

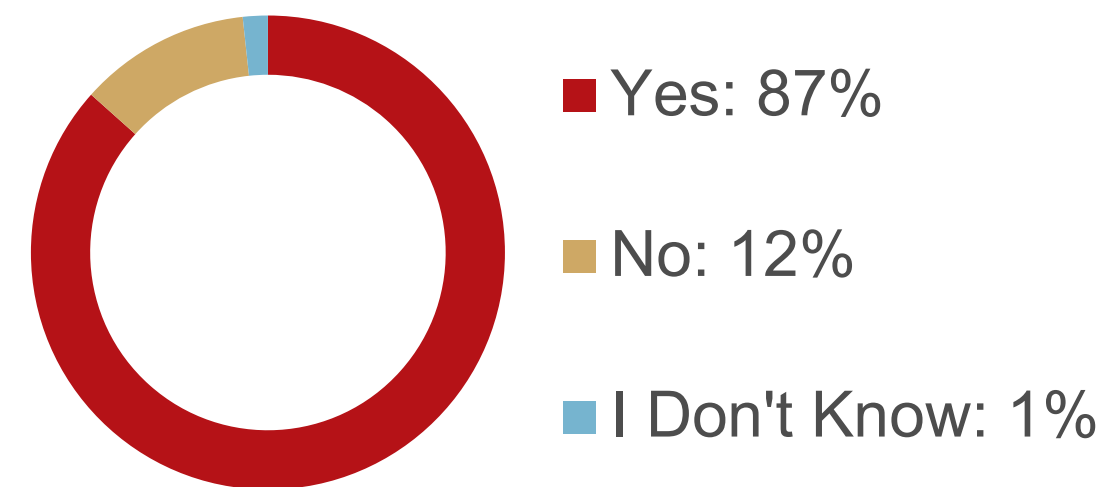
Combinatorial Reverse Auctions in Construction Procurement

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Motivation / Background

- Volume of construction is forecasted to grow by 85% to \$15.5 trillion by 2030¹
- An allocation mechanism is needed to source based on “who wants it the most?” and “who can do it best?”
- Procurement is often misaligned with companies’ strategic goals
- Combinatorial reverse auctions are used in the transportation sector
- Perform well compared to single item auctions
- Side constraints can easily be added to models to reflect business rules

“Do you believe that good procurement is always synonymous with a successful project?”²



Key Question / Hypothesis

- Can combinatorial reverse auctions be used to minimize procurement costs and improve project performance?
- Does adding bid adjustment and side constraints to models reflecting business rules well?
- Can the models handle uncertainty well?

