



# Exploring the Determinants of Student Loan Default Rates

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### Introduction

Student loan defaults in the United States have been a growing problem. After reaching a historic low of 4.5% in 2003, student loan default rates have been trending upward, rising to 10.0% for the 2011 cohort.<sup>1</sup>

Total student debt has also been increasing in the nation, rising above \$1 trillion in 2010 and approaching \$1.5 trillion in Fall 2017.<sup>2</sup> As student loan debt increases for an individual student, default rates actually tend to decrease—the assumption being that students who borrow more also end up earning more with professional degrees, such as in law or medicine.<sup>3</sup> Increasing total debt and increasing default rates together, however, is certainly a concerning trend.

In this article, we explore factors linked with student loan defaults. While the characteristics of individual students play a role—skill at managing financial risk, for example—this article looks at defaults from the perspective of the macro economy. We find that characteristics of the job market as well as students' chosen fields of study are also factors that influence the likelihood of defaults.

What can the student loan default situation tell us about the future of higher education? While the majority of loan defaults come from traditional college graduates or students who do not finish their degree, professional, continuing, and online education units may be able to play a part in adding value to credits earned through degree completion or alternative credentialing. The latter may also play a role in helping to reduce loan defaults by increasing an employee's value in the workplace. Other factors that could also increase value are more convenient delivery of programming through online delivery and more modular learning.

<sup>&</sup>lt;sup>1</sup> https://www2.ed.gov/offices/OSFAP/defaultmanagement/defaultrates.html

<sup>&</sup>lt;sup>2</sup> http://upcea.edu/online-trending-now/#107

<sup>&</sup>lt;sup>3</sup> https://www.nytimes.com/2015/09/01/upshot/why-students-with-smallest-debts-need-the-greatest-help.html





# Default Rates by School

To conduct this analysis, we began with the student loan default rates from the fiscal year (FY) 2013 cohort provided by the Department of Education.<sup>4</sup> This data set is composed of schools participating in the Title IV student financial assistance programs and includes students who entered into repayment of their loans between October 1, 2012 and September 30, 2013—defaulting (or not defaulting) by the end of September 30, 2016.<sup>5</sup>

The full data set includes 4,569 schools. After filtering out the schools with fewer than 100 loans (due to small sample sizes), and after removing some schools that were also lacking important data for other variables in our model, the final data set was composed of 2,684 schools. The average default rate across all student loans in this set of schools was 11.4%.

	Type of School	Highest Degree	Schools	Minimum	Maximum
1	For Profit	associates	192	2%	29%
2	For Profit	bachelors	80	0%	28%
3	For Profit	graduate	49	1%	23%
4	For Profit	non-degree	255	1%	47%
5	Private	associates	27	4%	26%
6	Private	bachelors	163	0%	44%
7	Private	graduate	692	0%	27%
8	Private	non-degree	8	2%	27%
9	Public	associates	616	4%	43%
10	Public	bachelors	102	3%	28%
11	Public	graduate	476	1%	30%
12	Public	non-degree	24	9%	21%

#### Summary of Default Rates by Type of School, FY 2013 Cohort, as of October 2016

Source: Department of Education

In this final set, there was a great deal of interesting variation in default rates. Total default rates by school ranged from less than half a percent on the low end to just over 47% on the high end. There was also some notable variation by the category of school.

Postsecondary schools can be classified into three types: profit, private not-for-profit, and public institutions. Each of these three types can be further subdivided according to the highest level of degree that can be earned at that institution. It is important to note that the category of the school is not the ultimate determinant of default rates. Within any category, a school could have a low or a high default rate. There do appear to be differences in the average default rate across these categories, but as discussed below, many of these differences can be attributed to other factors and are thus not directly due to the category of school.

