



# Pell Grant Reform Simulator

## Technical Appendix

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We simulate potential changes to the Pell grant program using data from the 2015–16 National Postsecondary Student Aid Study (NPSAS) and employing methodology similar to that used in previous work with 2011–12 NPSAS data and 2007–08 NPSAS data (Dynarski, Scott-Clayton, and Wiederspan 2013; Rueben, Gault, and Baum 2015). We detail how we constructed our sample before explaining how we estimated a 2018–19 baseline and simulated the distributional and budgetary implications of changes to the Pell program.

To estimate the number of Pell grantees and their amounts awarded, we limit the full 2015–16 NPSAS sample to undergraduate students who have applied for federal aid—that is, students who have Free Application for Federal Student Aid (FAFSA) data records in the Central Processing System. We also exclude students who are ineligible for Pell awards, including international students, students who already have a bachelor's degree, and students who are not in a degree program.

We estimate the baseline Pell award using each student's expected family contribution (EFC) and attendance-adjusted cost of attendance (COA). Because COA is not available for students attending multiple institutions, we do not adjust those students' Pell awards based on COA (i.e., we calculate the Pell grant they would receive if their COA were above the maximum Pell grant). Students attending multiple institutions make up about 10 percent of all students.

We start by estimating Pell awards for students in 2015–16. We initially calculate each student's award as the maximum Pell award in 2015–16 (\$5,775) minus her EFC. For full-time students whose adjusted COA is below their Pell award, we change their award to be COA minus EFC. Full-time amounts below half the minimum Pell (\$294) are adjusted down to zero. We compare these estimates with actual Pell grants during the year. We find students who either did not receive a Pell grant but were estimated to be Pell eligible or who received a Pell grant but were not estimated to be Pell eligible.

For these students, we set their Pell awards to zero in the baseline and in all simulations because we cannot accurately estimate whether they would receive the award.

Although the number of students who receive a Pell grant that we do not estimate to be eligible is less than 0.1 percent of students, the number of students not receiving a Pell grant that we expect to be eligible is about 8 percent of students. A previous analysis that pooled 2000, 2004, 2008, and 2012 waves of NPSAS found “that about 6 percent of students at four-year and 14 percent at two-year colleges appear to be Pell grant eligible based on their EFC but did not receive the award” (Evans et al. 2017, 50). This nonreceipt of Pell may be explained by changes in the final EFC that are not observed in NPSAS (Evans et al. 2017). These changes likely make these students ineligible, but we retain them in our sample so that they contribute to our estimates of the share of students that receive a Pell grant.

The Pell program adjusts students’ grants based on their enrollment intensity, measured as full time, three-quarter time, half time, or less than half time. Enrollment intensity is not measured at this level of detail in NPSAS, so we estimate it using a methodology similar to that used in previous research (Dynarski, Scott-Clayton, and Wiederspan 2013; Rueben, Gault, and Baum 2015). First, we calculate the ratio of the actual Pell amount to the estimated Pell amount to estimate enrollment intensity for students receiving Pell grants. Next, we regress this estimated enrollment intensity on a set of enrollment dummies (full time, half time, less than half time) for each of the 12 months of the 2015–16 academic year and use the predicted values as our enrollment intensity estimates for students who did not receive a Pell grant.

We use this enrollment intensity to adjust our estimated Pell amount. Specifically, we multiply each student’s estimated full-time Pell award by her enrollment intensity (e.g., a student with a \$4,000 estimated full-time award and an enrollment intensity of 75 percent is assigned an award of \$3,000). We then make a final adjustment to set awards below half the minimum Pell (\$294) to zero and those above or equal to half the minimum Pell to the minimum Pell award (\$588).<sup>1</sup>

## Estimating the 2018–19 Baseline

The calculations described above use 2015–16 Pell program parameters because we are using 2015–16 data. Our modeling tool uses simulated 2018–19 Pell awards as our baseline as a better point of comparison for changes to current policy.

We inflate the three key Pell eligibility inputs to estimated 2018–19 values using publicly available aggregate data. First, we inflate COA by the most recent three-year increases in tuition, fees, room, and board reported by the US Department of Education (2013–14 to 2016–17): 8.7 percent at two-year public institutions, 7.7 percent at four-year publics, 9.8 percent at two-year private nonprofits, 9.7 percent at four-year private nonprofits, 2.8 percent at two-year for-profits, and 10.8 percent at four-year for-profits.<sup>2</sup>

Second, we inflate family incomes and EFCs using parameters based on 2014 and 2017 income data from the American Community Survey. For dependent students, we inflate the incomes and EFCs of

students from families in the bottom and top halves of the 2014 income distribution (with \$66,000 as the median) by 16.0 and 12.6 percent, respectively. These are the average increases from 2014 to 2017 of the mean incomes of the two halves of the income distribution of families living with dependent children ages 6 to 17. For independent students, we use the increase for the bottom half of the dependent distribution (16 percent).

