## Methodology of America’s College Promise Cost Model

[First proposed](https://obamawhitehouse.archives.gov/the-press-office/2015/01/09/fact-sheet-white-house-unveils-america-s-college-promise-proposal-tuitio) by the Obama Administration in 2015, the “America’s College Promise” federal-state partnership for tuition-free community college is now being negotiated in Congress as part of a reconciliation package and [a broader policy agenda](https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/28/fact-sheet-the-american-families-plan/) for college affordability, racial equity, and economic justice. Though the federal cost was initially estimated to be [$109 billion](https://www.insidehighered.com/news/2021/04/28/biden-proposes-free-community-college-18-trillion-plan) to fund the partnership for ten years, actual costs may be significantly higher. Budgetary constraints are likely to force difficult policy design decisions in order to contain costs, and bill authors in Congress have numerous options for defining eligibility among students and institutions and defining the federal role.

As these policy design decisions get made, it is important that lawmakers be aware of how these decisions can shape who benefits from the partnership and how greatly they benefit. To this end, I have created a cost model for the America’s College Promise federal-state partnership for tuition-free community college based on the language of H.R. 2861/S.1396. Building on this model, I have developed [a web application](https://petergranville.shinyapps.io/AmericasCollegePromiseModel/) that enables users to select certain policy design choices and view key outputs. I have included some inputs that are not currently included in the bill text but could be used to maximize the likelihood that poorer states can afford to and choose to participate in the partnership—and, ultimately, help these funds reach the communities where the impact will be greatest.

The inputs and outputs of the model are the following:

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| --- | --- |
| Web application inputs (entered by user) | Outputs (generated based on cost model) |
| How the term “community colleges” is operationalized:   * The minimum percentage of annual degrees awarded that must be at the associate level (in order for the campus to qualify) * Whether a campus that awards graduate degrees qualifies   The base federal share (i.e. the match rate), as well as any of the following optional adjustments to the base:   * Adjustment to the match rate based on state wealth (i.e. total taxable resources per capita) * Adjustment to the match rate based on child poverty rate * Adjustment to the match rate based on personal income per capita * Adjustment to the match rate based on share of K-12 students eligible for FRPL * Adjustment to the match rate based on share of public undergraduates who Pell Grant | * Total cost for the federal government in 2022-23 * Total cost for the federal government over ten years, assuming 3% increase in costs every year * Total FTEs funded in 2022-23 by state/tribe * Federal share of costs in 2022-23 by state/tribe * Federal allocation in 2022-23 by state/tribe * Federal allocation per eligible FTE by state/tribe in 2022-23   + User can view 50-state map shaded by federal allocation per eligible FTE * New federal funding in 2022-23 per:   + Black high school student   + Hispanic high school student   + AAPI high school student   + Native American high school student   + White high school student * New federal funding in 2022-23 per:   + Black resident aged 18-35 without a college degree   + Hispanic resident aged 18-35 without a college degree   + AAPI resident aged 18-35 without a college degree   + Native American resident aged 18-35 without a college degree   + White resident aged 18-35 without a college degree * New federal funding at:   + Community colleges that are HBCUs and other MSIs (by Title III category)   + Tribal colleges |

Using this application, legislative staff can experiment with cost options to find the set of policy decisions that maximizes distributional equity amid political concerns and cost limitations.

I developed this cost model in R, primarily using IPEDS data. In doing so, I had to make a number of subjective interpretations of [H.R. 2861](https://www.congress.gov/bill/117th-congress/house-bill/2861/text)/[S.1396](https://www.congress.gov/bill/117th-congress/senate-bill/1396). I’ve provided this methodology to describe my process, explain subjective decisions, and transparently name any assumptions that I used. First in this document is a walkthrough of my process of model development, followed by discussions of decisions I made based on imperfect information or unclear meaning of bill text.

### Overview of *America’s College Promise Act of 2021* (H.R.2861, S.1396)

There are various ways that Congress could enact tuition-free community college, meaning there is no singular way to design a cost model for that policy. House staffers have told us to look to Title I of [H.R. 2861](https://www.congress.gov/bill/117th-congress/house-bill/2861/text)/[S.1396](https://www.congress.gov/bill/117th-congress/senate-bill/1396) as a model for future legislation on free community college, so the cost model used here mimics the approach taken by that bill. Before explaining the methodology I used, it is useful to outline the basic mechanics of this bill.