<sup>&</sup>lt;sup>4</sup> https://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html

<sup>&</sup>lt;sup>5</sup> https://ifap.ed.gov/DefaultManagement/guide/attachments/CDRGuideCh2Pt1CDRCalculation.pdf





# The Chmura Student Loan Default Model

In creating a model to see what factors influence default rates, we cast a wide net. One principal target was examination of the job market. This includes factors such as the availability of jobs, wages of those jobs, and characteristics linked to competition for those jobs. Another set of characteristics examined were factors related to the schools themselves such as the type of school, the average tuition, and the graduation rate.

After testing a wide variety of variables against student loan default rates, the final model included 10 variables that were found to have statistically significant linkages with default rates.<sup>6</sup> These 10 factors can be grouped into three broad categories:

- Institutional characteristics:<sup>7</sup> variables directly related to the school and its student body
  - Graduation rate (within 150% of the time for the program length)
  - o Percentage of students receiving Pell grants
  - Percentage of students taking out loans
  - o School category: two-year school versus school offering higher-level degrees
  - Percentage of students in graduate school
- **Overall economy**:<sup>8</sup> variables related to the economic climate of the state in which the school is located
  - The average annual wages in the school's state
  - The average unemployment rate in the school's state
- **Program/occupational characteristics**:<sup>9</sup> variables associated with the type of programs in each school and the corresponding occupations for which graduates have been trained
  - The average annual occupation wages associated with the programs offered at the school
  - The average occupation unemployment rate associated with the school's programs
  - The average training concentration associated with the school, a metric related to the training alignment between a school and local industry demand

<sup>&</sup>lt;sup>6</sup> While more than 10 factors were found to have correlations, some were no longer significant once combined into a model—meaning, the effects from those factors were primarily accounted for by other factors that remained in the model.

<sup>&</sup>lt;sup>7</sup> Institution characteristics variables were retrieved from various IPEDS data sets, all for the year 2013. Data sets can be found at https://nces.ed.gov/ipeds/datacenter/DataFiles.aspx

<sup>&</sup>lt;sup>8</sup> Data were retrieved from JobsEQ<sup>®</sup> for the year 2016. Unemployment data are from the Local Area Unemployment Statistics. Wages are primarily from the Quarterly Census of Employment and Wages but also include imputations for non-covered wage employment.

<sup>&</sup>lt;sup>9</sup> These data were retrieved from JobsEQ<sup>®</sup> for the year 2016. Completions data were obtained from the National Center for Education Statistics. Occupation data were computed by Chmura with a primary source being the Occupation Employment Statistics program. Program-to-occupation modeling was performed by Chmura based upon JobsEQ<sup>®</sup> data.





# Institutional Characteristics

Due to the large amount of information available, most of the variables we tested for our model were metrics tied directly to the schools in the data set. Of all the variables we examined in this category, five of them had a statistically significant relationship with student loan default rates in the final model, although two had a much higher impact on the default rates than the other three. The institutional characteristics with the highest impacts were the graduation rate and the percentage of students receiving Pell grants. These two variables were the most important in determining the student loan default rate among all the variables in the model.



#### Student Loan Default Rates: The Effect of Graduation Rates and Pell Grants, FY 2013 Cohort



As the graduation rate for an institution increases, the default rate generally decreases. This trend is, of course, very intuitive. We would expect students who do not graduate to have trouble finding the kind of work that would enable them to pay off their student loans. The data bears this assumption out. Indeed, the graduation rate shows a significantly strong relationship with default rates regardless of the award level. Arguably, the most crucial factor in whether students default on their loans is whether they finish the programs they're working on.

Another strong factor is that schools with a high percentage of students receiving Pell grants also tend to have higher default rates. This relationship is well documented.<sup>10</sup> The factors behind this trend are more difficult to pin down. One suggestion could be that students who are eligible to receive Pell grants lack the family financial support to assist them in paying off their debts compared to students who are ineligible for Pell grants.

<sup>&</sup>lt;sup>10</sup> For example, see "Lowering Student Loan Default Rates," Erin Dillon and Robin V. Smiles, February 2010.





