



**To:** Dean Brian Kench

**From:** George Heudorfer &  
A.E. Rodriguez

**RE:** Rankings Project

**Date:** October 28, 2024

Dear Dean Kench:

You asked that we review the College Rankings environment impacting the University, the Pompea College. The objective of this review was to draw an analysis leading to an outline, a roadmap, a strategy, or a set of next steps to take to improve our position in the rankings.

The task is challenging for a number of reasons. First, over the last few years there has been a veritable explosion in the proliferation of organizations publishing rankings. This expansion may be associated with the increased competitive intensity in the higher education market. Second, for their construction, rankings rely on any number of differing and often subjective, *ad-hoc* features. These may include subjectively weighted combinations of seemingly intuitive measures such as the 8-year graduation rate and the average net price paid. And/or they may include some more recently fashionable measures such as social mobility, diversity measures, LGBTQ+ centers.

The variation in the construction across rankings is equally rich as to the conceptualization or focus. For instance, serious, credible organizations publish rankings centered around universities, countries, continents, size, regions, programs, emphasis, public or private, amenities, and focus (e.g. trade schools, HBCU, LGGTQ+). There are presently rankings of colleges and universities, rankings of colleges or administrative units within colleges and universities, rankings of individual programs, all of the above combined across all type of regions both national and supranational, ad nauseum.



Third, and compounding the matter, is the proliferation of (possibly AI generated) puff-pieces-cum-advertising relying on softer, subjective metrics or surveys albeit served-up as rankings.

Fourth, the method in which the purveyors of rankings assemble them varies – and how the sausage is generated remains clouded in secrecy – for many of them. Ranking producers retain close control of their methods and their data. This secrecy is challenging and complicates an essential step of our remit: opening the “black box.” Appendix A to this report contains a hyperlinked list of the most prominent, popular rankings.

To accomplish our task, we opted for an analytical method that produces actionable results. We focused on the rankings published by the Washington Monthly. More specifically: the Washington Monthly College Guide: *2024 Best Bang for the Buck Rankings: Northeast*. We chose this particular one for several reasons. First, the organization makes its data available – allowing for a close examination of its elements. Importantly, it is the only organization that published its data *and* includes the University of New Haven in the leaderboard. Second, it is contained to the Northeast, the region which encompasses the University of New Haven’s footprint and where both the University of New Haven and the Pompea College strive to make our mark – as stated in our College Strategic Plan. Third, we believe that the elements of this particular rankings are actionable. Put differently, it is built with features which we believe college administrators may adjust.

## Methodology

The methodology we used for our analysis is drawn from the Explainable/Interpretable AI literature; the methodology is discussed in greater detail in the associated paper by Rodriguez, et al. and originally in Wachter, et al (Wachter, Mittelstadt, & Russell, 2018).

At its core – the methodology presumes to address questions that commonly emerge: why is the University of New Haven ranked 352<sup>th</sup>? What would happen if my Number of Pell graduates improve? Would my ranking change if my Net



Price fell? Is the gap between Pell and non-Pell graduates important and by how much? This is known as a counterfactual, model-agnostic, local approach.

We note that the methodology is a general one, applicable to any rankings.

### Data and Data Treatment

The Washington Monthly data titled *2024 Best Bang for the Buck Rankings: Northeast* is available online: [here](#); the methodology used by its authors: [here](#). It contains data for 376 colleges and universities in the Northeast consisting of eight variables or features, rankings for each variable, and the aggregated rank of each institution. Each of the attributes had an associated Rank; we removed the ranks-variables from the data set.

We list the resulting working dataset variables below.

- Rank
- 8-Year Graduation Rate
- Predicted Graduation Rate Based on Percent of Pell Recipients Incoming SAT
- Pell non-Pell Graduation Rate Gap
- Number of Pell Graduates
- Actual vs Predicted Pell Enrollment
- Median Earnings 9-Yrs After Entering College
- Predicted Median Earnings 9-Yrs After Entering College
- Net Price of Attendance for Families with \$75,000 Income

Table 1 displays the top and bottom three institutions in the data and the associated variables. The column names have been shorted.



