

Adjusting College Cost Figures for Noncredit Enrollments: Part 2—Iowa, South Carolina, Tennessee, and Virginia

by Richard M. Romano, and Mark M. D'Amico

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The first part of this research was published as CHERI Working Paper #176 in 2016, (<https://archive.ilr.cornell.edu/sites/default/files/CHERI%20WP176.pdf>). An expanded version was published in the *Community College Review* in 2019. It included the states of New York (SUNY, & CUNY), New Jersey, North Carolina, and California. The current study, labelled Part 2, includes four more states and adds to our knowledge of how the exclusion of noncredit enrollments distorts community college IPEDS data.

Abstract

Objective: This study extends prior work on a distortion in IPEDS data brought about by the exclusion of noncredit enrollments. This affects a commonly used metric, expenditures per FTE student. The problem is that expenditures for noncredit courses are reported to IPEDS but the enrollments are not. Previous research covered 4 states— New York, New Jersey, California and North Carolina. The current study adds four more states—Iowa, South Carolina, Tennessee and Virginia. **Method:** Data on noncredit enrollments were made available from system offices in our four new states. In addition, discussions were held on both the system and the campus level to verify the data and assumptions. Data were merged with existing IPEDS data at the campus and state level and were adjusted to account for noncredit enrollments. **Results:** Evidence supports the argument that IPEDS data overestimates the resources that community colleges have to spend on each student, although distortions vary greatly between states and among colleges in the same state.

Keywords: community college spending, noncredit enrollments, IPEDS

Richard M. Romano is professor emeritus of economics at Broome Community College (State University of New York) and director of the Institute for Community College Research. He is also an affiliated faculty member at the Cornell Higher Education Research Institute at Cornell University. Corresponding author: rmr46@cornell.edu

Mark M. D'Amico is Professor of Higher Education at the University of North Carolina at Charlotte. Prior to his faculty role, he was an administrator in the South Carolina and North Carolina systems of higher education. Corresponding author: mmdamico@uncc.edu

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Introduction

Backing up the claim that community colleges are underfunded, advocates often point to the amount colleges spend on each student compared to their 4-year public counterparts. Thus in 2012-13, the target year for most of the current study, the national average for public research universities (PR) was \$39,793 per full-time equivalent (FTE) student, \$19,310 per FTE for public master’s colleges (PM) and \$14,090 for public community colleges (CCs). In this example, the public colleges are grouped together according to their Carnegie classification. Other classifications are also possible and show a similar result.

As one example, in a report directed at policymakers and the media, Hillman (2020) classified colleges according to their selectivity from broad access (including the CCs and regionals which admit 80% or more of applicants) to highly selective (those which admit fewer than 40% of applicants). For the 2018-19 year, excluding spending on auxiliaries, research, and public service, the breakdown here is \$14,945 per FTE for the broad access group (\$12,747 for CCs) and \$52,129 for the highly selective group.

Both of these examples, as with almost all studies of comparable spending levels, use data from the Integrated Postsecondary Data System (IPEDS) and lead to the same conclusion: community colleges serve the neediest students but have the least to spend on them. The current study is not designed to argue this point (for a review of this issue see Romano and Palmer, 2016). Our objective is to show that the expenditure per FTE figures which researchers and the media use is inaccurate and is actually lower than that traditionally found when using IPEDS data, especially for the community college sector. The same can be said of revenues per FTE but we focus exclusively on expenditures because it more accurately measures what colleges actually spend educating students (on the difference between costs and prices and what drives each, see Feldman and Romano, 2019). If comparisons and claims are to be made in regard to funding and policy, it is important that we get the figures right.

Defining Noncredit

Our definition of noncredit follows that of the National Center for Education Statistics (NCES, 2016) which defines noncredit courses as those “having no credit applicable toward a degree, diploma, certificate, or other formal award” (p. 22). Based on this definition, noncredit enrollments are not reported to IPEDS as part of the annual reporting requirements. But, the revenue and expenditures for those courses are included in college budgets and therefore are reported to IPEDS. It is important to note that the two reporting stipulations cited—that enrollments are not reported, but their expenses are—are the defining characteristics which are

the focus of both the current and the previous study of the IPEDS measurement problem under examination (Romano et al., 2016; Romano et al., 2019).

Noncredit courses are often short in length and may be offered through a division of continuing education to an audience on or off campus. Most often designed with community service or workforce training in mind, they cover a wide range of topics from ballroom dancing to truck driving, depending on local area demand.

One major difficulty in isolating credit from noncredit offerings in state and college databases centers on ESL and remedial/developmental education courses. The pre-college courses offered by regular academic departments are not usually part of degree programs but carry institutional credit and may be counted for the purposes of financial aid. This is allowed under federal regulations. In these cases, courses are reported to IPEDS and do not fit our definition of noncredit. Similar conditions exist for some ESL classes. Thus, when Voorhees and Milam (2005) found that in public 2-year colleges 24% of noncredit enrollment is in remedial studies, 25% is in recreational courses, and 52% is in career and technical training, no clear distinction is made between those reported to IPEDS and those not.

Colleges are typically proud of their flexibility in designing noncredit courses which support state and local business needs, especially those labeled as workforce training. Some of this training is done under competitive contracts for specific employees, while others may be open enrollment. Some might be offered for credit and reported to IPEDS, others not. If they are reported, they do not fit the NCES definition of noncredit.

