Tuition Equity: A Study of the Impact of Upper/Lower Division Tuition Rates

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Abstract

There has been significant study associated with the equity of access to college and the college admissions process, but there has been far less study in the area of tuition and fees. There are numerous financial aid options in the form of grants and special programs for those with a need, but what if the tuition structure itself is working counter to the intent of internal and external financial aid packages?

While it has become common for universities to employ a tuition structure that charges different tuition rates based on major of study, it is also common among some regions in the US for universities to charge a different tuition rate based on whether a student is in the upper division or the lower division of their undergraduate study. Most schools employing this tuition structure consider a student to be in the lower division if they have 59 or fewer semester credits (120 semester credits being the requirement for a standard bachelor's degree), but there are a variety of different tuition structures and schemes to employ it.

This paper investigates whether this tuition structure adversely affects different groups of students. Students who change their majors and/or transfer in credits that do not satisfy graduation requirement tend to have unused or wasted credits when they graduate. Since the number of credits charged at the lower-division rate is capped at 59 or lower, all unused credits result in charges at the higher upper-division rate. Student data from Grand Valley State University was examined to compare the distribution of credits earned by graduation for different groups of students who graduated with a degree. Comparisons are presented based on Pell Grant eligibility, gender, race, and transfer status. These comparisons focus on the credits earned by the time of graduation. These comparisons are then used to show if there was a significant difference in the amount of tuition charged to the compared groups. This analysis is performed on data for students in all majors and then engineering students exclusively. The results for engineering students are compared with the results of all majors.

Introduction

There has been significant study associated with the equity of access to college and the college admissions process [1] [2] [3]. There are also advocates who are drawing attention to the fact that seemingly neutral policies such as requiring remedial courses and limited credit transfers from associate degree programs can have unintended consequences and contribute to structural racism in higher education [4]. However, there has been less study of policies regarding tuition and fees outside of financial aid and assistance. The work recently done in [5], explores how tuition and fee systems in different countries support or inhibit participation of low-income students. While there are numerous financial aid options in the form of grants and special programs for marginalized communities, this paper seeks to address the question of if the tuition structure itself is working counter to the intent of internal and external financial aid packages.

While it has become common for universities to employ a tuition structure that charges different tuition rates based on major, it is also common in Michigan for universities to charge a different tuition rate based on whether a student is in the upper division or the lower division of their

undergraduate study. Most schools employing this tuition structure consider a student to be in the lower division if they have 59 or fewer semester credits (120 semester credits being the requirement for a standard bachelor's degree), but there are variations in tuition structures and schemes to employ it [6].

This upper-/lower-division tuition structure is very common among public universities in the state of Michigan. Table 1 summarizes the differences in their credit hour tuition rate for the 2021-2022 academic year [6]. Both Lake Superior State University and Saginaw Valley State University do not participate in this tuition structure, but all other public universities in Michigan do to differing degrees. The average differential between lower-division and upper-division rates is $53.46 per credit hour, with Michigan Tech, University of Michigan, and Wayne State University being the top three with differences of $214, $87, and $81 respectively.

Table 1: Lower-Division and Upper-Division Tuition (per Credit Hour) for Public Michigan Universities [6]

	Lower-Division	*Upper-Division*	*Difference*
Michigan Technological University	$ 653.00	$ 867.00	$ 214.00
University of Michigan	$ 651.00	$ 738.00	$ 87.00
Wayne State University	$ 431.09	$ 511.60	$ 80.51
Oakland University	$ 485.75	$ 562.50	$ 76.75
Michigan State University	$ 512.63	$ 583.00	$ 70.37
Eastern Michigan University	$ 608.00	$ 668.00	$ 60.00
Western Michigan University	$ 577.08	$ 633.17	$ 56.09
Ferris State University	$ 467.00	$ 505.00	$ 38.00
Central Michigan University	$ 440.00	$ 474.00	$ 34.00
Grand Valley State University	$ 586.00	$ 615.00	$ 29.00
Northern Michigan University	$ 491.50	$ 516.50	$ 25.00
University of Michigan-Dearborn	$ 580.00	$ 605.00	$ 25.00
University of Michigan-Flint	$ 509.75	$ 516.00	$ 6.25
Lake Superior State University	$ 560.00	$ 560.00	$ -
Saginaw Valley State University	$ 385.50	$ 385.50	$ -

This paper asks the question: *Does the upper-/lower-division tuition structure have a disparate impact on enrolled students of marginalized identities?* We are motivated by the United Nations Sustainable Development Goals (SDG-4) for equity in education and chose to adopt the conceptual framework for equity described in *Handbook on Measuring Equity in Education* (UNESCO 2018) [7].

