How Much Education In Computer Science Do I Need to Succeed?

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*** This analysis uses Synthetic data**

PURPOSE

- **States Want to Build Workforces Quickly**
  - *Michigan*: MichiganWorks!; Registered Apprenticeship; Sixty by 30; Michigan Reconnect expansion
  - *Ohio*: ApprenticeOhio; TechCred
  - *Pennsylvania*: Degree requirement eliminated for 92% of Commonwealth jobs
- **Benefits to Job Seekers and Employers**
  - How do states get more people into the workforce?
- **Certificate vs Associate vs Bachelor degree**
  - How much education do job-seekers need to be successful in-state?
- **How do Wages Compare across Degree Types?**
  - Do all degrees result in jobs that provide a living wage in-state?
- **Earnings Potential across STEM-related Degree/Program Types**
  - Computer Science (a STEM-related field) is an emerging field that is highly-specialized, highly versatile and in-demand.
    - Coding Bootcamps have become quite ubiquitous (earned certificates)

Project Goals

1. To use data and evidence to support students with career path decisions that lead to securing jobs which pay competitive wages in the state.

2. To understand the difference between in-state earnings across degree types over time.

3. To investigate if reimagining degree requirements benefits the state workforce.

Key Findings in Analysis

- Associate and Bachelor degree holders in Computer Science earned comparable wages over time
- Over 50 percent of associate and bachelor degree completers earned an individual living wage by year 6 after first pursuit of a college degree
- Less than 35% computer science degree holders earned a single-parent livable wage by year 8
- All computer science degree types had decreasing in-state employment rates over time

Literature Review

- **Field of study influences future earnings** for associate's and certificate programs; these programs linked strongly to successful careers, especially certificates - almost exclusively career-oriented (Carlton 2023; Carnevale et al., 2020; CEW Georgetown Website)
- **Wages for STEM workers** are high at all levels of educational attainment; STEM occupations pay more than all other occupations for those with certificates and associate's degrees (Carnevale et al., 2011)
- **Value of certificate and associate degree programs** from a State perspective: broadening opportunities for job seekers, focusing on skills and experience in Pennsylvania and Ohio (governor.pa.gov, 2023; Bettinger & Soliz, 2016; Daugherty et al., 2020)
- **Job opportunities for computer science grads is growing** from a national perspective: supports a degree in computer science in every major U.S. industry (Kowarski & Wood. 2023. U.S. News & World Report.)

Operational Definitions | Data Measurements

2013/14 Cohort = students who began their first pursuit of a degree in 2013/14

Completers = students with the highest completion in 6 years of first pursuit of a credential

Living wage = defined for KY by the MIT Living Wage calculator

In-state employment rate = includes individuals with in-state, UI-recognized earnings in a particular year

Median wage = midpoint of earnings of all individuals employed in a particular year

Success (financial) = Ability to earn a living wage in KY; financially sustain oneself/or different family structure

