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## *Appendix A. Methodology*

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This appendix describes the following:

- Data sources used to create the maps included in this report;
- Data and methods we used to complete the economic footprint analysis; and
- Methods used to benchmark all Chicago colleges and universities to those of other cities.

### **GEOGRAPHICAL ANALYSIS**

All of the maps in this report were created using Geographic Information Software (GIS), using data provided by the universities and colleges in America's Urban Campus. When data were incomplete or imperfect in terms of geographies, we used professional judgement and GIS to make estimations.

Map 1, "Campus Locations for America's Urban Campus Institutions," on page 10 was created using the addresses of America's Urban Campus colleges and universities, including both of their main and satellite campuses in and around Chicago.

Map 2, "America's Urban Campus 2017 Partnerships with Chicago Public Schools," on page 30 is based on address information from AUC institutions on the location of Chicago Public Schools that they currently have partnerships with.

Map 3, "America's Urban Campus 2017 Global Partnerships," on page 33 is based on information from AUC institutions on the list of foreign countries that they currently pursue partnerships with.

Map 4, "Students by U.S. State, Fall 2016," on page 54 and Map 5, "Students by Country, Fall 2016," on page 55 were created using data on residence of student enrolled provided by AUC institutions. These maps do not include students from schools that were unable to provide student origin data.<sup>35</sup>

Map 6, "Alumni by Illinois County," on page 59, Map 7, "Alumni by U.S. State," on page 60, and Map 8, "Alumni by Country," on page 61 are based on data from AUC schools on their alumni with known location by Illinois zip code, U.S. state, and country. These maps do not include alumni from schools that were unable to provide alumni data by location.<sup>36</sup>

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35. The following schools are not included in the student by origin maps: Argosy University Chicago, Chicago State University, City Colleges of Chicago, East-West University, National Louis University, Northeastern Illinois University, Rush University, Saint Xavier University, and John Marshall Law School.

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## ACADEMIC PROGRAM DEFINITIONS

The academic program areas used in “Degrees” on page 51 are based on the National Center for Education Statistics’ Classification of Instructional Programs (CIP) codes that they use in their Integrated Postsecondary Education Data System. The composition of each program area is as follows:

The *Physical Science, Agriculture, and Natural Resources* academic program area includes the following fields of study: agriculture, agriculture operations, and related sciences; natural resources and conservation; and physical sciences.

The *Business, Management, and Law* academic program area includes the following fields of study: legal professions and studies; and business, management, marketing, and related support services.

The *Engineering, Mathematics, and Computer Science* academic program area includes the following fields of study: architecture and related services; computer and information sciences and support services; engineering; and mathematics and statistics.

The *Liberal Arts, Social Science, and Education* academic program area includes the following fields of study: area, ethnic, cultural, and gender studies; communication, journalism, and related programs; education; foreign languages, literatures, and linguistics; family and consumer sciences/human sciences; English language and literature/letters; liberal arts and sciences, general studies and humanities; library science; multi/interdisciplinary studies; philosophy and religious studies; public administration and social service professions, social sciences, theology and religious vocations; visual and performing arts; and history.

The *Medicine and Biological Science* academic program area includes the following fields of study: biological and biomedical sciences; health professions and related clinical sciences; and psychology.

The *Other* academic program area includes the following fields of study: personal and culinary services; parks, recreation, leisure, and fitness studies; Homeland security, law enforcement, fire fighting, and related protective services; construction trades; mechanic and repair technologies/technicians; military technologies; precision production; transportation and materials moving; communications technologies/technicians and support services; engineering technologies and engineering-related fields; and science technologies/technicians.

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36. The following schools are not included in the alumni data maps: Argosy University Chicago, Chicago State University, City Colleges of Chicago, Columbia College Chicago, East-West University, Illinois Institute of Technology, Loyola University Chicago, National Louis University, North Park University, Northeastern Illinois University, Rush University, Saint Xavier University, and John Marshall Law School.