The economic and personal impacts of student debt is a growing problem [8] that has a disproportionate negative effect on marginalized groups [9]. For instance, federal Pell Grants are

awarded solely based on financial need and can typically be used to pay only a fraction of total tuition (maximum federal Pell Grant for 2023-24 academic year is $7,395) [10]. Because tuition is typically larger than the level of support, changes in fees or tuition structure will affect Pell Grant recipients on a marginal dollar-for-dollar basis often leaving them with more debt than their peers [11]. Pell Grant recipients strongly correlate to marginalized identities and have been consistently found to have the highest default rates on student loans [12].

There are additional legal concerns regarding disparate impact in education. The U.S. Supreme Court ruling in *Grigg v. Duke Power Company* [13] (as modified by [14]) essentially made tests, examinations, fees, or other impediments to hiring, promotion, or advancement illegal for most private companies if those impediments have a disparate impact upon all Title VII protected classes (race, color, sex, and national origin) [15]. A similar regime applies to all organizations which receive federal funds under Title VI of the 1964 Civil Rights Act [16]. The U.S. Department of Justice uses the following three-part test to determine if an organization receiving federal funds has violated Title VI [17]:

1. **Disparate impact:** Does the adverse effect of the policy or practice fall disproportionately on a race, color, or national origin group? …
2. **Justification:** If so, does the record establish a substantial legitimate justification for the policy or practice? …
3. **Less discriminatory alternative:** Is there an alternative that would achieve the same legitimate objective but with less of a discriminatory effect? …

In this paper, we examine Pell Grant eligible students along with other demographic data to detect if the upper-/lower-division tuition scheme contributes to inequitable outcomes and whether there could be less discriminatory alternatives. Students who change their majors and/or transfer credits that do not satisfy any graduation requirement tend to have unused or wasted credits when they graduate. Since the number of credits charged at the lower-division rate is capped at 59 or lower, all unused credits result in additional charges at the higher upper-division rate. Student data from Grand Valley State University was examined to compare the distribution of credits earned by graduation for different groups of students who received a bachelor's degree. Comparisons are presented based on Pell Grant eligibility, self-reported gender, race, and transfer status. These comparisons focus on the attempted credits at the time of graduation. The attempted credit data is used to calculate the amount of extra upper-division tuition charged to the groups for comparison.

Further, we are interested in the effects of this tuition scheme on students majoring in engineering; therefore, we performed the analysis twice: first with all students and then with engineering students exclusively.

Methods

This paper investigates whether this tuition structure adversely affects students from marginalized communities. This was done by taking student data from Grand Valley State University which included the following information for each student:

- If student identifies as a student of color
- The self-reported gender

- Pell Grant eligibility
- Number of transfer credits
- Number of AP/CBE Credits
- Number of changes to degree program at GVSU
- Number of credits attempted at GVSU
    - Separated by level (000, 100, 200, 300, & 400 level)
- Number of credits earned at GVSU
    - Separated by level (000, 100, 200, 300, & 400 level)
- Total credits at graduation
    - Separated by level (000, 100, 200, 300, & 400 level)
- Number of credits attempted at GVSU by semester
    - Credit hours separated by semester

The dataset available includes data on 32,454 students who graduated with a bachelor's degree requiring a minimum of 120 semester credits. We first explored comparing the tuition paid by students but chose not to use this data because of changing tuition rates over time affecting the results. To avoid this, this analysis utilized the attempted hours by semester and employed the tuition structure of the current year. This eliminates the need to correct for inflation, time-value of money, and changing tuition rates, which impact students differently depending on their rate of academic progress. Additionally, the tuition charged to students in this dataset is also affected by the chosen major, which adds additional charges for certain majors. Our analysis omitted this consideration.

