



# 2016 ELECTION

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# DATA OVERVIEW

## Key Data Points:

- **2016 Data**
- **Primary Results:** Candidate, Party, Vote Count & Pct.
- **County Demographics:** 3,144 counties (55 columns) - Pop.,  
Gender, Race, Edu, Income, etc.
- **35.6% Missing Values**

# MISSING VALUES

- Alaska
- Colorado
- Connecticut
- Illinois
- Kansas
- Maine

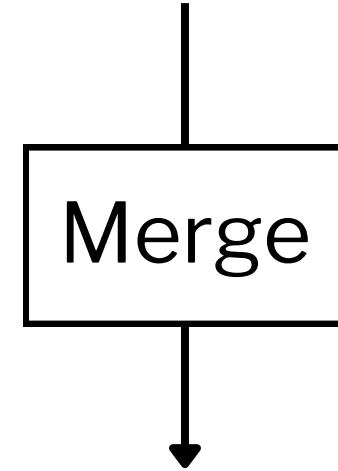
<b>Democratic Votes</b>	<b>3%</b>
<b>Republican Votes</b>	<b>15%</b>
<b>Democratic Votes (Fraction)</b>	<b>3%</b>
<b>Republican Votes (Fraction)</b>	<b>15%</b>
<b>Fips</b>	<b>33.5%</b>
...	<b>33.5%</b>

- Massachusetts
- North Dakota
- Rhode Island
- Vermont
- Wyoming

## Primary results:

Include counties that aren't real:

- State House District 1, State House District 10, State House District 11, etc.



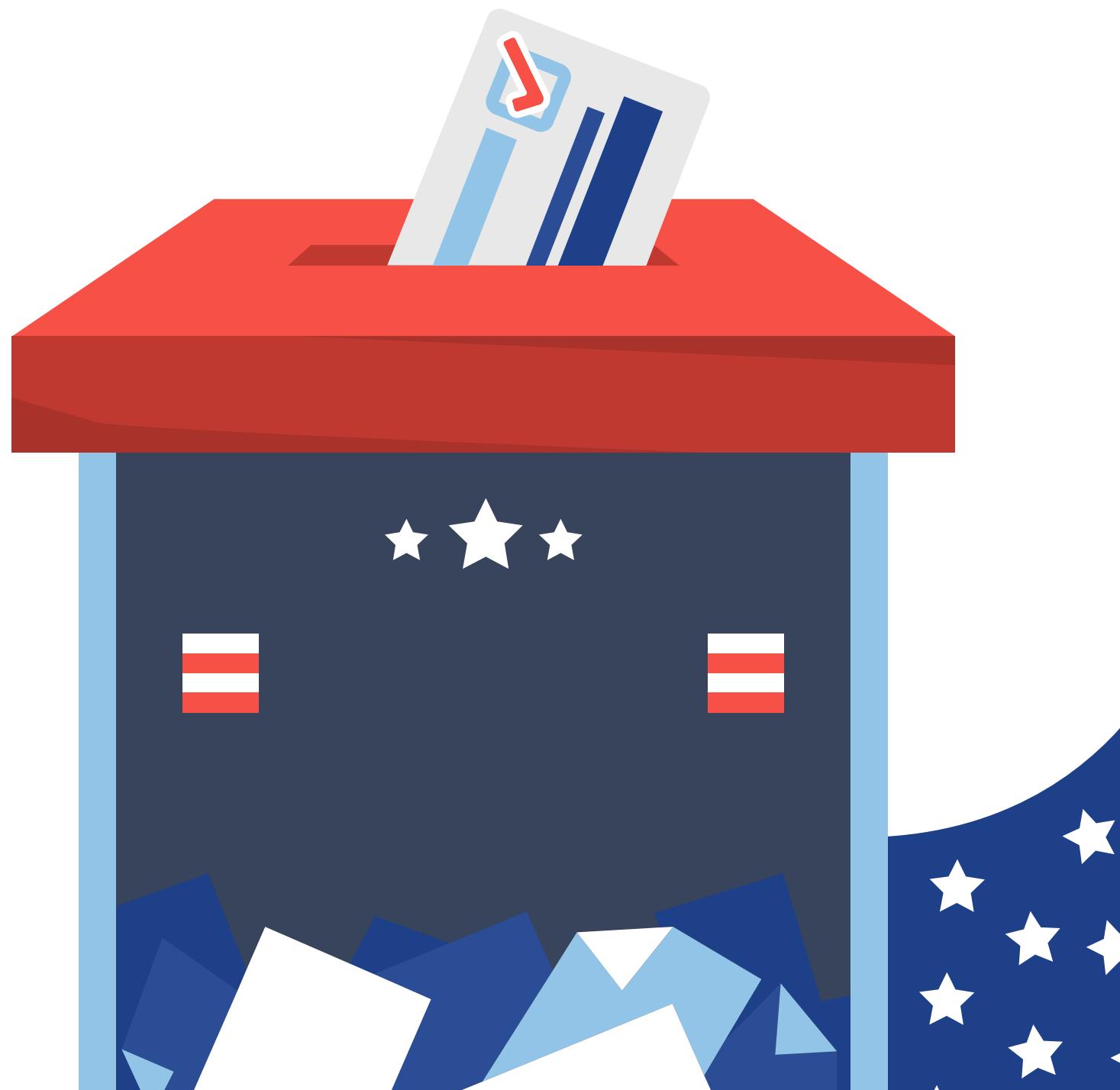
## Merged df:

