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# Census Delays and Introduction to Differential Privacy

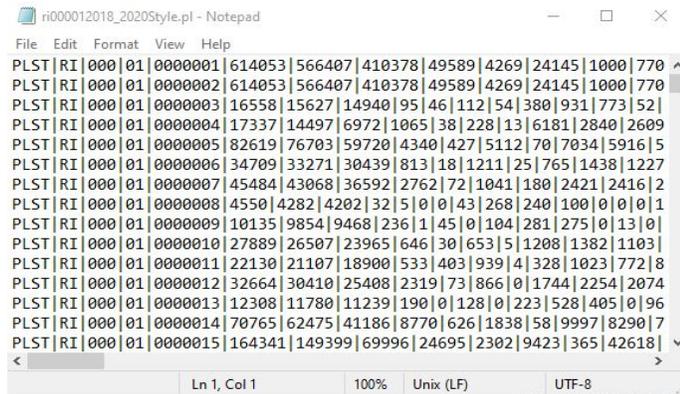
May 4, 2021

# Introduction to Census Data Delays

- Census Act – 13 U.S.C. § 141
  - (a) April 1 “decennial census date”
  - (b) Apportionment data w/n 9 months
  - (c) Population tabulation by state “as expeditiously as possible” but w/n 12 months
    - Known as “P.L. 94-171 data” – 1975 amendment

# Introduction to Census Data Delays

- 2021 Census Bureau announcement
  - February 12: “COVID-19-related delays and prioritizing the delivery of the apportionment results delayed the Census Bureau’s original plan to deliver the redistricting data to the states by March 31, 2021.”
    - COVID-19 pushes “Nonresponse Followup” effort from May 2020 to approx. August
    - Gulf Coast hurricanes, west coast fires, civil unrest
  - P.L. 94-171 data by September 30, 2021
  - Legacy data by August 16, 2021



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# Differential Privacy and Impact on Census

- Confidentiality requirement 13 U.S.C. § 9(a)(2)
  - Census Bureau may not “make any publication whereby the data furnished by any particular establishment or individual under this title can be identified.”
- Necessitates disclosure avoidance strategies
- Census Bureau deems previous use of “data swapping” inadequate
  - Data swapping held the population count and voting age population invariant (constant) at the block group level
- New method: differential privacy
  - Differential privacy introduces (allegedly) appropriate noise into the block level data, while maintaining overall state populations invariant

# What is differential privacy?

- First introduced in computer science literature in 2006. Has since been used in aggregate data analysis by Google, Apple, Uber, and others.
- Defined in formal mathematical language.
- Simply, differential privacy ensure that the only things that can be learned about an individual from a dataset are essentially the same as what could have been learned if the analysis had been performed without that individual's data.
  - That is, that the presence or absence of any one individual in a dataset does not significantly affect the responses that the data system provides.
- To achieve this, differential privacy injects a carefully tuned amount of “noise” to the statistics outputted.

# What does differential privacy protect against?

- Differential privacy aims to protect against “privacy attacks”
- A common privacy attack is taking de-identified data (such as anonymized health records) and comparing it to publicly available datasets (such as voter registration records) to deduce who the individuals in the de-identified dataset are.
- Example: in 1990s, Massachusetts published de-identified data of state employees’ hospital records. A researcher compared the data in this set to voter registration data and identified the health records of Massachusetts Governor William Weld.

# How to calibrate “noise”

- Injecting noise means that the computation gives an approximate answer to individual pieces of data.
- Determining how much “noise” to inject is determined by setting the privacy-loss budget, also known as the privacy-loss parameter or epsilon value ( $\epsilon$ ).
- Like tuning a knob for balancing privacy and accuracy
  - Setting  $\epsilon$  to zero means perfect privacy but useless data
  - Setting  $\epsilon$  to infinity means perfectly accurate data but no privacy
- Determining where to set  $\epsilon$  is a policy decision that depends on the intended use of the data and the importance of privacy.

# The Census Bureau's Use of Differential Privacy

- Census Bureau says it introduced its intention to use differential privacy in 2018.
- The Bureau has indicated that its internal studies indicate that Census data is vulnerable to re-identification attacks through record linkage.
- The Bureau first released four sets of “demonstration data” applying differential privacy to 2010 Census data.
  - These demonstration datasets applied  $\epsilon$  value of 4.
- These demonstration datasets resulted in serious accuracy concerns, now at issue in Alabama litigation.