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## ESTIMATING TOTAL EXPENDITURES

In “America’s Urban Campus Operations and Expenditures” on page 12, we presented total expenditures by America’s Urban Campus members on operations and construction, as well as spending by their students and visitors. These estimates included all expenditures related to these activities, and are different from the direct spending estimates shown in “Economic Footprint of America’s Urban Campus” on page 17, which accounted for only spending that went to businesses and households in Chicago.

The total spending estimates included all 22 America’s Urban Campus member schools. To calculate this total, we relied on data provided by AUC colleges and universities, who provided us with the data they submit to IPEDS for FY 2017. For schools that did not provide us with this information, we used their expenditures data for FY 2016 that are publicly available on IPEDS, and assumed that their expenditures remained the same in FY 2017.

## ESTIMATING ECONOMIC FOOTPRINT

We define *economic footprint* as the aggregate spending, jobs, and earnings in Chicago that are associated with the activity of America’s Urban Campus colleges and universities in Chicago. Economic footprint includes both direct effects and indirect effects, as described below:

1. The *direct* effect of the universities’ economic activity includes spending, employment, and earnings that are directly attributable to the colleges’ and universities’ operations in the city, including hiring Chicago residents and paying Chicago companies for goods and services.
2. The *indirect* effect of the colleges’ and universities’ economic activity occurs as dollars re-circulate throughout the city’s economy. Suppliers for the colleges and universities are part of a supply chain and have vendors of their own who benefit indirectly from university spending. In addition, employees use their wages to buy groceries from the local grocery store, and contractors may use their revenues from the universities to buy new equipment or expand their office space. Even then, dollars continue to circulate as grocery store owners and equipment providers now have more money to purchase goods and services in Chicago.

### *RIMS II Multipliers*

To estimate indirect spending, we multiplied direct spending by final demand output multipliers released by the U.S. Department of Commerce’s Regional Input-Output Modeling System (RIMS II). We estimated the indirect jobs and earnings using RIMS II direct-effect multipliers. These multipliers are only available for Cook County, so we made adjustments to estimate what they should be for the City of Chicago based on share of sales, employment, and earnings that occurred in Chicago relatively to the entire Cook County.

Table A-1 below shows how the multipliers we used for different categories of AUC spending.

**TABLE A-1. Industrial Classification of AUC, Student, and Visitor Spending**

Spending Category	Industry Classification	Final-demand Multipliers for Chicago		
		Output	Earnings	Employment
<i>College and University Spending</i>				
Salaries and Wages	Households	0.46	0.12	3.19
Employee Benefits	Insurance carriers*	1.36	0.26	4.01
Instruction & Academic Support	Educational services*	1.40	0.50	13.78
Research	Scientific research and development services*	1.43	0.37	5.27
Public Service, Student Services, Institutional Support, Auxiliary Enterprises, & Other Expenses	Junior colleges, colleges, universities, and professional schools*	1.39	0.43	10.67
Operation and Maintenance of Plant	Facilities support services*	1.35	0.29	7.12
Hospital Services	Hospitals*	1.40	0.42	7.78
Athletics	Spectator sports*	1.38	0.56	10.52
Construction	Construction	1.32	0.34	5.93
<i>Student Spending</i>				
Room and Board	Real Estate/Food**	1.28	0.27	8.23
Books and Supplies	Retail trade***	1.35	0.34	11.11
Apparel & Other Basic Needs	Retail trade***	1.35	0.34	11.11
Meal & Entertainment	Food services and drinking place	1.38	0.39	15.80
Student Transportation	Student transportation****	1.38	0.39	12.28
<i>Visitor Spending</i>				
Hotel	Accommodation	1.32	0.34	8.95
Retail	General merchandise stores	1.35	0.33	11.48
Food	Food services and drinking place	1.38	0.39	15.80
Visitor Transportation	Transit and ground passenger transportation	1.39	0.36	16.72

\* Industries using the multipliers for “detail” industries; the rest use multipliers for “aggregate” industries.

\*\*AEG estimated an average of the real estate and food and beverage stores multipliers for student off-campus room and board spending.

\*\*\*AEG estimated an average of the food and beverage stores and general merchandise stores multipliers for student spending on books and supplies and apparel.

