

College Affordability Diagnosis
Technical Report

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Introduction

This technical guide includes descriptions of each data indicator in the College Affordability Diagnosis report for each state. For each indicator, we include the following information:

- Sources: where the raw data used to calculate the indicator can be found
- Description: definition of the indicator
- Notes: includes a detailed methodology section for those indicators that require additional explanation.
- Availability: How to find the data used to calculate the indicator

It is our intent that the analysis undertaken for *College Affordability Diagnosis* can be replicated by others. Please contact us with questions or clarifications about how the analysis was done.

Net Price as a Percent of Income:

Sources:

IPEDS Student financial aid data files, 2008-2013:

<http://nces.ed.gov/ipeds/datacenter/data/SFA1314.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1213.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1112.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1011.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA0910.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA0809.zip>

IPEDS Instructional activity data files, 2008-2013:

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2014.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2013.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2012.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2011.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2010.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/EFIA2009.zip>

IPEDS Directory information:

<http://nces.ed.gov/ipeds/datacenter/data/HD2013.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2012.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2011.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2010.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2010.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2009.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2008.zip>

American Community Survey data files, 2008-2013 3-year averages:

http://www2.census.gov/programs-surveys/acs/data/pums/2013/3-Year/csv_hus.zip

http://www2.census.gov/programs-surveys/acs/data/pums/2012/3-Year/csv_hus.zip

http://www2.census.gov/programs-surveys/acs/data/pums/2011/3-Year/csv_hus.zip

http://www2.census.gov/programs-surveys/acs/data/pums/2010/3-Year/csv_hus.zip

http://www2.census.gov/programs-surveys/acs/data/pums/2009/3-Year/csv_hus.zip

http://www2.census.gov/programs-surveys/acs/data/pums/2008/3-Year/csv_hus.zip

Description:

Family ability to pay is defined as the ratio of net price after grant aid to family income. These calculations are conducted by family income level, then averaged across family incomes for the final figure reported. Sources and definitions for each are defined below.

- Numerator: net price for students in each sector
- Denominator: family income

Notes:

The descriptions below cover data and methods for both the overall ability to pay measures and the tables in each state profile.

Net Price:

Net price data is taken from the IPEDS student financial aid survey, completed by all Title IV eligible institutions. Net price is defined for students by NCES as follows:

Average net price for full-time, first-time degree/certificate-seeking undergraduates paying the in-state or in-district tuition rate who received Title IV federal student aid - INCOME LEVEL (0-30,000). Title IV federal student aid, includes federal grants or federal student loans.

Average net price is generated by subtracting the average amount of federal, state or local government, or institutional grant and scholarship aid from the total cost of attendance. Total cost of attendance is the sum of published tuition and required fees (lower of in-district or in-state), books and supplies, and the weighted average room and board and other expenses.

The weighted average for room and board and other expenses is generated as follows:

(amount for on-campus room, board and other expenses * # of students living on-campus.

+ amount for off-campus (with family) room, board and other expenses * # of students living off-campus with family

+ amount for off-campus (not with family) room, board and other expenses * # of students living off-campus not with family)

divided by the total # of students.

Students whose living arrangements are unknown are excluded from the calculation. For some institutions the number of students by living arrangement will be known, but dollar amounts will not be known. In this case the number of students with no corresponding dollar amount will be excluded from the denominator.

Applicable to public institutions with standard calendar systems (semester, quarter, trimester, 4-1-4) that report financial aid data for students enrolled for the FALL and received aid anytime during the full aid year.

Title IV aid to students includes grant aid, work study aid, and loan aid. These include: Federal Pell Grant, Federal Supplemental Educational Opportunity Grant (FSEOG), Academic Competitiveness Grant (ACG), National Science and Mathematics Access to Retain Talent Grant (National SMART Grant), Teacher Education Assistance for College and Higher Education (TEACH) Grant, Federal Work-Study, Federal Perkins Loan, Subsidized Direct or FFEL Stafford Loan, and Unsubsidized Direct or FFEL Stafford Loan.

Full-time, first-time degree/certificate-seeking undergraduates - A student enrolled in a four- or five-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate level, who has no prior postsecondary experience, and is enrolled for 12 or more semester credits, or 12 or more quarter credits, or 24 or more contact hours a week each term.

In-state tuition is the tuition charged by institutions to those students who meet the state's or institution's residency requirements. In-district tuition is the tuition charged by the institution to those students residing in the locality in which they attend school and may be a lower rate than in-state tuition if offered by the institution.

