ASNY Spring Meeting: Auditing Models for Bias

May 2019

NOT IF, BUT HOW

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Data Science Framework

From Idea to Application: Data Science Life Cycle

Idea

Accelerate UW using ML models for risk segmentation

Scope Problem

Using relevant data, determine risk class for applicants

Build Models

Collect historical data, build and test models

Deploy Models

Integrate model with application to assign scores to applicants

Update Product

Communicate changes in product to stakeholders

Monitor

On-going monitoring for decay

Important Touchpoints for Privacy and Bias

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- Data Sourcing & 3rd Party Data
  - Decide on appropriate data (internal and external) to build model; talk with subject matter experts to define relevant data sources
- Fairness Considerations
  - Based on data, decide on appropriate model design
  - Based on possible interventions, define metrics for model selection
  - Query model results for transparency and bias

3rd Party Data

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3 questions to think about when using 3rd party data

1. **What is the benefit of external data for the use case?**
   - In some cases, we want to use supplemental information to request less information from clients and make for an easy application process
   - In some cases, want to use it to verify statements that people make
2. **Do you satisfy specific policy requirements around the use of 3rd party data?**
3. **Are there proper procedures in place for storage and access to 3rd party data?**
   - Is there access control? Procedures in case of breach?
   - When matching external data to internal data, is this done in a robust, reproducible way?

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Measuring Fairness

Fairness Metrics

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Fairness and Model Audits is a new industry

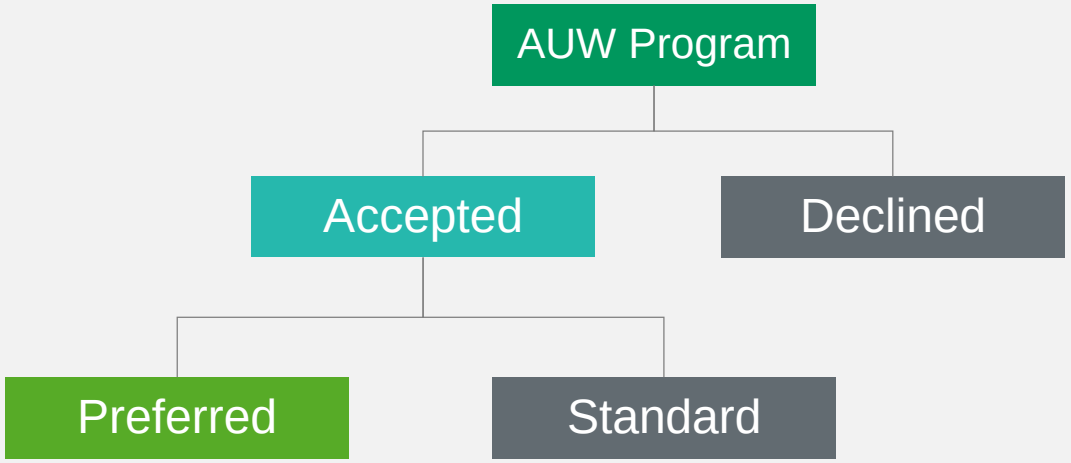
- Cathy O'Neill, author of Weapons of Math Destruction offers a "Model Audited for Bias" certification through her consulting firm ORCAA
- Other consulting firms like McKinsey also offer a model audit solution
- Aequitas, developed by center for Data Science and Public Policy is an open source tool that can help you audit your models for bias
- IBM AI 360, developed by IBM can calculate many fairness metrics
- All of these approaches specify metrics that can be used to determine if your model is fair/biased

In addition to a model performance metric, how do you incorporate a fairness metric in your model selection process?

Case Study

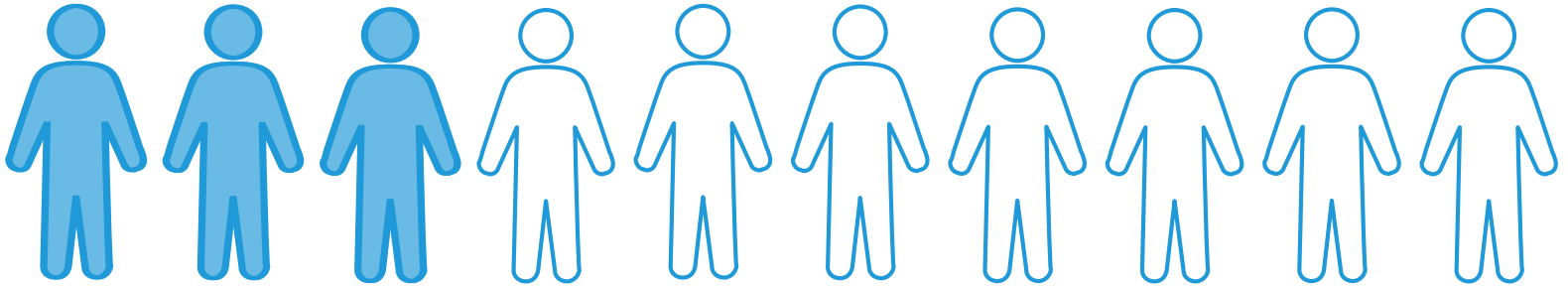
Exercise: Identify Privacy and Bias Concerns at each stage in the model and product cycle

- Problem: For an AUW program, how can we increase STP of Preferred candidates?
- Intervention: Based on a model score, the top scoring accepted candidates will be assigned a Preferred Class.



