

APPENDIX A: SOURCE AND DESCRIPTION OF DATA, AND METHODS

To derive and standardize total revenues (used in the denominator of the 90/10 ratio), we use the [IPEDS complete data files](#) for years 2014-2016. We use the following surveys:

- **Institutional Characteristics:** this file contains directory information for institutions, including the institution name, Office of Postsecondary Education I.D. number, institution type (public, private, for-profit), and other identifying variables.
- **Finance** (revised December 2018, November 2017, and Jan 2017): these files contain institutional finance data, including revenues by source. There are three separate finance files for public, private non-profit, and for-profit institutions. Data on public institutions use accounting standards established by the Governmental Accounting Standards Board. Data on private non-profit and for-profit schools use accounting standards established by the Financial Accounting Standards Board (FASB). We use this data to derive and standardize total revenues across institution types. The files that we use have the following titles on the IPEDS website:
 - Public institutions-GASB 34/35
 - Private not-for-profit institutions or public institutions using FASB
 - Private for-profit institutions
 - Response status for all survey components
 - This file has the year and quarter of the reported financial data for each school.
- **Student Financial Aid; Military Benefits** (revised December 2018, November 2017, and Jan 2017): the student aid file contains information on federal aid to first-time degree/certificate seeking undergraduate students, including grants and loans. We do not use this data for our exercise because we also want to incorporate aid to graduate students and parents of undergraduate students. Instead, we use it as a check for our incorporation of the FSA data. The military benefits file contains information on post-9/11 G.I. benefits and the Department of Defense's tuition assistance. The files that we use have the following titles on the IPEDS website:
 - Student financial aid and net price
 - Military service members and veteran's benefits

We use FSA's [Title IV Program Volume Reports](#) quarterly data for years 2013-2014 to 2016-2017 when calculating Title IV federal aid (the numerator of the 90/10 calculation). We also use FSA's official [Proprietary School 90/10 Revenue Percentages](#) to find the share Title IV

Pell Grants and loans that is included in the official 90/10 numerator, and as a check for our analysis.

- **Loan Volume**, *Title IV Program Volume Reports* (from AY 2013-2014, Q1 to AY 2016-2017 Q2): the loan file has quarterly information on subsidized, unsubsidized undergraduate, unsubsidized graduate, parent PLUS, and graduate PLUS loans.
- **Grant Volume**, *Title IV Program Volume Reports* (from AY 2013-2014, Q1 to AY 2016-2017 Q2): the grant file has quarterly information on federal Pell grants.
- **Report**, *Proprietary School 90/10 Revenue Percentages* (from 2016-2017, which provides information from financial statements between July 2015-June 2016): the file has institutional-level information on the aid and revenues that are used to calculate the official 90/10 ratios.

We use FSA's [Cohort Default Rates for Schools](#) in FY 2015 for other analysis. We use FY 2015 because it was the most recent data at the time of writing.

Data is aggregated to the six-digit OPEID level for both IPEDS and FSA data. We limit the sample to institutions that participate in the Title IV program (according to IPEDS), and which have both revenue data in IPEDs and aid data in FSA. In practice, this eliminates about 700 schools a year, most of which report receiving zero Pell grants or undergraduate loans in IPEDS and which have no corresponding FSA report.

APPENDIX B: CORRELATIONS OF KEY VARIABLES, 2014-2016

To assess the comparability of data between IPEDS and FSA, and the accuracy of the aggregation and merge between the data sources at the OPEID-level, we compared the correlation of variables reported in both data sources. The following tables show correlation coefficients between key variables from FSA and IPEDS in 2016. The last tables disaggregate by sector.