It is not unusual for colleges to point out that enrollments in noncredit programs are higher than those in credit programs. On a national level, this does not appear to be the case. The American Association of Community Colleges (AACC) estimates that in the fall of 2018, 5 million out of 11.8 million (42%) enrollments were in noncredit courses (AACC, 2010). The number of FTEs is unknown but is surely much lower as most, if not all, of these courses have fewer contact hours than a typical credit course. An early study of this issue using Wisconsin state data by Grubb, Badway and Bell, (2003), for instance, found that a 264,320 headcount of noncredit enrollments turned into only 4,225 FTEs. In the current study, in Iowa an enrollment of about the same number, 248,440, generated 7,581,717 contact hours, which resulted in an FTE count of 12,636 in 2012-13. For our purposes, the FTE count is the important one and contact hours, not headcount enrollments, are what is needed to compute them.

Previous Research

Noncredit activity has attracted a modest amount of interest among scholars, largely because the community college workforce development mission is delivered, in part, through this mode.

Most of these studies have been done on the type of noncredit offerings at community colleges, methods of funding, the characteristics of the students taking such courses, and selected outcomes (e.g., D'Amico et al., 2014; D'Amico et al., 2017; Van Noy et al., 2008; Xu & Ran, 2015). All of these provide important information on noncredit courses but none addresses the measurement problem found in the line of research that we are developing. One study, however,

is of particular interest to us because it covers the state of Iowa, which is included in the current study.

Employing an established typology for noncredit community college education (D'Amico et al. 2014), D'Amico et al. (2020) identified enrollment patterns and selected outcomes for community college noncredit programs in the state of Iowa. Their noncredit course clusters and the percentage of students enrolled in 2016-17 were occupational training (64.3%), personal interest (17.0%), contract occupational training (9.7%), and pre-college remediation including adult, secondary, and developmental education (9.0%).

These findings differed from a previous analysis of 33 states that had nearly equal splits of occupational, sponsored occupational, and pre-college education (28%, 29%, 28% respectively) and personal interest (11%) (D'Amico et al., 2017). Seeing the differences between one state's distribution and a broader sample, one of their conclusions is that noncredit offerings are mission driven, state and/or institution-specific, and may reflect the focus of the credit programs. The data and conclusions from this study helped frame our thinking for the current study, not only for the state of Iowa but, as it turned out, for all of the states in our analysis.

Undercounting Problems

An important study of a measurement problem within IPEDS is of particular interest to us. It was done by the Community College Research Center (CCRC) at Columbia. In it, Fink and Jenkins (2020) found an undercounting problem due to the reclassification of some community colleges as 4-year colleges, once they offer the bachelor's degree. The result is an undercounting of the number of community colleges, nationally, and therefore of students. This especially affects the states of Florida, where 27 colleges were eliminated, Washington, which lost 26 colleges, and California, which lost 15 colleges. It is no small problem since it includes 95 colleges and 1.4 million students from 2016-2017.

In the important state of Florida, for instance, only one of the 28 two-year public colleges is currently classified as a community college in IPEDS. Because of this reclassification, the number of FTEs recorded for the state in NCES data fell from 173,433 in 2000 to 16,516 in 2017. As the authors point out, "studies that rely on the IPEDS 'public two-year' sector definition [of CCs]... provide a misleading picture of community colleges in many states and nationally" (Fink & Jenkins, 2020, p.2).

In order to estimate the extent of undercounting, the CCRC used IPEDS data to develop a new dataset of public 2-year colleges that includes institutions that are generally recognized as community colleges by the AACC and state systems. This dataset has been shared with us and is a major source of information for the current study. It is discussed further in the data section below.

The other major study of an undercounting problem within IPEDS concerns the undercounting of enrollments from noncredit programs and therefore the calculation of an inaccurate spending per FTE figure for community colleges (Romano et al., 2019). The current study builds on this previous research which covered the states of New York (SUNY & CUNY), NJ, NC, and CA. In these five state systems, the authors estimate that mean state college expenditures per FTE

(2012-13) are overestimated within IPEDS by \$487 for NY (SUNY), by \$3,492 for NY(CUNY), by \$1,031 for CA, by \$913 for NJ, and by \$3,710 for NC.

We have used a target date of 2012-13 for the current study so that the findings may be more easily integrated with the previous one. An integration of the results can be found in the Results section below and in Table 1.

It not that the undercounting problem under study has not been recognized. Baum and Kurose (2013) pointed out that “a major problem with [IPEDS] data is that the counts of students include only those registered for credit ... [which] biases [community college] revenues and expenditures upward relative to those computed for four-year institutions” (p. 80).

An important study undertaken for the National Postsecondary Education Cooperative by Kolbe and Ketchen, (2017) also stated the problem very clearly:

Providing finance data separately or otherwise accounting for non-credit students (such as those enrolled in continuing education or certain types of remedial coursework) would create a more accurate expenditure metric than pre [SIC]-FTE metrics that are only based on credit-bearing courses (p. 16)

Two recent IPEDS Technical Review Panels have been convened on the matter by NCES. The first in 2008 (TRP#22) noted the problem of not including noncredit enrollments in the denominator of expenditure calculations (IPEDSa, n.d. p. 2) and recommended that noncredit enrollments be included in the future. But, the recommendations were not implemented. The second issued in 2021 (TRP#62) restated the problem, invited public comments, and noted that the undercounting problem affected “most often 2-year public institutions” (IPEDSb, n.d. p. 2). TRP#62 provides a sign that we are getting closer to measuring this type of activity.

