# Adjusting Default Rates According to Borrower Demographics

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## EXECUTIVE SUMMARY

This paper discusses a mathematical method for adjusting default rates to compensate for differences in a demographic variable such as the percentage of Pell Grant recipients enrolled at the college. It is a follow-up to a previous paper[1] that discussed the contribution of demographic differences to differences in default rates.

The previous paper recommended that default rates be split into two default rates, one for at-risk students and one for low-risk students, and suggested the use of Pell Grant recipient status instead of a more complicated risk factor. A college's eligibility for federal student aid would then be based on the default rates for just the low-risk students, in order to avoid penalizing colleges for trying to enroll and graduate students from at-risk populations.

The US Department of Education does not currently publish separate default rates for Pell Grant recipients and non-recipients. To explore the potential impact of splitting default rates according to risk, the present paper develops a method for approximating these default rates based on the percentage of a college's enrollment that are receiving the Pell Grant. This approach also provides a tool for ranking colleges based on an apples-to-apples comparison that is independent of demographic differences.

## METHOD FOR ADJUSTING DEFAULT RATES

Let $p$ and $n$ be the unknown default rates for Pell Grant recipients and non-recipients at a college and let $P$ be the percentage of students receiving a Pell Grant at the college.[2] Let $D$ be the college's overall default rate, as reported by the US Department of Education in the FSA Data Center.[3] Using the data from page 13 of the previous report, one can calculate the ratio $R$ of the default rates for Pell Grant recipients and non-recipients based on the type of college, as is illustrated in the following table.

| BPS:96/01 Default Rates | Pell Grant Recipient Status | | Ratio ($R$) |
|---|---|---|---|
| | No | Yes | |
| **Public Colleges** | 3.8% | 14.0% | 3.68 |
| **Non-Profit Colleges** | 4.4% | 12.6% | 2.86 |
| **For-Profit Colleges** | 13.6% | 30.0% | 2.21 |

[1] Mark Kantrowitz, Calculating the Contribution of Demographic Differences to Default Rates, April 5, 2010. (Last updated May 7, 2010.) www.finaid.org/educators/20100507demographicdifferences.pdf

[2] The percentage of students receiving a Pell Grant is available from the Integrated Postsecondary Education Data System (IPEDS) and College Navigator, available online at nces.ed.gov/ipeds and nces.ed.gov/collegenavigator.

[3] federalstudentaid.ed.gov/datacenter/cohort.html

The definition of the default rate ratios yield the equation $R = p/n$, from which we have

$$p = n \cdot R \qquad (1)$$

The sum of the default rates for Pell Grant recipients and non-recipients weighted by the percentage of students who are recipients and non-recipients, respectively, should equal the overall default rate. This yields the equation

$$D = p \cdot P + n \cdot (1 - P) \qquad (2)$$

Equations (1) and (2) are a system of two equations in $n$ and $p$ which can be solved for $n$ by substituting the equation (1) into equation (2), yielding

$$n = \frac{D}{(R - 1) \cdot P + 1} \qquad (3)$$

This yields a reasonable approximation of the default rate, $n$, for non-recipients. If the Pell Grant percentage is 7% at a non-profit college, then $n$ will be about 88% of the overall default rate. For the same Pell Grant percentage, $n$ will be about 92% of the overall default rate at a for-profit college and about 84% of the overall default rate at a public college. At a for-profit college Pell Grant percentages of 30%, 50% and 70% translate into values of $n$ equal to about 73%, 62% and 54%, respectively, of the overall default rate. (The corresponding values are 64%, 52% and 43%, respectively, at non-profit colleges and 55%, 43% and 35%, respectively, at public colleges.) The following chart shows how these percentages change with an increasing percentage of Pell Grant recipients at the colleges.