Counties with no demographic information



**Q: CAN WE USE DEMOGRAPHIC FACTORS TO PREDICT VOTER  
TENDENCIES IN U.S. COUNTIES?**

# OVERVIEW



# WINNING PARTY - OVERALL VOTES

Democratic

46.9%

Republican

53.1%

Total number of votes

# WINNING PARTY SHARE - COUNTY LEVEL.

**Democratic**

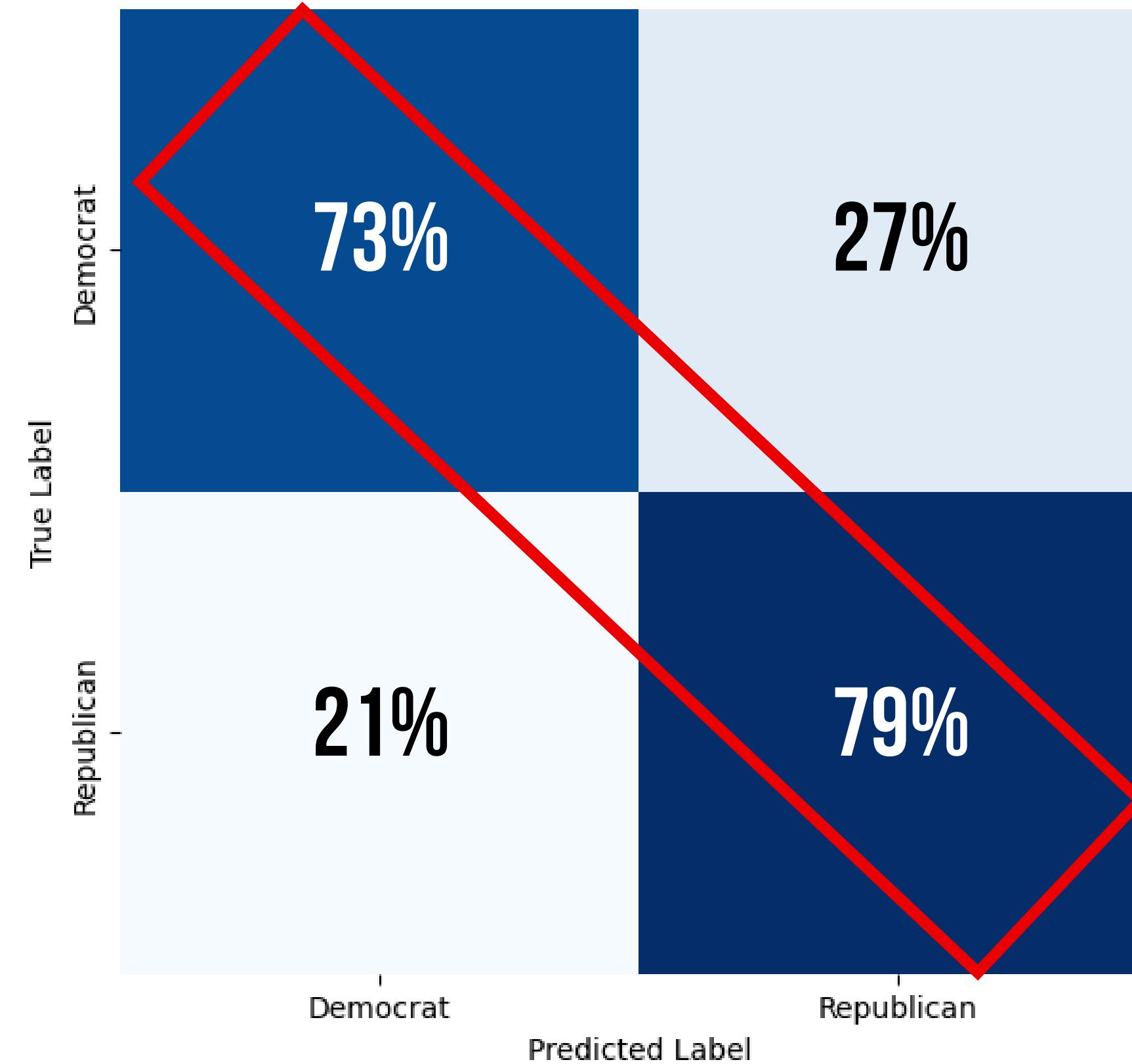
**22.9%**

**Republican**

**77.1%**

**Percent of counties that voted Democrat or Republican**

# CONFUSION MATRIX NORMALIZED

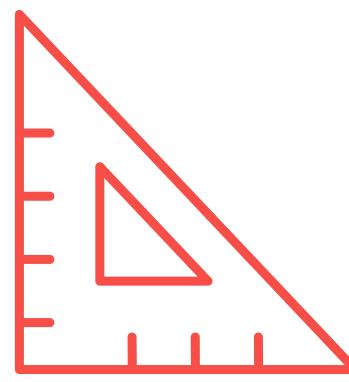


# METRICS



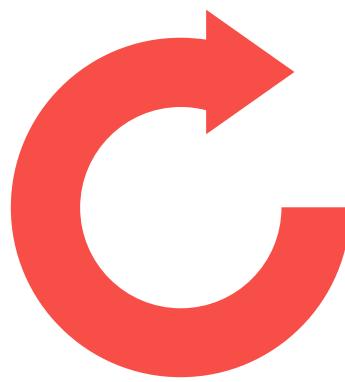
ACCURACY

77.5%



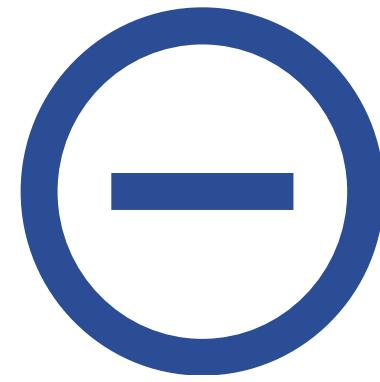
HIGH PRECISION

90% 



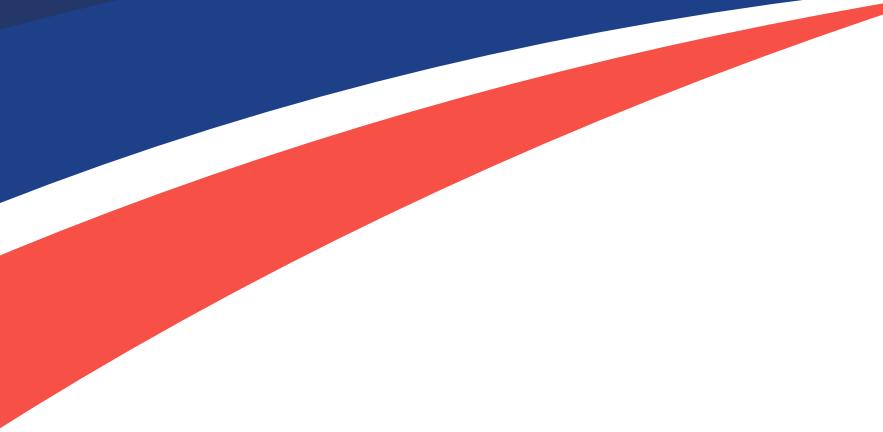
GOOD RECALL

79% 

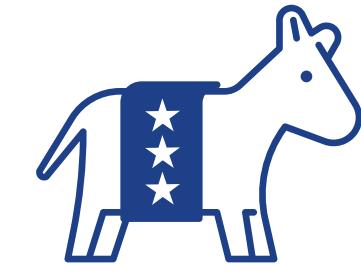


AUROC

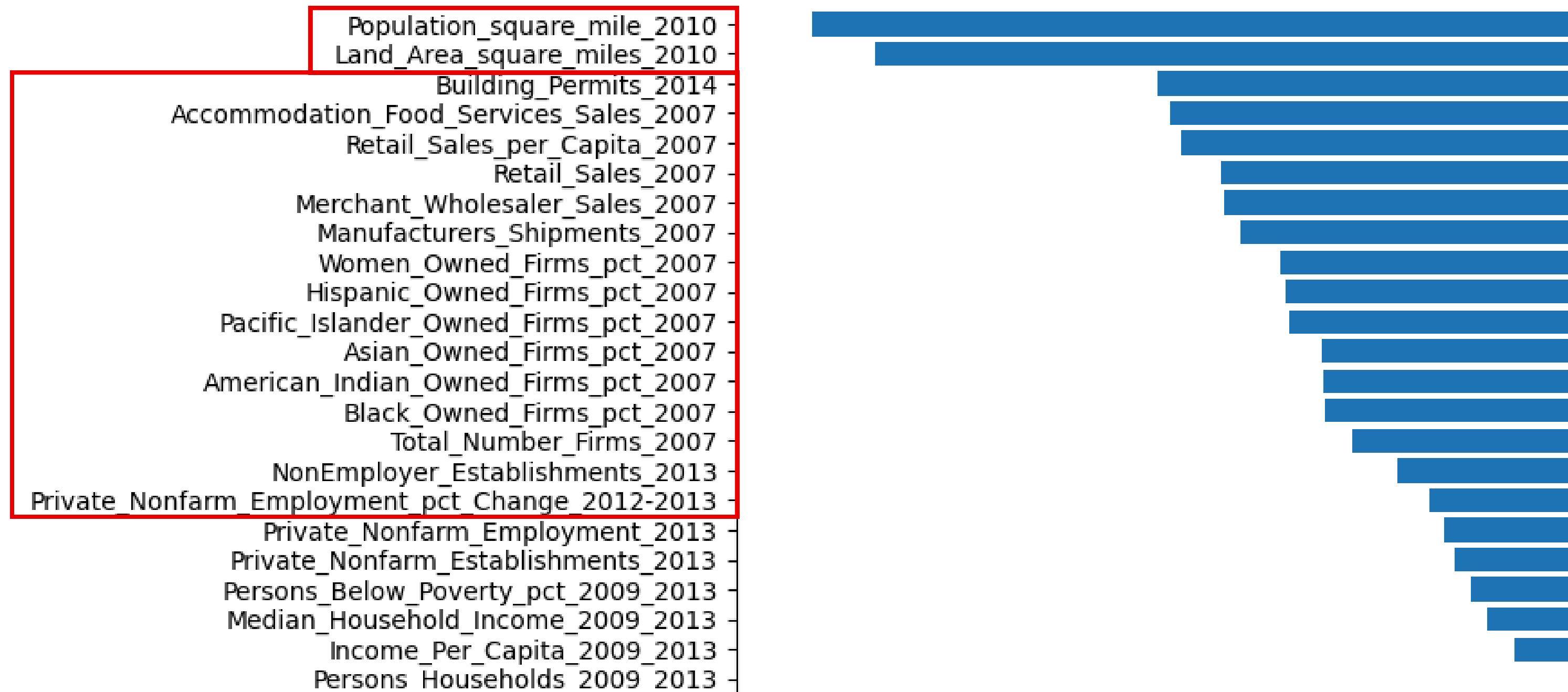
82%



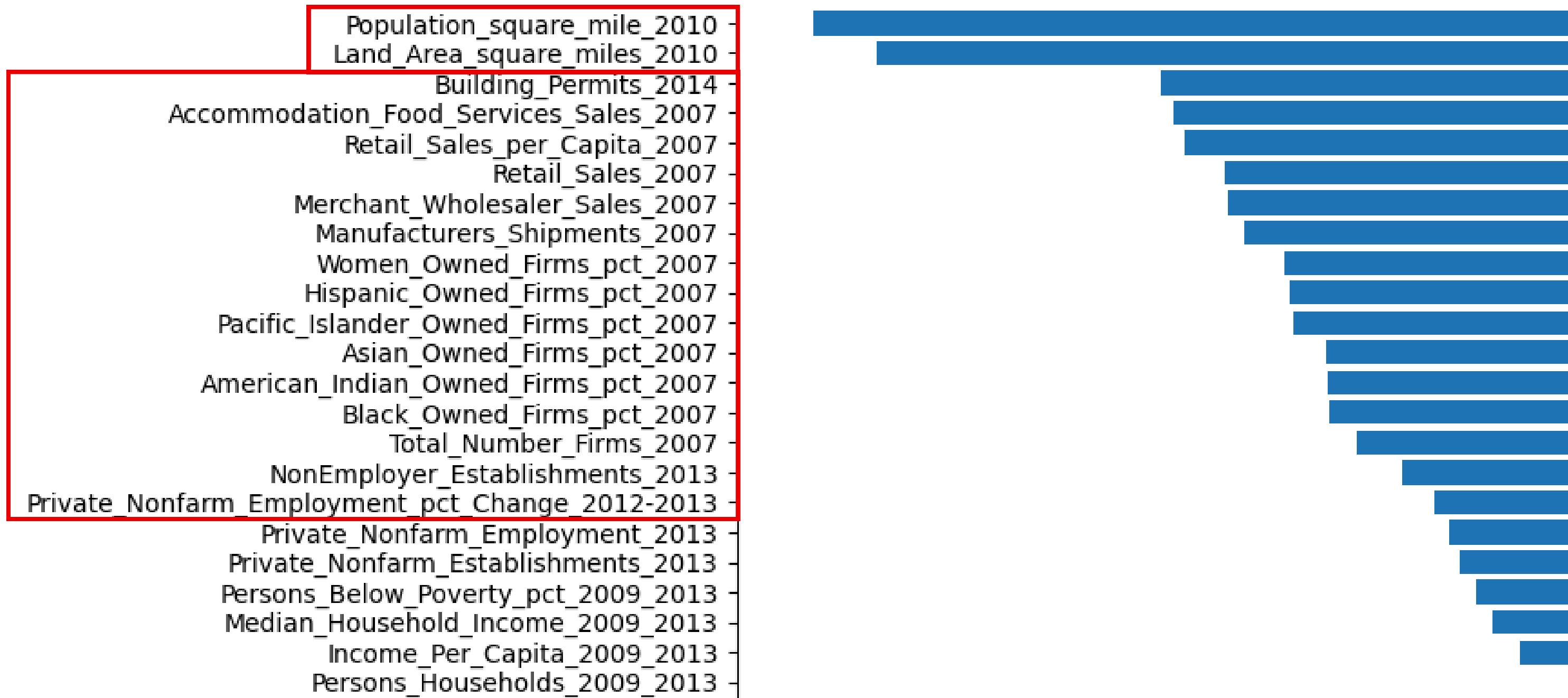
**DEMOCRATIC**



# COEFFICIENTS - DEMOCRATIC PARTY

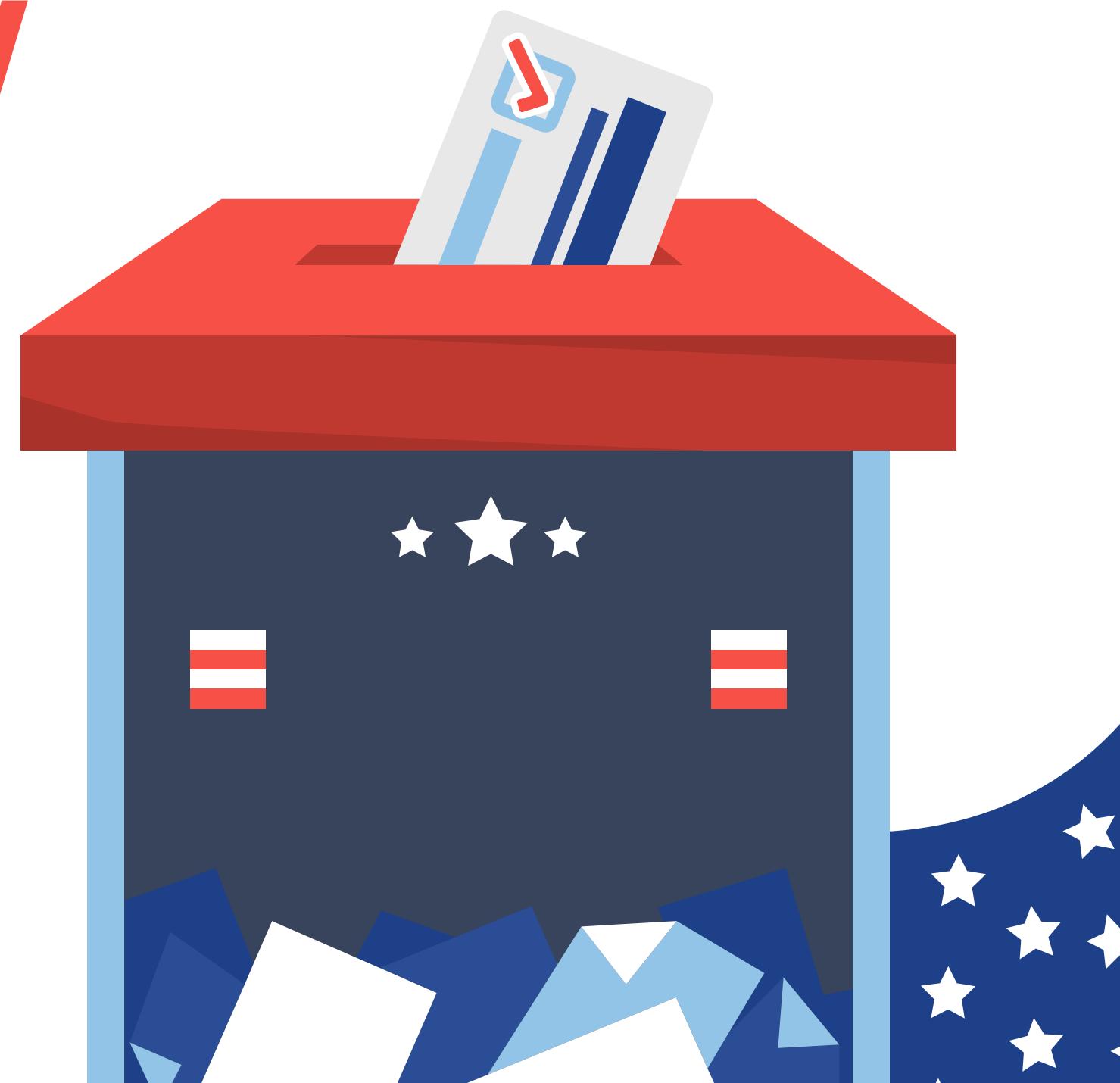


# COEFFICIENTS - DEMOCRATIC PARTY

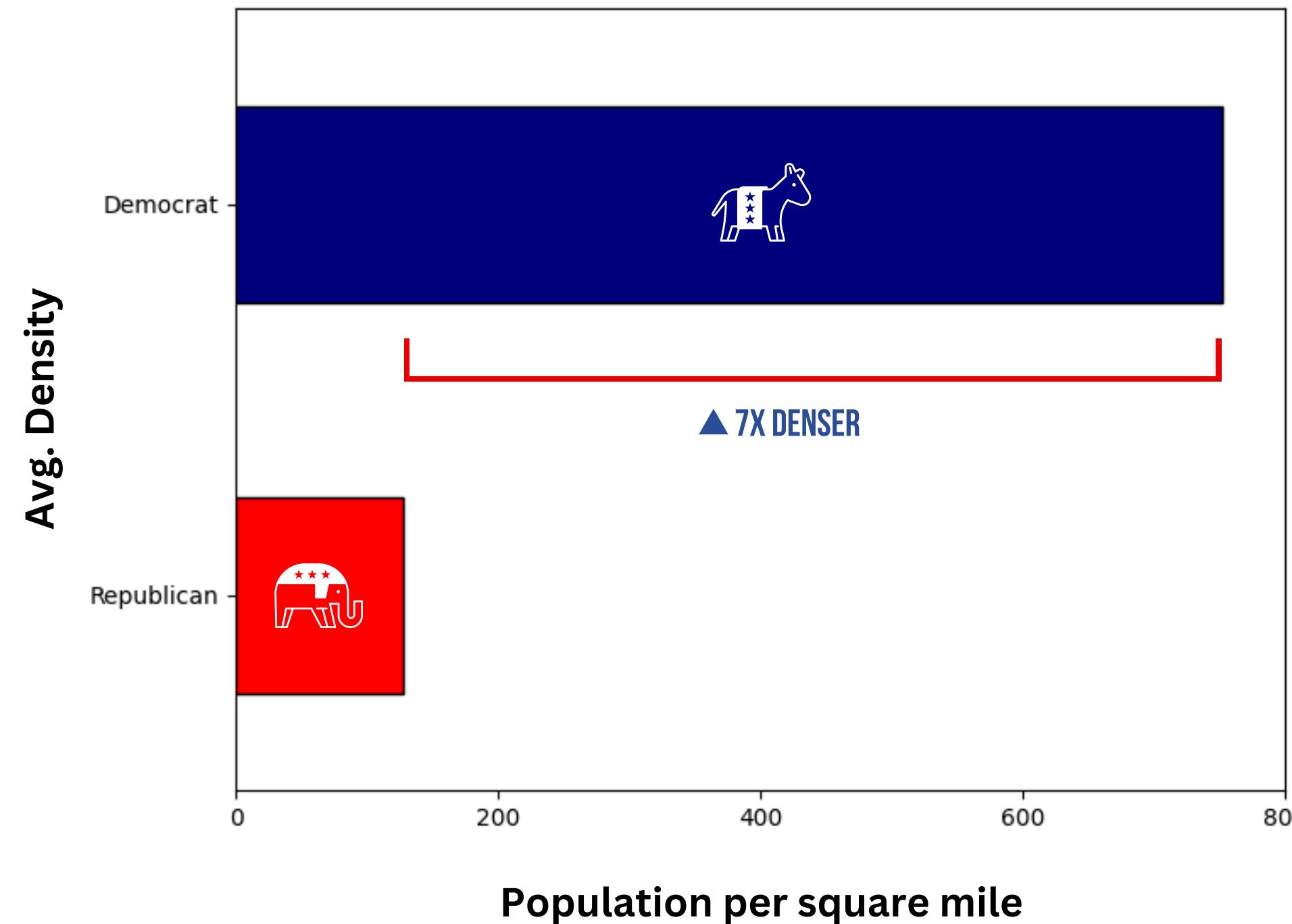


# POPULATION DENSITY

How does county population density influence party vote partiality?



# AVERAGE COUNTY POP. DENSITY BY WINNING PARTY

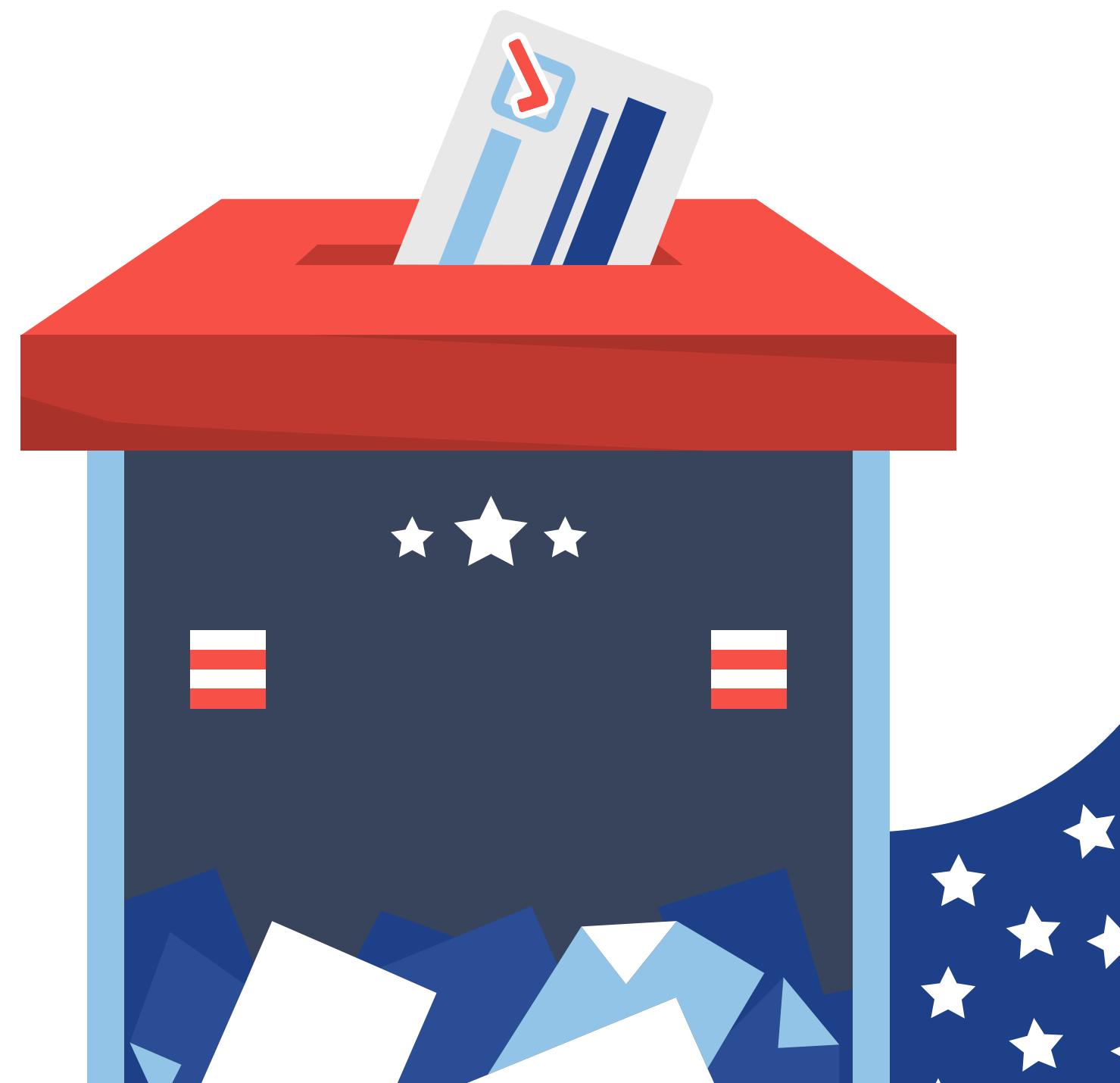


## 2016 Political Context:

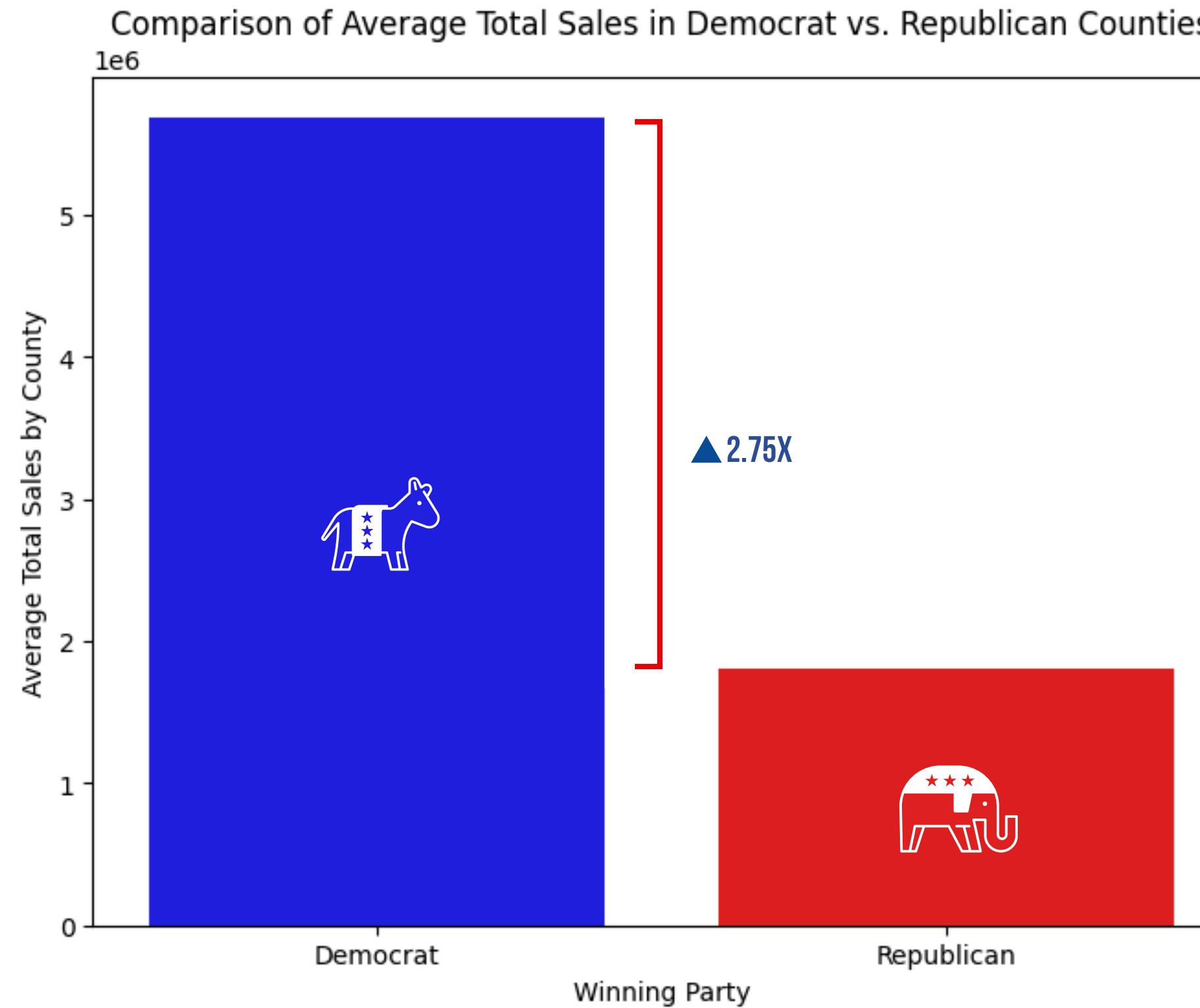
- Historical Robust Rural Support
- 2X Rep Rural Support ('10)
- Strong Urban Dem. Support (65%)
- Suburban = Divided Split

# COUNTY ECONOMICS

How does a county's **total business sales** influence vote shares?



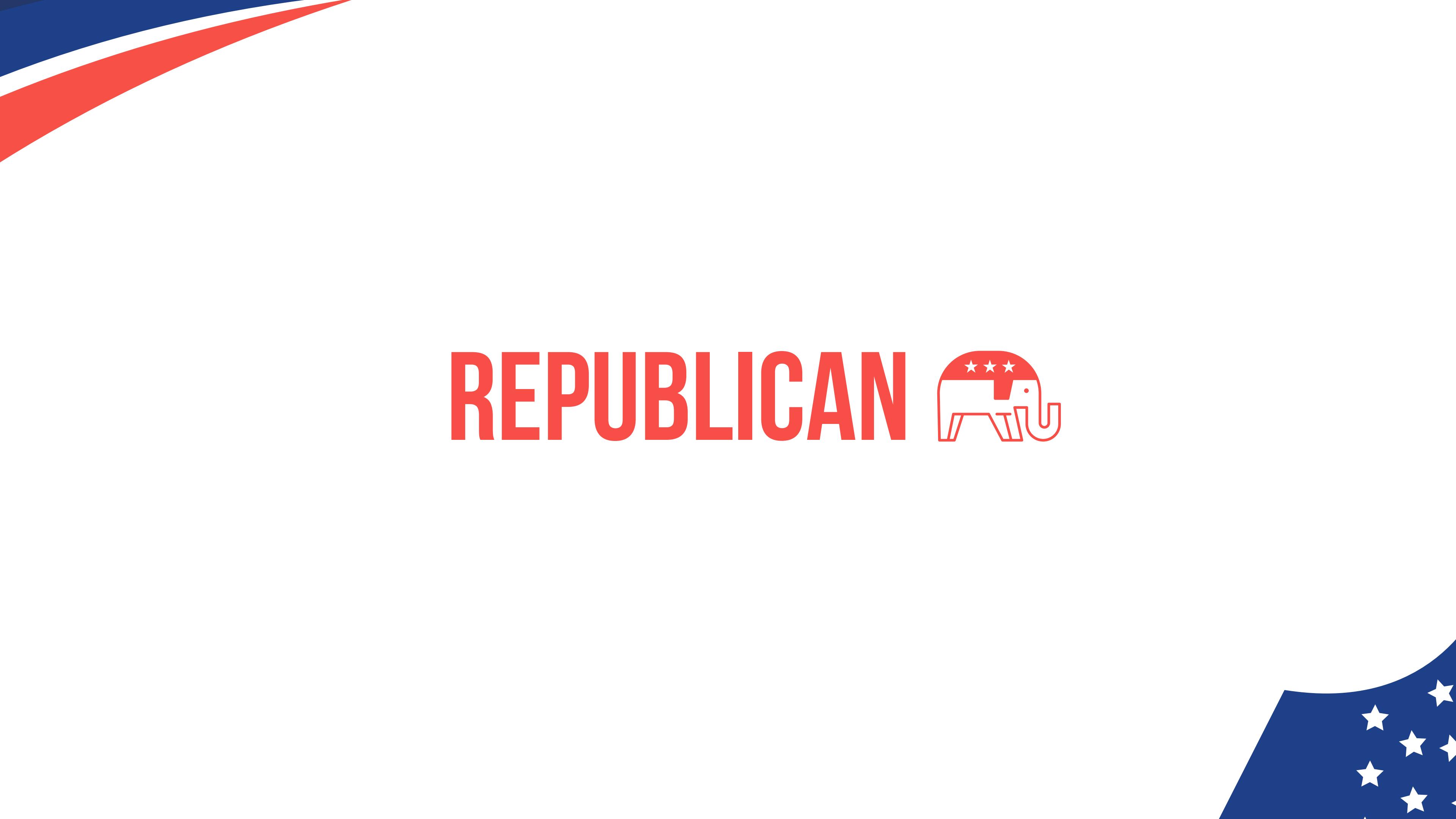
# AVG. COUNTY-WIDE SALES



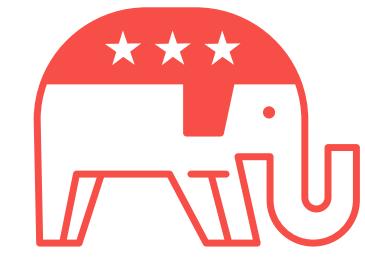
## 2016 Political Context:

*Clinton vs. Trump (extra info.)*

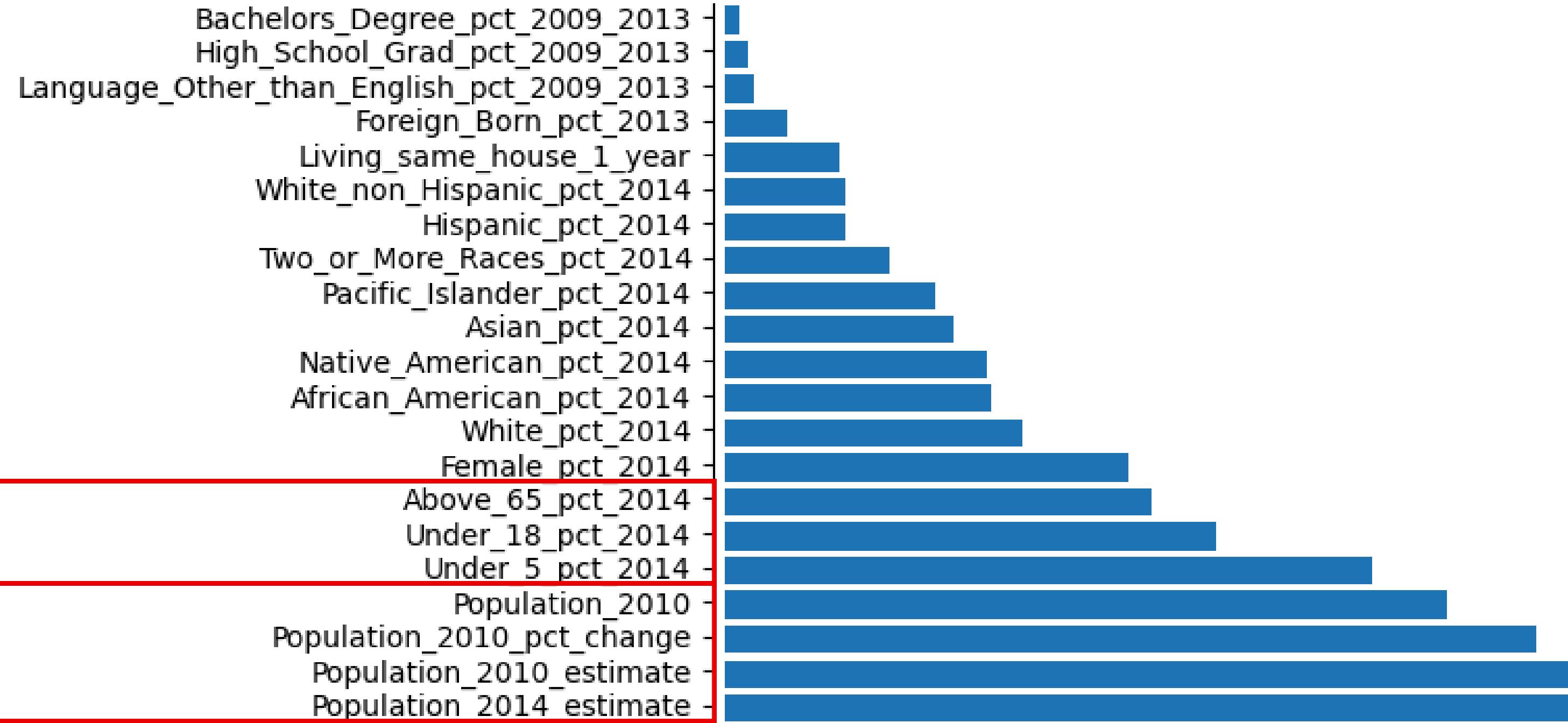
- 2584 Counties Won = 36%
- 472 Counties Won = 64%



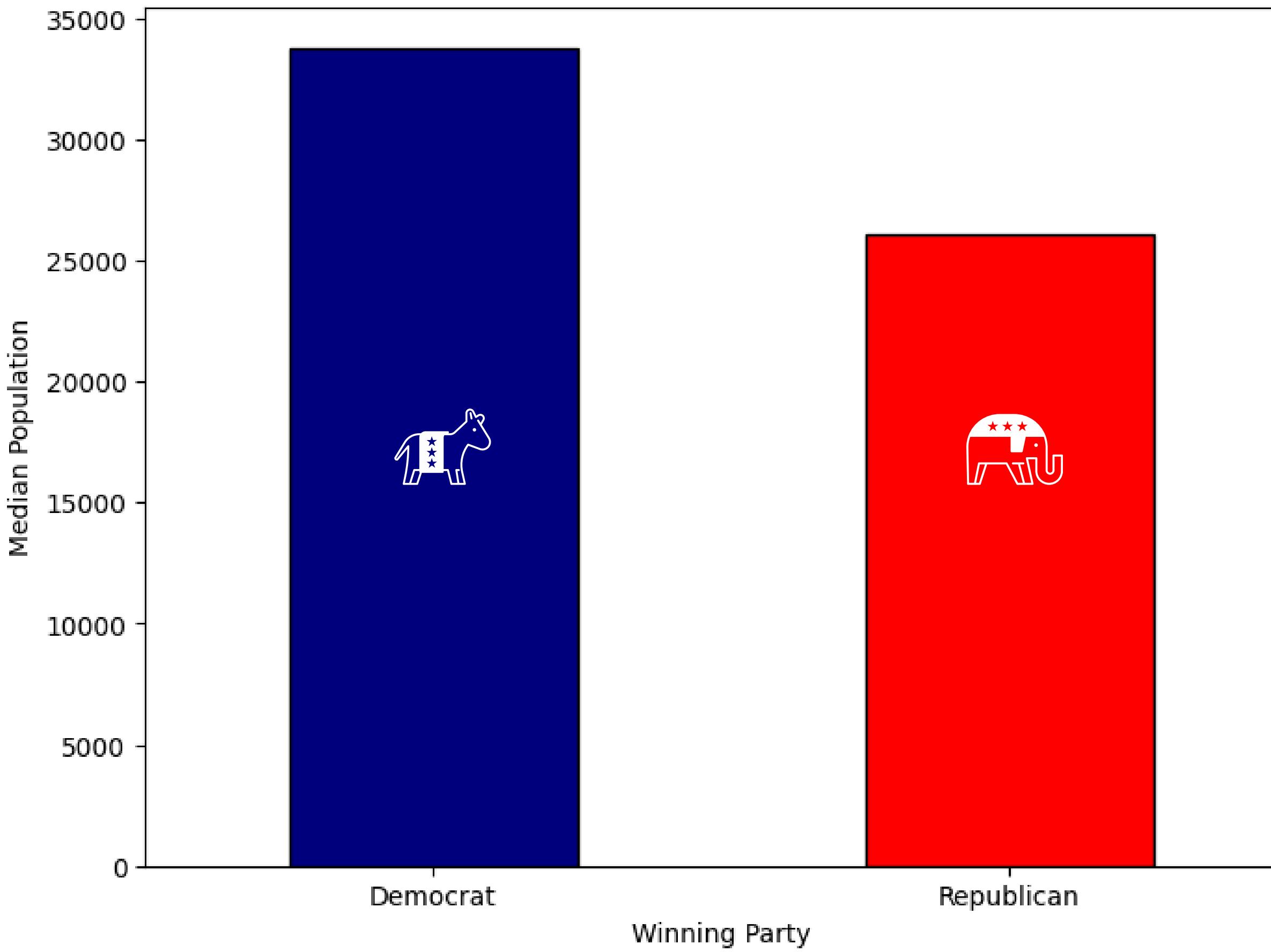
**REPUBLICAN**



# COEFFICIENTS - REPUBLICAN PARTY



# MEDIAN POPULATION BY WINNING PARTY



# WHY IS THIS THE CASE?

## DATA IMBALANCE

**Multiple small Republican counties** may **skew model** to associate pop. as (+) correlated with Republican outcomes.

## OTHER VARIABLES

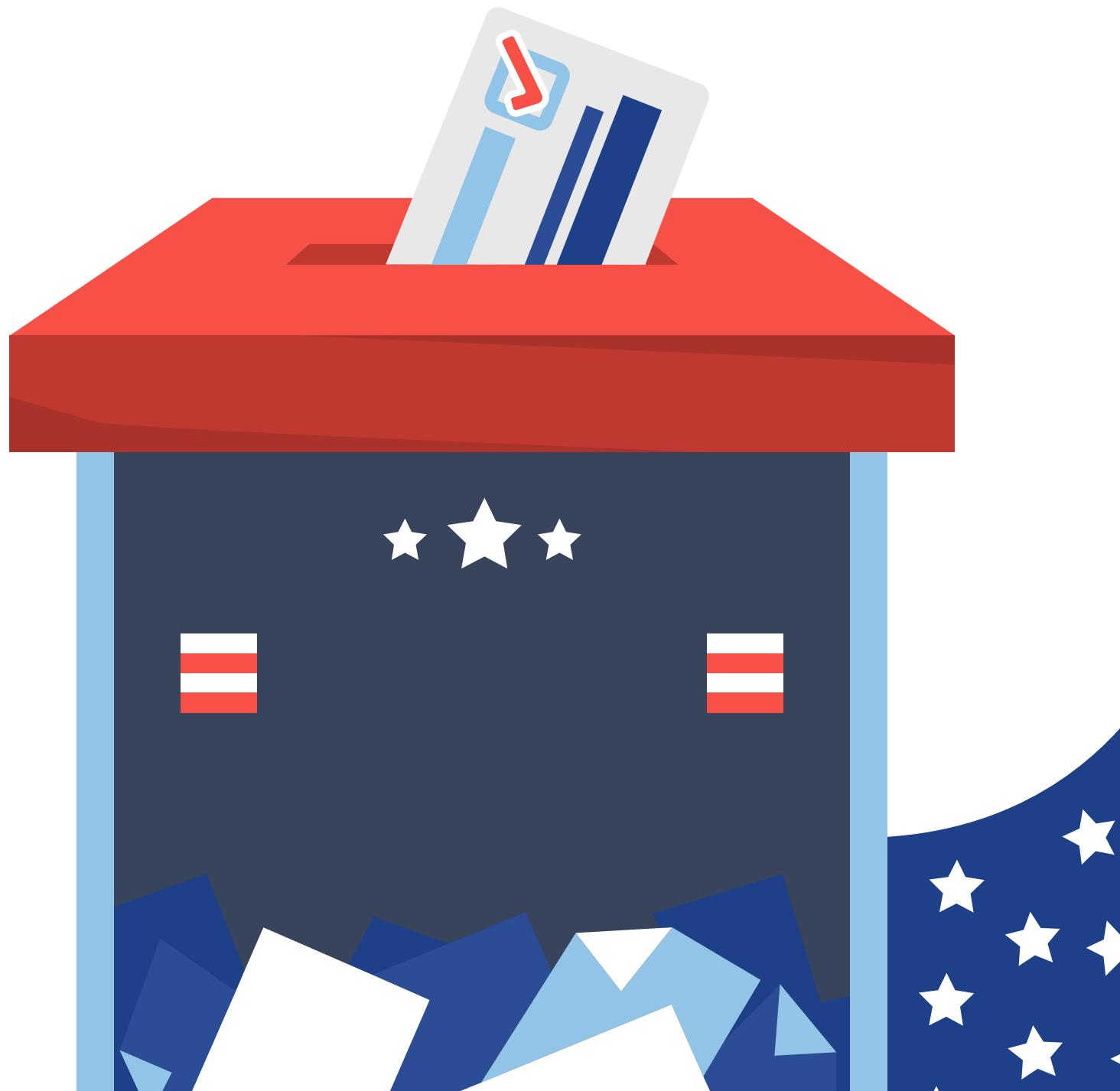
**When controlling** for race, poverty, age groups, etc., the **partial relationship with pop. can flip sign.**

## POP. VS. DENSITY

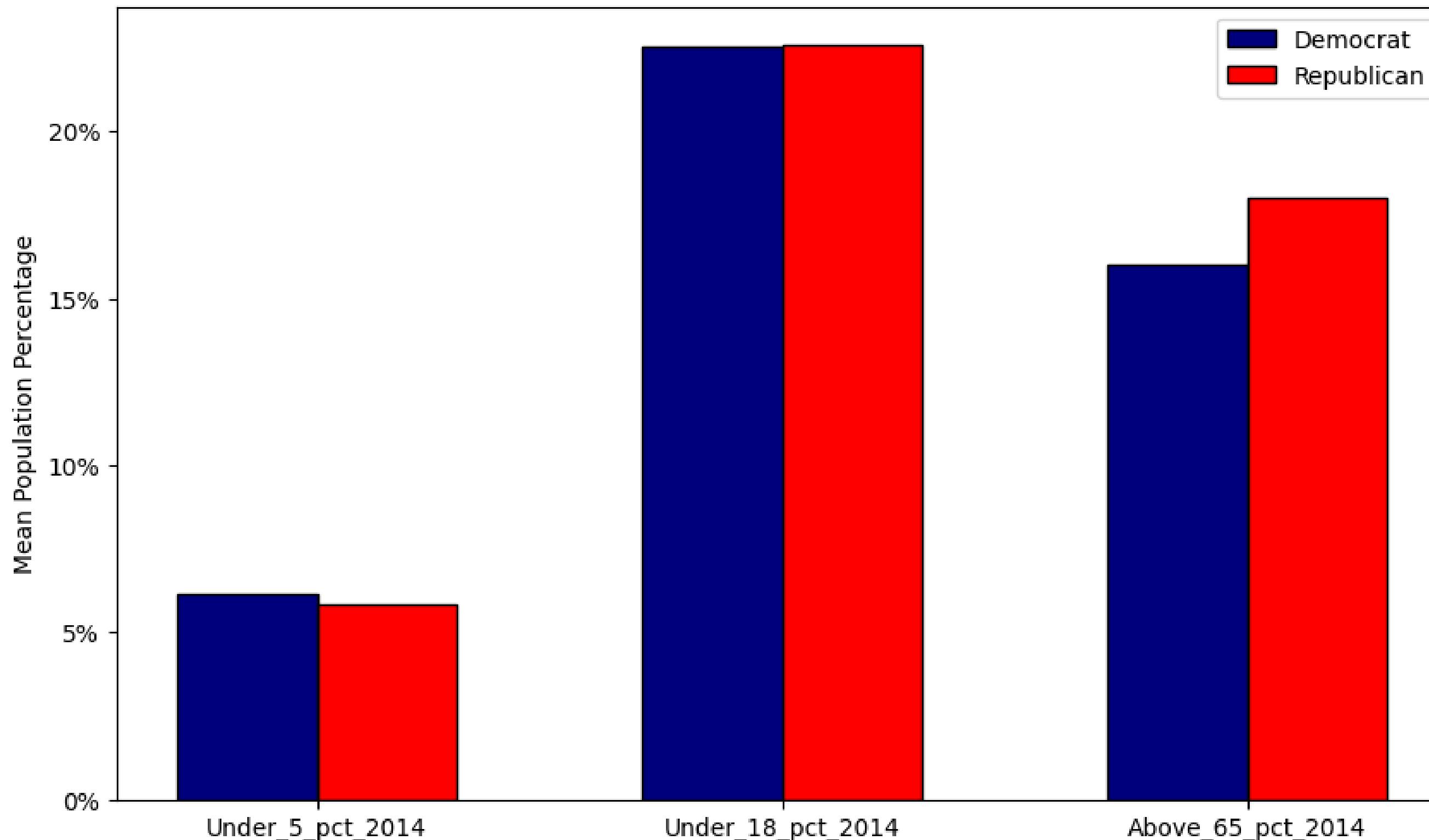
Large counties **aren't** necessarily **dense** (urban).

# HOUSEHOLD AGE

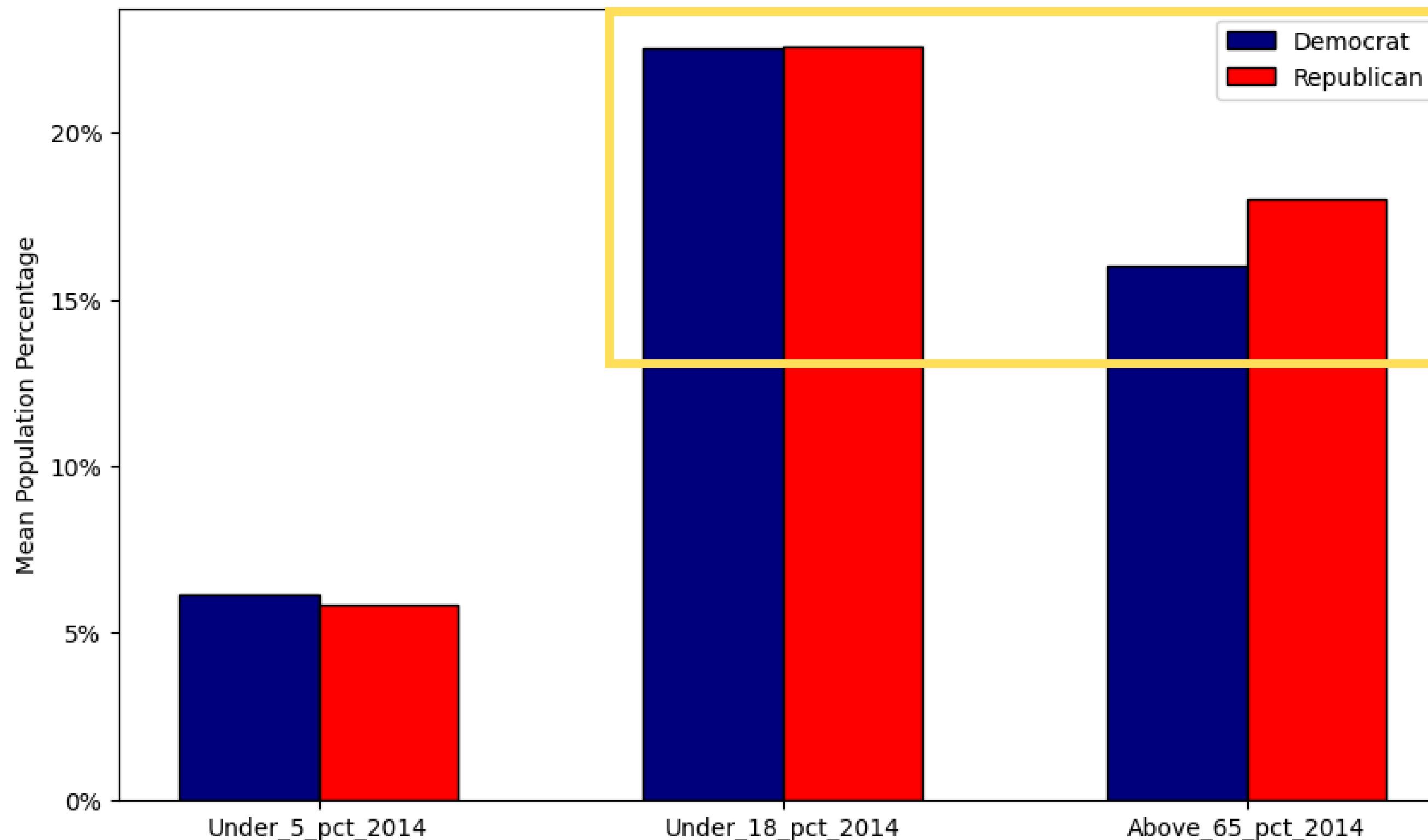
How do **age ranges** within a household affect voter tendencies?