*The partnership:* Under the bill, the federal government awards grants to states and tribes to carry out the tuition-free guarantee (Sec. 499A). These grants are provided to enable each state/tribe to waive tuition and fees for eligible resident students (499E(a)). The policy of the state/tribe must be to charge eligible students $0 in community college tuition and fees (499D(a)(1)), and the state/tribe may not apply financial assistance to the eligible students’ waived tuition and fees (499D(a)(2)). If federal funding remains after this is achieved, then it can be used for certain other educational purposes (499E(b)). States must meet other conditions to participate, such as improving transfer pathways (499D(b)) and reporting requirements (499E(f)), and they must provide maintenance of effort in financing higher education (499E(d)).

*Who qualifies:* Eligible students are those who are enrolled in an eligible program at a community college not less than half-time (499H(6)(A)) who either qualify for in-state resident community college tuition or would otherwise but for their immigration status (499H(6)(B)), so long as they have not received the ACP waiver for more than six semesters (499H(6)(C)). States and tribes may not apply additional conditions on eligibility (499D(c)). A community college is a public institution of higher education at which the highest degree predominantly awarded is an associate degree, including two-year tribal colleges and universities (499H(3)).

*Federal funding to states:* The federal government’s allocation to each state is, for each eligible student, 75% of the average resident community college tuition and fees in 2022-23 (499B(a)(1)(A)). (I have interpreted this to mean that there is a fixed amount per FTE that the federal government provides, and that this is a function of resident community college tuition and fees nationwide.) For each subsequent year, the same federal allocation is increased by 3% or by the increase in CPI, whichever is lower (499B(a)(1)(B)). The Secretary of Education shall make an adjustment to account for students enrolled less-than-full-time (499B(c)(1)). In the cost model interface, I allow users to modify this 75% value. In the event of a recession, the federal share automatically increases (499F).

*Federal funding to tribes:* The federal government’s allocation to each tribe is either what it would receive if it were a state (499B(a)(2)(A)) or 95% of the amount needed to waive tuition and fees for all eligible students (499B(a)(2)(B)). This is to say that, if a tribe’s community colleges already have tuition rates so low that 95% of tuition and fees are covered by the state allocation, the federal government won’t allocate more beyond that 95% amount. In the event of a recession, the federal share automatically increases (499F).

Barring changes to the bill, all states receive the same amount of funding per FTE. In my cost model, I provide users the option to vary allocations per FTE based on factors such as state wealth; this represents a modification to the approach laid out in the bill. In the cost model, these adjustments only apply to states and not to tribes.

### Cost model methodology, Pt. 1

The following steps are in the script file named “FSPartnershipModel.R”. Most of my code comprises one function, “runCostModel”, that accepts four inputs:

* the file name for the state-level dataset to be generated
* the file name for the tribe-level dataset to be generated
* the percent-threshold of associate degrees that determines whether a public institution counts as a community college
* a binary variable indicating whether a campus is ineligible if it offers graduate degrees.

runCostModel accepts these inputs and then produces a state-level dataset and a tribe-level dataset that will be used by the R Shiny application.

Note that all IPEDS data files used here are the [complete data files](https://nces.ed.gov/ipeds/datacenter/DataFiles.aspx?goToReportId=7) that are most recently published as of August 3, 2021.