# The Census Bureau's Use of Differential Privacy

- The Census Bureau says it deliberately set a low  $\epsilon$  value to its first demonstration datasets to identify issues and fine-tune approach later
- Published new demonstration dataset on April 28, 2021 that applies substantially higher  $\epsilon$  value of 10.3
- Census Bureau says that this demonstration dataset is much more accurate

# The Census Bureau's Use of Differential Privacy

- According to Census Bureau, the most recent dataset shows the following from differential privacy:
  - Total populations for counties have average error of +/- 5 persons
  - At the block level, differentially private data have an average population error of +/- 3 persons
  - No meaningful bias in the statistics for racial and ethnic minorities even in very small population geographies like Federal American Indian Reservations
- Final  $\epsilon$  value will be determined in June, 2021
- Census Bureau has invited feedback based on most recent dataset for fitness of use (including redistricting and VRA), privacy, and improvements
- Deadline for feedback is May 28, 2021

# Census Delay Litigation

- *Ohio v. Raimondo* (S.D. Ohio Feb. 25, 2021)
  - Based on Census Bureau's announcement of delay
  - Causes of action:
    - Violation of the Census Act, 13 U.S.C. § 141(c) (P.L. 94-171)
      - Failure to meet statutory deadline
    - Violation of the Administrative Procedure Act, 5 U.S.C. § 706
      - Not in accordance with law
        - Failure to meet statutory deadline
      - Arbitrary and capricious:
        - Failure to accommodate states with early deadlines
        - Failure to account for states' reliance interests on the March 31 deadline
  - Remedies:
    - Declaratory judgment, preliminary injunction, writ of mandamus

# Census Delay Litigation

- *Ohio* – Order Denying Preliminary Injunction/Dismissing Case (Mar. 24, 2021)
  - Held, Ohio lacks standing
    - No redressability
      - Not possible to order the Census Bureau to meet Mar. 31 deadline
      - Congressional apportionment must come first
    - No injury-in-fact
      - Statutory violation, in and of itself, is insufficient
        - Census Act provides no cause of action
      - Ohio law does not require federal redistricting data
        - No allegation that federal redistricting data will result in better districts, or better comply with federal law
      - Alleged need to avoid debates about the quality of data, and/or potential distrust, are speculative injuries
      - Injury is traced to Ohio's rigid timeline, not any act of the Census Bureau

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Based on census delay *and* use of differential privacy
  - Plaintiffs: State of Alabama, two individual voters, one candidate for Congress
  - Causes of action:
    - Violation of the Census Act, 13 U.S.C. § 141(c) (P.L. 94-171)
      - Differential privacy results in failure to produce accurate “tabulations of population” required under law
    - Violation of the Right to Vote under the Equal Protection Clause of the 5<sup>th</sup> Amendment
      - Differential privacy will result in false redistricting data, creating substantial risk the individual plaintiffs’ votes will be diluted in violation of the one-person, one-vote principle
    - Violation of the Administrative Procedure Act, 5 U.S.C. § 706
      - Not in accordance with law
        - Differential privacy results in failure to produce accurate tabulations under 13 U.S.C. § 141(c)
      - Contrary to constitutional right
        - Differential privacy produces substantial risk of vote dilution in violation of one-person, one-vote

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Causes of action (con't):
    - Violation of the Administrative Procedure Act, 5 U.S.C. § 706
      - Arbitrary and capricious
        - Failure to consider the effect of differential privacy on states that rely on accurate data
        - Failure to offer states the option for accurate redistricting data in lieu of differential privacy data
        - Offering an explanation that runs counter to the evidence before the Census Bureau
    - Violation of the Census Act, 13 U.S.C. § 141(c) (P.L. 94-171)
      - Failure to meet statutory deadline
    - Violation of the Administrative Procedure Act, 5 U.S.C. § 706
      - Not in accordance with law
        - Failure to meet statutory deadline

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Causes of action (con't):
    - Violation of the Administrative Procedure Act, 5 U.S.C. § 706
      - Arbitrary and capricious
        - Failure to roll out data and prioritize states with early deadlines
        - Failure to account for states' reliance interests on the March 31 deadline
  - Remedies:
    - Declaratory judgment, preliminary/permanent injunction, vacatur of delay decision, writ of mandamus
  - 3-judge panel appointed
  - Oral argument May 3, 2021

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs lack standing
      - Differential privacy issues
        - Plaintiffs have not suffered any injuries-in-fact
          - Plaintiffs will not suffer an informational injury because the Census Bureau will properly deliver “tabulations of population” under 13 U.S.C. § 141(c)
          - Plaintiffs will not suffer a sovereign injury that impedes its interest in drawing fair districts
            - The differential privacy data will be perfectly fit/useful
            - Alabama law doesn’t mandate use of federal redistricting data
        - Potential loss of federal funding is too speculative
        - Too early to tell whether differential privacy data will dilute minority groups’ votes (plus such claims must be brought by voters residing in the affected districts)
        - A mere violation of federal law is insufficiently particularized injury