**Table 1**

2024 Best Bang for the Buck Rankings: Northeast

Inst	Rank	X8 YR Grad Rate	Pred Grad Rate	Pell Grad Gap	Pell Grads	Act Pred Pell Enroll	9-Yr Med Earns	Pred 9-Yr Med Earns	Net Price
MA Institute of Technology (MA)	1	0.96	1	-0.03	186	0.05	118345.5	94780.34	-1896.01
Charter Oak State College (CT)*	2	0.56	0.49	0.21	146.67	0.04	57397.5	44813.59	11147.62
Boricua College (NY)	3	0.79	0.56	0.04	193.33	0.31	31767.5	23842.33	13905.14
	...	...	...	...	...	...	...	...	...
School of Visual Arts (NY)	373	0.74	0.78	-0.09	204.33	-0.07	41384	45497.23	47513.19
Dean College (MA)	374	0.44	0.54	-0.1	38.33	-0.08	32979.5	42667.33	29481.63
New England College (NH)	375	0.28	0.52	-0.11	111.67	0.03	34572.5	41312.36	27980.45
Berklee College of Music (MA)	376	0.64	0.62	-0.14	140.33	-0.06	29232.5	49102.47	43077.39

*Note.* Washington Monthly College Guide.

There were two NA instances in the data set; Sterling University and the University of Maine-Machias reported NAs for the *Media Earnings 9 Yrs After Entering College* attribute. We replaced the Nas with the attribute median.

### Rankings Reconstituted

We reconstituted the original rankings. That is to say, we re-ranked the institutions with a ranking of our own creation. We created the reconstituted rankings using unsupervised cluster analysis; specifically, the Local Outlier Factor. The Local Outlier Factor (LOF) algorithm is an unsupervised detection approach to identifying outliers in a dataset (Breunig, Kriegel, Ng, & Sander, 2000). In turn, the local outlier probability (LoOP), is a normalized version of the LOF. LoOP ranges from 0 to 1, and constitutes a direct measure of the likelihood of the particular point being dissimilar from each other. The algorithm is ideal for identifying similarities among institutions and ranking them accordingly. The measure of LoOP is multiplied by 100; it is then used to create a



ranking variable. Table 2 contains the data set displaying the first and last three institutions of the dataset listed according to the reconstituted rankings, labelled LoOP Ranks.

**Table 2: Reconstituted Rankings**

*2024 Best Bang for the Buck Rankings: Northeast*

Inst	8YR Grad Rate	Pred Grad Rate	Pell Grad Gap	Pell Grads	Act Pred Pell Enroll	9Yr Med Earns	Pred 9Yr Med Earns	Net Price	LoOP Rank
MA Institute of Technology (MA)	0.96	1	-0.03	186	0.05	118345.5	94780.34	-1896.01	1
Montserrat College of Art (MA)	0.58	0.67	-0.13	27.67	0.02	29364	34919.72	29733.97	2
Berklee College of Music (MA)	0.64	0.62	-0.14	140.33	-0.06	29232.5	49102.47	43077.39	3
	...	...	...	...	...	...	...	...	...
Curry College (MA)	0.59	0.62	-0.14	176.67	-0.13	47129	52150.6	25146.17	373
DeSales University (PA)	0.6	0.65	-0.16	123.33	-0.07	53474	54653.43	23438.66	374
Alvernia University (PA)	0.61	0.59	-0.15	114.67	-0.09	47218	50684.88	25637.85	375
Long Island University (NY)	0.52	0.59	-0.13	698.33	-0.08	51724.5	54305.35	24320.18	376

*Note.* Wahington Monthly College Guide.

