WHY ARE COLLEGES CLOSING? UNPACKING CLOSURES SINCE THE COVID PANDEMIC.

BY
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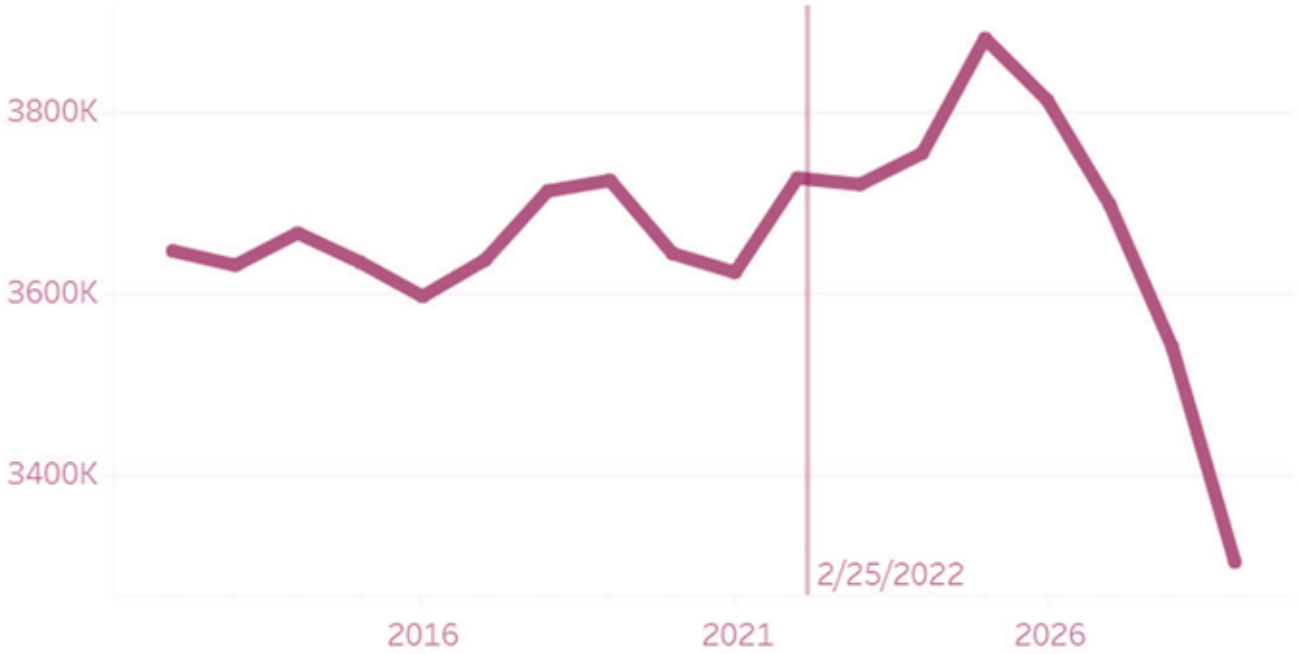
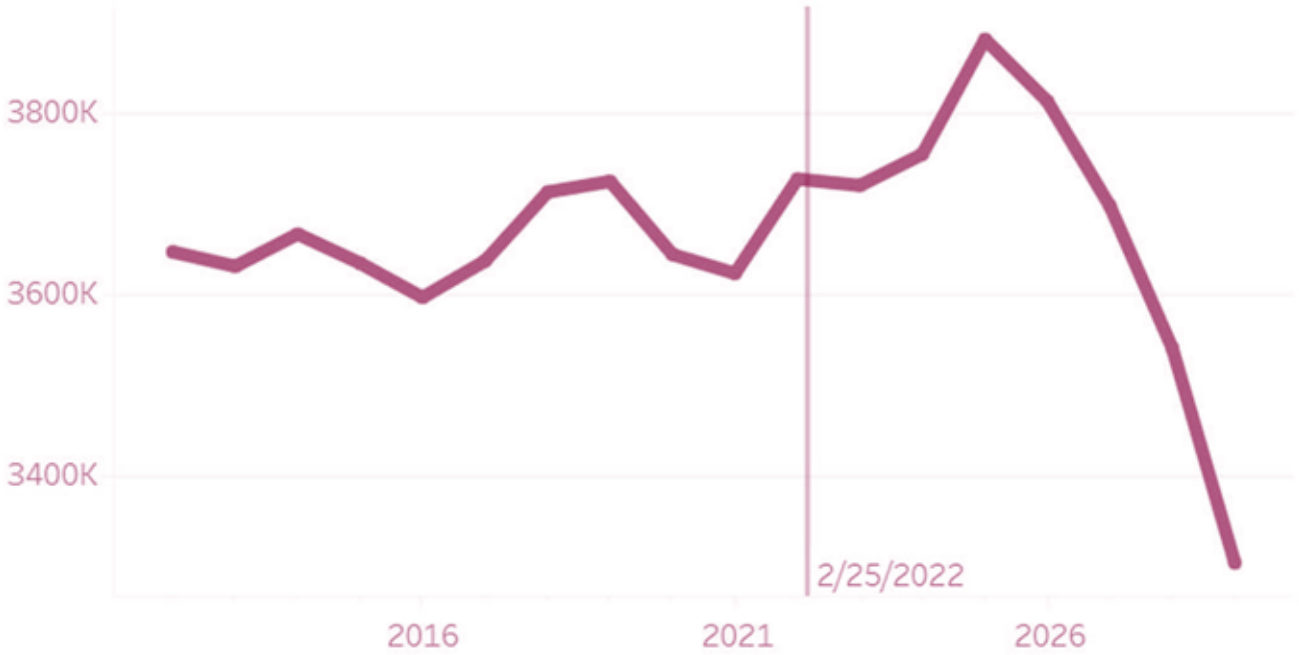
COLLEGES CLOSE BECAUSE THEY RUN OUT OF MONEY…!

COLLEGES NEED ENROLLMENT



College Enrollment Figures & Projections

Figure(s) Sourced from CUPA-HR



THE CLIFF

- College enrollment projections anticipate a **15% drop after 2025**.
- Between 2025 and 2029 the number of college-bound student will **decline by 400,000 student**.
- Since 2019, the number of undergraduate enrollments has **consistently decreased**.
- Since 2020, **66** higher education institutions have closed; **none opened**.

