



RESEARCH REPORT

Which Dollars Get Measured?

Assessing Earnings Metrics Using Data from Connecticut

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Executive Summary

More than ever, policymakers and researchers are focused on understanding the value of a college education. For many, a critical part of this calculation is understanding typical earnings after enrolling in higher education. But there is little consensus about how to develop aggregate measures of earnings. Using Connecticut data, we find that the earnings metric definition matters. The data we use, the period we assess, and the students we include affect how institutions stack up against each other.

Using wage data for students who attended Connecticut public institutions, we find the following:

- **Estimates made using in-state wage data tend to be lower than national estimates generated from the US Department of the Treasury for the College Scorecard.** Colleges close to out-of-state metropolitan areas seem to be particularly affected by this difference, resulting in in-state wage estimates that are substantially lower than national wage estimates for the same institution.
- **The students included in the measure matter.** Students who graduate from an institution typically have higher earnings than all of those who leave in the same year. When we exclude students who are enrolled in other institutions, we yield higher median earnings measures for both leavers and graduates. In particular, median wages are substantially higher when excluding graduates of two-year schools who are enrolled in higher education.
- **Time matters for distinguishing between the wages of different groups.** The differences between aggregate measures of graduates and all student earnings become more pronounced over time. Eight quarters after students leave an institution, median graduate wages by institution are more dispersed than wages for all students who left the institution.
- **The development of specific earnings definitions may exclude the outcomes of many students.** Nearly two-thirds of students in a cohort have wage data records, but restrictions that account for other higher education enrollment substantially reduce the number of students included in the measure.
- **The subgroup used for aggregate earnings measures can change how institutions rank.** The differences between median earnings among two-year institutions are often statistically meaningful, but an institution's relative position by median earnings can change based on how the subgroup cohort is defined.

Which Dollars Get Measured?

To understand how higher education might influence student outcomes, policymakers and researchers often assess postgraduate earnings. This information is frequently provided to the public to help prospective students discern their potential earnings trajectory after enrollment. But our current earnings measures are a patchwork of aggregated measures. Some measures include graduates only, others include only students who applied for federal aid, and still others can only provide data on the wages of those employed in state. In this report, we look at the potential biases of these restrictions, using wage and institutional data from Connecticut.

Earnings Data as a Measure of Return on Higher Education

Aggregate data on postschooling earnings are the most common measure of the return on investment in higher education. Earnings have been used to measure returns on human capital investment since the 1960s, but only recently have state and federal governments begun publishing data on what students earn after college. The College Scorecard, which provides earnings estimates for most US institutions, was first released by the US Department of Education in 2015. Using longitudinal datasets, some states now provide their own estimates by institution and program. Other national data, generated from both administrative and survey data, add additional dimensions to the question of how college enrollment may affect students' earnings.

Other Measures of Human Capital Formation and Returns on College Investment

Many researchers and policymakers cite increased earnings as a direct benefit of pursuing postsecondary education, but research has uncovered additional direct and indirect returns on obtaining a credential or an advanced degree (McMahon 1998). When policymakers look to invest in higher education, they may anticipate a return on their investment of taxpayers' money. Similarly, when prospective students are considering where to invest their eligible financial aid, their own money, and their time, they are also calculating whether the return on their investment will be greater than the monetary and nonmonetary costs. For both policymakers and students, earnings and employment are the returns on education that are most easily measured.

Research has uncovered several nonmonetary returns to education. Some researchers have cited direct returns, such as cognitive learning and emotional and moral development (Perna 2005). But other returns are more indirect, such as improved health, access to a more fulfilling work environment, and more informed consumer behavior (Perna 2005). Aside from what can be considered individual benefits, increased educational attainment has community effects, wherein people who are not enrolled still benefit from a more educated community (McMahon 1998). A more educated society can lead to improvements nationally and within communities, including economic growth, reduced crime, and increased civic participation (McMahon 1998; Perna 2005). But it is difficult to capture these returns through easily understood measures.

It is difficult to directly measure the returns on postsecondary education because researchers must isolate the impact of additional years of education from other possible influences. These external influences include a person's background, the program she chooses, and changes in industries and the local and national economy. Demographic differences also factor into a person's returns on a college education. Labor market discrimination and structural barriers may lead to variations in earnings. Most individual and societal benefits from increased educational attainment are realized over a long period or even over a person's lifetime. Because many of these returns are realized in the long run and are often difficult to identify explicitly, prospective students may not factor these returns into their calculation of potential benefits to education. Policymakers may have a similar desire to focus on immediate and easily quantifiable returns. The data systems available to state policymakers also present limitations to measuring other returns on education aside from earnings and workforce participation. Although many states have established longitudinal data systems that follow students from prekindergarten to the workforce, few, if any, connect these data to their residents' health records, criminal records, or financial data.¹

Aggregate Measures of Earnings Data

Multiple datasets provide earnings measures of people who enrolled in or graduated from higher education. Some datasets, such as census survey data or data from the National Center for Education Statistics, can offer only high-level aggregate earnings measures, broken down by degree or by the characteristics of students or the institutions they attend. Other datasets, such as the Department of Education's College Scorecard and the Post-Secondary Employment Outcomes (PSEO), provide earnings information by institution or even by program. State longitudinal datasets, typically based on earnings data collected for unemployment insurance records, vary in how well they can

estimate earnings data, but many do provide earnings by institution, and some provide these data by program.

Most administrative datasets report only an individual's salary or wage income, often without additional contextual information (e.g., number of hours worked). In survey data, earnings information may be available at both the individual and household level. Survey data may also distinguish between income generated from wages and salaries (which may also be captured by in-state earnings data) and all income, which may include other sources, such as investment or rental income. Typically, the survey respondent will report her own income, though some government agencies have experimented with links to administrative data (McClure, Santos, and Kooragayala 2017; Roemer 2002). Although survey data may provide more insights about the descriptive characteristics of the individual or household reporting their income, most surveys do not connect respondents to a given higher education institution, though longitudinal surveys of students in higher education (e.g., the Beginning Postsecondary Students Longitudinal Study) may provide broad information about the income of students who left institutions by level of degree program, sector, and selectivity.