# HOW DO HOUSEHOLD AGE GROUPS CHANGE VOTING?

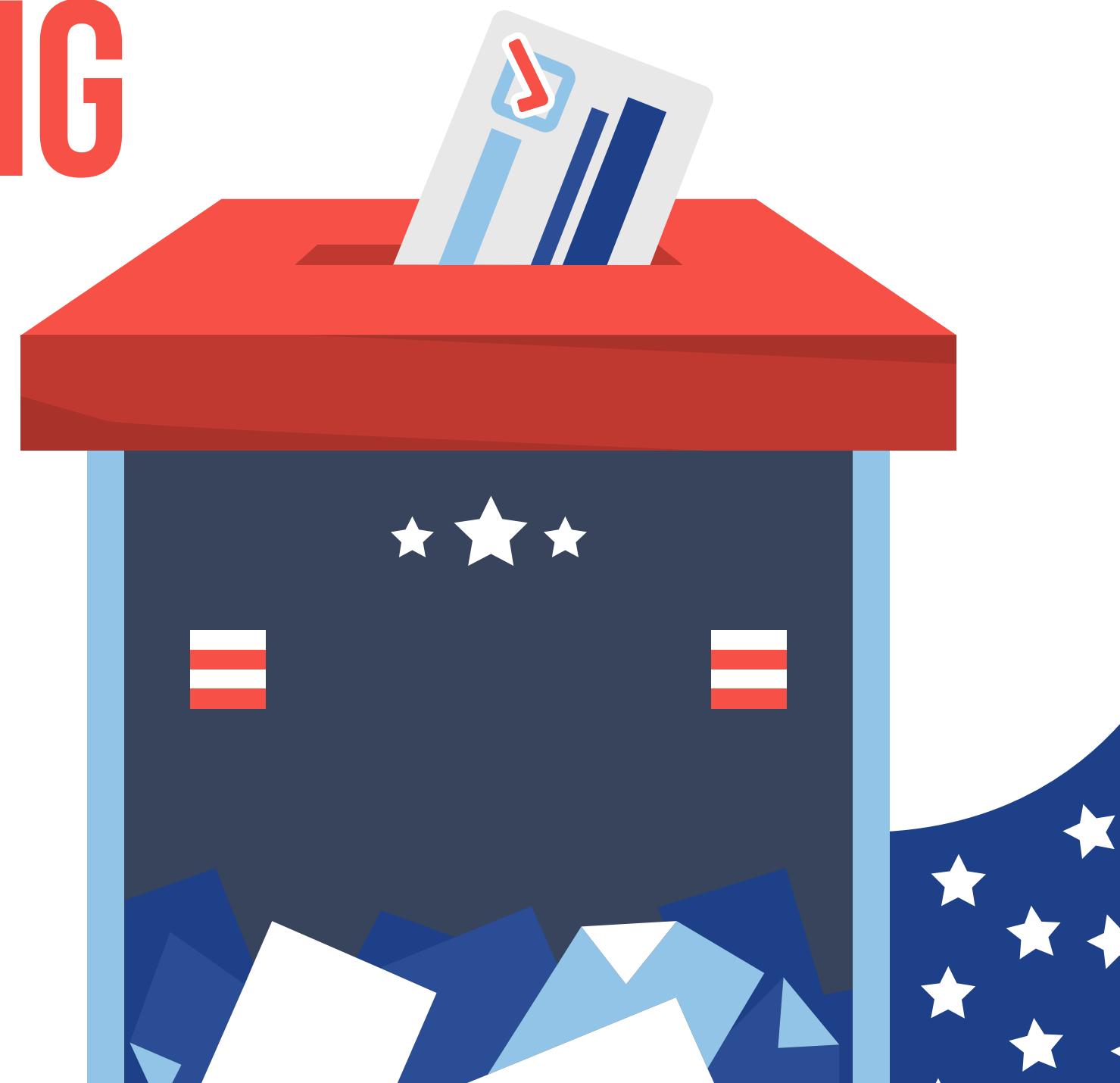


# HOW DO HOUSEHOLD AGE GROUPS CHANGE VOTING?



# FEATURE ENGINEERING

Can we **fine-tune** the model for better performance?



# VARIANCE INFLATION FACTOR (VIF)

**Purpose:** Evaluates level of correlation between predictor (feature) in a regression model

A high ▲ VIF means a feature is **redundant** because it **shares too much info.** with other **features**

**Can make the model unstable.**

# VARIANCE INFLATION FACTOR (VIF)

**County\_Size\_Index**

Population 2010	Households 2009_2013	Population 2014 estimate	Housing_Units 2014	...
--------------------	-------------------------	-----------------------------	-----------------------	-----

**Youth\_pct\_2014**

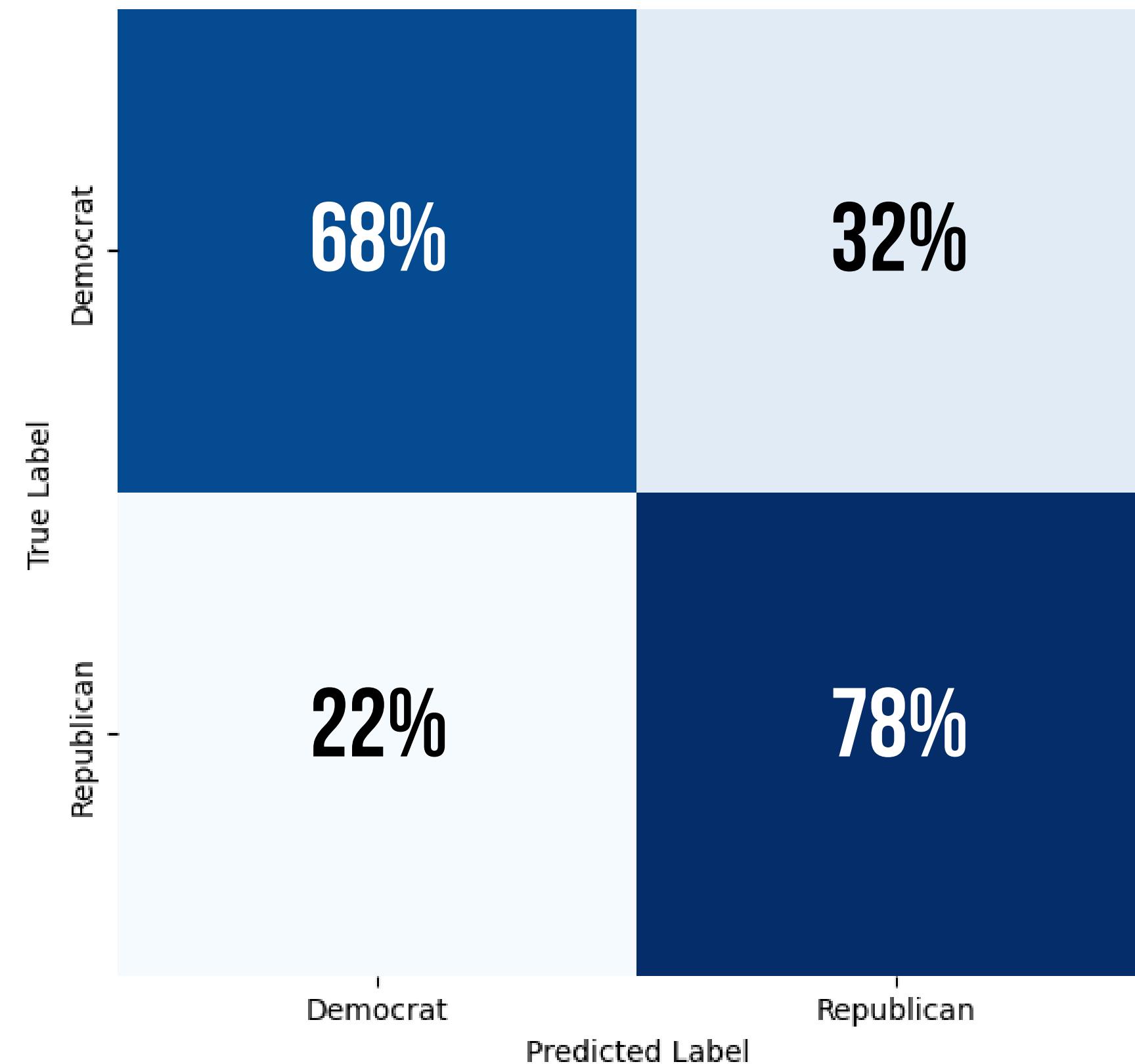
Under_5_pct_2014	Under_18_pct_2014
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**Income\_Index**

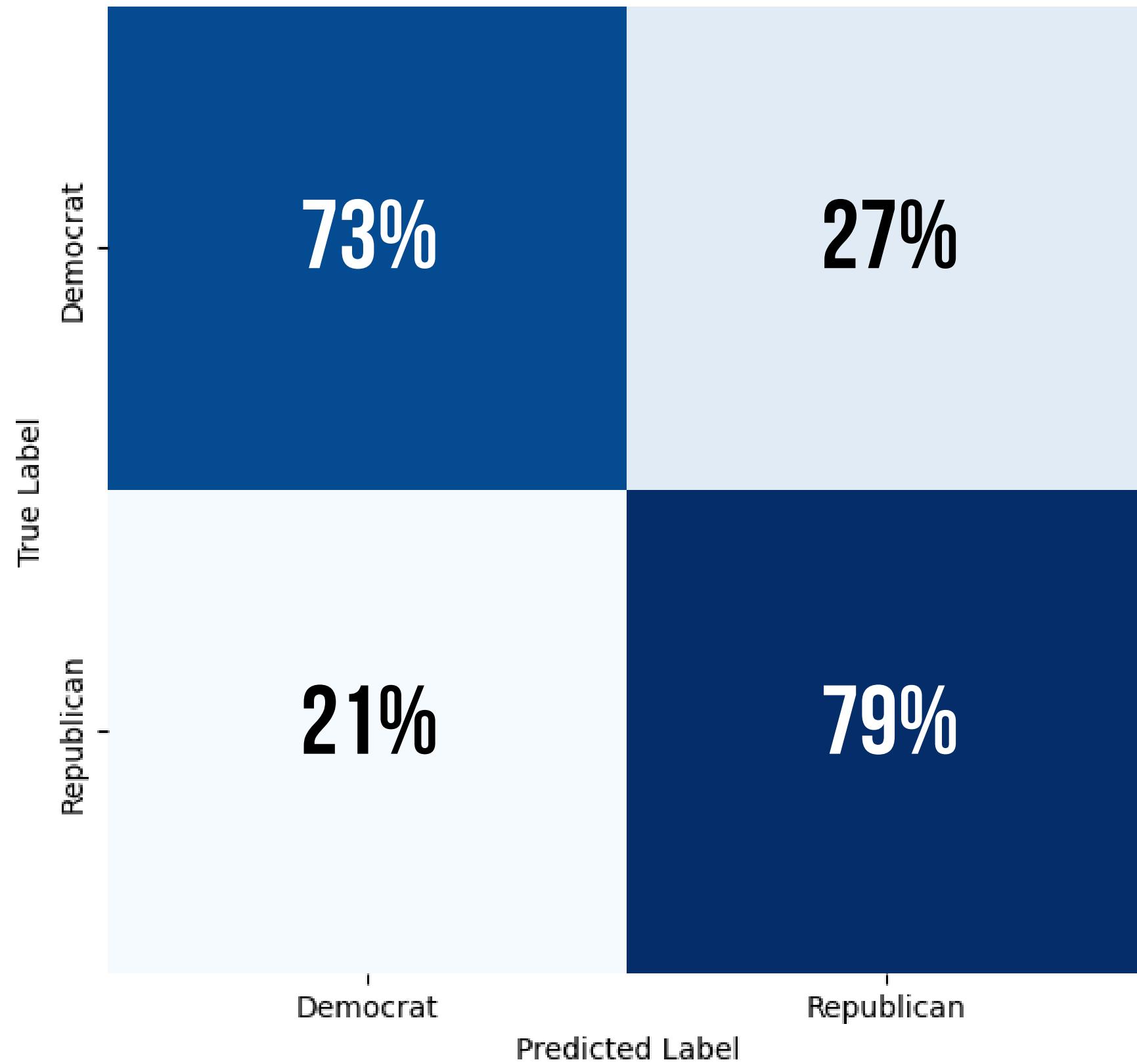
Median_Household_Income 2009_2013	Income_Per_Capita_2009_2013
--------------------------------------	-----------------------------

Correlation threshold = 0.8

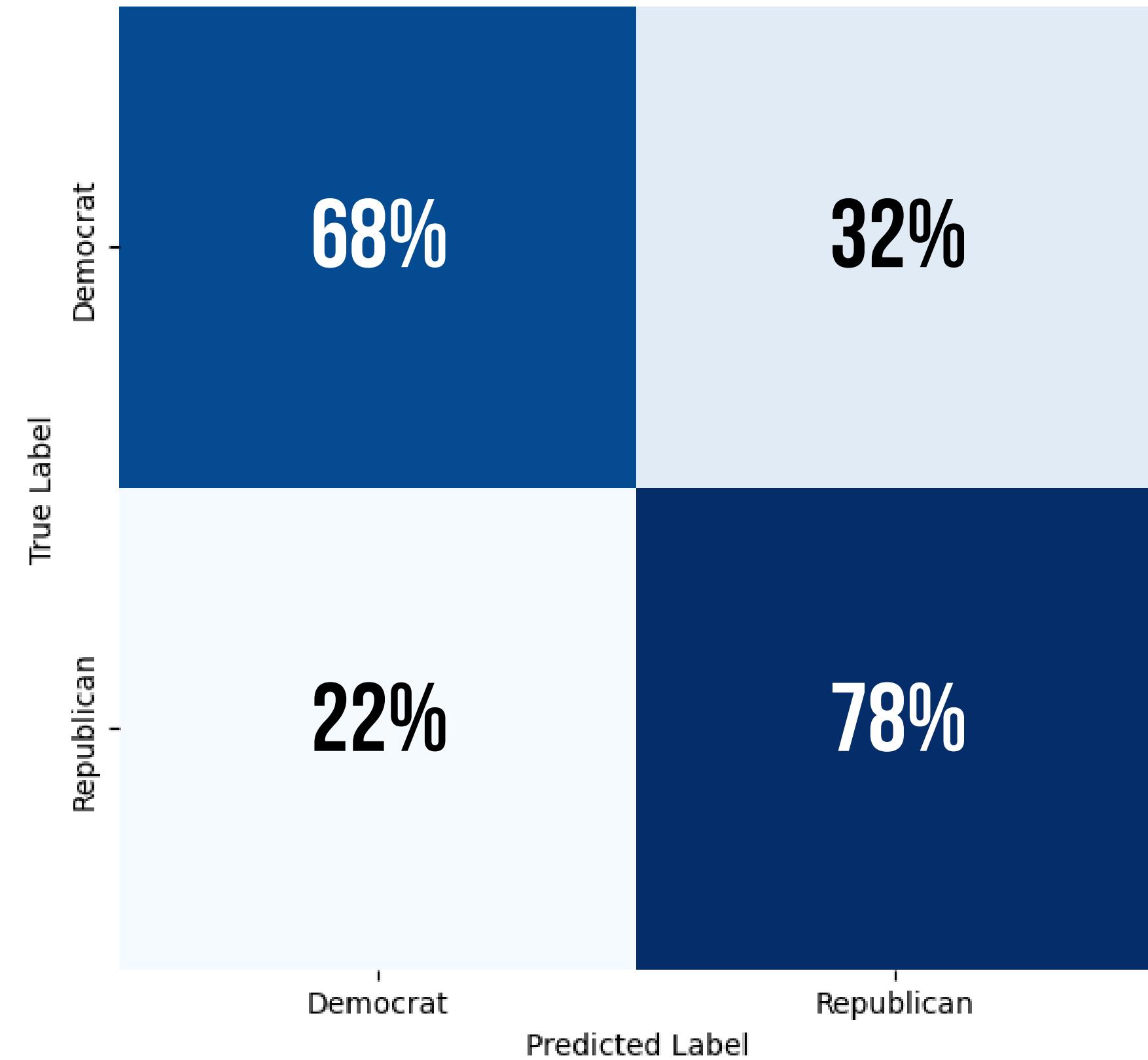
# CONFUSION MATRIX



# OLD



# NEW



# SUMMARY

- **Data Limitations:**
  - 35 % missing values
  - Data Imbalance: Republican-leaning
- Dense counties & Total Sales = More Democratic Tendencies
- Household Age Groups Influence Voting Dynamics
- Feature Engineering = We Tried - Accuracy Levels Dropped



# THANK YOU

Questions?



# WHY IS THIS THE CASE?

## DATA IMBALANCE

With **many small** Republican-leaning counties, the model might “see” population as **positively correlated** with Republican outcomes.

## OTHER VARIABLES

When controlling for race, poverty, age groups, etc., the partial relationship with population can flip sign.

