over 500 graduates were not only above the ACS wage, they were thousands of dollars above the wage. Further, the median wage in each band showed little variation across educational attainment groups. Simply, those that are above the living wage and/or above the ACS wage were above it regardless of educational attainment.

Table 7. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wages by Wage Band and Educational Attainment, Five Years after Graduation

Education Level	Total with Full-Quarter Wage	At or Below Minimum Wage		Between Minimum Wage and Living Wage		Between Living Wage and ACS Wage		At or Above ACS Wage	
		#	Median Quarterly Wage	#	Median Quarterly Wage	#	Median Quarter Wage	#	Median Quarterly Wage
All Associate's Degrees	*7,228*	*648*	*$2,188*	*1,505*	*$6,068*	*1,411*	*$9,407*	*3,664*	*$15,804*
Associate's Degree Only	2,195	160	$2,102	397	$6,351	422	$9,374	1,216	$15,852
Associate's Degree with Some College	1,144	112	$2,420	296	$6,074	237	$9,233	499	$15,192
Associate's Degree Still in College	1,404	187	$2,128	345	$5,933	272	$9,365	600	$14,720
Associate's Degree with Additional Lower Division Degree	375	27	$2,071	64	$5,651	53	$9,352	231	$15,715
Associate's Degree with Bachelor's or Higher Degree	2,110	162	$2,172	403	$6,089	427	$9,608	1,118	$14,322

Relatedly, the median quarterly wage for those in the *Below Minimum Wage* band and *Between Minimum Wage and Living Wage* band, at all educational attainment levels, was not just below the wage indicator, it was well below the wage indicator. For example, the median quarterly wage in the *Below Minimum Wage* band and the *Between Minimum Wage and Living Wage* band for the *Associate's Degree Only* group were both $1,500 below the wage indicator. This means that for graduates in these groups half are not just below the wage indicator, they are well below and have wages that are not equivalent to working a minimum wage job 30 hours a week. It is possible that these wages represent part-time work. It is also possible that graduates in these two wage bands may have supplemental income from other sources not reported in UI wages, that these UI wages represent a second job rather than the primary source of income. Further, although to be included in the wage analysis graduates had to have wages in the 19th and 21st wage periods, it is possible that the 20th wage quarter represents a period of employment transition. This quarter may be marked by lower than normal wages if the graduate did not derive wages for some portion of the fiscal quarter while transitioning between jobs.

Chart 2. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wages by Wage Band and Educational Attainment, Five Years after Graduation



It is also important to consider that 43% of Associate's degree graduate's from Maryland's community colleges do not have full-quarter wages five years after graduation. This population is excluded from this analysis as their irregular wage data at the five year mark makes it difficult to analyze and interpret. It is possible these individuals have employment out-of-state, with the federal government, or are employed in positions not subject to UI wage reporting. It is also possible these individual have chronic unemployment for all or some portion of the five year period after graduation. See **Appendix 2** for a discussion on wage visibility and its implications for this report.

Part 2. Wage Visibility Methodology

Wage data were also analyzed for each fiscal quarter after Associate's degree graduation to determine the number of graduates with wage data in each fiscal quarter. Plotting the wage visibility by educational attainment in relation to academic terms provides another perspective on the relationship between wage visibility, educational attainment, and workforce participation.

Part 2. Results

Wage Visibility by Educational Attainment

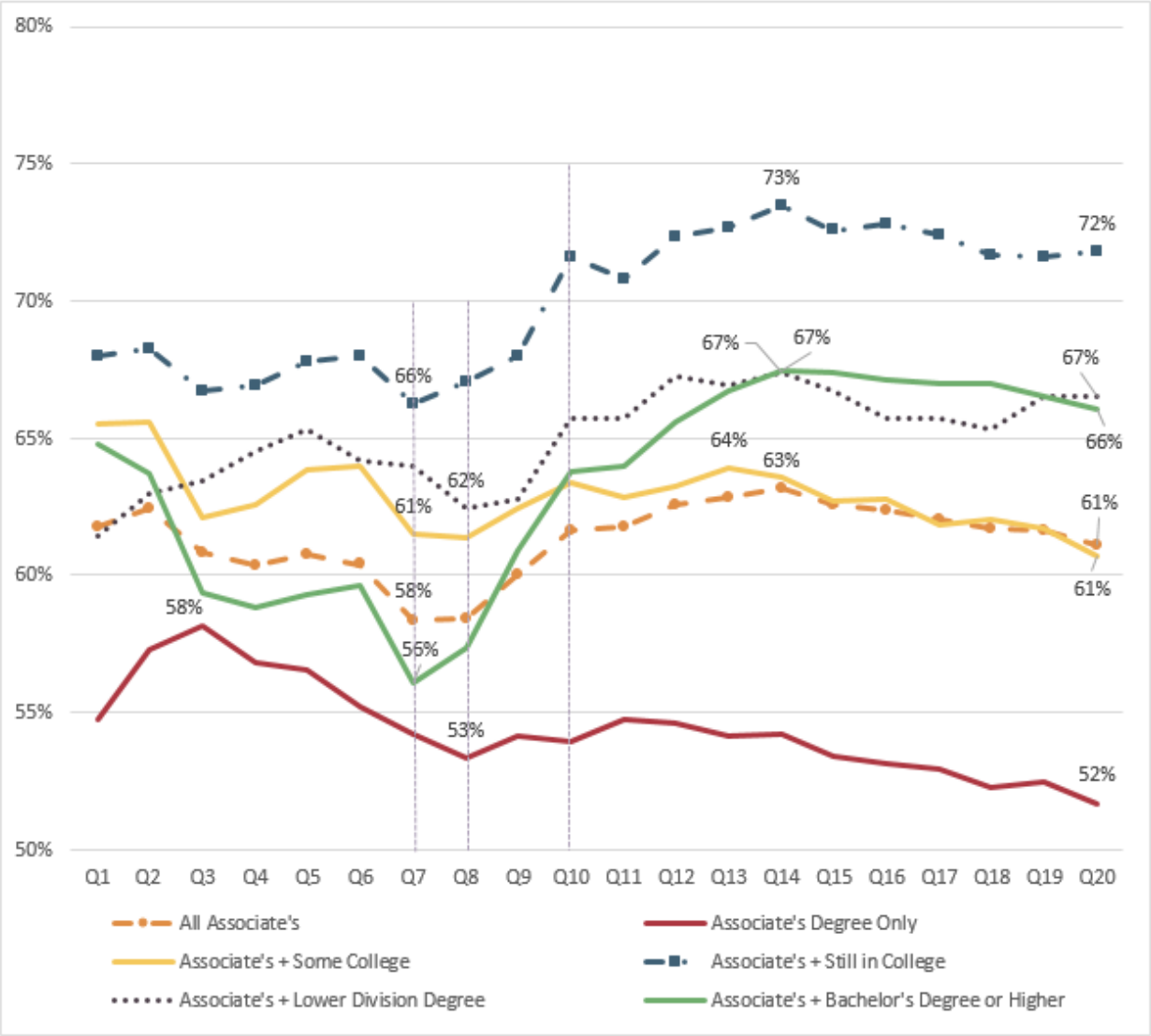
On average, 62% of all Associate's degree graduates were visible in the wage data in any one quarter over the five year period; with a low of 58% in quarters 7 and 8, which is two years after graduation. All other quarters range from 60% to 63%. See **Table 8**. For a full analysis by educational attainment, see **Appendix 1**.

Table 8. Associate's Degree, State of Maryland, 2012-2013, Wage Visibility by Quarter for Full Five Year Period after Graduation

Year	Fiscal Quarter	All Associate's Degree Graduates with Wages in Quarter	% of Associate's Degree Graduates with Wages in Quarter
Year 1	Q1	7,785	62%
	Q2	7,877	62%
	Q3	7,668	61%
	Q4	7,609	60%
Year 2	Q5	7,664	61%
	Q6	7,616	60%
	Q7	7,359	58%
	Q8	7,370	58%
Year 3	Q9	7,571	60%
	Q10	7,774	62%
	Q11	7,790	62%
	Q12	7,888	63%
Year 4	Q13	7,924	63%
	Q14	7,966	63%
	Q15	7,886	63%
	Q16	7,864	62%
Year 5	Q17	7,823	62%
	Q18	7,783	62%
	Q19	7,772	62%
	Q20	7,703	61%
	Average	**7,735**	**62%**

For all educational attainment groups, there is a distinct drop in wage visibility approximately 1.75 years after graduation (Q7 and Q8). See **Chart 3**. The drop reverses 2.5 years after graduation (Q10). It is possible that this period marks a transition from a first job to a second job, or in the case of those pursuing additional postsecondary education, a transition from in-college employment to post-2nd degree completion career-track employment.

