Privacy for Quantitative Social Science

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Collaboration: {Computer, Social} Science

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First paper crossing both fields presented at the Society for Political Methodology meetings

D'Orazio, Honaker, King (2015)

Attacks

Computer Science has destroyed the idea of "deidentification"

- anonymization techniques for data releases are generally open to reidentification attacks (Sweeney 1997, 2000, Narayanan & Shimatikov 2008);
- aggregated statistics can not have any privacy guarantee (Dinur and Nissim 2003) - fingerprinting (Bun, Ullman, Vadhan STOC 2014), (Dwork, Smith, Steinke, Ullman, Vadhan FOCS 2015);
- even statistical estimates can leak individual information (Ullman and Steinke 2013) - time variance.

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  - But where's the infrastructure to stand between data and users?

A repository for sharing, citing, analyzing, and preserving research data.

dataverse.org

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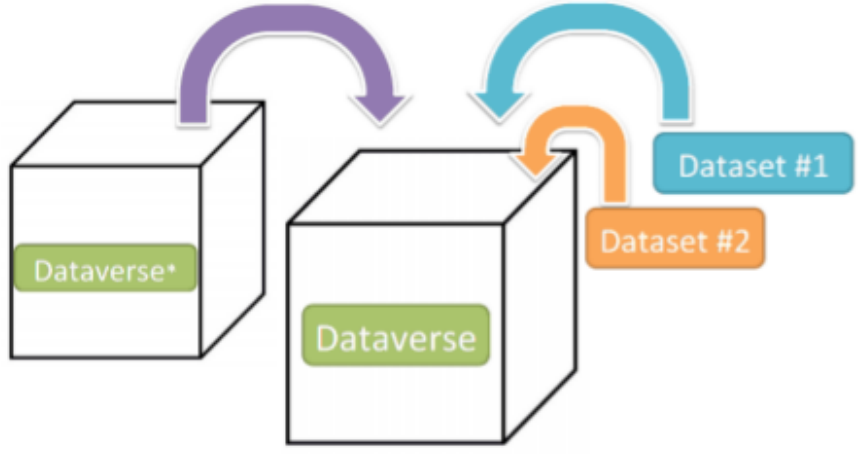
The largest collection of social science research data in the world

Schematic Diagram of a **Dataverse** in Dataverse 4.0



Container for your **Datasets** and/or **Dataverses***

* Dataverses can now contain other Dataverses (this replaces Collections & Subnetworks)

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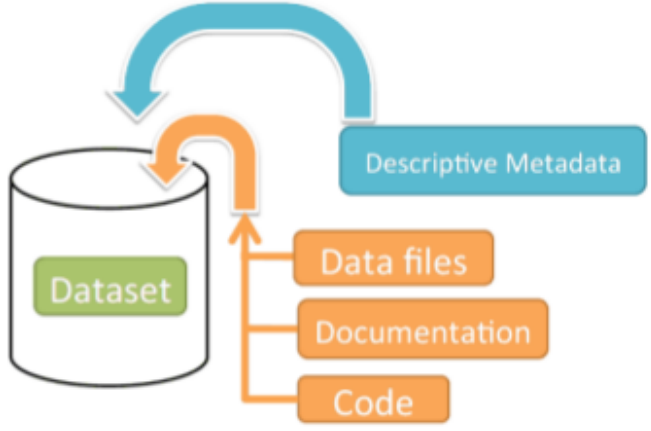

Container for your data, documentation, and code.

