

Colorado Minimum Value Threshold (MVT) Technical Documentation and Data FAQs

The Minimum Value Threshold (MVT) calculation to determine the financial value of postsecondary education in Colorado will consist of three components:

1. **Realized earnings**, the earnings that students who participate in higher education realize after they separate from school,
2. **Counterfactual earnings**, the earnings that students who participate in higher education would have earned had they not attended school (i.e., if they had entered the labor force with only a high school degree.) These include lost labor market earnings while enrolled in school, and
3. **College costs**, the costs specific to attending higher education, including net tuition and required fees, books, and supplies.

MVT can be calculated at several different levels of aggregation: for the individual student, for the degree program, for the institution, for certain demographic groups, or for Colorado as a whole. The best strategy for calculating MVT at these different levels of aggregation is to calculate each of the three components for each individual student with available data, then aggregate those students into cohorts.

MVT can then be calculated at the cohort level, such as postsecondary **completers and non-completers**. The Colorado Department of Higher Education's (CDHE) staff calculated the central tendency (either average or median) of realized earnings for all students in the cohort, and subtracted the central tendencies of counterfactual earnings and college costs for all students in the cohort. It is also possible to calculate other measures of economic value using this data, such as the percentage of students who outearn their counterfactual selves in any given year.

For the initial MVT calculation, CDHE staff employed a combined cohort of students who first enrolled in higher education in 2007 or 2008 and followed these students for fifteen years to assess their MVT from higher education. For the 2007 cohort, students were followed through 2021; for the 2008 cohort, through 2022. Moving forward, CDHE staff will use trends and patterns established using these data to forecast the earnings and workforce outcomes of future cohorts of students, rather than rely solely on a backward-looking approach.

These cohorts will exclude any student who enrolled in graduate school during the measurement period, as well as any student who was enrolled in school for more than half of the measurement period. The cohorts also include out-of-state students.

Proposed Calculation Method

The following sections explain the proposed method of calculation for each of the components of MVT