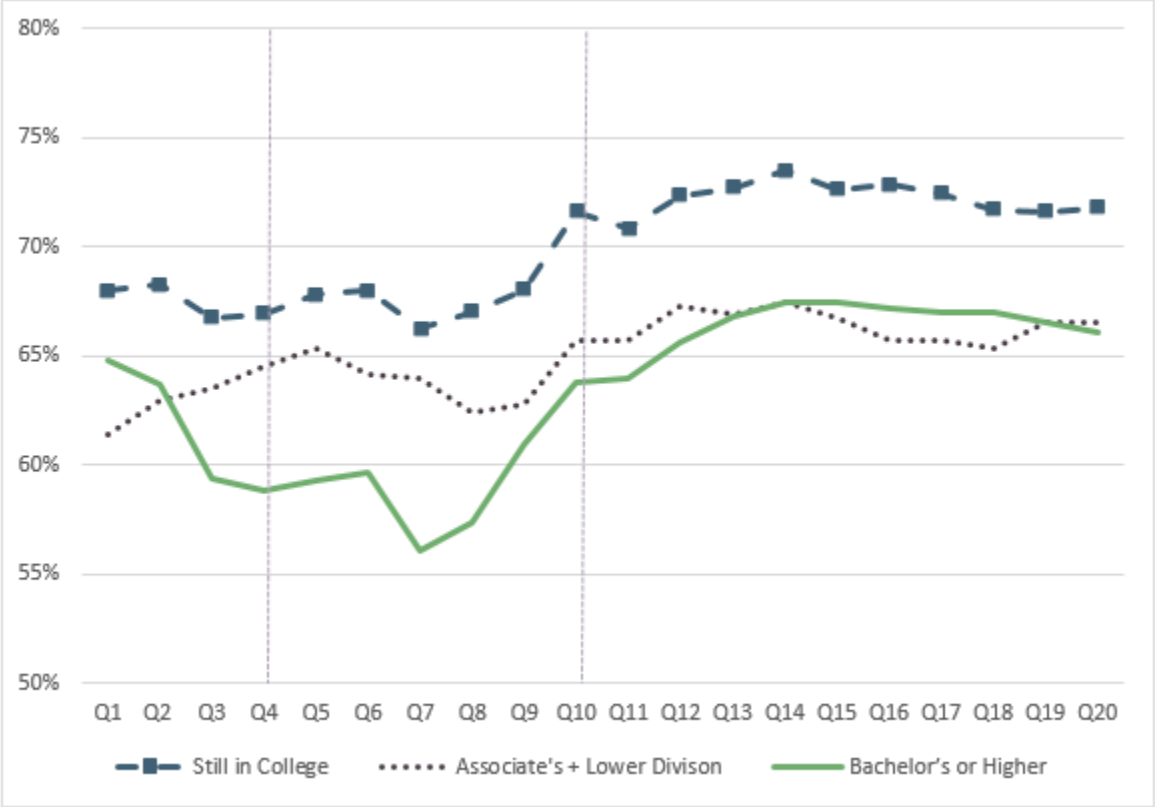
Chart 3. Associate's Degree Graduates, State of Maryland, 2012-2013, Wage Visibility by Educational Attainment for Full Five Year Period after Graduation



A second notable transition is for graduates who did not pursue any additional postsecondary education. See **Chart 3**. For the *Associate's Degree Only* group, their visibility is the lowest of the five educational attainment groups, with peak visibility peak three quarters after graduation with 58% of graduates visible. Starting with the 4th quarter, the wage visibility for this group declines until reaching an overall low of 52% at the end of the five year period. The six percentage point drop is not necessarily large; however, only one other group, *Some College*, experiences a decline (5%) in visibility between Q1 and Q20. The remaining three groups all increase in visibility from Q1 to Q20. The decline for both *Associate's Only* and *Some College* may reflect transitions for these group, whereby they relocate for work, start their own businesses, or engage in the workforce in other ways that become increasingly invisible in Maryland UI wage data. Further, the same declines may be visible in the other educational attainment groups once more time has lapsed after completing a subsequent degree.

The third pattern to consider is the variation in the overall rates of intragroup wage visibility. See **Chart 3**. The group with the highest visibility, *Still in College,* represents about 20% of the overall population, the majority of which are visible in the wage data every quarter for the full five year period. Comparatively, the *Associate's Degree Only* group represents 30% of the population and is the least visible in the wage data. Perhaps this is not surprising as the *Still in College* group is comprised of graduates still actively pursuing postsecondary education in Maryland. The *Associate's Degree Only* group is comprised of graduates who decided to enter the workforce directly from the degree, which may impact their wage visibility as they may have relocated or accepted jobs that cross state boundaries by comparison to the other groups who remain in the Maryland postsecondary system.

Chart 4. Associate's Degree Graduates, State of Maryland, 2012-2013, Wage Visibility for Still in College, + Lower Division, and Bachelor's or Higher for Full Five Year Period after Graduation



The fourth distinct pattern in wage visibility is the difference in wage visibility rates when comparing *Still in College, + Lower Division* and + *Bachelor's or Higher*. See **Chart 4**. First, all three groups begin with similar visibilities; however, a difference in visibility is seen in the third quarter after graduation. Graduates in the *Bachelor's or Higher* group drop in visibility over the next five periods. This may indicate that graduates in this group were initially working while in college, but may have stopped working to pursue college full-time. By the 10th wage period this group experiences a spike in visibility, which continues to climb and then flatten out. The 10th wage period is two and a half years after graduation and approximately the time required to complete a bachelor's degree if attending full-time. This suggests that, three years after graduating with an Associate's degree (Q12), 65% or more of the

Bachelor's or Higher group obtained their Bachelor's degree and are likely in the workforce in a career-track positions. Further, the earnings these graduates experienced in the 20th wage period may reflect only two years of employment *post*-Bachelor's degree attainment.

By comparison, the *Still in College* group is not only the most visible in the wage data, with visibility of 66%-68% for the first two years, about 2.5 years after graduation (Q10), their wage visibility rate increases to 72%. See **Chart 4**. While this is not necessarily a huge shift, it does indicate that this group continues to be highly engaged in the workforce perhaps at the expense of being able to fully engage in education. The median quarterly wage at Q20 for *Still in College* was $9,734. While this is well above the living wage, had they completed their additional educational goals earlier, they may have had quarterly wage equal to the medians of $12,711 or $11,247 for the *Lower Division* and *Bachelor's Degree or Higher* groups.

The *Lower Division* group also presents an interesting wage visibility patterns. Of the three groups, this group begins the five year period with the lowest visibility and then increases about four percentage points within one year (Q4). See **Chart 4**. The visibility then drops slightly, before peaking and flattening around Q10, or two and half years after graduation. This pattern may reflect graduates who, initially enter the workforce and then decided to supplement their education with a postsecondary Certificate or another Associate's degree to support career growth. The dip in visibility may reflect a reduction in workforce participation during their education while the increase in Q10 corresponds to the one to two years that would be required to complete the additional lower division degree.

Due to the gaps in the MLDS wage data, it cannot be said definitively that students enrolled in a subsequent degree program, particularly a Bachelor's degree program, "work less" than those who did not continue their education or attempted but did not complete additional education. However, the pattern suggests that those who earn a bachelor's degree within five years of the Associate's may in fact be devoting the majority of their time to school rather than working, allowing them to complete the Bachelor's degree sooner. It is also possible that the rates of Bachelor's degree students with wage data could be understated due to enrollment in out-of-state colleges as workforce participation would not be visible on students employed outside of Maryland. Additional research is needed to explore the relationship between wage visibility, workforce participation, and degree attainment.

Question 2. Industry of Employment Five Years after Graduating with an Associate's Degree

This section outlines the approach used to analyze the industry of employment and corresponding wages for Associate's degree graduates five years after graduation.

Methodology

The industry of employment was determine by evaluating the North American Industry Classification System (NAICS) code reported with each wage record. NAICS codes were grouped according to standard reporting categories.[22] The U. S. Census Bureau Stable Employment Methodology[23] was used as a basis for selecting Associate's degree graduates to include in the analysis with the added requirement that they must have been employed by the same employer for the nine month period before deriving median wage calculations for the 20th quarter[24] (referenced as Same-Employer throughout this report).