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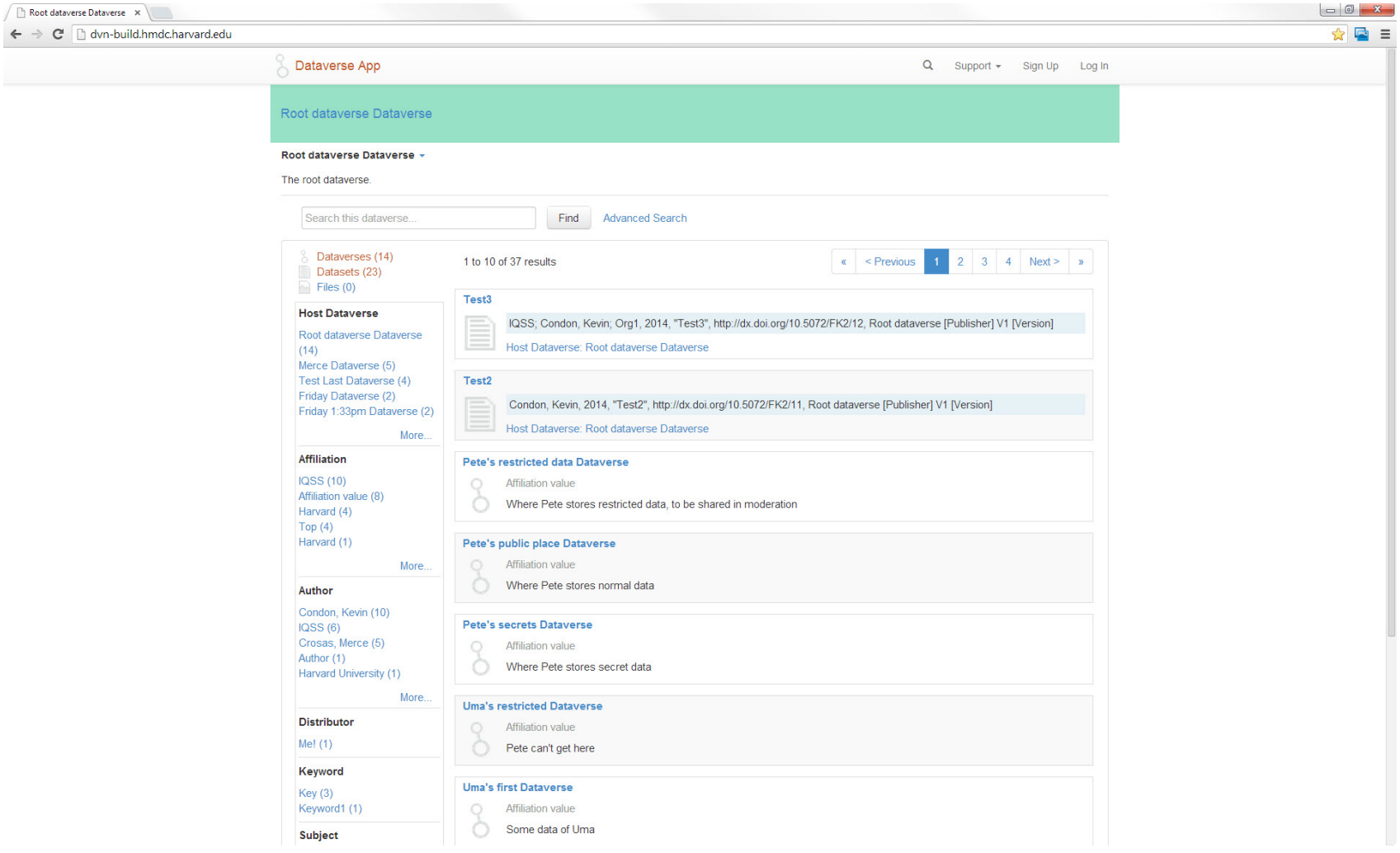