**Default Rate for Pell Grant Non-Recipients as a Percentage of the Overall Default Rate**

Public — Non-Profit — For-Profit

Percentage Pell Grant Recipients
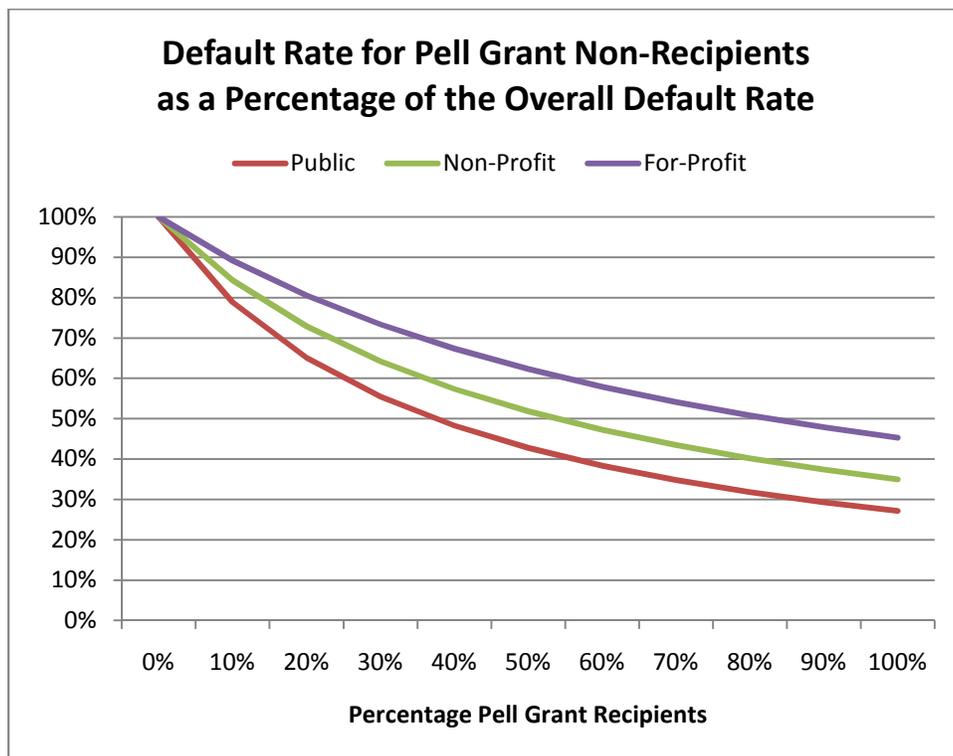
Given that 3-year cohort default rates at for-profit colleges are more than double the default rates at public colleges and triple the default rates at non-profit colleges, this suggests that the adjusted default rates at for-profit colleges will still be higher than the adjusted default rates at public and non-profit colleges even after this adjustment. But the gap will be somewhat smaller. There is more of a reduction in the adjusted default rates for public colleges than for non-profit colleges, and more of a reduction for non-profit colleges than for for-profit colleges.

Note that if $P$ is set to zero (0%) in the formula in equation (3), which would happen if none of the students at the college are Pell Grant recipients, then $n = D$ as expected. If $P$ is set to one (100%), which would happen if all the students at the college are Pell Grant recipients, then $n = D/R$, from which equation (1) yields $p = D$ as expected.

Smaller values of the ratio $R$ yields a higher default rate for Pell Grant non-recipients, expressed as a percentage of the overall default rate $D$. This suggests that $R$ may be a good measure of differences in institutional quality for individual colleges to the extent that such differences are manifested in differences in the default rates for Pell Grant recipients and non-recipients. Thus the ratio of default rates for Pell Grant recipients to the default rate for Pell Grant non-recipients may provide a good tool for ranking colleges according to institutional quality.

## IMPACT ON NATIONAL DEFAULT RATES

As the following table demonstrates, a much greater percentage of students at for-profit colleges are Pell Grant recipients than students at non-profit and public colleges.

| 2007-08 NPSAS | Percentage Pell Grant Recipients | | |
|---|---|---|---|
| | Public | Non-Profit | For-Profit |
| All College Levels | 23.0% | 26.3% | 63.1% |
| 4-Year Colleges | 25.4% | 25.7% | 57.5% |
| 2-Year Colleges | 21.2% | 39.2% | 71.7% |
| < 2-Year Colleges | 34.0% | 61.9% | 65.6% |

The following table lists the FY2007 2-year cohort default rates by type of college.[4]

| FY2007 | 2-Year Cohort Default Rates | | |
|---|---|---|---|
| | Public | Non-Profit | For-Profit |
| All College Levels | 6.0% | 3.8% | 11.1% |
| 4-Year Colleges | 4.4% | 3.7% | 9.9% |
| 2-Year Colleges | 10.0% | 8.1% | 12.6% |
| < 2-Year Colleges | 7.6% | 12.7% | 12.0% |

Note that the unadjusted cohort default rate at non-profit less-than-2-year colleges is higher than the

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[4] Default rates were recalculated from the source data at www2.ed.gov/offices/OSFAP/defaultmanagement/instrates.html based on the number of borrowers entering repayment and the number of those borrowers defaulting on their loans, instead of relying on the default rates published in the tables on this web page. Those default rates appear to contain rounding errors and differ from the actual values by up to 0.1%.

unadjusted cohort default rate at for-profit less-than-2-year colleges, as highlighted in yellow, while the unadjusted cohort default rate at public 2-year colleges is lower than the unadjusted default rate at for-profit 2-year colleges, as highlighted in green.