## Results

### Break Down Plots for the University of New Haven

Break Down plots offer a summary of the effects of explanatory variables on a model's predictions. BD display graphically which variables contribute the most to the observed results. The plots present "attribute contributions;" put differently, they decompose the model's prediction into contributions that can be attributed to different explanatory variables. Note that BD plots rely on a *ceteris paribus* assumption. In other words, breakdown plots capture the contribution of



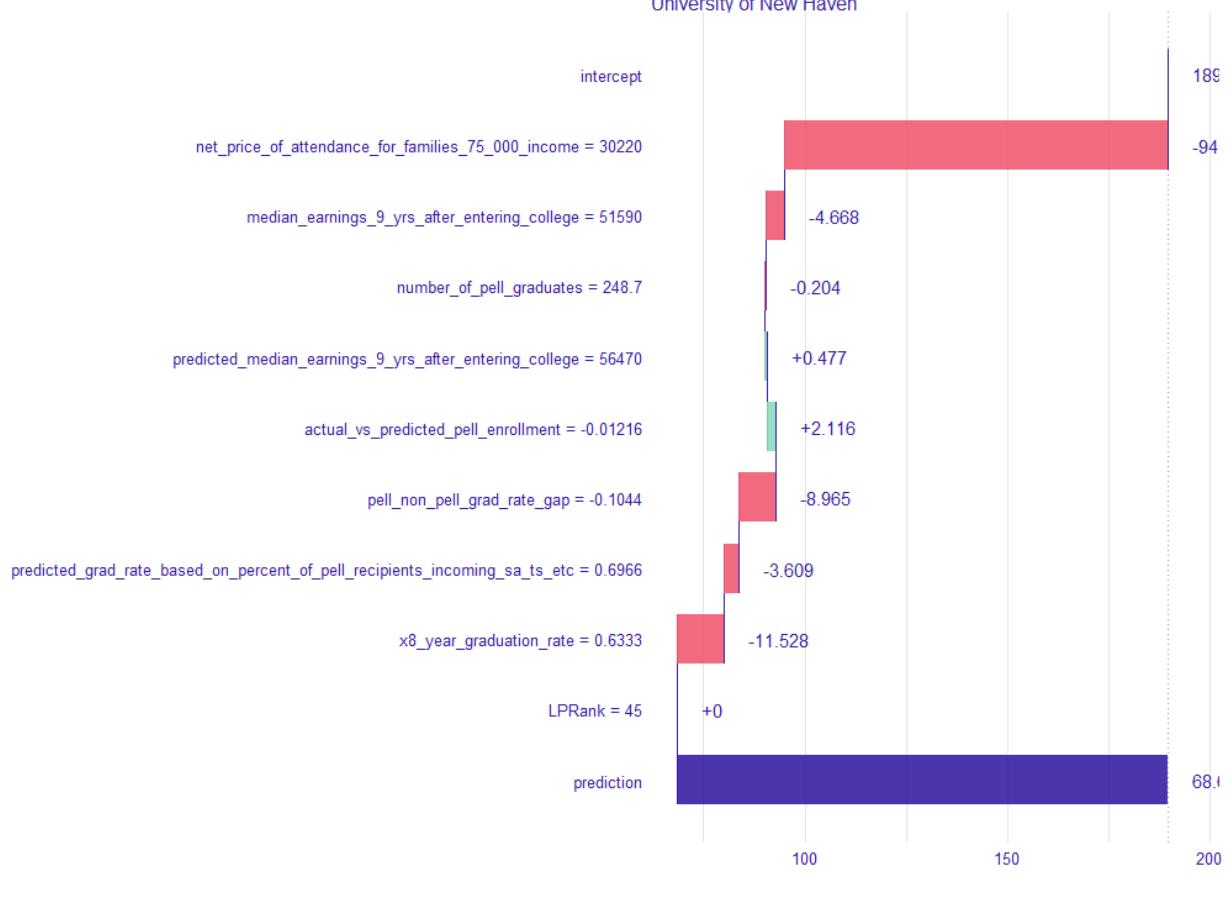
an explanatory variable to the model's prediction by computing the shift in the expected value of Rank, while fixing the values of other variables.

In Figure 1, the row marked "intercept" presents the overall mean value (184) of predictions for the entire reconstituted rankings dataset. Consecutive rows present changes in the mean prediction induced by fixing the value of a particular attribute. Positive changes are indicated with green bars; negative differences are indicated with red bars.