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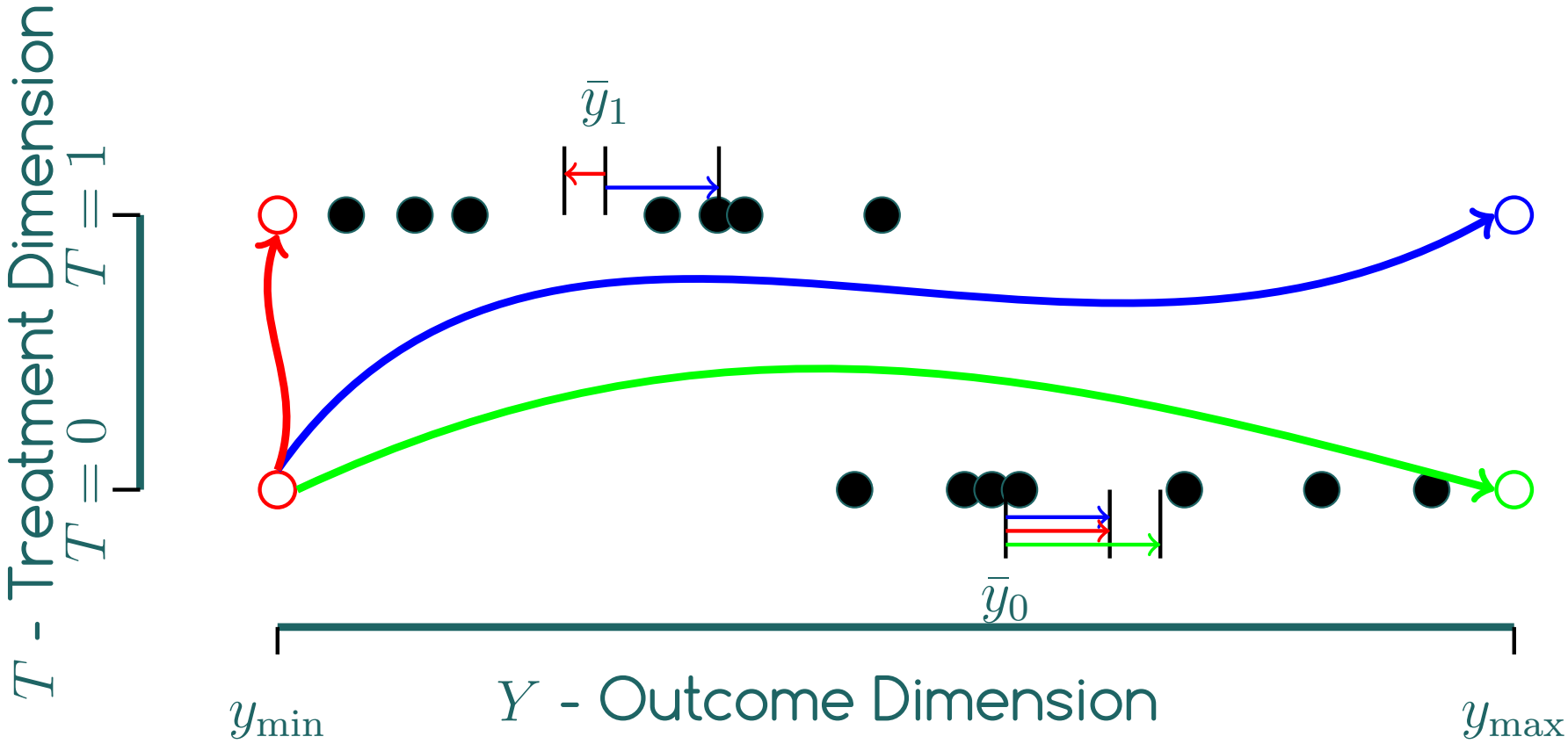
T - Treatment Dimension
$T = 1$
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$\bar{y}_1$
$\bar{y}_0$
$y_{\min}$
Y - Outcome Dimension
$y_{\max}$

