

Incorporating ESG Considerations into Optimizations

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Presentation Goals

- Many investment goals can be accomplished in multiple ways in the optimizer
- Using ESG metrics as an example, we'll go through three different ways you can parameterize your investment preferences
- By the end, you'll be 100% confident in how and when to use them in your own optimizations

Optimization Objective Function

- Investor objective is to maximize risk- adjusted returns net of costs:

$$\text{Utility} = \text{Return} - \text{Risk} - \text{Costs}$$

Optimization Objective Function With ESG

- Investor objective is to maximize risk- adjusted returns net of environmental/social/governance costs:

Utility = Return – Risk – Costs

– Pollution – Discrimination

– War – Human Rights Abuses

– Miami Disappearing
Into the Ocean

– Your Children Getting
Asthma and Never
Experiencing Snow

– Funding
Terrorism

– The Sadness of
Seeing A Very
Skinny and Sad
Baby Polar Bear

+ The Feeling of Telling People You Invest
Responsibly for Social Change

Method 1 - Screening

General strategy:

- Pick a benchmark
- Remove the stocks that do not meet ESG criteria
- Optimize the reduced universe against the benchmark to match on factor loadings and other characteristics

Pros:

- Straightforward
- Northfield-affiliated research by Lloyd Kurtz has shown this method to not significantly out- or underperform the benchmark (<http://www.northinfo.com/Documents/392.pdf>)

Cons:

- Not granular, does not take into account relative levels of ESG metrics between companies

Method 2 – Use scores or rankings

General strategy:

- Score or rank stocks based on ESG criteria
- Use the alpha reshaping feature to convert the scores to alphas¹
- Optimize normally, resulting in a portfolio with a socially responsible tilt

Pros:

- Gives preference to more “responsible” companies over less responsible ones on a risk-adjusted basis
- Explicitly includes ESG considerations in the utility function

Cons:

- Rankings can be unreliable
- Difficult to incorporate into active strategies (we used up the alpha input)

1) <http://www.northinfo.com/docs/tech082009.pdf>

Method 3 – Use Attributes

General strategy:

- Score or rank stocks based on ESG criteria
- Use these criteria as attributes – set goal values or bounds
- Optimize normally

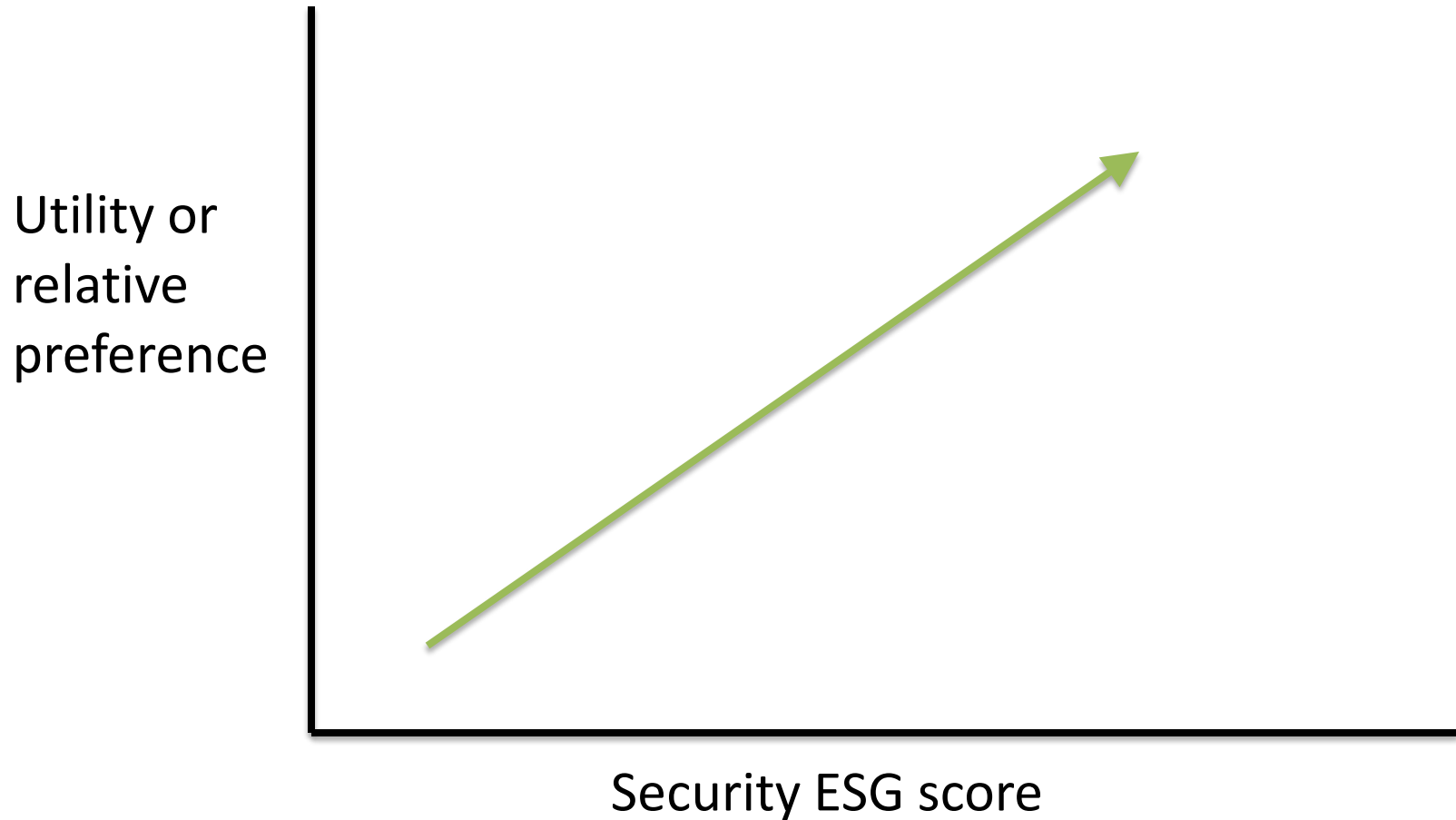
Pros:

