

Split Awards & Bid Protests in Acquisition

Acquisition Research Symposium

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Report Documentation Page

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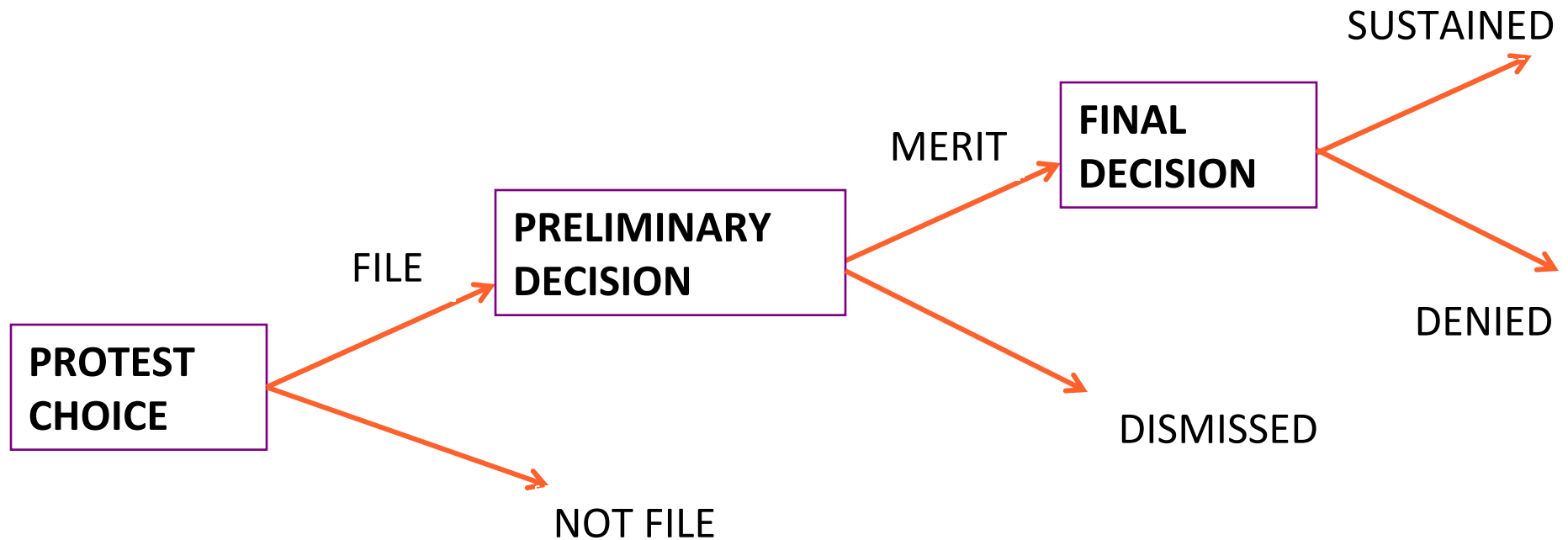
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Managing Bid Protests

- u Objective is not to minimize number of bid protests
- u Protests may correct procurement mistakes:
 - **Honest mistake**: Limited information & bounded rationality
 - **“Dishonest” mistake**: Bias by procurement officials
- u Objective is to “right size” number of protests
 - Encourage protests that correct (significant) mistakes
 - Discourage protests that don’t make significant corrections
- u What are DoD’s “levers of control” for managing the number and nature of protests?

The Bid Protest Process



- Probability (Merit)
- Probability (Sustained/Merit)

