

# Education & Labor Market Outcomes of Community College Students in New Jersey

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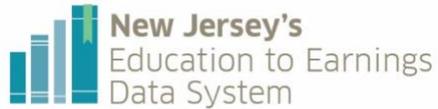
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July 2021



## **New Jersey Education to Earnings Data System Working Paper Disclaimer Statement**

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## INTRODUCTION

Two out of three community college entrants do not complete a degree (Jacob, 2018). The low graduation rate can be attributed to numerous reasons such as community colleges—operating as open-access institutions with relatively exiguous fiscal resources—serve a diverse population of students many of whom are at greater risk of failure including working adults often with family responsibilities, students from lower socioeconomic backgrounds and historically underrepresented groups, and enrollees with inadequate academic preparation. Additionally, despite two-year institutions’ partial focus on preparing some students for transfer to four-year institutions, there is evidence that these colleges may diminish the degree aspirations of their students (Cohen & Brawer, 2003; Pascarella & Terenzini, 2005; Clark, 1960).

The labor market outcomes for those who complete two-year colleges are well-documented and strongly positive for associate degrees. While the labor market outcomes for certificate recipients also tends to exceed that of students with post-secondary experience and no credentials, the benefits are far more modest (Belfield & Bailey, 2017). Furthermore, the value of an associate degree generally grows substantially over time whereas the returns to a certificate completion remain flat (Minaya & Scott-Clayton, 2020). As compared with graduates from four-year colleges and universities, graduation from community college may lead to employment in lower-status occupations and lower earnings (Pascarella & Terenzini, 2005). Also, there is evidence for a “penalty” in earnings and job status for baccalaureate graduates who started their education in a community college as compared to students who began post-secondary education at a four-year institution. At the same time, Pascarella and Terenzini (2005) conclude that the negative effect of starting at a community college on the occupational status, earnings, employment mobility, or job satisfaction of bachelor’s graduates is only modest or—for some outcomes—not statistically significant.

Given the above, students entering two-year institutions are different from students enrolling in four-year colleges and universities, their pathways to labor market are diverse, and their earnings and employment outcomes are different from the ones for high school completers and graduates with four-year degrees.

Overall, research clearly indicates income increases with educational attainment level. It is worth noting, however, that the difference between *Some college/no degree* and *Associates degree* completers is substantially smaller than the difference between associate degree completers and bachelor's degree completers (Stobiersky, 2020).

<b>Education Level</b>	<b>Median Annual Earnings</b>	<b>Unemployment Rate</b>
Less than high school	\$ 30,784	5.4%
High school	\$ 38,792	3.7%
Some college/no degree	\$ 43,316	3.3%
Associate degree	\$ 46,124	2.7%
Bachelors degree	\$ 64,896	2.2%
Masters degree	\$ 77,844	2.0%
Doctorate	\$ 97,916	1.1%

Despite the breadth of literature on value of college degrees, there is little documentation regarding the medium- and long-term returns to sub-baccalaureate credentials, especially community college certificates, and their evolution over time. Investigating this question is important because associate degrees and certificates are theoretically faster to attain, less expensive for the state and students when compared to bachelor's degrees, and tend to be in applied fields that generate natural pathways into the labor market (Minaya & Scott-Clayton, 2020). Furthermore, community colleges are a key component of workforce training ecosystem and represent a critical juncture of the education to workforce pathway for a large portion of the population.

## **STUDY DESIGN**

This study sought to develop a framework to track and analyze longitudinal employment outcomes of individuals entering postsecondary education with a focus on completers and non-completers of community college.

The initial focus was on students entering community colleges in the state of New Jersey. However, the framework is intended to be used in other states and for other institutional sectors and populations with the appropriate modifications. At the time of the project, no earnings or

employment data from contiguous states was available. So the next iterations of the framework may include such data if available.