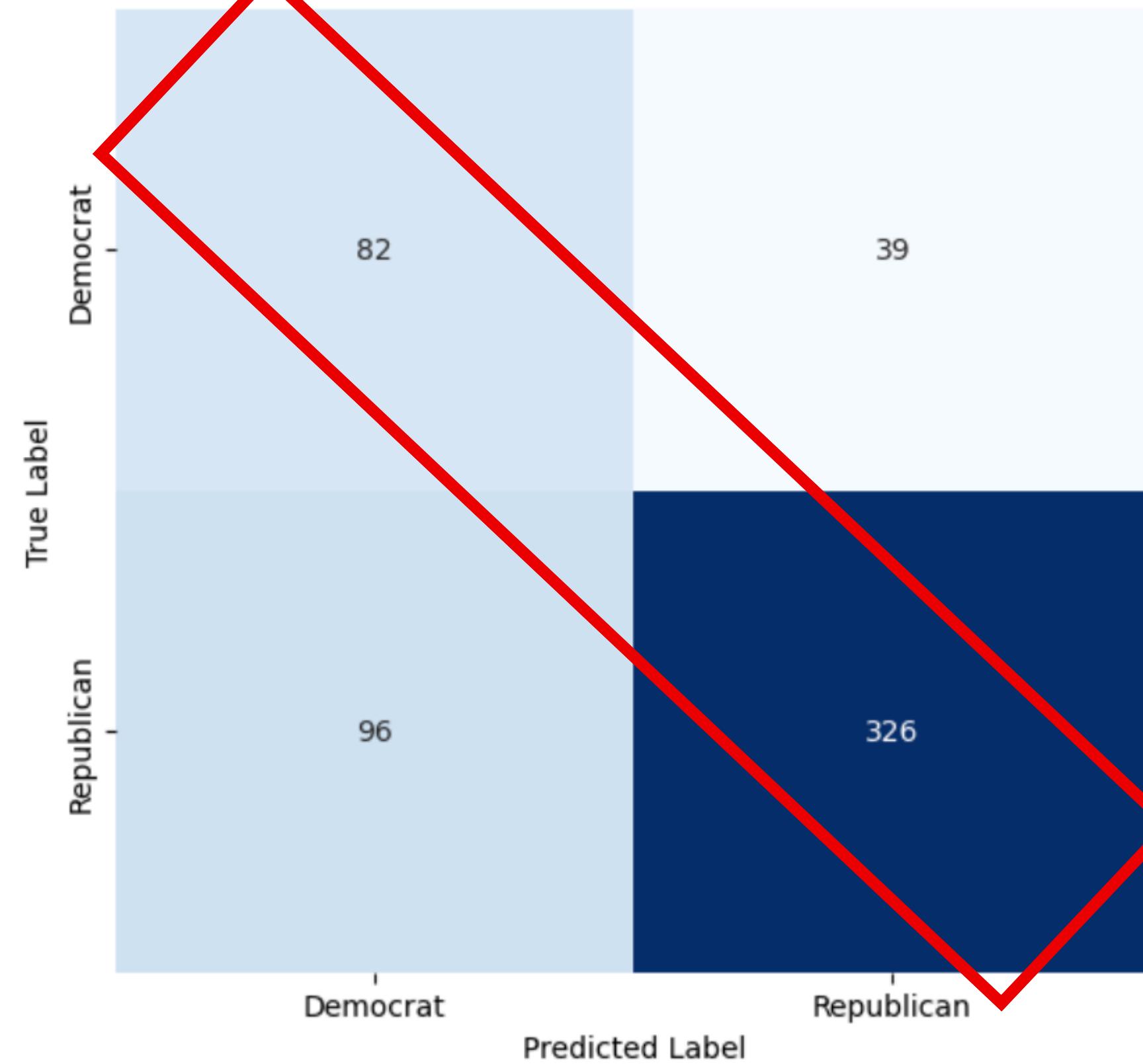
## POPULATION VS. DENSITY

Large counties **aren't** necessarily **dense** (urban).

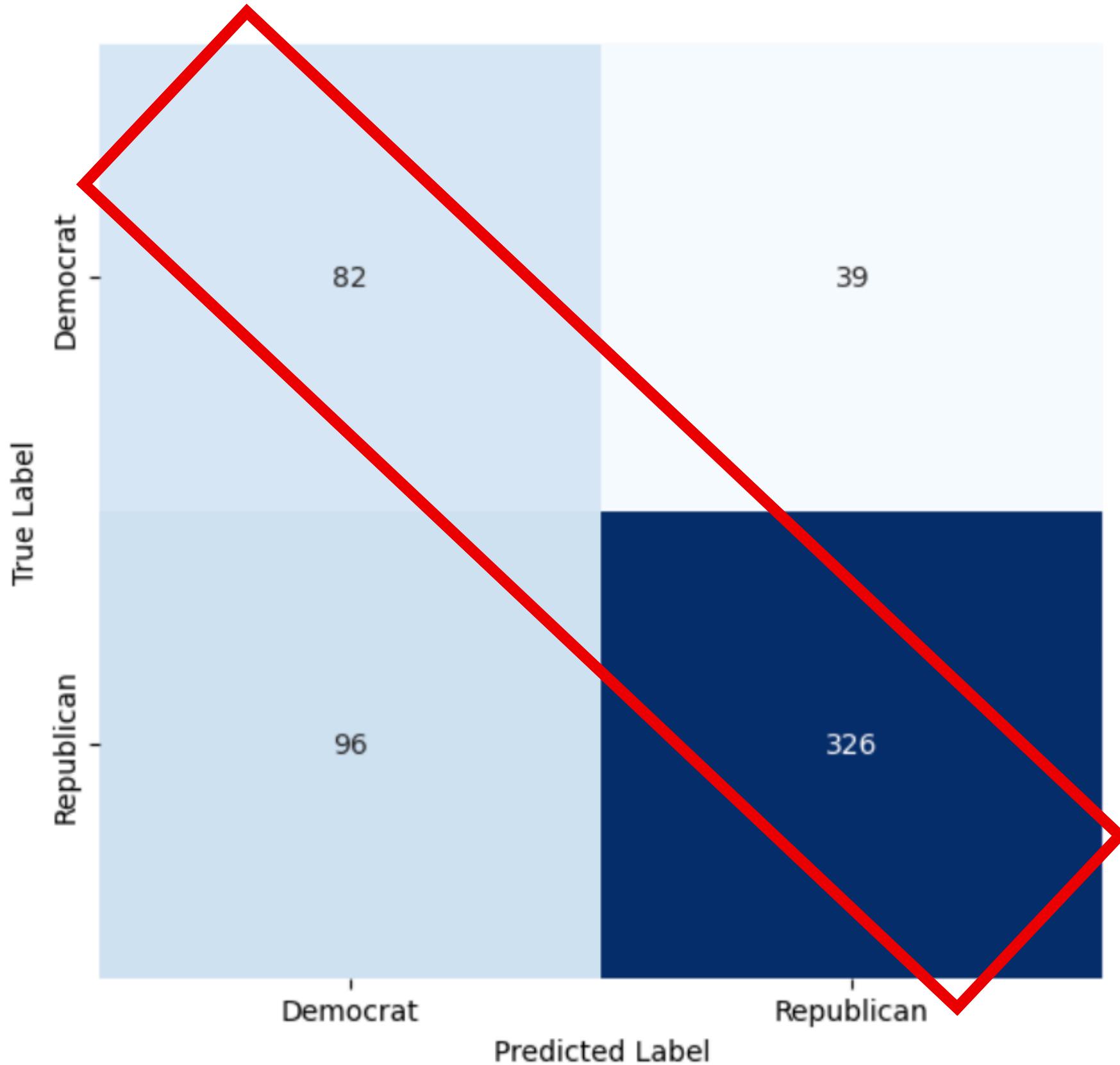
# LOGISTIC REGRESSION MODEL



# CONFUSION MATRIX



# CONFUSION MATRIX

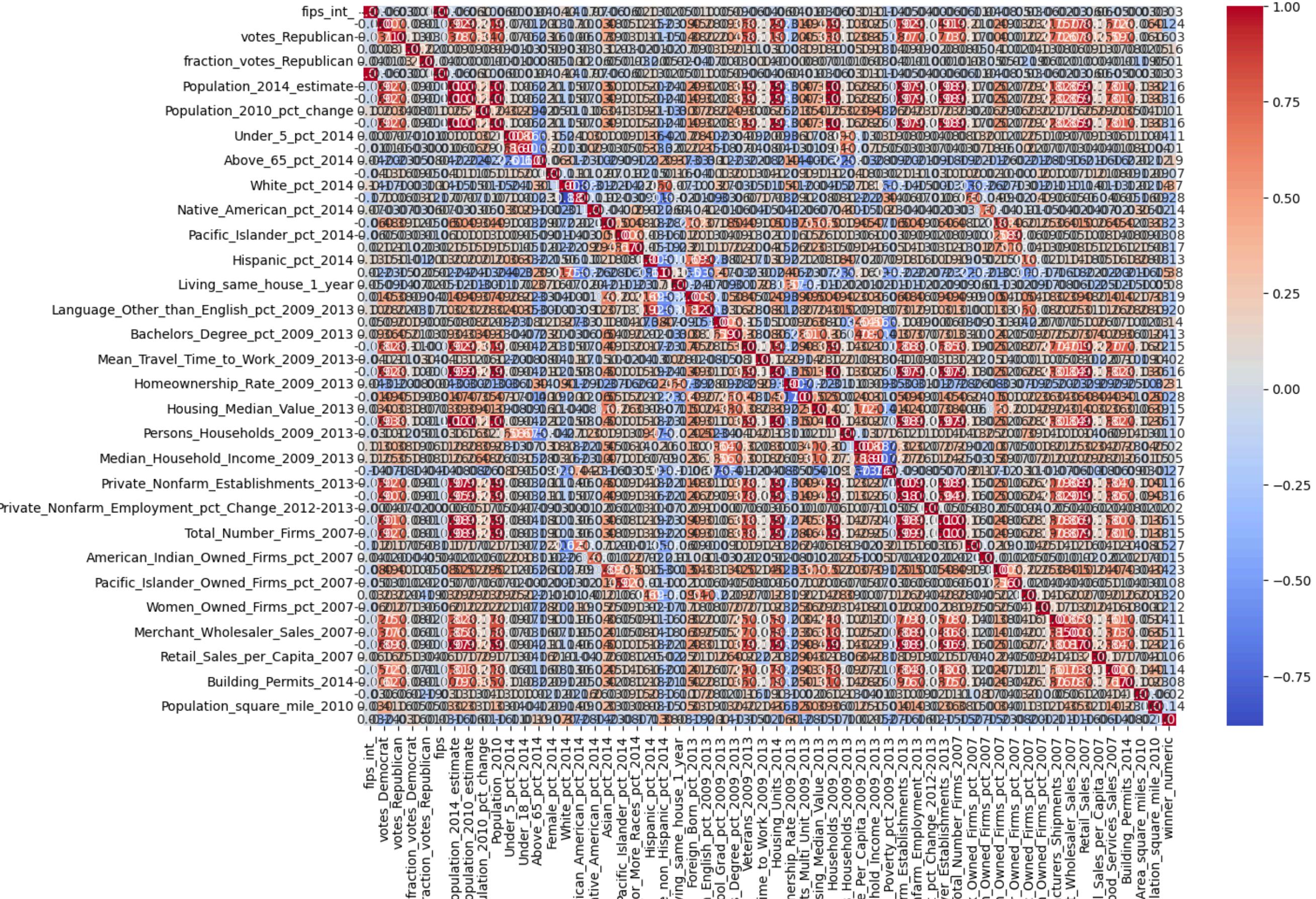


## Columns used:

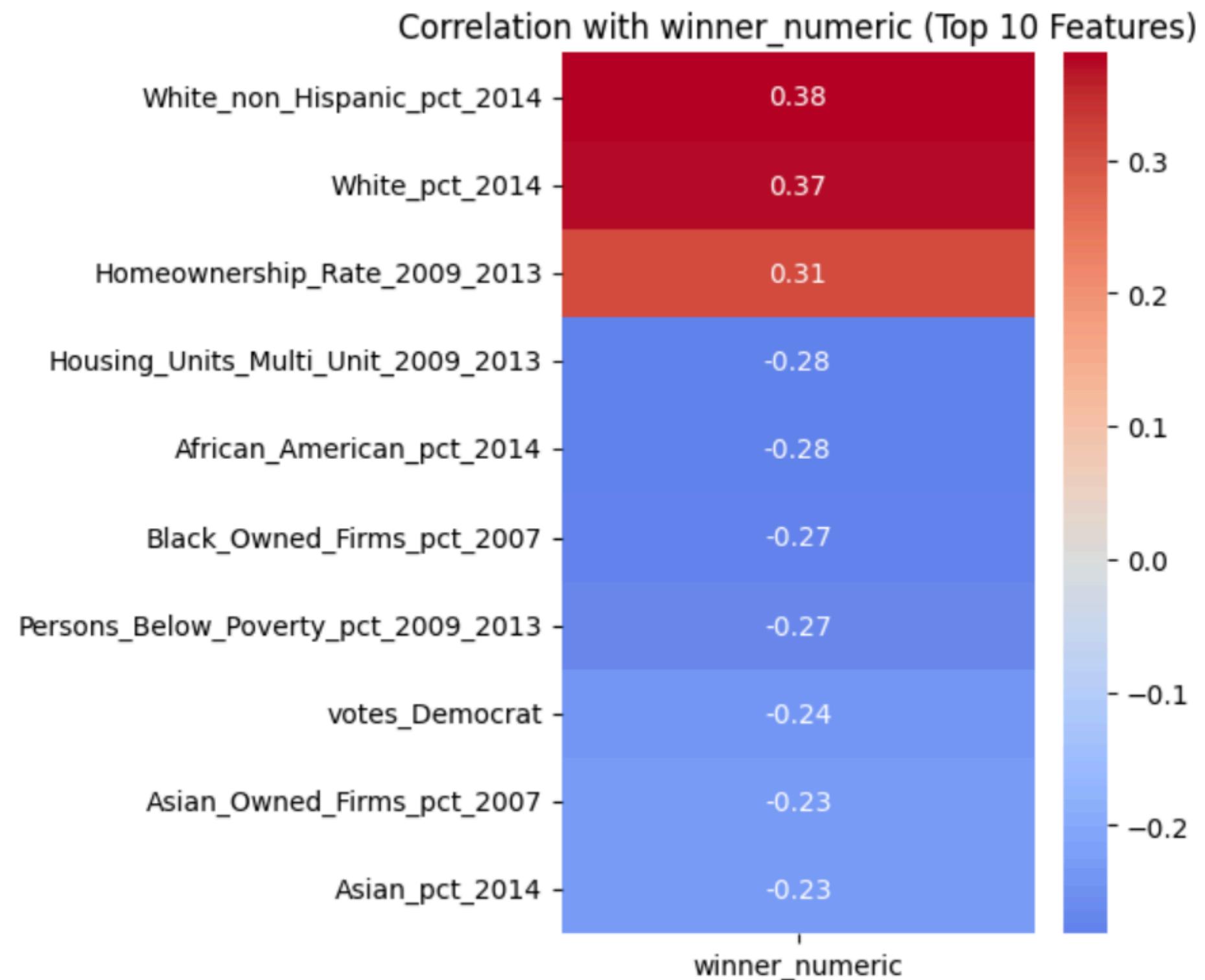
- White\_non\_Hispanic\_pct\_2014
- White\_pct\_2014
- Homeownership\_Rate\_2009\_2013
- Housing\_Units\_Multi\_Unit\_2009\_2013
- African\_American\_pct\_2014
- Black\_Owned\_Firms\_pct\_2007
- Persons\_Below\_Poverty\_pct\_2009\_201
- votes\_Democrat
- Asian\_Owned\_Firms\_pct\_2007
- Asian\_pct\_2014

# CORRELATION MATRIX

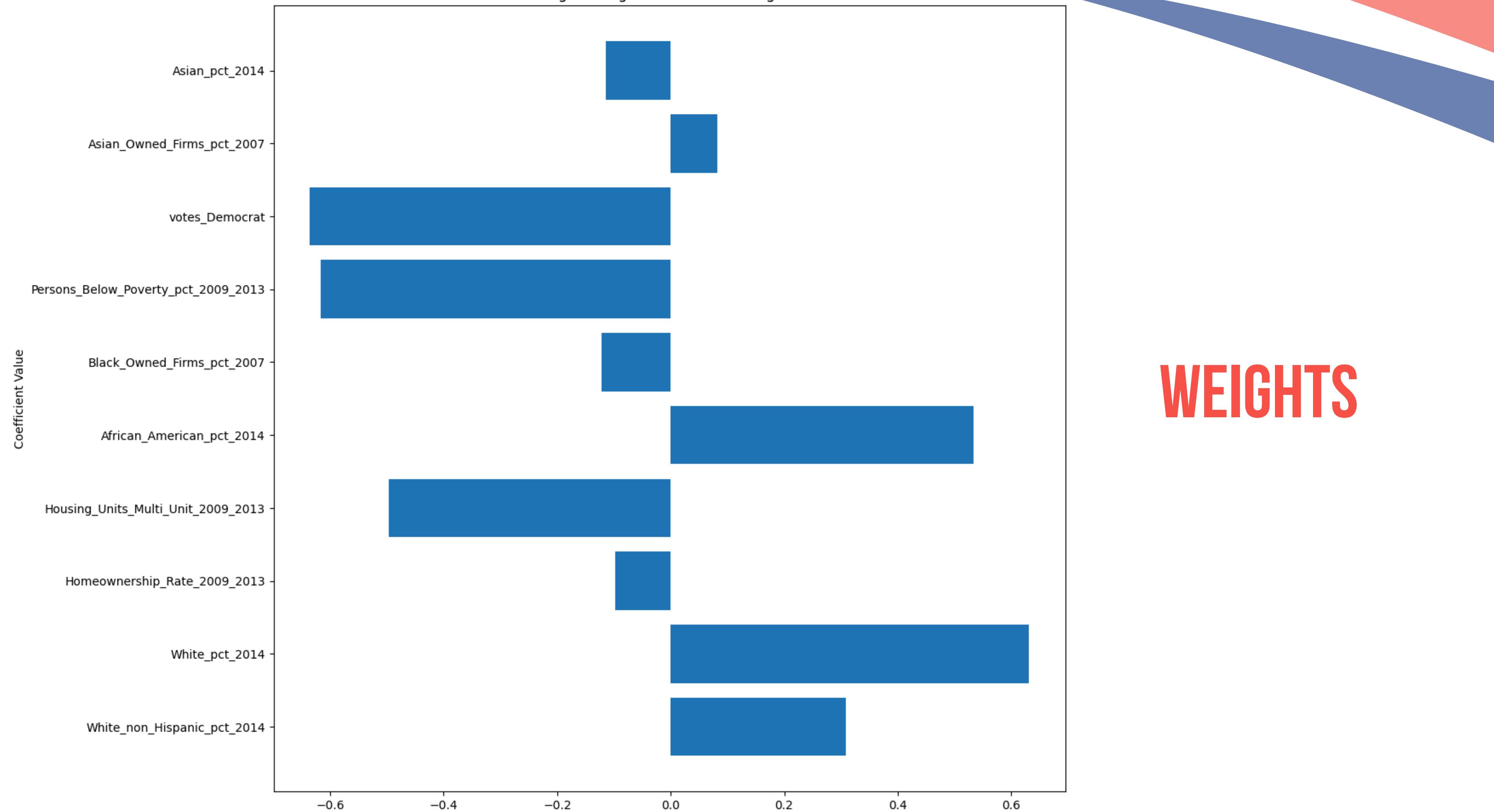
### Correlation Matrix for Numeric Features



# CORRELATION MATRIX



Logistic Regression Feature Weights



# NEXT STEPS

## COLLINEARITY

Many demographic indicators are highly correlated

## IMBALANCE IN DATA

Republican class has well over three times as many samples as the Democrat class

## TRY MORE COMBINATIONS

Look for more demographics that actually help predicting the winner party of a county/state



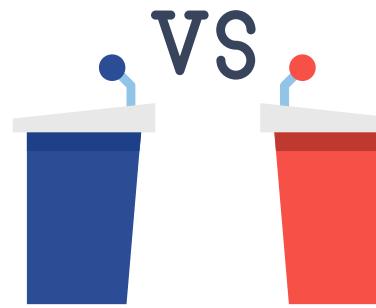
**MORE COOL RESULTS... TO BE CONTINUED**