\*\*\*\* AEG estimated an average of the automotive repair and maintenance and transit and ground passenger transportation multipliers for student spending on transportation.

Source: AEG estimates using base data from BEA RIMS II 2016 Multipliers

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### *AUC Operations, Student, and Visitor Spending*

We estimate the direct and indirect spending for the following sources of economic activity:

- University payroll spending;
- University non-payroll spending; and
- Student spending.
- Visitor spending

To estimate university payroll and non-payroll spending in Chicago, we relied on the detailed data for 12 AUC institutions that provided such data. For the institutions that did not provide such data, we produced estimates either based on the percentages of spending in Chicago those institutions had reported in our 2014 America's Urban Campus report<sup>37</sup> or based on averages across all reporting institutions. For visitor spending, we only included the 12 AUC institutions that provided detailed visitor data in the analysis. Our complete economic footprint analysis is shown in detail in Table A-3 on page A-9.

**Payroll Spending.** In order to estimate the amount of payroll spending (wages, salaries, and employee fringe benefits) in the city of Chicago, we relied on data from America's Urban Campus colleges and universities, who provided us with the data they submit to IPEDS for FY 2017. We then used the data they provided on salaries and wages by zip code to estimate the proportion of payroll going to Chicago residents. For institutions that did not report salaries and wages by zip code, we used the data they provided for the 2014 report to estimate the proportion of payroll going to Chicago residents, where available, or averages across all reporting universities. We multiplied this proportion by total payroll reported to IPEDS to estimate the wages and benefits going to Chicago residents.

**Non-payroll Spending.** In order to estimate the non-payroll spending in Chicago, we used data provided by the America's Urban Campus colleges and universities. Schools provided non-payroll expenditure payments by zip code. We applied the proportion of payments to vendors in the city, according to spending by zip code data, to the amount of non-payroll spending reported in IPEDS for FY 2017. For institutions that did not provide non-payroll expenditure payments by zip code, we used the data they provided for our 2014 report to estimate the proportion of non-payroll spending going to Chicago residents, where available, or averages across all reporting universities. Then we used our estimates from the 2014 report to determine the share of spending in Chicago by spending categories.

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37. Jason Horwitz and David Westlake, "America's Urban Campus: The Economic, Social, and Cultural Contribution of Chicago's Colleges and Universities," Anderson Economic Group, November 2014.

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**Student Spending.** To calculate student spending, we used data provided by the AUC colleges and universities on the number of students that lived on- and off-campus at AUC schools. We estimated student spending for several categories of living expenses:

- Off-campus rent and food;
- Books and supplies;
- Apparel, and other basic needs;
- Meals and entertainment off-campus; and
- Transportation.<sup>38</sup>

For books and supplies, we estimated total spending for the total number of full-time student equivalents (FTE). For each of the remaining categories, we estimated total spending for the total number of students. To estimate the share of student expenditures that went to businesses and households in Chicago, we multiplied the total estimated student spending by the share of student employee salaries that went to students living in Chicago.

#### *Off-Campus Rent and Food*

We obtained room and board costs for on-campus undergraduate and graduate students from America's Urban Campus colleges and universities. We used these costs as a baseline to estimate the costs of rent and food for students living off-campus. In order to avoid double counting, we do not include on-campus room and board in our economic footprint analysis. Based on our research on the cost of living off-campus in Chicago, we assumed that students living off-campus spend 10% less on housing and food than students living on-campus.<sup>39</sup>

Several AUC institutions do not offer on-campus housing. For these schools, we estimated the cost of off-campus rent and food by using the average of all AUC schools' on-campus housing costs as a baseline. We then applied the same assumption outlined above.

#### *Books and Supplies*

We obtained data for books and supplies from College InSight.<sup>40</sup> We assumed that graduate students paid, on average, the same as the undergraduate students on books and supplies.

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38. In order to avoid double counting in our economic footprint, we do not include on-campus room and board in our analysis.

