Analysis of Student Loan Applications and Economic Indicators

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1 Introduction

This project sought to investigate the potential link between economic indicators (e.g., treasury bills and home sales) and the number of Free Application for Federal Student Aid (FAFSA) requests made to the federal government. The housing data contained the quarterly number of new home sales from 2007 to 2012 [3]. The data on treasury bills contained daily bill rates for 4, 13, and 26 week bank discount rates with 1,500 rows [7]. The FAFSA data contained 147,585 rows with columns of school, school type, state, year, quarter, and number of applicants [1]. We aggregated the available data into fiscal quarters and analyzed data from 2007 to 2012. The overall picture was fairly straightforward; economic indicators showed a consistent downward trend in the U.S. economy consistent with the popular view of this time period (Figure 1). Similarly expected, FAFSA applications follow a consistent increasing trend during this same time period (Figure 2). Our analysis then turned to look further into the FASFA applications themselves and the institutions that were responsible for generating them.

For our analysis we used MySQL to do our initial aggregation before importing the data into Spotfire. In many cases it was very easy to import data into Spotfire because it automatically handles the parsing actions; however, we did encounter problems with large data sets and had to experiment with exporting our data into many formats before getting one that worked correctly. We then explored the standard features: line charts, bar charts, scatter plots, and other visualization options. Most of these features were fairly straightforward, however it was difficult to work with the map chart feature because it took a bit more configuration than other features had. The map chart tutorials seemed incomplete, though we eventually succeeded in getting map charts to work for our analysis. Ultimately,
Figure 1: The economic indicators of average 26 week bill rates and new home sales shown over time.

Spotfire is a very interesting application that offers a rich set of features that would be well worth exploring further in the future.

2 Headsline

2.1 Do proprietary schools take advantage of student loans?

Proprietary schools are for-profit educational institutions (i.e. businesses) whose goal is to make money through education. At first glance, the FAFSA application data suggests that at least some of these institutions are abusing the system by submitting an extremely high number of student loan applications. Figure 3 is a scatterplot that indicates the number of student loan applications by school. It also discriminates the school type by color. In this figure, one can see that the top 5 schools with the highest number of student loan applications are proprietary. These schools, ranked in order, are the University of Phoenix, ITT Technical Institute, Kaplan University, Devry University, and Ashford University. Other institutions near the top include Pennsylvania State University and Ivy Tech Community College of Indiana.
Figure 2: These graphs compare how new home sales and student loan applications changed as the country fell into a recession.

Analysis of the data reveals who the powerhouse educational institutions are. When inspected individually, one discovers that these institutions have many campuses or offer online classes. This allows them to crank through hundreds of thousands of students every year. For instance, Pennsylvania State University has 24 campuses and an online world campus that catered to 96,562 students in 2012 [8]. Another example is the University of Phoenix, which has 112 locations and online courses as well [5]. As a for-profit institution, it teaches 300,800 students while making over $800 million in revenue [4]. Since the attendance at these powerhouse institutions is so high, the large quantity of student loan applications might be justified. On the other hand, one should wonder whether the students are receiving a suitable education in exchange for their loan money. Public institutions typically have a good reputation and most students can probably find jobs after graduation. This is not the case for proprietary schools though. Many for-profit schools, including the University of Phoenix, have been identified as red flag schools, which means their loan default rate is higher than their graduation rate [6]. To address this problem, the Higher Learning Commission should consider immediately revoking the accreditation of red flag, proprietary schools. In addition, the Congressional Subcommittee on Higher Education and Workforce Training should investigate imposing stricter restrictions on eligibility requirements for proprietary
Figure 3: The total number of student loan applications from 2007 to 2012 for each school. The color indicates the type of school.

2.2 Student loan applications from public schools rise during economic downturns.

As seen in Figure 2, the economy sunk into a recession while FAFSA applications rose from 2007 to 2012. The heatmap in Figure 4 indicates how the relative number of loan applications for each type of educational institution has changed over this same time period. Relative loan applications in private and proprietary schools both declined slightly, however public school submissions are quickly increasing. We can see this trend in more detail from the trellis view in Figure 5. The number of loan applications rose for all school types, but the best fit slope for public schools is at least a factor of four greater than the other categories.

This data suggests two possibilities. One is that there is an increased demand for public school education. This may be due to the fact that public education is more affordable, while also providing a great education. Another possibility is that students attending public institutions are in greater need of help during recessions. In either case, it is clear that public schools should receive a priority for stimulus spending during recessions. This government
Figure 4: A heatmap indicating the relative number of loan applications for each type of school over time. Red means a high number of applications while blue shows a low number of submissions.

Funding could be used to subsidize tuition costs or fund larger enrollment classes. The Congressional Subcommittee on Higher Education and Workforce Training should consider legislation to financially support public schools during economic downfalls.

2.3 Types of educational institutions draw boundaries across the United States.

We began asking questions about where these applications come from. Specifically, could these applications tell us anything about how academic institutions are structured across the country? Figure 6 shows FAFSA applications based on state. Formative work indicated that the largest application generating states were New York, Florida, Texas, and California. We broke the applications for these states down into academic institution types; their compositions all seemed unique and similar to their immediate neighboring states. We then broke down the information for all continental states to see three main regions defined by similar proportions of college types generating FAFSA applications. The north east is predominantly defined by FAFSA applications for private institutions. The west coast seems to
Figure 5: A trellised view displaying the number of loan applications by school type over time. The best fit lines show that public schools grew at a much greater rate. The labels ‘b’ show the slopes of the best fit lines.

have more applications coming from public schools. The midwest and south have more applications from proprietary schools. This visualization indicates what types of opportunities people are taking advantage of in the recent economic crisis based potentially on geographic factors. This could also indicate what our future workforce will look like if we could drill down into demographic information surrounding these applicants based on the type of school they are enrolled in. The Congressional Subcommittee on Higher Education and Workforce Training should regulate the awards given based on the state and type of college applying to help provide equal opportunities for students across the country.

3 Conclusion

This analysis studied data on FAFSA applications and economic indicators. We discovered the number of student loan applications rose during recessions. This lead us to uncover intriguing headlines about the data which lead to actionable suggestions for policy makers. To reiterate, certain proprietary schools might be taking advantage of students and their loans, so officials should investigate these schools accreditation and ability to receive loan
money. Demand and need at public schools rise dramatically during recessions, so the education subcommittee should focus on allocating stimulus money for these schools. The types of schools vary by region, so local economies should be considered when appropriating money.

We did encounter a few limitations in our analysis. The major limitation was the government shutdown, which drastically limited access to data sources. Initially, we had planned to include statistics on unemployment rates, alcohol tax revenue, student loans awarded, and school enrollment data, however the websites hosting this data were shut down. Luckily, we managed to retrieve some data using the Wayback Machine, which archived certain government websites [2]. Our analysis also used fiscal year to look at financial data, and thus we had to convert the FASFA quarters to fiscal quarters based on when they were processed. It may be that this method of aggregation influenced our results, but this determination is left for future work.

References