# MORE COOL RESULTS...



## TRUST

Despite being red,  
Mars is a cold place. It's  
full of iron oxide dust



## DIALOGUE

It's a gas giant,  
composed mostly of  
hydrogen and helium

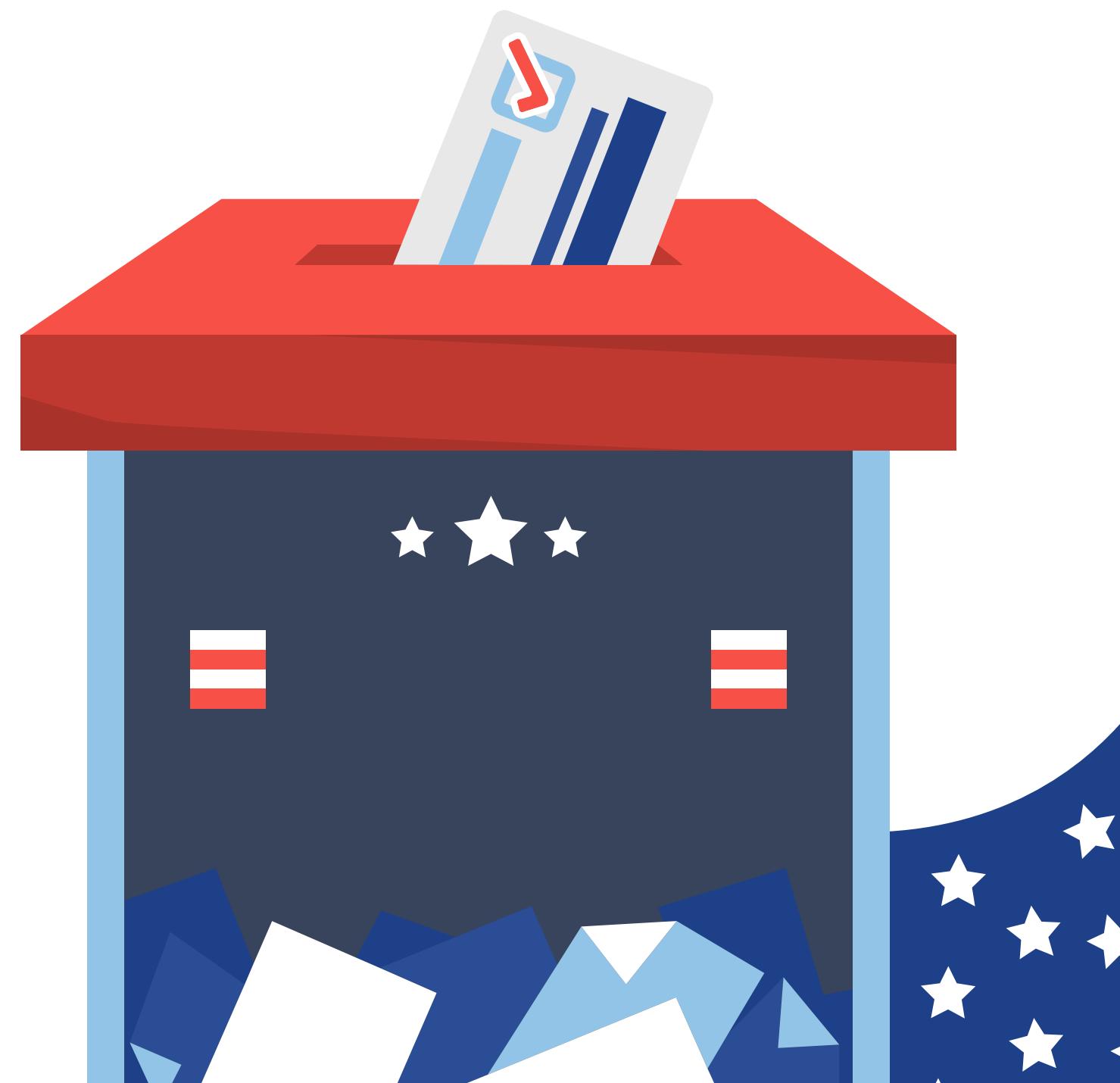


## FAIR ELECTION

Jupiter is a gas giant  
and the biggest planet  
in the Solar System

# OVERVIEW

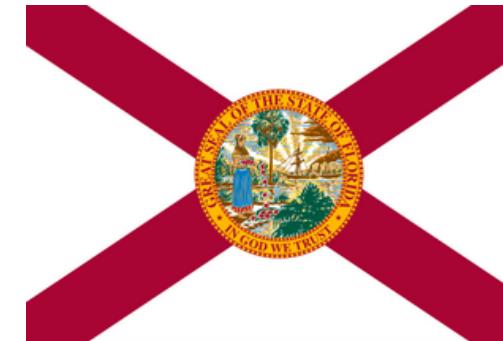
Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon. The planet's name has nothing to do with the liquid metal



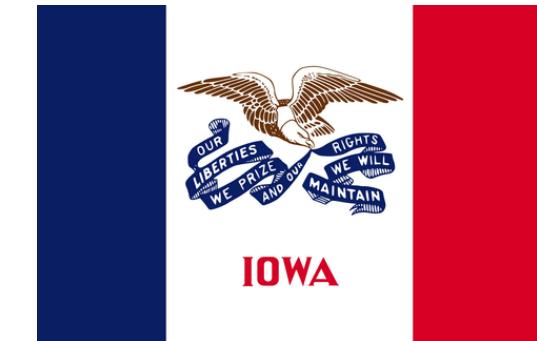
# SWING STATES



COLORADO



FLORIDA



IOWA



MICHIGAN



NEVADA



NORTH CAROLINA



OHIO

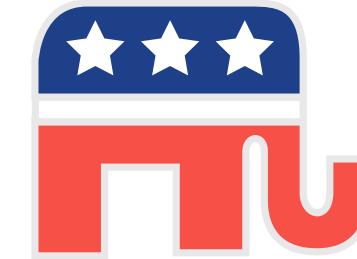


PENNSYLVANIA



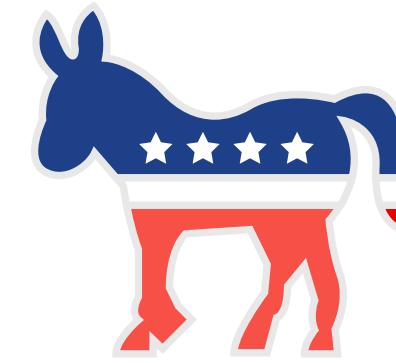
VIRGINIA

# WHAT SETS US APART?



## REPUBLICANS

It's the closest planet to the Sun and also the smallest one in the Solar System



## DEMOCRATS

Despite being red, Mars is a cold place. The planet is full of iron oxide dust

# CORE VALUES

## MARS

Mars is a very cold place

## JUPITER

Jupiter is the biggest planet

## NEPTUNE

Neptune is the farthest planet

## SATURN

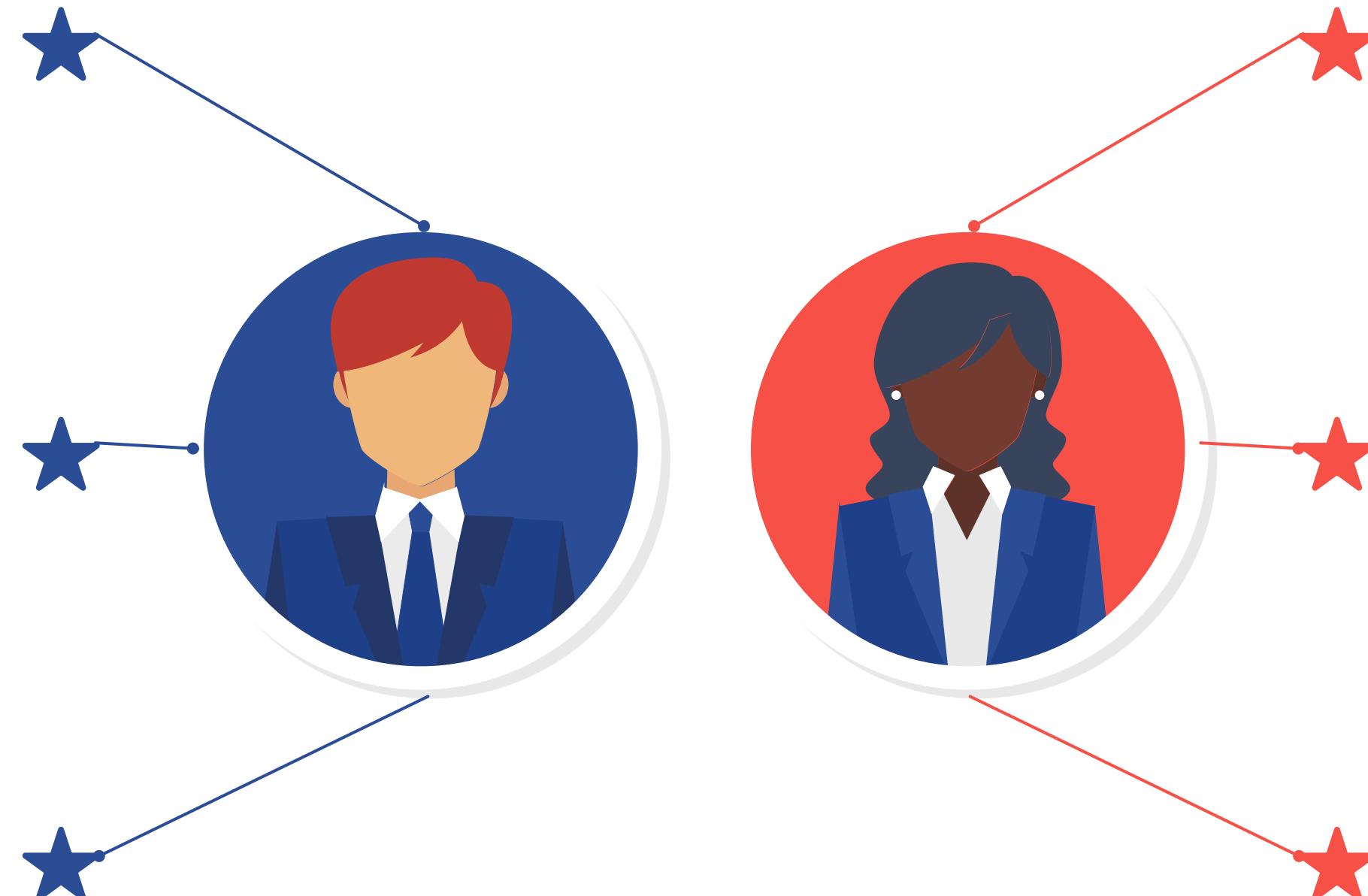
Saturn is the ringed one

## VENUS

Venus has a beautiful name

## MERCURY

Mercury is the smallest planet



# VOTERS

## MARS

Mars is a very cold place

## JUPITER

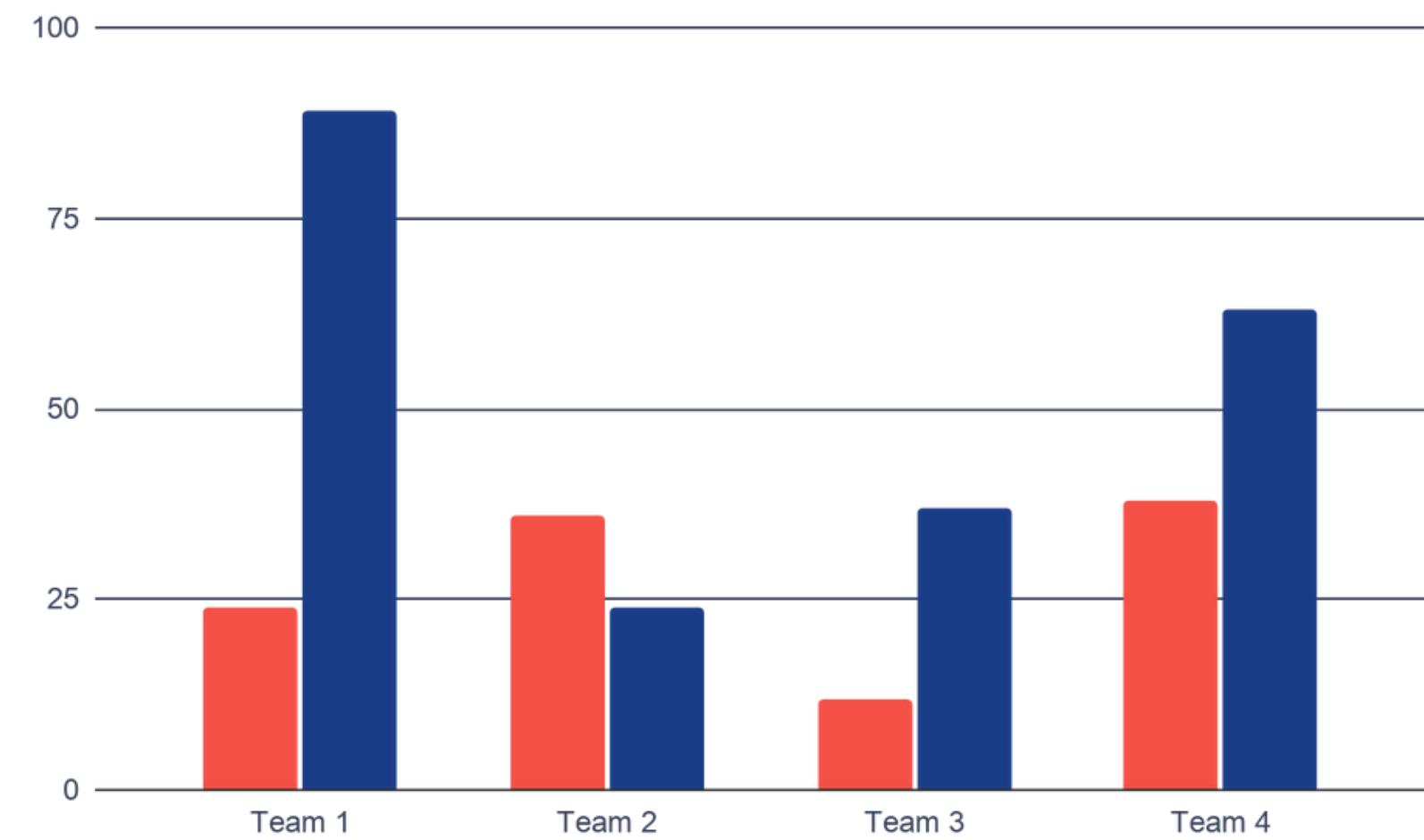
Jupiter is the biggest planet

## SATURN

Saturn is the ringed one

## VENUS

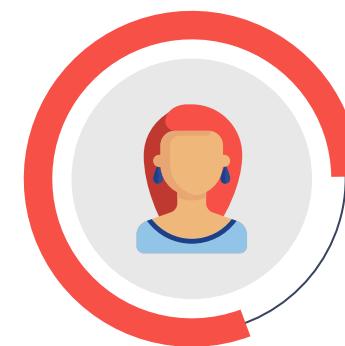
Venus has a beautiful name



To modify this graph, click on it, follow the link, change the data and paste the new graph here

# VOTER PROFILE

## GENDER



60%



85%

## AGE

25-35



36-45



46-65



## INTERESTS



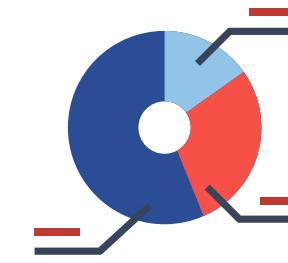
# SURVEYS

## MERCURY



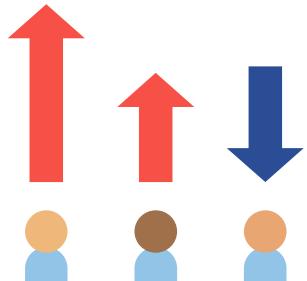
Mercury is the closest planet to the Sun

## JUPITER

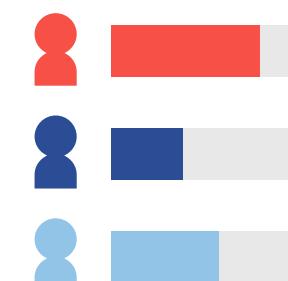


It's the biggest planet in the Solar System

## VENUS

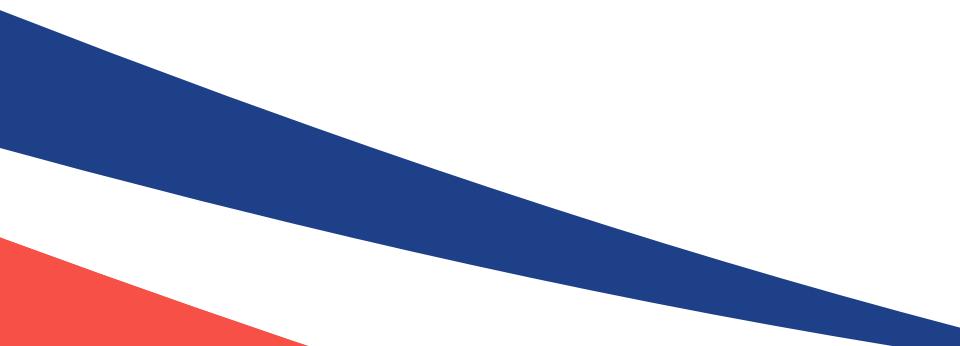
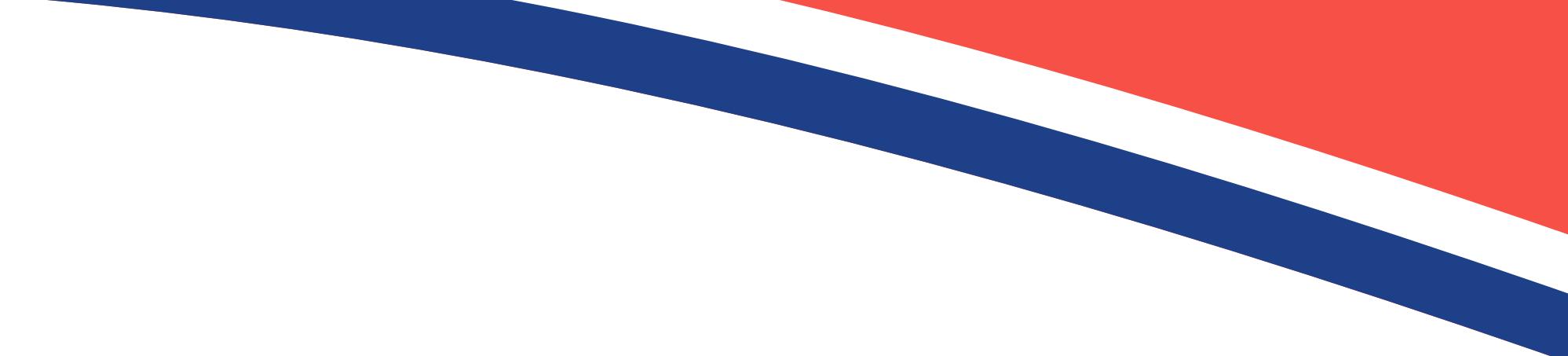


It has a beautiful name, but it's terribly hot



## SATURN

Saturn is the ringed one and a gas giant



“This is a quote, words full of wisdom that someone important said and can make the reader get inspired.”