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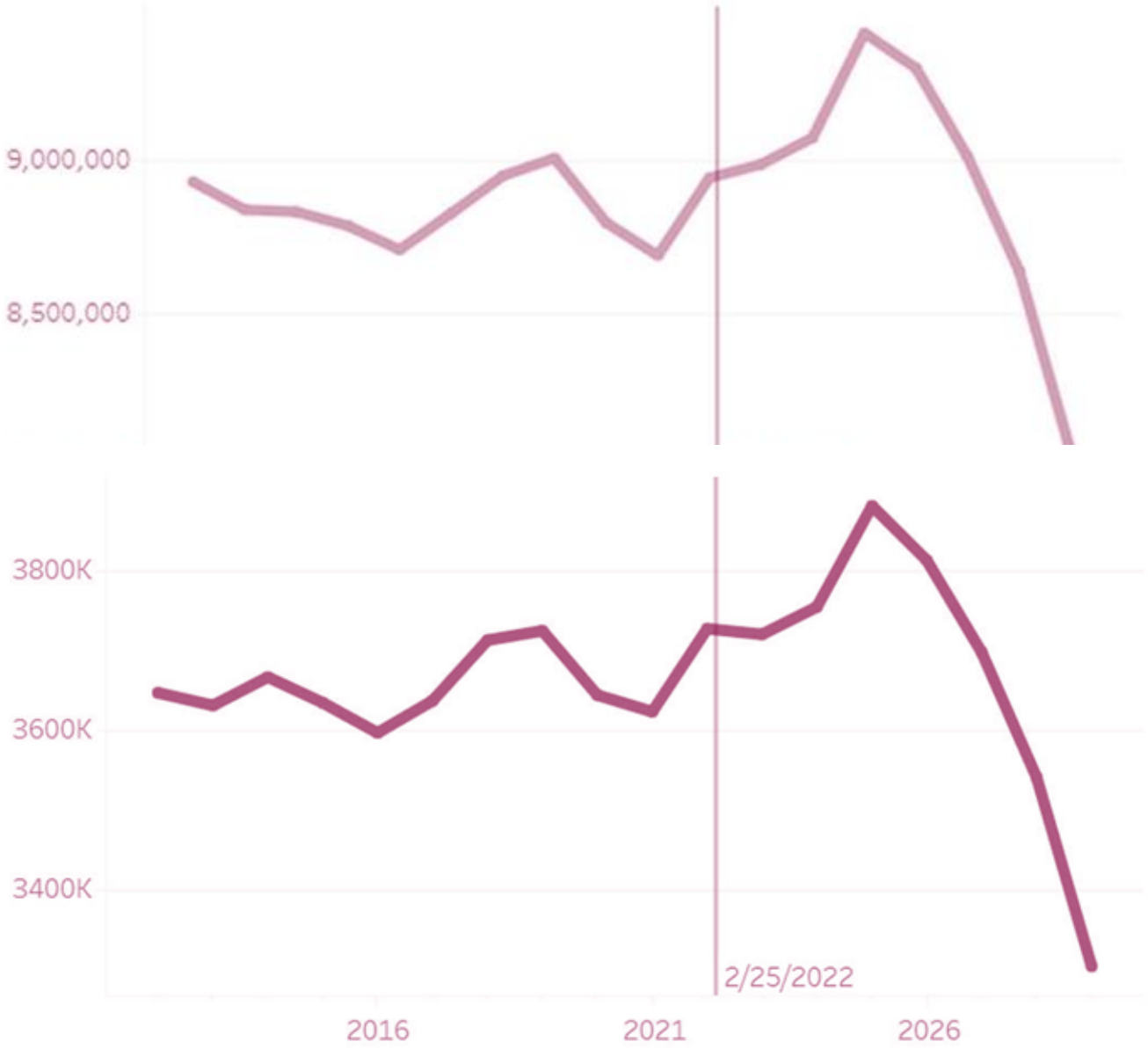

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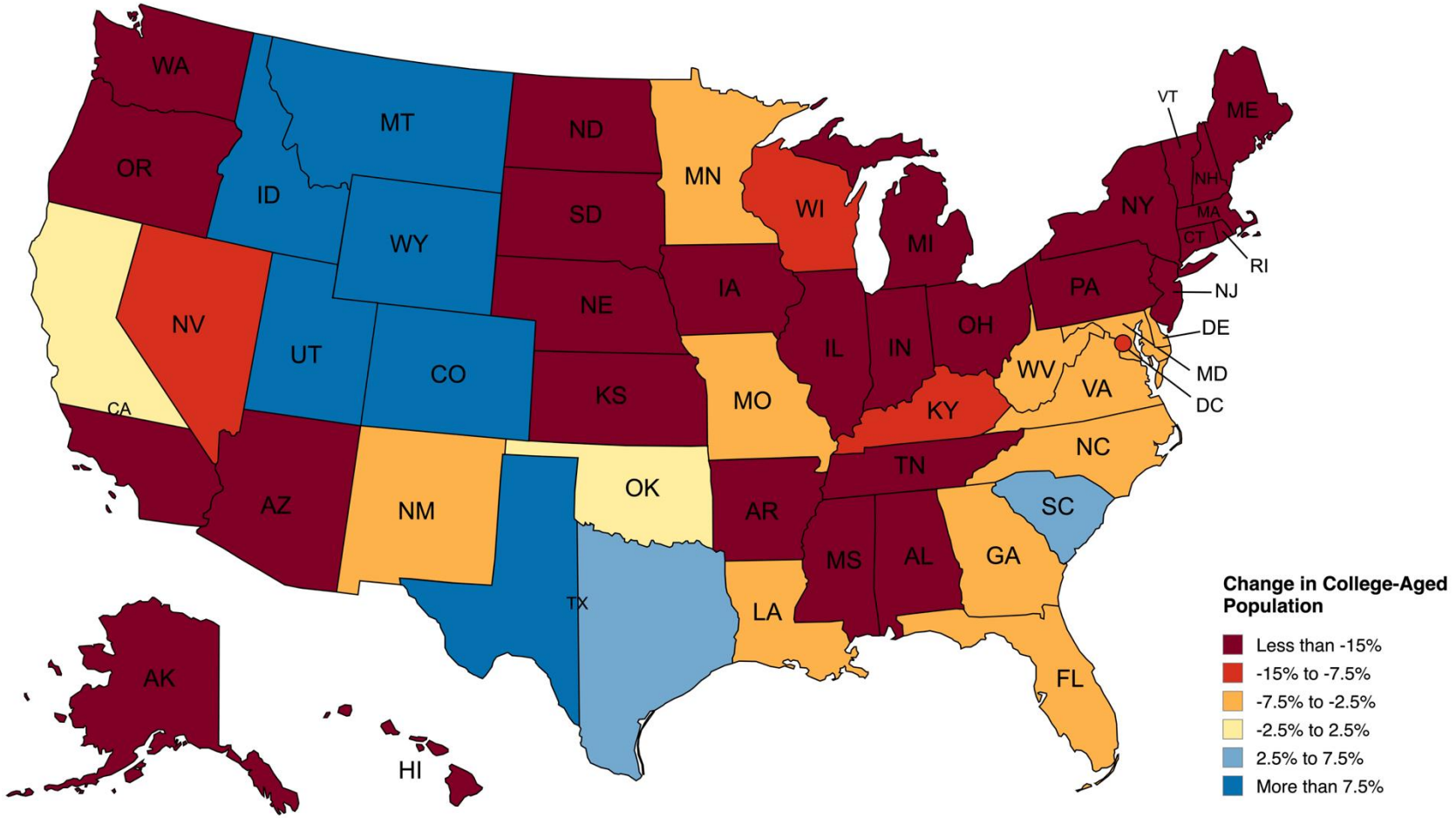
2012-2029 LOSSES AND GAINS IN COLLEGE-GOING STUDENTS