The second, TRP#62, heavily referenced a detailed report commissioned by NCES on how noncredit data could be collected on the IPEDS survey. This report notes that “the exclusion of noncredit enrollment from IPEDS has a negative effect on the quality of IPEDS data, specifically the calculation of per FTE student ratios” (Erwin, 2020, p. 27). It also acknowledges the importance of the findings that the current study is built on:

In 2019, Romano, Kirshstein, D’Amico, Hom, and Van Noy conducted a study to assess the effect of the mismatched coverages of enrollment and finance components. They concluded that “the addition of noncredit FTEs reduces what would typically be reported as expenditure per FTE student,” but that “there is a significant difference between the states in the study” (p. 13). Their findings suggest that the issue related to the calculation of per FTE student revenue and expense ratios identified by TRP#22 is valid and remains unresolved. (Erwin, 2020, pp. 8-9).

Despite the recognition of this noncredit undercounting problem, as far as we know the current study and the one that it builds on, are the only attempts to attach numbers to the problem. Together, these two studies are helping to build a more complete picture of the measurement problem and of the nature of college costs in general.

Sources of Data and Methods

Our data come from two sources, IPEDS and state system offices that collect data from individual colleges on noncredit enrollments. Since no national data exist on noncredit enrollments, it is left to the states to collect. But, the states that collect it, do so with varying definitions and coverage. Culling state-level databases for only the noncredit courses which fit our definition was a necessary part of our study.

In addition, to a search of campus and system websites, structured campus and/or system interviews were important sources of information in each state.

IPEDS Data

IPEDS is our source of information on college expenditures and credit enrollments (FTEs). In the previous study of NY, NJ, CA and NC, researchers used a compilation of the IPEDS data produced by the Delta Cost Project (DCP). In particular, they used the DCP online dataset found in Trends in College Spending (Desrochers, & Hurlburt, 2016). This online tool, which covered the years 1995-2013, was valuable because it allowed researchers to match college noncredit data obtained from the states with the colleges reporting to IPEDS (the 2 lists of colleges were not always the same). However, this online tool has been taken down and is no longer available on the NCES website.

Fortunately, the DCP data that we need has been replaced and updated to the year 2018 by the CCRC for the study by Fink and Jenkins (2020) mentioned above. This dataset, hereinafter referred to as CCRC/IPEDS, has been made available for the current study. It contains information from 2000-18 on enrollments (FTEs), expenditures, sources of revenues, and selected outcomes of all of the CCs in the states that are part of this study.

The colleges in the CCRC/IPEDS dataset are a limiting factor in the present study. If the college is not listed it is not included. This did not prove to be a problem as the lists of college noncredit contact hours provided by the states was easy to match with those taken from IPEDS, although 3 of the possible 67 colleges had to be eliminated due to lack of/or conflicting data. The case of Tennessee discussed below, also proved to be an interesting one.

State Data

The system office in each of the four states in the present study provided the data, by college, on enrollments and noncredit student contact hours for as many of the recent years after 2000 that they had. Only Iowa converts these contact hours into FTEs, which is a necessary part of the current study. In Iowa they divide the number of contact hours by a standard divisor to get the FTE count. The divisor used was 600 but with no particular rationale behind it. The most common divisor that has been found in other states is 450, so it became our default divisor. In our previous study, Romano et al. (2019) found that a divisor of 450 was the most common but that 525 was used in California. In the current study, SC, TN, and VA did not specify a divisor, so we used 450. In calculating the noncredit FTE we used the divisor preferred by the state but the choice of the divisor can have a large effect on the results as the example of Iowa illustrates in Table 1 below.

The 450 number is based on the calculation used in credit courses. The number assumes that a full-time student in credit courses attends 15 hours of class a week, there are 15 weeks in a semester and there are 2 semesters a year, so $15 \times 15 \times 2 = 450$ contact hours = 1 FTE. California uses a 17.5-week semester so its $15 \times 17.5 \times 2 = 525$ hours = 1 FTE. Tennessee uses 900 for its technical colleges, and this divisor, for mostly non classroom instruction, can actually be found within the IPEDS glossary.

Were IPEDS to require the reporting of noncredit contact hours, at some point, it will be necessary to address the divisor issue.

In what follows, the sources of our data and methods used are supplemented by a brief look at the elements within the community college system in each of our four states that might influence our results. Methods of calculating some of the data are deferred to the Results section, where they can be more closely followed.

Iowa

The state of Iowa is divided into 15 community college districts, each made up of several small counties. Eleven of the fifteen are rural colleges have a median FTE credit enrollment of 2,651 in our target year of 2012-13. Detailed records on noncredit enrollments and contact hours at the college level, and by topic, were provided by the Iowa Department of Education for the years 2000 to 2017.

Both the CCRC/IPEDS dataset and that of the state had the same number of colleges, 15, so it was not necessary to eliminate any colleges due to a lack of data as was the case for California in prior research where 17 colleges out of 113 were eliminated from the analysis (Romano et al., 2016).