Administrative datasets can often more clearly link to the institutions people attended. But these datasets also have limitations. Data gathered from state unemployment insurance wage records may omit people and can only measure the earnings of those who stay in state (box 1). But state unemployment databases can provide several dimensions of metrics, such as a proxy for full-time employment, employment in the public sector, and the share of people claiming unemployment (Minaya and Scott-Clayton 2016). More recently, researchers at the US Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program have linked graduates of certain institutions to a national jobs database, built primarily from state unemployment insurance wage records. This experimental dataset, the PSEO, provides information only on graduate earnings and may not cover certain workers (most notably, independent contractors). State unemployment insurance wage data typically exclude federal workers, but the PSEO incorporates these data using information from the Office of Personnel Management (Foote et al. 2019).

BOX 1

Understanding Earnings Using Unemployment Insurance Wage Records

Many analyses of earnings data use information from a state's unemployment insurance (UI) wage records. These records cover most workers and provide an accurate and relatively standardized way of assessing individual earnings profiles. But these data have downsides:

- **Geographic location.** UI wage data cover earnings only for people who work for an employer located within the state. Earnings for those who work outside the state are not included. A person who no longer has earnings recorded in a UI data system might be unemployed, but she might also have left the state or taken a job across the state border.^a
- **Employment covered.** UI wage data exclude some workers, including those who are self-employed, federal workers, military personnel, and some employees of nonprofit or religious organizations.^b The data also exclude people who have informal or nonstandard employment, which may make up a substantial share of the US labor force.^c The categories of workers covered vary by state.^d
- **Wage data available.** The format of UI wage data vary by state, but information on earnings (and sometimes, weeks worked) are provided by quarter and by industry.^e These data do not include information on hourly wages or position held. Thus, a person's earnings may appear artificially low if she was hired toward the end of an earnings quarter.

Some states are working to remedy these drawbacks by linking their UI databases to other government datasets to recover wages for federal employees or by recording the hours worked by employees and their occupation.^f Other states are partnering with nearby states to follow residents when they move or take jobs in a neighboring state.^g

^aRuth Curran Neild and Christopher Boccanfuso, "Using State Unemployment Insurance Data to Track Student Postsecondary Outcomes," *NASSP Bulletin* 94, no. 4 (Fall 2010): 253.

^bMichele Ver Ploeg, Robert A. Moffitt, and Constance F. Citro, eds., *Unemployment Insurance Wage Records Data to Measure Income and Employment for Low-Income Population* (Washington, DC: US Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, 2002).

^cDemetra Smith Nightingale and Stephen A. Wandner, "Informal and Nonstandard Employment in the United States: Implications for Low-Income Working Families" (Washington, DC: Urban Institute, 2011).

^d"Comparison of State Unemployment Laws," US Department of Labor, Employment and Training Administration, last updated June 5, 2017, <https://oui.doleta.gov/unemploy/comparison2017.asp>.

^eCurran Neild and Boccanfuso, "Using State Unemployment Insurance Data."

^fRachel Zinn, "Classroom to Career: Leveraging Employment Data to Measure Labor Market Outcomes" (Washington, DC: National Skills Coalition, Workforce Data Quality Campaign, 2016).

^gMindy Feldbaum and Tim Harmon, *Using Unemployment Insurance Wage Data to Improve Program Employment Outcomes: A Technical Assistance Guide for Community and Technical Colleges* (Alexandria, VA: National Science Foundation, n.d.).

Another important administrative dataset is the College Scorecard, which provides earnings information for students who were enrolled in an institution and working (not enrolled) a set number of years after matriculating. The College Scorecard earnings information relies on linked administrative tax records from the Treasury Department. These data contain the total wages and deferred compensation from all W-2 forms, as well as any reported self-employment earnings (Council of Economic Advisers 2015). But these data are reported only for people who applied for Title IV aid (federal grants and loans). Further, in an examination of College Scorecard data, researchers from the College Board observed that comparisons of these early-career earnings were potentially misleading because of substantial variation in the underlying earnings distribution. Colleges rank differently when looking at the 25th, 50th, or 75th percentiles of earnings 10 years after students enter the institution (Mabel, Libassi, and Hurwitz 2019).

Building Earnings Measures Using Data from Connecticut

To examine how measures of wage earnings affect the perception of student labor market outcomes, we use data from Connecticut's Preschool through Twenty and Workforce Information Network (P20 WIN) data linkage system. P20 WIN allows state agencies to link records to assess aggregate information on outcomes. Connecticut has used wage data, linked to higher education enrollment, to generate interactive dashboards with quarterly wage information by institution and program. We present the results of different specifications of these data, building on the initial measurement parameters the state uses. These specifications draw out both the strengths and challenges of using UI wage data to present aggregate earnings measures.

Using a Linked Enrollment and Earnings Dataset from Connecticut

We use student-level data from students who entered Connecticut colleges and universities between 2009 and 2012 linked to UI wage data from the Connecticut Department of Labor. We analyze data from the state's 12 community colleges and data from six four-year institutions. These four-year institutions are Southern Connecticut State University, Eastern Connecticut State University, Central Connecticut State University, Western Connecticut State University, the University of New Haven, and the University of Connecticut. For all institutions, our student-level data include the student's first academic year, last academic year, graduation status, major, and financial aid information. The earnings data comprise each student's earnings by quarter within each occupation category. Before analyzing

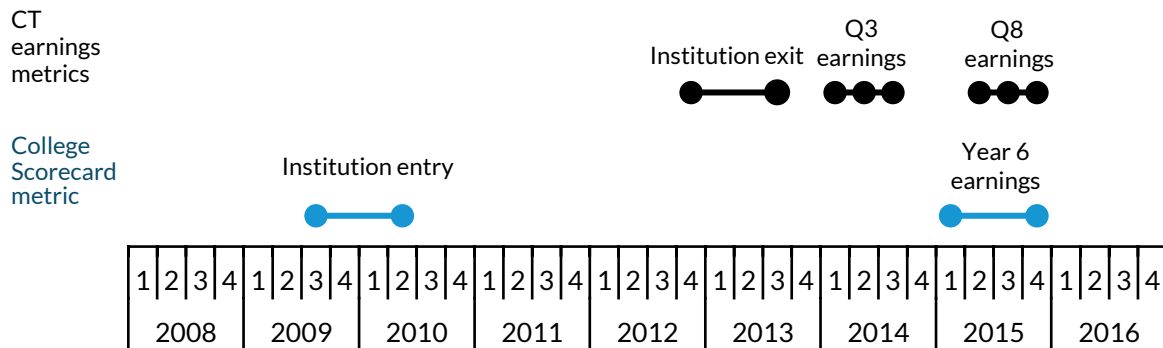
the data, we adjust each student's earnings for inflation, converting all earnings to 2019 dollars. We aggregate quarterly earnings if a student has earnings for more than one industry code (e.g., if she worked in both food service and in real estate during a given quarter). There may be instances where someone worked multiple jobs during one quarter. If both jobs are included in the same industry category, we would not be able to distinguish whether these earnings came from a single job or multiple jobs.