* Step 1: Establish basic set of institutions
  + Load in data on institutional characteristics (IPEDS HD2020 data file)
  + Filter data to only include public institutions and tribal colleges and universities
  + Filter data to remove administrative offices
  + Filter data to remove all institutions based outside the fifty U.S. states and D.C.
  + If the boolean runCostModel argument graduateFilter is set to “true,” then filter out all institutions that offer graduate credentials
  + Load in data set with governing tribe names for each tribal college [for details, see Discussion Item 8 below]
* Step 2: Merge with data on tuition and fees
  + Loan in data on tuition and fees (IPEDS IC2020\_AY data file) and merge with main data set
  + Define new variable that sums average in-state tuition and fees for full-time undergraduates
* Step 3: Defining what counts as a community college [for background, see Discussion Item 3 below]
  + Load in data on completions for the most recent three academic years (IPEDS C2018\_A, C2019\_A, and C2020\_A data files): 2017-18, 2018-19, and 2019-20
  + Merge these sets into one dataframe
  + Filter out second-major data to avoid double-counting
  + Filter data to only include public institutions
  + Filter data to only include degree awards (i.e. we ignore certificates)
  + Derive the number of associate’s degrees awarded and the total degrees awarded by institution
  + Derive for every institution the share of degrees awarded over this three-year period that are associate degrees
  + Count as a “community college” only the public institutions where at least X% of degrees awarded are associate degrees, where X is specified as a runCostModel argument
  + Filter our main data set to only include tribal colleges and the institutions we have identified as community colleges
* Step 4: Fill in missing data on tuition and fees
  + Load [College Scorecard institution-level data file](https://data.ed.gov/dataset/college-scorecard-all-data-files-through-6-2020/resources)
  + For 15 institutions that are missing tuition and fee data, impute tuition and fee revenue per FTE from College Scorecard
* Step 5: Account for FTE enrollment
  + Load in data on FTE enrollment (IPEDS EFIA2020 data file) and merge with main data set
  + Define a new variable that sums undergraduate and graduate FTE enrollment
* Step 6: Define in-state enrollment [for background, see Discussion Item 2 below]
  + Method 1:
    - Load in data on the state of residence of first-time degree/certificate-seeking undergraduate students (at the time they were admitted) (IPEDS EF2019C data set)
    - For each institution, derive the number of students who resided in the same state as the institution
    - For each institution, derive the total number of first-time degree/certificate-seeking undergraduate students
    - For each institution, derive the in-state enrollment percentage and merge this data into the main data set
  + Method 2:
    - Load in data on student financial aid (IPEDS SFA1819 data set)
    - Define the in-state enrollment share as the sum of students in the fall financial aid cohort paying either in-district or in-state tuition rates, divided by the sum of students in the fall financial aid cohort paying in-district, in-state, or out-of-state tuition rates[[1]](#footnote-1)
    - Merge this data into the main data set
  + Define each institution’s in-state enrollment percentage as the following:
    - If the institution has complete data for Method 1 but not for Method 2, then we use the result for Method 1
    - If the institution has complete data for Method 2 but not for Method 1, then we use the result for Method 2
    - If the institution has complete data for both methods, then we use the average of the two
    - If the institution has complete data for neither method, then a value of 100% is imputed
  + Define resident FTE enrollment as the product of FTE enrollment and in-state enrollment percentage
* Step 7: Make adjustments
  + To account for inflation between 2020-21 and 2022-23, multiply all tuition and fee values by 1.04721063.[[2]](#footnote-2)
  + To account for the share of FTE enrollment that is comprised of students who enroll less-than-half-time (and are thus ineligible for the free tuition benefit), multiply all FTE values by 0.9459854 [for background, see Discussion Item 1 below]
* Step 8: Label MSIs
  + Load in data from [a directory of Title III-eligible institutions](https://cmsi.gse.rutgers.edu/content/msi-directory) by program and merge with the main dataset (only institutions counted as a community college or TCU are included)
  + Derive total FTEs by Title III category and by state/tribe
* Step 9: Aggregate by state/tribe
  + Define partnershipCost as the product of resident FTE enrollment and the FTE-weighted average resident tuition and fees across all eligible institutions
  + Derive a new data set (“stateModel”) that, for each state, sums resident FTE enrollment and partnershipCost
  + Derive a new data set (“tribeModel”) that, for each tribe, sums resident FTE enrollment and partnershipCost
  + Determine whether each tribe’s federal allocation would be based on Section 499B(a)(2)(A) or (a)(2)(B) [see Discussion Item 6 below]
* Step 10: Add in state-level variables
  + Merge data on FTEs at MSIs with state/tribe data sets
  + Load in state data to be used for model adjustments and outputs [see the section of this document titled “Interactive cost model: Policy design inputs and outputs”] and merge with stateModel

These two data sets, one for states and one for tribes, are then exported for use in the web application. You can see here [an example of the resulting state file](https://github.com/PeterGranville/AmericasCollegePromiseModel/blob/main/stateModel50A.csv) and [an example of the resulting tribe file](https://github.com/PeterGranville/AmericasCollegePromiseModel/blob/main/tribeModel50A.csv).