The largest two CCs, in terms of FTE credit enrollments, are in the urban areas of Des Moines, the state capital, and Cedar Rapids. Des Moines CC had an FTE count of 13,554 in our target year of 2012-13, while Kirkwood CC, operating in a smaller area, enrolled 10,938 FTEs. Kirkwood has a relatively large noncredit enrollment so the two largest colleges often alternate as the state leader in overall enrollments and noncredit awards. Des Moines, which D'Amico et al. (2020), classified as a "high transfer college" according to Carnegie Classifications has a much higher concentration of "pre-college remediation" noncredit courses compared with the other colleges in the state.

For our purposes Kirkwood seems more representative of the state as a whole. For that reason, a structured interview was conducted with administrators at that college to verify data received from the state and to answer questions which the data could not. In 2020-21, ninety percent of these courses are open enrollment, with the remaining 10 percent being done on contracts with local industry.

During our campus interview it was revealed that the state provides all colleges with need based aid for noncredit workforce courses that the state prioritizes. In 2020-21, Kirkwood had over one million dollars for this purpose. This indicates a high degree of state support for noncredit offerings which no doubt contributes to the impressive results found in Table 1 below.

Noncredit enrollment data for the three public 4-year colleges in the state were also obtained from the Iowa Board of Regents for comparative purposes. For the three public universities, University of Iowa, Iowa State, and Northern Iowa, the noncredit enrollments for 2018-19 were 655,310, while total enrolments at the 15 community colleges for that year were 204,233. The surprising finding is that public 4-year colleges had three times the enrollment in noncredit courses as the CCs is discussed in the Results section.

South Carolina

The South Carolina Technical College System was created in 1961 with the express purpose of attracting industry into the state and it remains dedicated to that purpose. The state is divided into 16 multi-county community college service areas with an FTE credit enrollment in our 2012-13 target year of 61,798. The largest three colleges in the largest metropolitan areas (Charleston, Columbia, and Greenville) make up 44% of the state total, while the remaining 13 have a median FTE enrollment of 2,674. This makes South Carolina only slightly smaller than Iowa in terms of credit enrollments (61,798 vs 64,472) and with roughly the same urban-rural divide. But what is true for credit enrollments is not so for noncredit contact hours, which register as 2.3 million in South Carolina vs 7.3 million for Iowa in our target year.

Noncredit contact hours for each college were provided by the South Carolina Technical College System for the years 2001-2017. Although we had data for all 16 colleges in the system, one of the smaller ones was eliminated from our analysis because of incomplete/conflicting data.

The system is quite proud of its workforce and economic development roots, and 15 colleges still carry the name "Technical College," though all 16 are comprehensive community colleges that serve workforce development and college transfer missions. One of the particular points of pride is *readySC*, which is the state's workforce development incentive for new and expanding businesses in the state. Another is Apprenticeship Carolina, a statewide partnership with the business community to initiate the creation of registered apprenticeships across the state with technical assistance and a \$1,000 corporate tax credit for businesses. Over the past decade, the number of apprentices in South Carolina has expanded from less than 1,000 to nearly 35,000 today. While the state of South Carolina does not provide specific funding for noncredit education, the System includes noncredit contact hours along with credit enrollments in its funding formula when allocating state funds to individual colleges. A notable exception would be training funds that are supported through economic development incentives or other special workforce development arrangements.

Another contextual issue is that the Related Technical Instruction for apprenticeships offered by the state's Technical Colleges, can be delivered through noncredit or credit. Apprenticeship enrollments offered through credit would be measured in existing degree enrollments and reported to IPEDS. In the final analysis, we are confident that apprenticeship-related education is represented appropriately in the reported noncredit numbers.

Tennessee

Tennessee has 13 community colleges and enrolled 58,786 credit FTEs in our target year of 2012-13. The largest in that year was Southwest, at 7,574 FTEs, and the smallest was Dyersburg, at 2,269. This makes Tennessee only slightly smaller than two other community college systems in our study (Iowa - 64,472 and South Carolina - 61,794).

Data on noncredit contact hours were provided by the Tennessee Board of Regents for the years 2008-09 to 2019-20. The colleges on the state list were identical to those we found on the CCRC/IPEDS list, so none had to be eliminated due to missing data. Unlike other state lists in this study the courses for Tennessee include only activities approved as workforce training. Recreational and personal interest courses are not included. However, it was revealed during our interviews that student record data would indicate that the courses not measured would not make up more than an additional 10% of the total (Table 1 provides an estimate).

State records also indicate that enrollments in the workforce noncredit courses are concentrated into three areas: about 25% health, 11% business, and 45% technical. Roughly 40% of these courses are open enrollment and no special financial aid is available for students. Success in noncredit workforce training is part of the funding formula but on balance, they are expected to be self-financing.

A great deal has been written about the Tennessee colleges, mainly because of the Tennessee Promise scholarship program implemented in 2015 and the longest running performance funding regime in the U.S. started in 1979 (Hillman et al., 2018). Lately, they have also received national attention for their guided pathways reforms (Jenkins et al., 2018), which has been called “probably the furthest along [of any state]” (p. 3).

Weighted for institutional mission, registrations in workforce noncredit programs are a component of the performance funding formula. In 2021-22 the weights for individual colleges will range from 5 to 12.5 percent, with the average for the system at 8% of funding. Because these noncredit courses are part of the system of funding, this state keeps some of the best records on enrollments of any state in our study.