The goal of this analysis was to explore the amount of additional tuition charged to students who are in the upper division, which affects the baseline tuition for everyone in that group. For students at GVSU, the upper-division charge is triggered by having more than 54 earned credits (lower than the more typical 59 credit threshold), which includes transfer, AP (Advanced Placement), and CBE (Credit by Examination) credits.

To start, all transfer, AP, and CBE credits were assumed to be in the students record at the start of the first semester. Then, the history of attempted credits per semester was used to calculate the total of upper-division charges for each student in the dataset using the current tuition structure at GVSU. For comparison purposes, we propose an alternative upper-division tuition scheme, which was also calculated. This alternative scheme only adds the upper-division charge for credits attempted in 300- and 400-level courses. This alternative scheme is not currently used by any Michigan public university.

The average of extra upper-division tuition fees with the current and alternate scheme was calculated for different groups for comparison, which include:

- Students of color vs. non-students of color
- Male vs. female
- Pell eligible vs. non-Pell eligible
- Transfer vs. non-transfer

These comparisons were then used to find if there was a significant difference in the amount of tuition charged with the current and alternate scheme to the compared groups.

Results

All Majors

We started our analysis by looking at the effects of the tuition charge for students from all majors. Table 2 shows the average additional upper-division charge for the compared groups based on the current tuition structure and alternate scheme. The results have been color-coded with red being the highest totals and green being the lowest. In the four different group comparisons, Pell-eligible students, students of color, and transfer students were charged the most under the current tuition structure. In contrast, students who were not Pell-eligible, did not identify as a student of color, or did not transfer were charged the least. The comparison between students based on gender was found to be less significant.

Table 2: Average upper-division charge total for current tuition structure and alternate scheme for all majors.

Extra Upper-Division Tuition	Male	Female	Pell Eligible	Not Pell Eligible	Student of Color	NOT Student of Color	Transfer	non-Transfer
Current Structure	$2,494	$2,448	$2,570	$2,394	$2,538	$2,453	$2,504	$2,441
Alternative Structure	$1,667	$1,735	$1,713	$1,705	$1,664	$1,717	$1,597	$1,781

The alternative scheme would only charge the extra tuition for attempted hours in courses in 300- and 400-level courses. In theory, this scheme would better match tuition to the cost to deliver the course by the institution. Interestingly, we find that the averages shift with non-transfer students paying more than transfer students, Pell-eligible and non-Pell-eligible students paying nearly the same, and students of color paying less than students who do not identify as a student of color. This shows that the current upper-division charge is landing heaviest on those who are taking the fewest upper-division courses and are effectively being transferred to students taking courses at the lower division. This is primarily due to transfer credit that does not satisfy degree requirements and repeated coursework.

Figure 1 provides a scaled pair of histograms comparing the extra upper-division fees paid by Pell-eligible students compared to those who were not eligible. Figure 2 presents the same information side-by-side for the two populations as approximated probability density functions. It is clear from these two figures that the distributions differ and that Pell-eligible students tend to be more likely to pay higher amounts.

Figures 3 and 4 show a similar comparison between those who do and do not identify as a student of color. Those who identify as a student of color are more likely to be charged the higher amounts; however, Figure 5 shows that students of color take fewer upper-level courses compared to those who do not identify as a student of color. Figure 5 shows the same trend for Pell-eligible students and transfer students.

