

## Credential of Value Metric Description and Coding Logic for FY25

**Sources:** CBM009, CBM001, CBM0C1, TWC UI data, IPEDS tuition and fees data, ACS survey data

### CREENTIAL OF VALUE BASELINE METHODOLOGY

#### STEP 0: IPEDS REFORMATTING

IPEDS data back to AY 2000 are used to determine COA using in district tuition/fees, in state tuition/fees, books/supplies, on campus room and board, on campus other expense, off campus room and board (not with family), off campus other expenses (not with family), and off campus other expenses (with family). In-state tuition/fees are used for 4-year institutions, and in-district tuition/fees are used for 2-year institutions.

When a new year of IPEDS data needs to be added, use this program to reformat and add the newest year to the full IPEDS COA dataset.

#### STEP 1A: COV COHORT

1. Starting with CBM009 records, keep graduates of public 2-year institutions.

- Save a count of all degrees by FICE code and level to merge on later.

- Merge on CIP code names.

- Deduplicate by degree level (e.g., certificate, associate, bachelor) and FICE (i.e., for those who got degrees of the same level at multiple institutions within the year, only keep the highest-level degree (*level*)).

- Save a student-level dataset as the first step of creating the cohort.

2. Next, using CBM001/CBM0C1 records, look back 10 years from graduation year to find students' earliest FTIC record.

- Separate those who have an FTIC record and those who do not have an FTIC record.

- Non-FTIC records are saved, but as a separate dataset. Non-FTICs are not used in CoV at this time.

The file of FTIC students is merged onto the grad cohort from step 1 to remove those without FTIC records and get time to degree for FTICs. This file is saved as well for the next step of creating the cohort.

3. Pull in the CBM001/CBM0C1 again going back 14 years from cohort year to get dual credit hours.

- Variable *stuschhs* is used to calculate total dual credit hours by student, then left joined onto the cohort file by SSN.

-Merge onto cohort file.

4. Pull in the CBM0C1 a third time, going back 10 years from cohort year to get non-dual credit hours

- Roll up student total hours, credit hours, and dev ed hours, by student, year, semester, and FICE.

-Pre-FTIC SCH records are saved to a separate dataset.

-Post-graduation SCH records are saved to a separate dataset as well.

- Join SCH to the cohort file by SSN, keeping only the years from FTIC to graduation.

-This is the cohort file that is saved and used in the next steps (degree&year.sch).

5. Get FAD data going back 10 years from cohort year keeping student loans, parent loans, pell, and fad exempt status.

-Loans include the following variables:

*fadstafsub+fadstafuns+fadperkins+fadslsplus+fadheal+fadcal+fadprimcare+fadincont+fadsubfed+fadotherloans+fadunsubfed+fadloanres1+fadloanres2*

-Student aid includes the following variables:

*fadexemptall + fadcat + fadtexgrant + fadtexgrant2 + fadnonTXgrants + fadworkstudy + fadother*

-FAD data are merged onto grad file to keep only those included in cohort.

-Data are aggregated to get total grant and aid for the year. Students are indicated as pell if they had pell at any point during the year.

-Save FAD files by year. This will be merged on later in Step 1B.

6. Pull in CBM009 again, 10 years from cohort year. Get prior degrees for public 2- and 4-year students, and identify each student's highest degree earned in a given year.

-Flag students with prior degrees and create a variable that shows highest prior degree earned.

-Save for later use.

## STEP 1B: NET COST CALCULATION

1. Pull in all years of degree data created in the cohort file (degree&year.sch).

2. Create the *degr\_area* variable (16 broad program areas used to categorize credentials ([Appendix A](#))). This variable will be used throughout all the programs to aggregate data and merge back on at the student level.

3. Get IPEDS COA file created in Step 0.

-Divide COA into 2 long semesters (Fall and Spring) and calculate COA by semester for each year. Students with no long semesters will be excluded.

4. Merge IPEDS COA data onto the cohort by FICE, year, and semester (Fall and Spring).
  - All grads from 2-year institution receive in-district tuition.
5. Prorate COA based on semester credit hours (SCH) enrolled.
  - 12+ SCH are considered full time
  - Less than 12 SCH are considered part-time.
6. Merge on FADS data from Step 1A to calculate net cost using loan and aid data at the individual student level.
7. Merge on previous degrees.
8. Rank previous degrees and use degree level to filter out those who received a higher or equal previous degree than their current degree.
9. Save aggregate data with net cost to use in the next step.