When we asked the state for all noncredit courses, by college, the state also provided data on the 27 Colleges of Applied Technology (TCAT) which are part of the public system of postsecondary education and offer mainly less than 2-year certificates and diplomas in a variety of occupational programs. Program length are measured in clock hours rather than credits although a few academic courses may transfer toward community college degrees.

Students at these colleges are eligible for the typical range of federal and state grants. Most TCAT colleges are small with a headcount of less than 1,000. One of the colleges (Chattanooga) is located on a community college campus. The rest are not. When a large VW auto assembly plant moved in across the street, the noncredit numbers for this college took a large jump, as a targeted training program was started. This caused noncredit contact hours to go from 71,596 in 2007-08 to 241,977 in 2011-12.

The largest, TCAT, Murfreesboro, had a student headcount of 6,774 in 2018-19. It is also near a large auto plant (Nissan) and its programs very much reflect the close ties between local industry and the workforce training mission of these colleges.

Because the TCAT colleges have IPEDS–ID numbers and report their enrollment data to IPEDS and because they are not on the CCRC/IPEDS list of community colleges, they were not included in this study. However, in the section on Results below, we suggest that the TCAT

system might help us explain some of the low noncredit numbers reported for the state community college system.

The example of the TCAT colleges serves as a reminder that the current study does not provide a complete inventory of the workforce effort in these states. It only focuses on the measurement problem within IPEDS data.

Virginia

Although the legislature created the Virginia Community College System (VCCS) in 1966, Vaughan (1987) has traced its roots back to the Jeffersonian period. Today it consists of 23 comprehensive colleges. The largest, Northern Virginia, at 30,172 FTEs in our target year, draws on the suburbs of Washington, DC and enrolls a disproportionate share of university transfer students. The smallest three, registering from 539 to 800 credit FTEs, serve a decidedly different rural population.

The VCCS sent us an inventory of noncredit enrollments and contact hours for 22 colleges from 2013-18. The 2013 data covered our target year. One college, Reynolds, was not included because its enrollment data and expenses for noncredit programs were shared with John Tyler College. To avoid double counting, both of these colleges were eliminated from the study as it was impossible to isolate the enrollments and the general revenues and expenditures for them attributable to each college. We were left with 21 out of 23 colleges representing 2,571,523 of the VCCS total of 2,788,650 student contact hours for 2012-13.

Although the state invested \$4.8 million in the VCCS noncredit programs in 2013, it has not generally provided much targeted public subsidy for the programs. Workforce development contact hours are not included in the state performance funding system as they are in Tennessee. Open enrollments account for around 65% of the total for most years, with basic skills and recreational registrations making up about 10% of the total. The balance of enrollments, listed as workforce training, distributed themselves in the following way in 2013: 15% in health fields, 34% in business, 11% in technical, and 40% in other fields.

Results

Table 1 displays a summary of the most important findings of our study. That is, that IPEDS per FTE calculations are inflated by the exclusion of noncredit enrollments but that great variations exist among the states. For comparative purposes, we have included the results from the previous study which produced the same result. The methods used in both studies were identical. The details of the previous study will not be repeated here, save a brief mention in the discussion section below.

Table 1

Summary of the impact of community college noncredit courses on IPEDS expenditures per FTE data for 8 states-- 2012-13 (2012-13 dollars)

State (system) Current and Previous Study	Mean Expenditures/FTE (IPEDS)	Noncredit FTEs as % of credit FTEs	Mean Adjusted Expenditures/FTE	Difference
Iowa-1	\$12,401	18.9%	\$10,364	(\$2,037) 16.4%
Iowa-2	\$12,401	25.2%	\$9,445	(\$2,956) 23.8%
South Carolina	\$12,855	9.5%	\$11,771	(\$1,084) 8.4%
Tennessee*	\$11,784	3.02% (3.3)	\$11,448	(\$336) 2.9%
Virginia	\$11,463	6.7%	\$10,764	(\$699) 6.1%
Previous study				
New York (SUNY)	\$12,495	4.1%	\$12,008	(\$487) 3.9%
New York (CUNY)	\$15,971	28.0%	\$12,479	(\$3,492) 21.9%
California	\$12,811	6.1%	\$11,780	(\$1,031) 8.0%
North Carolina	\$14,726	27.6%	\$11,016	(\$3,710) 25.2%
New Jersey	\$10,949	9.1%	\$10,036	(\$913) 8.3%

Notes: Iowa-1 Contact hours divided by 600, the way the state does it. Iowa -2 contact hours divided by 450, the way NY, NJ, and NC do it. We have used a divisor of 450 for TN, VA, and SC. The TN ratio and adjusted IPEDS numbers are based on the workforce training hours given to us by the state. The (3.3) % for TN is the state estimate if non-workforce courses are included.

*Workforce only

To move from the official IPEDS data to the adjusted figure in Table 1, we converted the noncredit contact hours provided by the state system office into noncredit FTEs using the divisors specified above. Noncredit FTEs were then added to the IPEDS credit FTEs of the same academic year and the total was divided into the expenditure figures to obtain the adjusted Expenditures/FTE figure for each college using the Consumer Price Index configured to the academic year. Colleges were then summed to obtain the state average.

