

## Access to Election Data

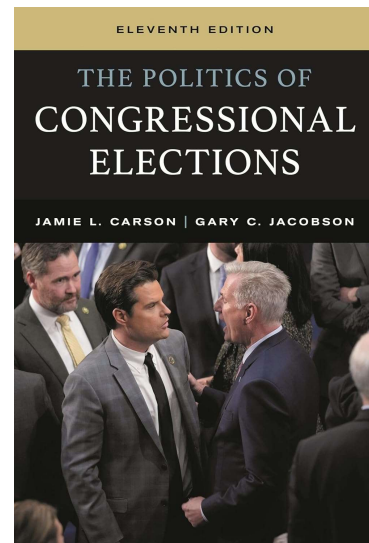
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## Reading

- Carson & Jacobson – Chapter 2 (Election Laws)
- Carson & Jacobson – Chapter 5
- Kelly – Chapter 7 (Voting)

You are responsible for all assigned readings.  
Exam and quiz questions based on reading  
material, lectures, and class discussions



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## Topics

- Voting process
- Voting devices
- Voting data
- Analysis of voting data

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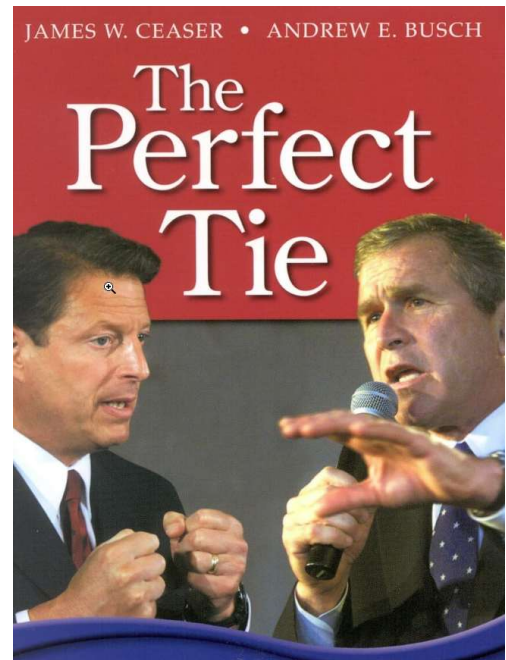
## Data Errors

- Recording errors
- Inadvertent process errors
- Intentional voter disenfranchisement

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## 2000 Presidential Election ...

- Candidates
  - George W. Bush – Republican
  - Al Gore – Democrat
- Election Day results (270 needed)
  - Bush – 246 electoral votes
  - Gore – 267 electoral votes
  - Florida electoral votes not yet decided
- Winner in Florida could never be decided because of voting errors
- Supreme Court declared Bush the winner on 12/12/2000



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## ... 2000 Presidential Election ...

- Margin of victory for Bush was 537 votes after multiple recounts
- Data errors were far greater than the eventual margin
- Contributing factors
  - Ballot design
  - Insufficient rules for manual ballot counting
  - Apparent racially motivated vote denial
- Data analysis
  - 180,000 ballots did not record a vote for President
  - 19,000 overvotes (causing Gore to lose more than 10,000 net votes)
  - 2,000 Gore supporters may have mistakenly voted for Buchanan
  - Data results not consistent with exit polls

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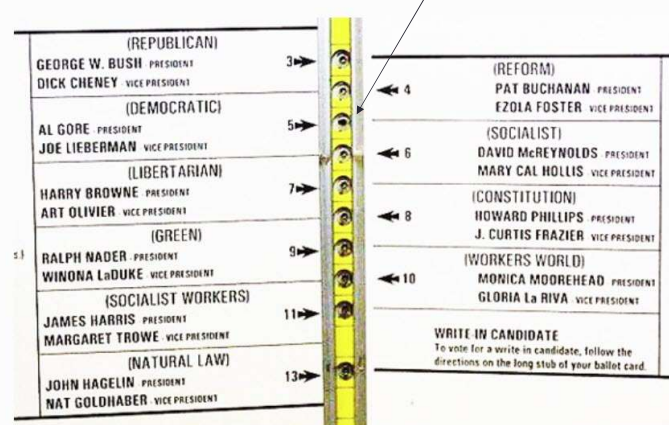
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## ... 2000 Presidential Election

