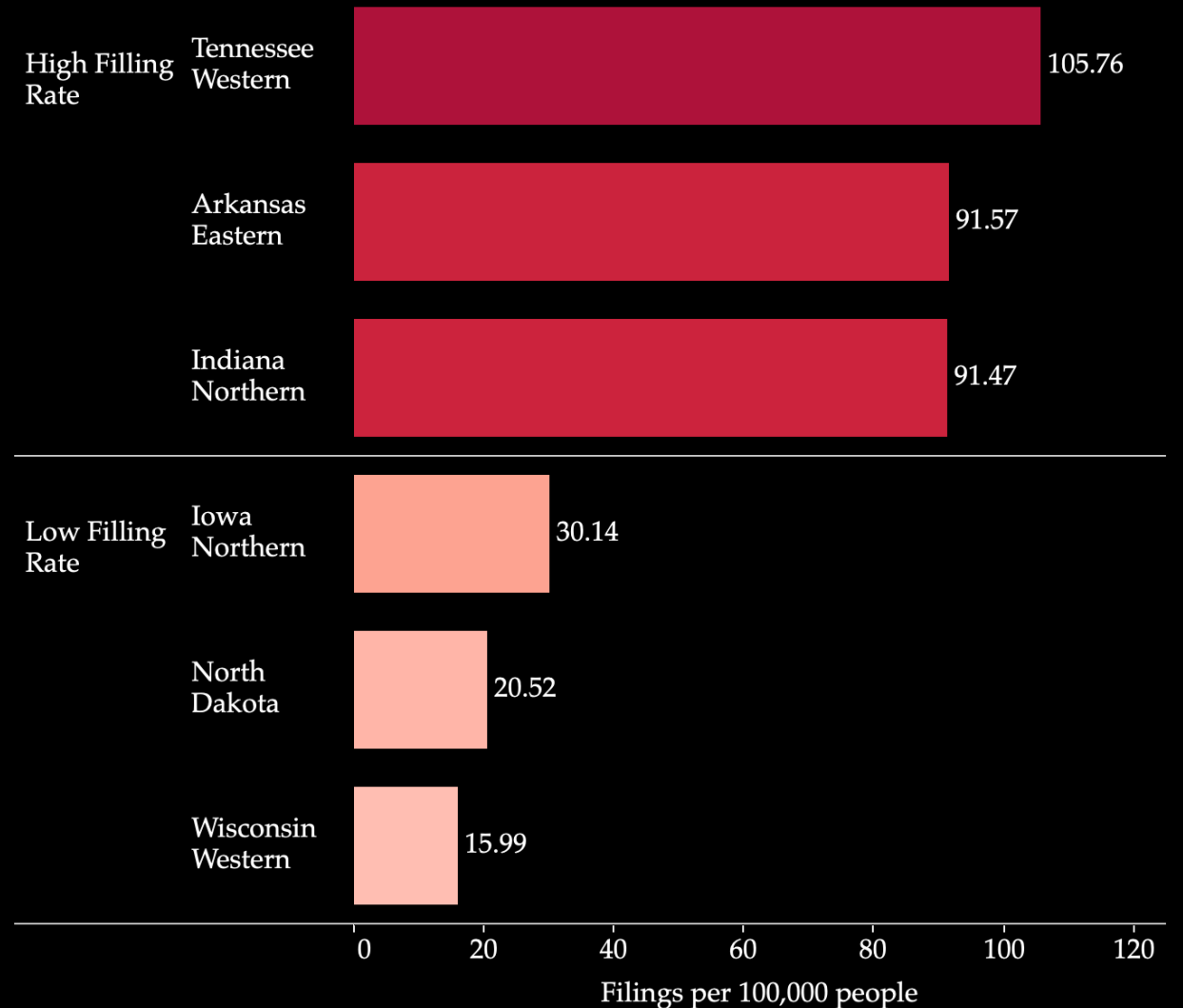# MUDAC 2020: Civil Right Case Insights

Team 43

Start With Summaries

- The Scale is diverse, but not unwieldy

- Smallest and largest 3 provide some context

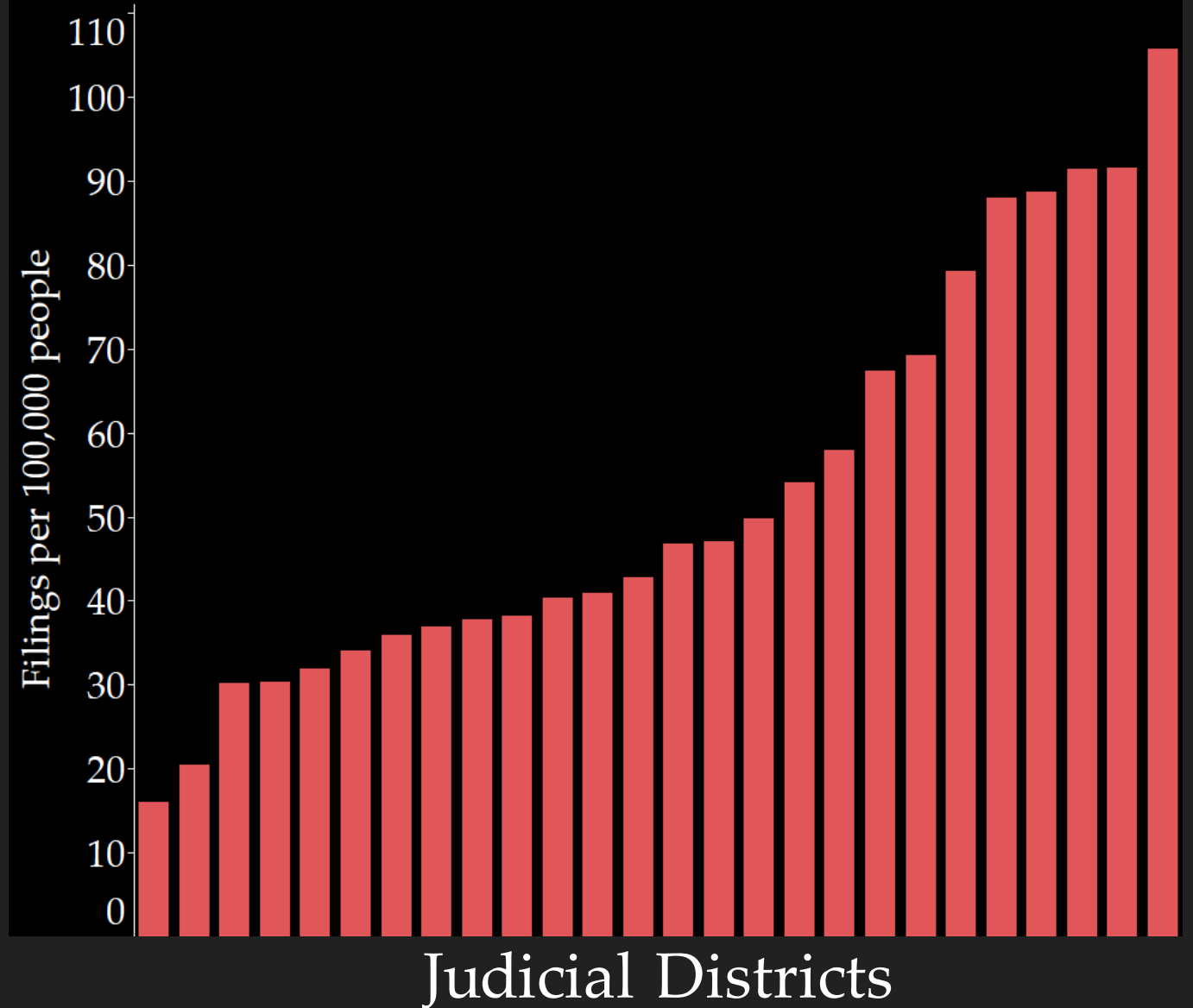- However, one also should look back at the bigger picture

Top 3 High vs. Bottom 3 Low Filing Rate for Districts

Summaries Cont.

- While variation is high, it builds and tapers slowly

- Beyond the immediate edges, a cutoff isn't clear

- A sense of location may prove more useful

Civil Rights Cases per 100,000 People by District

Filings per 100,000 people

Judicial Districts

Heatmap of Civil Rights case files by court districts.

- Geography is easier to understand

- Specific concentrations do exist

- The general pattern should also be considered.