39. According to the University of Chicago, students living off-campus can save up to \$4,000 compared to their on-campus budget. We conservatively assumed that, living off-campus would represent a 10% cost saving than living on-campus across all AUC schools.

University of Chicago, Financial Aid, "Housing and Dining", <https://financialaid.uchicago.edu/>, accessed on June 20th, 2018.

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Data on the cost of books and supplies was unavailable for several schools. For these schools, we estimated the cost on books and supplies to be the same as the average of all other AUC schools. We also allowed for 35% of books and supplies to be purchased online, resulting in spending outside the city.

*Apparel, Meals, Entertainment, and Transportation*

Students at America's Urban Campus schools also spend money on clothes, food at restaurants, entertainment, and transportation, all of which contributes to AUC's economic footprint in Chicago. We obtained data on spending on apparel and other needs, food away from home and entertainment, as well as transportation from the 2015-2016 Consumer Expenditure Survey (CES).<sup>41</sup> This survey provides data on the average annual expenditures per household on different categories of spending.

We used the CES age category "under 25" for undergraduate students, and the CES age category "25-34 years" for graduate students. We then multiplied each of the spending category values by 75% to account for time that the students spend on campus during the year.

**Visitor Spending.** Using data on average daily rate for hotels in Chicago from Choose Chicago, and per diem rates in Chicago from the U.S. General Service Administration, we estimated an average daily spending for visitors to America's Urban Campus institutions in Chicago. Our visitor spending estimate included only spending by visitors from outside of Chicago, as shown in Table A-3 on page A-9.

We then estimated the share of visitors coming from outside of Chicago. To do so, we relied on data provided by AUC schools on the geography of current student and alumni. For visitors to campus tours, commencement, and parents events, we assumed the share of non-Chicago visitor to approximate the share of current enrollment students from outside of Chicago. We also assumed the share of non-Chicago visitors to alumni events to be the same as the share of alumni that live outside of the city.

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40. College InSight is an initiative of the Institute for College Access & Success, and provides data sourcing from IPEDS, Pell Grant files, Fiscal Operations Report and Application to Participate files, and Common Data Set files. Data can be found at college-insight.org.

41. Bureau of Labor Statistics, Consumer Expenditure Survey, 2015-2016.

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**TABLE A-2. Average Daily Spending by Visitors at AUC institutions in Chicago**

<b>Spending Category</b>	<b>Visitor from Chicago<sup>a</sup></b>	<b>Visitor from Elsewhere in Illinois<sup>b</sup></b>	<b>Visitor from Out-of-state</b>
Accommodation	\$0	\$0	\$102
Retail <sup>c</sup>	\$0	\$20	\$20
Meals <sup>d</sup>	\$0	\$69	\$69
Transportation <sup>e</sup>	<u>\$0</u>	<u>\$5</u>	<u>\$5</u>
<b>Total:</b>	<b>\$0</b>	<b>\$94</b>	<b>\$196</b>

*Source: AEG analysis using base data from Choose Chicago, General Service Administration, and AEG estimates*

- a. We conservatively assumed that there wouldn't be any additional spending associated with visits by Chicago residents to an AUC institutions.
- b. We conservatively assumed that all visitors from outside of Chicago, but in Illinois would not stay overnight for their visits to AUC institutions in Chicago.
- c. We estimated the average retail spending based on our professional judgement derived from previous survey studies on visitor consumption.
- d. We estimated the average spending on meals based on the 2017 per diem rates for Chicago. We expected that non-Chicago visitors would consume all three meals in Chicago.
- e. We estimated the average spending on meals based on the 2017 per diem rates for incidental expenses in Chicago.