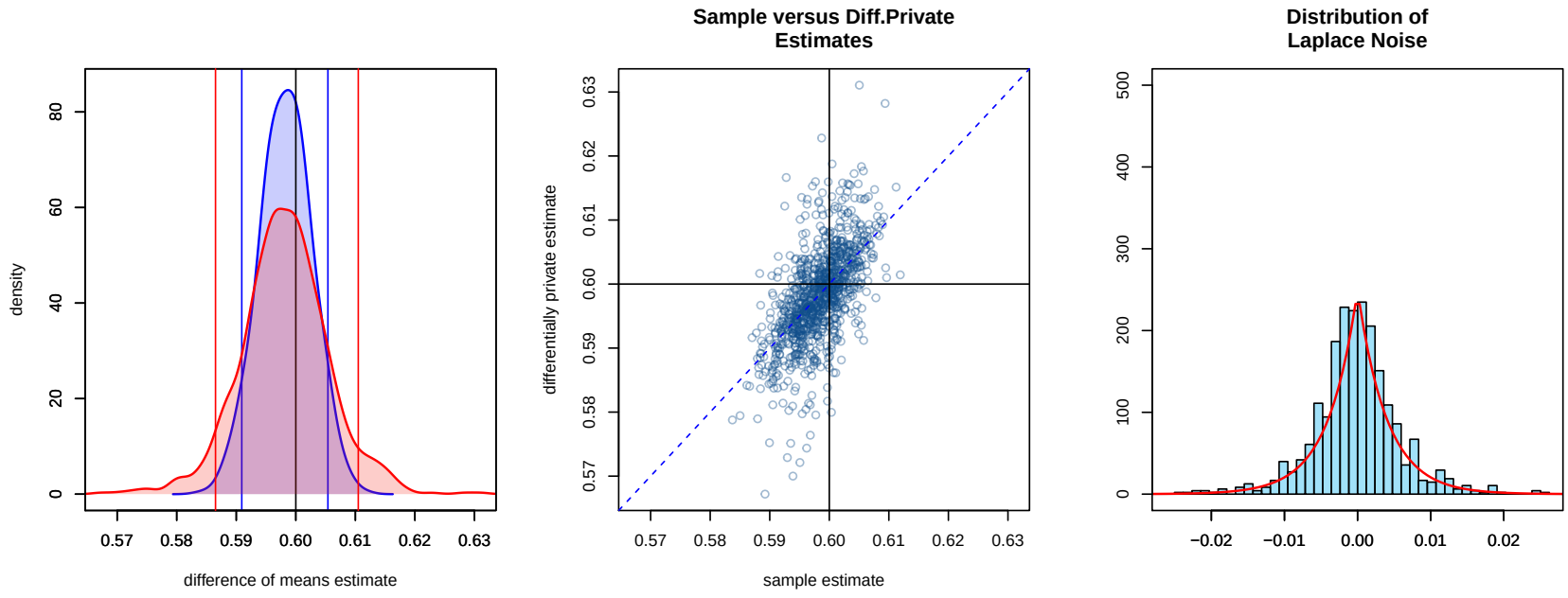


Figure: *Distributions of differentially private statistics of the difference of means estimate.*