Results

The Full-Quarter Employment with Same-Employer Methodology (Same-Employer) yielded 6,738 Associate's degree graduates for analysis. This is 53% of all graduates, and 93% of all graduates with full-quarter employment. See **Table 9**. This means that 93% of all Associate's degree graduates with full-quarter employment had wages from the same employer for all three fiscal quarters; only 7% of graduates with full-quarter employment changed employers at least once during this period.

Table 9. Associate's Degree Graduates, State of Maryland, 2012-2013, Full-Quarter and Same-Employer, Five Years after Graduation

All Associate's Degrees	Total with Full-Quarter Wage	Total with Full-Quarter Same-Employer Employment	% of Associate's Degrees with Full-Quarter Same-Employer Employment	% of Full-Quarter Associate's Degrees with Same-Employer Employment
12,609	7,228	6,738	53%	93%

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

[23]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.

[24]For the NAICS quarterly median wage calculation, some individuals had wages in the 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. 490 graduates had the same employer however, the employer changed NAICS over the course of 19th, 20th and 21st quarters. The NAICS of the 20th quarter were selected for these graduates. Additionally, 84 graduates had employment in the same NAICS for all three quarters, but, with different employers. These graduates were omitted from the analysis.

Collectively, 94% of same-employer Associate's degree graduates were employed in the Service Providing sector. See **Table 10**. The sector with the highest median quarterly wage was *Education and Health Services.* This sector also had the largest share of same-employer graduates, 43%. The sector with the lowest median quarterly wage was *Leisure and Hospitality.* This sector had one of the smallest shares of same-employer graduates, 6%. Overall, seven of the eight sectors within the Service Providing sector had a median quarterly wage above the living wage, five of which exceeded the living wage by almost $4,000. Only one sector, *Leisure and Hospitality*, had a median quarterly wage below the living wage.

Table 10. Associate's Degree Graduates, State of Maryland, 2012-2013, Industry of Employment and Median Quarterly Wages Compared to Living Wage, Five Years after Graduation

Sector	Total with Full-Quarter Same-Employer Employment	Same-Employer Quarter 20 Median Wage	Variation to Living Wage ($7,841)
Goods-Producing			
Natural Resources and Mining (11 and 21)	n/a	n/a	n/a
Goods Production (23, 31, 32, 33)	380	$12,004	↑ $4,163
Service Providing			
Trade, Transportation, and Utilities (22, 42, 43, 44, 45, 48, 49)	848	$8,203	↑ $362
Information (51)	104	$11,801	↑ $3,960
Financial Activities (52, 53)	404	$11,876	↑ $4,035
Professional and Business Services (54, 55, 56)	1,072	$11,891	↑ $4,050
Education and Health Services (61, 62)	2,928	$12,131	↑ $4,290
Leisure and Hospitality (71, 72)	380	$6,351	↓ $1,490
Other Services (81)	189	$8,434	↑ $593
Public Administration (92)	433	$11,780	↑ $3,939
Total	**6,738**		

Same-Employer wages were also analyzed to determine the number of graduates in each sector with wages above the living wage. The median quarterly wage identifies the quarterly wage for the person in the exact middle of a population; half the records in that population have a quarterly wage above this value, and half the records have a quarterly wage below this value. Identifying the number of graduates with same-employer wages above the living wage helps quantify the number of graduates that are engaged in the workforce at a level that provides for or exceeds the basic cost of living in Maryland.

Overall, 71% of same-employer Associate's degree graduates had a median quarterly wage that was above the living wage. See **Table 11**. This rate varied widely across sectors. Only 37% of same-employer graduates in *Leisure and Hospitality* had a quarterly wage above the living wage while 85% of same-employer graduates in *Financial Activities* had a quarterly wage above the living wage. In eight of the nine sectors the majority of graduates with same-employer wages had a quarterly wage at or above the living wage.

Table 11. Associate's Degree Graduates, State of Maryland, 2012-2013, Industry of Employment and Total Graduates at or above Living Wage, Five Years after Graduation

Sector	Total with Full-Quarter Same-Employer Employment	Total with Wages at or above Living Wage ($7,841)	% at or above Living Wage
Goods-Producing			
Natural Resources and Mining (11 and 21)	n/a	n/a	n/a
Goods Production (23, 31, 32, 33)	380	310	82%
Trade, Transportation, and Utilities (22, 42, 43, 44, 45, 48, 49)	848	442	52%
Information (51)	104	74	71%
Financial Activities (52, 53)	404	342	85%
Professional and Business Services (54, 55, 56)	1,072	848	79%
Education and Health Services (61, 62)	2,928	2,195	75%
Leisure and Hospitality (71, 72)	380	142	37%
Other Services (81)	189	102	54%
Public Administration (92)	433	362	84%
Total	**6,738**	**4,817**	**71%**

The sector with the largest share of same-employer Associate's degree graduates was *Education and Health Services*. The graduates in this sector not only had a median quarterly wage above the living wage, but, 75% of all graduates, over 2,000 graduates, had a quarterly wage at or above the living wage. Similarly, in the second largest same-employer sector, *Professional and Business Services,* 79% of all graduates employed in this sector had a quarterly wage at or above the living wage. Collectively, these two sectors account for 59% of all same-employer graduates. Conversely, the third largest same-employer sector, *Trade, Transportation, and Utilities* had a median quarterly wage above the living wage, but only 52% of graduates employed in this sector had a quarterly wage at or above the living wage.

The largest same-employer sector overall, *Education and Health Services*, was the largest sector for all educational attainment groups. See **Table 12**. Further, for all educational attainment groups the median quarterly wage in this sector was not just above the living wage, but, was also above the ACS wage. The second and third largest same-employer sectors overall, *Professional and Business Services,* and *Trade, Transportation, and Utilities,* were also either the second or third largest same-employer sectors for all educational attainment group.

Table 12. Associate's Degree Graduates, State of Maryland, 2012-2013, Sector of Employment for Same-Employer Employment by Educational Attainment with Median Quarter Wage, Five Years after Graduation

	Sector of Employment	Median Quarterly Wage	Sector of Employment	Median Quarterly Wage	Sector of Employment	Median Quarterly Wage
All Associate's Degrees	*Education and Health Services*	*$12,131~ total=2,928*	*Professional and Business Services*	*$11,891~ total=1,072*	*Trade, Transportation, and Utilities*	*$8,203^ total=848*
Associate's Degree Only	Education and Health Services	$13,589~ total=975	Trade, Transportation, and Utilities	$9,024^ total=282	Professional and Business Services	$11,640~ total=252
Associate's Degree with Some College	Education and Health Services	$11,243~ total=405	Professional and Business Services	$10,851~ total=170	Trade, Transportation, and Utilities	$7,764 total=147
Associate's Degree Still in College	Education and Health Services	$10,778~ total=625	Professional and Business Services	$11,105~ total=197	Trade, Transportation, and Utilities	$6,372 total=160
Associate's Degree + Lower Division Degree	Education and Health Services	$13,818~ total=202	Professional and Business Services	$14,317~ total=42	Trade, Transportation, and Utilities	$9,876^ total=31
Associate's Degree + Bachelor's or Higher Degree	Education and Health Services	$11,665~ total=721	Professional and Business Services	$12,682~ total=411	Trade, Transportation, and Utilities	$8,345^ total=228