### *Analytic questions*

The research questions of the study are as follows:

- What are educational and labor market outcomes of students entering New Jersey as first-time freshmen?
- How do these outcomes change over the 10-year period following the students' initial enrollment in community colleges?
- How do these outcomes differ by college completion status?
- What are the natural groupings of the sample based on the long-term labor market outcomes?

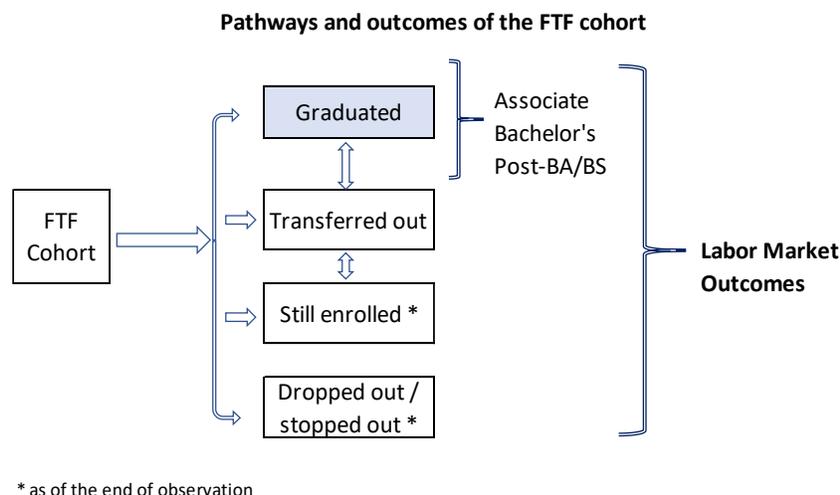
## **DATA/MODEL**

### *Sample, timeframe, data, and rationale*

The study analyzed five cohorts of community college entrants enrolling in years 2000-01 through 2004-05 in two-year institutions in New Jersey. The sample was limited to first-time degree-seeking freshmen with no prior college experience. Each cohort was tracked for 10 years (40 quarters) since the semester of first enrollment in a community college. The cohorts are pooled and analyzed together. The data for the study came from the New Jersey's Education to Earning Data System and include data from the Office of the Secretary of Higher Education's (OSHE) Student Unit Record system (SURE) and the New Jersey Department of Labor & Workforce development. All analyses were conducted in the Administrative Data Research Facility (ADRF) and used de-identified data.

Examining the entering cohorts—as opposed to a graduating cohort—enabled the researchers to compare outcomes by completer status (completers versus non-completer and completion by credential at the end of the observation), provided insight into opportunity costs (forgone income while enrolled in a higher education institution), and constructed a framework for potentially studying specific populations, such as working learners, which are not a focus for this investigation.