The feature that influences the University of New Haven's predicted rank the most is Net Price (with the value "\$30,220"). Median earnings – set at \$56,470 - accounts for another negative. All other features have smaller effects, with a few actually contributing positively.



Break Down Plot  
Feature Attributions  
University of New Haven





## Counterfactual

The analysis of counterfactuals returns the most similar observations to the University of New Haven from all the institutions in the data set whose prediction is in the desired outcome interval. The predicted rank of the University of New Haven is 143<sup>rd</sup>. Accordingly, we examined outcomes in the 135-140 positions. Only observations whose features values lie between the corresponding values in lower and upper are considered counterfactual candidates.

Table 3 shows the feature values of the counterfactual institutions as the difference to the University of New Haven. Positive values indicate an increase compared to the counterfactual. Negative values indicate a decrease.

**Table 3**

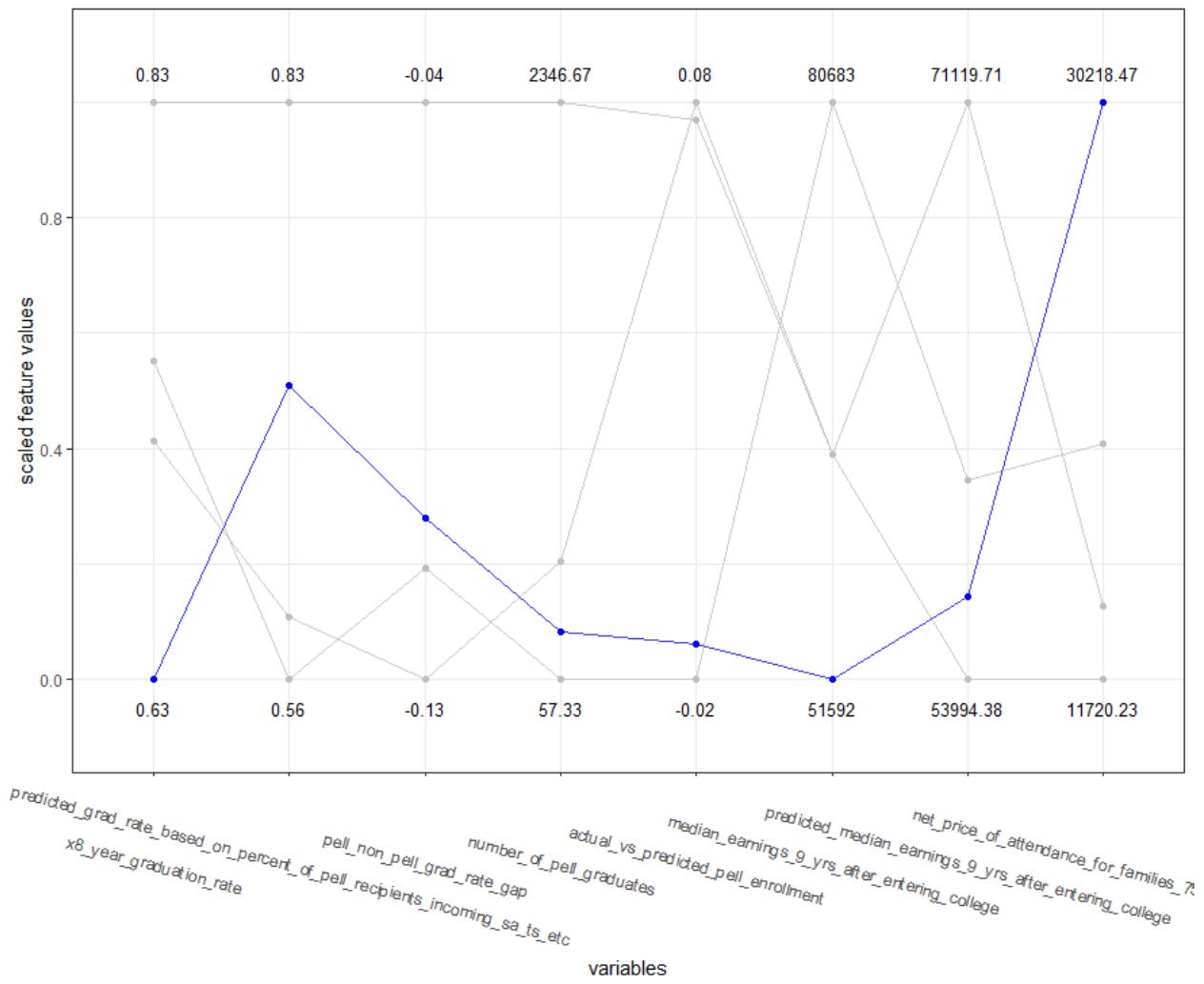
Pred Grad Rate Pell Recipients	Pell non-Pell Grad Rate Gap	Net Price
-0.134	-0.00785	-10956
-0.106	-0.02525	-18498
0.129	0.06526	-16152

