IDA

Decision Tools for Major Defense Acquisitions: Economics vs. Decision Science: Discussion (Conference Presentation)

Stanley A. Horowitz

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EXECUTIVE SUMMARY

This briefing discusses a paper comparing two approaches to making choices among alternative systems in the major defense acquisition process. The existing process is characterized as the Decision Science (DS) approach while the alternative is termed the Economic Evaluation of Alternatives (EEoA) approach. The paper identifies two concerns with the DS process: (1) it builds the government's value function over normalized attributes, which risks losing valuable information and can mislead decision-makers; and (2) it includes prices/costs alongside non-monetary attributes in the value function, which requires assigning a weight on costs (that can also mislead decision-makers as it loses valuable information). The discussion points out that the EEoA approach, as presented, similarly normalizes attributes and that the EEoA approach treats cost as a constraint when, in the real world, it is not nor should it be one. The discussion also notes that vendor behavior under the EEoA approach may be far from optimal from the government's point of view.

Decision Tools for Major Defense Acquisitions: Economics vs. Decision Science

Discussion

Stanley A. Horowitz

2018 Western Economic Association International Conference

This is not a new subject

In the paper, Prof. Melese cites substantial literature

Bracken and Goldberg's Koopmans prize-winning paper (1998) takes a game theoretic approach and finds the optimal method involves:

- Government provides effectiveness objectives to the vendors
- Contractors bid
- Award goes to lowest bidder at second-lowest price

I am unable to synthesize the entire literature and will take the paper on its own

Two criticisms are made of the decision sciences (DS) model

Utility functions normalize attributes

Cost is treated as an attribute, not a constraint

What's the difference between normalizing attributes and specifying a linear utility function?

Linear utility function for procurement agency choice under Economic Evaluation of Alternatives (EEoA):

U=w1a1+w2a2 (page 13)

Value function under Decision Science (DS) approach: $\boldsymbol{V_j}$ =$\sum_{i=1}^{n} \lambda_i \, v_i(\, a_{ij}) => [\lambda_1 \, v_1(a_{1j}) + \lambda_2 \, v_2(a_{2j})]$ (with two attributes) (page 15)

A more general utility function may have merit, but that is not what is presented

In the EEoA, do the isoquants capture what matters?

For any budget constraint, each vendor proposes the mix of attributes reflecting its attribute costs and technology

This choice is uninformed by how much the attributes matter to the government

It would seem that the government providing utility functions that weigh attributes allows vendors to tailor their products to satisfy buyer preferences

The vendor should not always be along the expansion path
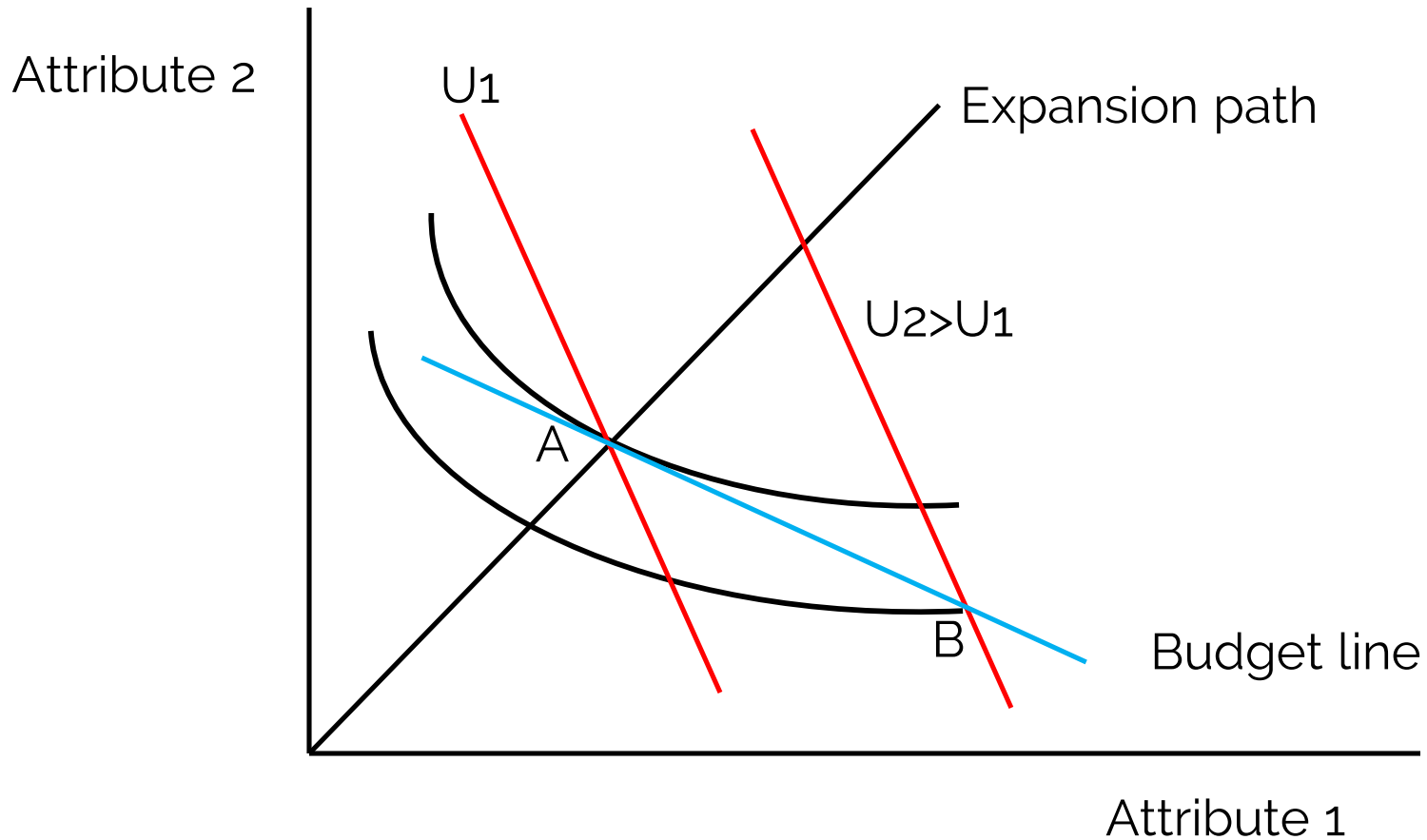
Under EEoA, the vendor chooses A

B is feasible and preferred; if only he'd known

Cost is not really a constraint

Sometimes a little extra cost can buy substantially more utility

Maybe at least as often, the last marginal increment of utility isn't worth the cost
   Is the new design aircraft carrier really worth the extra cost?

It may make sense to explicitly trade off cost and attributes

Perhaps EEoA doesn't dominate alternative methods

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