## STEP 2: EXIT COHORT MATCH TO TWC

1. Pull in cohort file from the last step in Step 1B.
2. Create panel year flags 1-10. Individuals are given a 1 for each panel year after they graduated/how many years of wage records they should have.
  - (i.e., at the time this was written, 2022 wage data was the most current wage data available. 2021 grads would have a 1 for panel year 1 because they would have one year of wages. 2018 grads would have a 1 for panel years 1 through 4 because they would have four years of wages).
3. Merge on up to 10 years of wage records (1 column per year of wages) from Texas CREWS wage data, depending on how many years of wages the grads have.
  - If there are no wages for a given year, wage will show missing for that year.
4. Create variables to show cumulative wages over 10 years (or as many years as each individual graduate has).
5. Calculate median wage by level and *degr\_area* for each year of cumulative wages.
  - Median wage is used as an imputed wage for individuals with missing wage data.

Make sure imputed wages are created for any individuals with any missing wage data.

  - Individuals may have some years with real wages and some years with imputed wages in their panel. This depends on how many years an individual matched with real wages when merged with the UI wage data.

Merge on imputed wages if wages are missing for a certain year. If wages are not missing, use real wages.

6. Create a variable that shows 'program design' time to degree (*year\_to\_deg2*) (e.g., certificate=1 year to degree, associates=2 years to degree, bachelors=4 years to degree).

-*year\_to\_deg2* will be used to calculate full cost of attendance for the baseline cohort.

7. Save the file with wages to be used in the next step. The file will also be used in Step 5 to determine the threshold for each *degr\_area*.

### STEP 3: ENROLLED WAGES

1. Pull in cohort with wages added (final file saved in Step 2) and match with TWC wage records back to 1999.

2. Merge on wage records while enrolled by SSN and year.

3. Create a variable to show median wage while enrolled by year.

4. Actual time to degree variable (*year\_to\_deg*) is calculated by subtracting beginning year (FTIC year) from graduation year.

5. Actual Earnings while Enrolled (*AEE*) is calculated at the end of this step by multiplying median wage while enrolled by *year\_to\_deg* to get wages while enrolled for the entire time enrolled.

### STEP 4: CUMULATIVE WAGES

1. Create aggregate mean variables to show net cost, 'program design' year to degree (*year\_to\_deg2*), and *AEE* by FICE code, *degr\_area*, level (e.g., associates, certificate, bachelors), and graduation year.

-These will be used to calculate mean opportunity cost and net cost variables by program and institution.

2. Calculate opportunity cost using 'program design' time to degree (*year\_to\_deg2*) \* median high school graduate wage (*hs\_wage*).

$oppcost = year\_to\_deg2 * hs\_wage$

-Median high school graduate wage (*hs\_wage*) comes from ACS survey data.

-The 2018 5-year sample is generated and downloaded using IPUMS USA. The most recently available 5-year sample of survey data includes 2014-2018 respondents. After downloading the data for Texas respondents, the following restrictions are made:

-Respondent age: between 22-40 years

-Education codes include:

062 High school graduate or GED

063 Regular high school diploma

064 GED or alternative credential

-Employment status='Employed'

-The median wage for this 5-year sample was \$26,184.

3. Calculate total cost by adding mean net cost + opportunity cost, and subtract actual earnings while enrolled mean.

$$\text{totalcost} = \text{mean net cost} + \text{oppcost} - \text{AEE}$$

4. Merge these mean variables back onto student-level data by FICE code, *degr\_area*, *level*, and graduation year.

-We are using means here because there are missing data for several students, so this has been determined as the appropriate way to estimate these costs at the individual level.

5. Using the cumulative imputed wages calculated in step 2, determine if the first year threshold is passed by each student using the following as a comparison to cumulative wage:

$$\text{-baseref} = \text{agg\_totalcost} + (\text{year} * \text{hs\_wage})$$

-where year is the number of years since the graduating year (i.e., if we wanted to determine whether a graduate was passing at year 7, we would say aggregate total cost + (7\*hs wage).

-If cumulative wages at X year are greater than *baseref* at the same year, the student is marked as passing the threshold.

- Create a variable to indicate passing within panel years.

$$\text{if cumulative wage} > \text{baseref} \text{ then } yX\text{pass\_ref} = 1; \text{ else } yX\text{pass\_ref} = 0$$

-Once an individual passes the threshold for a given degree for the first time, they will be marked as passing for each subsequent year regardless of wages in those years.