Cohorts

- 2013
- 2014

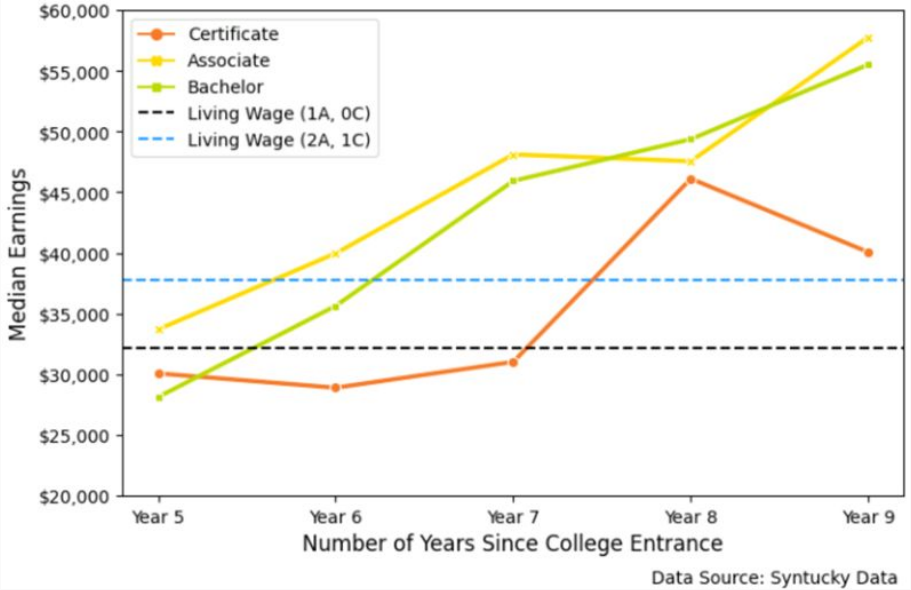
Job Quality Measurement

- Year 5 to year 9 median earnings
- Earned above the living wages for different family structures
  - One Adult
  - Two working adults, one child
  - Single parent

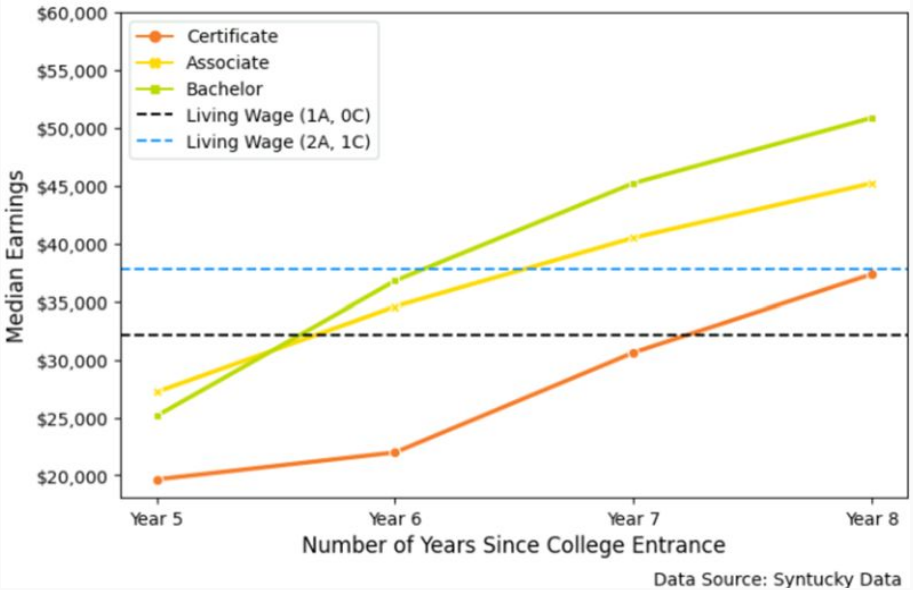
Median Earnings

Associate and Bachelor degree holders in computer science earned comparable wages over time