Combining the data in these two tables yields the following adjusted default rates as an approximation of the default rates for students who do not receive the Pell Grant.

| FY2007 | Adjusted Default Rates | | |
|---|---|---|---|
| Pell Grant Non-Recipients | Public | Non-Profit | For-Profit |
| All College Levels | 3.7% | 2.6% | 6.3% |
| 4-Year Colleges | 2.6% | 2.5% | 5.8% |
| 2-Year Colleges | 6.4% | 4.7% | 6.7% |
| < 2-Year Colleges | 4.0% | 5.9% | 6.7% |

While all of the default rates are smaller as a result of the adjustments, the default rates for Pell Grant non-recipients at for-profit colleges are still higher than the default rates for Pell Grant non-recipients at public and non-profit colleges. Yet the adjusted default rates at 2-year for-profit and public colleges are similar, as highlighted in green, suggesting that the quality of education in the 2-year programs may be similar after the impact of demographic differences is discounted. Note also that while the unadjusted default rate at non-profit less-than-2-year colleges was higher than the similar default rate at for-profit less-than-2-year colleges, the adjusted default rate at for-profit less-than-2-year colleges is higher after adjustment. Thus adjusting the default rates can affect the ranking of colleges according to default rates, both to the advantage and to the disadvantage of for-profit colleges.

The adjusted default rates for Pell Grant recipients can also be informative, as shown in this table.

| FY2007 | Adjusted Default Rates | | |
|---|---|---|---|
| Pell Grant Recipients | Public | Non-Profit | For-Profit |
| All College Levels | 13.6% | 7.3% | 13.9% |
| 4-Year Colleges | 9.6% | 7.1% | 12.9% |
| 2-Year Colleges | 23.4% | 13.5% | 14.9% |
| < 2-Year Colleges | 14.6% | 16.9% | 14.8% |

Note how the adjusted default rates for Pell Grant recipients at community colleges are much higher than the adjusted default rates for Pell Grant recipients at non-profit and for-profit 2-year colleges. (Also, the adjusted default rates for Pell Grant recipients at non-profit less-than-2-year colleges are somewhat higher than at for-profit less-than-2-year colleges.)  On the other hand, the adjusted default rates for Pell Grant recipients at 4-year for-profit colleges are significantly higher than the corresponding default rates for Pell Grant recipients at 4-year non-profit colleges but not for Pell Grant recipients at 4-year public colleges. These differences suggest that there may be room for significant improvement in the graduation and persistence rates of at-risk students at community colleges.

Note that these results should be interpreted with caution, as the adjusted default rates for Pell Grant recipients and non-recipients may not necessarily be the same as the actual default rates for Pell Grant recipients and non-recipients. Nevertheless, these results do demonstrate the potential value of disaggregating actual default rates by Pell Grant recipient status or other risk factors.

## OTHER DEFAULT RATE ADJUSTMENTS

A similar technique can be used to adjust the default rates according to other demographic variables or even multiple demographic variables. However, two variables (e.g., in this case, Pell Grant recipient status and college type) may be the practical limit because too many variables end up chopping the data too fine, yielding a loss of statistical power. In addition, while it is possible to calculate default rates for three variables such as college type, Pell Grant recipient status and dependency status, the variables interact due to a nontrivial amount of mutual information. The percentage of students who are dependent or independent varies by Pell Grant recipient status and by college type.