Figure's Credit to Nathan Grawe & Carleton College

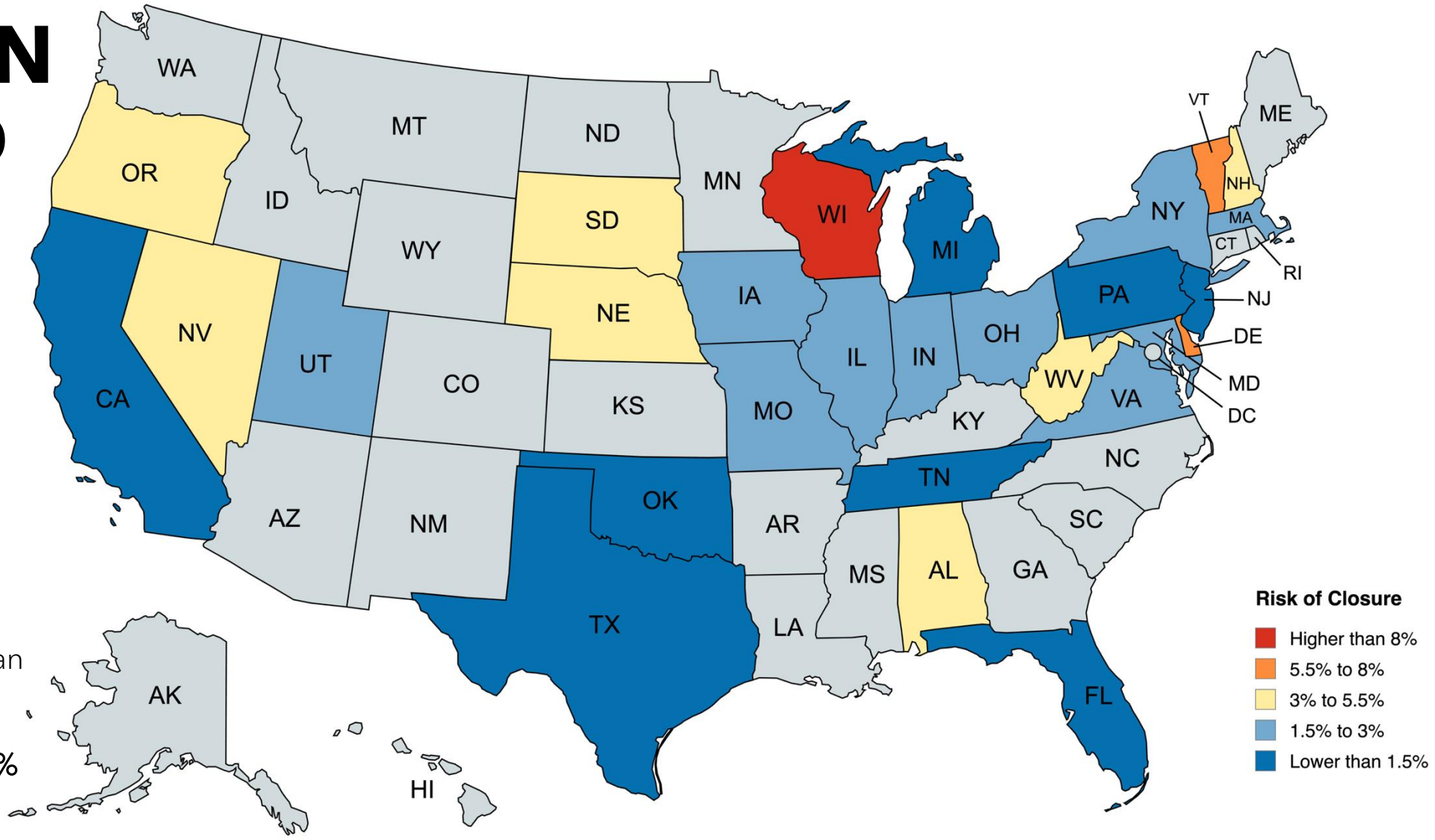
BUT IS THE NUMBER OF PEOPLE THE ONLY FACTOR?

IS URBAN TRAFFIC ONLY CAUSED BY THE NUMBER OF CARS?

Quantifying the Risk:

Where are institutions most vulnerable?

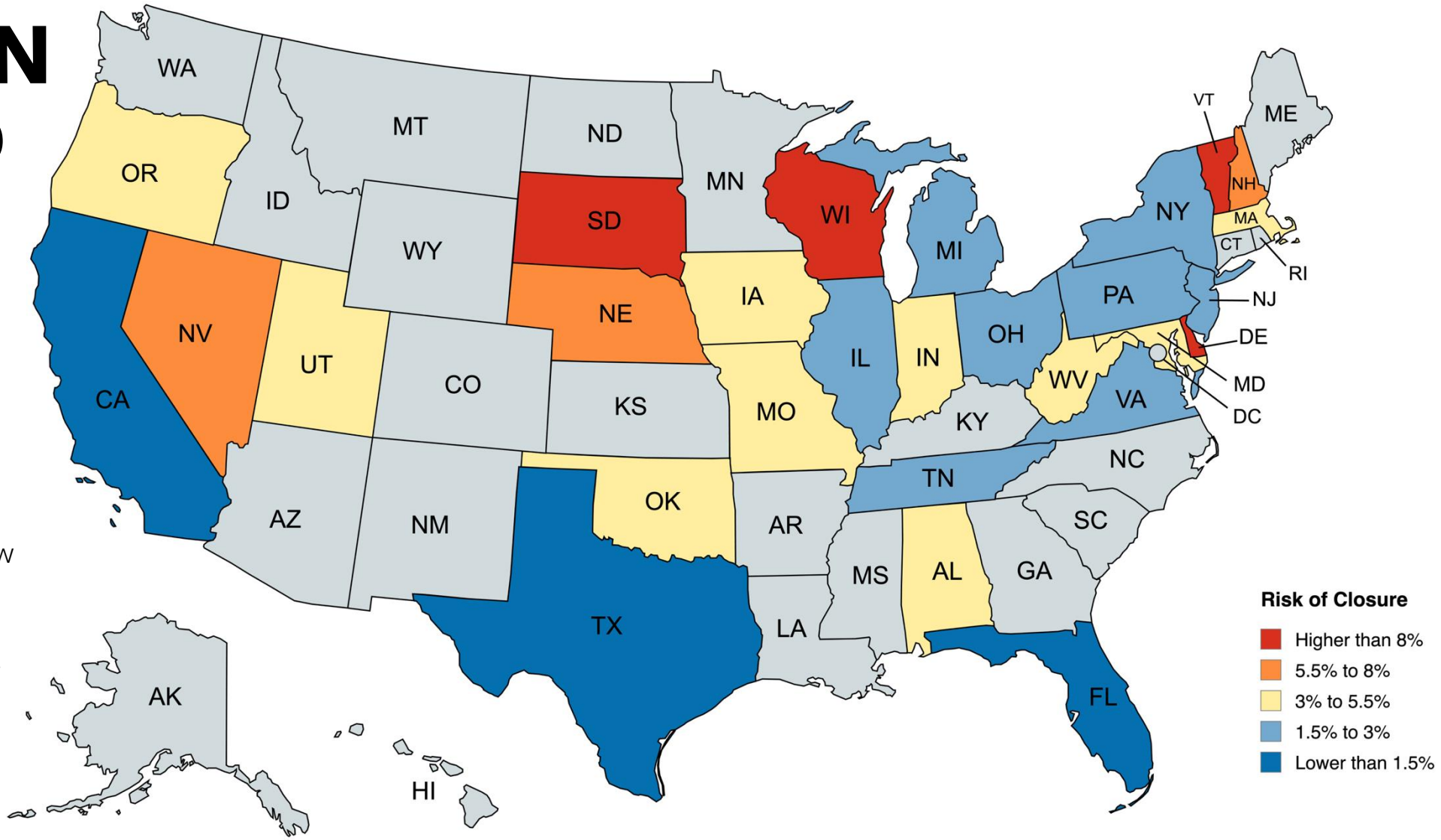
RISK OF CLOSURE IN OBSERVED STATES



- A college in **Wisconsin** has about **8%** risk of closure.
- In **Delaware** its **7%**; lower than Wisconsin!
- A college in **Texas**, has a **0.3%** risk of closure.