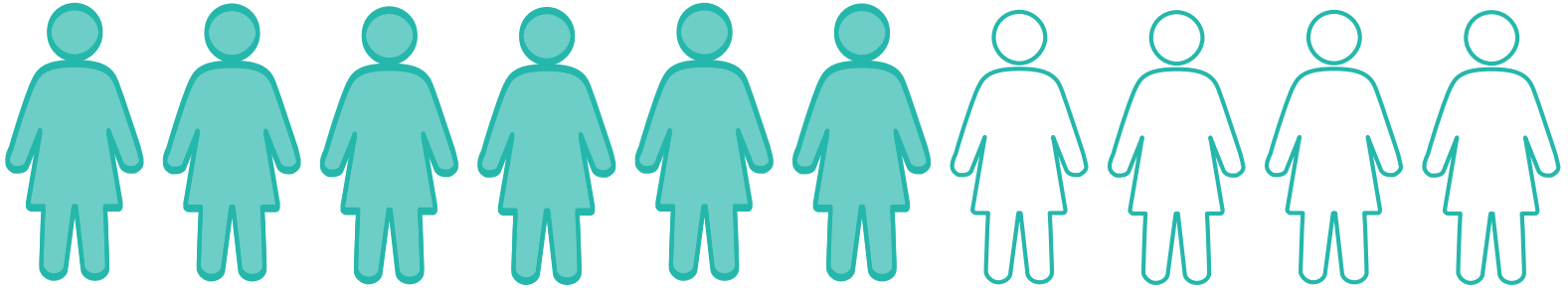
Model Results

Protected Attributes



30%

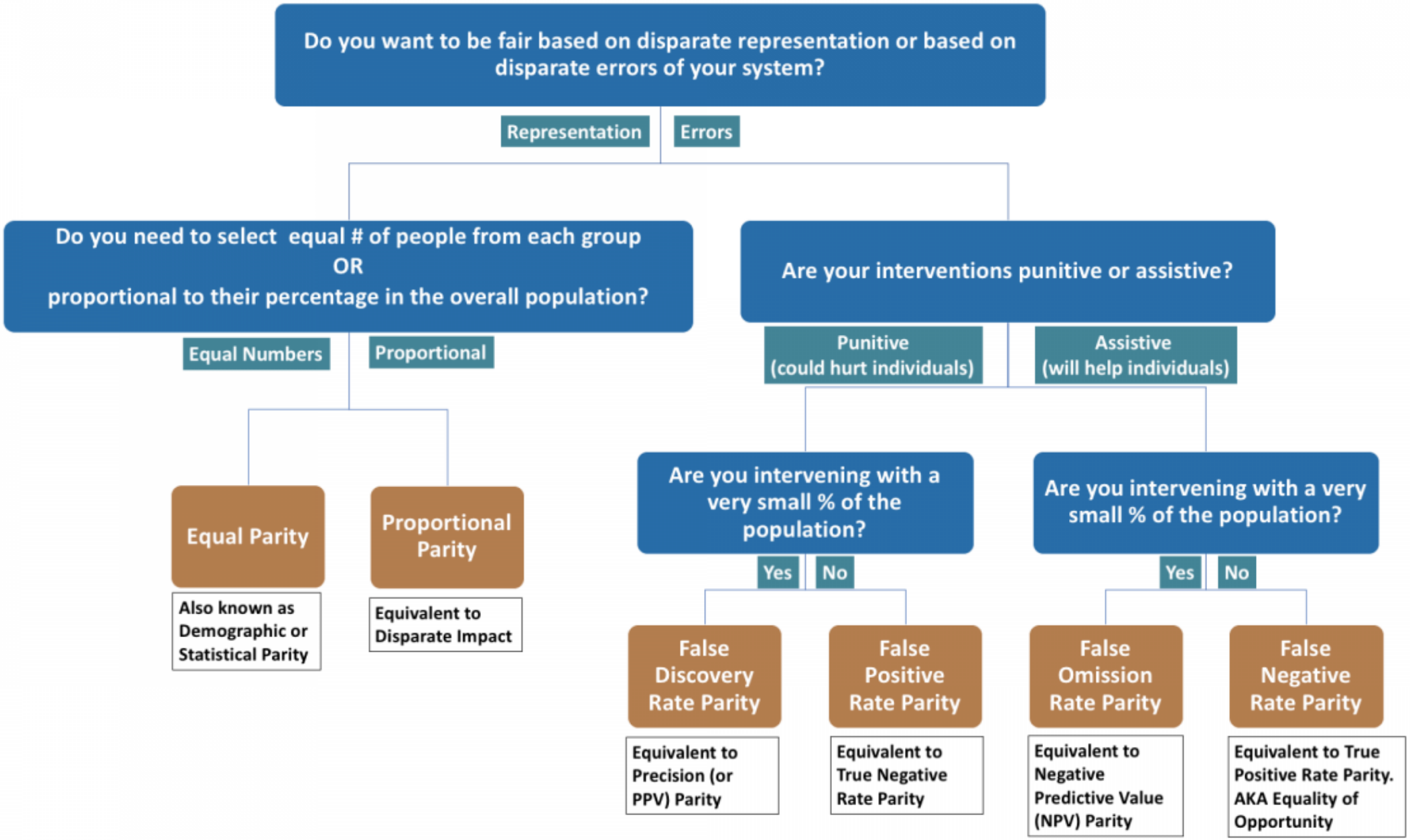
Men are flagged as Preferred



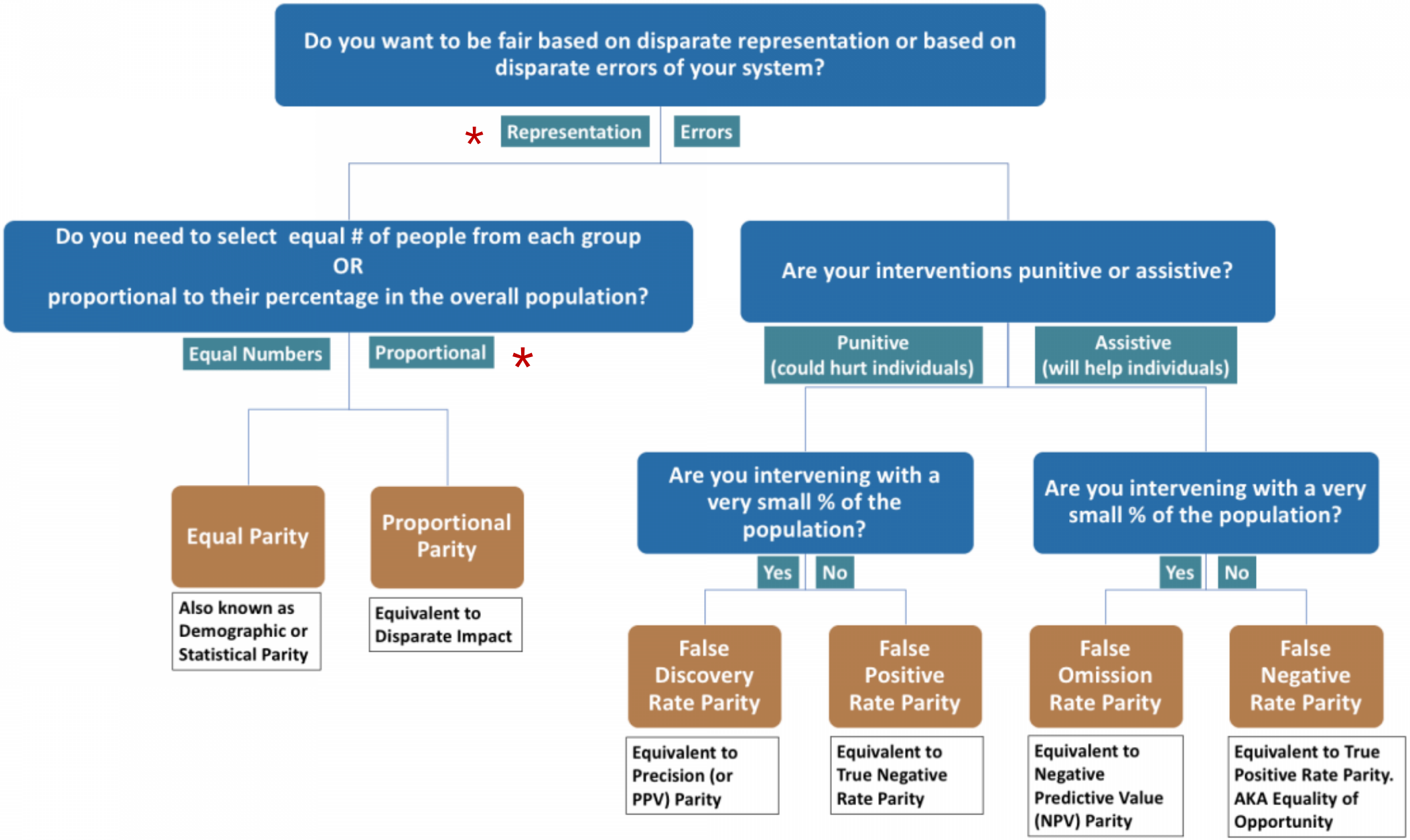
60%

Women are flagged as Preferred

FAIRNESS TREE



FAIRNESS TREE



Takeaways