Three other variables in this category have a statistically significant relationship with the student loan default rate, albeit with a smaller impact: the percentage of students taking out loans, whether the school is a two-year school, and the percentage of students in graduate school.

As the percentage of students taking out loans increases, the default rate generally decreases. This relationship is unusual but, as noted in the introduction, students who take out more loans tend to be working toward higher-paying fields. Moreover, students are more likely to need loans if they are in school longer to earn higher-level degrees.

Schools that do not offer awards higher than a two-year degree were more likely to have a higher default rate based on the model. While these schools tended to have higher default rates, the effect was inconsistent among different institution types. Another somewhat similar factor in the model is the percentage of students in graduate school. Schools with higher percentages of graduate students tend to have lower default rates. Consistent with earlier comments, if students are pursuing higher degree levels, then they are more likely to find higher paying jobs that will enable them to pay off their loans.

### **Overall Economy**



#### Average Student Loan Default Rates by State, FY 2013 Cohort

#### Source: Department of Education.

To get a picture of how the overall economy affects the rate of student loan defaults, we examined a number of economic metrics for the states<sup>11</sup> in which each school is located. We found two variables in this category to have a statistically significant relationship with default rates: the average annual wages of jobs in the state and the overall unemployment rate in the state.

<sup>&</sup>lt;sup>11</sup> Certainly, some schools and their students are more tightly tied to regions smaller than a state (such as a metropolitan area) while other schools and their students may be tied to a larger area such as several states. The single state of school location was thus selected as a consistent estimate for the "local economy."





Certainly, not all of a school's students will live in the state where they attended school, but since many will, the economic climate of that state will have a bearing on the student's ability to find a secure and well-paying job.



#### FY 2013 Cohort

Student Loan Default Rates: Effect of Average Annual Wages and Unemployment Rate by State



Source: Department of Education, JobsEQ, LAUS, QCEW

Within this category, the higher impact in the model comes from wages. Schools in states with higher average wages tend to have lower default rates. This is not surprising. In states where higher wages are being earned, students will be more likely to earn what they need to pay off their debts. Higher wages are also associated with jobs being in higher demand, meaning greater job security. A graduate in an occupation with greater security will more likely be in a better position to meet loan obligations.

Also, as expected, schools located in states with lower unemployment rates tend to have lower default rates. In the states with higher unemployment rates, it will generally be more difficult for graduates to find work. Graduates will thus be less likely to find and keep jobs in order to earn the income they need to pay off their debt.





# Program and Occupational Characteristics

In addition to examining the effect that the overall economy has on student loan default rates, we wanted to measure the economic effects specific to the programs from which the students graduated. In other words, are student loan defaults related to the type of degree students earn?

If a student graduates with an M.D. degree, for example, a job as a physician or surgeon has significant economic benefits. The demand for individuals with these skills is high, the wages are high, and the unemployment is low. Yet with other degrees, graduates may find the competition to be high relative to the demand, wages may range from moderate to below average, and the unemployment rate may be significant. Any of these negative factors or a combination thereof would put a graduate at a higher risk of defaulting on their student loan.

In our research, we are working with default data for schools rather than for individuals. Therefore, we cannot directly measure the effect of a degree on default rates. Nevertheless, by aggregating awards data and modeling program-to-occupation pathways, we were able to estimate the occupational outputs of individual schools and found statistically significant relationships to default rates. This modeling is used in analyses within JobsEQ<sup>®</sup>. We start with a graduate from a postsecondary program. That program is linked to one or more occupations via a crosswalk that shows the occupations for which a graduate has been trained.<sup>12</sup> The flow of graduates to occupations is then modeled, taking into account the relative state demand for occupations. Characteristics of these occupations (such as wages and unemployment rates) are then aggregated to the school level. Thus, for each school, we can estimate the average wages and unemployment rates of their graduates.