### Cost model methodology, Pt. 2

The file “app.R” uses the state and tribe files produced in part 1 and creates the interactive cost model web application. The first block of this code (“ui”) enables the user to:

* select the associate threshold (associateThreshold)
* elect whether to apply a filter for campuses that offer graduate programs (graduateFilter)
* set the base federal share of costs (averageMatch)
* choose any adjustment factors that make the match rate variable (adjustmentFactors)
* set a variable that weights the adjustment factors (powerCoefficient)

The next block (“server”) takes these inputs and creates tables of results through the following steps:

* Step 1: Getting started
  + Depending on the values of associateThreshold and graduateFilter, select the correct pair of state/tribe files (out of twelve possible pairs)
  + Read in stateData and tribeData
  + Derive community college average tuition per FTE
* Step 2: Define adjustment index for each state
  + Invert TTRPCindex (representing total taxable resources per capita, a measure of state wealth) and PIPCindex (representing personal income per capita) such that poorer states have higher values, thus aligning these variables with the other adjustment indexes
  + For any adjustment variable *not* selected by the user, “null” out the column of data by imputing NA values
  + Create a new adjustment index per state (newIndex), defined as the average of the adjustment indexes by state selected by the user
    - If no adjustment variables were selected, impute value of 1 for all states
  + Define the federal share of costs in each state as follows:
  + Cap matchRate at 1 so that no state is receiving greater than 100% of the cost of eliminating tuition and fees

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| Some notes on the formula:   * For states where newIndex < 1, the state will get less federal funding than the base match * For states where newIndex > 1, the state will get more federal funding than the base match * For states where newIndex = 1, the state will get the base funding match * When powerCoefficient = 0, newIndex = 1 for all states * When powerCoefficient = 2, it has the effect of squaring the influence of newIndex (i.e. a value of 1.5 becomes 2.25, and a value of 0.5 becomes 0.25), leading to greater divergence in the matches * If no adjustment factors are chosen then powerCoefficient becomes irrelevant, as 1 to the power of any value remains 1 |

* Step 3: Define federal allocations to states/tribes
  + Set each state’s federal allocation as the product of its match rate and the total cost of eliminating tuition and fees in the state
  + Set each tribe’s federal allocation as either of the following, whichever is lower:
    - The amount it would get if it were a state (no adjustments made)
    - 95% of the cost of eliminating tuition and fees
  + Create the table reporting this information in the web app
  + Generate map displaying federal allocation per FTE
  + Define the total federal funding over 10 years as the sum of:
    - The federal funding in 2022-23 multiplied by 3% every year for ten years
  + Create the table reporting federal funding in 2022-23 and over 2022-23 to 2022-32
* Step 4: Funding by subgroups
  + Use the state-level data on the high school student population to define funding per high school student in each state, and then multiply this by the counts of high school student subgroups (e.g. Black high school students, Hispanic high school students) to get state-level totals of funding per group
  + Divide these totals by the count of students by subgroup to derive the funding per student by subgroup (e.g. federal funding per Black high school student)
  + Perform the same process as above for residents aged 18-35 without college degrees
  + Create tables reporting this information
* Step 5: Funding to MSIs
  + Derive, for each MSI category, the share of FTEs in each state comprised by those MSIs (e.g. HBCUs’ share of FTEs)
  + Use this variable to derive, for each MSI category, the total federal allocation per state for those MSIs
  + Sum across states to derive the total federal funding to each MSI group
  + Create the table reporting this information

### Items for discussion

Developing this cost model relies on imperfect data and my own subjective interpretation of the America’s College Promise bill text. I’ve included below seven discussions of these trickier aspects of developing a cost model for the federal-state partnership.

#### [Discussion Item 1] The less-than-half-time data problem:

According to Section 499H(6), a student is only eligible for a free tuition benefit under the federal-state partnership if they enroll at least half-time. Neither IPEDS nor the College Scorecard tell us who, among those who are enrolled part-time, are enrolled at least half-time. Therefore, we cannot find out how many students at each individual community college are enrolled less-than-half-time, but I have used the following methods to develop an estimate for the community college sector as a whole.

According to NPSAS, among public two-years in Fall 2015 14.8% of students were enrolled less-than-half-time, while 40.8% were enrolled half-time and 44.4% were enrolled full-time (QuickRetrieve ID #cfgcbfc38).