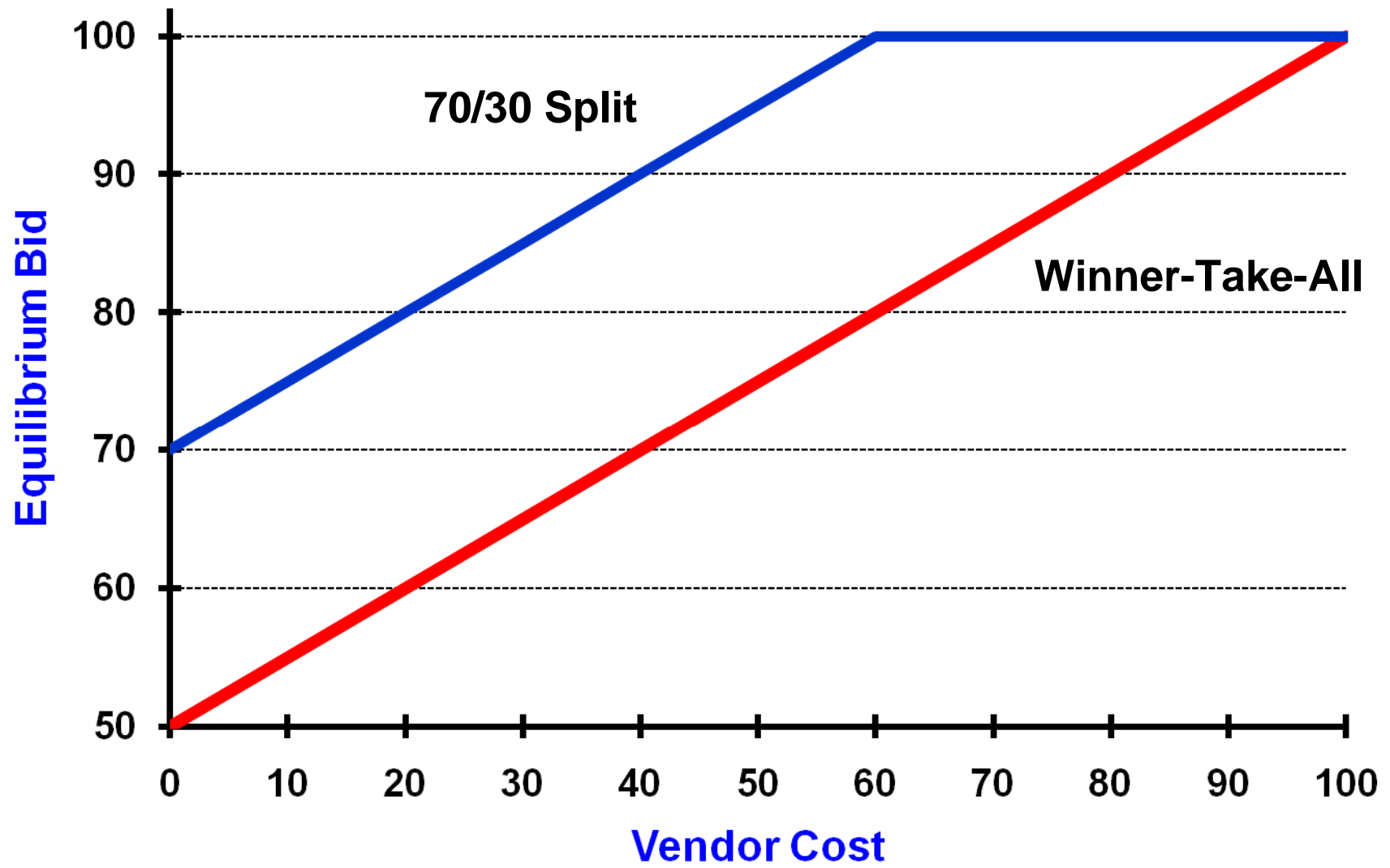
Managing Vendor Protest Incentives

- u Profit from Protest
 - = Expected Benefits – Expected Costs
- u Expected Benefits
 - = Prob (Merit) × Prob (Sustained | Merit) × **Added Revenue**
- u Expected Costs
 - = Search & Information + Legal + Reputation + Opportunity Costs
- u Levers of control?
 - Influence expected benefits
 - Influence expected costs
 - Encourage “good” protests, discourage “bad” protests

Split-Awards to Manage Bid Protests

- u Benefit of winning protest much larger under “winner-take-all” vs. split-award
 - Winner-take-all = 100% vs. 0%
 - Split-award \approx 70% vs. 30%
- u Raises “hurdle” to file protest
 - Expected benefit insufficient for “bad” protests?
 - Expected benefit sufficient for “good” protests?
- u Key question: What is the right split?

The Problem with Fixed Splits



Simple Model: Two Sellers

Notation:

- P_L = Lower bid price
- P_H = Higher bid price
- Let $R = P_L / P_H$
 - $0 \leq R \leq 1$
- S_L = Share or split awarded low bidder
- S_H = Share or split awarded high bidder
 - $S_L + S_H = 1$
 - $0 \leq S_H \leq 1/2$ & $1/2 \leq S_L \leq 1$

Endogenous Split Award Function

Example Split Function:

- $S_H = \alpha R^\beta$
 - α = maximum share to low value bidder ($0 \leq \alpha \leq \frac{1}{2}$)
 - $\beta \geq 0$
 - S_H is increasing in α & R
 - S_H is decreasing in β

DoD decision: What are the best α & β ?