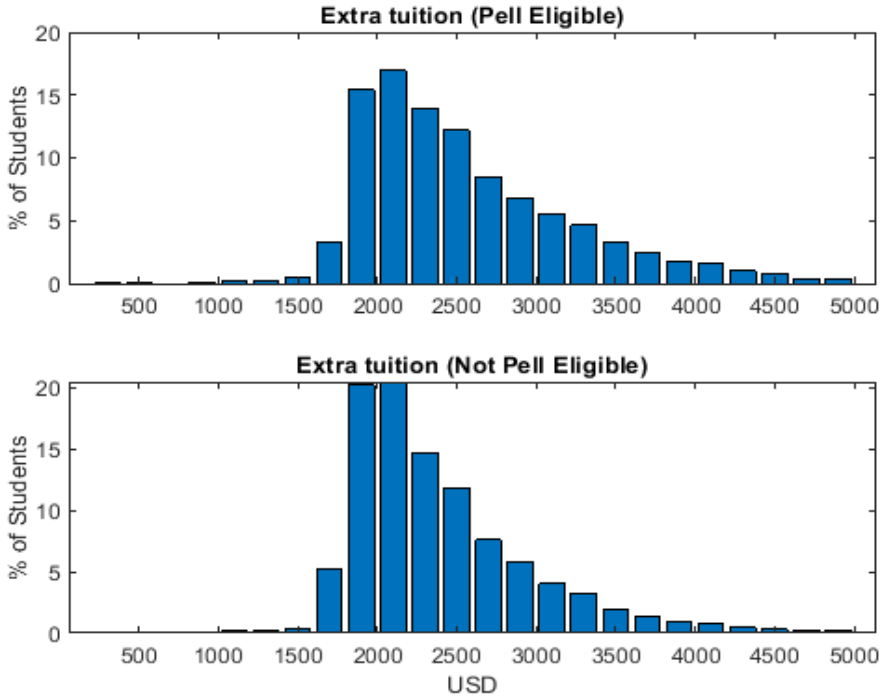

Figure 1: Histogram of Upper-Division Charges based on Current Tuition Scheme (Comparing based on Pell Eligibility)

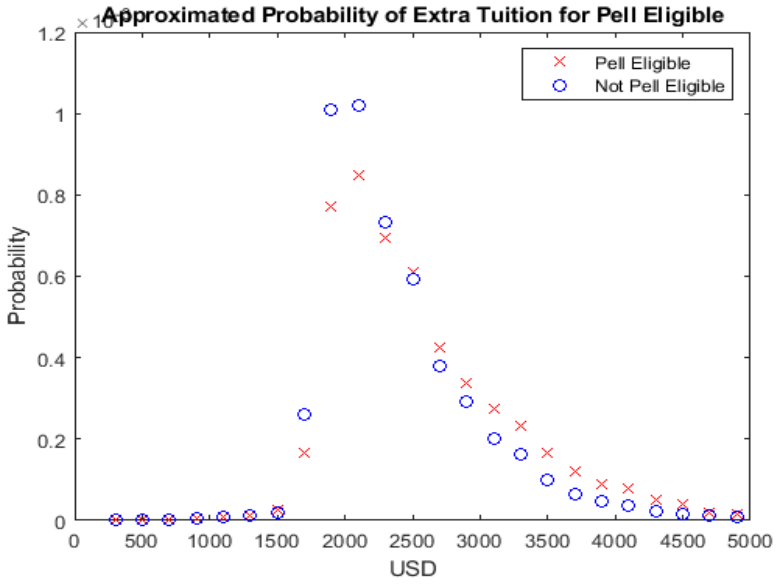

Figure 2: Approximated Probability Distribution for Extra Tuition paid by students with and without Pell Grant eligibility.

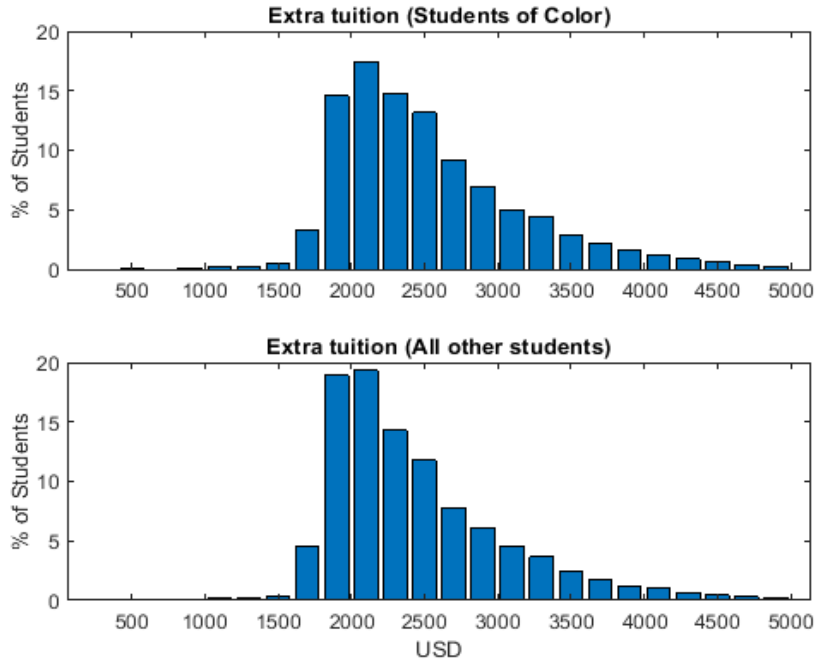

Figure 3: Histogram of Upper-Division Charges based on Current Tuition Scheme (Comparing based on Student of Color)