^value is above living wage.
~value is above living wage and ACS wage

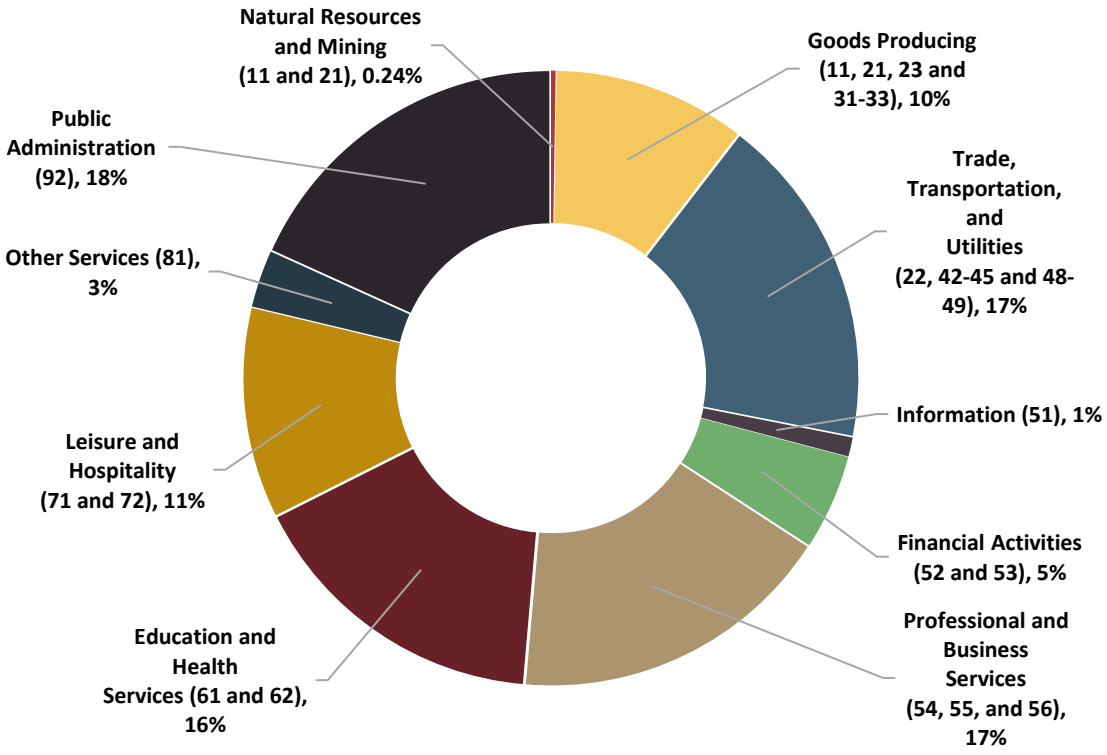
All educational attainment groups in these three sectors, had a median quarterly wage above the living wage, and most were above the ACS wage. There was, however, two notable exceptions. The *Still in College* and *Some College* groups had median quarterly wages below the living wage in *Trade, Transportation, and Utilities.* Generally, these two groups had lower median quarterly wages in all sectors as compared to those in the *Associate's Only, +Lower Division* and *+Bachelor's or Higher* groups. See **Appendix 5.** This most likely reflects that the *Still in College* group has delayed career-track employment to prioritize additional education, while the *Some College* group may have reduced wages from delayed entry to career track employment while attempting, but not completing, an additional college degree.

Another noteworthy pattern appears for the *+Bachelor's or Higher* educational attainment group. In several sectors the median quarterly wage is lower than that of other educational attainment groups. See **Table 12** and **Appendix 5**. At the point of wage evaluation, the *Associate's Only* and *+Lower Division* graduates may have been in the workforce after earning a second college degree for three or more years, allowing time to advance in their careers and receive raises, while those in the *+Bachelor's or Higher* group are just transitioning to career-track employment after earning the Bachelor's degree and have had only one or two years of post-degree to secure and advance in career-track employment. Whether the earnings gaps between educational attainment groups persist, narrow or widen will be determined as additional time passes in the workforce.

Size and Growth of Workforce

The distribution of Associate's degree graduates can also be considered from the perspective of the size, projected growth, and wages of the overall Maryland workforce. This context reveals if graduates are being employed in sectors that are expanding or contracting and that offer long-term opportunities for wage increases.

Figure 1. Distribution of the Statewide Workforce by Sector, State of Maryland, 2017

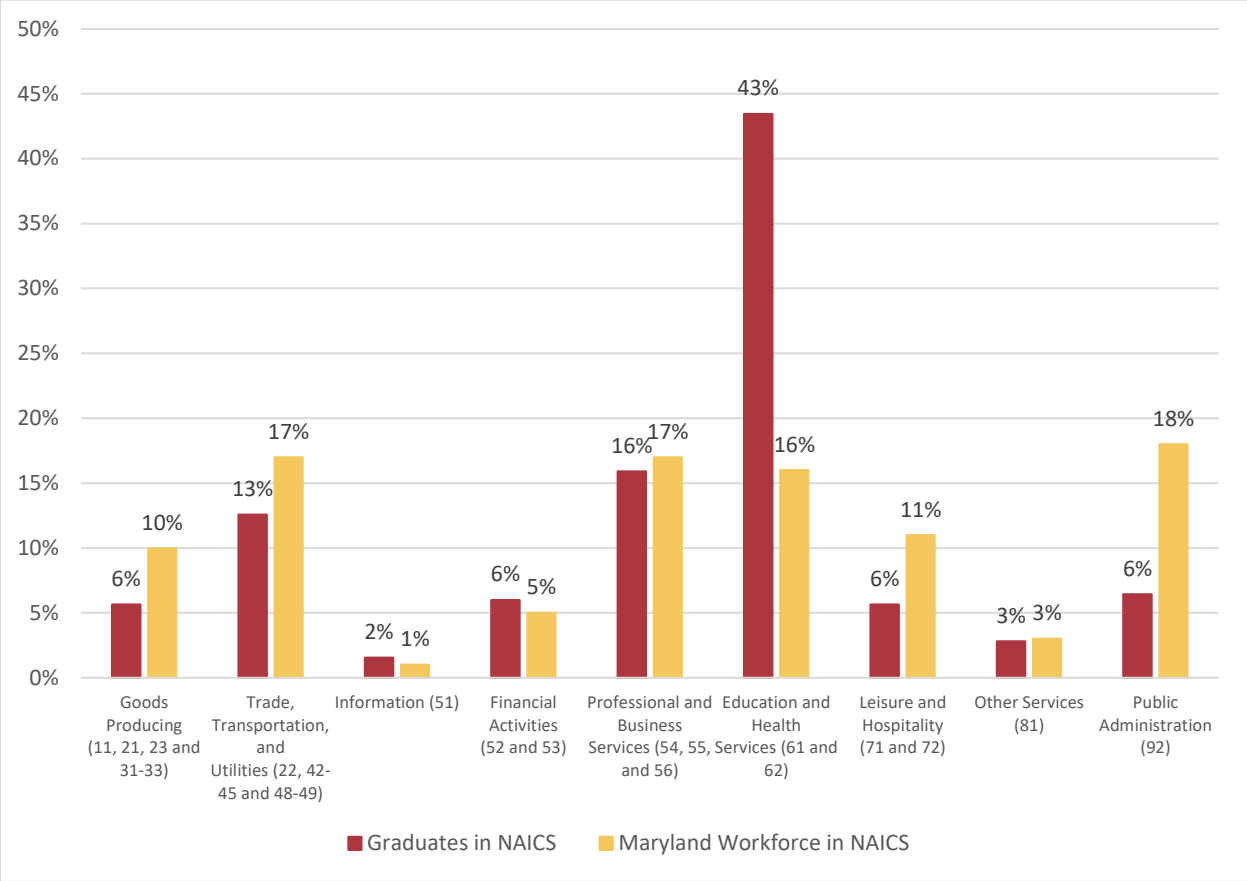


In 2017, the Maryland workforce was comprised of over 2.8 million workers and was projected to increase by over 76,000 workers by 2020[25]. See **Figure 1**. The largest employment sectors in the State of Maryland were (1) *Public Administration,* (2) *Trade, Transportation and Utilities*, and (3) *Professional and Business Services*. These three sectors employed 52% of the Maryland workforce, and, in fiscal quarter 2 of 2018, contributed $197 billion to Maryland's economy and paid $22 billion in wages[26].

[25]Maryland Department of Labor. Maryland Industry Projections - 2018-2020 - Workforce Information and Performance.

[26]U. S. Bureau of Economic Analysis. Gross Domestic Product by State, Second Quarter, 2018. Maryland Department of Labor. Second Quarter 2018 - Industry Series - Maryland's Quarterly Census of Employment and Wages (QCEW) – OWIP. http://www.dllr.state.md.us/lmi/emppay/tab1md22018.shtml

Chart 5. Associate's Degree Graduates, State of Maryland, 2012-2013, Industry of Employment Compared to Workforce Size in 2017, Five Years after Graduation



Overall, the two sectors employing the largest share of graduates were *Education and Health Services* (43%) and *Professional and Business Services* (16%). Associate's degree graduates found employment in the *Education and Health Services* NAICS at a rate of almost two to one compared to all other sectors. These sectors are the fourth (16%) and second (17%) largest employers in the state, and both are projected to grow by 3% by 2020.[27] See **Chart 7**. The *Education and Health Services* sector includes jobs critical to the health and education of Maryland residents. These sectors include positions such as nurses and social workers who operate hospitals and clinics, and teachers/faculty and principals/college administrators who operate schools and colleges. This sector paid over $5 billion in wages and contributed $38 billion to Maryland's economy in fiscal quarter 2 of 2018 and is projected to add 23,500 workers to Maryland by 2020[28].