Once we have adjusted COA, income, and EFC, we calculate the 2018–19 baseline Pell awards by setting each student’s award to the current maximum Pell award of \$6,095 minus EFC. For full-time students whose adjusted COA is below their Pell award, we change their award to be adjusted COA minus their EFC (this changes Pell awards for 6 percent of students, most whom are part-time students attending two-year public institutions, with an average change of \$1,600). Full-time amounts below half the minimum Pell (\$325) are adjusted down to zero. We next adjust Pell awards using the estimates of enrollment intensity calculated earlier. Finally, we set awards below half the minimum Pell (\$325) to zero and awards that are at least half the minimum Pell but less than the minimum Pell award to the minimum Pell award (\$650).<sup>3</sup>

## Simulating Adjustments to the Maximum Pell Grant

Our simulation of changes to the maximum Pell grant follows the process outlined above, substituting different maximum and minimum Pell awards while keeping all inputs (EFC and COA) at their 2018–19 (simulated) baseline values. The user chooses the maximum Pell award at intervals of \$100. We set the minimum Pell award at 10 percent of the maximum Pell award, which approximates current policy (e.g., the 2018–19 minimum is 10.7 percent of the maximum).

## Simplified Formula Simulation

Our simplified Pell model uses only adjusted gross income (AGI), family size, and COA (with AGI and COA simulated to 2018–19 baseline values) to calculate Pell awards. The simplified formula we model is a function of AGI, as a percentage of the federal poverty level, and allows the user to set three parameters: maximum Pell award (point A in figure 1), AGI level at which phaseout of award begins (point B), and AGI level at which phaseout of award ends (point C). Family AGI as a percentage of the 2018 federal poverty level accounts only for family size and whether the student’s home state, as recorded on her FAFSA, is in the contiguous United States, Alaska, or Hawaii.

$$Pell_{Fulltime} = A - A * \frac{(AGI - B)}{(C - B)}$$

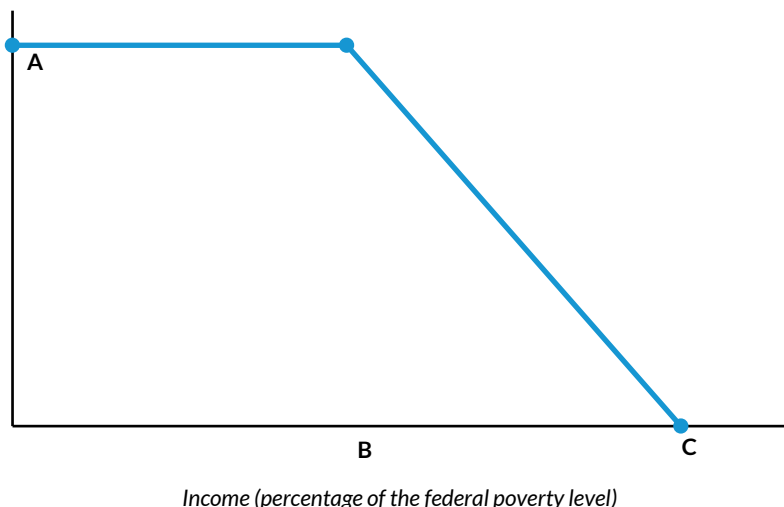
After estimating each student’s Pell award using the formula above, we make similar adjustments as those done under current policy. We adjust Pell awards based on enrollment intensity and round values below the minimum Pell award in the same way described above (with the minimum Pell again set as 10

percent of the maximum). If a student's COA is less than her estimated Pell award, we reduce the Pell amount to COA. (This deviates from current policy, which reduces Pell to COA minus EFC when COA is below the maximum Pell.)

FIGURE 1

### How the Simplified Formula Would Estimate Award Amounts for the Pell Grant Program

Pell award (\$)



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**Note:** “A” represents the maximum Pell award, “B” represents the point at which award phaseout begins, and “C” represents the point at which award phaseout ends.

## Estimates of Total Program Participation and Distributional Impacts

Under each scenario, we calculate every aid applicant's estimated Pell award (setting awards at zero for students who did not apply for federal aid as well as aid applicants whose 2015–16 estimated Pell eligibility did not match whether they received a grant). Applying the NPSAS weights (which reflect the sampling design and response rates), we calculate an estimated total number of Pell recipients, annual program cost, and average Pell grant.

Our 2018–19 baseline estimates nearly match the April 2018 Congressional Budget Office (CBO) baseline for 2018: we estimate 7.5 million Pell recipients with total grants of \$30.0 billion, and the CBO estimates 7.5 million recipients and total grants of \$30.6 billion. The difference likely reflects the fact that we do not model year-round Pell awards, which were introduced in summer 2018, an issue we return to below.

We also report the share of undergraduate students receiving a Pell grant, which we calculate as the number of aid applicants estimated to receive a Pell grant divided by the total number of

undergraduate students. This calculation will underestimate the share of students receiving a Pell grant to the extent that program changes would induce more students to apply for federal aid (assuming at least some of those students would be eligible).