Developing Multiple Earnings Measures

For our analysis, we assess three earnings measures. First, we look at the earnings of the 2009–10 cohort, measured six years after entry into the institution. This measurement is closest to the cohorts used for the earnings measurement in the College Scorecard. Then, we look at earnings as they are typically measured by policymakers in Connecticut, three (Q3) and eight (Q8) quarters after graduation (figure 1). These earnings are measured for students who have evidence of stable employment, meaning they have at least a dollar in earnings in the quarters before and after the measurement quarter (e.g., in the second and fourth quarters after graduation for the Q3 measurement). We represent these quarterly wages as annual wages by multiplying the wages in Q3 and Q8 by four. All earnings data are presented in 2019 dollars and only for students who had enrolled in at least six credits (half a standard course load) at the institution.

FIGURE 1

Earnings Cohort Measurement for the College Scorecard and Connecticut Measurement



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Source: Urban Institute analysis of College Scorecard and Connecticut earnings metrics.

Notes: Q = quarter. The single-digit numbers on the x-axis represent quarters: 1 = January through March, 2 = April through June, 3 = July through September, 4 = October through December. The College Scorecard cohort is for students who received any federal financial aid and were working and not enrolled in higher education. Connecticut earnings are measured for those who have recorded unemployment insurance wage data in the state. The College Scorecard measurement is taken six years after entry, and Connecticut takes earnings three and eight quarters after institution exit year, for students with earnings in the quarter before and after the target quarter.

The College Scorecard measure looks at median earnings for students who received Title IV aid (federal loans or grants); were employed 6, 8, or 10 years after first enrolling in the institution; and were no longer enrolled in higher education (students are considered enrolled if they had an in-school deferment status for at least 30 days in the measurement year).² Because the College Scorecard measure relies on a link to deidentified federal tax records, earnings data are not restricted to a given state, as many unemployment insurance wage records are.

The College Scorecard measure is the most complete national measure of earnings by institution and, in a more recent pilot, by program. But because the measure looks only at federal aid recipients, these earnings data may not be representative for institutions that have a large number of non-aid recipients (Council of Economic Advisers 2015).³ Comparisons of College Scorecard data with other sources have found that the College Scorecard may slightly underestimate earnings because it does not account for non-aid recipients.⁴

Connecticut agencies typically measure postenrollment earnings from the point after a student graduates from an institution, rather than from point of entry. This approach generates a cohort composed of different students than the ones used in the College Scorecard measure. Although the state has used multiple measurements, we focus on measurement at three and eight quarters after leaving the institution. We further refine this measure by looking at four cohorts of earners (figure 2).

First, we look at students who left the institution during that year (with or without a credential) and at those who graduated (with an undergraduate certificate, associate’s degree, or bachelor’s degree). We further subdivide these categories, looking at earnings for anyone who meets the criteria for inclusion in the Q3 and Q8 metrics (including stable employment and enrollment of at least six credits) and then looking only at those that meet the criteria and for whom we have no record of other higher education enrollment at the same time. To determine enrollment, we rely on linked National Student Clearinghouse records, which cover most US postsecondary institutions (Dynarski, Hemelt, and Hyman 2013).

FIGURE 2
Earnings Cohorts for Connecticut Measurement

	Meet inclusion criteria	Meet inclusion criteria, no other enrollment record
Any exit	<i>Left, all students</i>	<i>Left, not enrolled</i>
Graduation (certificate, associate's degree, bachelor's degree)	<i>Graduated, all students</i>	<i>Graduated, not enrolled</i>

Note: We look at four cohorts of earners at both three and eight quarters after leaving the institution.

In the following sections, we look at how these restrictions affect the measurement of students’ median earnings, helping policymakers better understand how decisions about which students to include in a given metric may affect the representation of earnings.

Assessing Earnings Measures Using Connecticut Data

The decision of data source, students to include, and time frame on which to measure wages all affect the way colleges appear to stack up on aggregate earnings. We use our Connecticut data to examine how earnings measures can shift when the specifications of the measure change. By “pressure testing” different specifications, we identify potential biases in each measure and provide useful context for researchers and policymakers who seek to compare different metrics.

Are In-State Wage Measures Biased Downward?

Although state longitudinal data systems typically have the most complete data on a student's enrollment in public institutions and her in-school outcomes, most states rely only on in-state unemployment (UI) data to look at employment and earnings data after graduation. Colorado, Michigan, Texas, and Wisconsin have partnered with the LEHD program at the US Census Bureau to develop nationwide earnings data for students who leave postsecondary institutions. Evidence from LEHD states indicates that in-state estimates are lower than nationwide estimates because students who move out of state may be more likely to earn more than those who do not move (Foote et al. 2019). To further validate this finding, we compare median earnings on the College Scorecard, reported six years after first enrollment, with a similar earnings metric using only in-state UI wage data.

The most recent cohort in the College Scorecard is the pooled cohort of students who first enrolled at the institution during the 2007–08 and 2008–09 school years and whose earnings were measured in the 2014 and 2015 calendar years. Our Connecticut sample starts with students who first enrolled the following school year, 2009–10. We exclude students who do not appear to have received federal financial aid during their time in school. Although we cannot exactly match the cohort, we would expect in-state results to be upwardly biased because the economy improved from 2014 to 2016 (e.g., national unemployment fell from 6.6 percent in January 2014 to 4.9 percent in January 2016). Thus, if our inflation-adjusted results are still lower than the College Scorecard outcomes, we have further evidence that in-state estimates are biased downward relative to national estimates, at least in Connecticut.

When we plot College Scorecard median incomes relative to a similar measure using only in-state wage data, we find a strong correlation between the measures for two-year schools and a weaker correlation for four-year schools (figure 3). In line with other data, we find that in-state medians are generally lower than a similar College Scorecard median. Two community colleges stand out as having particularly low in-state median earnings—more than \$3,500 lower—relative to the national measure. These two schools are close to the state border near large out-of-state cities. Community colleges closer to the state interior tend to have a median closer to the College Scorecard median. This finding suggests that institutions (e.g., community colleges) that tend to draw local students may have differing levels of downward bias when using in-state earnings data, relative to national data, based on proximity to an out-of-state metropolitan area.