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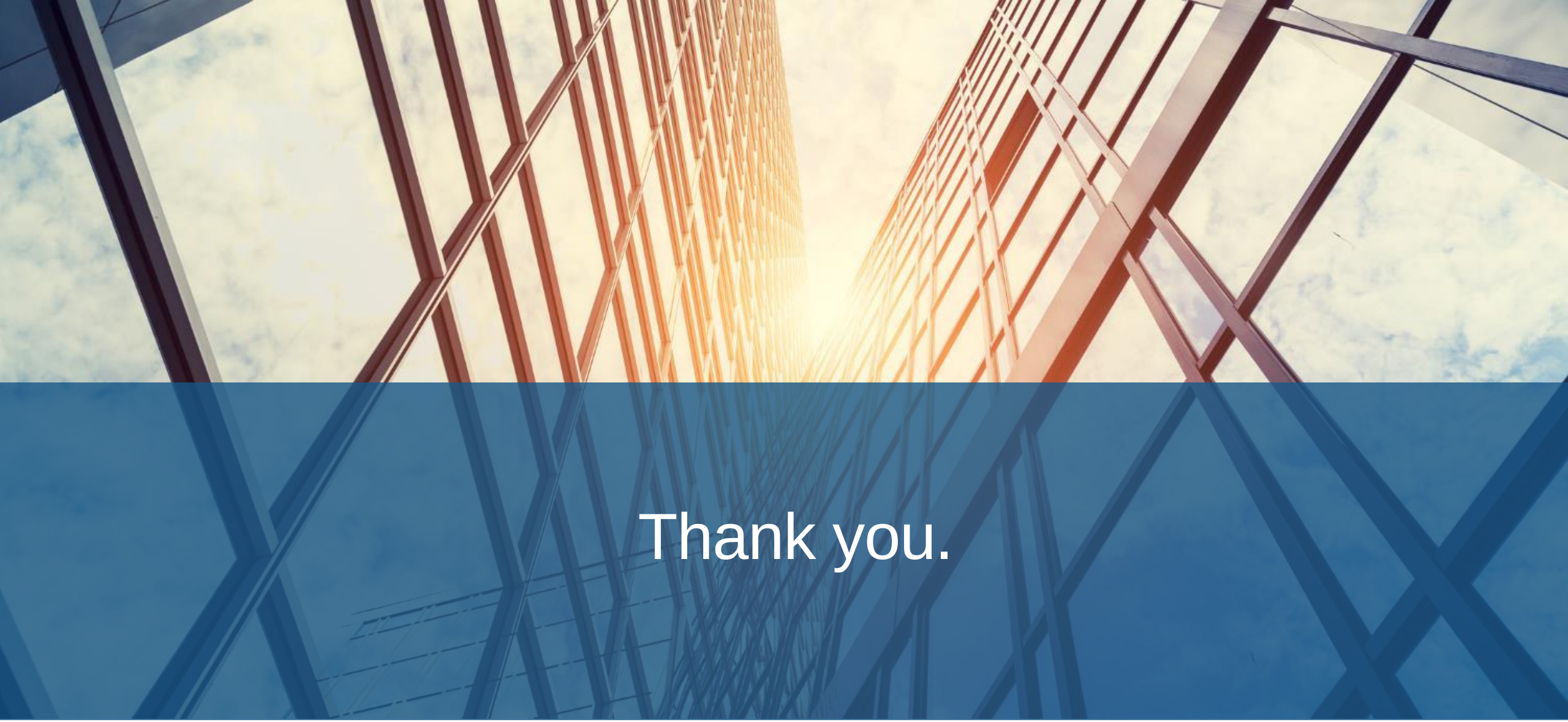
- Privacy and bias considerations of the modelling process are real
- Uncertainty about what is required from a regulatory perspective
- To account for such considerations:
  - Design a model that takes into account the process which it supports
  - Document all decisions made around model selection
  - Audit models for bias and incorporate bias metrics into model selection process
  - Work with legal to be in compliance with policy requirements around 3rd party data

Questions?



Thank you.

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