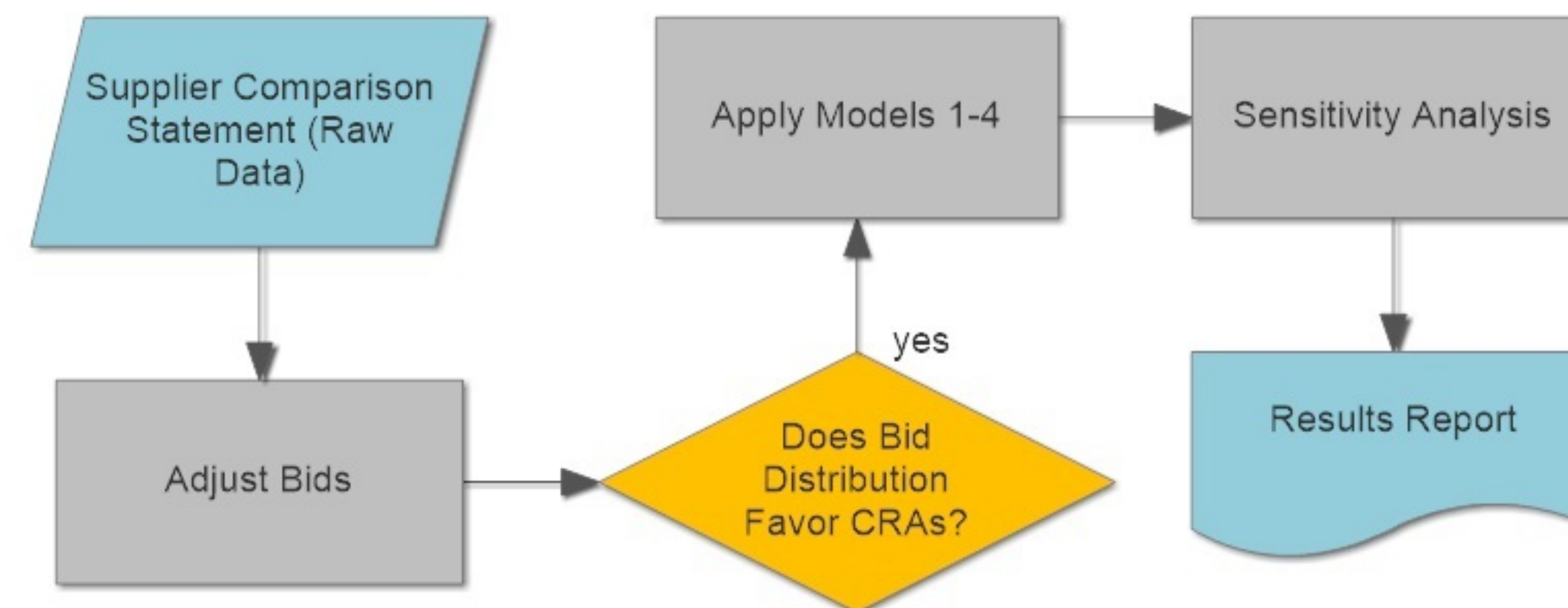
Relevant Literature

1. Global Construction Perspectives and Oxford Economics. (2015). Global Construction 2030 . London: Global Construction Perspectives and Oxford Economics.
2. The Chartered Institute of Building. (2010). A Report Exploring Procurement in the Construction Industry.
3. Lunander A, L. S. (2012). Combinatorial Auctions in Public Procurement: Experiences from Sweden. Contemporary Economic Policy.

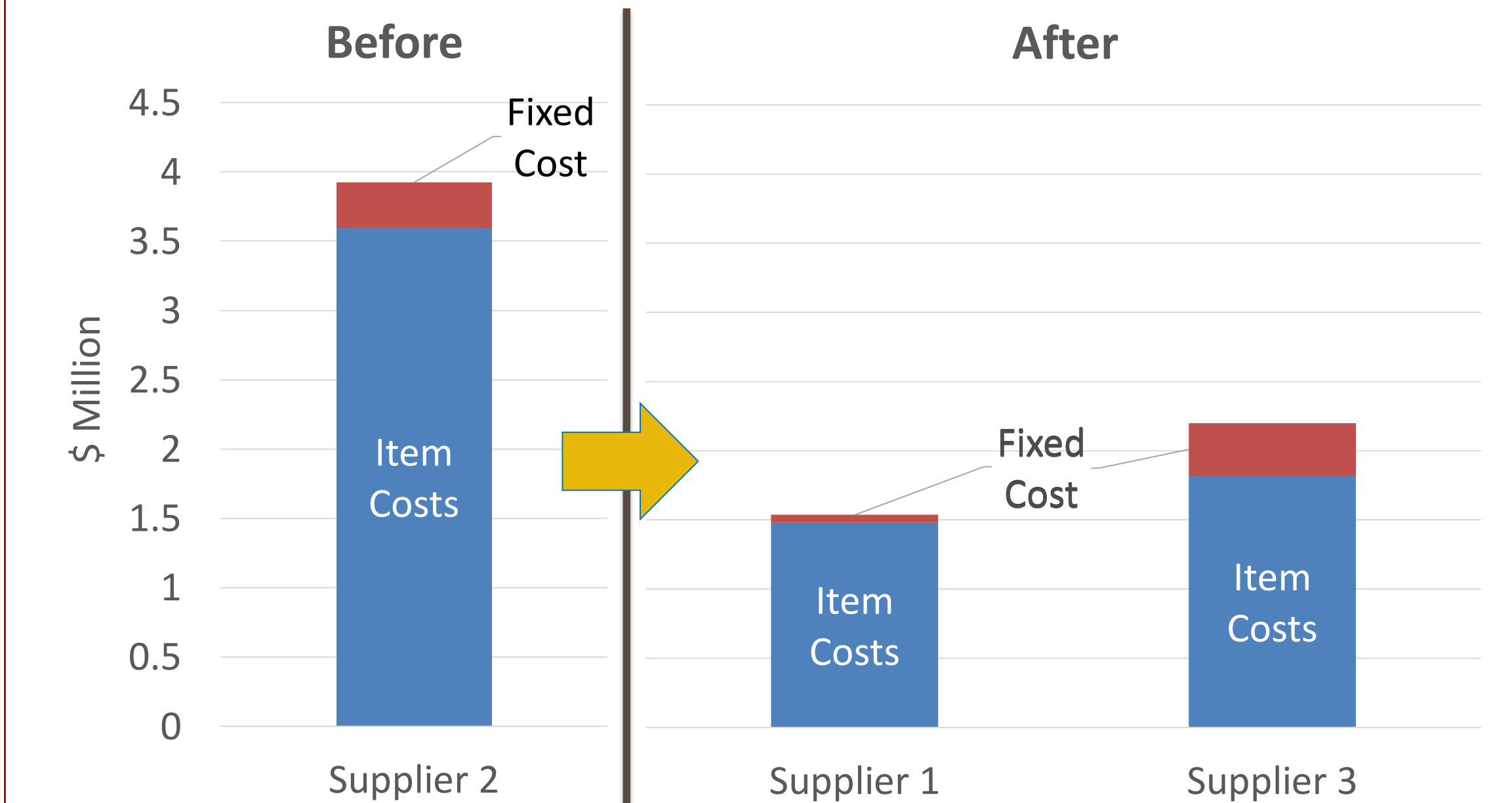


Methodology

Historical data will be used to generate package bids. Bids will be adjusted to include indirect costs. 4 optimization models will be run to find optimal allocations and compared to traditional allocations.



Initial Results



Allocation changed from exclusively using Supplier 2 to using Suppliers 1 & 3 lowering costs by 4.8%

Expected Contribution

- Recommend a framework for construction procurement
- Show that models can take into account factors other than cost using bid adjustments and side constraints
- Propose a method for handling uncertainty

Results and insights from this project may be applied to other industries that deal with the project based procurement.