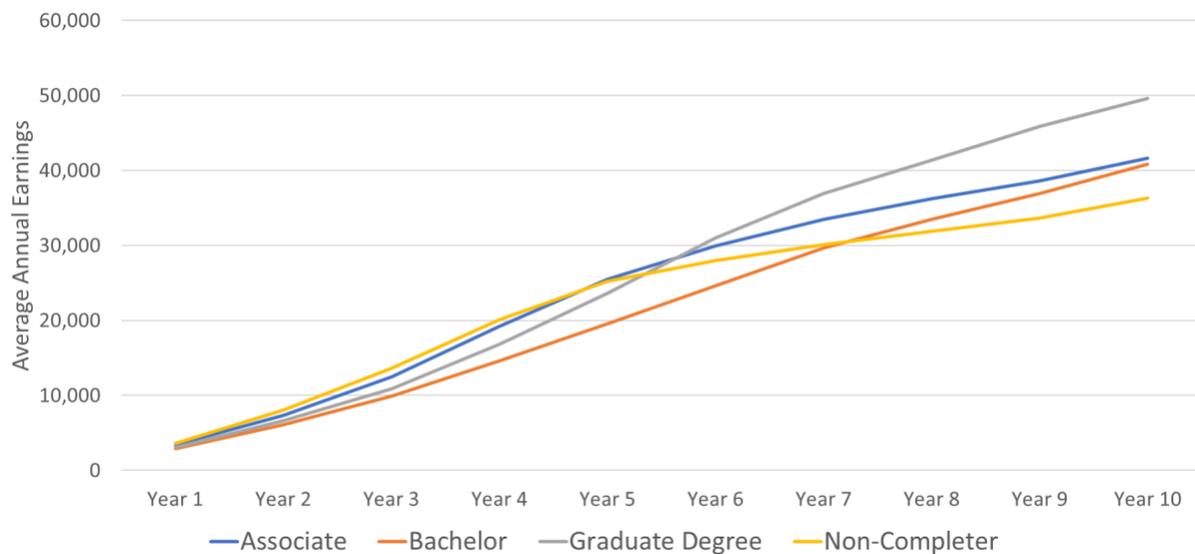
The analysis of entering students was complicated by a variety of different pathways students may take and credentials they may earn before, or after, they enter the labor market. To address this issue, the following modelling decisions were made for the study: 1) Focus on traditional freshmen enrolling after high school graduation; 2) Classify educational outcomes at the end of observation (after 10 years for each individual) into completers and non-completers and by credential; and 3) Examine labor market outcomes from two angles: a) Traditional approach examining difference in outcomes by completion status and b) Machine learning-based clustering of outcomes based on multiple dimensions of labor market outcomes (annual earnings, cumulative earnings, wage growth, number of employers, wage variance, and degree of missingness in wage data). Clustering was used to group students based solely on the characteristics of labor market outcomes and examined against the context provided by the rule-based classification of completers and non-completers.



## KEY FINDINGS

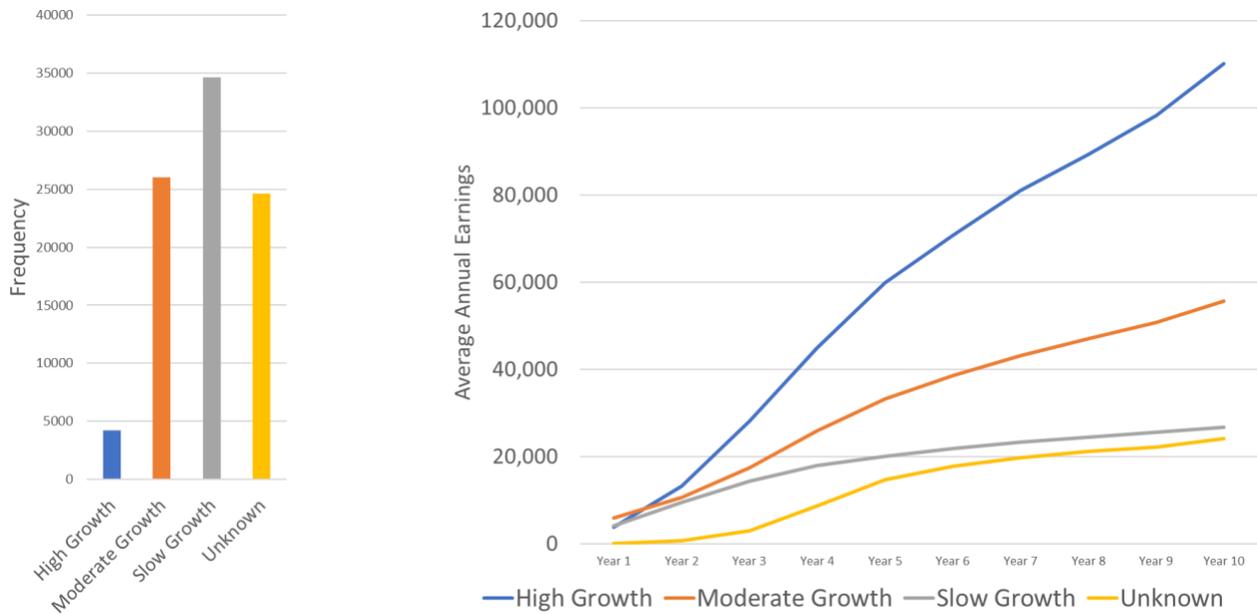
As a baseline, the rule-based approach classifying community college entrants by completer status produced the following results when the average annual earnings are used as an outcome. There are several points of interest. First, non-completers tend to have higher wages than the other groups in the first several years; however, college completers started to outpace them as they graduated and entered the workforce. As expected, those with graduate degrees begin to outperform all other groups after Year 6. Second, graduates with a bachelor's degree do