2013 Cohort



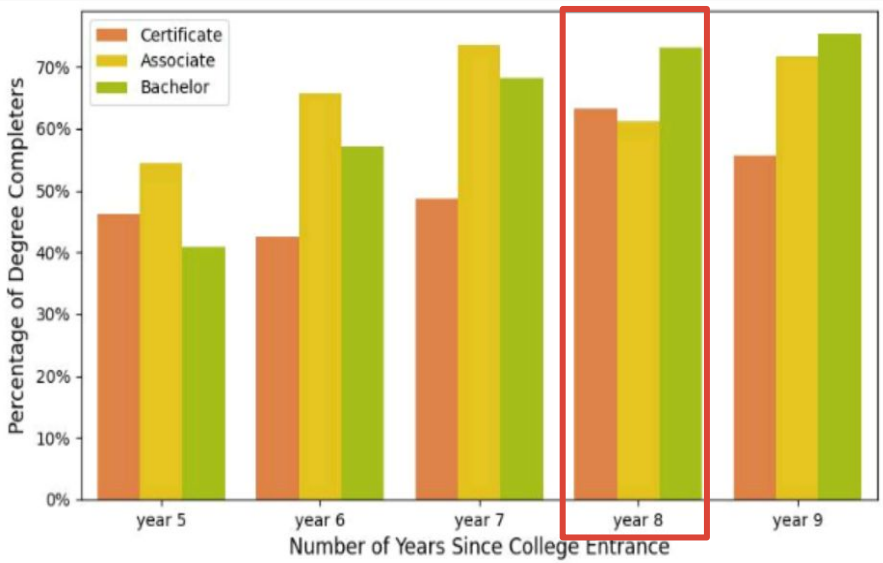
2014 Cohort



KY Living Wage: 1 Adult ($32,136)

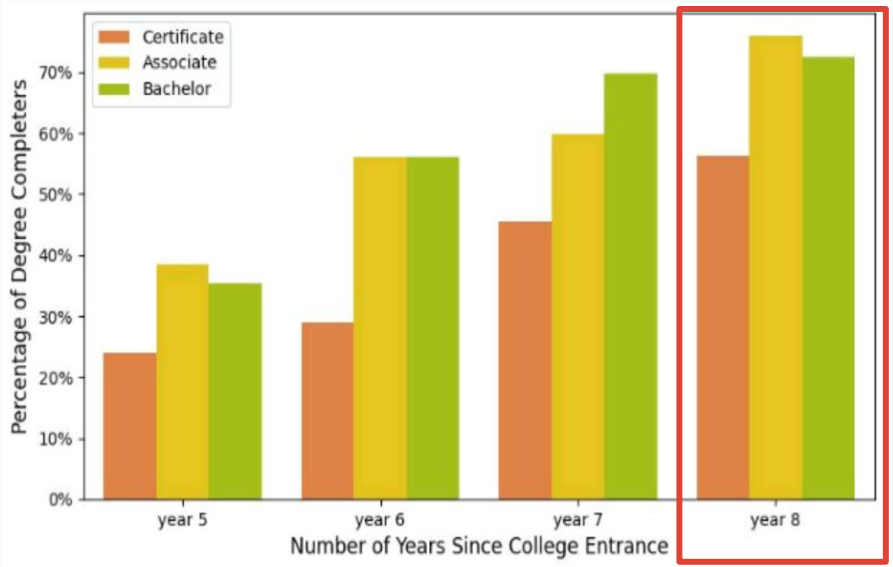
Over 50 percent of Associate and Bachelor degree completers earned a living wage for one adult by year 6