[27]Maryland Department of Labor. Maryland Industry Projections - 2018-2020 - Workforce Information and Performance.

[28]Maryland Department of Labor. Maryland Industry Projections - 2018-2020 - Workforce Information and Performance.

Maryland Department of Labor. Second Quarter 2018 - Industry Series - Maryland's Quarterly Census of Employment and Wages (QCEW) – OWIP. http://www.dllr.state.md.us/lmi/emppay/tab1md22018.shtml

U. S. Bureau of Economic Analysis. Gross Domestic Product by State, Second Quarter, 2018.

Professional and Business Services (16%), and *Trade, Transportation, and Utilities* (13%) were the other two same-employer sectors with large shares of same-employer graduates. Graduates in *Professional and Business Services* are employed in sectors such as legal services, tax services, computer systems, advertising, management, waste remediation, and other services that support businesses across Maryland. Graduates in *Trade, Transportation and Utilities* are employed in sectors such as shipping, air transportation, electrical power distribution, and other sectors critical in Maryland's infrastructure and industry. *Professional and Business Services,* and *Trade, Transportation and Utilities* are expect to add around 16,000 and 15,000 workers respectively.

Only 14% of graduates with same-employer wages were in NAICS that are projected to experience workforce declines between 2018 and 2020[29]. The sector with the biggest projected decline *Information*, includes the smallest share of same-employer Associate's degree graduates (2% or 104 graduates). The *Information* sector employs Marylanders in publishing, media broadcasting, and telecommunications. The other two sectors expected to have declines in employment are *Financial Activities* and *Public Administration*, each included 6% of same-employer graduates in positions related to banking, insurance, real estate, and government. See **Chart 5**.

Sector Wages

The median quarterly wage for each sector was compared to the average wage paid to all workers in a sector to understand how wages that are likely to be entry level may increase overtime as Associate's degree graduates continue to advance in the workforce. See **Table 13**. Average wages paid to all workers in Maryland varied from a low of $8,334 in *Leisure and Hospitality* to a high of $23,568 in *Financial Activities.*[30]

In all sectors except *Education and Health Services* the average quarterly wage for all workers is greater than the median wage for Associate's degree graduates with same-employer wages. In *Education and Health Services,* the median quarterly wage for the Associate's degree graduates with same-employer wages is about $700 higher than the average for all workers in the sector. In four sectors, *Other Services, Leisure and Hospitality, Good Production,* and *Trade, Transportation and Utilities,* the variation between the average quarterly wage for all workers and the median quarterly wage for Associate's graduates is between $900 and $3,400 or between $3,600 and $14,000 for the year. The variation in the averages is much larger for the four sectors which have highest average wages, *Financial Acitivites, Information, Professional and Business Services,* and *Public Administration,* with a varition between $4,400 and $11,700 or between $17,600 and $46,800 for the year. None of the variations are surprising as the wages for all workers would include individuals with decades of work experience, whereas the

[29]Maryland Department of Labor. Maryland Industry Projections - 2018-2020 - Workforce Information and Performance.

[30]Maryland 2017 - Industry Series - Maryland's Quarterly Census of Employment and Wages (QCEW) - OWIP https://www.dllr.state.md.us/lmi/emppay/md2017ep.shtml. Wages are derived from unemployment insurance (UI) filings and include all workers employed within a NAICS is regardless of level (part-time or full-time) or duration (single quarter vs full-year). Wages exclude individuals not subject to UI filings working in the NAICS, such as contractors or other temporary workers.

Associate's graduates are just entering the labor force and beginning to build a career. However, some sectors appear to offer opportunities for larger wage increases over time than other sectors.

Table 13. Associate's Degree Graduates, State of Maryland, 2012-2013, Industry of Employment and Median Quarterly Wages Compared to Living Wage and Average Wage for All Workers, Five Years after Graduation

Sector	Full-Quarter Same-Employer	Median Quarterly Wage	Variation to Living Wage ($7,841)	Average Quarterly Wage for All Workers	Variation to Wage for All Workers
Goods-Producing					
Natural Resources and Mining (11 and 21)	n/a	n/a	n/a	$10,858	n/a
Goods Production (23, 31, 32, 33)	380	$12,004	↑ $4,163	$15,096	↓ $3,092
Service Providing					
Trade, Transportation, and Utilities (22, 42, 43, 44, 45, 48, 49)	848	$8,203	↑ $362	$11,602	↓ $3,399
Information (51)	104	$11,801	↑ $3,960	$20,071	↓ $8,270
Financial Activities (52, 53)	404	$11,876	↑ $4,035	$23,568	↓ $11,692
Professional and Business Services (54, 55, 56)	1,072	$11,891	↑ $4,050	$17,998	↓ $6,107
Education and Health Services (61, 62)	2,928	$12,131	↑ $4,290	$11,462	↑ $669
Leisure and Hospitality (71, 72)	380	$6,351	↓ $1,490	$8,334	↓ $1,983
Other Services (81)	189	$8,434	↑ $593	$9,298	↓ $864
Public Administration (92)	433	$11,780	↑ $3,939	$16,200	↓ $4,420
Total	**6,738**				

CONCLUSIONS AND IMPLICATIONS

The analysis in this report demonstrates that five years after earning an Associate's degree, the vast majority of graduates who are fully engaged in the workforce have earnings sufficient to meet the basic costs of living in Maryland. Many graduates even exceed the median earnings for Maryland workers reported in the American Community Survey (ACS Wage). The results are consistent with national data available on earnings by educational attainment level[31]. However, the analysis must be interpreted with caution as limitations on MLDS System data result in gaps in wage data. It is impossible to speculate on how the analysis may change if complete wage data were available on all Associate's degree graduates from 2012-2013. The chart below summarizes the variation in wage data available for analysis:

Method	Definition	Count	Percent
Population of Interest	Community College Associate's Degree Graduates, July 2012 to June 2013	12,609	
Wages in Quarter 20	2012-2013 Community College Associate's Degree Graduates with wages in Q20 or fiscal quarter 2 of 2017	7,707	61%
Full-Quarter Employment	2012-2013 Community College Associate's Degree Graduates with wage data in Q19, Q20 and Q21	7,228	57%
Full-Quarter with Same-Employer Employment	2012-2013 Community College Associate's Degree Graduates with wage data in same NAICS in Q19, Q20 and Q21	6,738	53%
Wage Visibility Overall	2012-2013 Community College Associate's Degree Graduates with at least one quarter of wage data in the 5 year period.	10,834	86%
Wage Visibility – Quarter Average	2012-2013 Community College Associate's Degree Graduates with wage data in any one of the twenty fiscal quarters	7,735	62%

This report presents results on the 57% of graduates that have full-quarter employment five years after graduation. While this is the majority of the population, it excludes the 43% of the population who do not have regular wages. Their lack of visibility should not be interpreted as unemployment, as gaps in wage data mean that these individuals may be fully engaged in the workforce, just not in a way that is visible in UI wage data. It is noteworthy that the educational attainment group with the lowest wage visibility was those who earned their Associate's degree and then disengaged from any further college education. On average, 54% of this group was visible in the wage data each quarter for the five year period. Equally noteworthy, those in the *Still in College* and *+Bachelor's or Higher* groups were, on average, visible in the wage data every quarter at a rate of 70% and 63% respectively. This means that these graduates are working at a high rate while continuing their college education, perhaps to finance their education, but, may be delaying their time to degree and reducing their lifetime earnings by

[31]For example, Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

dividing their focus between work and college. These rates are also significantly higher than those reported for high school graduates pursuing a college education. High school graduates pursuing a Bachelor's or still in college, are, on average, visible in the wage data every quarter at rates of 33% and 52% respectively[32].

It is important to note that the analysis presented here was conducted across a population that may be in very different career stages. The majority of Associate's degree graduates were between the ages of 18 and 24, and at the early stages of a career. These graduates may be entering the workforce for the first time, exploring options for continuing their college education, or pursuing other types of training programs, including completing licensure requirements or apprenticeships. These activities may have depressed wages during the first two or three years of employment after graduation.