Source: IPEDS Student financial aid data dictionary. The variables used are:

NPIS412, NPIS422, NPIS432, NPIS442, NPIS452 for public institutions and NPT412, NPT422, NPT432

NPT442, NPT452 for private institutions. Source Document:

http://nces.ed.gov/ipeds/datacenter/data/SFA1314_Dict.zip

For more information on net price, see the IPEDS FAQ on net price:

https://nces.ed.gov/ipeds/Section/Institutional_net_price.

Enrollment:

Net price is averaged at the sector level within each state. These averages are weighted by full-time undergraduate enrollment in order to reflect enrollment patterns within the states. Full-time equivalent (FTE) enrollment for undergraduates comes from the instructional activity website from IPEDS. The

variable used for our analysis is estimated full time equivalent undergraduate enrollment (variable name fteug), defined by IPEDS as follows:

For institutions with a semester, trimester, or 4-1-4 plan, the number of FTE undergraduate is the sum of undergraduate credit hours divided by 30 and contact hours divided by 900. For institutions with a quarter plan, undergraduate credit hours divided by 45 and contact hours divided by 900. For institutions with continuous enrollment over a 12-month period, undergraduate credit hours were divided by 30 and contact hours were divided by 900.

Source: http://nces.ed.gov/ipeds/datacenter/data/EFIA2012_Dict.zip

Income Levels:

Net price data for the state-level tables are defined for five income levels by IPEDS: families with yearly incomes less than \$30,000, from \$30,000 to \$48,000, from \$48,000 to \$75,000 from \$75,000 to \$110,000 and \$110,000 and above. The variables used are: NPIS412, NPIS422, NPIS432, NPIS442, NPIS452, and NPT412, NPT422, NPT432, NPT442, NPT452.

Family Income:

Averages are calculated at the state level using data from the American Community Survey. For each state, average family income is calculated, both overall and for each of the income groups as defined by IPEDS (0-30k, 30-48k, 48-75k, 75k-110k, 110k+). Family income is defined by the Census Bureau in the American Community Survey as follows:

In compiling statistics on family income, the incomes of all members 15 years old and over related to the householder are summed and treated as a single amount. Although the family income statistics cover the past 12 months, the characteristics of individuals and the composition of families refer to the time of interview. Thus, the income of the family does not include amounts received by individuals who were members of the family during all or part of the past 12 months if these individuals no longer resided with the family at the time of interview. Similarly, income amounts reported by individuals who did not reside with the family during the past 12 months but who were members of the family at the time of interview are included. However, the composition of most families was the same during the past 12 months as at the time of interview.

Source: https://www.sociaexplorer.com/data/ACS2013_3yr/documentation/e850479e-e5c9-437b-b5b0-44d831f59e5c

Variables used are: FINCP (family income) and WGTP (family weight).

Institutional Sectors:

Higher education institutions are grouped into 5 sectors:

- Public two-year colleges: All institutions listed using IPEDS variable SECTOR as public two-year colleges (level 4), plus institutions listed using IPEDS variable SECTOR as public four-year institutions (level 2) that are classified by the Carnegie classification (ccipug) as “associate’s dominant” (2).
- Public non-doctoral four-year institutions: All institutions classified by IPEDS variable sector as public four-year institutions (level 2) that are NOT classified by the Carnegie classification as research universities, nor as associate’s dominant institutions. These institutions have little to no research activity, as they award less than 20 doctoral degrees overall, or less than 10 doctoral degrees across three or more disciplines.
- Public research universities: All institutions classified by IPEDS variable SECTOR as public four-year institutions that are ALSO classified by Carnegie classification as research intensive or research extensive (levels 15 or 16). Institutions in this category either award 10 or more doctoral degrees across three or more disciplines or more than 20 doctoral degrees overall.
- Private non-doctoral four-year institutions: All institutions classified by IPEDS variable sector as private four-year institutions (level 4) that are NOT classified by the Carnegie classification as research universities. These institutions have little to no research activity, as they award less than 20 doctoral degrees overall, or less than 10 doctoral degrees across three or more disciplines.
- Private research universities: All institutions classified by IPEDS variable SECTOR as private four-year institutions that are ALSO classified by Carnegie classification as research intensive or research extensive (levels 15 or 16). Institutions in this category either award 10 or more doctoral degrees across three or more disciplines or more than 20 doctoral degrees overall.
- Technical two-year colleges: In three states (GA, OK, TN) public two-year technical colleges are reported as a separate sector. This sector definition comes from SREB’s college sectors, <http://www.sreb.org/criteria-and-definitions>.

Please note: Our calculations exclude service academies and the Community College of the Air Force.