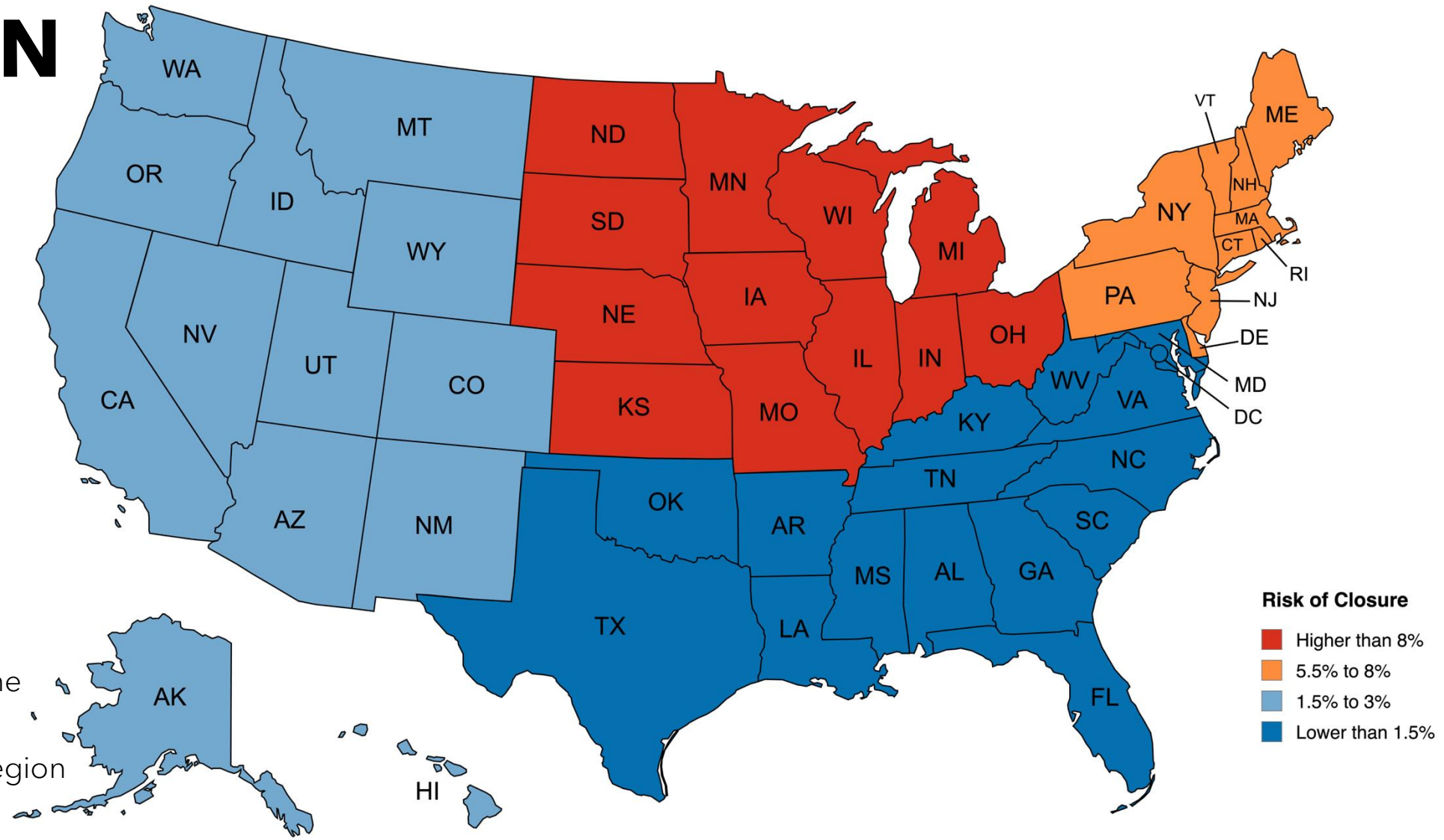
RISK OF CLOSURE IN OBSERVED STATES

BASED ON CLAIMS



- A college in **Wisconsin** is now about **10%** at risk of closure.
- Now **Delaware** is **15%** at risk.
- While in **Texas**, the risk of closure has only risen by **0.03%**.

RISK OF CLOSURE IN REGIONS



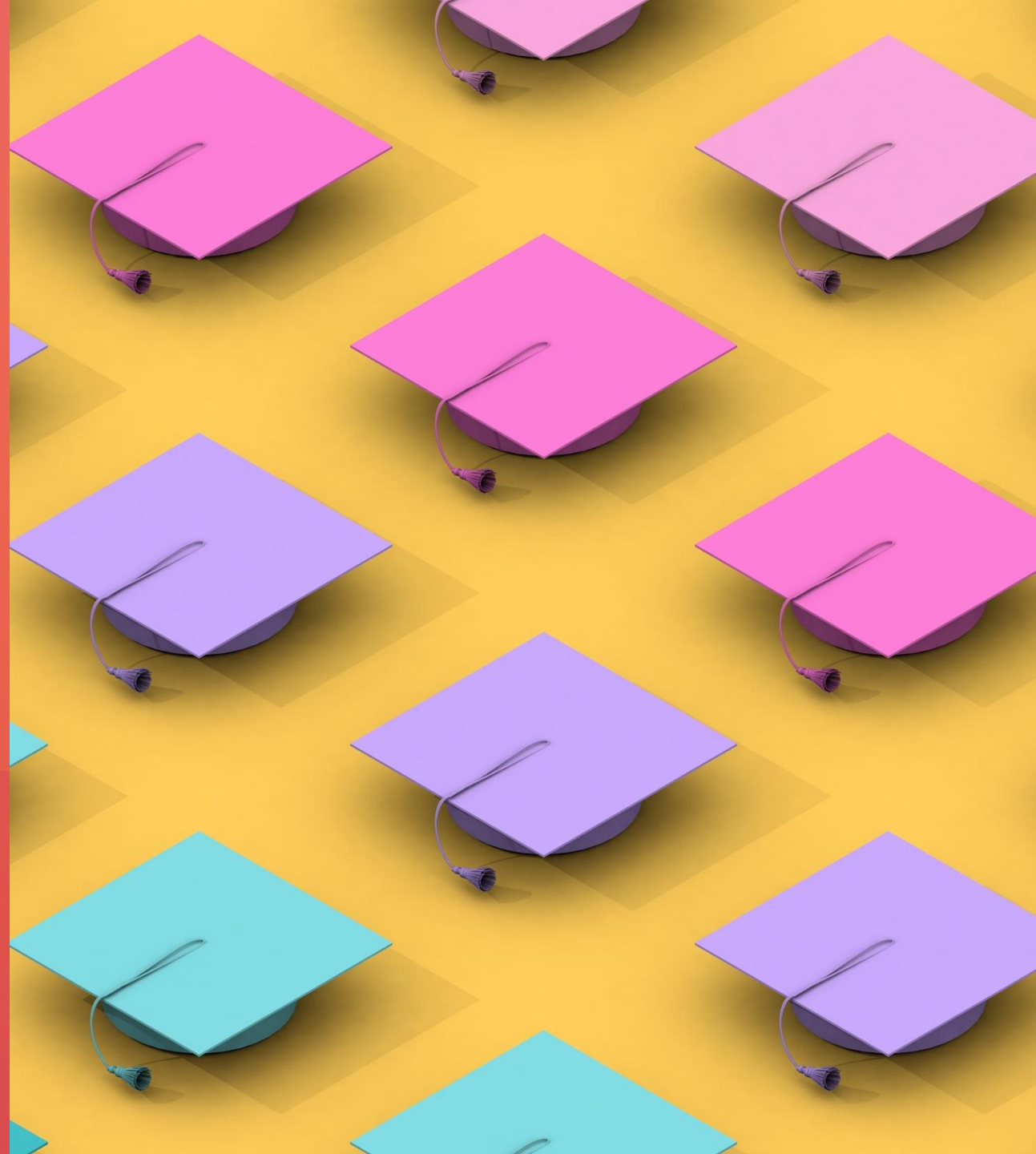
Although even 2%, the risk of closure in the Midwest, is not alarming, when compared to the south or west, there is a clear separation. Based on just the region the college was established in.