not appear to catch up with associate degree earners at the end of observation. One should keep in mind that the sample only includes students who originally enrolled in a community college before pursuing a bachelor's degree. This result aligns with the above-mentioned "penalty" for initial enrollment in a community college for baccalaureate graduates. More years of observation are necessary to see whether bachelor's graduates will start to outpace the associate graduates in terms of average annual wages and at when it may occur.



The cluster analysis yielded four distinct groups. To simplify categorizations, they are named based primarily on wage growth outcomes although other outcomes were also used in clustering as explained above. The category *High Growth* includes individuals with moderately consistent earnings with significant growth and few employers over 40 quarters of observation. The group *Moderate Growth* includes persons with highly consistent earnings with moderate growth and few employers. The category *Slow Growth* is comprised of individuals with highly consistent earnings with little growth. This group includes two distinct subpopulations: workers with consistent employment patterns (few employers over ten years) and employees who frequently change employers. Despite this stark difference in their employment patterns, both subpopulations display similar labor market outcomes. The last category is termed *Unknown* because it contains high volume of missing quarterly wage records. For this group of individuals, there is no reliable information on their employment or earnings outcomes.

The graph below shows a relative frequency of each of the final clusters identified in the analysis as well as the average annual earnings for each category. It shows that most community college entrants were classified as members of the *Slow Growth* category at the end of the 10-year observation period, while the best-performing *High Growth* group has relatively few individuals.



The analysis also compared both approaches to examining labor market outcomes: 1) Rule-based descriptive analysis by completer status and credential, and 2) Clustering analysis. The table below shows what percentage of each completer category ended up in each labor market outcome cluster. Apart from graduate degree earners, the majority of individuals in each degree level ended up in the *Slow Growth* cluster.

However, if comparing all completers versus non-completers, a smaller share of the former (35.8%; not shown) ended up in the *Slow Growth* as compared to the latter (40.4%). A larger share of completers (33.8%, not shown) are in the *Moderate Growth* category at the end of the observation period versus 26.6% for non-completers.

	Slow Growth	High Growth	Moderate Growth	Unknown	Rounded Total
<b>Associate</b>	<b>36.6%</b>	6.1%	<b>32.9%</b>	24.4%	14,200
<b>Bachelor</b>	<b>36.6%</b>	4.6%	<b>32.8%</b>	26.0%	14,800
<b>Graduate Degree</b>	26.3%	9.3%	<b>44.8%</b>	19.5%	2,600
<b>Non-Completer</b>	<b>40.4%</b>	4.1%	26.6%	<b>29.0%</b>	57,800
<b>Rounded Total</b>	34,600	4,200	26,000	24,600	89,200

A noteworthy observation is that the distribution of bachelor’s degree earners across the *Slow Growth* and *Moderate Growth* clusters is nearly identical to that of the associate degree earners. Graduate degree recipients, however, are predominantly found in the *Moderate Growth* category.

***Conclusions and contributions***

Overall, the main conclusion from the analysis is that there is opportunity for improvement for community college entrants in terms of their long-term employment and earnings outcomes. While there is merit to the argument that completers tend to achieve better labor market outcomes than non-completers, a substantial portion of completers fall into less than desirable employment and wage patterns—at least for the cohorts under analysis and the time period under examination. Importantly, these results come from a pilot study with a methodology that needs to be tested and further evaluated prior to offering any final conclusions.