We also report both the share of students estimated to receive a Pell grant and their average grant size (excluding zeros) for subgroups of students defined in terms of the following characteristics:

- Income and dependency status: we divide dependent students into four quartiles based on their parents' income (total income, not AGI). We set the quartile cutoffs based on the distribution of household incomes of families with dependent children ages 6 to 17 in the 2017 one-year American Community Survey estimates (quartile cutoffs of \$38,800, \$75,000, and \$125,200). We do not disaggregate independent students because their incomes tend to be low (about 85 percent had incomes below \$20,000), and it is not clear to what national distribution they should be compared.
  - » Dependent students in the bottom income quartile (an estimated 15 percent of all undergraduates)
  - » Dependent students in the second income quartile (11 percent)
  - » Dependent students in the third income quartile (12 percent)
  - » Dependent students in the top income quartile (13 percent)
  - » Independent students (49 percent)
- Parents' highest education level
  - » High school diploma (including GED) (24 percent)
  - » Associate's degree or some college (31 percent)
  - » Bachelor's degree (23 percent)
  - » Master's degree or higher (20 percent)
- Race or ethnicity
  - » White students (53 percent)
  - » Black or African American students (15 percent)
  - » Hispanic or Latinx students (20 percent)
  - » Asian students (7 percent)
  - » Students of another race (including American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and more than one race) (5 percent)
- Institutional sector (we do not report results in this breakdown for students who attended a two-year private institution or who were enrolled in multiple institutions)
  - » Public four-year institutions (32 percent)
  - » Private nonprofit four-year institutions (14 percent)
  - » Public two-year institutions (35 percent)
  - » Private for-profit institutions (9 percent)
  - » Other institutions, including students attending multiple institutions (11 percent)

- Whether any member of the student's household received federal benefits during the 2013 or 2014 calendar year, including Supplemental Nutrition Assistance Program benefits (food stamps), free and reduced-price school lunch, Supplemental Security Income, Temporary Assistance for Needy Families, or benefits from the the Special Supplemental Nutrition Program for Women, Infants, and Children
  - » Received no federal benefits (80 percent)
  - » Received any federal benefits (20 percent)
- Independent students, broken down by whether they had dependent children (i.e., dependents other than a spouse)
  - » Independent students without dependents, other than a spouse (25 percent)
  - » Independent students with dependents, other than a spouse (24 percent)

## Cost Estimates

We also provide annual and 10-year program cost estimates aimed at approximating CBO's methodology. The inputs into these estimates are the total number of Pell recipients and average Pell award from our simulation and the year-by-year estimated number of Pell recipients and annual program costs from 2019 to 2029 in the January 2019 CBO baseline (CBO 2019, table 1).

To estimate the annual program cost for the 2019 fiscal year, we use CBO's estimate from January 2019 for fiscal year 2019. We rescale our estimate to match the CBO 2019 baseline, which increases it by 5.9 percent (largely capturing our inability to model year-round Pell awards, as well as the increase in the maximum Pell award from \$6,095 in 2018–19 to \$6,195 in 2019–20). We apply the same 5.9 percent adjustment to all annual cost estimates produced by our simulations.

To estimate program costs over 10 years, we use the year-by-year changes to CBO's estimates of Pell award recipients and average awards (program cost divided by number of recipients) to estimate the number of Pell award recipients and average awards for 2019–29. For example, CBO estimates that between 2019 and 2020, the number of recipients will increase from 7.49 million to 7.62 million (an increase of about 1.7 percent). We apply this increase to the simulated number of recipients and follow the same process for each year. We also use this method to apply CBO's projection of average awards in each year to our simulation results.

Once we have estimated the number of recipients and average award for each year, we multiply the number of recipients by the average award to calculate total program cost in each year. Finally, we apply the adjustment noted earlier (105.9 percent) to account for year-round Pell in each year and sum up program costs from 2020 to 2029 to estimate a 10-year program cost (this would be the 10-year budget window that CBO would likely use to score legislation introduced in 2019).

## Notes

- <sup>1</sup> Jeff Baker, “2015–2016 Federal Pell Grant Payment and Disbursement Schedules,” US Department of Education letter to colleagues, January 29, 2015, <https://ifap.ed.gov/dpcletters/GEN1502.html>.
- <sup>2</sup> See the Digest of Education Statistics, table 330.10: [https://nces.ed.gov/programs/digest/d17/tables/dt17\\_330.10.asp?current=yes](https://nces.ed.gov/programs/digest/d17/tables/dt17_330.10.asp?current=yes). The College Board reports qualitatively similar percentage changes in tuition, fees, room, and board for a smaller set of sectors for more recent years (2015–16 to 2018–19): “Tuition and Fees and Room and Board over Time,” College Board, Trends in Higher Education, accessed February 5, 2019, <https://trends.collegeboard.org/college-pricing/figures-tables/tuition-fees-room-and-board-over-time>.
- <sup>3</sup> James F. Manning, “REVISED 2018–2019 Federal Pell Grant Payment and Disbursement Schedules,” US Department of Education letter to colleagues, April 10, 2018, <https://ifap.ed.gov/dpcletters/GEN1804.html>.

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