

# Partisan Representation and Vote Patterns in North Carolina Elections

Project BEAM

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# Introduction and Research Question

**How does vote share translate into seat share in North Carolina U.S. House elections, and what does this imply about partisan representation?**

## **Motivations:**

- We are interested in understanding how political representation is determined and whether election outcomes accurately reflect voter preferences.
- By comparing vote share and seat share, we can examine whether small differences in voter support lead to larger differences in political power, revealing whether representation is proportional or amplified across parties.
- North Carolina is often considered a "swing state," making it a useful case study, and as Duke students, this helps us better understand the political landscape that impacts our local communities.

# US House Election Results

## Data Source & Structure

- MIT Election Data and Science Lab (MEDSL), via TidyTuesday
- U.S. House election results (1976–2022), including candidate-level vote totals, party affiliation, and district information.

## Key Variables (For each candidate)

- **year & state**
- **party:** Democrat, Republican, or third party
- **candidatevotes:** votes received
- **district:** house district

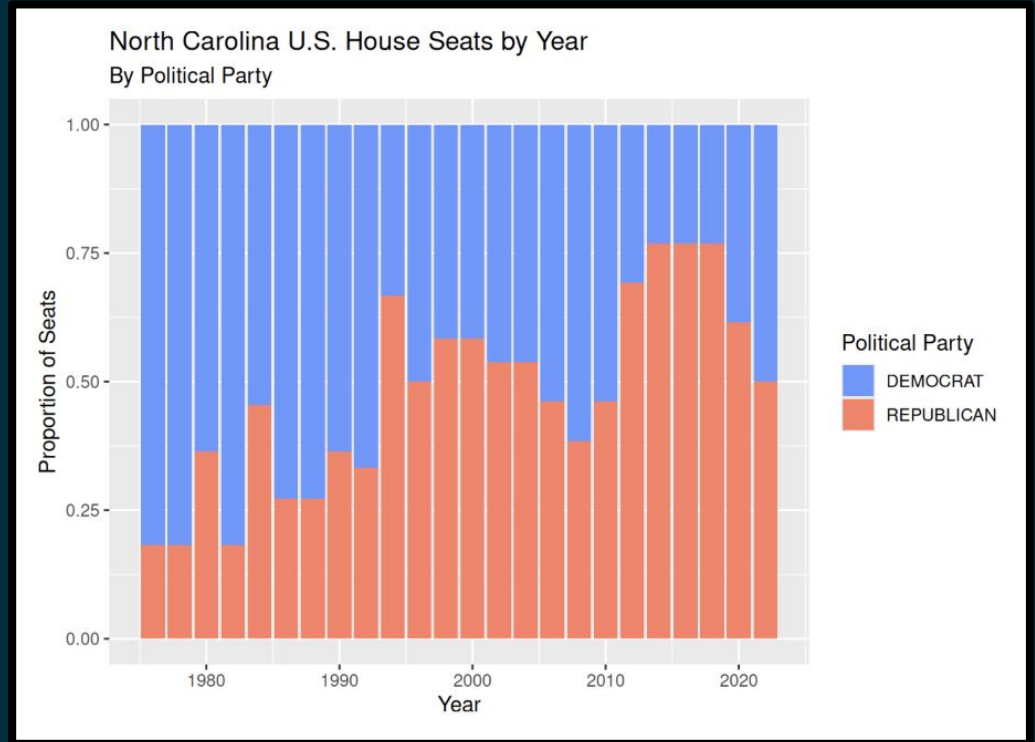
## Derived Variables

- **vote\_share:** proportion of total votes per year
- **seats\_prop:** proportion of seats won per year
- **representation\_gap:** difference between seats and votes

# North Carolina US House Seats by Year

- Calculated the proportion of seats won by each party in North Carolina over time.
- Highlights how political representation in Congress has shifted across elections.