This study made the following contribution to the field: First, it created a framework for analyzing labor market outcomes of freshmen entering community colleges. Second, it analyzed earnings and employment outcomes of students in New Jersey community colleges using an approach that included all freshmen (both completers and non-completers at the end of the

observation) and covered a long time period (from the initial entry into postsecondary education and 10 years out for each cohort). Finally, it tested a model that can be used in other states and institutional types and for other populations of interest.

## **CAVEATS**

The available data did not include any out-of-state education or employment data, leading to data gaps in the analysis. Students who left New Jersey to study or work in other states are not captured, and this omission introduces some bias in the results. Moreover, migration from community colleges to private institutions is not captured, and these students are also absent in the analysis. The sample under examination is limited to community college entrants, and the observation period is limited to ten years (40 quarters), which may not be enough for individuals earning some higher awards to demonstrate compensation differences and upward economic mobility. Also, annual earnings include pay from all employers (i.e., they are not limited to one employer).

Other caveats pertain to how the study imputed missing wage data: different assumptions for different time periods were made based on the expert advice and official Great Recession data, including removing records with more than 80% of missingness and two years of trailing missingness for wage data. Also, besides the Great Recession, other environmental factors that may have influenced earnings in New Jersey during the observation period were not considered, and it was assumed that everybody in the sample was affected in the same way (homogeneous response assumption).

Based on the above, the study does not make any causal claims about the effect of postsecondary credentials on the labor market outcomes.

## **POSSIBLE EXTENSIONS**

The next stage for developing the proposed approach is to repeat this analysis in a different state while simultaneously revising the methodology and running sensitivity analyses on separate cohorts or other samples. Revision of the methodology should also include consideration and trial of alternative ways of addressing missing wage data based on the feedback from experts and literature review. A key element of the future work will be creation of final visualizations that will highlight the key findings, allow for comparison of subpopulations of interest and for equity

analysis by gender, race/ethnicity, age, and so on, and ultimately to compare outcomes in New Jersey to Tennessee (and other SREB states when it becomes possible). It has also been suggested that the initial analysis be augmented with the industry-level examination in order to include more data that would characterize the demand side and include a breakdown by major fields.

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# Education and Labor Market Outcomes of Community College Students in New Jersey

Team 01 – July 21, 2021

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Approximately 2 out of 3 community college entrants don't complete a degree\*

- We seek to develop a framework to track and analyze longitudinal employment outcomes of individuals entering into post-secondary education with a focus on completers and non-completers of community college.

\*National Center for Education Statistics

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## Income increases as education level increases

Education Level	Median Annual Earnings	Unemployment Rate
Less than high school	\$ 30,784	5.4%
High school	\$ 38,792	3.7%
Some college/no degree	\$ 43,316	3.3%
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3

## There's a knowledge gap

"...sub-baccalaureate credentials are appealing to both students and policymakers because they are, in theory, quicker to attain than a bachelor's degree and are often in highly applied fields. Yet despite the shorter program length, many students still leave without attaining any credential."

"...studies generally find substantial positive returns for both associate's degrees and long certificates, and smaller returns for short certificates. Yet, far less is known about the medium and long-term returns to these credentials and their growth trajectories..."

Minaya, V., & Scott-Clayton, J. (2020). Labor Market Trajectories for Community College Graduates: How Returns to Certificates and Associate's degrees Evolve Over Time. *Education Finance and Policy*, 1-62.

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## We focus on community colleges because...