While this makes clear that 14.8% of community college students would be ineligible for the benefit due to less-than-half-time enrollment, federal funding is allocated to states on an FTE basis rather than headcount. The share of FTEs represented by less-than-half-time students must be *less* than 14.8% because these students are all enrolled at a lower intensity than their peers.

We need to estimate what share of FTE enrollment consists of students enrolled less-than-half-time, and I’ve chosen to do so in the following way. For simplicity, suppose each full-time student enrolls for 12 credit hours each semester, for a total of 24 on the year. Suppose each half-time student enrolls for 6 credit hours each semester, for a total of 12 on the year. And suppose each less-than-half-time student enrolls for 3 credit hours each semester, for a total of 6 on the year.

Using these assumptions, we can convert our headcount measure to an FTE measure. For interpretability, imagine we’re only talking about a universe of 1,000 students.

* *Full-time students:* 44.4% of headcount \* 1,000 = 444 full-time students. At 24 credit hours per year each, these full-time students enroll for a total of 10,656 credit hours.
* *Half-time students:* 40.8% of headcount \* 1,000 = 408 half-time students. At 12 credit hours per year each, these half-time students enroll for a total of 4,896 credit hours.
* *Less-than-half-time students:* 14.8% of headcount \* 1000 = 148 less-than-half-time students. At 6 credit hours per year each, these less-than-half-time students enroll for a total of 888 credit hours.
* In this universe of students, there are 16,440 credit hours, 888 of which represent students enrolled less-than-half-time. This means that less-than-half-time students represent 888/16,440=5.40146% of credit hours.

Because FTE enrollment is a function of credit hours, then for any given number of FTEs, about 5.40146% reflect students who are not enrolled at least half-time and are thus ineligible for the benefit. Therefore, I multiply FTE measures in my cost model by 0.9459854 to reflect this.

#### [Discussion Item 2] The in-state resident enrollment problem:

A student is only eligible if they qualify for “(i) in-State resident community college tuition, as determined by the State or Indian tribe; or (ii) would qualify for such in-State resident community college tuition, but for the immigration status of such student” (Sec. 499H(6)(B)).

IPEDS does not have an exact measure of total students who would meet these criteria, so we must make an approximation using the available data. IPEDS features two sets of variables that are useful for this purpose:

* *SFA1819 data file*: The number of students in the institution’s fall cohort who pay in-district tuition rates (SCFA11N); the number who pay in-state tuition rates (SCFA12N); and the number who pay out-of-state tuition rates (SCFA13N). From these variables, a measure of the in-state share can be derived.
* *EF2019C data file:* The number of fall semester first-time undergraduate freshmen by their state of residence at the time they were admitted (EFRES01). From these variables, a measure of the in-state share can be derived.

Neither of these options is ideal. The first set of variables accounts for what colleges and state laws have defined[[3]](#footnote-3) as in-state residence for the purpose of tuition charges, but it does not account for the bill’s carve-out for those with immigration statuses that otherwise disqualify them from being treated as in-state residents. Meanwhile, the second set of variables would include those who live in the same state as their community college (without regard for immigration status), but it does not account for residency agreements across state lines and how students often have to show residence within their state for at least one year to obtain in-state resident status.

For the purposes of this analysis, I’ve done the following:

* For an institution with complete data for *both* of the approaches listed above, I record the average as the resident enrollment percentage. Out of the 1,018 institutions in the cost model under default settings, 717 are in this category.
* For an institution with complete data for only one of the two approaches listed above, I record the available data point as the resident enrollment percentage. Out of the 1,018 institutions in the cost model under default settings, 290 are in this category.
* For an institution with complete data for *neither* of the approaches listed above, I record 100% as the resident enrollment percentage, which errs on the side of overestimating costs. Out of the 1,018 institutions in the cost model under default settings, 11 are in this category.

#### [Discussion Item 3] Defining community colleges:

For our purposes, we need to define what counts as a community college. According to the bill text, an institution must be one that is public and where “the highest degree that is predominantly awarded to students is an associate’s degree” (Sec. 499H(3)). This definition leaves room for interpretation: what should “predominantly” be taken to mean?