Note an important distinction: we previously discussed wages and unemployment rates in the overall economy and those linkages to default rates. In these next instances, we're looking at wages and unemployment rates again, but this time modeling the specific expected wages and unemployment of the students of individual schools. Here we take into account the wages and unemployment that are resulting from differences related to what a student majored in: medicine, mathematics, business, communications, etc.

<sup>&</sup>lt;sup>12</sup> The crosswalk used is primarily based upon the NCES crosswalk found here:

https://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55, but also incorporates modifications made by Chmura based upon other sources and research.





#### Student Loan Default Rates: Effect of Average Annual Wages and Unemployment Rate by School



#### FY 2013 Cohort

#### Source: Department of Education, JobsEQ, LAUS, QCEW, BLS, NCES

The occupation-adjusted economic metrics are parallel with those of the overall economy. Schools where the expected occupation outcomes result in higher average wages were found to have generally lower default rates. In addition, among schools where the expected occupation outcomes result in lower unemployment rates, the default rates were also found to be generally lower.

The last variable included in the model is a metric created by Chmura and used in JobsEQ:<sup>13</sup> the training concentration. This is a metric for the educational alignment of a region—comparing the overall postsecondary output to the industry demand. For example, if a certain metropolitan area needs a large supply of welders and the regional schools are graduating only bakers, that's a misalignment.

Measuring this alignment isn't easy, and again, a brief methodological description is in order. As above, the first step is to model the flow of graduates into occupations. The next step is to add together the graduates of all the schools in a given area—for this study, we performed this aggregation at the state level. Next, the mix of occupations representing the graduates is compared to regional industry demand (again, at the state level). Finally, the ratio of graduates to demand is benchmarked to the national average. The result is a convenient way to quickly delve into the question: are we over-producing or under-producing certain occupations in our region?<sup>14</sup>

<sup>13</sup> http://www.chmuraecon.com/jobseq

<sup>&</sup>lt;sup>14</sup> To be clear, this metric alone cannot answer that question, but it is very helpful in that analysis. The training concentration metric specifically is comparing to the national output and the national output itself may be too high or too low—answering that is a separate issue.





For example, for every 100 employed nurses in the nation, U.S. postsecondary schools graduate about 12 nurses.<sup>15</sup> If a nursing school is in a state which graduates, say, 30 nurses for every 100 employed, graduates from that school are going to be facing greater competition than average. On the other hand, for a nursing school in a state which graduates only six nurses for every 100 employed, those graduates will likely be facing less competition, giving them a better chance to land a good job and pay off their student loans.

For this analysis, we computed the average training concentration for each school based upon its mix of graduates by occupation. A positive correlation was found between this metric and default rates. In other words, with higher training concentrations—meaning heavier competition—the default rates tended to be higher. In the final model, this metric was only used for public schools, the category where this variable had the strongest effect.

#### Which Occupations Should Students Pursue?

If students incur debt for higher education, the likelihood of being able to repay that debt is a top consideration. According to our results, the combination of high wages and low unemployment rate in the career of choice should be beneficial to being more likely to not defaulting on student loans.

Theoretically, some of the top "low-default occupations" for jobs typically requiring an associate's degree would be dental hygienists and respiratory therapists. For jobs needing a bachelor's degree, some careers with the best combination of high wages and low unemployment rates are aerospace engineers and software developers. For master's degrees, nurse practitioners and physician assistants are career choices where we would expect to see particularly low default rates.

The combination of low unemployment and high wages can also be found within industries. The professional and technical services industry, for example, provides higher-than-average wages with lower-than-average unemployment as does the hospital industry. Regardless, the key is the individual occupation. High-wage and low-unemployment careers can be found even in industries without those characteristics overall.

It is also possible that stackable credentials, such as providing the student with certificates of completion as they reach specific milestones, could improve employment possibilities, job security, and wages. For occupations where employment upon graduation is high, alternative or stackable credentials may have little added impact. However, in degree areas where employment potential is less, then alternative or stackable credentials may have more impact.