Split Award Scenarios with $S_H = \alpha R^\beta$

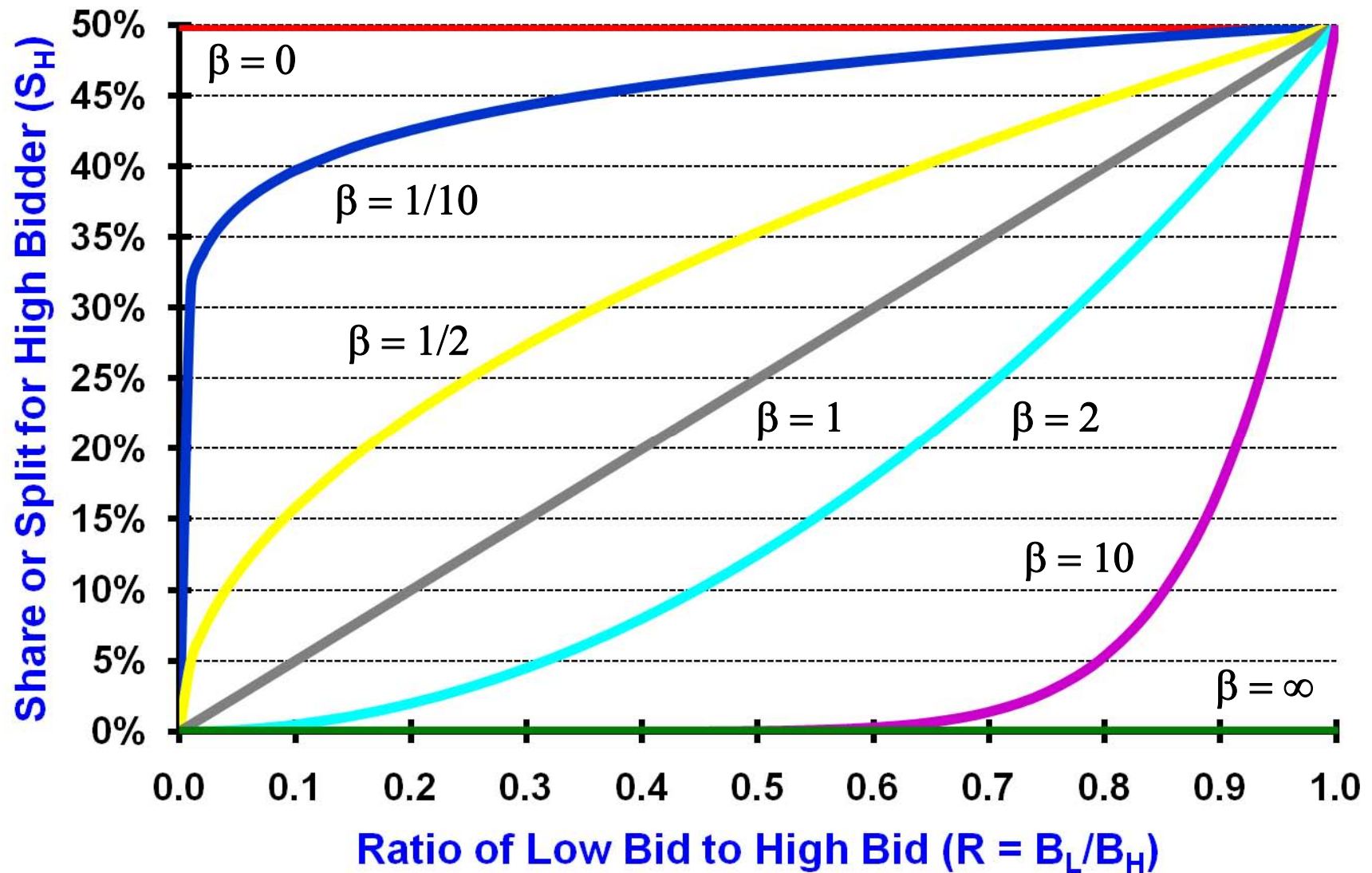
	$\beta = 0$	$0 < \beta < 1$	$\beta = 1$	$1 < \beta < \infty$	$\beta = \infty$
$\alpha = 0$	$S_H = 0$ Winner-Take-All	$S_H = 0$ Winner-Take-All	$S_H = 0$ Winner-Take-All	$S_H = 0$ Winner-Take-All	$S_H = 0$ Winner-Take-All
$0 < \alpha < \frac{1}{2}$	$S_H = \alpha$ Fixed Split	$0 \leq S_H \leq \alpha$ $S_H > \alpha r$	$0 \leq S_H \leq \alpha$ $S_H = \alpha r$	$0 \leq S_H \leq \alpha$ $S_H < \alpha r$	$S_H = 0$ Winner-Take-All
$\alpha = \frac{1}{2}$	$S_H = \frac{1}{2}$ Even Split	$0 \leq S_H \leq \frac{1}{2}$ $S_H > \frac{1}{2}r$	$0 \leq S_H \leq \frac{1}{2}$ $S_H = \frac{1}{2}r$	$0 \leq S_H \leq \frac{1}{2}$ $S_H < \frac{1}{2}r$	$S_H = 0$ Winner-Take-All