I’ve taken the liberty to operationalize the definition as follows: a community college is a public institution at which associate’s degrees comprise at least 50% of degrees awarded. (In the interactive cost model, a user can elect to set a higher threshold than 50%.) For this analysis, I’ve used three years of completion data to make these determinations, in order to prevent an institution from being miscateogrized due to a lone outlier year.

After removing institutions not based in any U.S. states, this definition provides us with 1,012 institutions in IPEDS being counted as community colleges. I compared my list of community colleges with the Teachers College Community College Research Center’s [sector categorization](https://ccrc.tc.columbia.edu/images/easyblog_articles/199/CCRC_IPEDS_InstXSector_042820.xlsx), which is considered a reliable categorization of institutions by sector. Here is a breakdown of how these lists match:

|  |  |  |  |
| --- | --- | --- | --- |
| CCRC Sector | # counted as community college under my method | # not counted as community college under my method | Agreement percentage |
| Community Colleges | 927 | 2 | 99.8% |
| Other public two-years / less-than-two-years | 39 | 347 | 89.9% |
| Public four-years | 42 | 637 | 93.8% |
| Private not-for-profit four-years | 2 (both tribal colleges) | 1,699 | 99.9% |
| Other private not-for-profits | 0 | 254 | 100% |
| Private for-profits | 0 | 3,087 | 100% |
| N/A (missing) | 2 (both tribal colleges) | 12 | 85.7% |
| *Total* | 1,012 | 6,038 |  |

Note that some institutions may be double-counted due to IPEDS Unit ID disparities, which would explain why the total number of institutions is high.

My method produces results that match CCRC’s sector classifications rather effectively, but there are some exceptions:

* I count as community colleges 39 institutions that CCRC calls “Other public two-years / less-than-two-years.” These include 15 tribal colleges. The remaining 24 institutions are largely technical colleges and career centers, special purpose institutions (e.g. Southwest Collegiate Institute for the Deaf), and satellite campuses of public universities (e.g. University of South Carolina-Sumter). I’ve decided to keep these in my list of community colleges despite the discrepancy with CCRC’s list.
* I count as community colleges 42 institutions that CCRC calls “Public four-years.” These include seven tribal colleges. Of the remaining 35, seven are in Georgia, which has in recent years consolidated its community colleges into its public university system; another three are CUNY/SUNY campuses; and 17 are campuses of public universities in Ohio (Kent State, Ohio State, Ohio University, and the University of Cincinnati). While these campuses are indeed part of university systems that predominantly function as public four-years, I’ve decided to continue to count these campuses as community colleges to err on the side of overestimating costs.
* There are two institutions that the CCRC counts as community colleges which I do not: J F Ingram State Technical College (unit ID 101471) and GateWay Community College-Central City (246895). According to the College Scorecard, there are only about 1,000 FTE students across these institutions. Therefore, I leave these two institutions out of my set of community colleges for the purposes of this analysis, knowing that the impact on the overall results will be negligibly small.

Overall, I do not find these discrepancies of major concern, for the reasons given.

There is one final issue to address when defining what counts as a community college. There are five institutions listed in IPEDS as *private* tribal colleges:

* Blackfeet Community College
* White Earth Tribal and Community College
* Turtle Mountain Community College
* United Tribes Technical College
* College of Menominee Nation

These institutions are indeed private, but it stands to reason that they serve as community colleges in their communities (and three of them even have “community college” in their names). I’ve decided to include these in my list of community colleges. This then leaves one final tribal college, the Institute of American Indian and Alaska Native Culture and Arts Development, outside of my list of community colleges. For simplicity, I’ve added it to my list of community colleges eligible to be funded under the federal-state partnership, knowing that the impact to the overall cost model will be negligible.

These additions bring the number of institutions in our cost model to 1,018, assuming the associate share threshold is 50% and there is no filter applied to remove campuses that offer graduate programs. .

#### [Discussion Item 4] Measuring state wealth

Federal-state partnerships sometimes provide higher federal matches to states on the basis of state wealth. This is because a fixed federal match (e.g. 75% for all states) may actually be a relatively low amount (or a relatively high amount) compared to state wealth. The federal government asks more of poorer states under a fixed match; a variable match that accounts for state wealth helps boost the money that flows into poor states and reduce their cost of participation. This is not currently a feature of the America’s College Promise Act bill text, but I include it as an option for the user to add to the cost model.