**TABLE A-3. Economic Footprint of America's Urban Campus in Chicago**

	2017 Spending	% in Chicago	2017 Spending in Chicago	Final Demand Multipliers			Footprint		
				Output	Earnings	Employment	Output	Earnings	Employment
<i>Payroll Expenditures</i>									
Salaries and Wages	\$ 5,436,607,349	56%	\$ 3,050,591,180	0.46	0.12	3.19	\$ 1,411,476,502	\$ 380,132,464	9,721
Employee Benefits	\$ 2,134,260,397	55%	\$ 1,184,046,787	1.36	0.26	4.01	\$ 1,609,659,919	\$ 305,542,208	4,751
<b>Total Payroll Spending</b>	<b>\$ 7,570,867,746</b>	<b>56%</b>	<b>\$ 4,234,637,966</b>				<b>\$ 3,021,136,421</b>	<b>\$ 685,674,672</b>	<b>14,472</b>
<i>Non-payroll Expenditures</i>									
Instruction & Academic Support	\$ 807,902,122	36%	\$ 289,784,566	1.40	0.50	13.78	\$ 406,967,086	\$ 143,876,623	3,994
Research	\$ 487,913,522	8%	\$ 38,608,484	1.43	0.37	5.27	\$ 55,286,733	\$ 14,377,347	203
Institutional Support, Auxiliary Enterprises, & Other Expenses	\$ 2,769,051,503	20%	\$ 562,046,445	1.39	0.43	10.67	\$ 782,705,911	\$ 241,252,357	5,995
Operation and Maintenance of	\$ 668,780,336	30%	\$ 200,914,810	1.35	0.29	7.12	\$ 270,469,629	\$ 59,184,504	1,430
Hospital Services	\$ 334,530,963	4%	\$ 13,689,953	1.40	0.42	7.78	\$ 19,209,463	\$ 5,733,013	107
Athletics	\$ 145,215,548	32%	\$ 47,023,822	1.38	0.56	10.52	\$ 64,781,895	\$ 26,560,501	495
Construction	\$ 743,436,057	27%	\$ 199,449,706	1.32	0.34	5.93	\$ 262,702,825	\$ 66,863,627	1,183
<b>Total Non-Payroll Spending</b>	<b>\$ 5,956,830,051</b>	<b>23%</b>	<b>\$ 1,351,517,786</b>				<b>\$ 1,862,123,541</b>	<b>\$ 557,847,973</b>	<b>13,407</b>
<i>Student Spending</i>									
Room and Board	\$ 2,171,488,344	65%	\$ 1,405,766,327	1.28	0.27	8.23	\$ 1,794,713,366	\$ 374,012,876	11,564
Books & Supplies	\$ 315,905,782	65%	\$ 205,338,758	1.35	0.34	11.11	\$ 276,607,552	\$ 68,842,524	2,281
Apparel & Other Basic Needs	\$ 129,301,147	62%	\$ 80,364,415	1.35	0.34	11.11	\$ 108,257,224	\$ 26,943,229	893
Meal & Entertainment-away from	\$ 433,209,613	63%	\$ 271,588,062	1.38	0.39	15.80	\$ 375,508,630	\$ 105,136,876	4,292
Transportation	\$ 159,633,344	63%	\$ 100,975,858	1.38	0.39	12.28	\$ 138,872,601	\$ 39,819,439	1,240
<b>Total Student Spending</b>	<b>\$ 3,209,538,231</b>	<b>64%</b>	<b>\$ 2,064,033,419</b>				<b>\$ 2,693,959,374</b>	<b>\$ 614,754,944</b>	<b>20,270</b>
<i>Visitor Spending</i>									
Hotel	\$ 15,797,741	100%	\$ 15,797,741.43	1.32	0.34	8.95	\$ 20,870,483	\$ 5,305,869	141
Retail	\$ 6,133,423	100%	\$ 6,133,422.61	1.35	0.33	11.48	\$ 8,249,659	\$ 2,030,803	70
Food	\$ 21,160,308	100%	\$ 21,160,308.00	1.38	0.39	15.80	\$ 29,257,097	\$ 8,191,555	334
Transportation (visitor)	\$ 1,533,356	100%	\$ 1,533,355.65	1.39	0.36	16.72	\$ 2,129,204	\$ 555,609	26
<b>Total Visitor Spending</b>	<b>\$ 44,624,828</b>	<b>100%</b>	<b>\$ 44,624,828</b>				<b>\$ 60,506,444</b>	<b>\$ 16,083,836</b>	<b>572</b>