Overall:

| Relationship | Correlation Coefficient |
|---|-------------------------|
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.997 |
| Total Aid Disbursements (FSA) and Official 9010 Numerator (FSA) | 0.957 |
| Official 90 10 Denominator and Total IPEDS Revenues | 0.975 |
| Official 90 10 Denominator and Total IPEDS Non-Auxiliary Revenues | 0.987 |

By school type:

| Relationship | Correlation Coefficient |
|---|-------------------------|
| For-Profit, 4-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.999 |
| Total Aid Disbursements (FSA) and Official 9010 Numerator (FSA) | 0.954 |
| Official 90 10 Denominator and Total IPEDS Revenues | 0.976 |
| Official 90 10 Denominator and Total IPEDS Non-Auxiliary Revenues | 0.986 |
| For-Profit, 2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.993 |
| Total Aid Disbursements (FSA) and Official 9010 Numerator (FSA) | 0.997 |

| | |
|---|-------|
| Official 90 10 Denominator and Total IPEDS Revenues | 0.899 |
| Official 90 10 Denominator and Total IPEDS Non-Auxiliary Revenues | 0.988 |
| For-Profit, <2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.996 |
| Total Aid Disbursements (FSA) and Official 9010 Numerator (FSA) | 0.988 |
| Official 90 10 Denominator and Total IPEDS Revenues | 0.986 |
| Official 90 10 Denominator and Total IPEDS Non-Auxiliary Revenues | 0.977 |
| Public, 4-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.999 |
| Public, 2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.994 |
| Public, <2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.982 |
| Private Non-Profit, 4-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.987 |
| Private Non-Profit, 2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 1.000 |
| Private Non-Profit, <2-year | |
| Pell Grant Disbursements (FSA) and IPEDS Pell Grants Received | 0.989 |

APPENDIX C: REPLICATION IN OTHER YEARS

The following tables show the results for replicating our exercise with data from school years 2013-2014 and 2014-2015.

Appendix Table C1: Estimated Compliance with the 90/10 Rule (2013-2014)

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid / IPEDS Non-auxiliary Revenues, weighted by enrollment | Total FSA Aid / Total IPEDS Revenues | Total FSA Aid / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 89.7% | 97.6% | 87.8% | 81.2% |
| By Type | | | | |
| Public | 98.8% | 99.9% | 98.1% | 96.9% |
| Private Non-Profit | 94.6% | 96.7% | 91.4% | 91.4% |
| For-Profit | 77.4% | 84.0% | 75.7% | 58.7% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 100.0% | 100.0% | 99.7% | 98.8% |
| 2 Year | 99.8% | 99.8% | 99.5% | 98.5% |
| < 2 Year | 90.5% | 95.4% | 86.9% | 84.2% |
| Private Non-Profit | | | | |
| 4 Year | 95.1% | 96.8% | 92.7% | 92.4% |
| 2 Year | 92.5% | 92.0% | 83.6% | 85.1% |
| < 2 Year | 85.2% | 95.7% | 74.1% | 79.6% |
| For-Profit | | | | |
| 4 Year | 82.3% | 83.6% | 71.5% | 64.7% |
| 2 Year | 77.0% | 90.1% | 74.7% | 58.4% |
| < 2 Year | 76.6% | 78.3% | 77.0% | 57.6% |

Source: IPEDS and FSA 2014. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90 percent of total institutional revenues recorded in IPEDS. Institutions are defined by six-digit OPEID.

Appendix Table C2: Estimated Compliance with the 90/10 Rule (2014-2015)

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid / IPEDS Non-auxiliary Revenues, weighted by enrollment | Total FSA Aid / Total IPEDS Revenues | Total FSA Aid / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 90.8% | 90.8% | 88.5% | 82.4% |
| By Type | | | | |
| Public | 99.2% | 100.0% | 98.1% | 97.3% |
| Private Non-Profit | 95.1% | 96.2% | 90.8% | 90.7% |
| For-Profit | 79.2% | 86.0% | 77.4% | 61.2% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 99.8% | 100.0% | 99.7% | 98.8% |
| 2 Year | 99.8% | 100.0% | 99.5% | 99.2% |
| < 2 Year | 95.1% | 98.1% | 87.2% | 84.5% |
| Private Non-Profit | | | | |
| 4 Year | 96.1% | 96.8% | 92.5% | 92.1% |
| 2 Year | 87.1% | 89.5% | 78.6% | 79.3% |
| < 2 Year | 86.3% | 56.7% | 72.5% | 78.4% |
| For-Profit | | | | |
| 4 Year | 83.7% | 85.1% | 73.8% | 66.8% |
| 2 Year | 77.4% | 89.6% | 75.5% | 59.2% |
| < 2 Year | 79.1% | 84.3% | 79.1% | 60.9% |

Source: IPEDS and FSA 2015. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90

percent of total institutional revenues recorded in IPEDS. Institutions are defined by six-digit OPEID.