2013 Cohort



Data Source: Syntucky Data

2014 Cohort

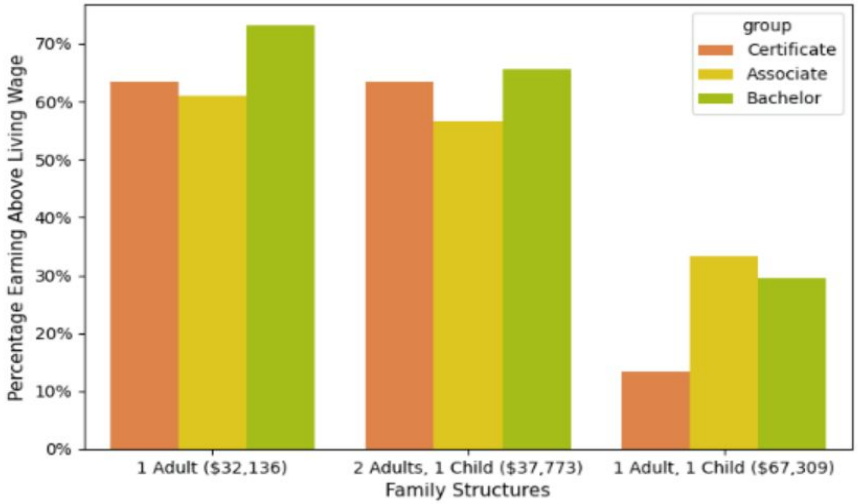


Data Source: Syntucky Data

Living Wages for Different Family Structures

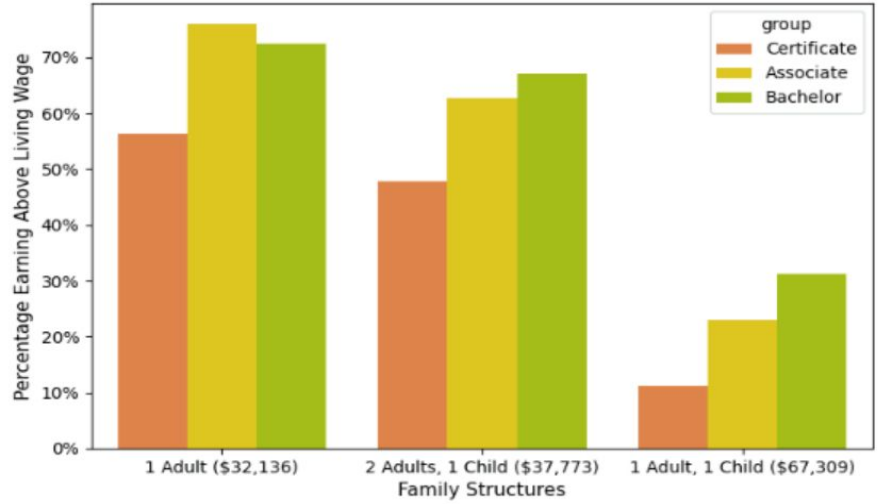
The majority of degree-holders earned above the established living wages for the first two family structures. Whereas, less than 35% degree holders earned a single parent livable wage by year 8.