© 2020 Mapbox © OpenStreetMap

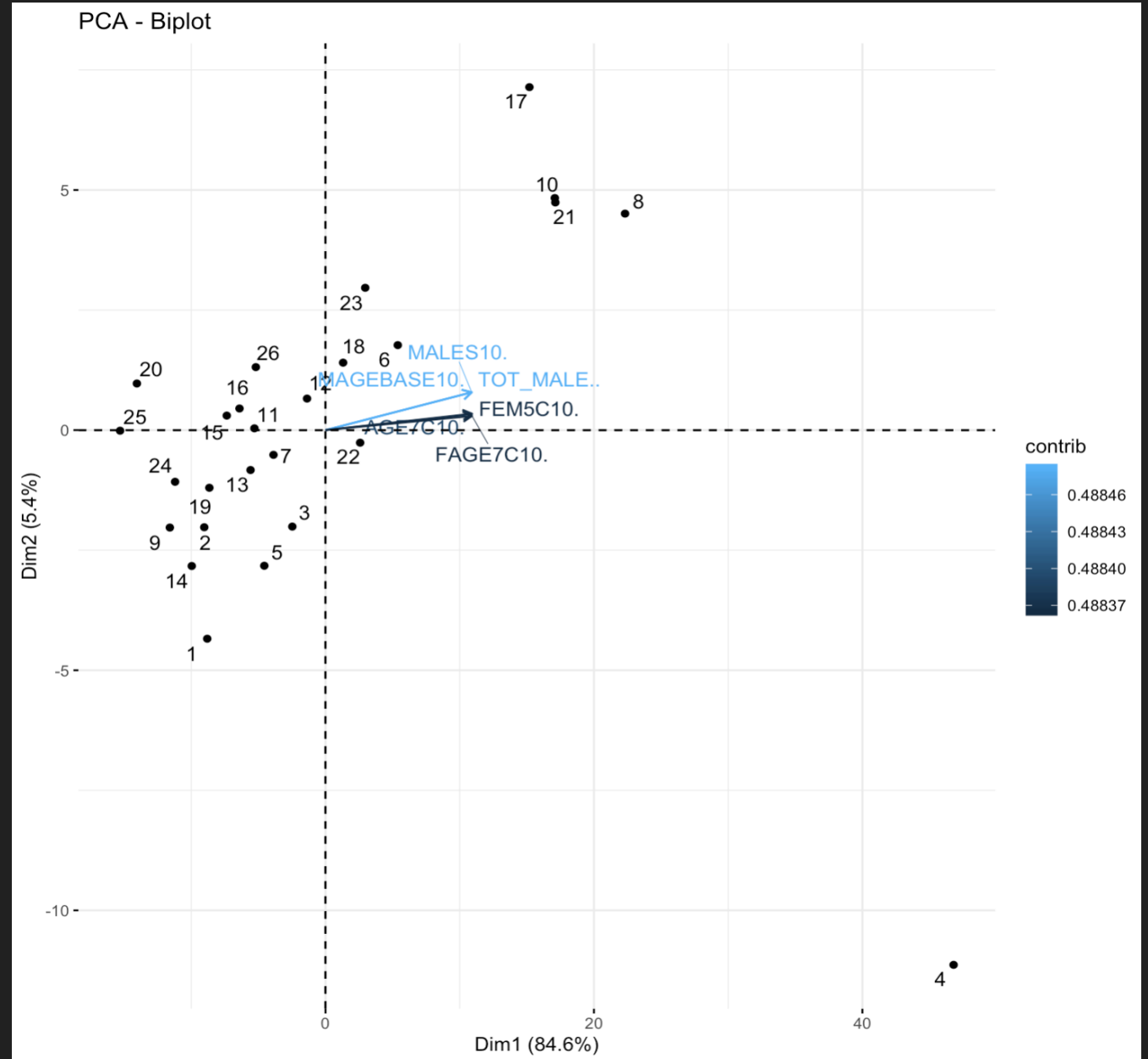15.99   105.76
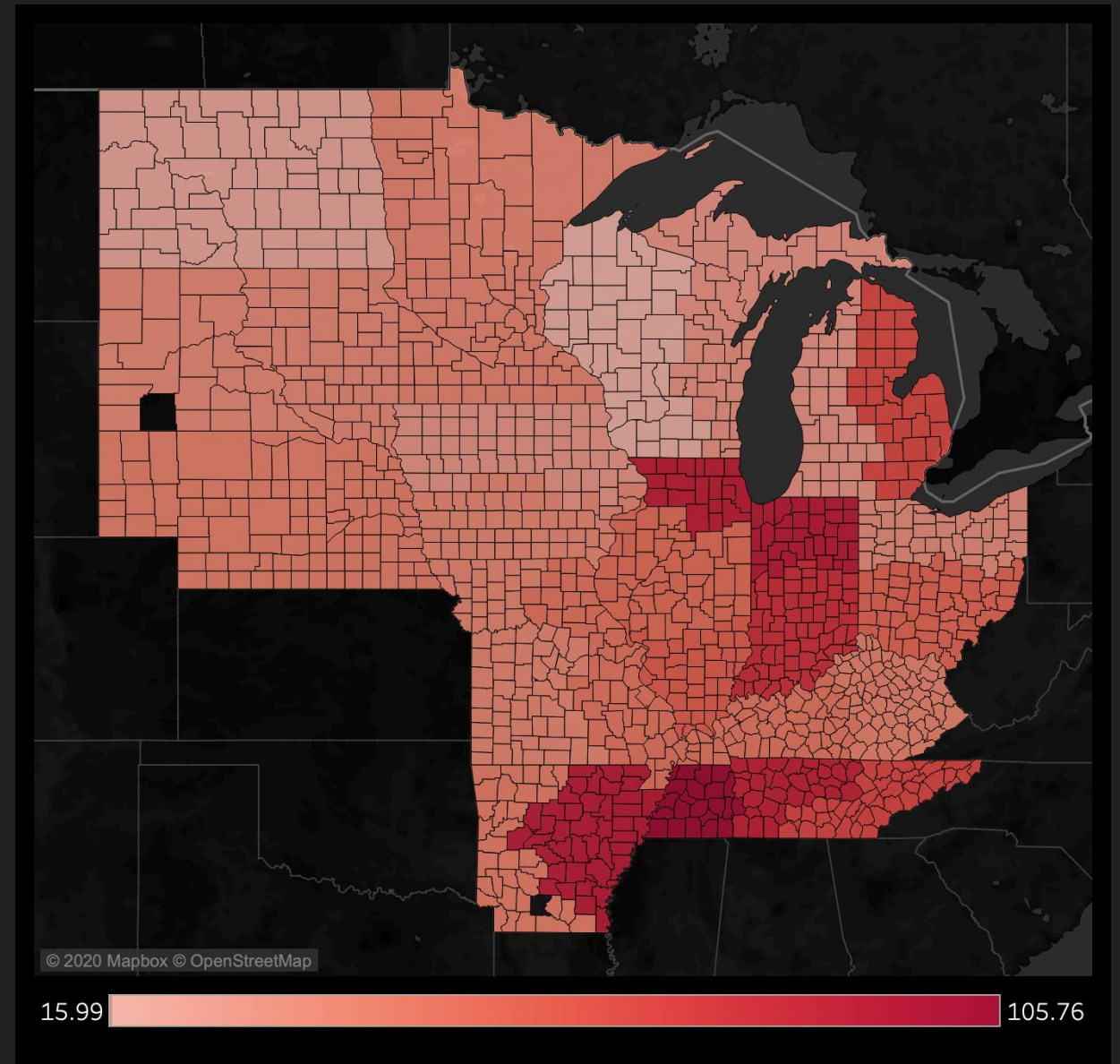
Digging Deeper