The following tables show the default rates for dependent and independent students according to Pell Grant recipient status for each type of college. Dependency status can be integrated with Pell Grant recipient status by using the percentages of dependent and independent students at a college to calculate a weighted average of the default rates for each Pell Grant recipient status. Ratios can be calculated from the weighted average default rates, and these values can then be used with the two-variable version of equation (3). This approach reduces a three-variable problem to a two-variable problem.

| BPS:96/01 – Default Rates All Colleges | Pell Grant Recipient Status | | Ratio (R) |
|---|---|---|---|
| | No | Yes | |
| Dependent | 4.3% | 13.9% | 3.23 |
| Independent | 7.8% | 22.7% | 2.91 |

| BPS:96/01 – Default Rates Public Colleges | Pell Grant Recipient Status | | Ratio (R) |
|---|---|---|---|
| | No | Yes | |
| Dependent | 4.0% | 11.6% | 2.90 |
| Independent | 2.2% | 17.7% | 8.05 |

| BPS:96/01 – Default Rates Non-Profit Colleges | Pell Grant Recipient Status | | Ratio (R) |
|---|---|---|---|
| | No | Yes | |
| Dependent | 4.2% | 11.4% | 2.71 |
| Independent | 10.5% | 13.8% | 1.31 |

| BPS:96/01 – Default Rates For-Profit Colleges | Pell Grant Recipient Status | | Ratio (R) |
|---|---|---|---|
| | No | Yes | |
| Dependent | 9.5% | 30.4% | 3.20 |
| Independent | 18.2% | 29.0% | 1.59 |

Note how much the default rates disaggregated by Pell Grant recipient status and dependency status vary according to college type. Public colleges have a higher ratio of default rates for independent students than for dependent students, the opposite of the ratios for non-profit and for-profit colleges. So even though the overall ratios are similar when all college types are combined, there is significant differentiation in the ratios according to type of college. Independent students who are Pell Grant recipients have a higher default rate at public colleges and independent students who are not Pell Grant recipients have a lower default rate at public colleges, causing a much greater ratio for independent students at public colleges.

The following tables show the percentage of students who are dependent or independent according to Pell Grant recipient status and college type. These values vary considerably by college type.

| BPS:96/01 College Type | All Students | | Pell Grant Recipients | | Pell Grant Non-Recipients | |
|---|---|---|---|---|---|---|
| | Dependent | Independent | Dependent | Independent | Dependent | Independent |
| **Public** | 82.2% | 17.8% | 63.4% | 36.6% | 77.4% | 22.6% |
| **Non-Profit** | 92.6% | 7.4% | 82.5% | 17.5% | 94.1% | 5.9% |
| **For-Profit** | 38.9% | 61.1% | 29.2% | 70.8% | 42.7% | 57.3% |

Note that if one uses the percentage of students who are dependent or independent to recreate the overall statistics without a dependency split, one obtains ratios of 3.85, 2.59 and 2.03 instead of the values listed in the first table on page 1, namely 3.68, 2.86 and 2.21. The ratios are still descending and yield at most a 4.0% difference in the overall default rates, but the difference demonstrates the loss of accuracy from chopping the data too fine.

## RECOMMENDATIONS

The mathematical formula depicted in equation (3) provides a practical tool for adjusting default rates according to Pell Grant recipient status. This can help identify differences in performance with regard to high- and low-risk students.

College rankings that are based in part on default rates might find it helpful to distinguish between default rates for Pell Grant recipients and non-recipients, as demographic differences may mask differences in institutional quality. Non-profit colleges with selective admissions policies may have lower default rates because they enroll a lower percentage of high risk students. Likewise, for-profit colleges with unselective open admissions policies may have higher default rates because they enroll a greater percentage of high risk students. Using risk-adjusted default rates yields more of an apples-to-apples comparison of colleges despite significant demographic differences. The for-profit colleges still have higher default rates after adjustment, but the gap is much narrower.

The adjusted default rates, however, are an approximation and are at best an imperfect substitute for actual default rates. The US Department of Education should analyze and report default rates disaggregated according to Pell Grant recipient status, dependency status and other significant risk factors.

The US Department of Education does not currently provide independent researchers with access to the National Student Loan Data System (NSLDS) because of security concerns prompted by past alleged abuses by education lenders and US Department of Education staff. Analysis of NSLDS data, however, could yield valuable information about borrowing trends and predictors of default and could help identify methods of reducing default rates. This could save the federal government billions of dollars in student loan defaults and improve college retention and graduation rates. The US Department of Education should consider asking the National Center for Education Statistics to develop a data analysis system (DAS) interface to NSLDS data to permit analysis of aggregate data in a manner that protects borrower privacy.