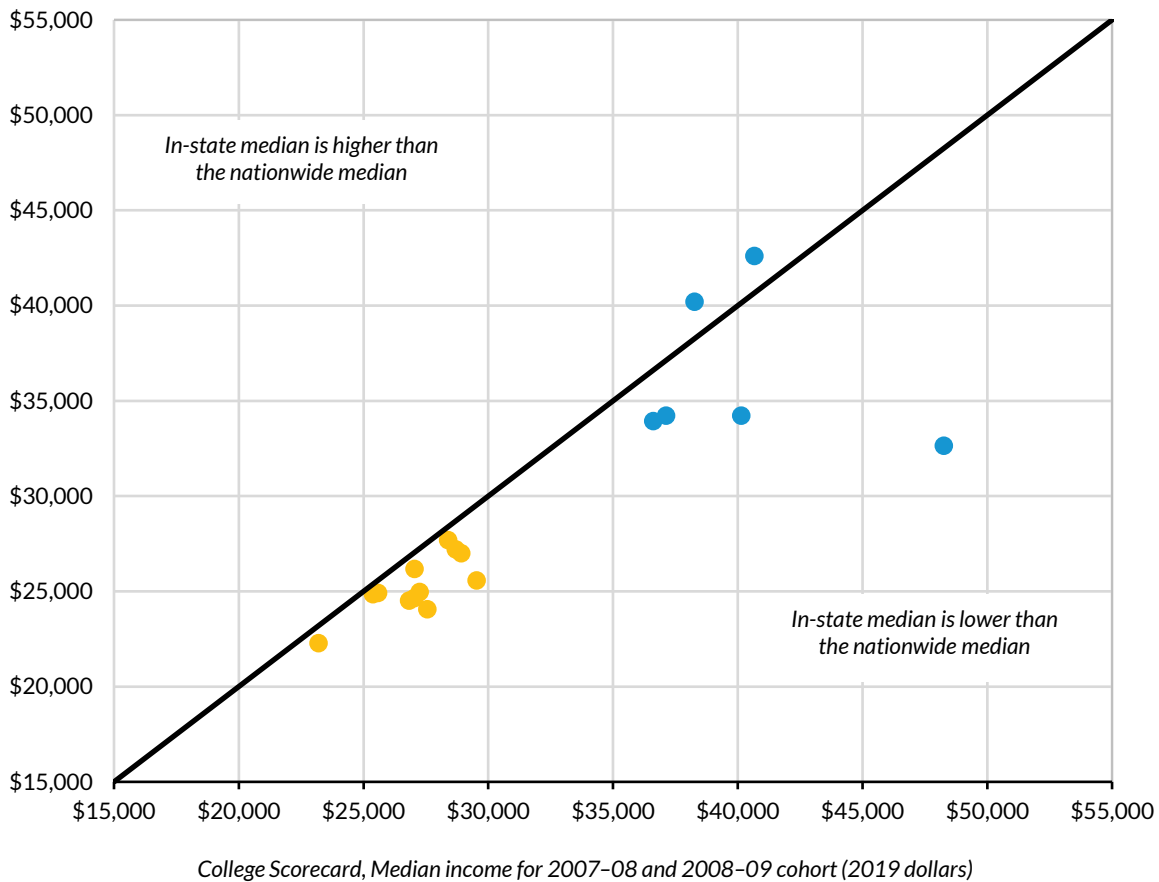
FIGURE 3

In-State Earnings Data Compared with National Earnings Data for Connecticut Institutions

Although correlated with College Scorecard earnings data, median in-state unemployment wage data tend to be lower

● Four-year institutions ● Two-year institutions

Connecticut wage data, 2009–10 class, 2019 dollars



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Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Four-year institutions do not display the same correlation between the two metrics as two-year institutions (though we have only a small number of four-year institutions in our data). Connecticut's in-state wage data appear to substantially underestimate national earnings for four-year institutions that have more out-of-state undergraduates. But this finding may not transfer to analyses of wage data in other states. For example, if many students come from high-income metropolitan areas near Connecticut, such as Boston or New York City, they may be more likely to return to these high-income

areas after leaving school. It is unclear whether this pattern would hold true in states where out-of-state students may come from, and potentially return to, less-prosperous areas.

How Much Do Nongraduates Depress Median Wages?

College Scorecard earnings data are based on when the cohort of earners entered the target institution. But policymakers may be more interested in learning about outcomes for students as they leave school, because the “entering cohort” approach could introduce substantial variation in institutional experiences. For example, the College Scorecard measure could present the earnings for a student who stayed for only one semester at a given four-year institution and then spent five years in the workforce, in the same cohort as a student who completed a degree in five years at the institution and is just now starting her first year of work.

Earnings measures published by the state of Connecticut are largely based on when students leave the institution, so that wage data portray trends in a student’s early career after graduating from an institution. Of course, there are variations in student earnings among exiting cohorts. The largest variation might be between students who earn a credential from an institution and students who leave without a degree. To understand this, we look at median earnings three and eight quarters after the exit year for all who left a given institution (both graduates and nongraduates) and compare this outcome with the median for graduates only. Because a credential typically increases employability and earnings, we would expect that earnings will be higher for graduates than for the broader cohort. But it is also possible to imagine an alternate scenario. Perhaps students who leave school are motivated by employment opportunities, while students who complete degrees take longer to find a job that requires their credential.