Better for High Bidder
Worse for Low Bidder

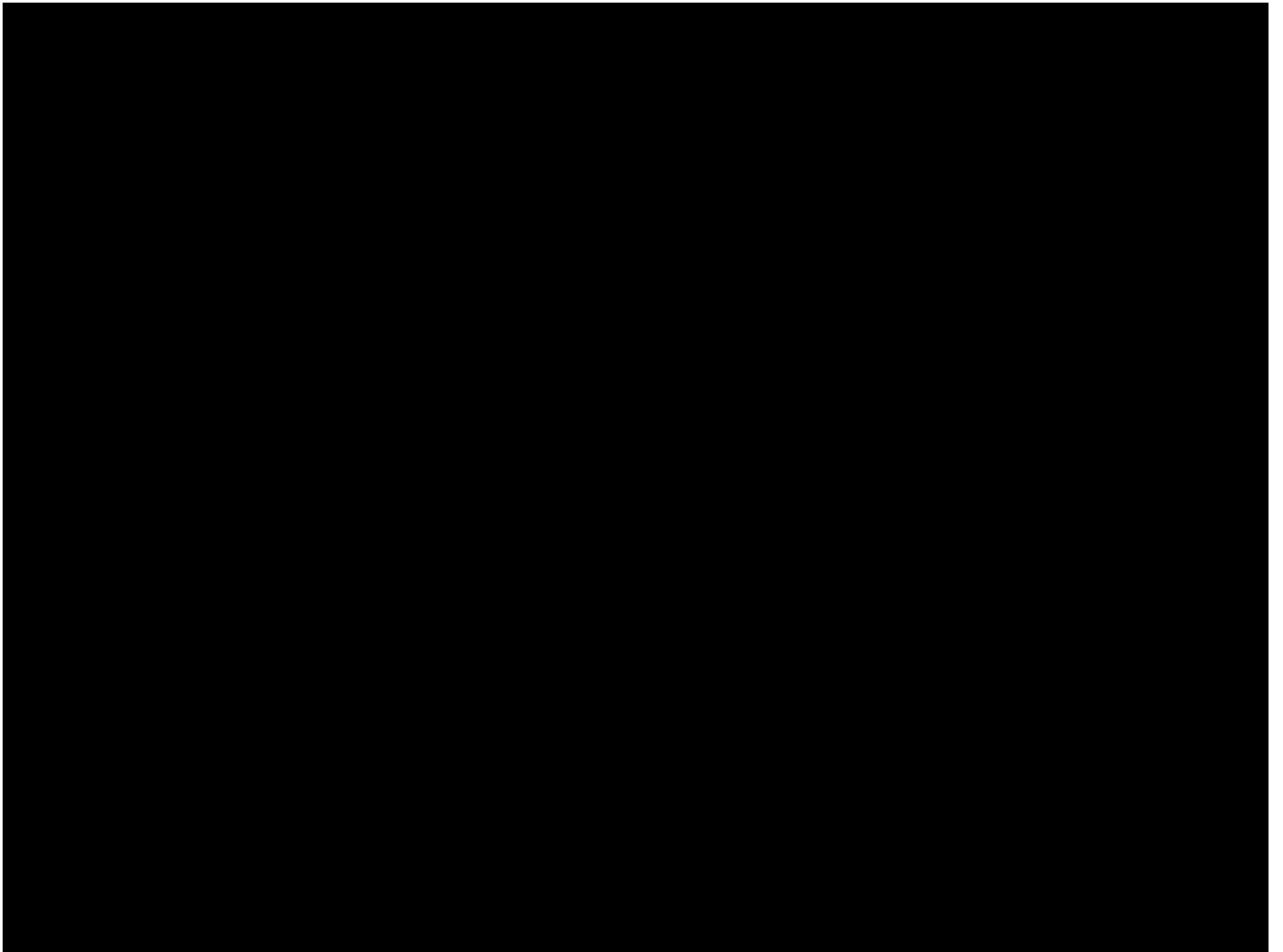
Worse for High Bidder
Better for Low Bidder

Split Award Scenarios with $S_H = \frac{1}{2}R^\beta$



Factors Under Investigation

- u Imperfect information & error
- u Dynamic/repeated procurement
- u Learning/experience effects
- u Pre-bid investment & innovation
- u Economies of scale



Imperfect Information & Award Error

- u Award error could arise from a number of sources:
 - Imperfect information about bids (price or quality)
 - Accidental error by buying agent
 - Buying agent bias
- u For simplicity, we model the source of award error as imperfect information about seller bids

Imperfect Information & Award Error

- u Without loss of generality, assume buyer knows P_H but has imperfect information about P_L
- u Let $R = P_L / P_H$
 - $0 \leq R \leq 1$
- u Let $r =$ Buyer's estimate of R
 - $0 \leq r \leq 1$
- u $r \sim B(N,R)$ Bernoulli?
 - Binomial with N draws & expected value R
 - Higher $N \Rightarrow$ more accurate estimate of R