Sector Averages:

Sector level averages are calculated as the simple average across all income levels for that sector. We do not use weighted averages for this calculation because we don’t have accurate overall information about enrollment patterns by income across institutions.

Overall Ranking on College Affordability by State:

States are ranked by a single measure of net price as a percent of income. This figure is computed by first calculating net price at each income level for all institutions (public and private) in the state for each income level (0-\$30,000 to \$110,000+). These net price figures are weighted by Full-Time Equivalent (FTE) enrollment.

Net price is then calculated as a percent of income across all income levels, using statewide measures of family income as described above.

The final calculation involves averaging net price as a percent of income across all five income groups. This calculation is weighted using the proportion of families in each income group in the state.

States that are ranked higher have lower net price as a percent of income at each income level, while states that are ranked lower have higher net price as a percent of income at each income level.

Availability:

IPEDS data files were downloaded directly from the IPEDS dataset, with data organization and calculations conducted by the authors. Similarly, the American Community Survey data were downloaded from Census Bureau, with calculations conducted by the authors. Code available upon request.

State Grant Funding:

Need based grants per student and other grants per student

Sources:

Grants: National Association of State Student Grant & Aid Programs (NASSGAP), personal communication from NASSGAP staff drawn from 2013, 2007, and 2004 Annual Surveys. The survey includes total state grant dollars for undergraduate students at public higher education institutions. The survey contains 5 different types of aid: need based only, need based and non need based (grants that have a need and a non need component), non need based only, special purpose grants, and uncategorized grants. For this analysis we use two categories: need based and all other forms of financial aid.

Enrollment: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Integrated Postsecondary Education Data System (Iped), Reported full-time equivalent (FTE) undergraduate and graduate enrollment 2014, 2007, 2004.

Description:

This indicator measures states' commitment to provide aid based on need and aid based on other criteria. The indicator is calculated using the following formula for Need Based grants per student (a similar calculation is used for the other two types of grant aid):

Numerator: Total amount of grant dollars for need based financial aid/other financial aid for public and private undergraduate students in the state.

Denominator: Total number of public undergraduate Full-Time Equivalent students enrolled in the fall.

Notes:

Availability:

Data was generously supplied by the National Association of State Student Grant and Aid Programs. Data available for 50 states.

Total Federal Borrowing Per Student:

Sources:

IPEDS Student financial aid data files, 2008-2013:

<http://nces.ed.gov/ipeds/datacenter/data/SFA1314.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1213.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1112.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA1011.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA0910.zip>,

<http://nces.ed.gov/ipeds/datacenter/data/SFA0809.zip>

IPEDS Instructional Activity data files, 2008-2013:

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<http://nces.ed.gov/ipeds/datacenter/data/HD2010.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2009.zip>

<http://nces.ed.gov/ipeds/datacenter/data/HD2008.zip>

Description:

Total federal borrowing at the undergraduate level, divided by full-time equivalent enrollment.

Notes:

Borrowing: As defined by NCES, total federal borrowing per undergraduate student (variable UFLOANT from SFA survey) is:

Total amount of federal loan aid received by undergraduate students.

Loans to students - Any monies that must be repaid to the lending institution for which the student is the designated borrower. Includes all Title IV subsidized and unsubsidized loans. Does not include PLUS and other loans made directly to parents.

Undergraduate - A student enrolled in a four- or five-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate.

Source: IPEDS Student financial aid survey data dictionary:

https://nces.ed.gov/ipeds/datacenter/data/SFA1314_Dict.zip

Sectors:

Higher education institutions are grouped into 5 sectors:

- Public two-year colleges: All institutions listed using IPEDS variable SECTOR as public two-year colleges (level 4), plus institutions listed using IPEDS variable SECTOR as public four-year institutions (level 2) that are classified by the Carnegie classification (ccipug) as “associate’s dominant” (2).
- Public non-doctoral four-year institutions: All institutions classified by IPEDS variable sector as public four-year institutions (level 2) that are NOT classified by the Carnegie classification as research universities, nor as associate’s dominant institutions. These institutions have little to no research activity, as they award less than 20 doctoral degrees overall, or less than 10 doctoral degrees across three or more disciplines.
- Public research universities: All institutions classified by IPEDS variable SECTOR as public four-year institutions that are ALSO classified by Carnegie classification as research intensive or research extensive (levels 15 or 16). Institutions in this category either award 10 or more doctoral degrees across three or more disciplines or more than 20 doctoral degrees overall.
- Private non-doctoral four-year institutions: All institutions classified by IPEDS variable sector as private four-year institutions (level 4) that are NOT classified by the Carnegie classification as research universities. These institutions have little to no research activity, as they award less than 20 doctoral degrees overall, or less than 10 doctoral degrees across three or more disciplines.