- Append Census data from ArcGIS Hub to our dataset to scrutinize demographics

- Focus on population density, race, and age

- take on a lot of predictors, then cut them down to the best
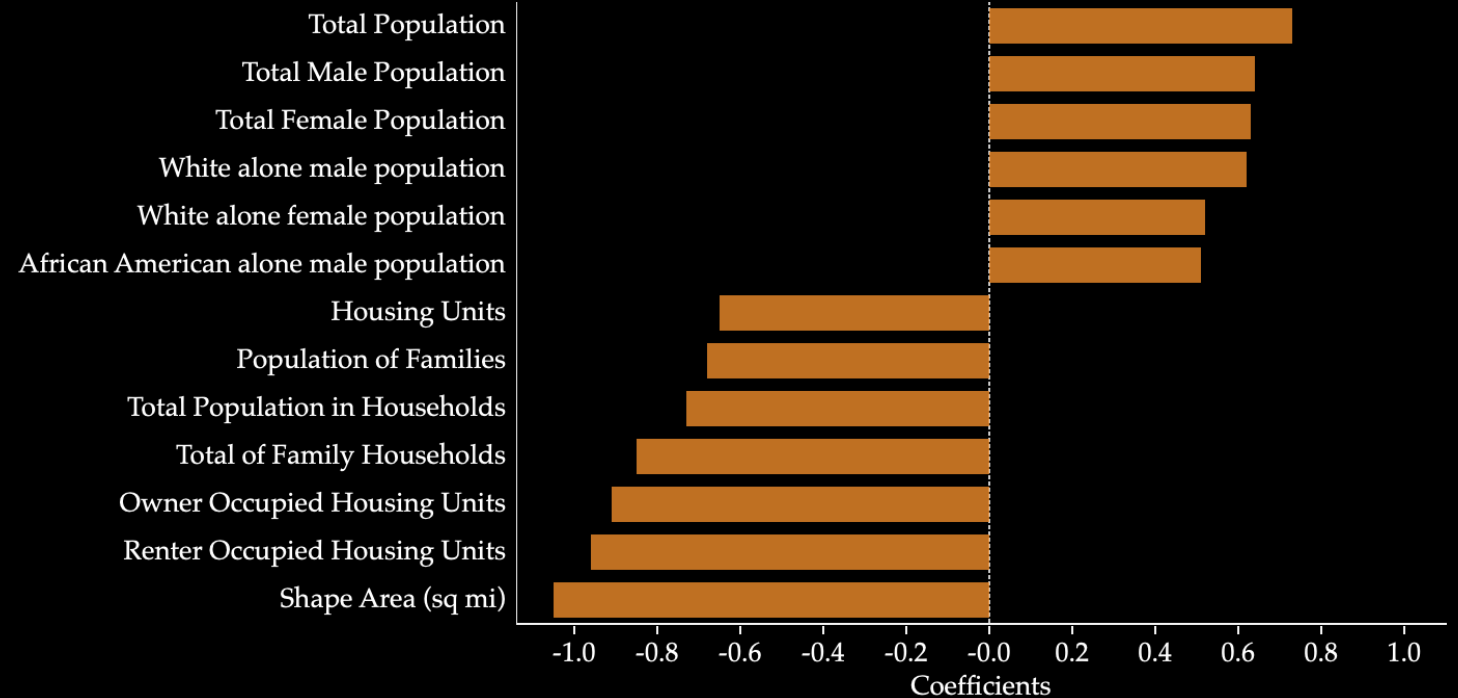
PC Biplot