HOW DO WE FIND THE CHARACTERISTICS THAT PUT A COLLEGE AT RISK?

Note that : American University of Puerto Rico, closed in 2023, is excluded from this analysis.

DATASET

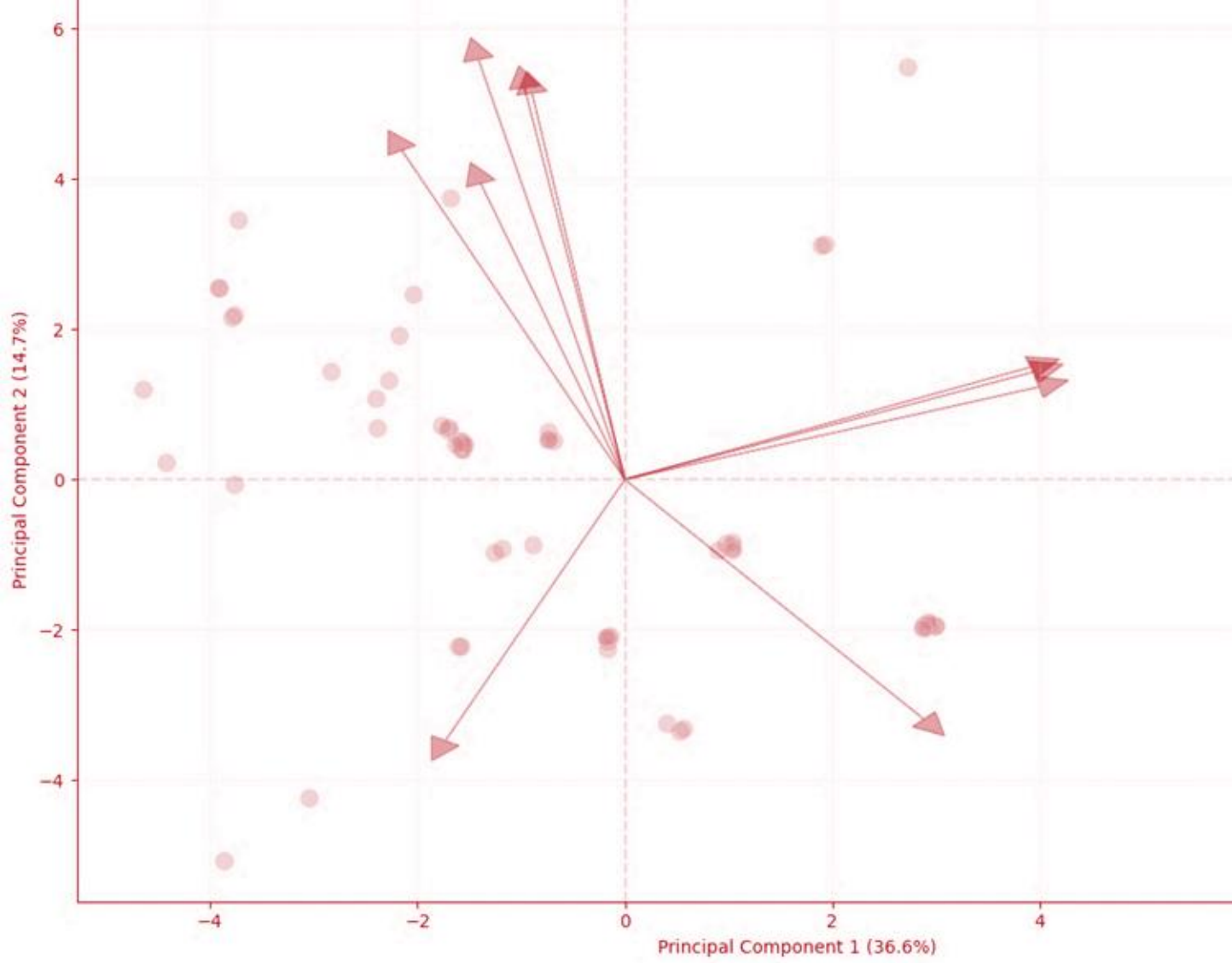
2020-2025 CLOSED COLLEGES' CHARACTERISTICS AND INFORMATION + RELEVANT STATE- AND REGIONAL LEVEL DATA



PRINCIPAL COMPONENT ANALYSIS

Some of the most **influential features** to the first two Principal Components (~51% of variance):

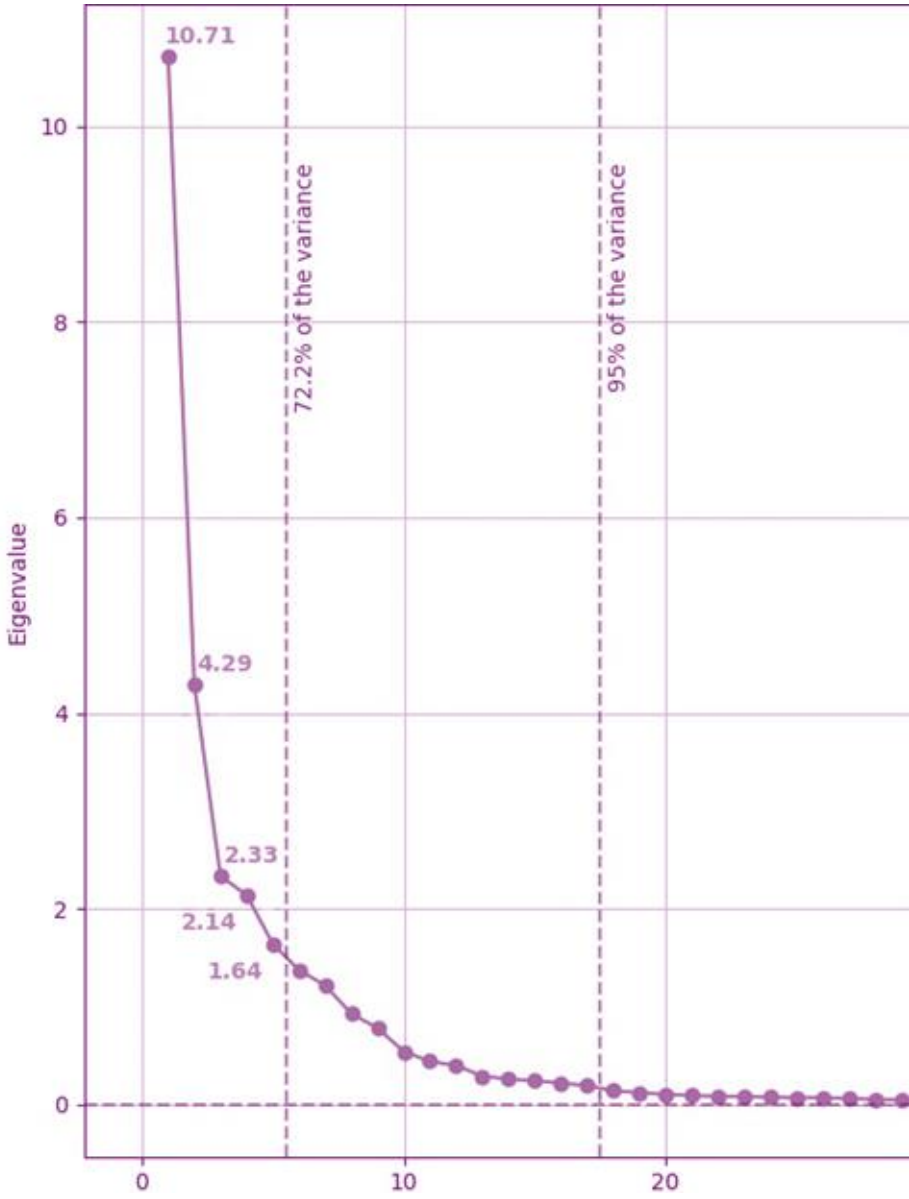
- Region's Birth Rates
- Per Capita Income in State
- State's Population of 18 to 24 yr.
- State's 2-year College's Tuition
- State's Population