- Palm Beach county used a punch hole ballot
- Voters were expected to punch a hole in the ballot next to the candidate of their choice
- A scanner would detect the holes
- Candidates on separate columns subsequently advised against
- Overvotes result in no candidate tallied



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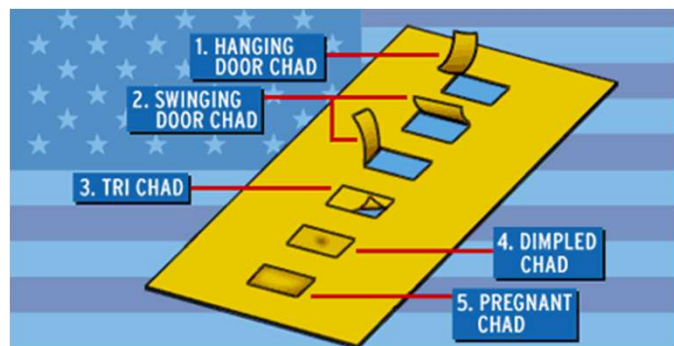
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## Hanging Chads in 2000 Florida

- When is a vote not a vote?
- Punch hole devices register a vote when the "chad" is completely removed
- But many ballots had chads that were not completely removed
- Definition of how to determine the intent of the voter changed during recount
- Recounts contested
- Manual recounts add to the errors



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## Florida Voter Registration Issues

- US Commission on Civil Rights reported approximately 14.4% of ballots cast by Florida's black voters were rejected
- A disproportionate number of African American voters were purged from the voter rolls
- Election Day attempts to resolve the issues were ineffective
- Statistical techniques used to demonstrate that black voters had a much higher probability of being rejected

**Allegheny County POLL BOOK**

| Digitized Signature      | Voter Info                                                                                     | Assistance | Party     | Voter Signature                                         |
|--------------------------|------------------------------------------------------------------------------------------------|------------|-----------|---------------------------------------------------------|
| <i>Marie A. Burke</i>    | <b>BURKE, MARIE A</b><br>535 MAIN STREET<br>PITTSBURGH, PA. 15200<br>10/27/1932 1168023-3      |            | <b>R</b>  | <i>Marie A. Burke</i><br>INACTIVE: AFFIRMATION REQUIRED |
| <i>James Enright</i>     | <b>ENRIGHT, JAMES</b><br>605 MORELAND DRIVE<br>PITTSBURGH, PA. 15200<br>08/15/1967 1168023-3   |            | <b>NO</b> | <i>James Enright</i><br>ID REQUIRED                     |
| <i>Walter Hill</i>       | <b>HILL, WALTER</b><br>110 MAIN STREET<br>PITTSBURGH, PA. 15200<br>03/09/1990 1168023-3        |            | <b>D</b>  | <i>Walter Hill</i><br>ID REQUIRED                       |
| <i>John Larkin III</i>   | <b>LARKIN, JOHN III</b><br>1321 FIRST AVENUE<br>PITTSBURGH, PA. 15200<br>06/04/1961 1168023-3  |            | <b>R</b>  | <i>John Larkin III</i><br>ABSENTEE                      |
| <i>Florence Williams</i> | <b>WILLIAMS, FLORENCE</b><br>5555 FORBES AVENUE<br>PITTSBURGH, PA. 15200<br>5/3/1953 1168023-3 |            | <b>D</b>  | <i>Florence Williams</i><br>MAIL IN                     |
| <i>Steve Williams</i>    | <b>WILLIAMS, STEVE</b><br>5555 FORBES AVENUE<br>PITTSBURGH, PA. 15200<br>7/31/1978 1168023-3   |            | <b>D</b>  | <i>Steve Williams</i><br>MAIL IN                        |

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## 2000 Florida Results

- Supreme Court ruled that recounts must stop
- Bush margin at the time was 537 votes
- Gore conceded
- Significant post election data analysis showed flaws in the voting process
- Post-election legislation passed to correct some of the problems