APPENDIX D: REPLICATION INCLUDING DEPARTMENT OF DEFENSE AID, OTHER YEARS

We replicate our main exercise after including educational aid from the Department of Defense (DoD). This includes post-9/11 G.I bill benefits and tuition assistance from the DoD. The following tables show the results for school years 2013-2014 and 2014-2015.

Appendix Table D1: Estimated Compliance with GI Bill and DoD Benefits (2013-2014)

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid + GI Bill / IPEDS Non-auxiliary Revenues | GI Bill Benefits / Non-auxiliary Revenues |
|--------------------------------------|--|--|--|
| Overall | 89.7% | 88.4% | 2.0% |
| By Control | | | |
| Public | 98.8% | 98.6% | 1.0% |
| Private Non-Profit | 94.6% | 94.3% | 1.2% |
| For-Profit | 77.4% | 74.5% | 3.7% |
| By Control and Level | | | |
| Public | | | |
| 4 Year | 100.0% | 99.7% | 1.0% |
| 2 Year | 99.8% | 99.7% | 0.9% |
| < 2 Year | 90.5% | 90.5% | 0.9% |
| Private Non-Profit | | | |
| 4 Year | 95.1% | 94.7% | 1.1% |
| 2 Year | 92.5% | 92.5% | 1.6% |
| < 2 Year | 85.2% | 85.2% | 1.8% |
| For-Profit | | | |
| 4 Year | 82.3% | 75.1% | 5.5% |
| 2 Year | 77.0% | 74.2% | 3.7% |
| < 2 Year | 76.6% | 74.5% | 3.3% |

Source: IPEDS and FSA 2014. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans (from FSA) plus GI Bill Benefits plus DoD Tuition assistance (from IPEDS) is less than 90 percent of total non-auxiliary revenues recorded in IPEDS. Institutions are defined by six-digit OPEID.

**Appendix Table D2: Estimated Compliance with GI Bill and DoD Benefits
(2014-2015)**

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid + GI Bill / IPEDS Non-auxiliary Revenues | GI Bill Benefits / Non-auxiliary Revenues |
|--------------------------------------|--|--|--|
| Overall | 90.8% | 89.6% | 2.2% |
| By Control | | | |
| Public | 99.2% | 99.1% | 1.0% |
| Private Non-Profit | 95.1% | 94.5% | 1.3% |
| For-Profit | 79.2% | 76.4% | 4.3% |
| By Control and Level | | | |
| Public | | | |
| 4 Year | 99.8% | 99.7% | 1.0% |
| 2 Year | 99.8% | 99.7% | 0.9% |
| < 2 Year | 95.1% | 95.1% | 0.9% |
| Private Non-Profit | | | |
| 4 Year | 96.1% | 95.6% | 1.2% |
| 2 Year | 87.1% | 87.1% | 1.9% |
| < 2 Year | 86.3% | 84.3% | 2.7% |
| For-Profit | | | |
| 4 Year | 83.7% | 77.1% | 6.4% |
| 2 Year | 77.4% | 75.1% | 3.8% |
| < 2 Year | 79.1% | 76.8% | 4.0% |

Source: IPEDS and FSA 2015. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans (from FSA) plus GI Bill Benefits plus DoD Tuition assistance (from IPEDS) is less than 90 percent of total non-auxiliary revenues recorded in IPEDS. Institutions are defined by six-digit OPEID.

APPENDIX E: REPLICATION WITH MATCHED PELL DATA

We replicate our main exercise with a sample where in which Pell Grant amounts in IPEDS and FSA are within 10 percent of each other (to exclude any outliers arising because of errors in either data source). The following tables show the results for years 2014-2016. These results support our findings in the main text: for-profit schools have much lower compliance rates relative to public and private non-profit schools according to all measures.