[Total taxable resources](https://home.treasury.gov/policy-issues/economic-policy/total-taxable-resources), as measured by the U.S. Treasury, is a measure that is already used in existing federal-state partnerships. For the cost model, I use total taxable resources per capita (TTRPC), downloadable [here](https://home.treasury.gov/system/files/226/TTR-tables-2020.xlsx). For each state, I derive the average TTRPC across 2016, 2017, and 2018 and then determine each state’s rank according to that measure. This rank measure is used for the model.

I am not married to the use of total taxable resources for this purpose (and am not an expert on that particular data), so if others have different ideas for measuring state wealth, I am happy to consider them.

#### [Discussion Item 5] Interpreting “the average resident community college tuition and fees per student in all States”

Section 499B(a)(1)(A) defines the 2022-23 federal share as a function of “the average resident community college tuition and fees per student in all States for the most recent year for which data are available.” Operationalizing this definition requires some subjective interpretation. I can imagine different options, and I’ve described three below. All the resulting values are in 2022 dollars (using projected CPI).

* *Institution-level average.* Gather the full-time resident tuition and fee charges by institution for all community colleges in U.S. states (excluding TCUs). Take the average.
  + The resulting value is $4,738.
* *Student-level average.* Gather the full-time resident tuition and fee charges by institution for all community colleges in U.S. states (excluding TCUs). Adjust for FTE resident enrollment. Take the average.
  + The resulting value is $4,356.
* *State-level average.* Gather the full-time resident tuition and fee charges by institution for all community colleges in U.S. states (excluding TCUs). Adjust for FTE resident enrollment. For each state, take the average in each state. Then derive the 50-state average.
  + The resulting value is $5,055.

In my mind, the student-level average is what makes the most sense. Using the institution-level average would give small institutions an outsized influence, and using the state-level average would give tiny states an outsized influence. For the model, I’ve used the student-level average. (However, I would love to know if others think an alternative definition makes more sense.)

#### [Discussion Item 6] Calculating federal allocations to tribes

Section 499B(a)(2) of the America’s College Promise Act bill text describes how the federal share of the grant to tribes shall be calculated. For each tribe, the federal allocation to the tribe is the lesser of:

* [Calculation 1] 75% of “the average resident community college tuition and fees per student in all States” per student (with adjustments made for FTE enrollment), which is the amount the tribe would receive if it were treated as a state; and
* [Calculation 2] 95% of “the total amount needed to waive tuition and fees for all eligible students enrolled in the community colleges operated or controlled by such tribe”.

Per Discussion Item 5 above, we have calculated “the average resident community college tuition and fees per student in all States” to be $4,356. In my methodology, I use resident FTE enrollment to calculate the estimated allocation to each tribe under Calculation 1. Next, I use tribal colleges’ tuition and fees and resident FTE enrollment to calculate the estimated calculation to each tribe under Calculation 2.

For 17 of 31 tribes, Calculation 1 produces the lesser result, and for the other 14, Calculation 2 produces the lesser result. For the cost model, I use whichever is the lower result for each tribe.

#### [Discussion Item 7] Assigning tribal colleges to tribal governments

The America’s College Promise Act bill text is designed to allocate funds to states and Native American tribes. When creating this model, I learned that IPEDS does not provide information on which tribal government operates each tribal college, nor was I able to find a list online. I instead gathered information from the websites of the 35 tribal colleges to identify the tribal government that operates each college. (Three appear to be operated by non-tribal entities such as the Bureau of Indian Affairs, so I listed their governing tribe as “Other governance”.) My list is located [here](https://docs.google.com/spreadsheets/d/12zSf5Pn5d2PVogfnDP4KRm8GqGibKNhd9WhuBZnavMY/edit?usp=sharing), and I used tribe names as listed in [this BIA directory](https://www.bia.gov/tribal-leaders-directory).

*Side note:* Some of the tribe names used in the BIA directory may be outdated or considered offensive, such as the BIA’s use of the term Sioux. I am curious whether others consider it more appropriate to use the names as listed in the BIA directory, as I’ve done above, or to seek an alternative source.