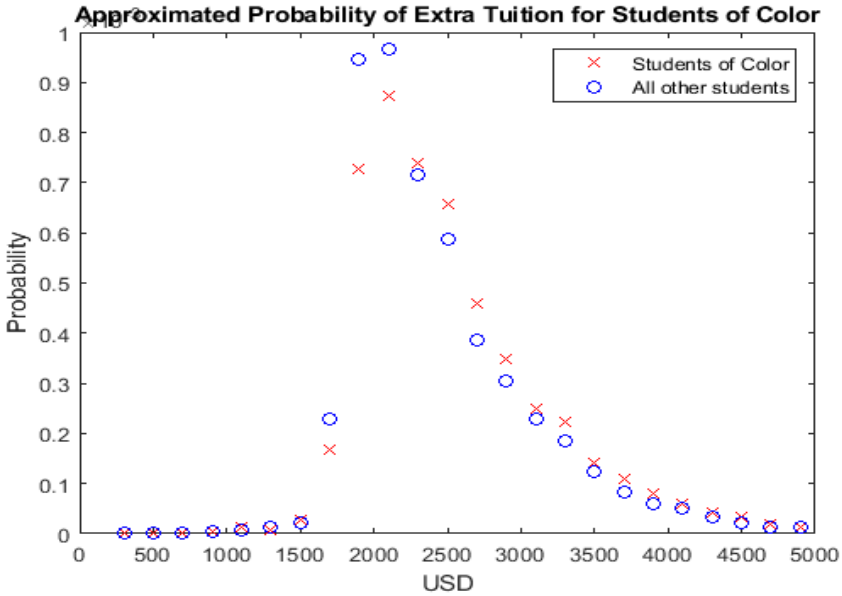

Figure 4: Approximated Probability Distribution for Extra Tuition paid by students who did and did not identify as a Student of Color.

Figure 6 shows the average earned credits by level for the different groups and includes all credit from transfer, AP, and CBE. This shows that earned upper-level credits are very similar among the groups, but there are significant differences in the 100-level. Transfer students have more earned credits, but many of their transfer courses only count toward general credit and do not fulfill degree requirements. There is also a larger number of 100-level credits for students of color and Pell-eligible students as they are more likely to transfer credits or change majors.