As Table 1 shows, that the inclusion of noncredit enrollments deflates the official IPEDS data. The percentage figure for each state/system in the difference column shows the percentage reduction in the IPEDS data that is necessary to get to the “real” adjusted figure. Community colleges are poorer than official figures show but great variations among and within states exist.

In general, the larger colleges in each state generate more noncredit enrollments but the story may be different when adjusted for size. The noncredit to credit ratio, expressed as a percentage, is an easy way to estimate this relative measure. On this measure the leaders are New York (CUNY), and the state systems in Iowa and North Carolina. The lowest ratios are found in Tennessee and New York (SUNY). Higher ratios generate greater distortions in the IPEDS data but a range of differences within each state also exist.

The previous study only collected data for the target year, 2012-13. For the current study we had noncredit contact hours, and FTEs, for a number of years. This allowed us to see that the variation from year to year for most colleges and certainly for the state, was much greater than the variation in credit FTEs. It also gave us some faith that our target year of 2012-13, was a

more “normal” one than some of the others. Some of the variation from year to year might be related to the business cycle but a lot of it reflects new or lost contracts, competition from other vendors for the same market, or changes in state policy which impact noncredit offerings. All of these things can affect credit market as well but the impact on noncredit offerings is greater.

In what follows we give a brief discussion of the differences found in each state within the current study and a few educated guesses on what causes them, many of them derived from campus/system interviews.

Iowa

Owing to a study by D’Amico, et al. (2020) and the quality of data obtained from the state, we have a more complete picture of nature of noncredit offerings in Iowa than we do for the other states in our study.

As Table 1 shows, we estimate that, in our target year of 2012-13, the official IPEDS expenditure of \$12,401 is inflated by \$2,000 to \$3,000 depending on which divisor is used. Among the individual colleges, the largest, as measured by credit FTEs, is Des Moines. It has the greatest number of noncredit FTEs (2,238), but the noncredit-to-credit ratio is only 16.5%. A college about a third as large, Eastern Iowa, has a ratio of 27.6%. The state-wide range on this measurement is 6.2% to 27.6%, so considerable difference among colleges exist.

Looking at credit enrollments from 2000-17, we see a steady climb, with a few minor interruptions, from 2000-09 and then an upward surge due to the recession of 2007-09, after that a steady decline to 2017. This follows national patterns.

The pattern for noncredit courses whether measured by enrollments, contact hours or FTEs, is quite different. Here we see a steady decline from 2000-19, with only two up years in 2007 and 2016. The statewide FTE count in 2000 of 20,543 fell to 9,927 in 2019, a decline of 52%. We were unable to tease out the impact of the business cycle on these numbers, but whatever upward push it might have given in certain years, they were offset by the factors pushing in the opposite direction. Campus interviews indicate that increased competition from other public and private sectors had contributed to the decline. State figures show large declines in areas which can be read as positives. Fewer drunk drivers, less need for secondary education and college academic success courses, are all good signs but lead to reduced need for those services. Perhaps the generally expanding economy and improved education upgrades reduced the demand for these courses. However, this would not explain the decrease in enrollments for leisure/recreational courses.

Nevertheless, the noncredit numbers for Iowa remain the highest in our sample. It is not difficult to see why, as the state has provided generous support for these programs, including need based student aid, which can cover the full cost of attendance for some workforce courses.

South Carolina

Table 1 shows that the adjustment for this state is less than half of that for Iowa. This is because the noncredit contact hours are far fewer. Still, its noncredit to credit ratio of 9.5% is the second largest in the current study. The range on this metric was even greater than that found in Iowa,

going from 1.5%, at the smallest college in the state with only 396 credit FTEs, to 22.6%, at another small college, with only 1,788 credit FTEs in our target year.

Looking at the variation of noncredit contact hours and FTEs over the 2001-18 period, we see a great deal of volatility around a secular decline in all measures of enrollment, with FTEs falling from 9,242 in 2001 to 5,030 in 2017. This volatility is greater than that found in the other states in this study and may have been due in part to the persistent challenges in noncredit data reporting, as discussed by D'Amico et al. (2017). However, for our target year of 2012-13, noncredit FTEs were reported to be 2.5 million, which is near the median of 2.6 million from 2009-10 to 2017-18 period. This gave us some confidence that our target year could be classified as a more typical year for purposes of analysis.

Frankly, we expected the noncredit numbers to be higher in South Carolina, owing to the importance of workforce development as a key part of the system mission. State data, interviews, and a survey of campus websites uncovered several possible reasons for these relatively low numbers. First, colleges have found ways to integrate the time spent working into the course credits, perhaps to capture financial aid for the students. Thus, they would not turn up in our noncredit numbers. Second, the apprenticeships may not generate many contact hours and the ones that do use a divisor of 900 to convert contact hours to FTEs.

For instance, at Northeastern Technical College, one program in machine tool technology is 3 ½ years long and is fully integrated into the credit program. After acquiring 34 credits at the college, the students are awarded an associate's degree and a journeyman's license from the U.S. Department of Labor. All college expenses are paid by the employer and no noncredit hours are generated. In another program, college expenses are also paid by the employer. Students acquire 34 credits but no degree and work at the job site for only 400 hours.