The parallel plot in Figure 2 connects the (scaled) feature values of each counterfactual and the University of New Haven in blue.



## University of New Haven

Feature Differences to Two Most Similar Institutions





## Next Steps

The feature analysis set forth above in Figure 1 indicated that the most important attributes responsible for our position on the rankings are *Net Price* and the *Predicted Graduation Rate Based on Percent of Pell Recipients Incoming SAT*. Importantly, the graph reveals the difference between the University of New Haven and the three counterfactuals.

The gap analysis that emerges from the counterfactual exercise and visible above in Figure 2 indicates the differential that needs to be closed.

Any strategic plan aimed at improving the institution's position in the rankings should turn on addressing this issue.



## Appendix A: Rankings: Colleges, Universities, Business Schools

This is a non-systematic collection of the various rankings available to prospective students.

[Wall Street Journal College Rankings](#)

[Money Magazine Best Colleges](#)

[Times Higher Education Rankings](#)

[QS Top Universities](#)

[Forbes](#)

[Financial Times Rankings](#)

[US News & World Report](#)

[Bloomberg Rankings](#)

[The Economist Ranking](#)

[Poets & Quants](#)

[The Princeton Review](#)

[Niche](#)

[Heritage Foundation](#)

[CEO Magazine's 2025 Global MBA Rankings](#)

[Education Corner](#)

[Washington Monthly](#)

[ARWU](#)

[CWTS Leiden](#)

[EHESO Benchmark](#)



[Best Colleges](#) is an example of a platform that offers various College and Program rankings. It also includes a *sui generis* ranking for “Alternative Colleges: Unique Schools for Unique Students:” [here](#).

The [US Department of Education’s College Scorecard](#) doesn’t rank schools. Instead, its web-based tools allows the filtering and sorting of institutions based on features including academic program, location, attendance cost, graduation rate, and salary expectations; a user can obtain rankings ala carte.

Still another [college ranking](#), introduced recently by F-1 Hire, rates American institutions on career outcomes for international students. Per the F-1 ranking a college’s ranking is based on four factors: average salary, the ratio of salary to tuition, the total number of applicants for permanent residency over the past 10 years, and the ratio of total number of international students to number of permanent-residency applicants. The survey, which is based on data collected by the federal government, includes 274 colleges that enrolled at least 500 foreign students in 2023. It includes the University of New Haven, ranking us 229<sup>th</sup> out of 274 colleges.

## References

Alghushhairy, O., Alsini, R., Soule, T., & Ma, X. (2021). A Review of Local Outlier Factor Algorithms for Outlier. *Big Data and Cognitive Computing*, 1-24. doi:<https://doi.org/10.3390/bdcc5010001>

Breunig, M., Kriegel, H.-P., Ng, R. T., & Sander, J. (2000). LOF: Identifying Density-Based Local Outliers. *PROCEEDINGS OF THE 2000 ACM SIGMOD INTERNATIONAL CONFERENCE ON MANAGEMENT OF DATA*, 93-104. doi:<https://doi.org/10.1145/342009.335388>

Wachter, S., Mittelstadt, B., & Russell, C. (2018). Counterfactual Explanations Without Opening the Black Box: Automated Decisions and the GDPR. *Harvard Journal of Law & Technology*, 31, 841-854.