- Private research universities: All institutions classified by IPEDS variable SECTOR as public four-year institutions that are ALSO classified by Carnegie classification as research intensive or research extensive (levels 15 or 16). Institutions in this category either award 10 or more doctoral degrees across three or more disciplines or more than 20 doctoral degrees overall.
- Technical two-year colleges: In three states (GA, OK, TN) public two-year technical colleges are reported as a separate sector. This sector definition comes from SREB's college sectors, <http://www.sreb.org/criteria-and-definitions>.

Enrollment:

Loans per student are calculated at the sector level within each state. Students are defined as full-time undergraduate enrollment in order to reflect enrollment patterns within the states. Full-time equivalent (FTE) enrollment for undergraduates comes from the instructional activity website from IPEDS. The variable used for our analysis is estimated full-time equivalent undergraduate enrollment (variable name fteug), defined by IPEDS as follows:

For institutions with a semester, trimester, or 4-1-4 plan, the number of FTE undergraduate is the sum of undergraduate credit hours divided by 30 and contact hours divided by 900. For institutions with a quarter plan, undergraduate credit hours divided by 45 and contact hours divided by 900. For institutions with continuous enrollment over a 12-month period, undergraduate credit hours were divided by 30 and contact hours were divided by 900.

Source: http://nces.ed.gov/ipeds/datacenter/data/EFIA2014_Dict.zip

Data Availability:

IPEDS data files were downloaded directly from the IPEDS dataset, with data organization and calculations conducted by the authors. Code available upon request.

Hours of Work to Pay for College:

Sources:

Net Price of College by Sector (see description under Ability to Pay metrics), and Federal Minimum Wage for 2009 and 2013. Note the Federal Minimum Wage changed halfway through the year 2008 and we have used the higher wage level. United States Department of Labor, Wage and Hour Division, History of Federal Minimum Wage Rates Under the Fair Labor Standards Act, 1938-2009, <http://www.dol.gov/whd/minwage/chart.htm>

Description:

This indicator measures the ability of a student to pay for college by working while enrolled. The indicator is calculated using the following formula:

Numerator: (Average Net Price for College by Sector *divided by* Federal Minimum Wage)

Denominator: Number of Weeks in the year

Notes:

Because the state minimum wage varies substantially we have chosen to use the federal minimum wage for all state calculations. This provides for a similar comparison between all states, but does not take into account the fact that the minimum wage is higher in some states. The highest minimum wage is in California and Massachusetts, at \$10 per hour, while the current federal minimum wage is \$7.25. 21 states have minimum wages at or below the current federal minimum of \$7.25 per hour. Source: <http://www.dol.gov/whd/minwage/america.htm>.

Average net price is calculated as follows:

Within each institution, the average net price is tuition and required fees less financial aid for each income group. To create an average at the institutional level, a weighted average is calculated using the number of first-time full time students in each income group. Then, to create a sector-level average within each state, the weighted average is calculated using the number of undergraduate fte in each institution.

Availability:

Data available for all 50 states and the District of Columbia. Some states do not have net price data available for all sectors. Where net price data for a sector is missing the Hours of Work calculation for that sector has not been included.

Contextual Indicators

Percent of Jobs that Will Require Postsecondary Education by 2020:

Sources:

Carnevale, Smith, and Strohl, *Recovery: Job Growth and Education Requirements Through 2020*, Georgetown University Public Policy Institute. Center on Education and the Workforce, June 2013, detailed data obtained through personal email communication.

Description:

This indicator describes how many jobs in each state will require some form of postsecondary education. Calculations are provided by Georgetown University.

Notes:

Availability:

Data generously provided by the Georgetown Center on Education and the Workforce. Calculated data available for 50 states.

Educational Attainment:

Sources:

Educational Attainment of the Population 25-34 years of age and of the Population 35-64 years of age. Data analysis provided by the National Center for Higher Education Management Systems from U.S. Census Bureau, 2012, 2013, and 2014 American Community Survey (ACS) One-Year Public Use Microdata Sample (PUMS) Files.

Description:

This indicator describes the current education level in the state by age group. The indicator is calculated using the following formula:

Numerator: Number of 25-34 year olds with an Associate's degree or higher

Denominator: Total number of 25-34 year olds in the state

AND

Numerator: Number of 35-64 year olds with an Associate's degree or higher

Denominator: Total number of 35-64 year olds in the state

Notes:

Availability:

Data available for 50 states.