Figure 1: Colorado's Proposed Minimum Value Threshold Calculation

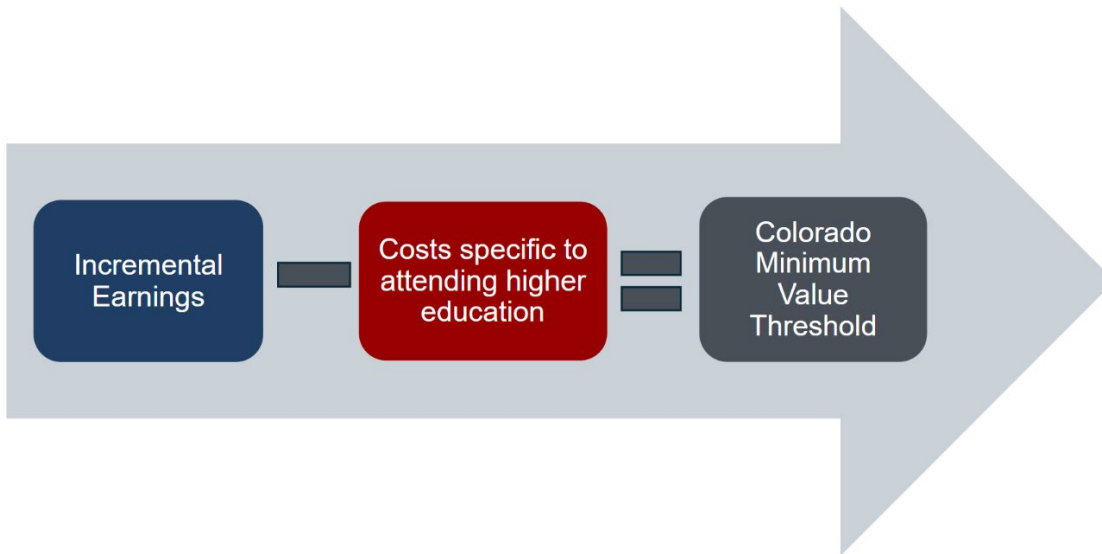
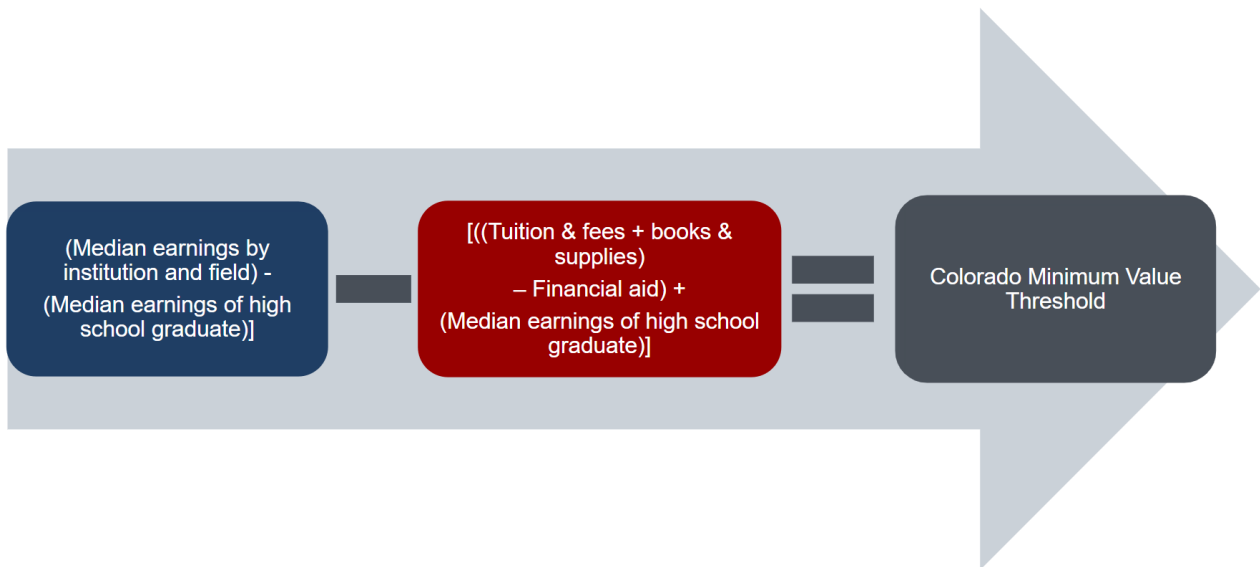


Figure 2: Specific Data Elements to Calculate Colorado's Minimum Value Threshold



Realized Earnings

Former students' actual earnings are observed through unemployment insurance records, which record the wages and salaries that an individual earned each quarter, if they lived in Colorado. If an individual was not employed or did not live in Colorado,

their earnings are recorded as zero or missing. Annual earnings are calculated by summing the quarterly wages for each calendar year.

Annual earnings should be calculated for individual-year observations with at least three quarters of positive earnings. Individual-year observations with fewer than three quarters of positive earnings should be treated as missing. This is because that individual could have been working out of state (meaning their earnings would not be recorded in the Colorado unemployment insurance records), so including this individual in the calculation would bias estimated earnings for their cohort downwards.

It is also possible to calculate realized earnings for students who work while they are enrolled in postsecondary education, which may be especially applicable for students who work part-time to defray the costs of college and recoup some lost labor market earnings. Where these in-school earnings are available, they are incorporated into the MVT calculation.

Where in-school earnings are missing, but enrollment data show that a student was enrolled at a Colorado institution of higher education, that student's earnings should be recorded as zero rather than missing. Or, if the student has fewer than three quarters of positive earnings, these partially missing earnings should still be recorded and included in the calculation. This is because the reason for the students' missing or partially missing earnings is almost certainly their enrollment in school; one can therefore reasonably conclude that their actual earnings during the missing quarters were zero.