- A visualization that explains contribution of variables

- We can see certain columns gravitating away from others

- These variables share features

Patterns Emerge – table for important variables

- Larger populations of lonelier people imply dismissal

- Complex social units in more open areas imply the opposite

- Does a social environment care more for civil rights?

Which court venues are more (or less) sympathetic to a filer's motion to dismiss?

Variable	
Total Population	
Total Male Population	
Total Female Population	
White alone male population	
White alone female population	
African American alone male population	
Housing Units	
Population of Families	
Total Population in Households	
Total of Family Households	
Owner Occupied Housing Units	
Renter Occupied Housing Units	
Shape Area (sq mi)	

Coefficients: -1.0 -0.8 -0.6 -0.4 -0.2 -0.0 0.2 0.4 0.6 0.8 1.0

Civil Right Case Filing Rate for Venues

Which court venues are more (or less) sympathetic to a filer's motion to dismiss?

District: Office

District: Office	Venue	Percentage
51: 1	Tennessee West.	49%
68: 2	North Dakota	47%
61: 3	Arkansas West.	46%
46: 2	Michigan West.	45%
65: 4	Missiouri East.	43%
50: 3	Tennessee Mid	43%
50: 2	Tennessee Mid	41%
69: 1	South Dakota	41%
49: 4	Tennessee East.	40%
55: 2	Illionois Mid	40%

Percentage Dissmissed
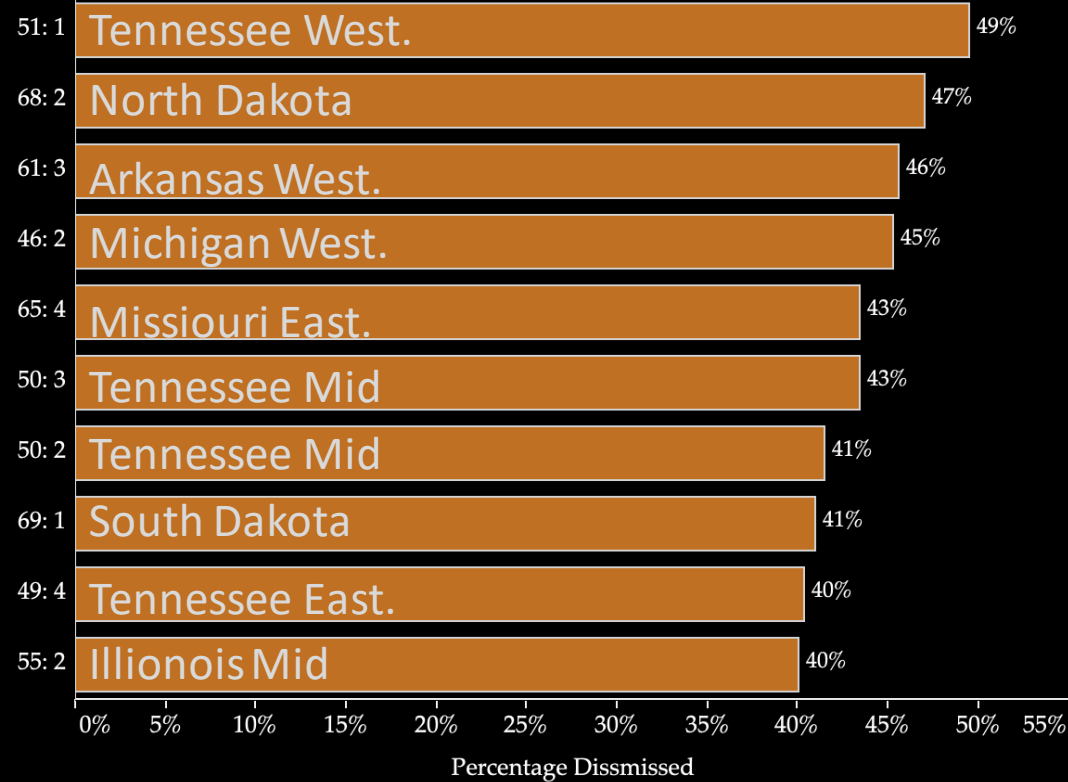
Which court venues are more (or less) sympathetic to a filer's motion for summary judgement?