<sup>&</sup>lt;sup>15</sup> That is to say, the schools graduate a certain number of students in nursing-related programs and the modeling estimates a certain percentage of those will enter into the nursing profession.





# Conclusion and Key Takeaways

The purpose of this paper was to provide awareness and insights towards reducing the risk of college students defaulting on their loans. The influencing factors cover a wide range, from characteristics of the student body, to the economic climate in which a school is located, to the fields of study of the graduates.

- **Graduation Rate**. The single most important variable in the model in determining the default rate for a school is its graduation rate. As the graduation rate increases, the default rate decreases. Students who do not leave school with a credential of some kind are more likely to need additional resources to avoid going into default. Institutions, rather than ignore noncompleters, should explore other options to help students complete their credential or earn an alternative credential enroute to the degree. Providing noncompleters with more flexible options to complete a credential could also boost graduation rates.
- **Grants and Loans**. The percentage of students receiving Pell grants is consistent with higher default rates, whereas the percentage of students receiving loans is consistent with lower default rates. Like students who fail to graduate, those students who have student loans in addition to a Pell Grant are likely candidates for additional attention.
- **Degree Level**. Schools whose highest level of education offered is a two-year degree have the highest default rates. Additionally, schools with a higher percentage of students in graduate school have lower default rates. These correlations imply students with lower attainment levels can be specifically more at risk of default. Again, credentials en route to a two-year degree or more flexible ways of learning could improve employment or job security opportunities.
- State Economy. The overall economy of the state where the school is located has a significant effect on the default rates of its students. Schools in states with a higher average annual wage tend to have lower default rates, and schools in states with a higher unemployment rate tend to have higher default rates. Certainly, these factors are difficult or impossible to control directly, but aiding students with the education-to-career transition may provide benefits against defaults. With many industries and occupations changing as a result of new technologies, greater partnerships between higher education and business and industry could improve the relevancy of the educational credential and employability.
- **Program Offerings**. Finally, the particular assortment of programs offered by a school is extremely important in determining whether its students are likely to default. Schools offering programs associated with high-paying and heavily employed occupations tend to have lower default rates. Additionally, the greater the harmony between the degrees offered by a school relative to other schools in the area and regional job demand, the lower the default rates are likely to be. It is thus beneficial for both schools and students to be attuned to the local economy and the likely career paths following graduation. The greater the alignment between schools and the preferred job market, the better off their students will be.





It can be argued that educational credentialing, and more specifically the four-year degree, was designed for an economy that evolved from manufacturing into the service sector and not necessarily a more global, technology-driven economy where learning has a shorter shelf-life. In addition, the characteristics of a Millennial or Generation Z workforce may merit educational rewards and credentials that are more modularized. It is likely that future generations may seek other educational options should higher education not align itself more closely with employers to increase the likelihood of employment. Will alternative credentials, stackable certificates, online learning, and more integration of real-world experiences play a greater role in the future?

Generation Z and Millennials perceive the cost of college as high and the possibility of employment not fully guaranteed.<sup>16</sup> As a result, higher education could be at risk of lower enrollments in the future as potential students seek alternatives to a degree. These generations are also less welcoming of loans in general and are more resourceful at finding alternatives, thus the evolution of the sharing and gig economies.

# Final Methodology Notes

In examining factors influencing whether a student is likely to default, we focused on the primary factors in addition to those factors that can be influenced or ameliorated by the institution. This study was not meant to be exhaustive—other factors, not mentioned here, may influence default rates as well. Moreover, in the research process, some other influencing factors indeed were found, yet when all the factors were combined into one model, some factors were eliminated as they did not contribute to the overall model in a statistically significant manner. Additionally, this analysis is based exclusively on the default rates from the FY 2013 cohort; it is very possible that the determinants of defaulting will fluctuate over time.

<sup>&</sup>lt;sup>16</sup> http://genforwardsurvey.com/assets/uploads/2017/09/GenForward-Education-Report\_Final.pdf