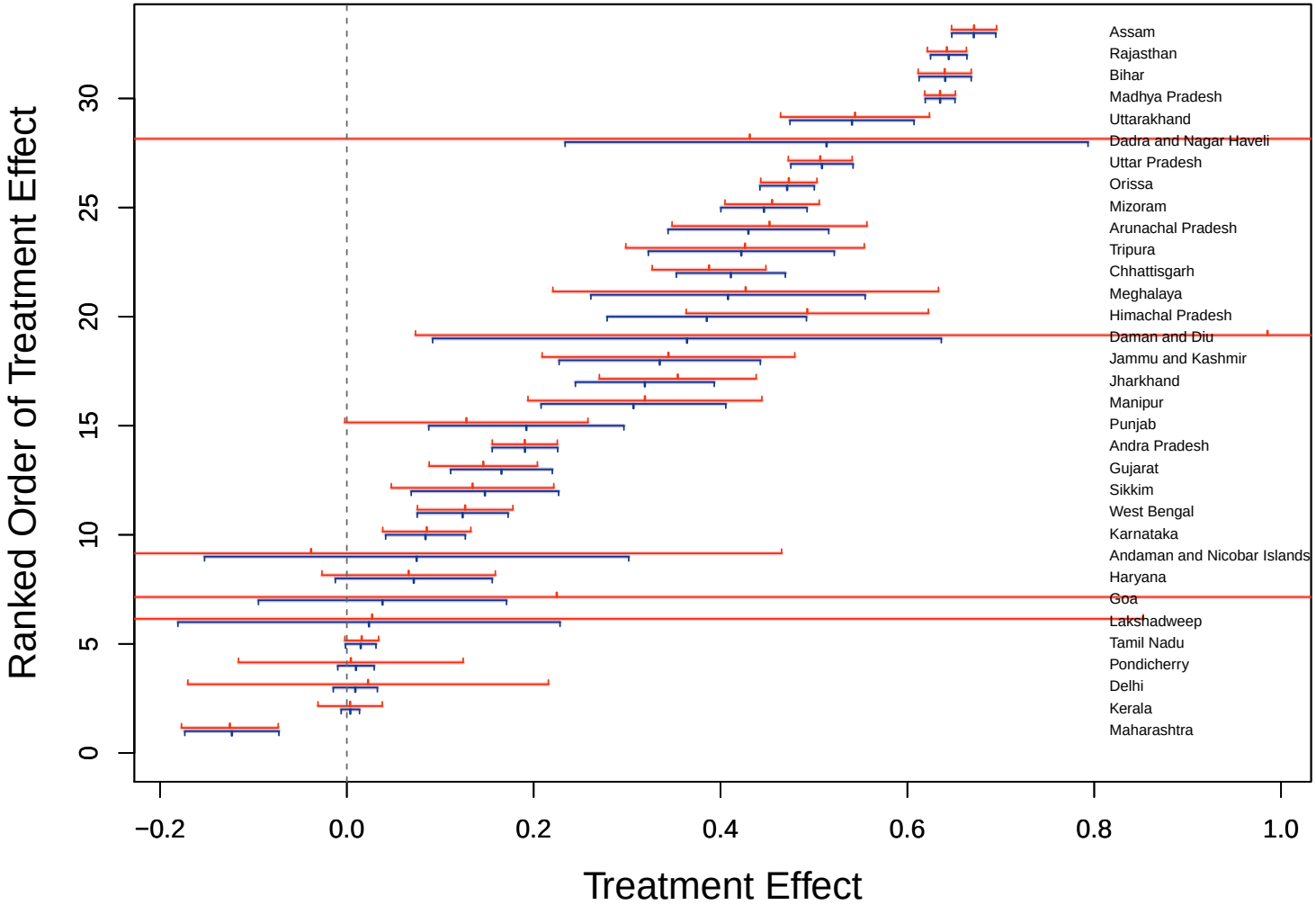
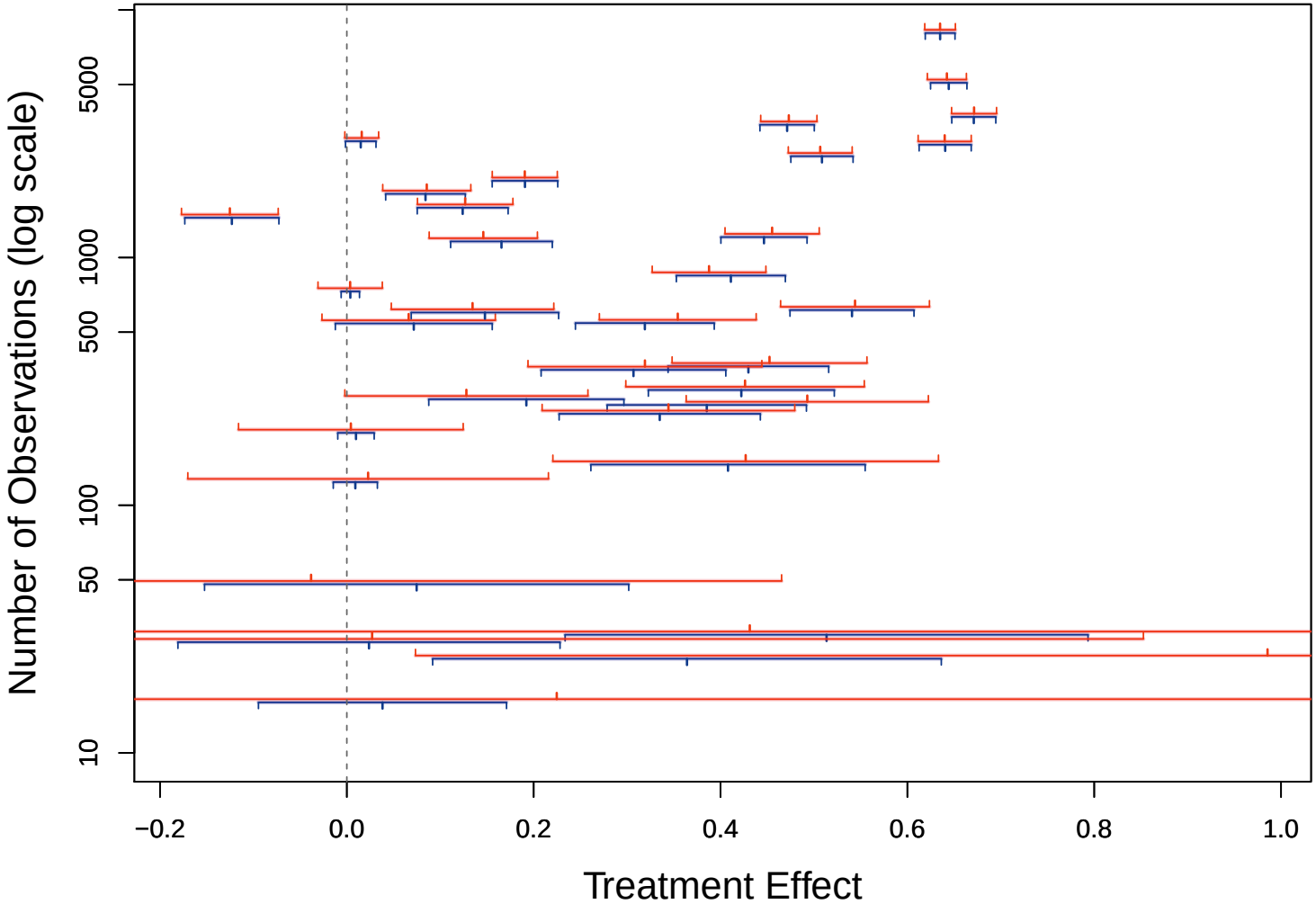


Figure: *Diff. of means estimates across 33 Indian states for the treatment effect of JSY cash transfers to women on the probability of delivering at a birthing center.*



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- Social science exploration revolves around causal inference, summary statistics, and regression – all of which we've made strides in
- Going forward:
  - sensitive data can be shared through the same repositories now used, such as Dataverse
  - There's an urgent need to expand the realm of social science-specific statistical methods that be made (a) differentially private but (b) with reasonably sized uncertainty estimates