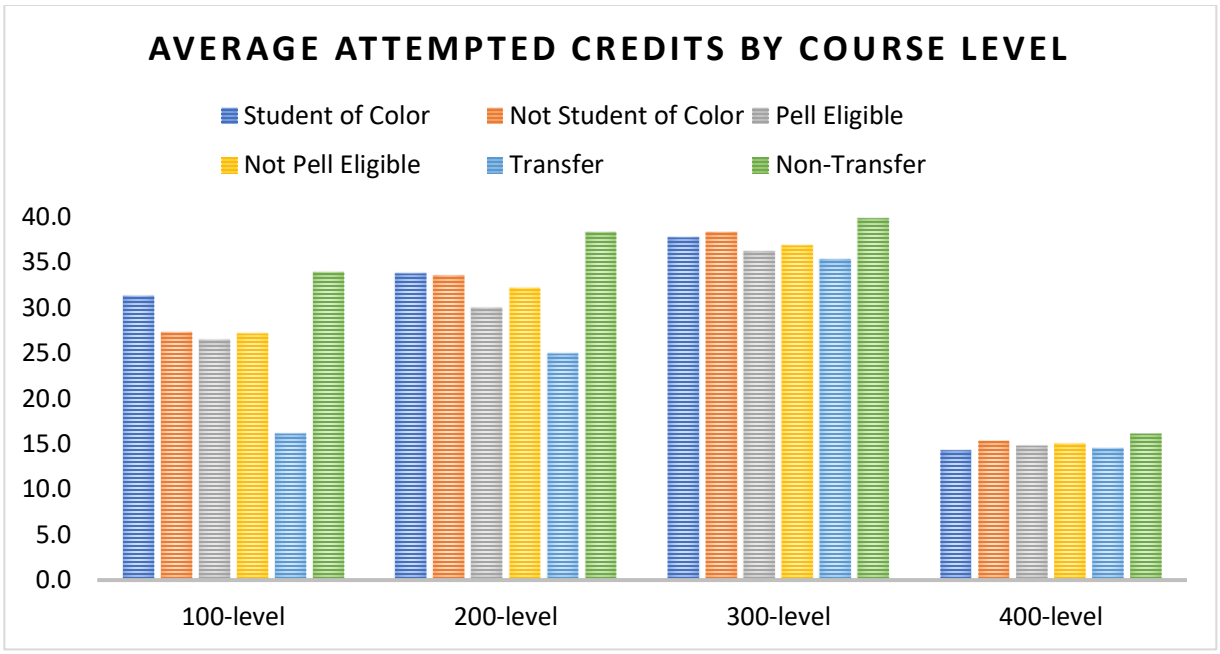

Figure 5: Average attempted credits by course level comparison between groups

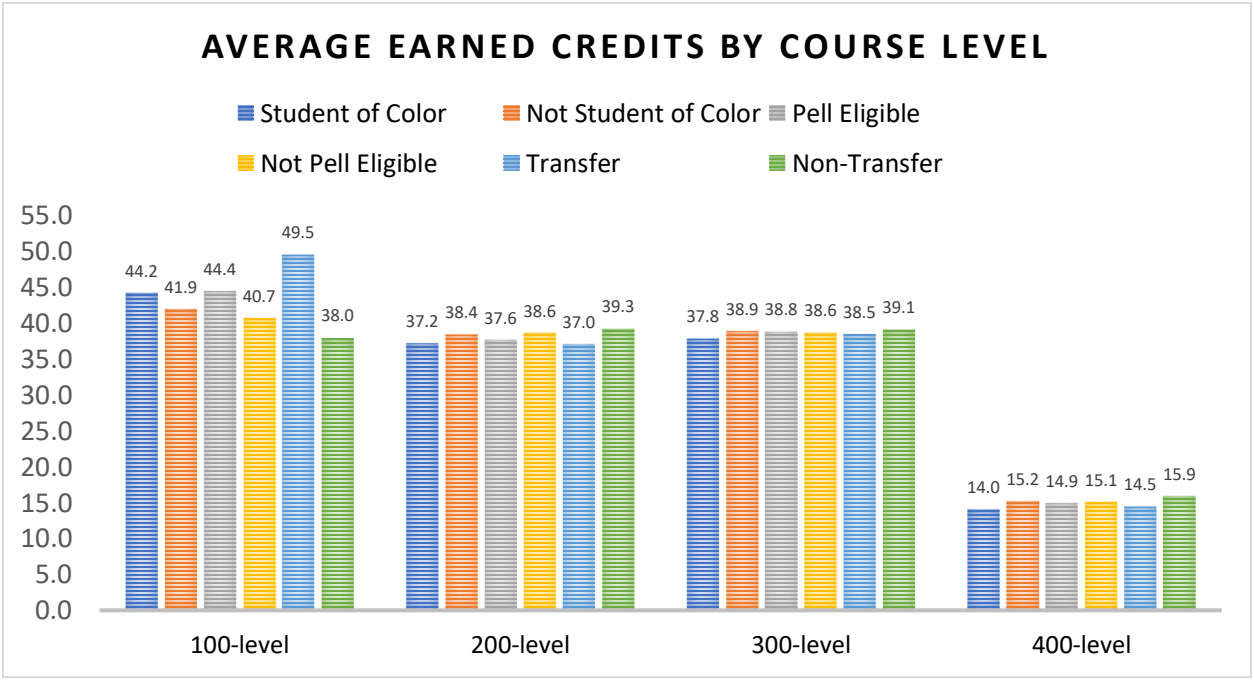

Figure 6: Average earned credits by course level comparison between groups. (Includes all transfer, AP, and CBE credit)