PRINCIPAL COMPONENT ANALYSIS

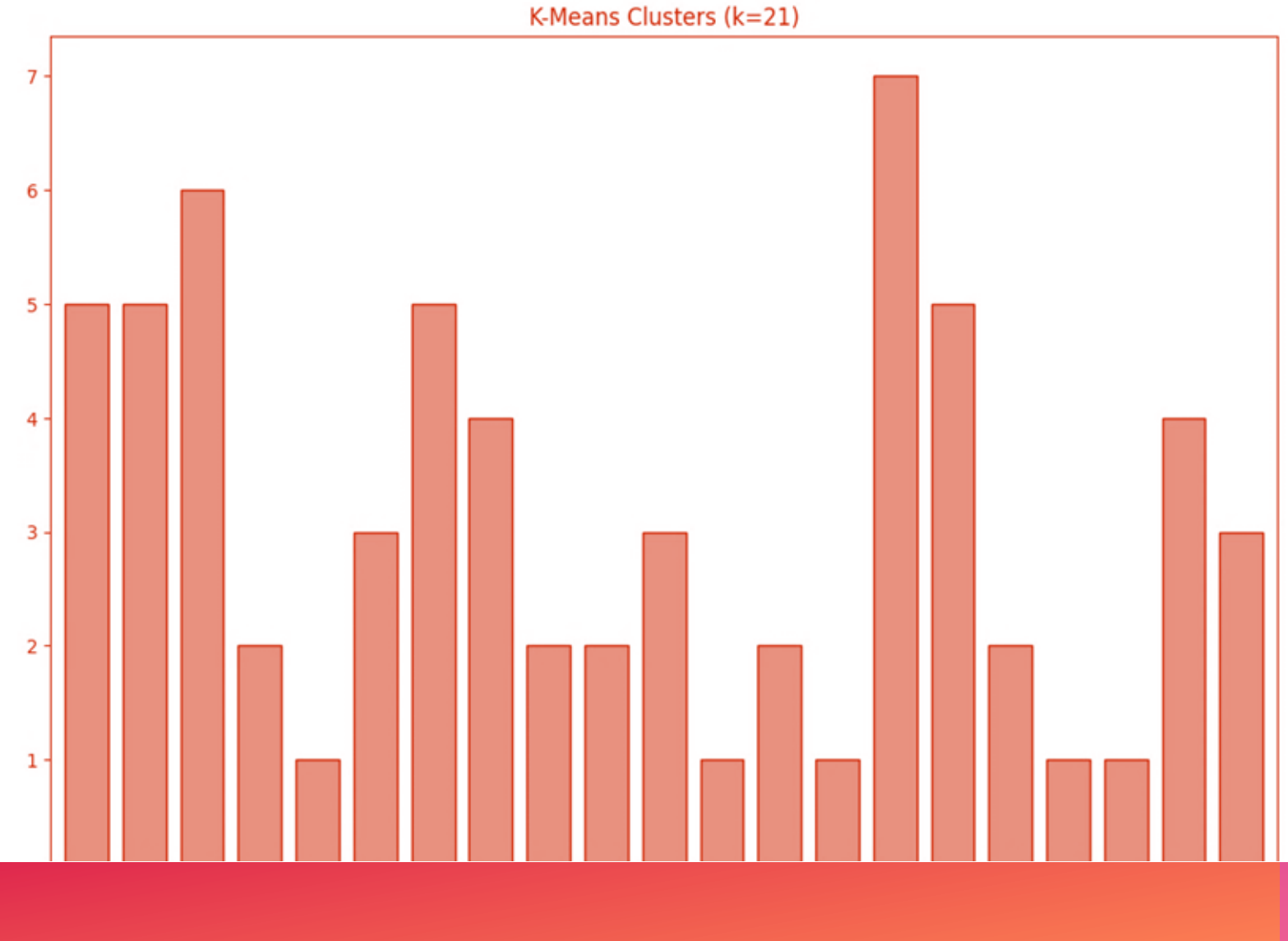
The presence of about 17 Principal with significant high eigenvalues point to the nuance that exists in the dataset; this means:

- The dataset created, and features are multi-faceted, as intended.
- There are many underlying patterns present in the dataset, which supports our hypotheses of college-level characteristics and state and regional data being influential.