2013 Cohort



Notes: All Working Adults; Year 8
Data Source: Syntucky Data

2014 Cohort

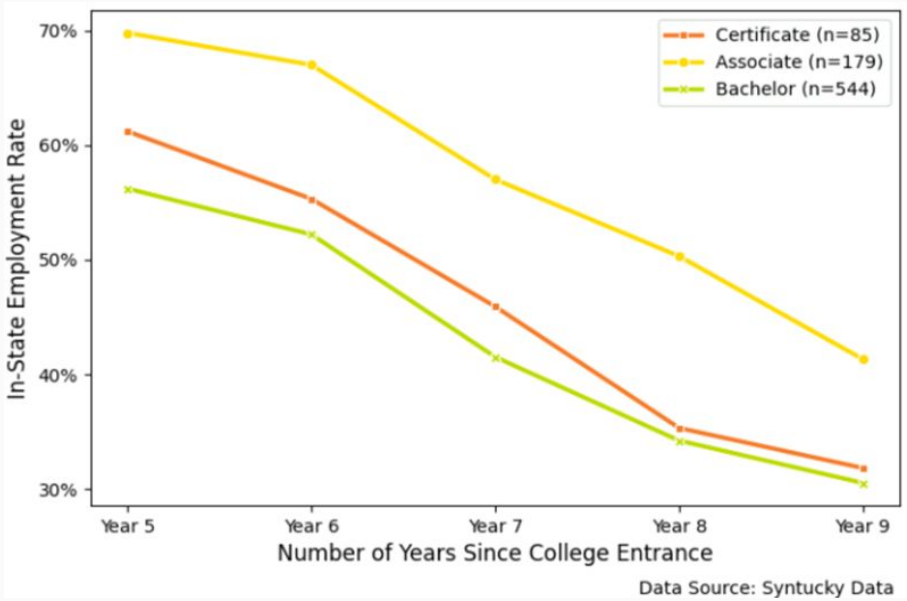


Note: All Working Adults; Year 8
Data Source: Syntucky Data

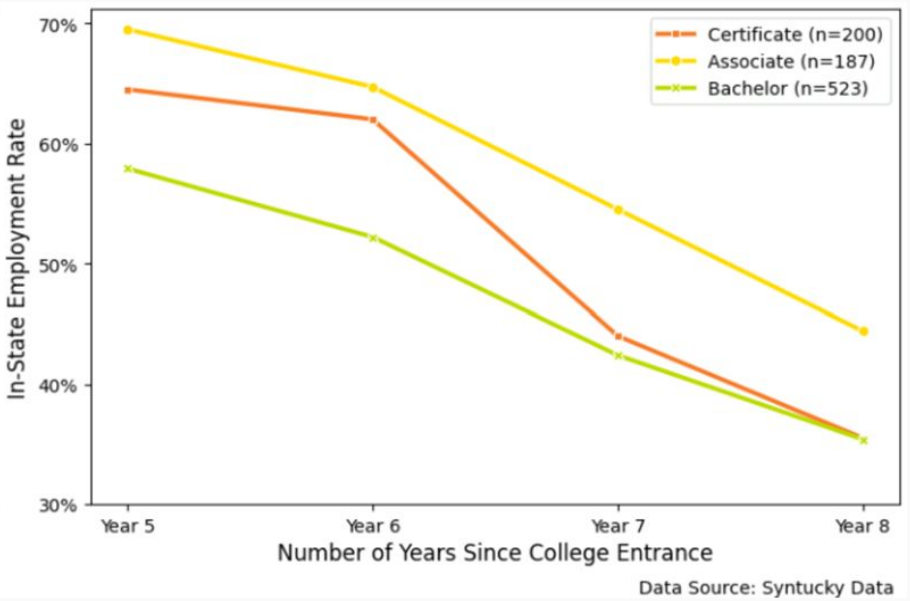
In-State Employment Rates Declined Over Time

All computer science degree types had decreasing in-state employment rates over time

2013 Cohort



2014 Cohort



So…How Much Education In Computer Science Do I Need to Succeed?

- **<u>Based on our current analyses</u>**, for a CS student who:

  1) only needs to support oneself or support a family where there are two working adults and one child
  2) plans to stay in Syntucky after college graduation

  an Associate degree may be sufficient.

- Syntucky may also build the computer science workforce faster when students spend fewer years in college.

Caveats

- The data includes only state UI-covered workers and does not give insight into people who moved out of state, were unemployed, or were self-employed
- The in-state employment rate plummets over time, especially for bachelor's degree holders
- We cannot definitively tell whether or not the work they are doing is consistent with their major
- We don't know prior work history or income prior to starting the degree program
- We only focused on three family structures with the minimal living wages for this analysis

Real World Applications

- How does this class help in our actual work/state?
  - Use administrative data to design dashboards to assist students with making educational and career decisions
  - Provide information to potential apprentices in MI, OH, and PA (marketing plan)
  - Help policy makers to understand how we can encourage students to stay in state after graduation
  - Design research to understand what incentives (e.g., scholarships) can attract people for certain majors

Appendix

References

- What Students Need to Know Before They Go to College (CEW Georgetown Website)
- The Overlooked Value of Certificates and Associate's Degrees (Carnevale et al., 2020)
- How Much Can I Make With A Certificate? (Carlton 2023)
- Center on Education and the Workforce by Georgetown University (Carnevale et al., 2011)
- Governor Shapiro Leads the Nation on Eliminating College Degree Requirements in PA (governor.pa.gov, 2023)
- Returns to Vocational Credentials (Bettinger & Soliz, 2016)
- Stacking Educational Credentials in Ohio (Daugherty et al., 2020)
- MIT Living Wage Calculator (Glasmeier, Amy K. Living Wage Calculator. 2023. Massachusetts Institute of Technology.)
- What Can You Do With a Computer Science Degree? (Kowarski & Wood. 2023. U.S. News & World Report.)