- Key component of workforce training ecosystem
- Critical juncture of the education to workforce pathway
- Serves large portion of the population
- Data and research timeline limitations

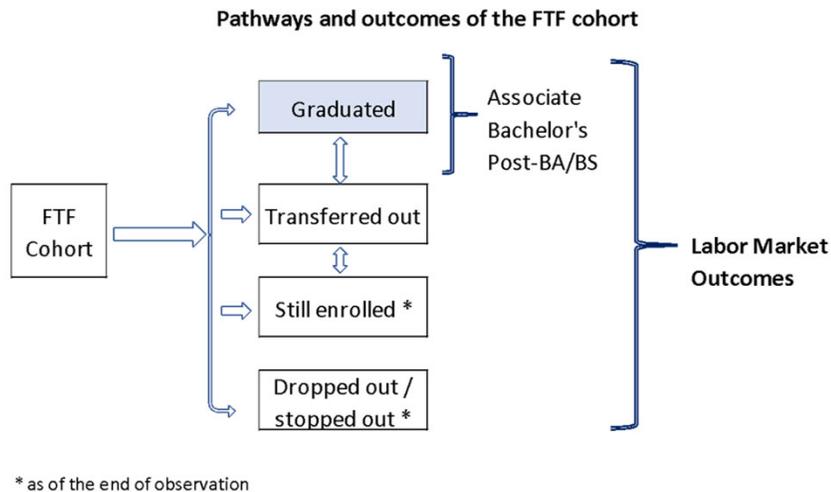
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## Tracking *entering* student cohorts to a variety of outcomes

- Enables researchers to capture completer versus non-completer status
- Provides insight into forgone income while enrolled
- Constructs framework to research working learners

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## Community college entrants may follow different academic pathways



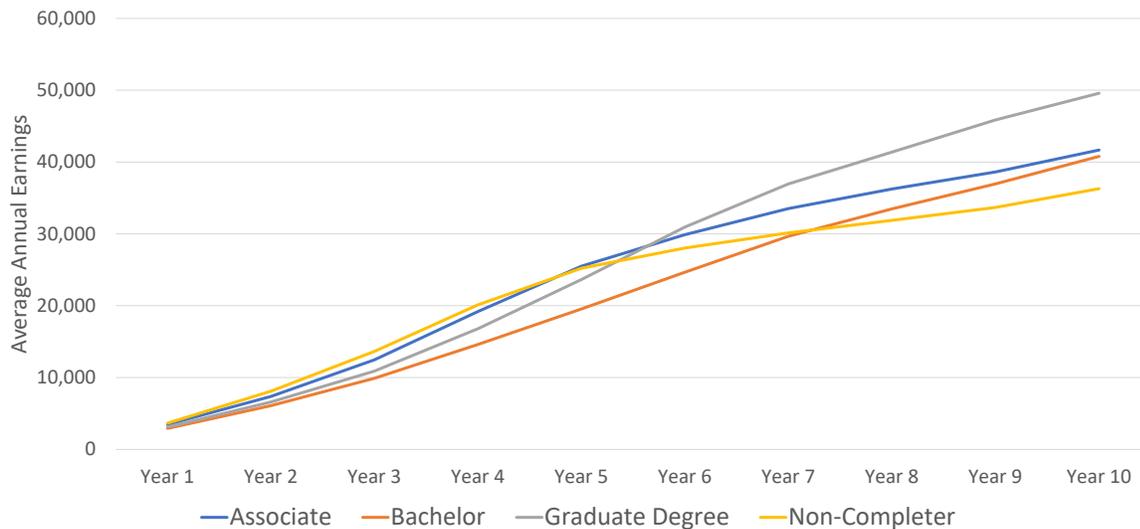
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## Clustering on multiple dimensions of labor market outcomes

- Employment stability
- Wage stability
- Wage growth
- Degree of “missingness” from UI wage records

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## Completers, on average, earn more than non-completers