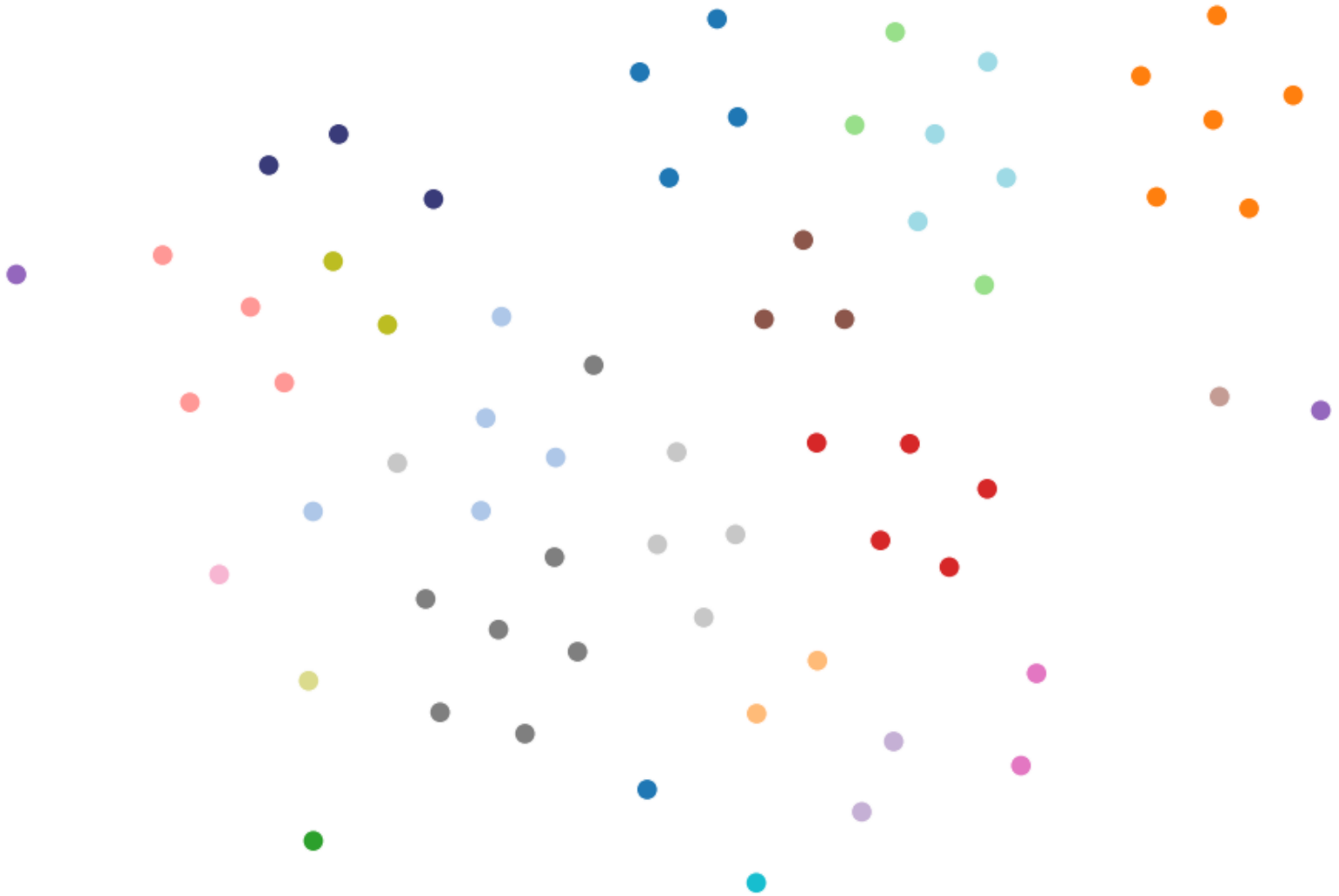


HOW SHOULD WE GROUP THESE INSTITUTIONS?

K-MEANS CLUSTERING

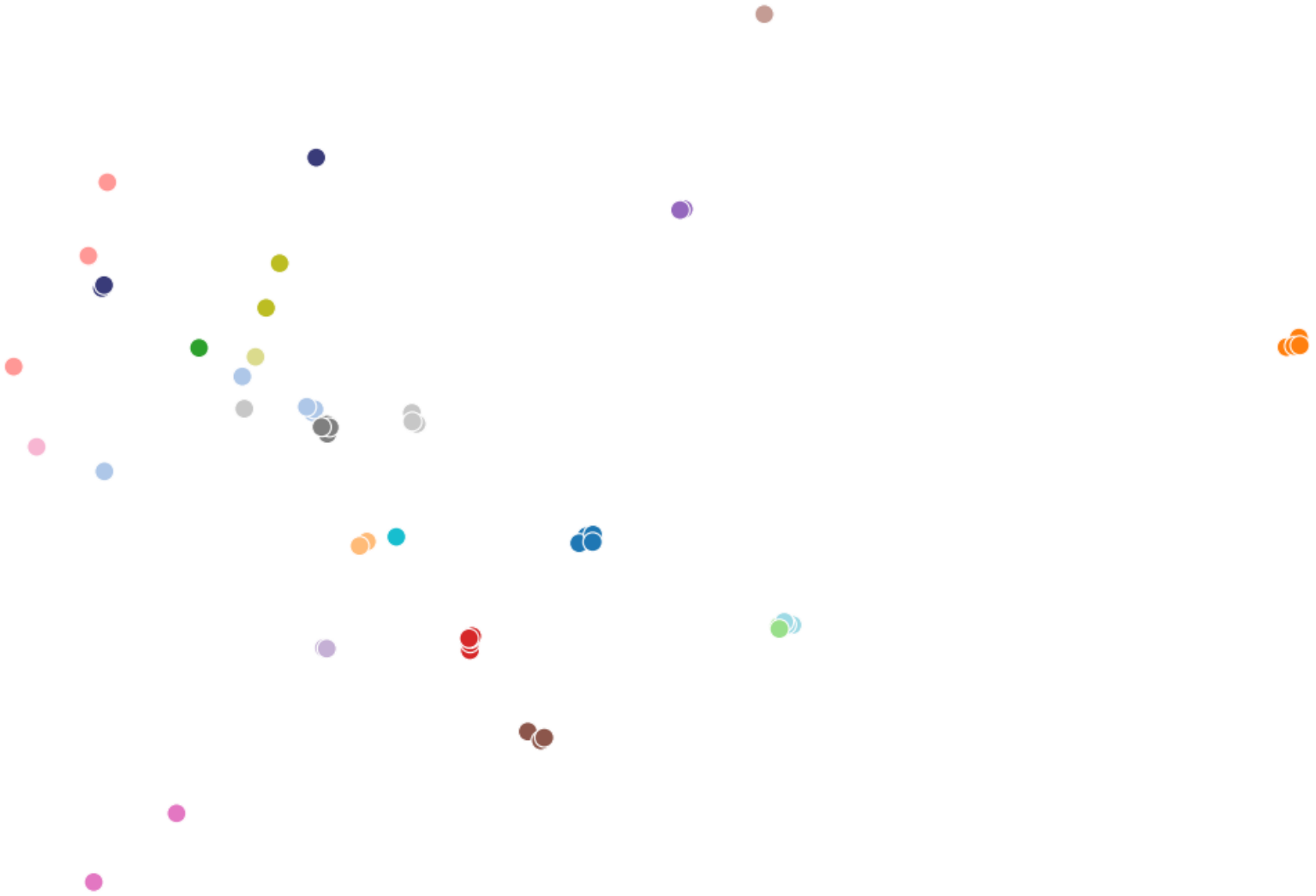


- We use the K-Means to group institutions into 21 groups (clusters).
- The purpose of this approach is to see which colleges get grouped together without human intervention and solely based on data.
- We can then dissect each cluster and understand what variables the institutions are getting grouped by.



t-SNE VISUALIZATION

- The figure proves that the data is not only placed in clusters successfully but is also separatable.
- A clean looking t-SNE like this one, supports the idea of there being strong features that different groups of colleges have in common.



K-MEANS CLUSTERING

- Each point is a different closed college, grouped with other colleges based on certain similarities.
- Tighter groups represent the colleges being more similar, looser groups indicate that the colleges are not very similar (or PC1+PC2 were not able to capture the variance).
- Clusters far away from the rest indicate the colleges are distinct from the rest based on underlying features.

SHAPELY ADDITIVE EXPLENATIONS

- Helps us find the defining characteristics of each cluster.
- We can also analyze what the key differentiating features are, and what features are present among all of them.