District: Office

| District: Office	Venue	Percentage
67: 7	Nebraska	55%
44: 4	Kentucky Western	54%
57: 1	Wisconsin East.	54%
62: 6	Iowa North.	53%
68: 1	North Dakota	50%
61: 1	Arkansas West.	48%
68: 4	North Dakota	47%
46: 4	Michigan West	47%
45: 1	Michigan East	44%
43: 3	Kentucky East.	44%
45: 5	Michigan East.	44%
47: 3	Ohio North.	44%
44: 1	Kentucky West.	44%
55: 4	Indiana North	43%
53: 2	Illinois CN	42%

Percentage of Summary Judgements

Courtroom Bias

- Districts and Courts can skew more towards defendants or plaintiffs

- Best shown by looking at percentage rates of motion approval

- The why is tougher, but demographics offer ideas.

Area plot of average percentage rates for Judgement Supremacy Motions by District
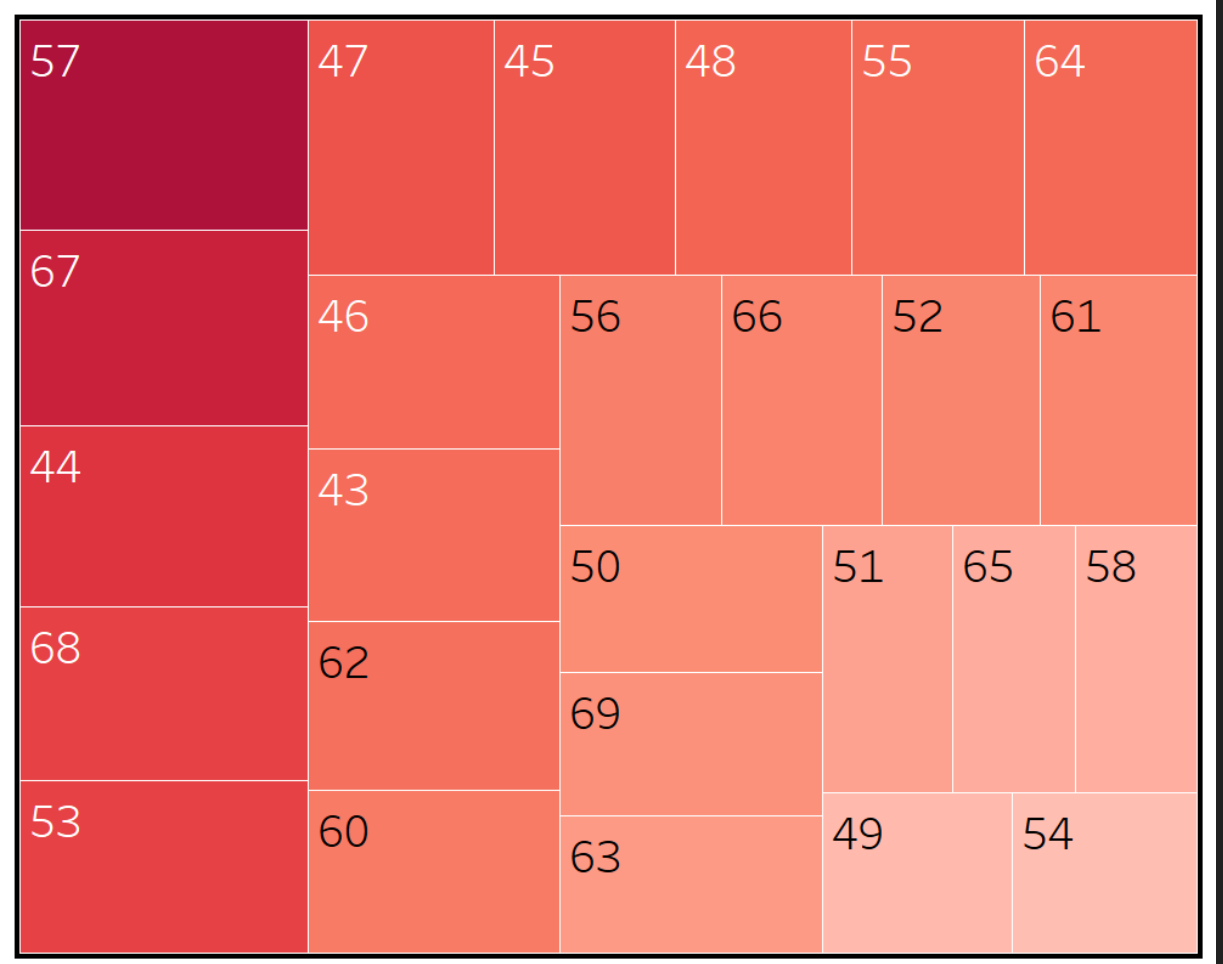
Courtroom Score