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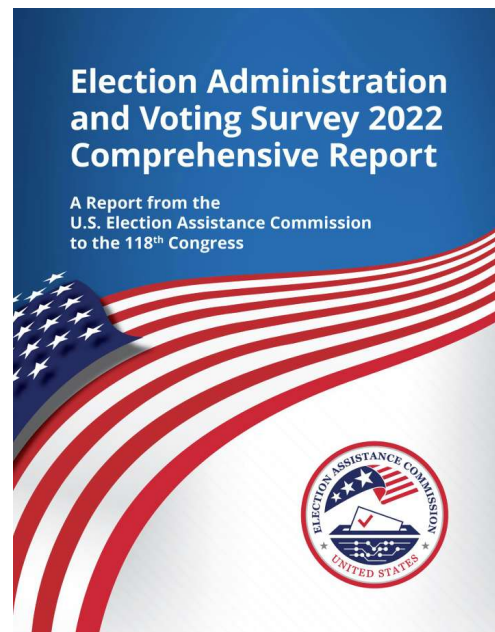
## Voting Process

- Voter registration
- Ballot preparation
- How and when to vote
  - In-person
  - Early in-person
  - Mail
  - Provisional ballots
  - Military and overseas
- Vote count
- Vote recount

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## Data Analysis

- We will analyze voting data in subsequent sessions
- Data available through the US Election Assistance Commission (EAC)



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## Legislation...

- US Constitution
- Grants Congress the power to control some aspects of voting
- Congress mandated a national Election Day
- Congress mandated single member districts for US Representatives
- Congress has the power to pass laws related to voter registration

### *Article I, Section 4, Clause 1:*

*The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by Law make or alter such Regulations, except as to the Places of chusing Senators.*

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## ...Legislation...

- UOCAVA Act
- Uniformed and Overseas Citizen Voting Act of 1986
- US citizens register to vote and cast a ballot by absentee ballots
- Overrides statewide date limits
- Some ballots often tallied after Election Day

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## National Voter Registration Act of 1993 (NVRA)

- Response to some vote process and turnout issues
- Requires states (with exceptions) to:
  - Standard form for voter registration with citizenship claim
  - Easier voter registration (DMV process or same day registration)
  - Public assistance registration
  - Mail registration
  - Provide and maintain voter registration lists
- Shortcomings include:
  - Inconsistent list maintenance
  - Additional state restrictions
  - Inconsistent compliance

What is the current controversy over voter list maintenance?

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## Help America Vote Act (HAVA)

- Resulted from 2000 election problems
- Created the EAC
- Replaced punch card and lever-based systems
- Provided testing and certification of voting systems
- Provided financial incentives to states
- Required a statewide voter registration list and statewide list maintenance
- Shortcomings:
  - No pollbook checking outside state
  - Varying registration approaches
  - Inconsistent procedures for provisional ballots
  - No mention of paperless voting

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## SAVE Act (Safeguard American Voter Eligibility)

- Passed in House of Representatives, pending in Senate
- Requires:
  - Proof of citizenship for new voters and changed voters (e.g., moved)
  - Proof – some combination of passport, birth certificate, etc.
  - Alternate process for those without required documents
  - Check voter rolls for citizenship
- Election official can face 5 years in prison or be sued if they register a noncitizen who did not show proof
- No federal funding

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## Voting Technology

- Ballot design
  - EAC published a document to aid in the preparation of voting materials
  - Brennan Center report on ballot design
- Voting Equipment
  - Selection and deployment largely controlled by states
  - Many categories exist
  - Many vendors in each category
  - Voluntary Voting System Guidelines (VVSG)
    - Common data formats
    - Interchange formats
    - Limited compliance with VVSG 2.0

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## Optical Scan Voting

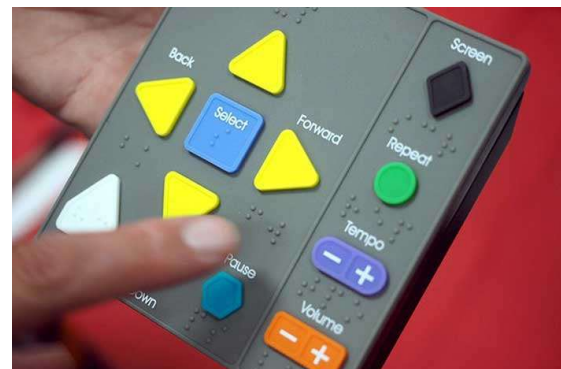
- Voters mark a paper ballot (e.g., filling in an oval symbol)
- Ballot is either
  - Individually scanned or
  - Bulk scanned
- Scanning errors can occur



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## Ballot Marking Device (BMD)

- Presents the electronic ballot
- Allows voters to select candidates
- Produces a paper ballot
- Process
  - Mark pre-printed ballots
  - Print summaries of voter selections
  - Encode votes in bar codes
  - Voters place resulting ballots in scanners, ballot boxes, etc.
- Useful for voters with disabilities
- Options – large type, audio, etc.