Engineering Majors

We continued our analysis by looking at the effects of the tuition charge for students from only engineering majors. Table 3 shows the average additional upper-division charge for the compared groups based on the current tuition structure and alternate scheme for only engineers. The results have been color-coded with red being the highest totals and green being the lowest. As was seen with the analysis of students from all majors, Pell-eligible students, students of color, and transfer students were charged the most under the current tuition structure. In contrast, students who were not Pell-eligible, did not identify as a student of color, or did not transfer were charged the least. When comparing gender, students who identified as female were charged more compared to students who identified as male. This is the reverse of what was seen with all majors.

Table 3: Average upper-division charge total for current tuition structure and alternate scheme for only engineering majors.

Extra Upper-Division Tuition	Male	Female	Pell Eligible	Not Pell Eligible	Student of Color	NOT Student of Color	Transfer	non-Transfer
Current Structure (EGR Students)	**$3,147**	**$3,351**	**$3,341**	**$3,081**	**$3,332**	**$3,160**	**$3,382**	**$3,079**
Alternative Structure (EGR Students)	**$1,917**	**$1,988**	**$1,944**	**$1,931**	**$1,936**	**$1,936**	**$1,885**	**$1,960**

Overall, the results for engineering majors are consistent with the results for all majors; however, the problem is amplified. If we use the alternate scheme as an accurate measure of how much upper-division coursework a student is enrolled in, then we can calculate the difference between the two schemes. The result of this calculation is shown in Figure 7. These results show that the engineering program amplifies the disparity between the quantity of upper-division coursework being taken and the charges associated with it under the current scheme.

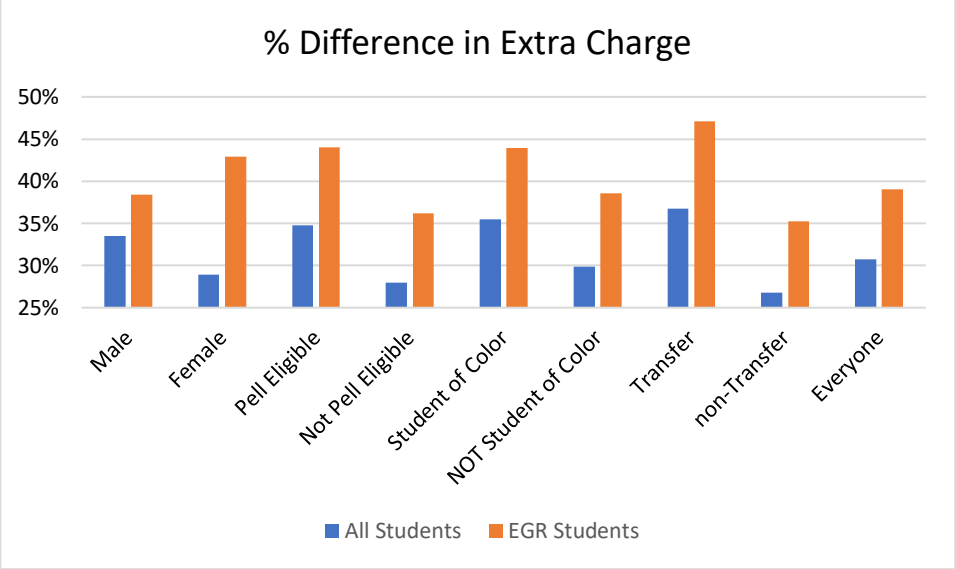

Figure 7: Difference in extra charge between the current and alternate scheme relative to different groups. Results for all majors (blue) and engineering majors (orange) are presented.

If we say that every student should be charged the same additional fee for each credit taken in the upper division, then we can come up with an approximation of how much students are over or under charged under the current scheme. This is done by looking at the difference in variation between the two schemes, yielding an approximation of the average amount students are over or under charged for each group relative to their enrollment in upper-division courses. The results of this calculation are shown in Figure 8. From these results, we can see that a consistent disparate impact exists for transfer students, students of color, and Pell-eligible students. Interestingly, students who identify as female tend to be under charged when analyzing data for all majors but are over charged when only analyzing engineering majors.