- The most granular method – can constrain on any number of metrics
- Can explicitly include ESG considerations in the utility function
- Can remain neutral on a security level but express a preference at a portfolio level

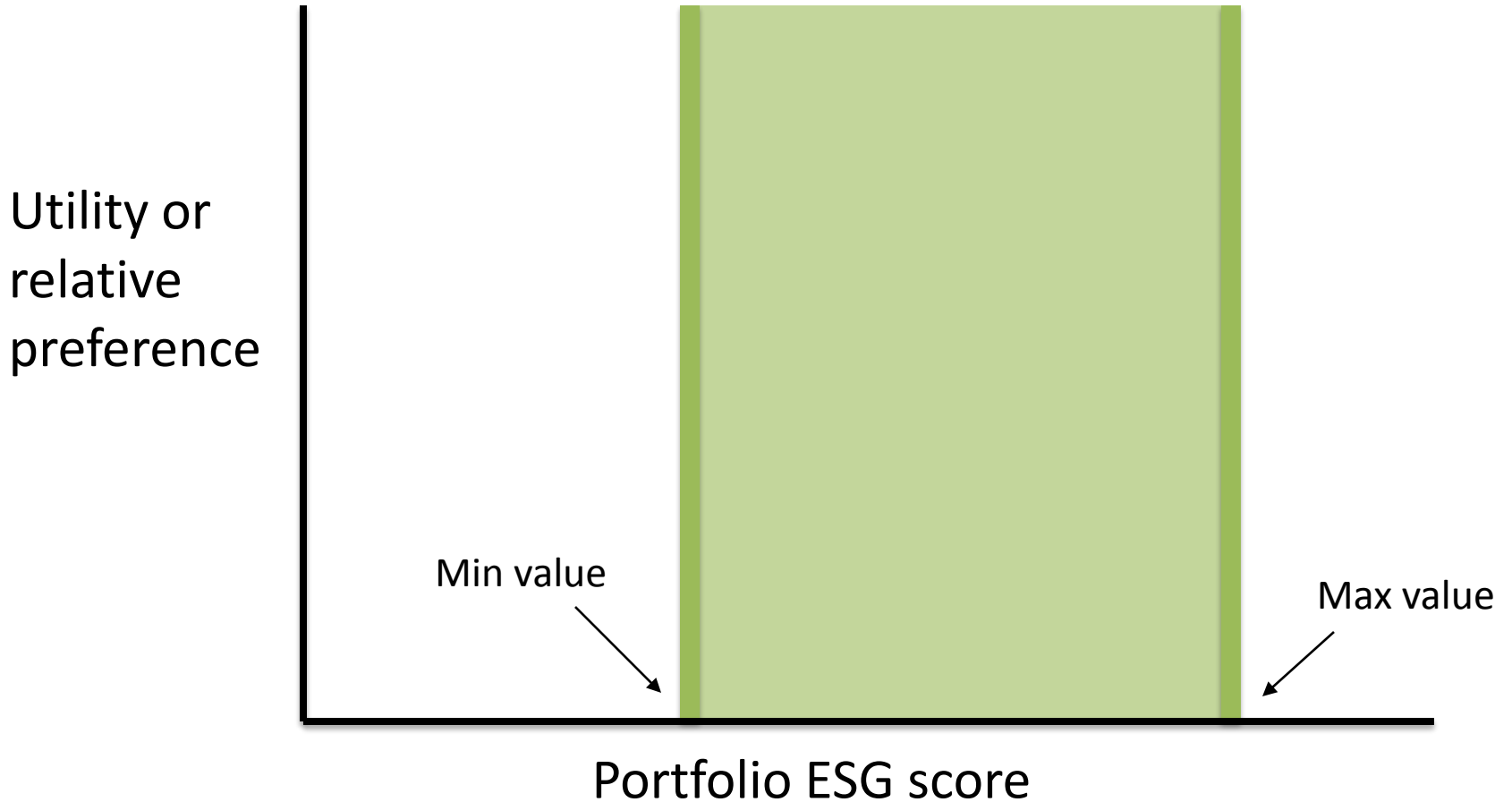
Cons:

- Quadratic penalty scaling can be difficult to fine tune
- The two-sided nature of the quadratic penalty doesn't always directly translate to ESG-type constraints (e.g. most managers wouldn't want to penalize a company for not giving off *enough* greenhouse gases)

Method 2 – Use scores or rankings



Method 3 – Use Attributes



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