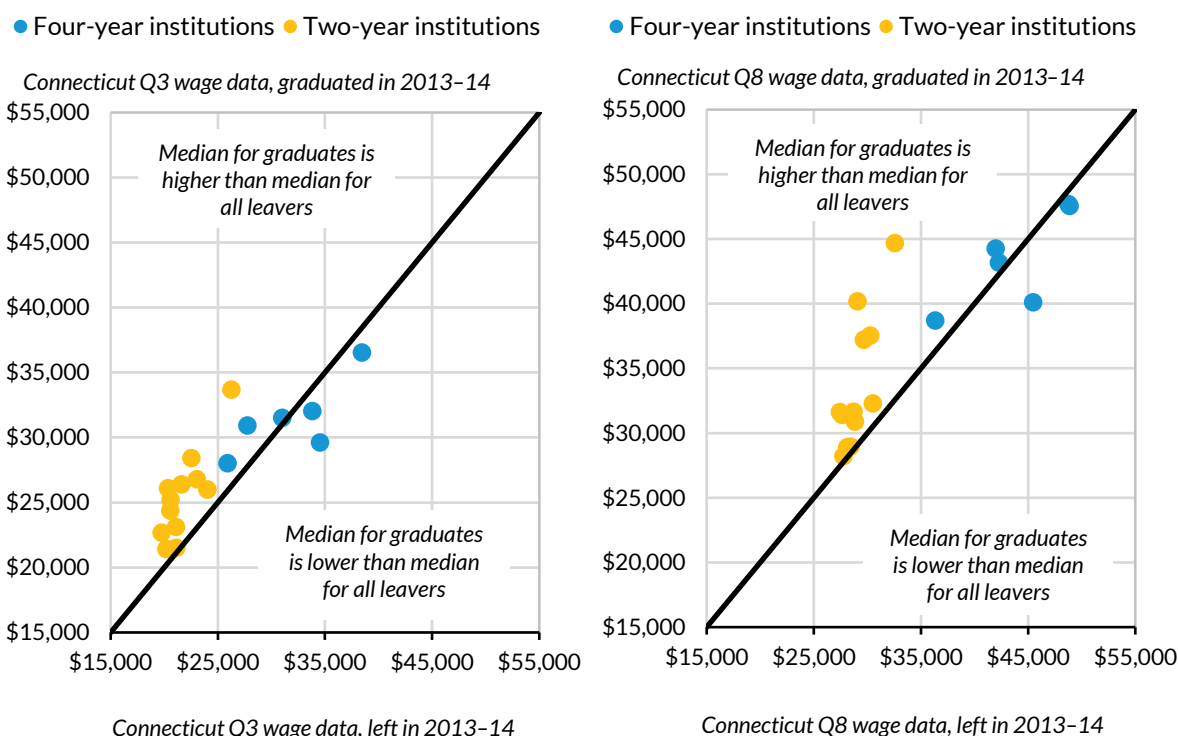
When we compare the earnings of all students who left, and those who graduated, in the 2013–14 school year, we find that graduates of two-year schools tend to make more (median earnings) than the broader cohort that left in the same year (figure 4). Further, the earnings gap between graduates and all leavers grows as we track wages from three quarters after graduating or leaving to eight quarters, though wages tend to go up for both groups. The gap in estimated median earnings measures when we exclude noncompleters varies substantially. The differences in median measures within each institution range from \$400 to \$7,400 in Q3 and from \$500 to \$12,100 in Q8. Further, as the earnings measure moves farther out in time, two-year institutions have wider variation in the median earnings of their graduates, relative to the median earnings of all leavers. In Q8, the difference between the highest and lowest median earnings at the institution level is about \$5,100 for two-year institutions, but when we

look only at graduates, this difference triples to \$16,400 between the highest and lowest institutional median earnings. We discuss the significance of these differences in a later section.

FIGURE 4

Earnings among Graduates Relative to the Broader Cohort of Leaving Students

The gap in median wages for leavers versus graduates grows over time



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Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Note: Quarterly wage data are inflated to 2019 dollars and multiplied by four to reflect predicted annual wage data.

Although there is a clear relationship between graduating from a two-year institution and earning more, we do not observe the same for students from four-year institutions. In fact, looking only at graduates for some of our four-year schools actually depresses our estimate of median wages. There are several possible explanations. First, more four-year graduates may be continuing their education in Connecticut, earning wages but also enrolling in graduate school. We investigate this in the next section. Another potential explanation, one we cannot directly investigate, is that graduates may have different preferences for earnings in the first years of their career, relative to the broader cohort of students who leave the institution with or without a degree. Bachelor's degree holders may feel secure in their ability to achieve a higher salary over time and may take a low-paying job to build job

experience, prepare for graduate school, or contribute to a social cause. The decision to stay in state may also play a role. We know that students who leave the state tend to earn more. If the propensity to leave the state is correlated with graduation from a four-year school, we may have a downward bias in our median graduate earnings.

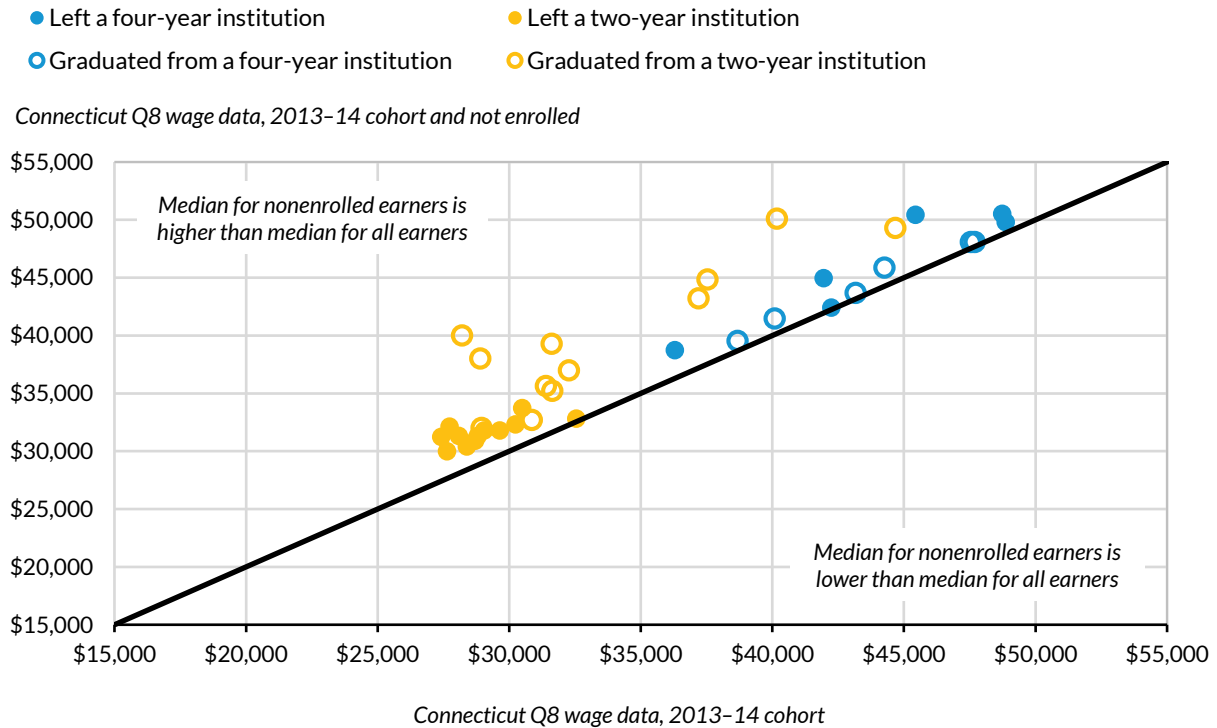
Does Accounting for Higher Education Enrollment Change the Way We Measure Earnings?