The importance of the partnerships that the colleges have made with local industry through the apprenticeship program and other workforce oriented offerings is not fully reflected in our numbers, even if they are accurate, due to the prevalence of credit-based offerings, and provides another example of how the present study does not represent a full inventory of the workforce training provided by these colleges that span delivery mechanisms.

Tennessee

Tennessee is another example of why our study is not intended to provide a complete inventory of the noncredit workforce activity in any state. By concentrating on the IPEDS problem and its impact on community colleges, we are forced to ignore a group of 27 Colleges of Applied Technology that are part of the post-secondary system in this state.

As Table 1 shows, TN has the lowest noncredit to credit ratio of all eight states in our study. Even when we add an estimate of the non-workforce activity, the percentage is only 3.3%. Seven out of 13 colleges have a noncredit to credit ratios of 1% or less, with the most active college at 9%. As in other states, the colleges in Tennessee exhibit a wide variation, even with these decidedly lower numbers. Moreover, the variation in noncredit enrollments does not mirror those on the credit side of the house with eight up years and four down years since 2007-08.

Interviews reveal some possible reasons for the low numbers of noncredit FTEs. Chief among them is the existence of the Technical Colleges which do some of the work done by CCs in other states. These colleges do not classify work in credit hours but rather in contact hours, and their programs do not include general education courses. They produced more than 12 times the number of contact hours than the system of community colleges in 2018-19 (11,424,279 vs 929,512). The state calculates the FTE totals for the Technical Colleges at 12,694, using a divisor of 900 vs our calculation of 2,066 for the CCs using a divisor of 450.

Although, we have not tested this in any way, the presence of performance funding in the state may have also reduced the number of students in noncredit courses at the community college. Workforce training contact hours are given some weight in the state point system, but degrees and certificates are favored. This has caused some bundling of noncredit courses into award programs which are then reported to IPEDS and for which students are eligible for more financial aid.

Why have we excluded the Technical Colleges from our study? First, because they are not on our CCRC/IPEDS list of community colleges. But, more importantly, because they provide their enrollment data to IPEDS, so they do not fit the problem which this study addresses.

Virginia

Virginia has the largest community college system, measured by credit enrollments of 96,862 FTEs, of any of the four states in this study. The largest college, Northern Virginia with an FTE count in our target year of 30,172, also has the largest number of contact hours in noncredit courses (841,537). When adjusted for size, however, it shows a noncredit to credit ratio of 6.2%, just about at the state average of 6.7% and the community colleges in the state of California in our previous study. The smallest college in the system, Eastern Shore with 539 FTEs and 29,780 contact hours has a ratio of 12.3%. Overall, the range on this measure is from 3.9 to 18.2 percent.

Data provided by the state show that the number of contact hours and FTEs in noncredit courses increased from 6,197 FTE in 2013 to 6,795 FTE in 2018. Over that same period, the system saw two years with falling noncredit FTEs and three years with rising ones. The largest gains were in 2017 and 2018. Declines of 42% at the largest college, from 2013 to 2018, were offset by impressive gains at 16 of the other colleges. It is notable that this cyclical pattern does not follow the FTE enrollments in credit programs over those years which, following national trends, fell in every one of those years.

In fact, looking only at descriptive data, no pattern can be found in the noncredit numbers of the four states in this study with rising numbers in TN and VA and much larger falling numbers in Iowa and South Carolina. Local conditions are most surely the controlling factor in both credit and noncredit programs but the swings are greater in the noncredit programs.

Comparisons: 2 vs 4-year colleges

This study has shown that the real expenditure per FTE figure for CCs is lower than the official IPEDS numbers used by researchers and the media. In comparing CC spending with that of other

public colleges in the nation, for instance, the IPEDS figures, in our target year of 2012-13, were \$39,793 for public research universities (PR), \$19,310 for public master's colleges (PM) and \$14,090 for community colleges (CCs). Our work has shown that once noncredit enrollments are included, the expenditure per FTE figure falls, making the gap between the CCs and other public colleges even wider. But, is the gap wider?

To get a more accurate picture of the gap in spending (and funding) among public colleges we would need to adjust the 4-year college expenditures per FTE for noncredit courses in the same way that we have for the CCs. We do not have enough data to measure the magnitude of noncredit offerings at all of the public 4-year colleges in our sample. But, the figures we do have raise some interesting questions and is intriguing enough to be presented in Table 2.

Table 2 Noncredit comparisons-- Public 4 and 2-year colleges, selected data and years

State (System)	Public Research	Public Master's	Community Colleges
Panel A* Average	FTE Per College		
New York (SUNY)	3,346	57	473
New York (CUNY)	0	773	3,319
Panel B+ Enrollments	(#of colleges)		
Iowa	646,582 (2)	8,738 (1)	214,563 (15)

* 2012-13; + 2018-19

The sample shown in Table 2 is unsatisfying in many ways. It is only for two states and three systems--certainly important information on these states but hardly enough to draw generalizations from for a national perspective. Interestingly, in our sample, the noncredit FTEs and/or enrollment generated by the research universities in two of the systems, Iowa and CUNY, is much larger than that of the community colleges. However, these figures do not provide a legitimate comparison, given our definition of noncredit.

In Iowa, 498,555 of the state's total contact hours for 4-year colleges of 655,310 (76%) are generated by Iowa State University, the state land grant college. Of that, 99% are from cooperative extension activities (agriculture and 4-H youth programs). Land grant colleges generate a lot of activity.