- A numeric measure gotten from total motion verdicts

- Only one kind of termination per trial, a pass negates previous failures

| Denied	Denied as Moot	Other	Granted in Part	Granted
-2	-1	0	+1	+2

Visualizing Scores

- All but 6 districts favor defense

- Dist. 52, Office 1 (Oakland County, Michigan) seems to favor them excessively high

- Dist. 45, Office 5 (Bexar County, Texas) is the most in favor of the plaintiff by this metric

Packed Areas of Surplus Score by District Offices

Dist. 52, Off. 1
3,086
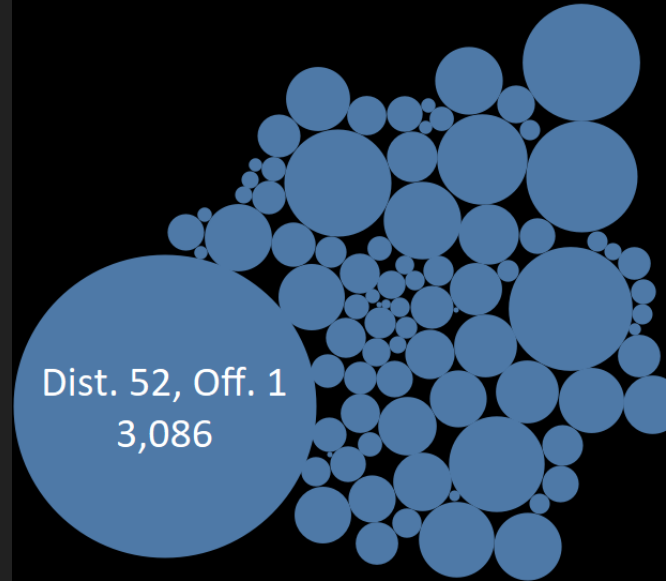
Note the differing Scales

Packed Areas of Negative Score by District Office

Dist. 45, Off. 5
45
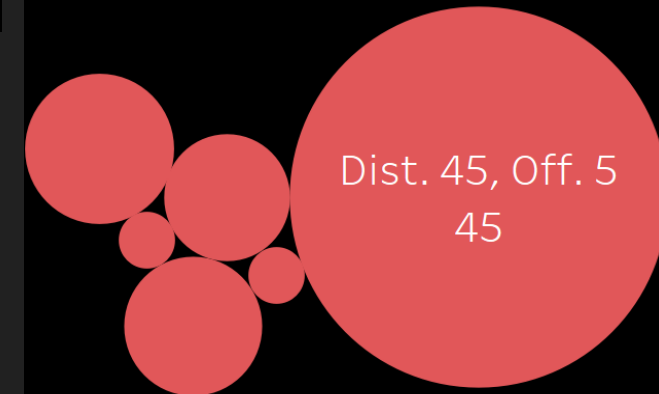
Associations for Motion and Judge's Verdict on Outcome