**Jobs**

Faculty	\$ 25,154	57%	\$ 14,457
Staff	\$ 43,384	55%	\$ 23,689
<b>Total</b>	<b>\$ 68,538</b>	<b>56%</b>	<b>\$ 38,146</b>

<b>Total Economic Footprint</b>			
	Spending	Earnings	Jobs
Direct	\$ 4,644,222,819	\$ 3,050,591,180	38,146
Indirect	\$ 2,993,502,959	\$ 1,874,361,425	48,721
<b>Total Economic Footprint</b>	<b>\$ 7,637,725,778</b>	<b>\$ 4,924,952,605</b>	<b>86,867</b>

Source: AEG analysis using base data from America's Urban Campus colleges and universities, IPEDS, College Insight, Consumer Expenditure Survey, and BEA RIMS II Multipliers

Note: The economic footprint includes all institutions - members of AUC in Chicago.

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## **PARTNERSHIPS WITH CHICAGO PUBLIC SCHOOLS**

We asked America’s Urban Campus colleges and universities to submit information about their partnerships with Chicago Public Schools, including any programs aimed at improving college readiness (scholarships, enrichment programs, and fairs/visits), collaborative interactions designed to address community priorities, programs to develop academic and career skills, and structural approaches to transforming educational experiences within CPS.

Nine AUC institutions provided data, including the names of initiatives, the addresses of CPS sites, the number of CPS students participating, and the number of AUC faculty, staff, and students engaged.<sup>42</sup> Whenever data were incomplete, we made conservative assumptions to estimate the scale of AUC-CPS partnerships to the greatest extent possible. We relied on information from AUC colleges and universities and our thorough research of other sources.

We required some of these assumptions when determining the number of AUC staff, faculty, and students involved in certain programs. Where AUC institutions could only provide a range for the number of participants, we used the middle value. When these colleges and universities could only provide a lump sum of involved AUC staff, faculty, and students, we utilized a 4:1 ratio of students to faculty members to estimate the number of people in each classification. Finally, for program that lacked AUC participation numbers altogether, we approximated a figure. We assumed that scholarships required one staff member and programs required two to five individuals. In some cases for this task, we used information from the relevant websites of AUC institutions.

Additionally, we needed to determine attendance at certain events. When AUC institutions could only provide an estimate, but not an exact count of attendees, we used that estimate. When an event lacked any attendance figure, we used our own estimate based on information on the websites of relevant AUC institutions, cross-referencing it with other online resources.

## **GLOBAL PARTNERSHIPS**

In this report, we assess the global reach of America’s Urban Campus colleges and universities by considering the number of study abroad and student exchange programs, international campus facilities, extension locations, faculty exchange programs, strategic alliances, and memoranda of understanding that they have established collectively. This information came directly from AUC entities except for the number of study abroad and student exchange programs offered by some AUC colleges and universities. Where data were incomplete, we consulted the websites of relevant AUC institutions.

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42. DePaul University, Illinois Institute of Technology, Loyola University Chicago, National Louis University, Northwestern University, Robert Morris University, School of the Art Institute of Chicago, University of Chicago, and University of Illinois at Chicago reported on their partnerships and programs with Chicago Public Schools.

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## **CHICAGO'S TALENT PIPELINE**

We looked at the talent pipeline using data from America's Urban Campus. We presented information on the total number of undergraduates and the number of CPS alumni who started college as freshmen in the 2017 fall semester as reported. We did the same for the number of transfer students from City Colleges in AUC institutions' undergraduate populations in the 2017 fall semester.

In order to find the share of undergraduates entering school as freshmen in fall 2017 who were CPS alumni, we divided the number of relevant CPS alumni by the total number of undergraduates that entered as freshmen in fall 2017.

Likewise, we used the average six-year graduation rate for all fall 2011 freshmen and those who were CPS alumni as well as the average six-year graduation rate for all fall 2011 transfer students and those transferring from City Colleges as reported by AUC colleges and universities. The averages we presented were not weighted as information on the relevant 2011 cohorts was unavailable. Instead, a simple average of the reporting schools' metrics was calculated.