### Key assumptions and limitations

The following are key assumptions used when developing this cost model:

* I assume no changes in FTE enrollment totals between 2019-20 and 2022-23.
* I assume no changes in institutions’ in-state enrollment shares between Fall 2019 and 2022-23.
* I assume that degrees awarded between July 2019 and June 2020 is a fair basis for defining the institutions that serve as community colleges in Step 3 of the methodology. (If need be, I could average award completions over multiple years, but for simplicity I have only used the most recent year of data.)

The following are important limitations to be aware of while using this cost model:

* In calculating the total federal cost between 2022-23 and 2031-32, I have not accounted for any future recessions that would trigger an elevated federal match rate under Sec. 499F. If/when such a recession occurs, the federal match will be higher than projected here.
* In calculating the total federal cost between 2022-23 and 2031-32, I have not accounted for any future periods of inflation that see year-over-year CPI growth exceed 3% any individual year. If/when such an inflationary period occurs, the nominal federal cost will be higher than projected here.
* I use CPI to adjust for tuition and fee growth from 2020-21 (the most recent year with available IPEDS data) to 2022-23. As is well-known, tuition and fee charges tend to rise faster than prices in the economy overall. I am likely underestimating growth in tuition and fee charges over this period, but because two years is a relatively short period of time, I do not expect this to be a significant concern.
* I did not account for the fact that, according to the bill text, a student becomes ineligible for the benefit after receiving the ACP tuition/fee waiver for six semesters (Sec. 499H(6)(C)). Once the partnership has been put in place for a few years, this may have a downward effect on costs as students lose eligibility. While it is possible that the free-tuition benefit’s six-semester limit could cause changes in student behavior and lead to earlier completion, it is difficult to predict how large that effect could be.

### Interactive cost model: Policy design inputs and outputs

This project aims to make concrete the impacts of key policy decisions made in the design of a federal-state partnership for tuition-free community college.

To supplement the state-level data already included in the cost model through the methods described above, additional state-level data on economic, demographic, and educational factors are leveraged. The table below details the variables and data sources. The Google Sheets file containing relevant data tables and the statistics used in the model can be found [here](https://docs.google.com/spreadsheets/d/1OOfq8Fyg74ZQV5KrDDri65y-MS2GmQR8E8DBVM-5ORs/edit?usp=sharing).

|  |  |  |
| --- | --- | --- |
| State-level variable | Data source | Years used |
| Total taxable resources per capita | [U.S. Treasury](https://home.treasury.gov/system/files/226/TTR-tables-2020.xlsx) | 2016 to 2018 |
| Child poverty rate | Data.census.gov ([Table S1701](https://data.census.gov/cedsci/table?t=Poverty&g=0100000US,.04000.001&tid=ACSST5Y2019.S1701&hidePreview=true)) | 2015 to 2019 |
| Personal income per capita | [Bureau of Economic Analysis](https://apps.bea.gov/regional/downloadzip.cfm) | 2017 to 2019 |
| Share of K-12 students eligible for free/reduced price lunch | NCES, *Digest of Education Statistics* ([Table 204.10](https://nces.ed.gov/programs/digest/d20/tables/dt20_204.10.asp?current=yes)) | Academic year 2018-19 |
| Share of undergraduates at public institutions receiving Pell | NCES, IPEDS ([Guest\_76267973773](https://nces.ed.gov/ipeds/datacenter/LoadSession.aspx)) | Academic year 2018-19 |
| Grade 9-12 enrollment by race | NCES, Common Core of Data ([Table ID 186836](https://nces.ed.gov/ccd/elsi/tableGenerator.aspx)) | Academic year 2019-20 |
| Residents aged 18-35 without a college degree, by race | American Community Survey, Public Use Microdata Sample | 2015 to 2019 |

1. For the purpose of this analysis, I ignore the count of students whose tuition rate is unknown. Only 0.5% of all reported students fall into this category. [↑](#footnote-ref-1)
2. [The forecasted CPI](https://www.statista.com/statistics/244993/projected-consumer-price-index-in-the-united-states/) for 2022 is 271.06, compared to 258.84 in 2020. The change from 2020 to 2022 can be projected to be 4.721063%. [↑](#footnote-ref-2)
3. A good example of why this matters is Eastern Gateway Community College, located in Ohio near the OH-PA-WV tri-state area. Only 17% of its students reside in Ohio (according to Measure 2), yet 48% of students pay resident tuition (according to Measure 1). [↑](#footnote-ref-3)