Appendix Table E1: Estimated Compliance with the 90/10 Rule, Excluding Pell Outliers (2013-2014)

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid / IPEDS Non-auxiliary Revenues, weighted by enrollment | Total FSA Aid / Total IPEDS Revenues | Total FSA Aid / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 91.2% | 97.8% | 89.5% | 82.6% |
| By Type | | | | |
| Public | 98.8% | 99.9% | 98.3% | 97.2% |
| Private Non-Profit | 96.4% | 96.6% | 93.8% | 94.0% |
| For-Profit | 78.9% | 85.1% | 76.6% | 57.9% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 100.0% | 100.0% | 99.8% | 98.9% |
| 2 Year | 99.8% | 99.8% | 99.6% | 98.7% |
| < 2 Year | 90.4% | 95.2% | 87.2% | 84.0% |
| Private Non-Profit | | | | |
| 4 Year | 97.0% | 96.6% | 95.4% | 95.1% |
| 2 Year | 92.9% | 91.2% | 82.3% | 85.0% |
| < 2 Year | 86.1% | 97.5% | 75.0% | 83.3% |
| For-Profit | | | | |
| 4 Year | 89.2% | 85.6% | 74.7% | 69.4% |

| | | | | |
|----------|-------|-------|-------|-------|
| 2 Year | 76.9% | 90.8% | 74.9% | 57.0% |
| < 2 Year | 77.8% | 77.3% | 77.8% | 56.2% |

Source: IPEDS and FSA 2014. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90 percent of total institutional revenues recorded in IPEDS. The sample is limited to institutions where Pell Grant amounts in IPEDS and FSA are within 10 percent of each other. Institutions are defined by six-digit OPEID.

Appendix Table E2: Estimated Compliance with the 90/10 Rule, Excluding Pell Outliers (2014-2015)

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid / IPEDS Non-auxiliary Revenues, weighted by enrollment | Total FSA Aid / Total IPEDS Revenues | Total FSA Aid / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 92.7% | 98.5% | 90.6% | 84.7% |
| By Type | | | | |
| Public | 99.4% | 100.0% | 98.2% | 97.4% |
| Private Non-Profit | 97.3% | 98.0% | 94.3% | 94.2% |
| For-Profit | 81.4% | 87.3% | 78.9% | 62.3% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 99.8% | 100.0% | 99.8% | 98.9% |
| 2 Year | 99.8% | 100.0% | 99.5% | 99.1% |
| < 2 Year | 95.8% | 98.4% | 86.8% | 84.2% |
| Private Non-Profit | | | | |

| | | | | | |
|------------|----------|-------|-------|-------|-------|
| | 4 Year | 97.9% | 98.0% | 95.8% | 95.3% |
| | 2 Year | 91.0% | 96.7% | 82.0% | 84.0% |
| | < 2 Year | 94.3% | 99.3% | 77.1% | 85.7% |
| For-Profit | | | | | |
| | 4 Year | 90.1% | 86.3% | 77.3% | 74.0% |
| | 2 Year | 77.4% | 90.0% | 75.3% | 58.4% |
| | < 2 Year | 81.6% | 87.2% | 80.8% | 61.9% |

Source: IPEDS and FSA 2015. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90 percent of total institutional revenues recorded in IPEDS. The sample is limited to institutions where Pell Grant amounts in IPEDS and FSA are within 10 percent of each other. Institutions are defined by six-digit OPEID.

**Appendix Table E3: Estimated Compliance with the 90/10 Rule, Excluding Pell Outliers
(2015-2016)**

| Institutional Characteristics | Scaled FSA Aid / IPEDS Non-auxiliary Revenues | Scaled FSA Aid / IPEDS Non-auxiliary Revenues, weighted by enrollment | Total FSA Aid / Total IPEDS Revenues | Total FSA Aid / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 93.9% | 98.4% | 92.0% | 86.9% |
| By Type | | | | |
| Public | 99.4% | 100.0% | 98.6% | 98.2% |
| Private Non-Profit | 97.9% | 96.3% | 94.6% | 95.1% |
| For-Profit | 84.1% | 88.5% | 82.3% | 67.0% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 99.8% | 100.0% | 99.8% | 99.4% |
| 2 Year | 99.9% | 100.0% | 99.8% | 99.8% |
| < 2 Year | 95.6% | 98.3% | 88.0% | 85.8% |
| Private Non-Profit | | | | |
| 4 Year | 98.0% | 96.2% | 95.0% | 95.3% |
| 2 Year | 98.0% | 98.9% | 93.1% | 92.2% |
| < 2 Year | 97.0% | 99.5% | 84.8% | 97.0% |
| For-Profit | | | | |
| 4 Year | 90.5% | 88.0% | 78.7% | 79.3% |
| 2 Year | 81.0% | 90.5% | 82.8% | 64.1% |
| < 2 Year | 84.3% | 87.7% | 82.7% | 66.2% |