—SOMEONE FAMOUS

★ 03 ★

# GOALS & STRATEGY

You could enter a subtitle here if you need it

# IMPORTANT STATES



## VENUS

Venus has a beautiful name



## SATURN

Saturn is the ringed one



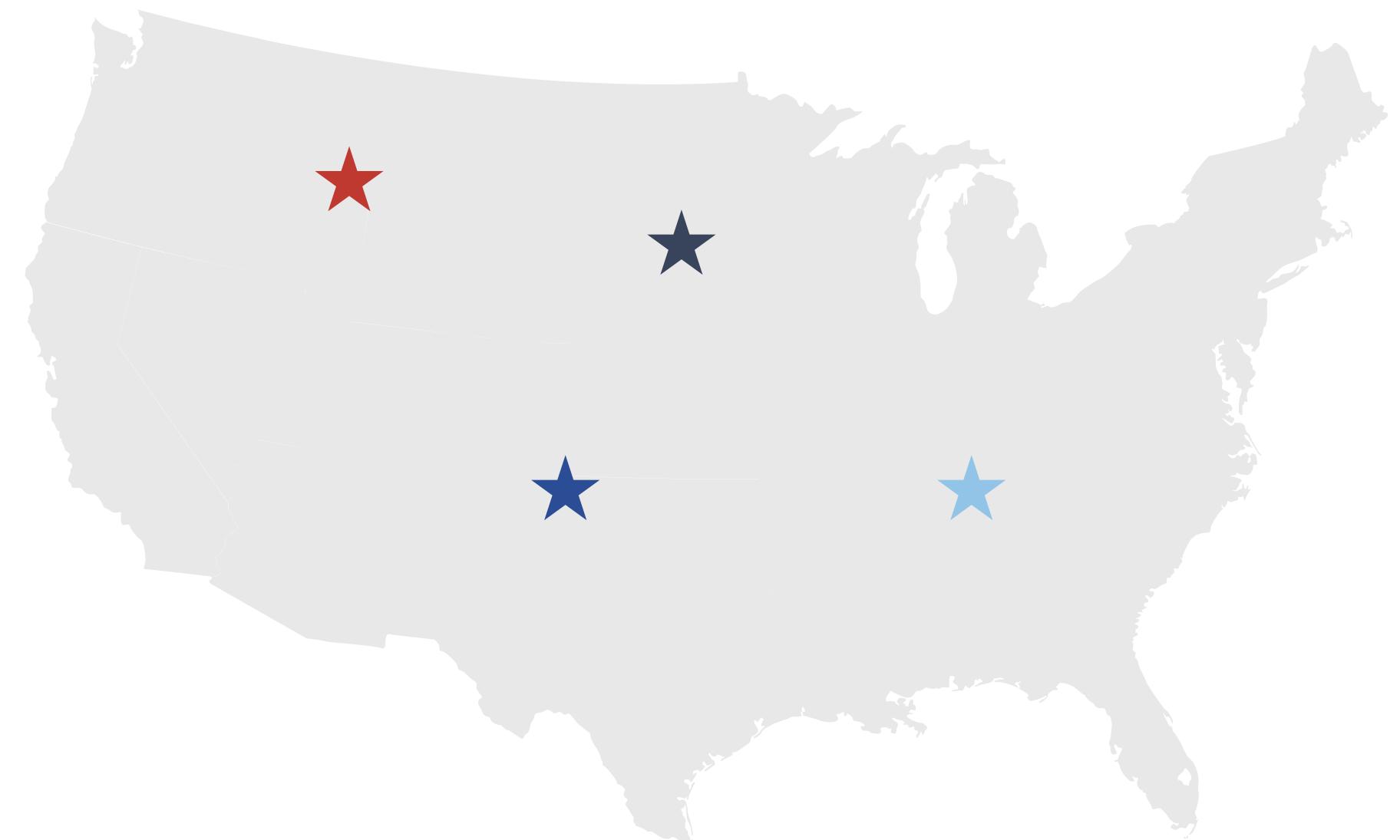
## MERCURY

Mercury is the smallest planet



## MARS

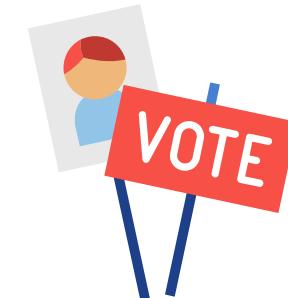
Mars is a very cold place



# STRATEGY



**STEP 1**  
Mercury is the  
smallest planet



Saturn is the  
ringed one

**STEP 2**



**STEP 3**  
Venus has a  
beautiful name



Mars is a very  
cold place

**STEP 4**

# ELECTION DESCRIPTION

# DEMOCRATS



# REPUBLICANS

# FUNDING

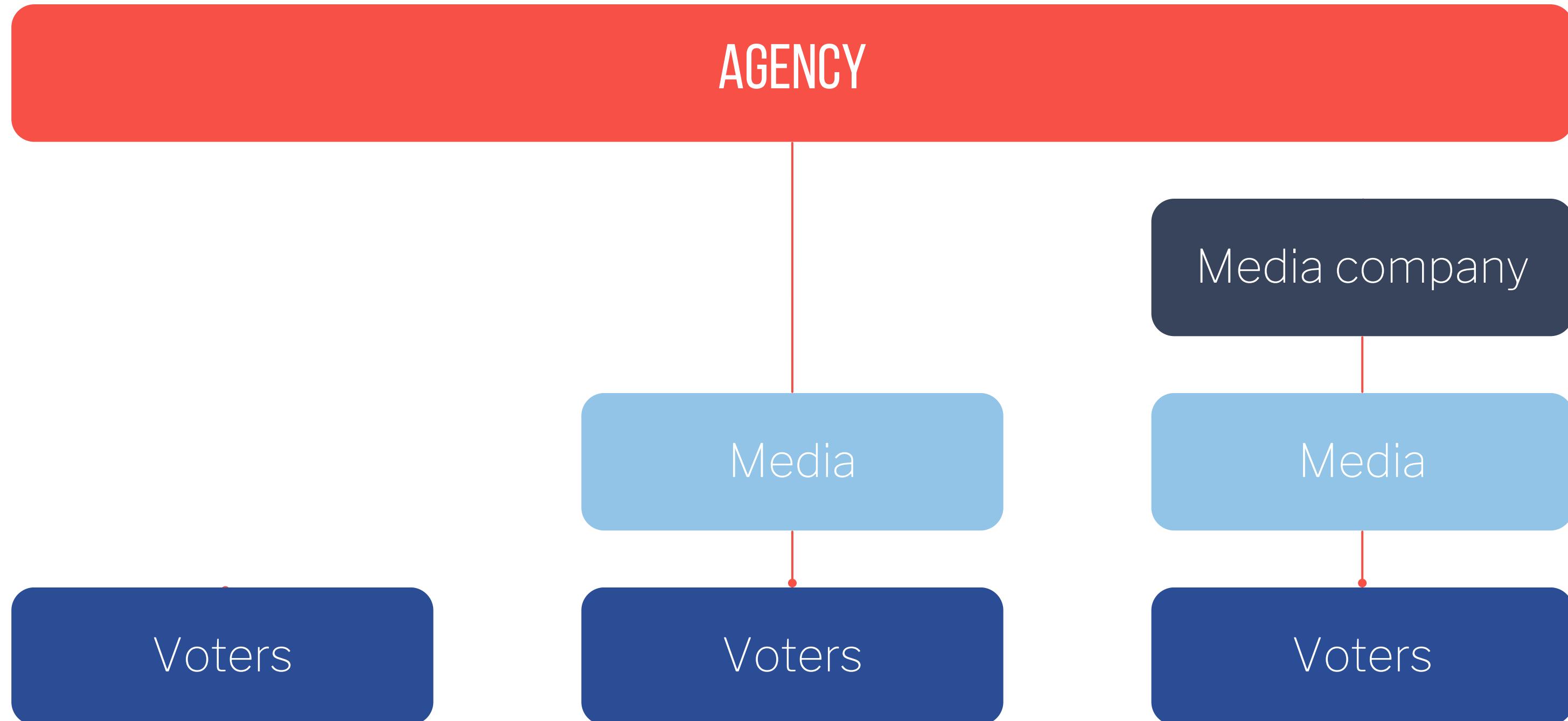
\$23,667

Mercury is the closest planet  
to the Sun

\$98,567

Venus has a beautiful name,  
but it's hot

# MARKETING CHANNELS



# PROMOTION



## MERCURY

Mercury is the closest planet to the Sun



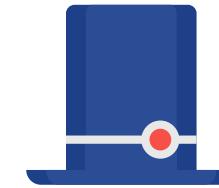
## VENUS

Venus has a beautiful name, but it's terribly hot



## MARS

Despite being red, Mars is a cold place



## JUPITER

It's the biggest planet in the Solar System



## SATURN

Saturn is the ringed one and a gas giant



## NEPTUNE

Neptune is the farthest planet from the Sun

A decorative arrangement featuring several small American flags of various sizes and orientations. Some flags are positioned diagonally, while others are more vertical. They are set against a white background that is decorated with numerous red, white, and blue paper stars of different sizes.

A PICTURE IS WORTH  
A THOUSAND WORDS



**\$45,000,000**

Is the total budget for the campaign

# ADVERTISING CAMPAIGN 1



## CHANNEL

Multimedia

## BUDGET

\$ 25,000,000

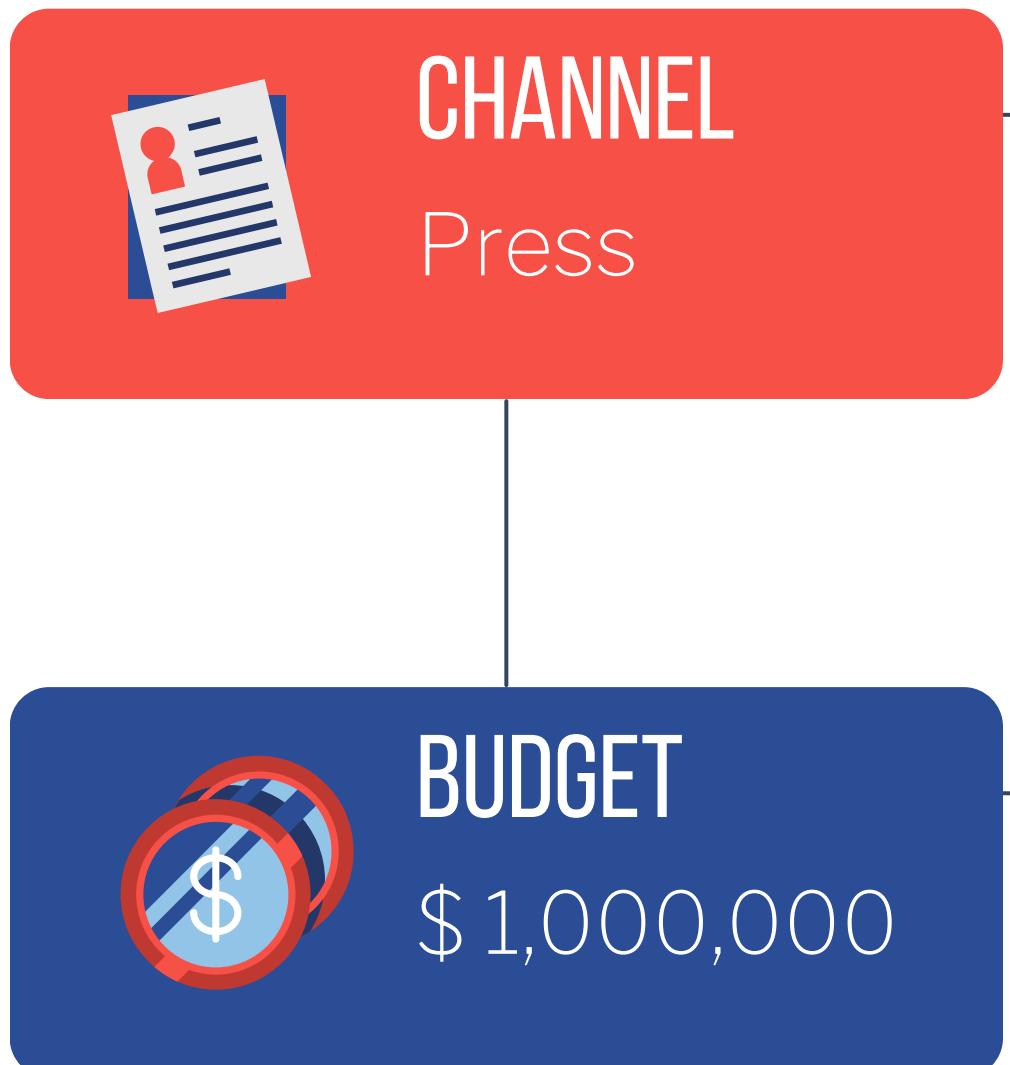
## GOALS

- Here you can list your goals
- Here you can list your goals
- Here you can list your goals

## DESCRIPTION

Mercury is the closest planet to the Sun and the smallest one in the Solar System

# ADVERTISING CAMPAIGN 2



## DESCRIPTION

Mercury is the closest planet to the Sun and the smallest one in the Solar System

## GOALS

- Here you can list your goals
- Here you can list your goals
- Here you can list your goals

# PR OUTREACH

## MEDIA CHANNELS

Multimedia

## GOALS

50%

## KEY MESSAGES

It's the ringed one

---

Radio

10%

It's the biggest

---

Press

40%

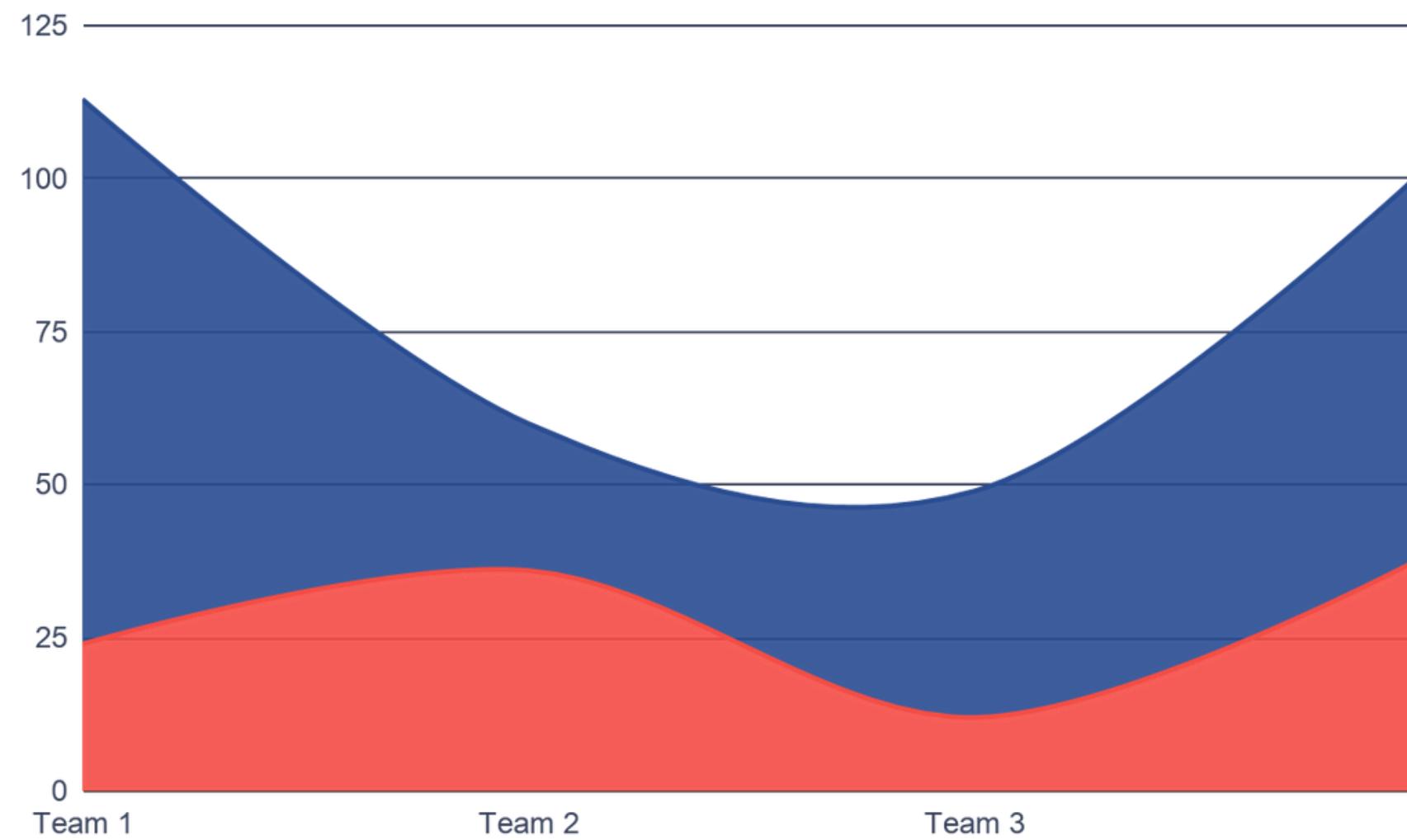
Mars is a cold place

# BUDGET ALLOCATION

VENUS	MERCURY	JUPITER	SATURN
\$2,000	\$3,100	\$400	\$1,300
\$3,400	\$600	\$200	\$100
\$4,000	\$1,600	\$800	\$500



# PREDICTED REACH



**20,000**  
Retweets

**100,000**  
Mentions & interactions

To modify this graph, click on it, follow the link, change the data and paste the new graph here

# TIMELINE

**MERCURY**

1

Mercury is the  
smallest planet

Saturn is the  
ringed one

2

**SATURN**

**VENUS**

3

Venus has a  
beautiful name

4

**MARS**

Mars is a very  
cold place

# MULTIMEDIA

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon



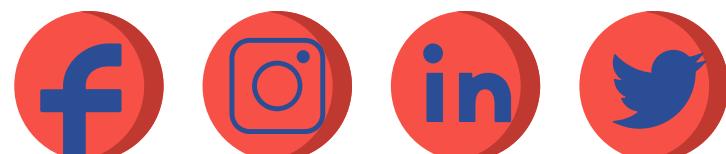
Insert your multimedia content here

# OUR TEAM



Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon

# THANKS!



Do you have any questions?