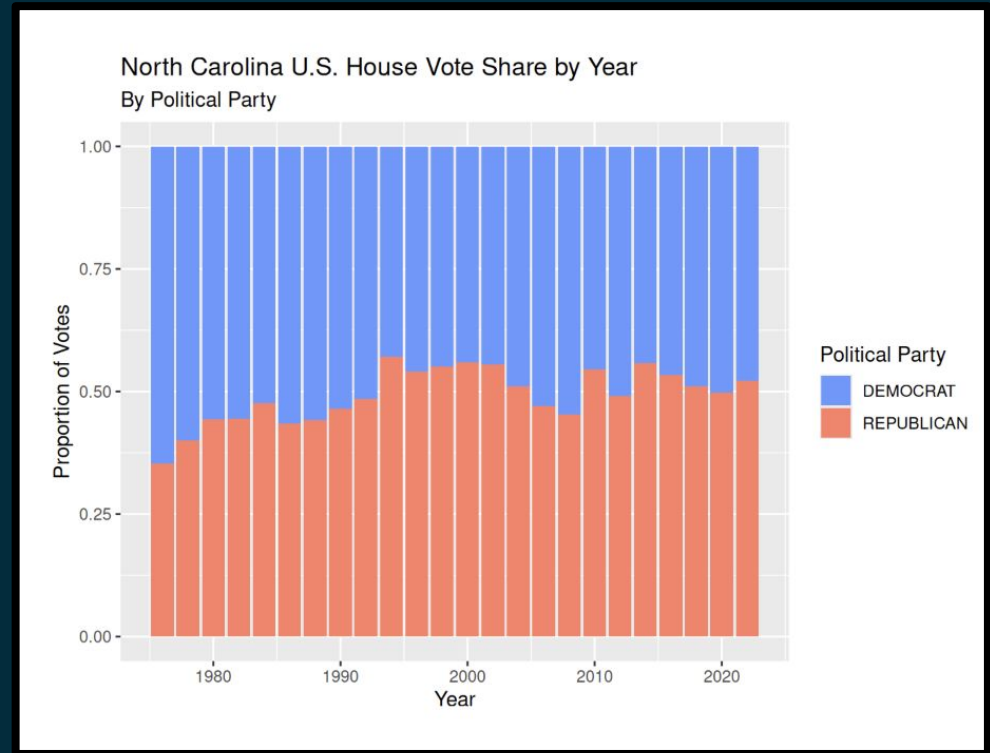
*Seats represent the number of districts won by each party, calculated by identifying the winning candidate in each district per year.*



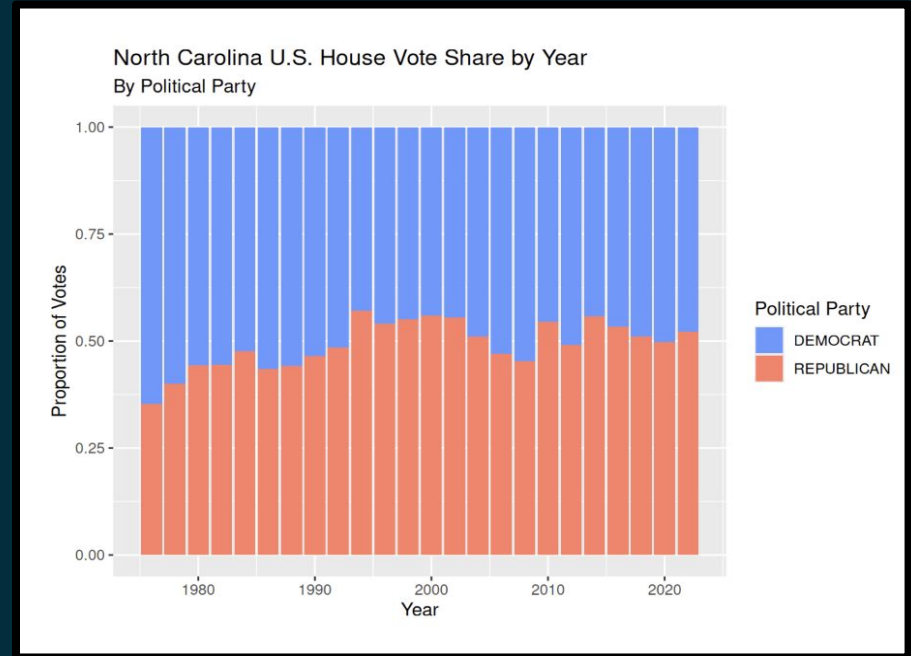
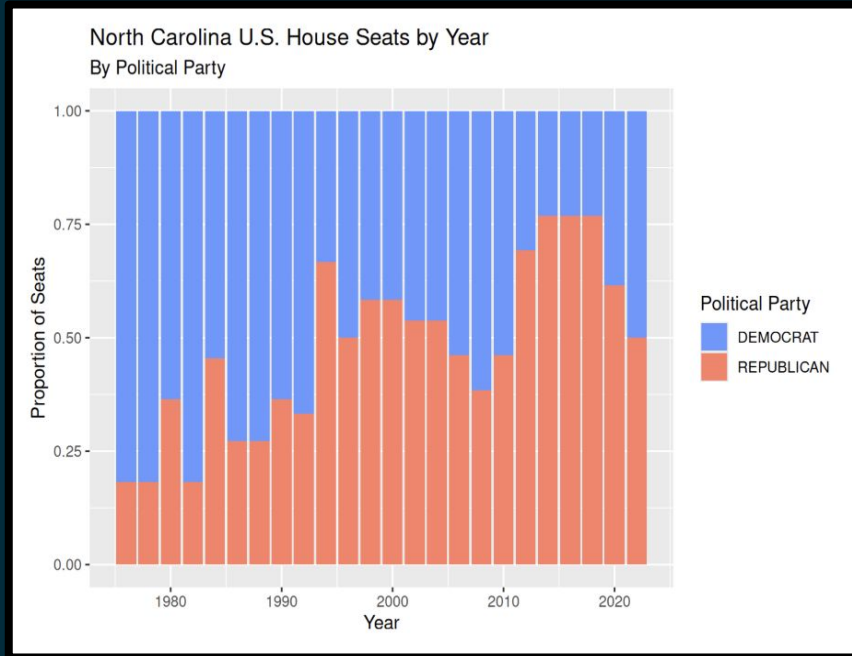
# North Carolina U.S. House Vote Share by Year