The College Scorecard measure excludes people who have earnings in the measurement year but have a record of higher education enrollment for at least one month of the calendar year. This exclusion omits students who may still be enrolled in the target school (e.g., may have enrolled part time or taken time off from and returned to school), who may have transferred to a different institution, or who completed a degree and are enrolled in another degree program. The reasoning for this exclusion is that those who are still enrolled may be working part time and may not have fully realized their earnings potential. However, it is unclear the extent to which this exclusion may affect the median measures.

FIGURE 5

Effects of Excluding Enrolled Wage-Earners

The enrollment exclusion produces an increase in median earnings for students from four-year institutions smaller than the increase for two-year graduates



Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Note: Quarterly wage data are inflated to 2019 dollars and multiplied by four to reflect predicted annual wage data.

To investigate the effects of excluding students enrolled in higher education, we compare the median earnings for all students who meet the earnings criteria and then for those who are not enrolled in school in or around Q8, based on records in the National Student Clearinghouse (figure 5). We conduct this analysis for all students who left in 2013–14 and only for graduates from that year.

Including an enrollment exclusion produces the largest change for students who graduated from two-year schools, increasing median institutional earnings in Q8 by an average of \$6,100, while excluding enrolled students changes the rate for the broader cohort of two-year leavers by just \$2,500. This may be because graduates of two-year schools are more likely to pursue a bachelor's degree, postponing full-time earnings.

The enrollment exclusion has less of an effect on institutional median earnings for four-year schools. Excluding earners who are enrolled in higher education increases the median earnings for all students by \$800 in Q8 and by \$2,200 when looking at the median for graduates only. There are several

possible explanations. Students may be less likely to enroll in further higher education immediately after leaving a four-year school. In addition, students may be more likely to pursue further education out of state and are thus not included in the initial earnings measures, meaning their exclusion has no effect.

How Do Cohort Criteria Affect the Share of Students Included in Our Earnings Measures?

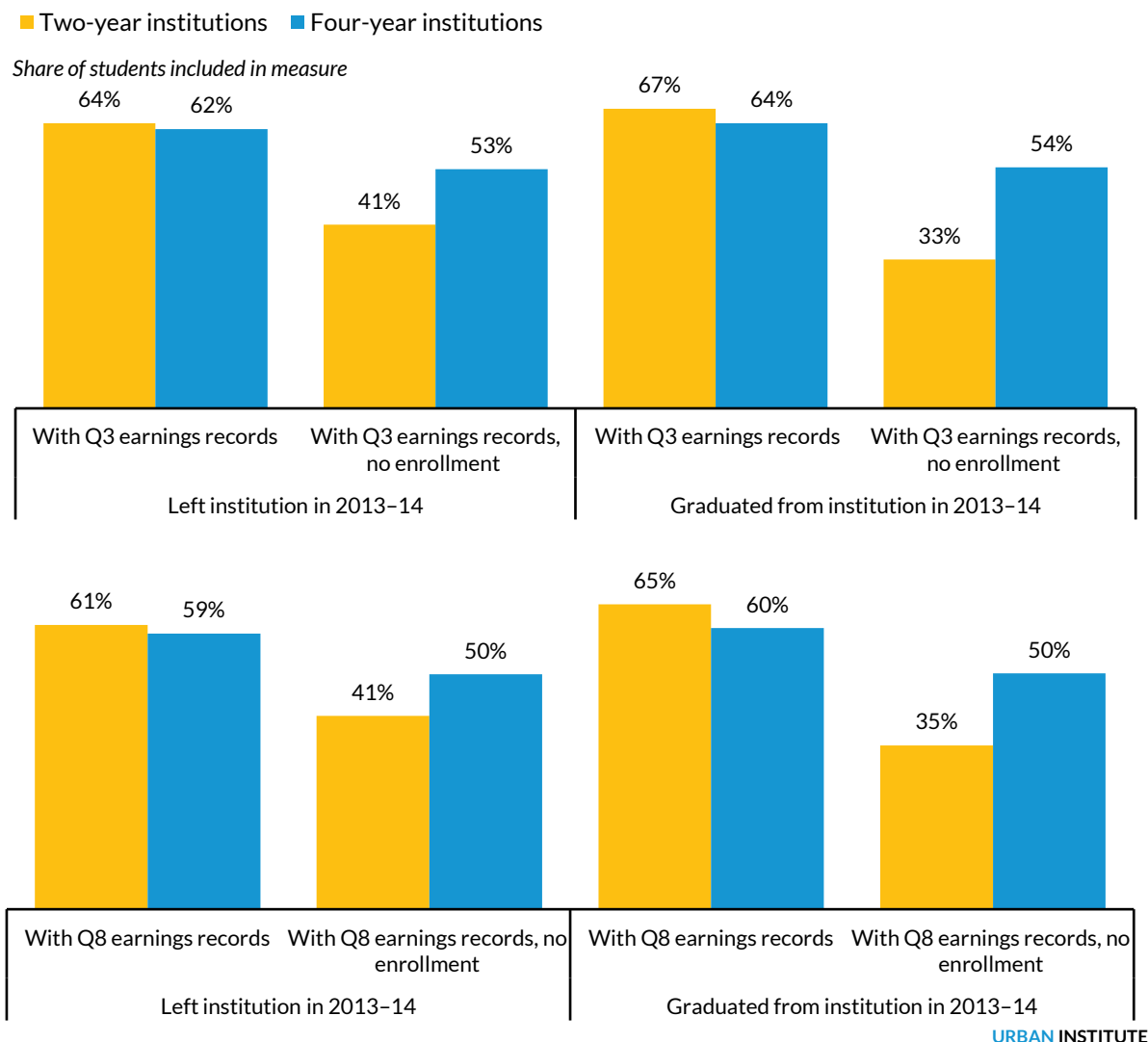
The exclusions in our measure—looking at in-state earnings in a given quarter and limiting the sample to those who are not currently enrolled—mean that our institutional metrics fail to describe outcomes for a substantial share of students. For policymakers, this may be a necessary trade-off. To characterize the experiences of students who fit the profile of a full-time wage earner, it is necessary to exclude students who do not fit the profile. But the number of students excluded from these earnings measures is rarely discussed. To assess the size of these exclusions, we look at the total number of students that left or graduated from two-year and four-year schools in our sample in 2013–14 and present data on the share included in each measure.