Source: IPEDS and FSA 2016. Table shows the fraction of institutions in each category for which the sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90 percent of total institutional revenues recorded in IPEDS. The sample is limited to institutions where Pell Grant amounts in IPEDS and FSA are within 10 percent of each other. Institutions are defined by six-digit OPEID.

APPENDIX F: COMPLIANCE RATES USING ONLY TUITION AND FEES AS REVENUES, OR INCLUDING STATE AND LOCAL REVENUES

We estimate compliance rates by using the same numerator as in the text (scaled FSA disbursements) but comparing to IPEDS tuition and fees as the denominator. Gross is tuition and fees before discounts and allowances. Net is tuition and fees after deducting discounts and allowances. The following table shows the results for school years 2015-2016. At most public institutions, Pell Grants and other aid are excluded from net Tuition and Fees biasing the compliance rate lower. The third column shows compliance rates for schools when we include state and local appropriations and grants in the numerator. The fourth column shows compliance rates for schools when we include GI Bill Benefits and DoD Tuition assistance along with state and local appropriations and grants in the numerator.

Appendix Table F: Estimated Compliance with the 90/10 Rule, using Tuition and Fees in the Denominator, or Including Other Revenue Sources in the Numerator

| Institutional Characteristics | Scaled FSA Aid / Gross Tuition and Fees | Scaled FSA Aid / Net Tuition and Fees | Scaled FSA Aid+State and Local /Non-auxiliary Revenues | Scaled FSA Aid + GI Bill +State and Local / Non-auxiliary Revenues |
|--------------------------------------|--|--|---|---|
| Overall | 79.8% | 65.5% | 86.6% | 84.5% |
| By Type | | | | |
| Public | 71.7% | 40.1% | 83.4% | 81.2% |
| Private Non-Profit | 90.9% | 82.0% | 95.3% | 94.7% |
| For-Profit | 77.7% | 75.6% | 82.1% | 78.6% |
| By Sector | | | | |
| Public | | | | |
| 4 Year | 78.8% | 52.3% | 86.9% | 84.8% |
| 2 Year | 64.8% | 28.5% | 81.9% | 79.8% |
| < 2 Year | 80.0% | 53.2% | 79.1% | 76.4% |
| Private Non-Profit | | | | |
| 4 Year | 91.8% | 83.6% | 95.5% | 95.1% |
| 2 Year | 87.2% | 75.2% | 94.7% | 93.2% |

| | | | | | |
|------------|----------|-------|-------|-------|-------|
| For-Profit | < 2 Year | 72.0% | 52.0% | 90.0% | 84.0% |
| | 4 Year | 80.5% | 72.5% | 84.3% | 80.1% |
| | 2 Year | 75.9% | 74.4% | 80.4% | 76.6% |
| | < 2 Year | 78.0% | 76.9% | 82.4% | 79.3% |

Source: IPEDS and FSA 2016. The first two columns of the table shows the fraction of institutions in each category for which the scaled sum of total Pell Grant aid and loans calculated from quarterly FSA data is less than 90 percent of total tuition and fees recorded in IPEDS. The third column shows the fraction of institutions in each category for which the scaled sum of total Pell Grant aid and loans calculated from quarterly FSA data, plus state and local revenue sources, is less than 90 percent of institutional revenues in IPEDS. The fourth column shows the results after adding GI Bill Benefits and DoD Tuition assistance (from IPEDS) to the numerator on top of state and local revenues and scaled FSA aid. Institutions are defined by six-digit OPEID.