- A more direct take on a court's attitude

- Sample size still is expected to be very low

- The findings may push one to try and pursue the collection this metric further
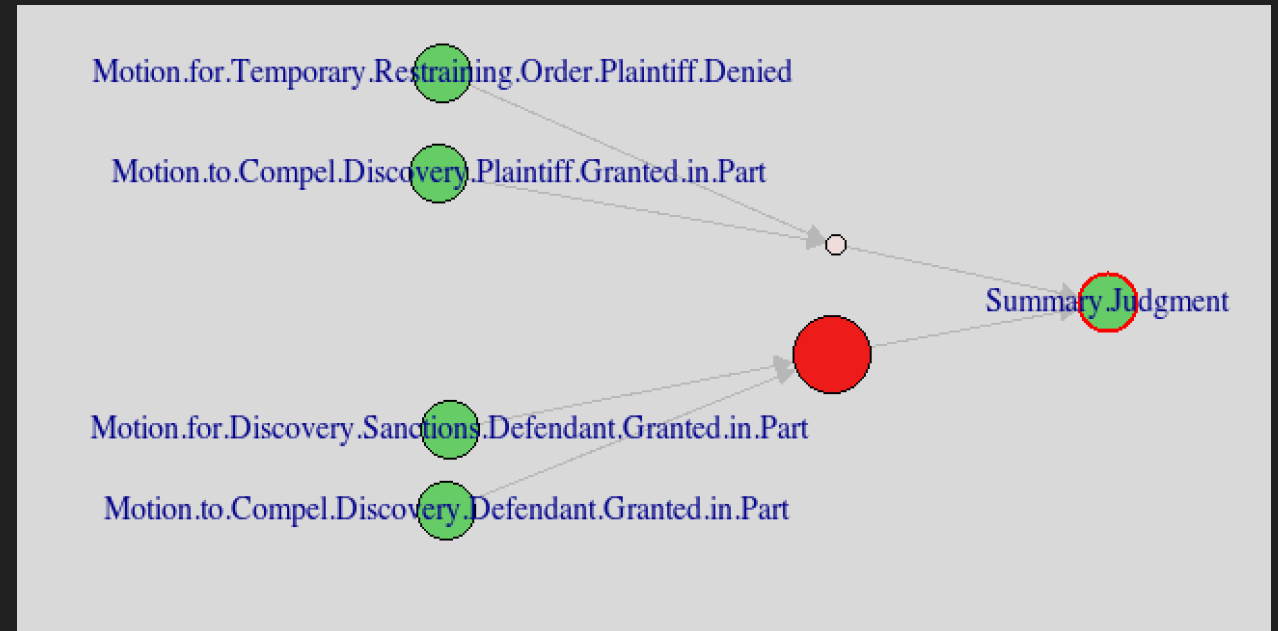
Best Decision Rules for Summary Judgement

Rule Set-up	Count	Support	Confidence	Lift
Motion to Compel Discovery Defendant Granted in Part,Motion for Discovery Sanctions Defendant Granted in Part	7	0.05%	87.5%	3.64
Motion to Compel Discovery Plaintiff Granted in Part, Motion for Temporary Restraining Order Plaintiff Denied	6	0.05%	87.6%	3.56

Best Decision Rules for Settlement

Rule Set-up	Count	Support	Confidence	Lift
Motion.for.Protective.Order.Plaintiff.Granted,Motion.for.Protective.Order.Defendant.Other	11	0.09%	78.5%	2.02
Motion.to.Compel.Discovery.Plaintiff.Granted.in.Part,Motion.for.Protective.Order.Plaintiff.Granted,Motion.to.Compel.Discovery.Plaintiff.Other	10	0.08%	77.7%	1.98

Association Rule Comprehends

- Pro-defendant motions lead to Dismissal, pro plaintiff ones lead to Sum. Judge.

- Settlements tended to see shared approval between each's demands

- Powerful when they occur, but low presence weakens practicality

Demographics on Outcome

- Using shrinkage methods reduction techniques such as elastinet and stepwise reduction

- Start with a lot a variables

- narrow it down to the most useful and least collineated

Predicting Future Cases

- Utilize the best variables we found both from and outside the provided data

- Hope to provide a probability of outcomes

- Use multiple models, cross-validate to find the best

Models Considered (Judgement Summary)

MODEL	AUC	ACC. On Train	ACC on Validation
Random Forest	84.84%	80%	81%
Neural Network	82.82%	81%	78%
Logistic Regression	80.8%	80%	80%
Step-Wise	75%	78%	73%
Elastic Net	76%	74%	78%

Final

- Judgement Summary – Random Forest

- Settlement – Neural Network

- Each model performed the best in its category

Conclusion

- The makeup of a community in terms of raw population impacts the perception of civil rights cases

- In general, there is a skewness towards the defendants for these kinds of cases for the observations observed

- However, we only have data for a portion of the United States, among other critiques