The other half of the graduates were over 25 at the time of graduation, with 30% between the ages of 25 and 34, and 20% over 35. These two latter groups would be between the ages of 30 and 39 or over 40 at the point of wage evaluation and are likely to be very different in terms of previous work history than the younger group. Some of these graduates may be career changers who pursued training to enter a new career sector, perhaps from a job that is no longer part of the modern workforce. Others may be established in their careers but seeking skills for career advancement. Additional analysis is needed to understand the relationship between wages and degree when the degree is earned a decade or more after the high school graduation or mid-stream in work history.

The median quarterly wages were compared to overall State of Maryland living wage of $7,841 to give context to the wages. The living wage for Maryland varies greatly by region. The quarterly living wage Garrett County is $5,582 while it is $9,123 in Montgomery County[33]. This variation may mean that median quarterly wages and median quarterly wages by sector, are not necessarily above or below the living wage when regional variation is factored into the analysis. The age diversity of the population may also mean the living wage indicator selected for this report may overstate the number of graduates with earnings sufficient to meet the basic costs of living in Maryland. The median quarterly wages reported here appear more than sufficient for a graduate who is a single individual; however, half the population in the report was over the age of 30 at the time of wage evaluation. These graduate may be married and/or have children. The living wage for Maryland for one adult with a child is approximately $15,000 per quarter.[34] For these older graduates, the overall median of $10,967 falls several thousand dollars short of meeting the basic costs of living in Maryland.

The results presented here also hint at how wage outcomes may change for high school graduates in the Career Preparation Expansion Act reports (CPEA). Around 2,000 high school graduates earned an Associate's degree within five years of high school graduation. These graduates had a median quarterly

[32]MLDS Center. (2019). Career Preparation Expansion Act: Annual Report to the General Assembly and Governor Larry Hogan. Baltimore, MD: Maryland Longitudinal Data System Center. https://mldscenter.maryland.gov/CenterReports.html
[33]https://livingwage.mit.edu/states/24
[34]https://livingwage.mit.edu/states/24

wage around $7,500 or $30,000 a year, earnings just under the living wage for Maryland. The median quarterly wage for *Associate's Degree Only* graduates in this report, five years after graduation, was $11,780 or $47,120 per year. Although there are distinct differences between the two populations, half of the Associate's degree population studied in this report was between the ages of 18 and 24 at the time of degree and between the ages of 23 and 29 at the time of wage evaluation. Comparatively, high school graduates in the CPEA who earned an Associate's degree were around age 23 at the time of wage evaluation and had only two years of time in the workforce after earning an Associate's degree. The differences in wages two years after the Associate's in the CPEA compared to five years after the Associates reported here may mean that high school students with an Associate's degree have the potential to experience significant wage growth in as little as an additional three years (or eight years after high school graduation).

This report demonstrates that an Associate's degree does appear to provide a meaningful return on investment. The average in-county tuition and fees for completing an Associate's degree in Maryland in 2012-2013 was $7,400[35]. For this investment, five years after earning the degree, the median quarterly wage for an Associate's degree graduate was $10,967 or approximately $43,000 per year. Comparatively, the median quarterly wage for a Maryland high school graduate who does not continue on to college was $5,931[36] or approximately $24,000 per year, five years after high school. This means that a high school graduate who invests $7,400 in tuition and fees to earn an Associate's degree has the potential to earn twice as much as a high school graduate who directly enters the workforce without additional postsecondary education.

Finally, it is important to remember that in 2013, as this cohort was graduating from college, the impact of the economic recession on unemployment and underemployment was still lingering in the economy.[37] The extended recovery from the recession may impact this analysis in three ways. First, it may mean that there were fewer jobs available in the early part of the analysis, thus, wage visibility may be lower due to scarcity of open positions in the job market rather than individuals being employed in positions that are exempt from UI reporting. Second, it may mean that wages were lower during the first year or two of the period than in pre-recession periods, something that may curtail periodic wage increases and life-time earnings. Third, this group may have been competing with more experienced workers and/or college graduates with bachelor's degrees for the employment typically available to Associate's degree graduates. This may have limited the graduates' employment opportunities or may have required more frequent job changes to advance careers. It also could have been responsible for depressing wages. Additional research is required to understand both the short-term and long-term impact of the recession on the Associate's degree graduates of 2013.

[35] Maryland Higher Education Commission. (2015). Data Book.
[36] MLDS Center. (2019). Career Preparation Expansion Act: Annual Report to the General Assembly and Governor Larry Hogan. Baltimore, MD: Maryland Longitudinal Data System Center.
[37] For example, see Abel, Jaison R. and Richard Deits (2016). Underemployment in the early careers of college graduations following the great recession. NBER Working Paper #22654.; Oreopoulos, Philip, Till von Wachter, and Andrew Heisz. (2012). The Short- and Long- Term Career Effects of Graduating in a Recession. American Economic Journal: Applied Economics, 4(1): 1-29.

APPENDICES

Appendix 1. 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[38]. Second, Associate's degree graduates who pursued an additional college degree may be employed in part-time entry-level minimum-wage positions so they can prioritize college; comparatively Associate's degree graduates that did not pursue an additional college degree 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 Associate's degree. For example, Associate's degree graduates who earn a second Associate's degree may enter the workforce two years earlier than those that complete a Bachelor's degree. The time required to complete the additional degree is subject to transfer credit policies and the graduation requirements of the subsequent degree. If the student changes majors rather than continues in a major related to the first degree, the credit loss from transfer or major change may extend the time to degree.

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 earning an Associate's degree) 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 stopped attending college without graduating. Reporting on time to degree and college completion rates is outside the scope of this report.

[38]For example, see:

Baum, Sandy, Jennifer Ma and Kathleen Payea. (2013). Education Pays 2013: The benefits of higher education for individuals and society. College Board.

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

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

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

For this report, the following five educational groups were created for wage analysis. See **Figure 1** and **Table 1** in the report for distributions. Education attainment definitions:

1. **Associate's Degree Only**: Associate's degree graduates with no additional postsecondary degree or college enrollment record by the end of spring term 2017. Note, a small number of graduates earned two Associate's degree concurrently or an Associate's and a Certificate concurrently rather than a single Associate's degree.
2. **Associate's Degree with Some College**: Associate's degree graduates enrolled for at least one term between fall 2012 and fall 2016 but who did not earn a postsecondary degree and are not actively enrolled in college in the spring 2017 or fall 2017 terms.
3. **Associate's Degree Still in College**: Associate's degree graduates enrolled in college in the spring 2017 and/or fall 2017 terms. These graduates may have earned another postsecondary degree by the end of the fall 2016 term; however, they are still actively pursuing additional postsecondary education in the spring 2017 and/or fall 2017 terms.
4. **Associate's Degree with Additional Lower Division Degree:** Associate's degree graduates who earned another Associate's degree or a Certificate degree by the end of the fall term 2016 and are not enrolled in college in the spring 2017 or fall 2017 terms. Additionally, the category includes any Associate's degree graduates that obtained an Associate's degree or Certificate PRIOR to earning the Associates degree included in this study.
5. **Associate's Degree with Bachelor's or Higher Degree**: Associate's degree graduates who earn a Bachelor's degree, Master's degree, or other degree above the baccalaureate level by the end of the fall term 2016 and are not enrolled in college in the spring 2017 or fall 2017 terms.

Note, some Associate's degree graduates received more than one degree during the five year period. Each graduate is counted only once, based upon highest degree attained or their enrollment status at the five year evaluation period. For example, if an Associate's degree graduate completed an additional Associate's degree and then a Bachelor's degree, the graduate is counted in the Bachelor's category. Other Associate's degree graduates that completed another Associate's degree but were still progressing toward an additional degree were counted in the Still in College category rather than in the Associate's Degree with Additional Lower Division Degree category. Due to data limitations, it is possible that some Associate's degree graduates earned a postsecondary credential prior to data contained within the MLDS Center System or completed a postsecondary degree out-of-state pre or post the Associate's degree.

The matrix below provides the alignment of Associate's degree graduation date to the academic period used to evaluate subsequent postsecondary activity and the final academic period consider for evaluating if a graduate had earned an additional degree or was still enrolled in college. Any Associate's degree graduate that did not earn a postsecondary degree in the last academic period of evaluation that was not enrolled in the academic period of the 20th fiscal quarter was considered no longer progressing and classified as Some College.

The decision to use these cut-offs 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.