6. Save this file to use as the final whole file to determine threshold by *degr\_area*.

-Output from this file shows the percentage of individuals passing in each of the 10 years of the 10-year panel. Use this output to determine which programs meet 'credential of value' criteria.

## CREDENTIAL OF VALUE PREMIUM METHODOLOGY:

### STEP 5: DEFINE COMPARISON YEAR FOR EACH PROGRAM GROUP ([Appendix B](#))

Determine the year where over 50% of institution/programs have over 50% of their grads meeting or passing the threshold.

1. Start with cohort created in the final step of Credential of Value Baseline that includes a variable showing the first year each graduate passed the threshold for the first time based on program design TTD (1,2,4yrs).

-For associates degrees and certificates, keep only those with at least 8 years of wages. For bachelor degree earners, keep all years of wages.

-We keep all wages for bachelors degrees at 2-year institutions because they are newer and typically smaller programs for which fewer data are generally available.

-This may change in the future because some programs have not been around long enough to give students a threshold to pass. We will continue refining our methodology to better account for student outcomes.

2. Aggregate to the institution/*degr\_area* level to count total students within each group *degr\_area*, and generate a count of how many students passed the threshold at each of the 10 year marks.

3. Flag the first year and subsequent years where at least 50% of students passed the threshold.

(i.e., if there are 40 students total in program X at institution A, we would flag the first year 20 of those students that passed the threshold for the first time).

4. Aggregate the flagged institutions to the *degr\_area* level to get count of how many institutions passed the threshold at each 10 year mark for each *degr\_area*.

5. Flag the years where the *degr\_area* has 50% of institutions passing the threshold.

(i.e., if 20 institutions offer program X, flag the first year at least 10 of those institutions have been flagged as having 50% of students passing the threshold).

6. Save comparison years for the Final Step.

-In the end, this file will be used to determine the passing year for each *degr\_area* when merged onto the current target cohort we are projecting wages for.

### FINAL STEP: ESTIMATED CUMULATIVE WAGES FOR INSTITUTION/PROGRAM

1. Pull in current target cohort we are projecting wages for (2023 in this case).

2. Calculate opportunity cost and aggregated total cost except using **actual time to degree** instead of program design (NOTE: steps 2-3 below are similar to steps taken in Step 4: Cumulative Wages, with the exception of using actual time to degree)

-Calculate premium opportunity cost using actual time to degree \* median high school graduate wage (*hs\_wage*).

$$\text{oppcost} = \text{year\_to\_deg} * \text{hs\_wage}$$

-Calculate total cost by adding opportunity cost to mean net cost, and subtract actual earnings while enrolled mean.

$$\text{agg\_totalcost} = \text{rev\_netcost\_prAll} + \text{oppcost} - \text{AEE};$$

3. Using the cumulative wages calculated in step 2, determine when the threshold is passed for the first time by each student using the following as a comparison to cumulative wage:

$$\text{baseref} = \text{agg\_totalcost} + (\text{year} * \text{hs\_wage})$$

4. Merge estimated cumulative wage for the determined t0 year onto 2023 cohort by FICE code, *level*, *degr\_area*

5. Create a variable for '*wage\_at\_t0\_&n.*' as a comparison variable for the cumulative wages at the determined threshold year for each associated institution, *level*, *degr\_area*

6. Compare each individuals' cumulative wage at t0 year (*be\_at\_t0*) to total COA + (t0 \* HS wage) to determine whether the individual completed their degree in the premium timeframe for their associated institution and *degr\_area*.

$$\text{if } \text{wage\_at\_t0\_mean} > \text{be\_at\_t0} \text{ then } \text{cov\_premium} = 1; \text{ else } \text{cov\_premium} = 0$$

## Appendices

### Appendix A. Broad Program Categories

The degree fields for credential recipients in the ACS are categorized in the survey results in a manner similar to the taxonomy for Classification of Instructional Programs (CIP) codes by the National Center for Education Statistics (NCES). At the 2-digit level, the degree field responses in the ACS are grouped into thirty-nine categories. To determine program groupings, programs of study were further collapsed into 16 broader groupings (Table 1). The only exception to the classification was CIP 30.9999 – Multi/interdisciplinary studies which was included in the Education major group. This was done because Texas four-year institutions were not allowed to offer undergraduate degrees in Education until 2020, so students pursuing a career in K-12 teaching were assigned into the multi/interdisciplinary studies (30.9999) major group.