In New York (SUNY), Cornell University, or at least a portion of it, is the land grant college. Its cooperative extension activities make up 50 percent of the noncredit contact hours and FTEs of the five public research universities in the SUNY system. Moreover, the state instructs colleges to include, in their reporting, noncredit activity for grants, conferences and faculty consulting in the community (Romano et al., 2016). Interestingly the other public college system in the state, The City University of New York (CUNY) asks colleges not to report any of these activities, giving the research universities zero activity in their reports to the state. Clearly the definition of noncredit is important.

In the state reports that we have been working with, the land grant colleges have been asked to claim cooperative extension activities. But, the revenue and expenses from these activities do not

appear to be in the university budget. As such, they would not meet the definition of noncredit activity that impacts our study. Below is a statement that was received from a Vice President at one of the large land grant colleges in our study.

I have connected with our Cooperative Extension administration and they have explained that the revenues and expenses associated with these non-credit contact hours are recorded in the financial systems of each local Cooperative Extension association. These revenues and expenses are not in the university's general ledger or financial statements and therefore would not be in the IPEDS numbers.

This statement was circulated to two other land grant colleges, and they signaled agreement with it. Land grant cooperative extension courses are not in university budgets but receive separate state appropriations for their operations. With the land grant numbers out of the picture, we can safely say that the community colleges in our sample of states generate more FTEs and offer more noncredit courses to the community than public research universities in their states. This is even more true of master's level colleges, who CCs are more likely to be compared to.

The public master's colleges in our sample of states have lower noncredit hours than any of the public colleges included in our study including public bachelor's colleges, which we did not show here. One caveat here, is that in geographic areas not serviced by a community college, the noncredit offerings of nearby public 4-year colleges may be higher than in our sample. This possibility is suggested in a recent study by McClure et al. (2021) of 118 rural 4-year colleges in 39 states.

Looking beyond the figures shown in Table 2, we have found that, even more than the community colleges, the 4 year colleges and universities in our small sample, offer noncredit courses that closely conform to their credit offerings and the specialties of their faculty. This is especially true for those with professional schools, such as medicine, law, business, agriculture and pharmacy.

So, even considering the adjustments necessary to account for the noncredit courses offered by public 4-year colleges, the gap in the expenditure per FTE figures between the 2 and 4-year sectors will grow beyond those shown in official IPEDS figures.

Discussion and Further Research

Issues sounding the nature of college costs are of great interest to students/parents, policymakers, taxpayers and the media. The key metric in measuring college costs is what colleges spend to educate students, in particular expenditures per student FTE. This paper is concerned with the proper measurement of this metric and has shown that the official figures that measure it are inflated for all colleges but in particular for community colleges. Looked at from either an expenditure or a revenue perspective, community colleges are even poorer than IPEDS figures indicate due to the exclusion of noncredit enrollments. Our study reinforces the previous work done on this issue and shows that figures within the current IPEDS universe that depend on a per student FTE figure will be wrong. Additionally, not accounting for noncredit enrollments properly shows an undervaluing of the comprehensive mission of community colleges.

Using our sample, the measurement error created by the exclusion of noncredit enrollments can be as much as 25% (North Carolina) or as little as 2.9% (Tennessee). Researchers and the media often like to use figures drawn from the nation instead of from the states, but it is not possible for us to give anything but an educated guess on what that figure might be. We do have some large states in our sample and national data often track that in California because that state enrolls about 20 % of the national total of credit students. Weighting our sample of states by their enrollments, we would estimate that the community college expenditure figures per FTE, as calculated from official IPEDS data, could be reduced by 8-10 percent to take into account the exclusion of noncredit enrollments.

We are also not able to discern definite national trends in noncredit enrollments from our sample of states since our target year of 2012-13. However, they appear to be downward, which means that the measurement error is decreasing. The impact of the pandemic will throw all of our trend numbers into disarray, but surely future research will be engaged in examining the impact of this event on enrollments and outcomes.

Future research will also be shaped, in part, by what the NCES does about including noncredit enrollments in the IPEDS database. The new numbers will generate new lines of research. At present, research will continue to grapple with what we have found. This includes questions about the role noncredit courses play in workforce education, pre-college remediation, and other community needs. In addition, the central collection of data could lead to more robust studies of noncredit funding, as we know from previous research (D'Amico et al., 2017) that not all states fund noncredit activities.

Both this and the previous study have a number of limitations. First, the results shown in Table 1 are based on a single point in time. We are reasonably confident that our target year of 2012-13 is not an outlier but, given the volatility in noncredit enrollments, a longer time frame would be desirable. Second, even though our sample of states accounts for 42% of the credit enrollments in the nation, some large states have been left out. These include Texas and Florida, in particular. Data on noncredit activity in Florida is publically available but, even with the help of system people, it was hard to separate the numbers reported to IPEDS from those not. Clearly, the inclusion of more states could change our estimate of a national average.

Another shortcoming of our studies is that our conclusions are based on estimates. There is no uniform national framework for collecting data on noncredit enrollments or other noncredit activity. This is left to the states and their methods, and the accuracy of their collection varies. We have done our best to understand each of the systems in our sample and to use a common method for including them, but mistakes will be made until IPEDS specifies a common national framework for collecting these data.

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