Counterfactual Earnings

Ideally, counterfactual earnings would reflect what a college student would have earned in the parallel universe where he or she did not attend college. Instead, however, counterfactual earnings estimates are constructed based on the earnings of people who are similar to each college student at the point of college entry but have only a high school diploma.

The American Community Survey (ACS) is used to calculate counterfactual earnings. The variable INCWAGE records each ACS respondent's wage and salary income over the past 12 months and is thus most comparable to the unemployment insurance wage and salary income recorded in Colorado's unemployment insurance records.

To construct an ACS sample for counterfactual estimates, only ACS respondents who live in Colorado, have a high school diploma but no college credential (EDUCD between 63 and 65), worked for at least 27 weeks of the previous 52 (WKSWORK2 between 3 and 6), and had nonzero wage and salary income (as recorded by INCWAGE) are included.

Colorado's Student Unit Record Data System (SURDS) enrollment file records for each student: gender, race and ethnicity, date of birth and year of separation from the institution (from which we can calculate each student's age upon separation), and, for

some students, the Colorado county in which the student lived at the time of entry. ACS records gender, race and ethnicity, age, and county and metro area of residence.

Therefore, ACS data are used to calculate counterfactual earnings for a demographically and geographically similar group of individuals to each student, using the student characteristics information recorded in the SURDS file. The ACS sample is divided into groups along the following dimensions: gender (male or female), race and ethnicity (underrepresented minority or non-underrepresented minority), geographic location (Front Range urban corridor or rest of state), and age in 2007 or 2008 (16 to 21, 22 to 24, 25 to 29, 30 to 34, or 40 to 49).

Students appearing in the SURDS data file are matched to the appropriate counterfactual group of individuals in ACS. For example, a white female student who lived in Denver County upon enrollment and began college at age 18 in 2007 would be matched to the ACS subsample of non-underrepresented minority women who live in the Front Range urban corridor and were between ages 16 and 21 in 2007.

Broader subsamples are employed for student observations with missing data. If the example student above lacked race or ethnicity information, for example, an ACS subsample of all women who live in the Front Range urban corridor and were between 16 and 21 in 2007 can be used.

This method is then used to assign counterfactual earnings estimates to every student-year observation for which realized earnings can be calculated using unemployment records. This example student, for instance, would have different counterfactual earnings in 2007, in 2008, in 2009, and all the way through until 2021, reflecting the fact that her counterfactual earnings profile increases over time.

College Costs

CDHE keeps records of published tuition figures for each of Colorado's higher education institutions and programs, along with the estimated cost of books and supplies. The SURDS financial aid file records the scholarship and grant aid given to each student. Net price for each student is calculated by subtracting each student's financial aid package each year from the cost of tuition, fees, books, and supplies associated with their institution and program (adjusted by enrollment intensity). The present discounted value of the net price paid in each year is summed to ascertain the total cost of college for each student. To aggregate costs, a measure of central tendency is calculated for this total cost rather than the central tendency for each year.

Calculating the Minimum Value Threshold (MVT)

All cash flows (i.e., realized earnings, counterfactual earnings, and tuition payments) are used as nominal values. Table 1 below shows an example student who enrolls in college in 2008, stays for four years, then works in-state for seven of the next ten years:

Table 1: Sample Minimum Value Threshold Calculation for A Student

Years since first enrollment (used to calculate discounting)	Calendar year	Student activity	Realized earnings	Counterfactual earnings	College costs
0	2007	In school (1/2 year)	None; included as zero	Half-year	Net cost (1/2 year)
1	2008	In school (full year)	None; included as zero	Full year	Net cost (full year)
2	2009	In school (full year)	None; included as zero	Full year	Net cost (full year)
3	2010	In school (full year)	None; included as zero	Full year	Net cost (full year)
4	2011	In school (1/2 year); working in-state (1/2 year)	Half-year; included	Full year	Net cost (1/2 year)
5	2012	Working in-state (full year)	Full year; included	Full year	None
6	2013	Working in-state (full year)	Full year; included	Full year	None
7	2014	Working in-state (full year)	Full year; included	Full year	None
8	2015	Working out-of-state (full year)	None recorded; dropped	Not calculated	None
9	2016	Working out-of-state (full year)	None recorded; dropped	Not calculated	None
10	2017	Working in-state (full year)	Full year; included	Full year	None
11	2018	Working in-state (full year)	Full year; included	Full year	None
12	2019	Employed less than 1/2 year	Only two quarters recorded; dropped	Not calculated	None
13	2020	Working in-state (full year)	Full year; included	Full year	None
14	2021	Working in-state (full year)	Full year; included	Full year	None

Because any individual student is likely to have several instances of missing data in the unemployment records, MVT is not calculated for an individual student, as one cannot be sure whether that student is employed out of state, earns money through non-unemployment insurance sources, or is not employed at all. Therefore, missing instances of realized earnings are dropped from the sample rather than treated as zero, unless the student is enrolled in college that year.

Student data is instead aggregated into cohorts based on their year of entry into higher education. Within that cohort, averages and medians of realized earnings, counterfactual earnings, and college costs for each calendar year are calculated, dropping missing values. While individual student-year observations may be missing, each cohort is likely to have some observations in each calendar year.

Frequently Asked Questions

Frequently asked questions (FAQs) about the MVT calculations and the data employed are presented below.

General Questions

For the purposes of the MVT calculations, does the term “students” refer to enrolled students or students who earn a degree?

Answer: “Students” refers to a starting cohort of enrolled students. The MVT calculations will include outcomes for completers AND non-completers.

Are all students included in these calculations, or only those who are Colorado residents?

Answer: The sample includes students who pay in-state tuition in Colorado and are found to be working in-state upon earning a degree or leaving higher education.

What is the time period for evaluating earnings outcomes?

Answer: This calculation uses 15 years of unemployment insurance earnings; additional years will be projected using a 2% inflationary adjustment for both earnings and counterfactual data.

Why does this analysis use 15 years of employment/wage data rather than literal lifetime earnings?

Answer: Data availability limits CDHE’s ability to calculate the full lifetime earnings (40+ years of employment). While 15 years of earnings data are currently available, CDHE will include additional years used as more data become available.

What level of degree program detail will be used (i.e., a 2, 4, or 6-digit CIP Code?)

Answer: This depends on the size of the cohort data available by program, due to data privacy norms. Depending on cohort size, a 2, 4, or 6 digit CIP code may be used.

How does the MVT calculation account for geography and geographic differences across the state?

Answer: Students are dichotomously flagged as residing in the Front Range Urban Corridor (i.e., Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, Pueblo, Teller, and Weld counties) or a non-Front Range Urban Corridor county.

Does the region in which a student attended high school affect earnings and the counterfactual?

Answer: Yes. The counterfactual is constructed and assigned to the individual accounting for race, gender, and geographic area.

What demographics are included?

Answer: Demographics including race, sex, and geography are based on the enrolled student cohort. Due to data privacy policies, demographic detail is limited when the cohort and/or cell sizes are 10 or less.

How will multiple awards be handled?

Answer: Earnings are assigned to the highest degree earned, most often limited to AA/AS and BA/BS degrees. Certificate data may be used but is limited.

Are graduate degrees included in the MVT calculations?

Answer: No. Data at this time is limited to undergraduate degrees.

Will earnings for college graduates and high school graduates be sourced from the same data?

Answer: No. Colorado unemployment insurance data will be used for postsecondary graduates; American Community Survey (ACS) data is used for high school graduates.

Median Earnings of Degree Recipients

What data is used to calculate earnings for degree recipients?