Table A. Associate's Degree Graduation Dates Aligned to Evaluation Periods

Associate's Degree Graduation Dates	Last Academic Period Evaluated for College Degree Attainment	Academic Period at 20th Fiscal Quarter	20th Fiscal Quarter
July, August or September 2012	Fall 2016	Spring 2017	Q2 2017
October, November or December 2012	Spring 2017	Fall 2017	Q3 2017
January, February or March 2013	Spring 2017	Fall 2017	Q4 2017
April, May or June 2013	Fall 2017	Spring 2018	Q1 2018

Appendix 2. Wage Visibility

Wage visibility is defined as the number of quarters in which an individual has reported wages for the timeframe of interest. Analyzing wage visibility is an important component of all MLDS Center research and is undertaken prior to beginning any report to explore the data and determine the potential impact of wage gaps on the analysis. Wage visibility is directly affected by gaps in the MLDS wage data. The MLDS does not contain workforce data on self-employed persons, independent contractors, military personnel, out-of-state employment, or federal employees. The analysis is provided in as an appendix to provide additional context for the data included in this report and to discussion on how results presented in the report need to be interpreted with caution due to missing or incomplete wage data.

Methodology 1: Wage Visibility Across the Five Year Period

Associate's degree graduates were evaluated to determine the number who never appear in wage data, those with limited wage data, and those with complete wage data for the full five year period. The wage visibility patterns were also evaluated to determine if difference exist by subsequent educational attainment.

All Associate's degree graduates were placed into one of five mutually exclusive groups based upon the number of quarters each was visible in the wage data:

1. **No Visibility (NONE)** – no wages for the entire 20 quarters,
2. **Irregular Visibility (IRRG)** – wages for 25% of the period (1 to 5 quarters)
3. **Intermittent Visibility (INTR)** – wages for 25%-49% of the period (6 to 10 quarters)
4. **Frequent Visibility (FREQ)** – wages for 50%-74% (11 to 15 quarters), or
5. **Continuous Visibility (CONT)** – wages for 75% or more of the period (16 to 20 quarters).

Results

At least one quarter of wage data was available for 86% of Associate's degree graduates. Only 14% of Associate's degree graduates were never visible in the wage data. Of the 86% that are visible, 47% appear in almost every wage quarter (continuous), 15% are frequently visible, 12% are intermittently visible, and 12% are visible in less than 5 quarters of the 5 year period (irregular). This visibility was compared to that of Maryland public high school graduates from the same period.[39] See **Table B**. Compared to high school graduates, the overall visibility was similar; however, the rate at which the Associate's degree graduates were continuously visibly was nearly double that of high school graduates. This variation is not surprising as many high school graduates were either enrolled in college full-time, leaving little time to work, or enrolled in college out-of-state, making employment invisible. By comparison, Associate's degree graduates would have been available to directly enter the workforce after completing their education or may have worked part-time to supplement their income while continuing their education.

[39]MLDS Center. (2018*). Career Preparation Expansion Act: Annual Report to the General Assembly and Governor Larry Hogan*. Baltimore, MD: Maryland Longitudinal Data System Center. https://mldscenter.maryland.gov

Note, the distributions in **Table B** represents total number of quarters an Associate's degree graduate had wage data, having multiple quarters of wage data does not necessarily represent consecutive periods of employment. Further, having wage data in a quarter does not indicate that a graduated worked for the full quarter or worked full-time within a quarter. Employment in the quarter may have been for as little as one day.

Table B. Associate's Degree Graduates, State of Maryland, 2012-2013, Wages Visibility for Full Five Year Period Compared to Maryland High School Graduates, 2012

Wage Visibility	Associate's Degrees, 2012-2013, and % Wage Visibility		Maryland High School Graduates, 2012
No Wages for Full Five Years (NONE)	*1,775*	14%	13%
Total with Wages	*10,834*	86%	86%
Irregular (IRRG)	*1,466*	12%	20%
Intermittent (INTR)	*1,573*	12%	19%
Frequent (FREQ)	*1,858*	15%	19%
Continuous (CONT)	*5,937*	47%	28%
Total Associate's Degree Graduates	***12,609***		

The distributions provided in **Table B** indicates that almost half of the population (CONT) was engaged in the workforce in a way that is visibility for the vast majority of the five year period. This proportion of graduates has a long wage history which can be informative for exploring wage and career trajectories.

A quarter of the graduates had such low visibility (NONE + IRRG) over the five year period that little insight gain be gained about their career and wage trajectories. However, their data could be informative if the visible wage quarters represent entrance to the Maryland workforce after working earning a subsequent degree.

Finally, the remaining 27% (INTR + FREQ) of graduates were periodically engaged in the workforce in ways that were visible but do not offer sufficient data to explore wage and career trajectories. This periodic visibility may also indicate these individuals are experiencing chronic unemployment or working intermittently while continuing their college education.

Table C. Associate's Degree Graduates, State of Maryland, 2012-2013, Wages Visibility Categories by Educational Attainment, Full Five Year Period after Graduation

Wage Visibility	Total	NONE	% NONE	IRRG	% IRRG	INTR	% INTR	FREQ	% FREQ	CONT	% CONT
All Associate's Degrees	***12,609***	*1,775*	*14%*	*1,466*	*12%*	*1,573*	*12%*	*1,858*	*15%*	*5,937*	*47%*
Associate's Degree Only	**4,453**	1,038	23%	583	13%	393	9%	486	11%	1,953	44%
Associate's Degree with Some College	**2,036**	226	11%	263	13%	280	14%	278	14%	989	49%
Associate's Degree Still in College	**2,126**	172	8%	186	9%	245	12%	333	16%	1,190	56%
Associate's Degree with Lower Division Degree	**583**	73	13%	66	11%	53	9%	83	14%	308	53%
Associate's Degree with Bachelor's or Higher	**3,411**	266	8%	368	11%	602	18%	678	20%	1,497	44%

The educational attainment group with the least wage visibility is the *Associate's Degree Only* group. See **Table C**. Almost one-quarter of this group was never visible in the wage data, nine percentage points higher than the overall rate. Another 13% of this group had wage data for fewer than five quarters for the five year period. Wage data from this group may understate workforce engagement and/or deflate earnings as some portion of this group of graduates may have been engaged in the workforce in a capacity that is not subject to reporting UI wage data, continued their education out-of-state, or worked in a sporadic, part-time capacity to prioritize college.

The second notable pattern is the rate at which Associate's degree graduates were either frequently (FREQ) or continuously (CONT) visible in the wage data amongst the educational attainment groups that continued their education after graduation. See **Table C**. The combined FREQ+CONT visibility rate for the *Associate's Only* group was 55%. Comparatively, the other four groups that continued their postsecondary education had FREQ+CONT visible rates of 63% (*Some College)*, 72% (*Still in College)*, 67% (*+Lower Division)*, and 64% *(+Bachelor's or Higher)*. These higher than average participation rates are why it is important to consider wages by educational attainment; many Associate's degree graduates were working while continuing their educations. This most likely has a direct impact on earnings, five years after graduation as many of the graduates either delayed entering the workforce or were minimal engaged in the workforce to continue pursuing a college education. Either option would most likely results in lower earnings when compared to those that entered the workforce immediately after graduation and had 4 or 5 years to be promoted into positions that may increase wages.

Methodology 2: Quarterly Wage Visibility Full Five Year Period

Wage data were also analyzed for each fiscal quarter after graduation to determine the number of graduates with wage data in each fiscal quarter. This analysis helps identify changes in visibility that may be due to seasonal employment, overall changes in economic conditions, or other factors. It also helps identify potential differences in visibility patterns by subsequent educational attainment.

Results

The results of the analysis are presented in **Table D**. The number graduates with wage data in any one quarter was somewhat consistent for the majority of the five year period, ranging from a low of 58% to a high of 63% with an average of 62%. This rate of wage visibility was much higher than that of high school graduates for the same time period[40]. Again, this is not surprising as many high school graduates spent the five year period after high school graduation engaged in college, leaving little time to work. By comparison, many Associate's degree graduates concluded their education and pursued career track employment for the five year period after graduation.