About 60 percent of students who left or graduated from our sample institutions in Connecticut had a valid earnings measure in Q3, and a similar share had earnings in Q8 (figure 6). Although it is possible that graduates of four-year schools are more likely to pursue jobs out of state, we do not observe a substantial difference in the share of students captured in in-state wage data. Two-year graduates are 3 percentage points more likely to have a record of in-state wages in Q3, relative to all those who left a two-year institution, and are 4 percentage points more likely in Q8. The most striking shift in the share of students included in the earnings measure occurs with the enrollment restriction. In line with our observations of large shifts in median earnings for two-year students, we find that excluding currently enrolled students reduces the share of students in the measure by 23 percentage points for leavers measured in Q3 and by 30 percentage points (roughly half) for graduates measured in Q3. We observe similar but slightly smaller changes—18 percentage points for leavers and 30 for graduates—when looking at Q8. The shift for the four-year cohort is roughly 10 percentage points smaller for both cohorts in both measurement periods.

FIGURE 6

Effects of Enrollment Exclusions on the Share of Measured Students

The enrollment exclusion removes a small share of four-year students and a substantial share of two-year students



Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Note: Q = quarter.

How Much Can Earnings Data Differentiate between Institutions?

How we measure earnings can substantially change the presentation of median earnings in the years following a student's enrollment in a school. At a two-year school that typifies this change, median earnings in Q3 increase from \$22,534 when estimated for all leaving students, to \$28,405 when estimated only for graduates, and to \$33,480 when estimated for graduates who are not enrolled.

These changes in student cohorts, from the least restrictive definition to the most restrictive, produce a large increase in the median wage estimate for this institution.

One of the challenges of selecting and presenting an earnings measure is that institutions may appear to have different outcomes. An institution that ranks highly when we look at all students who leave in a given year may not rank so highly when we look only at nonenrolled graduates. To further understand how much earnings measures can (or cannot) differentiate between institutions, we ask two questions: (1) Are the differences in institutions' median earnings measures significantly different, or could they be because of chance? (2) How does changing the earnings measure affect the way institutions stack up on earnings?

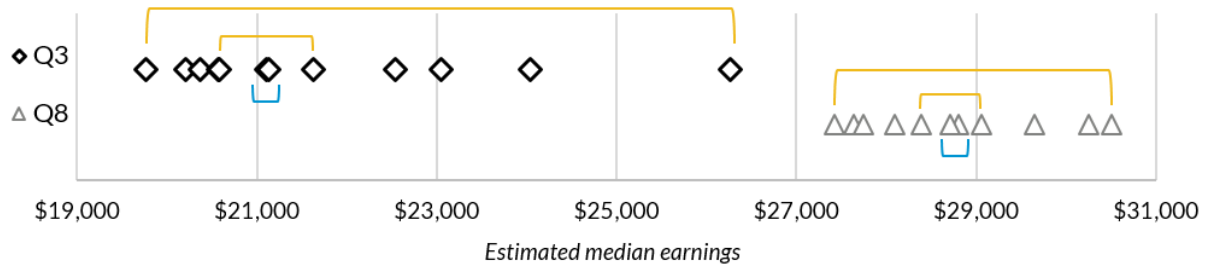
To investigate these questions, we focus on two-year schools, which are more numerous and have median earnings measures that tend to be less dispersed than those at four-year schools. To look at whether these median earnings measures are statistically different from one another, we employ a Kruskal-Wallis test. This test looks at whether it is possible that the samples of our institutions appear to be part of a population with the same median (essentially, whether we could get a similar distribution of median values if we took the population of earners and randomly divided them into groups). When we conduct this test across all two-year institutions, we find it is very unlikely (less than 1 percent probability) that the samples for our earnings measures are from a distribution of the population with the same median.

Another way to test whether the differences we observe are statistically meaningful is to compare two institutions' medians separately. For these tests, we use the least-dispersed measures: the median earnings for all students who left the institution, measured at Q3 and Q8. We then look at the likelihood that two institutions could be drawn from an underlying sample with the same median. To simplify this test, we look at three pairs: the institutions with the highest median and with the lowest (i.e., the 1st and 12th), the fourth highest and fourth lowest (the 4th and 8th), and the middle pair (the 6th and 7th). We find that the difference between the medians is always statistically different for the highest and lowest medians (highlighted in yellow if there is less than a 10 percent chance that the distribution was because of chance), but for pairs of institutions that have closer medians, it becomes less likely that the underlying populations are statistically different (highlighted in blue if there is more than a 10 percent chance).

FIGURE 7

Differences between Institutions with Close Earnings Medians

Institutions that have similar medians may not be statistically different from each other



URBAN INSTITUTE

Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Notes: Q = quarter. Statistical test of medians conducted with Kruskal-Wallis test. Quarterly wage data are inflated to 2019 dollars and multiplied by four to reflect predicted annual earnings.