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs lack standing
      - Differential privacy issues (con't)
        - Plaintiffs' alleged injuries are not traceable to the Census Bureau's conduct
          - Alabama's conundrum is due to its own state law inflexibility (citing *Ohio*)
          - Alabama cannot show that differential privacy data is less accurate than alternative disclosure avoidance methodologies
        - Plaintiffs' injuries are not redressable
          - Census Bureau still must protect privacy; 2010 data swapping is adequate and would make the data more inaccurate
          - Abandoning differential privacy would require the Bureau to start over, creating a delay of "several months"

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs lack standing (con't)
      - Census delay issues
        - Plaintiffs have not suffered any injuries-in-fact
          - Alabama is not required to use the federal census data
          - Alabama's Board of Registrars is able to get a head start in reassigning voters to correct precincts
          - Plaintiff candidate will not be uniquely harmed by shorted campaign time
        - Plaintiffs' alleged injuries are not traceable to the Census Bureau
          - Any injuries result from the state's independent actions
          - Front-loading Alabama could result in rushed, inaccurate data
        - Plaintiffs' alleged injuries are not redressable.
          - Not possible to speed up the delivery date

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs cannot prevail on the merits
      - Differential privacy issues
        - Use of differential privacy data complies with the Census Act, 13 U.S.C. § 141(c)
          - Alabama (as a state) doesn't qualify as an "aggrieved person" under a federal law, P.L. 105-119, § 209, and thus cannot bring a lawsuit to private enforce violations of the Census Act
        - Differential privacy won't necessarily create vote dilution, and state not even required to use the data
        - The Census Bureau did not violate the APA by use of differential privacy data
          - The differential privacy announcement is not a "final agency action"
            - Plaintiffs criticize broad policy, not specific "agency actions"
          - The action is not "final"
            - Only non-final demonstrations have been produced
            - No final decision has been made on how to tune the data noise

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs cannot prevail on the merits
      - Differential privacy issues
        - The Census Bureau did not violate the APA by use of differential privacy data (con't)
          - The differential privacy decision does not violate any law
          - The decision is not arbitrary or capricious, and meets a highly deferential standard
          - The decision was based on reasoned conclusions that the 2010 methodology was inadequate

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs cannot prevail on the merits
      - Census delay issues
        - Alabama (as a state) doesn't qualify as an "aggrieved person" under a federal law, P.L. 105-119, § 209, and thus cannot bring a lawsuit to private enforce violations of the Census Act
        - The Census Bureau did not violate the APA by delaying the redistricting data
          - The Feb. 12 announcement is not a "final agency action"
            - The action is not "final"
            - No legal consequences because Alabama is not required to use the data
          - The delay decision is not arbitrary or capricious because it was supported by a reasoned decision: COVID-19 made it impossible to meet the statutory deadline

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Commerce Department response to Motion for Preliminary/Permanent Injunction
    - Plaintiffs cannot demonstrate irreparable harm
      - Alabama has not alleged any harm, much less irreparable harm
      - Harm cannot be irreparable if Alabama waited nearly 2 years
    - Balance of hardships
      - Differential privacy is in the public interest
        - Creating a new disclosure avoidance method would delay the census data by months
      - Ordering an accelerated deadline for Alabama would disrupt other states

# Census Delay Litigation

- *Alabama v. U.S. Dept. of Commerce* (M.D. Alabama Mar. 10, 2021)
  - Amicus Curiae participation
    - Supporting plaintiffs
      - Professor Jane Bambauer, U of A law professor (applying differential privacy across the board, without context or assessment of particular privacy risks, is an irrational policy)
      - Professor Margo Anderson, Univ. of Wisc. history professor (critiquing lack of sufficient state consultation)
      - 16 States: Utah, Alaska, Arkansas, Florida, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Carolina, Texas, and West Virginia (relies on Utah Legislature study comparing 2010 differential privacy demonstration data and 2010 final redistricting data; demonstrates differential privacy data is inaccurate and thus impacts federal funding, rural communities, and minorities)
      - State Government Leadership Foundation and legislators from Louisiana, Minnesota, Mississippi, Nevada, Oklahoma, and Vermont (differential privacy will threaten redistricting plans and create litigation)
      - Pennsylvania Republican legislative leaders
    - Supporting the Census Bureau
      - Coalition of 20 privacy experts (differential privacy is the only sound method to prevent reconstruction attacks)
      - National Redistricting Foundation (rushing process would be harmful; no position on differential privacy)

# Thank you Questions?

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