Table D. Associate's Degree Graduates, State of Maryland, 2012-2013, Wage Visibility by Quarter for Full Five Year Period

Year	Fiscal Quarter	All Associate's Degree Graduates with Wages in Quarter	% of Associate's Degree Graduates with Wages in Quarter
Year 1	Q1	7,785	62%
	Q2	7,877	62%
	Q3	7,668	61%
	Q4	7,609	60%
Year 2	Q5	7,664	61%
	Q6	7,616	60%
	Q7	7,359	58%
	Q8	7,370	58%
Year 3	Q9	7,571	60%
	Q10	7,774	62%
	Q11	7,790	62%
	Q12	7,888	63%
Year 4	Q13	7,924	63%
	Q14	7,966	63%
	Q15	7,886	63%
	Q16	7,864	62%
Year 5	Q17	7,823	62%
	Q18	7,783	62%
	Q19	7,772	62%
	Q20	7,703	61%
	Average	**7,735**	62%

[40]MLDS Center. (2018*). Career Preparation Expansion Act: Annual Report to the General Assembly and Governor Larry Hogan*. Baltimore, MD: Maryland Longitudinal Data System Center. https://mldscenter.maryland.gov

Quarterly wage visibility rates were also explored by subsequent educational attainment. See **Table E**. The wage visibility results for the *Associate's Degree Only* group ranged between 52% and 58% for the five year period. Comparatively, the visibility range were higher for graduates *Still in College* was 66% to 73%, *Some College* was 61% to 64%, *+Lower Division* was 61% to 67%, and *+ Bachelor's or Higher* was 56% to 66%. On the surface, this patterns seems contradictory as graduates that continued to be engaged in college may be expected to be working at a lower rate than those that did not continue their education; however, it supports the prior assertion that graduate's in *Associate's Degree Only* group are likely to be engaged in employment in ways that are not visible through MLDS UI wage data, including self-employment and out-of-state employment as quarter over quarter only half appear in the wage data.

Table E. Associate's Degree Graduates, State of Maryland, 2012-2013, Wage Visibility by Quarter for Full Five Year Period by Educational Attainment

Year	Fiscal Quarter	All Associate's with Wages	Associate's Only with Wages	Associate's + Some College with Wages	Associate's + Still in College with Wages	Associate's + Lower Division Degree with Wages	Associate's + Bachelor's or Higher with Wages
Year 1	Q1	62%	55%	66%	68%	61%	65%
	Q2	62%	57%	66%	68%	63%	64%
	Q3	61%	58%	62%	67%	63%	59%
	Q4	60%	57%	63%	67%	64%	59%
Year 2	Q5	61%	57%	64%	68%	65%	59%
	Q6	60%	55%	64%	68%	64%	60%
	Q7	58%	54%	61%	66%	64%	56%
	Q8	58%	53%	61%	67%	62%	57%
Year 3	Q9	60%	54%	62%	68%	63%	61%
	Q10	62%	54%	63%	72%	66%	64%
	Q11	62%	55%	63%	71%	66%	64%
	Q12	63%	55%	63%	72%	67%	66%
Year 4	Q13	63%	54%	64%	73%	67%	67%
	Q14	63%	54%	64%	73%	67%	67%
	Q15	63%	53%	63%	73%	67%	67%
	Q16	62%	53%	63%	73%	66%	67%
Year 5	Q17	62%	53%	62%	72%	66%	67%
	Q18	62%	52%	62%	72%	65%	67%
	Q19	62%	52%	62%	72%	67%	67%
	Q20	61%	52%	61%	72%	67%	66%
Averages		**61%**	**54%**	**63%**	**70%**	**65%**	**63%**

Appendix 3. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wages by Educational Attainment, Five Years after Graduation with and without Full-Quarter Employment

This table presents the number of Associate's degree graduates with wages in Q20 and those with full-quarter employment (wages in Q19, Q20 and Q21). The Full-Quarter Employment methodology reduces the graduates included in the median wage calculation by 4 percentage points overall and between 2 and 6 percentage points for each educational attainment group. Restricting analysis to graduates with full-quarter employment increases the median quarterly wage between $113 and $641.

Education Level	Total	Total with Wages in Quarter 20th	% of Group with Wages in Q20	Median Wage for Quarter 20	Total with Full-Quarter Employment	% of Group with Full-Quarter Employment	Median Wage for Quarter 20	Variation between Q20 Only Wage and Full-Quarter Wage
All Associate's Degrees	12,609	*7,707*	61%	*$10,605*	7,228	57%	$10,967	*$362*
Associate's Degree Only	4,453	2,303	52%	$11,519	2,195	49%	$11,780	$261
Associate's Degree with Some College	2,036	1,236	61%	$9,372	1,144	56%	$9,874	$502
Associate's Degree Still in College	2,126	1,526	72%	$9,093	1,404	66%	$9,734	$641
Associate's Degree with Lower Division Degree	583	389	67%	$12,598	375	62%	$12,711	$113
Associate's Degree with Bachelor's or Higher	3,411	2,253	66%	$10,904	2,110	64%	$11,247	$343

Appendix 4. Associate's Degree Graduates, State of Maryland, 2012-2013, Industry of Employment and Living Wage, Five Years after Graduation

Industry	All Associate's		Associate's Degree Only		Associate's Degree with Some College		Associate's Degree Still in College		Associate's Degree + Lower Division Degree		Associate's Degree + Bachelor's or Higher	
	Same-Employer Wages	At or Above Living Wage	Same-Employer Wages	At or Above Living Wage	Same-Employer Wages	At or Above Living Wage	Same-Employer Wages	At or Above Living Wage	Same-Employer Wages	At or Above Living Wage	Same-Employer Wages	At or Above Living Wage
Goods-Producing												
Natural Resources and Mining (11 and 21)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Goods Production (23, 31, 32, 33)	380	310	119	97	58	43	59	*	17	*	127	111
Service Providing												
Trade, Transportation, and Utilities (22, 42, 43, 44, 45, 48, 49)	848	442	282	173	147	70	160	60	31	20	228	119
Information (51)	103	74	17	11	20	16	22	13	n/a	n/a	44	34
Financial Activities (52, 53)	404	342	118	97	69	57	65	52	13	10	139	126
Professional and Business Services (54, 55, 56)	1,072	848	252	197	170	118	197	151	42	33	411	349
Education and Health Services (61, 62)	2,928	2,195	975	778	405	294	625	425	202	158	721	540
Leisure and Hospitality (71, 72)	381	142	107	54	85	31	76	*	10	*	103	41
Other Services (81)	189	102	62	30	24	13	35	*	10	*	58	37
Public Administration (92)	433	362	144	126	78	60	67	54	33	29	111	93
Total	**6,738**	**4,817**	**2,076**	**1,563**	**1,056**	**702**	**1,306**	**830**	**358**	**272**	**1,942**	**1,450**

* To protect student privacy, values of 10 or fewer are masked. Additional values are masked to prevent calculating masked values when group totals and sub-totals are provided. Due to small values, analysis of College Degree by NAICS was omitted.

Appendix 5. Associate's Degree Graduates, State of Maryland, 2012-2013, Median Quarterly Wage by Industry of Employment, Five Years after Graduation

Industry	All Associate's Degrees Same-Employer Median Wage	Associate's Degree Only Same-Employer Median Wage	Associate's Degree with Some College Same-Employer Median Wages	Associate's Degree Still in College Same-Employer Median Wages	Associate's Degree + Lower Division Degree Same-Employer Median Wages	Associate's Degree + Bachelor's or Higher Same-Employer Median Wages
Goods-Producing						
Natural Resources and Mining (11 and 21)	n/a	n/a	n/a	n/a	n/a	n/a
Goods Production (23,31, 32, 33)	$12,004~	$10,899~	$10,081^	$11,997~	$11,253~	$13,768~
Trade, Transportation, and Utilities (22, 42, 43, 44, 45, 48, 49)	$8,203^	$9,024^	$7,764	$6,372	$9,876^	$8,345^
Information (51)	$11,801~	$11,828~	$12,400~	$8,509^	n/a	$11,875~
Finance Activities (52, 53)	$11,877~	$12,189~	$11,568~	$11,552~	$11,668~	$12,003~
Professional and Business Services (54, 55, 56)	$11,891~	$11,640~	$10,851~	$11,105~	$14,317~	$12,682~
Educational and Health Services (61, 62)	$12,131~	$13,589~	$11,243~	$10,778~	$13,818~	$11,665~
Leisure and Hospitality (71, 72)	$6,351	$7,958^	$6,088	$5,046	$5,951	$6,435
Other Services (81)	$8,434^	$7,815	$8,199^	$7,712	$7,081	$9,501^
Public Administration (92)	$11,780~	$13,411~	$11,826~	$10,635^	$12,832~	$10,636^

^value is above living wage.
~value is above living wage and ACS wage