- Calculated the proportion of total votes received by each party in North Carolina over time
- Shows how general voter support for each party has changed across elections in North Carolina

*Vote share = total votes received by each party*



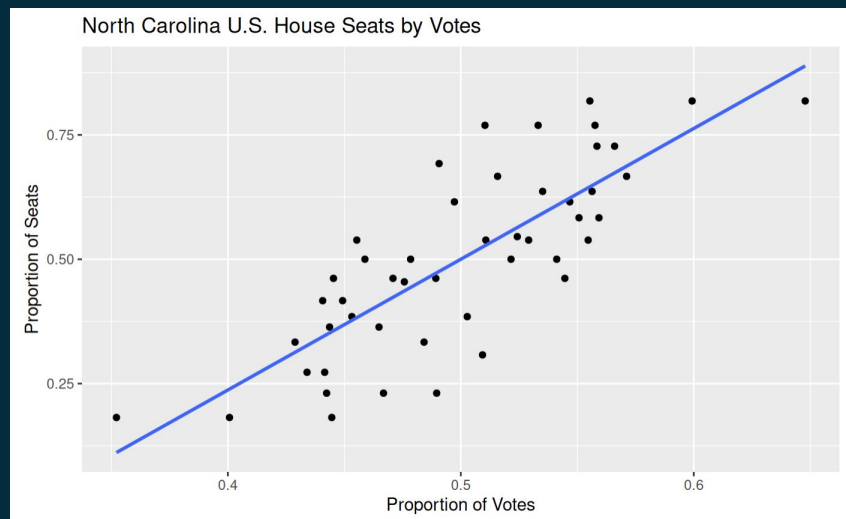
# House Seats vs. Vote Share in North Carolina



*Republican seat share has increased more than would be expected from changes in vote share, suggesting a political representation imbalance.*

# Linear Regression Analysis

- Fitted a linear regression of seat share on vote share
- Estimated slope = 2.63 ( $p < 0.001$ ), indicating a statistically significant relationship
- A 1% increase in vote share corresponds to an approximately 2.6% increase in seat share



**In North Carolina, seat share increases more than proportionally with vote share, suggesting an amplified relationship between votes and representation.**

*This pattern is reflected in observed Republican seat gains over time.*

# Conclusion and Discussion

## Takeaways

- Seat share does not increase proportionally with vote share in North Carolina
- Small changes in vote share correspond to larger changes in seat share
- This suggests an amplification effect, where changes in vote share are associated with disproportionately larger changes in seat share
- **Electoral systems may be translating similar voter support into unequal political power.**

## Potential Reasons

- Redistricting / gerrymandering may concentrate or dilute voter support
- Geographic distribution of voters (urban vs rural clustering)
- Uneven voter turnout across regions affects vote totals vs. outcomes

# Limitations and Future Directions

- The linear regression assumes a constant relationship between vote share and seat share over time, but the amplification effect may have changed across different redistricting periods
- The time period (1976–2022) spans many different political eras, making it hard to draw clean conclusions about any single cause
- No way to identify the reason for the discrepancy with absolute certainty, as the data did not include any variables related to redistricting or demographic distribution
  - As of right now can only theorize, but future scholarship might include such exploration
- Aggregating vote share statewide masks district-level variation
  - Two parties could have the same statewide vote share but very different geographic distributions
  - Could later conduct a more detailed, broken down analysis accounting for vote share within each district