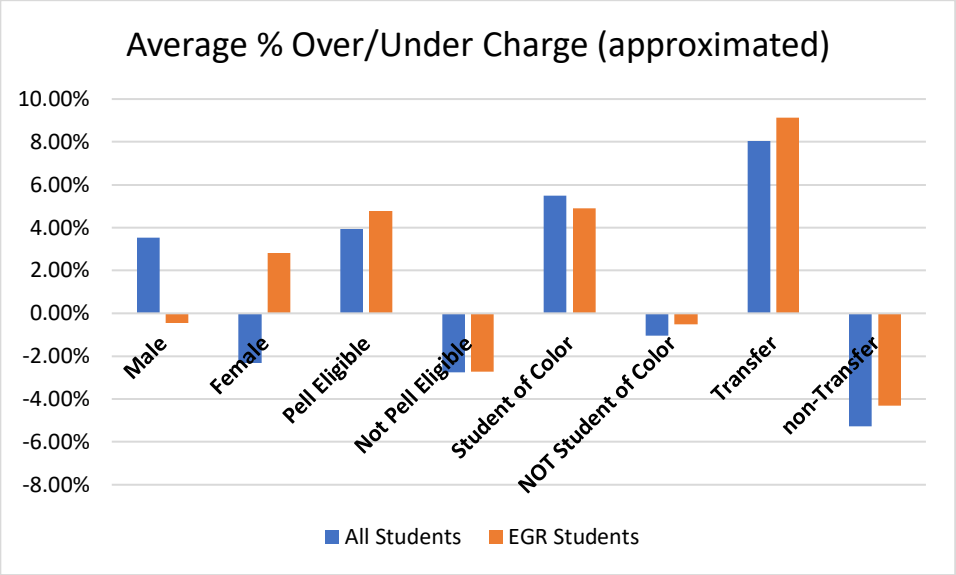

Figure 8: Comparison of the average % student groups are over or under charged. Results for all majors (blue) and engineering majors (orange) are presented.

Discussion and Conclusions

This paper has presented a study of the effect of the upper-/lower-division tuition structure on different groups of students. The analysis of these effects includes dispersion metrics as defined by the framework laid out in [7]. The results show that this structure disproportionately charges more tuition to students of color, Pell-eligible students, and transfer students relative to the amount of 300- and 400-level course work that they attempt. The disparate impact is amplified for students in engineering programs. This disparate impact is mostly due to additional unused credits at the lower 100-level resulting in additional credits being taken after the students are considered to be in the upper division by completing approximately 59 semester credits. Because engineering programs typically have few if any free electives and require more credits than most programs, this issue is worse. This is especially true for students who transfer (typically from a community college) or change majors resulting in credits that are unused to satisfy degree requirements.

The argument for having a higher upper-division tuition rate is that upper-division courses tend to cost more to offer due to smaller class sizes and need more specialized faculty and facilities; however, the current structure simply charges less for the first 59 credits and more for all credits afterward regardless of the level of the course or its cost. This is especially burdensome for students

adding a minor, which would all be charged at the upper-division rate despite being mostly lower-level coursework. As was observed by [5], overcharging groups of students is likely to discourage their participation in education. With the current scheme, pursuit of a minor, double-major, and additional certificates is the most inhibited.

The alternative tuition scheme shown in this paper was based on charging extra only for upper-level (300- and 400-level) courses. When compared to the charges in the current scheme, the groups who would be charged the most are different. The data showed that the non-minority groups tended to take more upper-level courses yet were charged the least upper-division tuition resulting in an undesirable situation where minority groups appear to be subsidizing upper-level coursework of non-minority groups. Clearly, the tuition scheme in which tuition charges are based on course level rather than total hours earned would be more equitable.

Looking at the three-part test laid out by the U.S. Department of Justice for Title VI in [17], this analysis shows that this policy has a measurable *disparate impact* on students of color. The *justification* for this policy is to match revenue to the higher expenses of upper-division courses, but there is a *less discriminatory alternative*. While this paper is not meant to serve as legal advice, the evidence it contains suggests that this long-standing tuition policy looks as bad through a legal lens as it does when analyzed through well-established conceptual frameworks on equity in education and is discouraging participation in degree programs like engineering that amplify the effect.

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