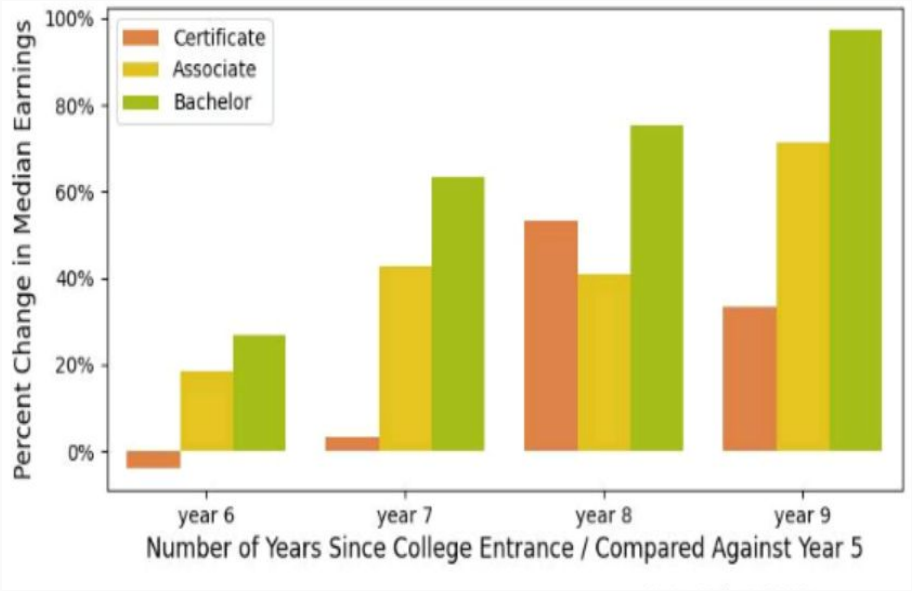
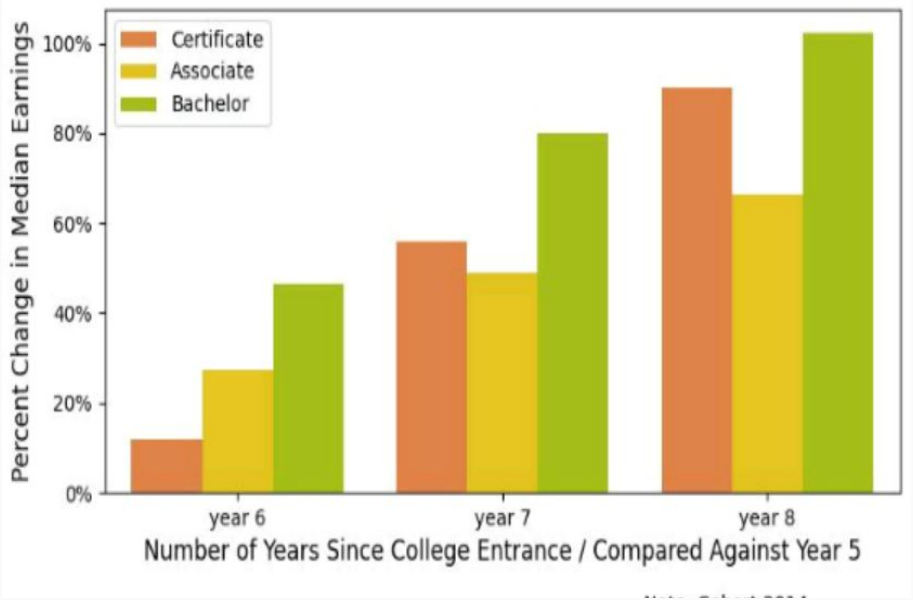
Thank you!

Questions / Comments?

Wage Growth

Wage growth was highest for those with a Bachelor's degree

2013 Cohort



2014 Cohort