Answer: Unemployment insurance data provided by the Colorado Department of Labor and Employment.

Is there an inflation assumption (to grow earnings) or a discount rate applied to earnings data?

Answer: No. At this time, this analysis uses nominal wage and tuition data.

Are any populations excluded from unemployment insurance wage records? How are work-study students, students on fellowship, and other forms of support recorded in these wage records?

Answer: For all enrolled students, any unemployment insurance data available will be used.

Median Earnings of High School Graduates

What data is used to calculate earnings for high school graduates?

Answer: American Community Survey (ACS) data are used to construct the counterfactual earnings.

Are ACS earnings comparable to unemployment insurance wages records?

Answer: Yes. This analysis uses the “sourced” field within the ACS data.

Is there an inflation assumption (to grow earnings) or a discount rate applied to earnings data?

Answer: No. At this time, this analysis uses nominal wage and tuition data.

At what age are the earnings of the counterfactual calculated?

Answer: All ages, as aligned with cohort construction.

Do these data include students who are concurrently enrolled in high school and postsecondary education?

Answer: No. At this time, these students are excluded from the sample.

Are income calculations based on age? County? Occupation?

Answer: Earnings data is based on age and county of residence; occupation data is limited and is not used in the counterfactual calculations.

Do these calculations account for academic preparation and how preparation may affect control group earnings?

Answer: Academic preparation data are unavailable at this time and are excluded from any calculations.

College Costs

What is the source of the college costs data used in the MVT calculations?

Answer: Tuition and fees are drawn from CDHE's Annual Tuition and Fees report and internal SURDS data. Books and supplies data are pulled from IPEDs.

What specific costs are included?

Answer: Tuition, fees, books and supplies are included. Housing and transportation costs are excluded, per the best practices employed by Gates, IHEP, and FREOPP's prior work in this area.

What costs are allocated to students who are enrolled part-time?

Answer: For students enrolled less than full time, costs are calculated on a per credit basis.

Are financial aid packages (e.g., grants and scholarships) included in the cost calculation?

Answer: Yes. Grant and scholarship aid is subtracted from gross college costs to determine the per-student net cost. Grants and scholarships included in this calculation are: Federal PELL, Federal SEOG, Other Federal Grants, CLEAP, CSG - CO Student Grant, CO Undergraduate Merit, CO Graduate Need Based, CO Graduate Merit, Filler - CO Categorical Grant, Filler - Inst Award Outside Funds, Inst Need Based Awards, Inst Merit Based Funds, Other Scholarship, Filler - Governor's Opportunity Scholarship, SLEAP, GPA of Merit Recipient, Filler - Veterans Benefits, GEAR UP Scholarship, Filler - Academic Competitiveness, Filler - National SMART, Filler - CO PreCollegiate, CO Teach Scholarship, Federal Teach Scholarship, CO CTE Grant

Are certificate program costs included?

Answer: At this time, the MVT analysis uses base resident cost to determine college costs, as differential tuition rates by CIP code are not always available.

Are credits earned during high school included in these calculations, for those who bring credits and therefore potentially shorten time-to-degree?

Answer: Costs are calculated using tuition and fees paid after initial enrollment. Transferable credits earned prior to enrollment may reduce cost by reducing the required credits; this would be reflected in the overall MVT calculation.

Foregone Earnings (Opportunity Cost) While Enrolled in Postsecondary Education

What data is used to calculate any forgone earnings for enrolled students?

Answer: American Community Survey (ACS) data are used to estimate any foregone earnings while a student is enrolled in postsecondary education.

Does the MVT model assume that students do not work while enrolled in postsecondary education?

Answer: No. Any wages earned while enrolled are included in this analysis.

Does this analysis make any assumptions about how long a student is enrolled and therefore out of the workforce?

Answer: No. This analysis relies on SURDS data reflecting years enrolled and credits attempted and accumulated.