[youremail@freepik.com](mailto:youremail@freepik.com)

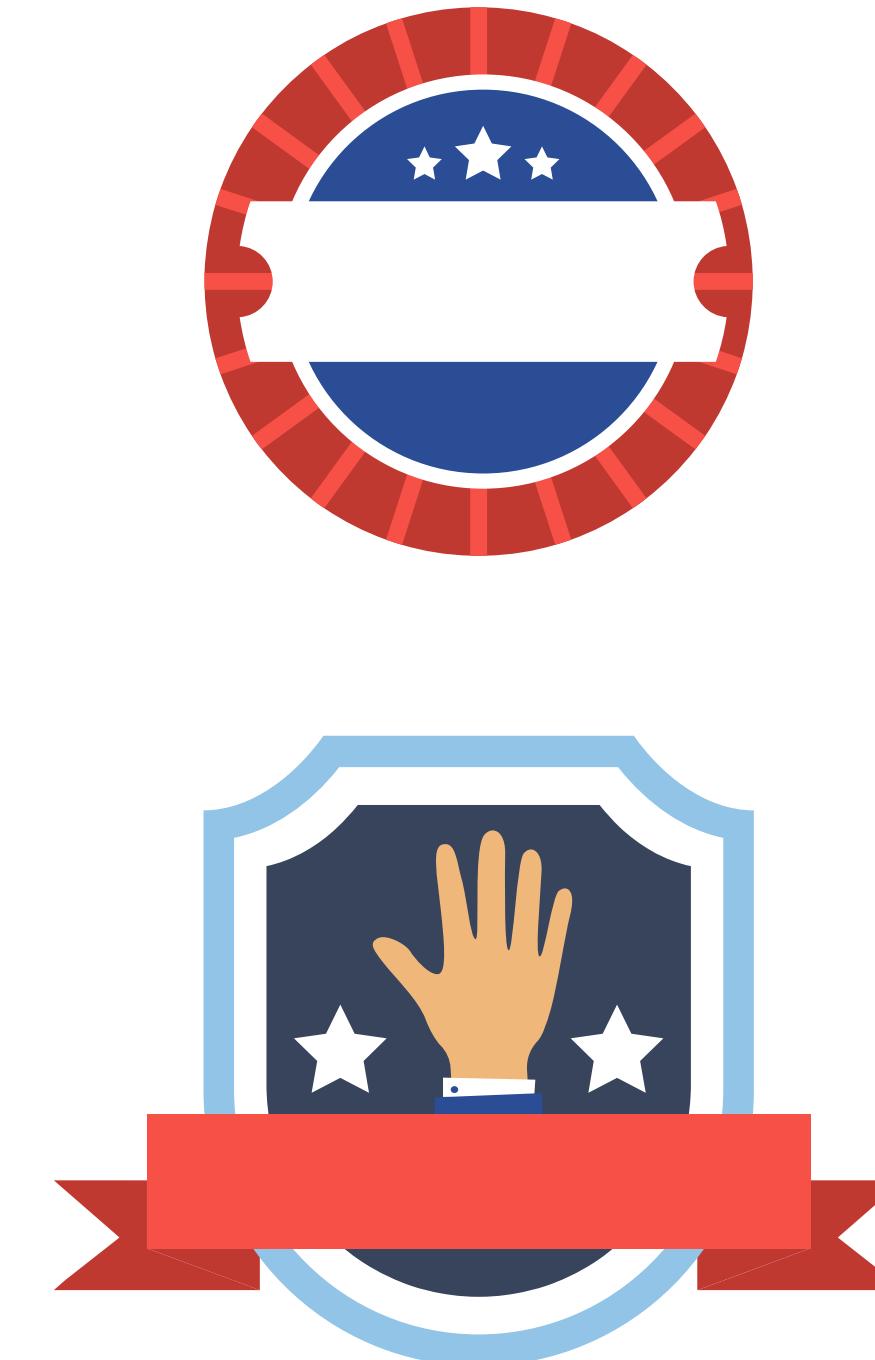
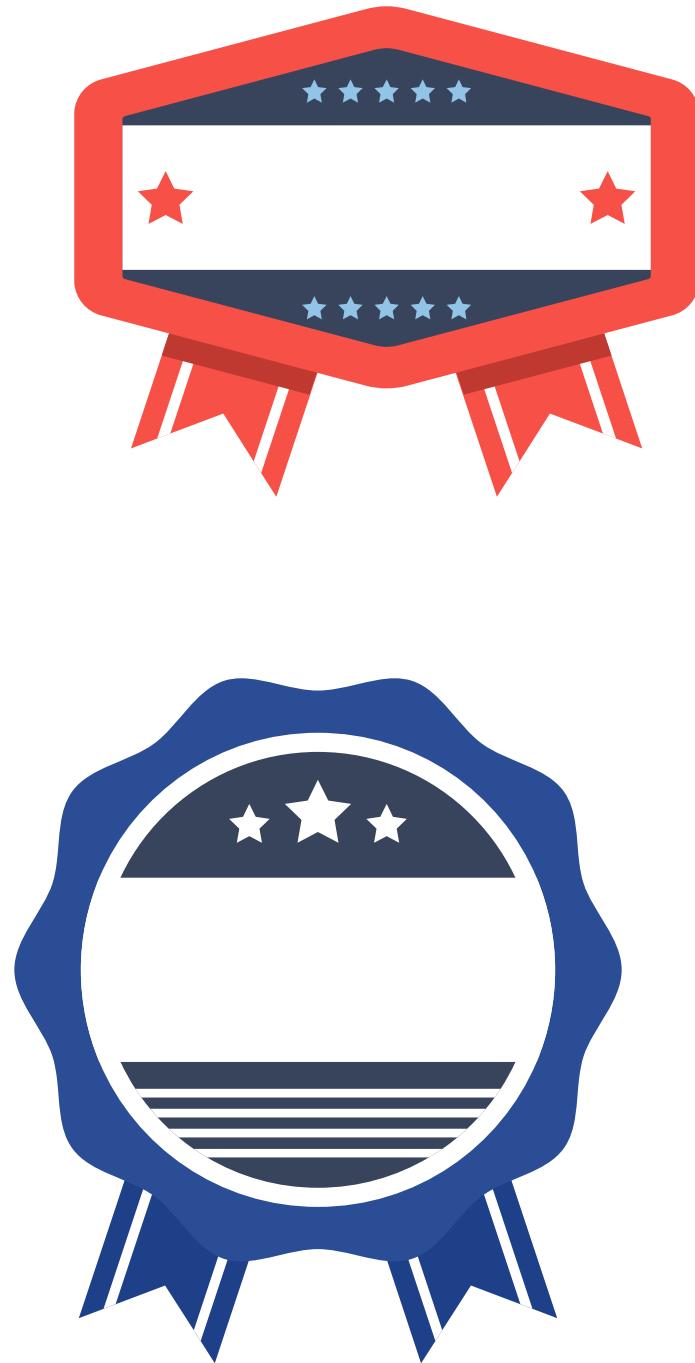
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# ALTERNATIVE RESOURCES



# RESOURCES

## VECTOR

- [2020 us presidential election wallpaper](#)
- [Republicans and democrats vector](#)
- [2020 presidential election](#)
- [Presidential election composition with flat design](#)
- [President's day](#)
- [Collection of voting badges and stickers](#)
- [Flat design presidents day celebration](#)
- [Usa map states](#)

## PHOTO

- [Us elections concept with copy space](#)
- [Red and blue stars with usa flag on white background](#)
- [Multiethnic man and woman with american flags](#)

## ICON

- [Elections Icon Pack](#)

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#233868

#1d4089

#2a4d95

#91c4e7

#f65047

#c03931

#e8e8e8

#ffffff

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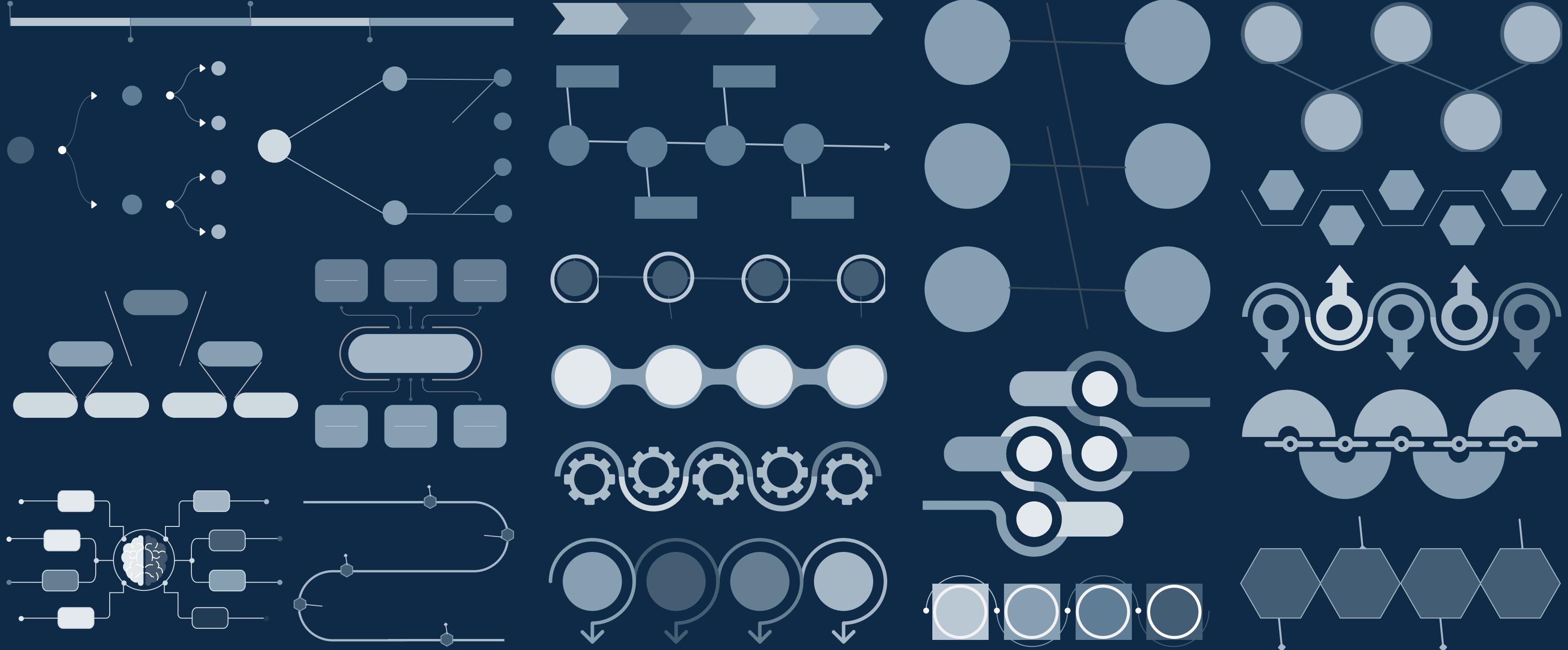
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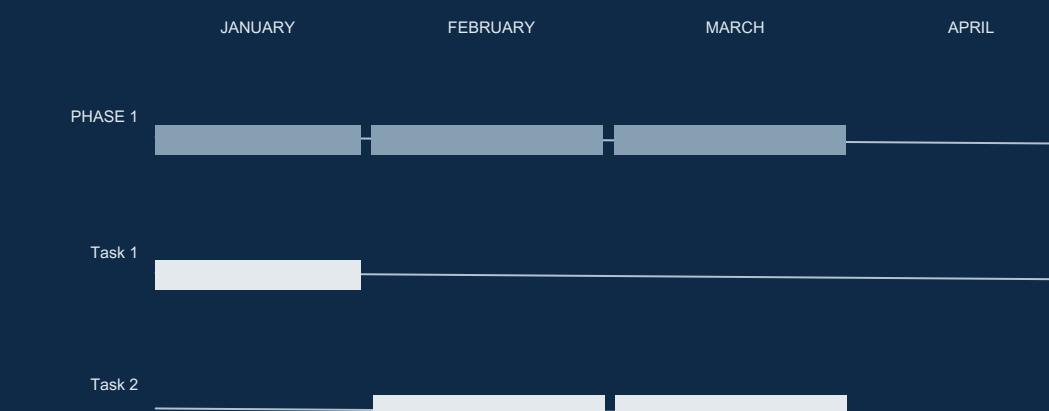
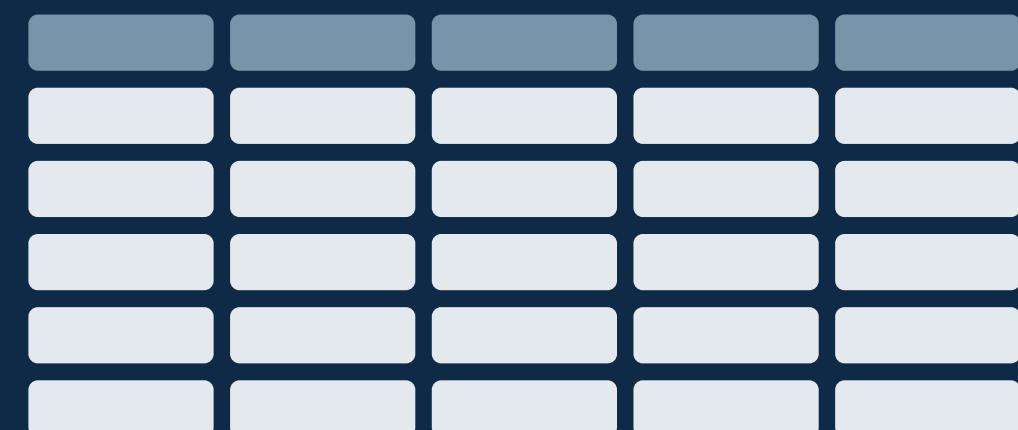
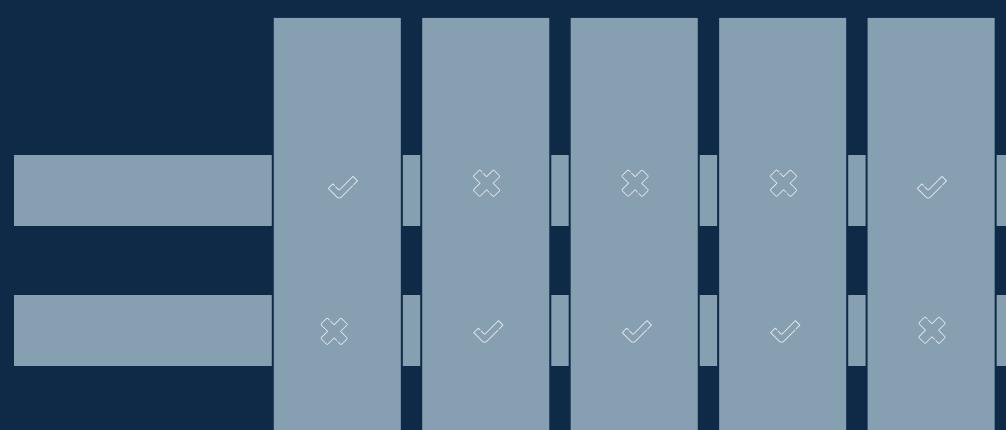
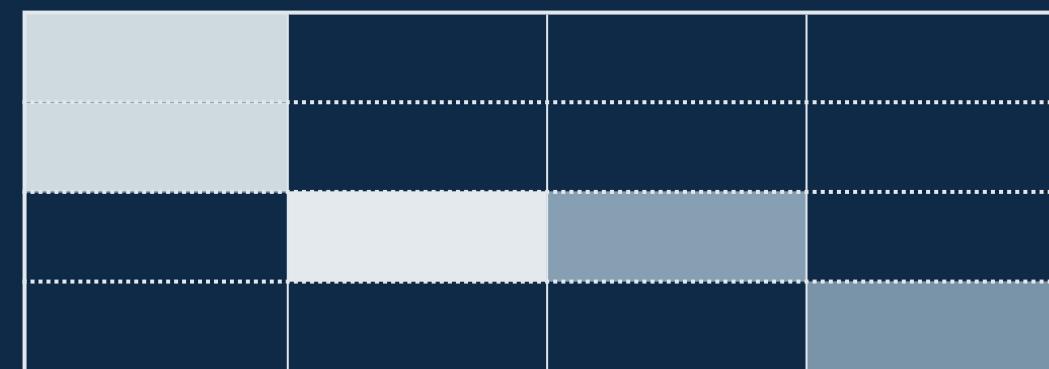
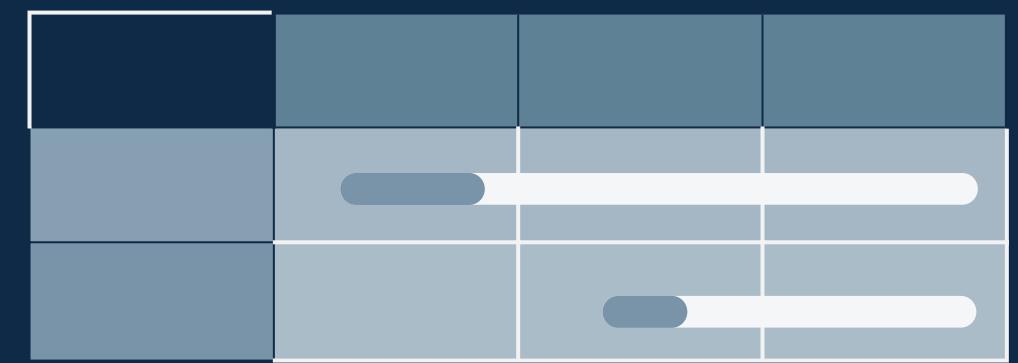
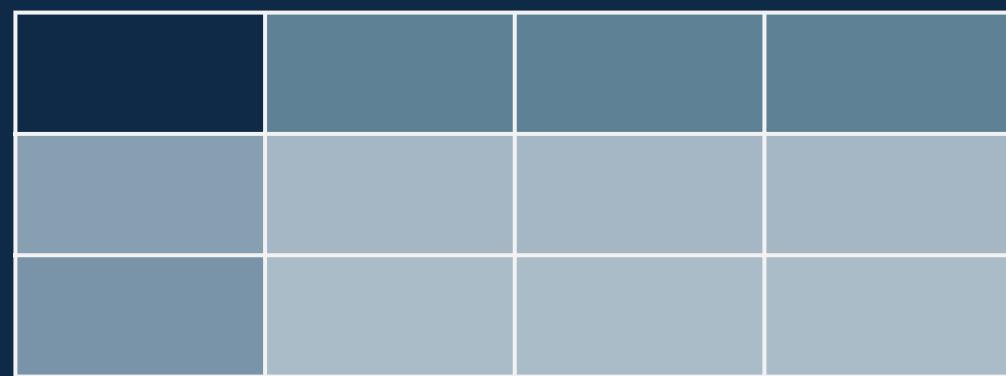
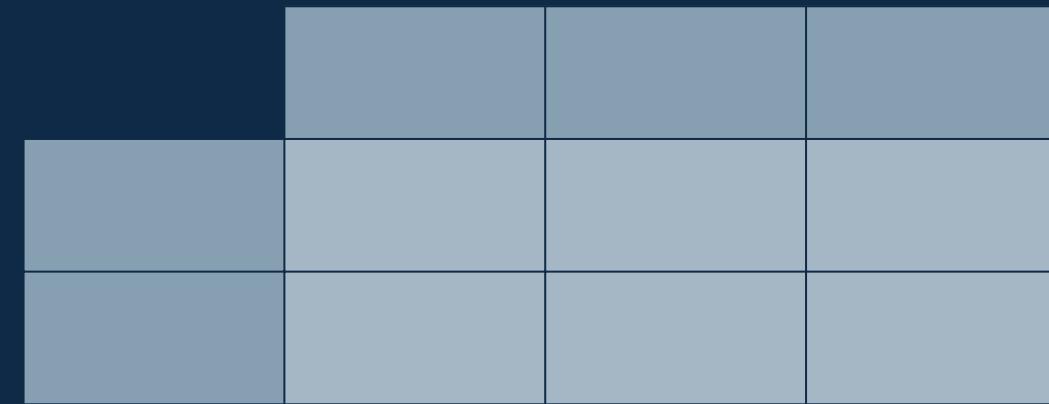
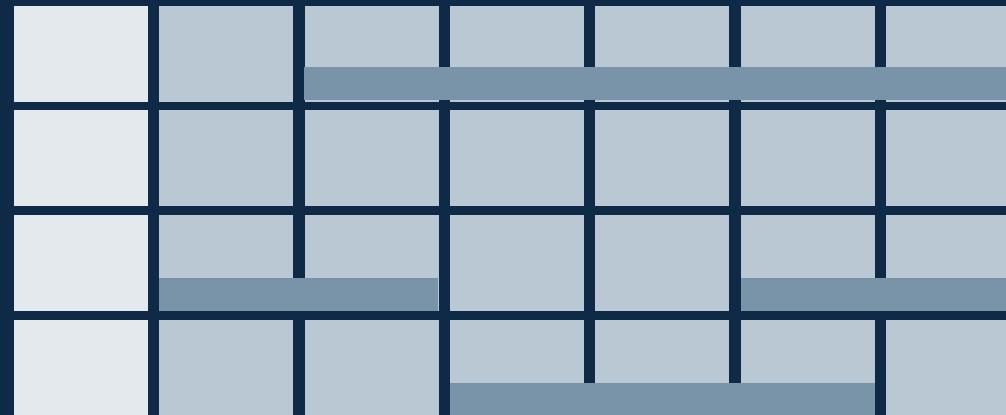
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