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## Direct Recording Electronic (DRE) Devices

- Votes recorded through an electronic device
- Stored in memory
- Automatically tabulated
- Some devices use an audit trail for subsequent verification



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## Voter Verified Paper Audit Trail (VVPAT)

- Method to provide feedback to voters who use an electronic voting system
- Includes a DRE
- Paper trail implementation options
  - Printer attached to DRE
  - Printed page containing a bar code
  - Encrypted audit trail



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## Case Study

- Georgia 2020 election
- Used newly installed BMD with VVPAT (from Dominion)
- Joe Biden wins Georgia with a 11,779 vote margin
- Statewide audit triggered, analyzing the auditable paper ballot
- Human errors identified and added 1,274 votes for Trump
- Full statewide audit confirmed the result

What is the significance of the  
Dominion voting system?

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## Voting Analysis

- Election Administration and Voting Survey (EAVS) – source of comprehensive nationwide data concerning election administration
- EAVS data
  - Is collected at a local level (e.g., county)
  - Is available for Federal election years (e.g., 2024)
  - Contains voting equipment usage
  - Contains lots of other data
  - Might contain errors

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## EAVS Data Interactive

- Interactive access to EAVS data
- <https://www.eac.gov/research-and-data/studies-and-reports/eavs-data-interactive>
- Go to the Web site and access Election Technology
- Click arrow at bottom of graphic to navigate to “EAVS Election Equipment” (Page 11 of 13)
- Select your favorite state
- How many voting systems are deployed? What type? What is the variation by county?
- Can you find any state/counties that use a DRE without a VVPAT?

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## Analysis of EAVS Datasets

- We will look at EAVS data to determine remote ballots (e.g., mail) as a percentage of overall votes in a state
- We will look at Tennessee
- EAVS datasets available at <https://www.eac.gov/research-and-data/studies-and-reports>
- Open the Excel file
- How would you identify the meaning of the various columns?
- What overall steps would you follow to start to read the dataset in Python?

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## Read the Dataset

```
import pandas as pd
import os
print(os.getcwd())
os.chdir('G:\\My_Drive\\Courses\\ISE369\\Textbook\\Chap07-Voting\\Data')
df = pd.read_excel('2024_EAVS_for_Public_Release_V1_xlsx.xlsx')

# Select columns to display
df1=df.loc[:,['State_Abbr', 'Jurisdiction_Name', 'A3a', 'A4a', 'A8a']]
print('get Tennessee')
state_df = df1[df1['State_Abbr'] == 'TN']
state_df.rename(columns={'A3a': 'Total', inplace=True)
state_df.rename(columns={'A4a': 'Mail', inplace=True)
state_df.rename(columns={'A8a': 'Mail Inv.'}, inplace=True)

print('Num rows: ', len(state_df))
```

Comments start with a #

Selects only the rows from Tennessee

Makes the change directly to the state\_df object

Num rows: 95

Built-in len function returns the number of rows in the DataFrame

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## Change the Data to a Form We Can Read

```
print(state_df.dtypes)

State_Abbr      object
Jurisdiction_Name object
Total           object
Mail            object
Mail Inv.       object

print(state_df.dtypes)
state_df['Total']=state_df['Total'].astype('int64')
state_df['Mail']=state_df['Mail'].astype('int64')
state_df['Mail Inv.']=state_df['Mail Inv.'].astype('int64')

state_df['%'] = 100 * state_df['Mail Inv.'] / state_df['Mail']
print(state_df.dtypes)

State_Abbr      object
Jurisdiction_Name object
Total           int64
Mail            int64
Mail Inv.       int64
%              float64
```

We need the type of Total, Mail, and Mail Inv. to be a number so we can calculate a percentage

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## Calculate the Percentages

```
total_votes=state_df['Total'].sum()
mail_votes=state_df['Mail'].sum()
mail_invalid = state_df['Mail Inv.'].sum()
mail_percent = 100 * mail_votes / total_votes
mail_invalid_percent = 100 * mail_invalid/mail_votes
print('Percentage Mail Votes: ', mail_percent)
print('Percentage invalid mail votes: ', mail_invalid_percent)
```

Percentage Mail Votes: 12.024653771643727  
Percentage invalid mail votes: 4.237143007693119