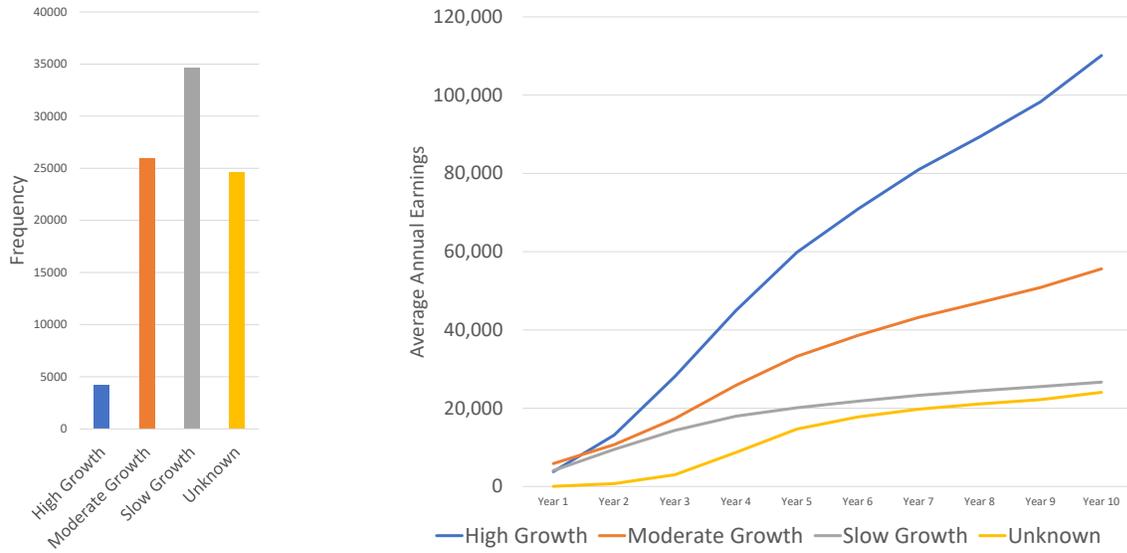
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## Labor market outcomes were clustered into four distinct categories

1. "Excellent" – Moderately consistent earnings with significant growth and few employers
2. "Good" – Highly consistent earnings with moderate growth and few employers
  - a) Working learners
3. "Bad" – Highly consistent earnings with little growth
  - a) Consistent employment patterns
  - b) Job-hoppers
4. "Unknown" – High volume of missing quarterly wage records

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## Many students had “Bad” labor market outcomes



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## Outcomes by completer category

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## There is opportunity for improvement

While there is merit to the argument that completers tend to achieve better labor market outcomes than non-completers, a substantial portion of completers fall into less than desirable employment and wage patterns.

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## Contributions

- Created a framework for analyzing labor market outcomes of freshmen entering community colleges
- Analyzed earnings and employment outcomes of students in New Jersey community colleges
  - Included all freshmen, including both completers and non-completers
  - Large timeframe: from the initial entry into postsecondary education and 10 years out for each cohort.
  - Analyzed several key outcomes of interest
- Tested a model that can be used in other states and institutional types

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## Take it all with a grain of salt...

- Out-of-state migration
- Migration from community colleges to private institutions
- Limited to community college entrants
- Limited to 10-year window of analysis
- Annual earnings not limited to individual employer

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## Other caveats

- Used some assumptions and rules in imputing missing wage data
  - Removed records with >80% missingness & 2 years of trailing missingness for wage data
  - Different assumptions for different time periods based on expert advice and official Great Recession data
  - Did not consider other (besides Great Recession) environmental factors that have influenced earnings in New Jersey during observation
  - Assume that everybody in the sample was affected in the same way (homogeneous response assumption)
- Cannot claim causal effect of postsecondary credentials on labor market outcomes

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## Next steps

- Consider alternative ways of addressing missing wage data based on the feedback from experts and literature review
  - Test other options of imputing missing wage for the Great Recession time period
- Run sensitivity analyses by focusing on separate cohorts or other samples
- Compare outcomes in New Jersey to similar analyses in Tennessee
- Compare subpopulations of interest
  - Equity analysis by gender, race/ethnicity, age, etc.