Educational Attainment by Race:

Sources:

Educational Attainment of the Population 25-64 years of age by race. Data analysis provided by the National Center for Higher Education Management Systems from U.S. Census Bureau, 2012, 2013, and 2014 American Community Survey (ACS) One-Year Public Use Microdata Sample (PUMS) Files.

Description:

This indicator describes the current education level of all state residents age 25-64 year olds by racial and ethnic group. The indicator is calculated using the following formula for each of the following racial and ethnic groups: white non-Hispanic, black non-Hispanic, Hispanic (any race), American Indian and Alaskan Native, Asian, Native Hawaiian, and Other Pacific Islander. Below is an example of the formula for white non-Hispanics.

Numerator: Number of 25-64 year old white non-Hispanic with an Associate's degree or higher in the state

Denominator: Total number of 25-64 year old white non-Hispanics in the state

Notes:

Availability:

Data available for 50 states.

Projections of High School Graduates:

Sources:

Western Interstate Commission for Higher Education, *Knocking at the College Door: Projections of High School Graduates, 2012*. Projections of Public High School graduates by race and ethnicity 2020-2028.

Description:

This indicator provides information on the ethnic breakdown of college students in 2020 and beyond. This data is used to examine the racial components of high school graduates in 2020 and the change in racial composition of the high school graduates between 2020 and 2028. Racial and ethnic groups include: American Indian/Alaskan Native, Asian/Pacific Islander, Black non-Hispanic, White non-Hispanic, and Hispanic.

Calculations for the 2020 projected number of public graduates by race: (examples are given for white non-Hispanic but the same method was applied to each racial group)

Numerator: Number of white non-Hispanic public high school graduates in 2020

Denominator: Total number of public high school graduates in 2020

Calculations for the projected growth in public high school graduates by race and ethnicity between 2020 and 2028:

White non-Hispanic percent share of total high school graduates in 2028 *minus* white non-Hispanic percent share of total high school graduates in 2020.

Notes:

Availability:

Data available for 50 states.

Children in Poverty

Sources:

U.S. Census Bureau, 2009-2013 American Community Survey 5-Year Estimates Table: S1701 Poverty Status in the Past 12 Months.

Description:

This indicator describes the percent of children in the state that are living below the poverty level. By looking at the level of children in poverty this metric provides a background of the possible income level for incoming college students and the level of financial aid those students are likely to need. This indicator is the percent of the total population under 18 living in poverty. The calculation is provided by the Census Bureau.

Notes:

Availability:

Data available for 50 states.

Student Share of Total State and Tuition Revenues for Public Higher Education:

Sources:

State Higher Education Executive Officers Association (SHEEO), State Higher Education Finance (SHEF) 2014, State and US Nominal All Data 2014, Data from 1989-2014 by state, downloaded from <http://www.sheeo.org/resources/publications/shef-%E2%80%94state-higher-education-finance-fy14>

Description:

The annual SHEF report from SHEEO provides calculations of state educational appropriations and net tuition per state. SHEEO provides an analysis that sums state educational appropriations and student net tuition and then divides by total Full Time Equivalent Students (FTE). To calculate the “student share” of this figure SHEEO takes net tuition per FTE and divides by total state and student revenue per FTE. All SHEEO data are adjusted for inflation with the Higher Education Cost Adjustment (HECA). For more details about the HECA adjustment see:

http://www.sheeo.org/sites/default/files/SHEEO002_2014AdtlDocs_TechA_Rd1.pdf

All calculations provided by SHEEO.

Notes:

Availability:

Data available for 50 states.

Student Share of Total State and Tuition Revenues for Public Higher Education

Sources: State Higher Education Executive Officers Association (SHEEO), State Higher Education Finance (SHEF) 2014, State and US Nominal All Data 2014, Data from 1989-2014 by state, downloaded from <http://www.sheeo.org/resources/publications/shef-%E2%80%94state-higher-education-finance-fy14>

Description: The annual SHEF report from SHEEO provides calculations of state educational appropriations and net tuition per state. SHEEO provides an analysis that sums state educational appropriations and student net tuition and then divides by total Full Time Equivalent Students (FTE). To calculate the “student share” of this figure SHEEO takes net tuition per FTE and divides by total state and student revenue per FTE. All SHEEO data are adjusted for inflation with the Higher Education Cost Adjustment (HECA). For more details about the HECA adjustment see:

http://www.sheeo.org/sites/default/files/SHEEO002_2014AdtIDocs_TechA_Rd1.pdf

All calculations provided by SHEEO.

Notes:

Data Availability: Data available for 50 states.