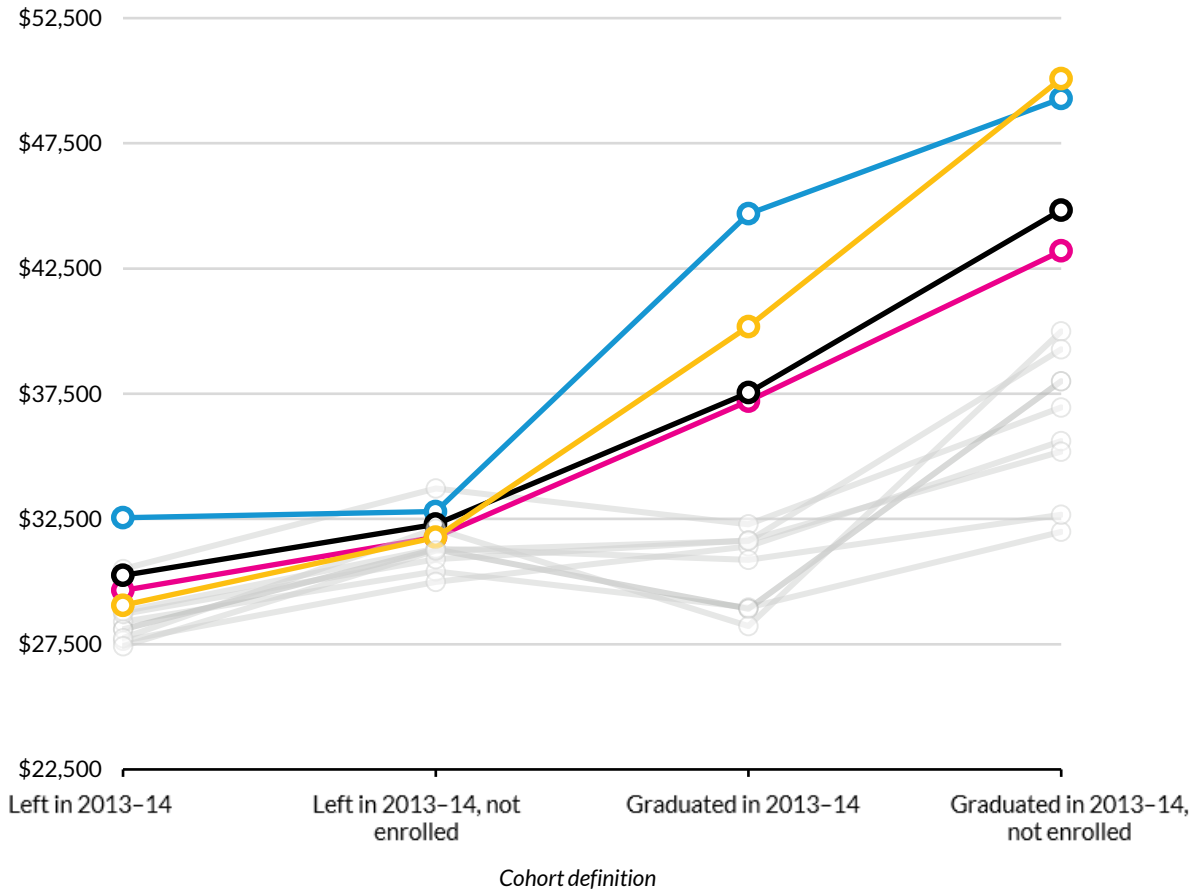
Aside from whether measures are statistically different from one another, another question is whether the distinctions are economically meaningful. For this least-dispersed measure, the difference between projected annual median earnings at one institution relative to another institution could be as small as \$20 or as high as \$6,500 in Q3. Certainly, large differences in median earnings could be meaningful to students and policymakers, but if these institutions were ranked, the magnitude of these differences would be hidden. To tackle our second question—whether “sorting” institutions is affected by cohort restrictions—we plot the four rankings for all institutions, tracing the institutions that rise or fall based on the measure (figure 8). When we plot these cohort changes, we see that institutions are more differentiated on the earnings of their graduates, particularly when excluding students who continue their enrollment in higher education. This divergence may be caused by multiple factors, such as the credential and degree programs offered, the criteria for graduation, and the propensity of students to have earnings out of state.

FIGURE 8

Relative Position of Two-Year Institutions, by Earnings Cohort

Institutional earnings for graduates diverge more than earnings for any student who leaves the institution

Q8 wage data



URBAN INSTITUTE

Source: Urban Institute analysis of College Scorecard and Connecticut wage data.

Notes: Q = quarter. Quarterly wage data are inflated to 2019 dollars and multiplied by four to reflect predicted annual earnings.

The cohort used to measure median earnings has a substantial effect on how institutions are positioned relative to others. For example, on the Q8 measure, one institution has the lowest median earnings when looking at all students who left in 2013-14. But this institution moves up in position as the cohort definitions change and is 6th among the 12 institutions when looking at 2013-14 earnings among graduates who are not enrolled in school. Although this is one of the larger shifts in an institution's relative position across cohort definitions, the typical institution moves 2 or 3 positions up or down as the definition shifts from students who left to students who graduated and are not enrolled in school.

Improving College Earnings Metrics

Data on postcollege earnings can help policymakers discern one of the key outcomes of higher education: increases in human capital that increase earnings for the state's workers. But our analysis of wage data in Connecticut indicates that these data should be used with caution. In-state wage data are lower than national estimates, and this gap may vary by geography. Further, policymakers must consider which cohort provides the most relevant measure. Even though the earnings of leavers may provide a more accurate estimate of typical student outcomes, graduates' median earnings tend to more clearly show differences between institutions.

Earnings data will continue to be an important benchmark against which prospective students and policymakers will measure institutions and degree programs. Our findings illustrate several ways to better measure postcollege earnings.

Continue to foster connections between state and federal agencies. One of the most robust datasets on postgraduate earnings is the experimental PSEO, which relies on both state and federal data to paint the fullest picture of earnings. These measures are still in their nascent stages, but such a collaboration could give states a more complete picture of postsecondary outcomes over time.

Clearly present data for different types of cohorts. Policymakers need to clearly identify and describe the students they include in their aggregate earnings measures. There are no easy answers here. Presenting graduate earnings alone may mislead a prospective student about her future earnings, particularly if many students do not complete the program. Similarly, presenting earnings data for all students who enrolled in the institution may not clearly delineate the degree's value. The best solution may be for states to clearly describe how they built their earnings cohort and to allow data users to look at different cohort specifications.

Incorporate multiple earnings measures. Measure specification matters. An institutional cohort that appears to have higher earnings a few quarters after graduation may have comparatively lower earnings later. Policymakers could build an index or composite number that incorporates multiple earnings measures and measurements at multiple points in time so students understand both the level of their expected earnings and their potential earnings trajectory. Our findings are consistent with previous work indicating that a mix of earnings measures may be the best approach (Minaya and Scott-Clayton 2016).

For many people, a college education is one of the most substantial investments of time and money they make. Providing more information about this choice—particularly information about potential

earnings—will help students navigate their options and help policymakers understand the outcomes of their public institutions. Our analysis indicates that the information conveyed by aggregate earnings measures may vary substantially, depending on who is included in the measure and when they are measured. Policymakers and students will benefit most when the measures incorporate the most complete data and provide multiple clear earnings measures.

Notes

- ¹ “Statewide Longitudinal Data Systems,” Education Commission of the States, accessed January 10, 2020, <https://c0arw235.caspio.com/dp/b7f93000c5d42acacdaa48a69a8f>.
- ² “Technical Documentation: College Scorecard Institution-Level Data,” US Department of Education, accessed January 10, 2020, <https://collegescorecard.ed.gov/assets/FullDataDocumentation.pdf>.
- ³ “Technical Documentation,” US Department of Education.
- ⁴ Jonathan Rothwell, “Understanding the College Scorecard,” Brookings Institution, September 28, 2015, <https://www.brookings.edu/opinions/understanding-the-college-scorecard/>.

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