**Table 1. Categorization of CIP Codes**

Broad Program Categories	2-level CIP
<b>Agriculture and natural resources</b>	01 - Agriculture, agriculture operations, and related sciences; 03 - Natural resources and conservation
<b>Architecture and engineering</b>	04 - Architecture and related services; 14 – Engineering; 15 - Engineering technologies and engineering-related fields
<b>Arts</b>	50 - Visual and performing arts
<b>Biology and life sciences</b>	26 - Biological and biomedical sciences
<b>Business</b>	52 - Business, management, marketing, and related support services
<b>Communications and journalism</b>	09 - Communication, journalism, and related programs; 10 - Communications technologies/technicians and support services
<b>Computers, statistics, and mathematics</b>	11 - Computer and information sciences and support services; 27 - Mathematics and statistics
<b>Education</b>	13 – Education; 25 - Library science; and 30.99 - Multi/interdisciplinary studies
<b>Health</b>	51 - Health professions and related programs
<b>Humanities and liberal arts</b>	05 - Area, ethnic, cultural, gender, and group studies; 16 - Foreign languages, literatures, and linguistics; 23 - English language and literature/letters; 24 - Liberal arts and sciences, general studies, and humanities; 30 - Multi/interdisciplinary studies; 38 - Philosophy and religious studies; 39 - Theology and religious studies; and 54 – History



<p><b>Industrial arts, consumer services, and recreation</b></p>	<p>12 - Personal and culinary services; 19 - Family and consumer sciences/human sciences; 31 - Parks, recreation, leisure, and fitness studies; 46 - Construction trades; 47 - Mechanic and repair technologies/technicians; and 49 - Transportation and material moving</p>
<p><b>Law, public policy, and social work</b></p>	<p>22 - Legal professions and studies; 43 - Homeland security, law enforcement, firefighting, and related protective services; 44 - Public administration and social service professions</p>
<p><b>Physical sciences</b></p>	<p>40 - Physical sciences; 41 - Science technologies/technicians</p>
<p><b>Psychology</b></p>	<p>42 - Psychology</p>
<p><b>Social sciences</b></p>	<p>45 - Social sciences</p>
<p><b>Other</b></p>	<p>28: Reserve Officer Training Corps; 29: Military Technologies; 32: Basic Skills; 33: Citizenship Activities; 34: Health-related Knowledge and Skills; 35: Interpersonal and Social Skills; 36: Leisure and Recreational Activities; 37: Personal Awareness and Self-Improvement; 47: Mechanic and Repair Technologies/Technicians; 48: Precision Production; 53: High School/Secondary Diplomas and Certificates; and 60: Residency Programs</p>

Appendix B. Comparison Year Groups

COMPARISON YEAR FOR EACH PROGRAM GROUP FOR PUBLIC 2-YEAR INSTITUTIONS

degreetype	degree area (16 broad areas)	number of institutions	pass year
Associate	Agriculture and natural resources	32	6
Associate	Architecture and engineering	47	3
Associate	Arts	40	6
Associate	Biology and life sciences	32	5
Associate	Business	50	3
Associate	Communications and journalism	28	6
Associate	Computers, statistics, and mathematics	51	5
Associate	Education	46	5
Associate	Health	50	1
Associate	Humanities and liberal arts	51	5
Associate	Industrial arts, consumer services, and recreation	46	5
Associate	Legal services, public policy, and social work	49	2
Associate	Other	31	3
Associate	Physical sciences	35	4
Associate	Psychology	27	5
Associate	Social sciences	32	4
Bachelor's	Architecture and engineering	1	1
Bachelor's	Business	7	1
Bachelor's	Computers, statistics, and mathematics	4	NA
Bachelor's	Education	1	NA
Bachelor's	Health	15	1
Certificate	Agriculture and natural resources	21	3
Certificate	Architecture and engineering	47	1
Certificate	Arts	18	3
Certificate	Business	51	1
Certificate	Communications and journalism	16	2
Certificate	Computers, statistics, and mathematics	46	1
Certificate	Education	4	3
Certificate	Health	51	1
Certificate	Humanities and liberal arts	10	2
Certificate	Industrial arts, consumer services, and recreation	51	1
Certificate	Legal services, public policy, and social work	43	1
Certificate	Other	43	1
Certificate	Physical sciences	10	1
Certificate	Social sciences	7	1