SHAPELY ADDITIVE EXPLENATIONS

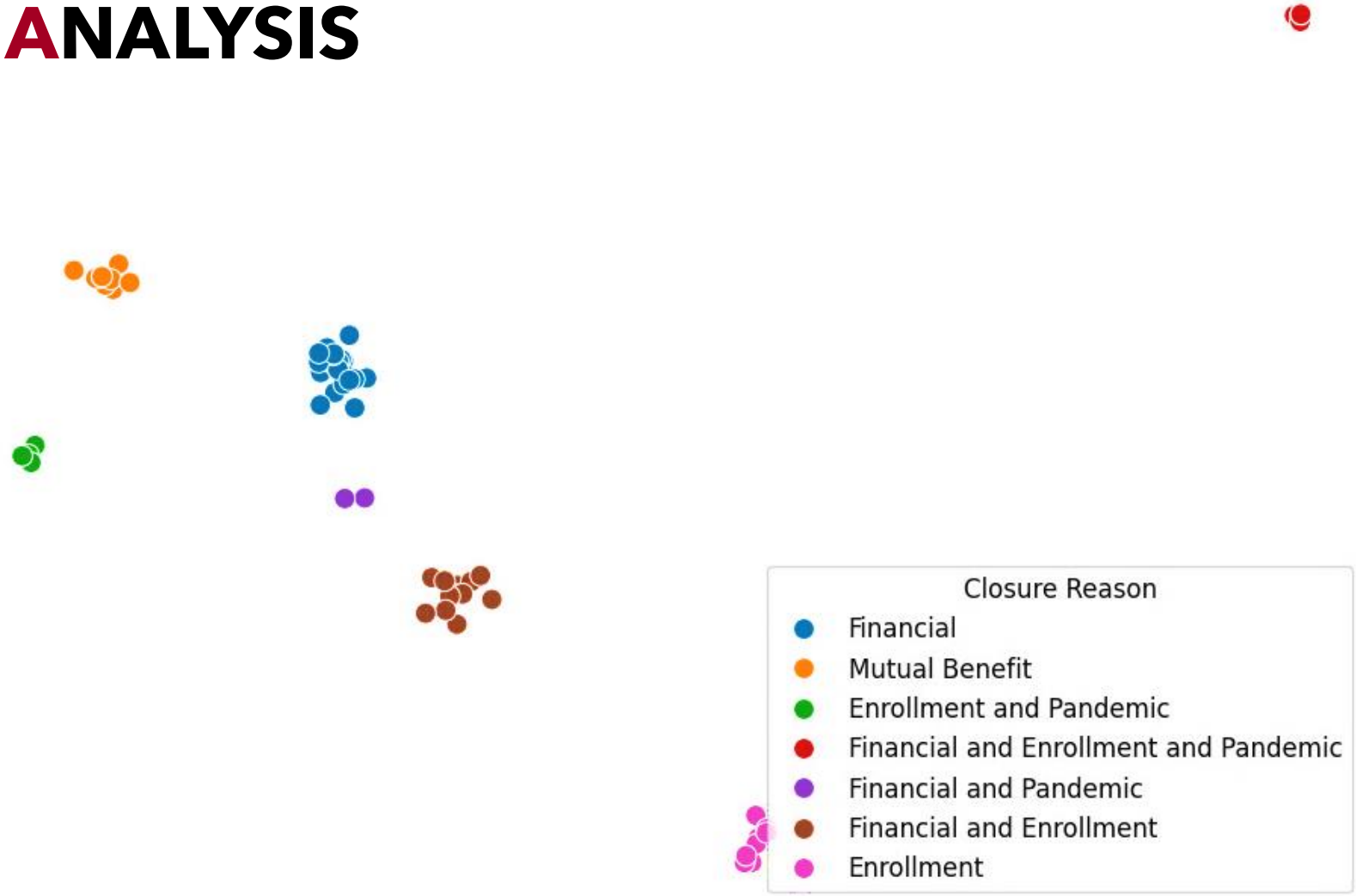
Some of the most influential features underlying the clustering are:

- Appropriation Amounts for 4-year Colleges in States
- Tuition Revenue of States
- Population of the Region
- High School Graduation Rate (ACGR)
- Appropriation Amounts for Community Colleges in States
- Unemployment Rate in the State
- Per Capita Income in State
- Median Endowment of Colleges
- Population of Individuals With Some College Education in State
- Fertility Rate in the Region

WHY ARE PEOPLE NOT ENROLLING?

LINEAR DISCRIMINANT ANALYSIS

- The reasons for closure have very different underlying characteristics or patterns in the original data, since LDA was able to separate them so well.
- From the negative and positive associations of our two components:
  - The first component differentiates institutions based on the **demand of their academic context and goals.**
  - The second component differentiates based on **a balance of population size and an uneducated population**.



BUT DOES THE "OFFICIAL REASON OF CLOSURE" REALLY CAPTURE ALL THE NUANCE? NOPE...

LATENT DIRICHLET ALLOCATION

- Dataset curated included 1 key article, mainly from Higher Ed Drive, per closure.
- In 4 topics captured, ever single one has a word related to “financial” matters, and one related to some “religious” or faith affiliation.
- The figure shows a sample topic (Topic 2) of the LDA model.

THE CLIFF-PROOF INSTITUTION

IN CONCLUSION

UNDERSTANDING THE DEMAND SHIFT

RESTRUCTURING OF ACADEMIC PROGRAMS, FACILITIES, AND STUDENT LIFE

A DEEPLY DATA-INFORMED INSTITUTION

A DATA-DRIVEN STRUCTURE FOR ACADEMIC PROGRAMMING, BUDGETING, AND ENROLLMENT CAMPAIGNS

A CHANGING ETHNIC DEMOGRAPHIC

FURTHER RESEARCH DIRECTION

THANK YOU!

Many thanks to the James Rocco Program that allowed for this investigation to flourish. Along with Professor Taylor for coordinating the program, Dr. Jamshidi for supervising the project, and Bita Aslrousta for her assistance in curating the project's dataset.

QUESTIONS?

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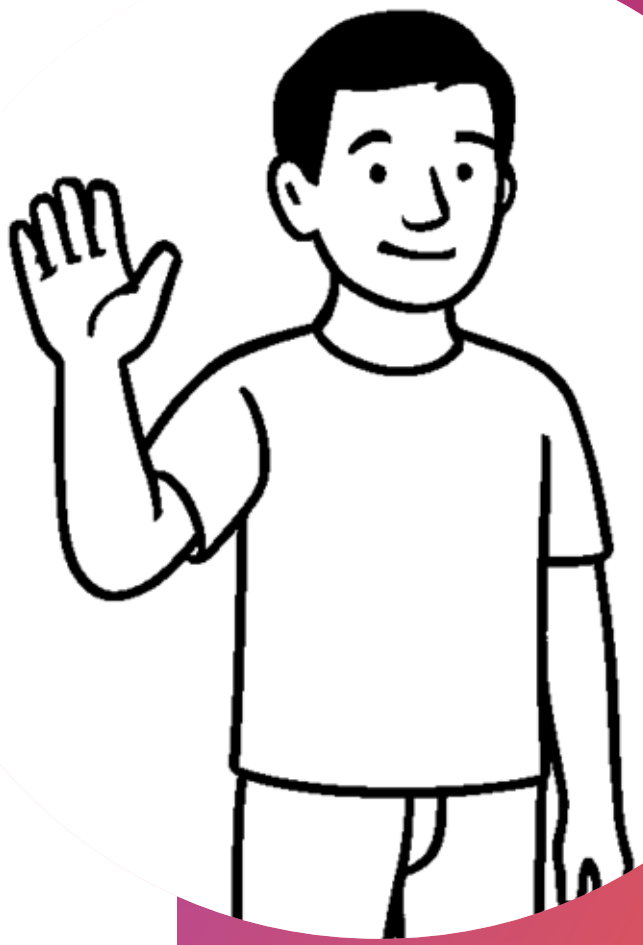

AI-Generated Image/Illustration