

COE Bidding Systems

Lowest-Successful-Bid vs. Pay-As-You-Bid

Media Briefing

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Qualities of a Good Bidding System

- **Strategy-proof:** Incentivises bidders to bid their true valuation of the good
- **Efficient:** Allows for the allocation of the good to those who value it the most and are willing and able to pay for it
- **Simple:** Potential buyers can understand and participate
- **Minimal transaction costs** to bid for the good

Current COE System (Open LSB)

- Bidders submit their reserve price, i.e. maximum bid amount that a bidder is prepared to pay for the COE
- The bid is in the running as long as their reserve price is equal to or higher than the Current COE Price (CCP); the CCP will rise until the number of people willing to pay for a COE at that price falls within the allowable quota
- **The CCP is the highest unsuccessful bid plus \$1**
- Bidders all pay **the same price**; they are not penalised for being willing to pay more than the CCP (this incentivises truthful bidding)

Bidding Strategy for LSB

- The dominant strategy is to bid your own true valuation of the COE from the start; if others bid less than you, you win

Underbid True Value	Overbid True Value
<ul style="list-style-type: none">• No extra savings – price is unaffected by reducing your bid• In fact, underbidding increases risk of losing the auction even though you are willing to pay for it	<ul style="list-style-type: none">• Winning would mean paying a higher price than your true valuation and hence you will be worse off

- Therefore, bidding your true value is the only sensible action
- There is no point in under- or over-bidding

Example – LSB (4 COEs, 6 bidders)

Under LSB (Current Open Bidding COE system)

Bidder	True Value of COE to Bidder	Actual Bid
A	\$4,000	\$4,000
B	\$3,000	\$3,000
C	\$2,500	\$2,500
D	\$2,000	\$2,000
E	\$1,500	\$1,500
F	\$1,000	\$1,000

Winning Bids

Final COE price = \$1,501

Outcome: A, B, C and D win & pay \$1,501. E and F lose but they never wanted to pay above \$1,501 in the first place

Efficient: Those who value the COEs most get the COEs

LSB Does Not Lead to Over-Bidding

- One is worse off from securing a COE at a price above maximum willingness to pay
- LTA's data shows that most bids are clustered around the clearing price
- In the 6 bidding exercises from Jun to Aug 2013, 93% of the successful bids in Cat A and B are no more than 10% of the clearing price



Pay-As-You-Bid (PAYB) Open System

- Ascending auction similar to current open COE bidding system (where bidders can see the CCP)
- All successful bidders pay their actual bids

Bidding Strategy for PAYB

- PAYB encourages people to bid below one's true valuation to minimise the amount paid over the next bidder. But bidding too low also risks not securing a COE.
- So under an open PAYB system, bidders will bid just above the current COE price and monitor it, and keep adjusting their bids marginally (as long as it is less than what they are willing to pay)
- **Likely to lead to similar price outcome as current system, but higher transactional costs and time required to monitor**
- Extent of over-bidding depends on whether bidder is risk-averse to losing the COE, or whether he is diligent in monitoring bidding

Example – PAYB (4 COEs, 6 risk-neutral bidders)

Open PAYB Scenario 1 (risk-neutral bidders)		
Bidder	True Value of COE to Bidder	Actual Bid
A	\$4,000	\$1,501
B	\$3,000	\$1,501
C	\$2,500	\$1,501
D	\$2,000	\$1,501
E	\$1,500	\$1,500
F	\$1,000	\$1,000

Winning Bids

Final COE price = \$1,501 i.e. **Same as open LSB system**

Outcome: A, B, C and D win and pay \$1,501. E and F lose the auction but they never wanted to pay above \$1,501 in the first place

Efficient: Those who value the COEs most get the COEs. However, it is time-consuming as it requires monitoring of bids real-time

Example – PAYB (4 COEs, 6 risk-averse bidders)

Open PAYB Scenario 2 (risk-averse bidders)		
Bidder	True Value of COE to Bidder	Actual Bid
A	\$4,000	\$1,999
B	\$3,000	\$1,650
C	\$2,500	\$1,606
D	\$2,000	\$1,501
E	\$1,500	\$1,500
F	\$1,000	\$1,000

Winning Bids

Final COE price = Between \$1,501 to \$1,999 (**Ave price = \$1,689**)

Outcome: A, B, C decided to put in higher bids than \$1,501 as they fear losing the COE lest they bid the wrong amount or do not bother to monitor bidding.

E and F not disgruntled as the price is above what they are willing to pay.

Costly to buyers: A, B and C pay more than necessary to secure their COEs.

Ave COE price higher than clearing price of \$1,501.

Comparison: Final COE price

- In both LSB and PAYB, market will clear when the minimum bid is above the highest loser's bid
- Hence in the example, the outcome price would be at least \$1,501 for both open LSB and PAYB, with more people under PAYB potentially paying more than the lowest successful bid

Comparison: Final COE price

Bidder	True Value of COE to bidder	Actual Bids Under LSB	Actual Bids Under PAYB (Risk-neutral)	Actual Bids Under PAYB (Risk-adverse)
A	\$4,000	\$4,000	\$1,501	\$1,999
B	\$3,000	\$3,000	\$1,501	\$1,650
C	\$2,500	\$2,500	\$1,501	\$1,606
D	\$2,000	\$2,000	\$1,501	\$1,501
E	\$1,500	\$1,500	\$1,500	\$1,500
F	\$1,000	\$1,000	\$1,000	\$1,000
Final COE price		\$1,501	\$1,501	\$1,501-\$1,999

Winning Bids

It is more likely that with PAYB, more people will pay a higher premium over the highest loser vs. LSB system.

Summary

- Due to the incentive for truthful bidding, **the LSB system achieves the market clearing price without bidders having to monitor the bidding process**
- **LSB does not lead to aggressive overbidding**; LTA's data shows that most of the bids are clustered around the strike price
- A PAYB system may not lead to a lower COE clearing price, as it is fundamentally dependent on market demand; in fact, **it is likely that more bidders would pay more than the market clearing price for their COEs under the PAYB system**

Thank you

Bidding Strategy for PAYB under a Closed Bidding System

- Bidders tend to shade their bids
- As the CCP is unknown, bidders tend to game the system to try to secure the bid
 - E.g. Bid during specific perceived periods with lower demand, collude with other bidders etc
- Bidding behaviour of bidders depends on their risk appetites and their guesses of the CCP
- Overall – High uncertainty, and not transparent

Example – PAYB (Closed) (4 COEs, 6 Bidders)

Under PAYB (Closed)		
Bidder	True Value of COE to bidder	Actual Bid
A	\$4,000	\$1,300
B	\$3,000	\$2,000
C	\$2,500	\$2,300
D	\$2,000	\$1,800
E	\$1,500	\$1,400
F	\$1,000	\$900

Winning Bids

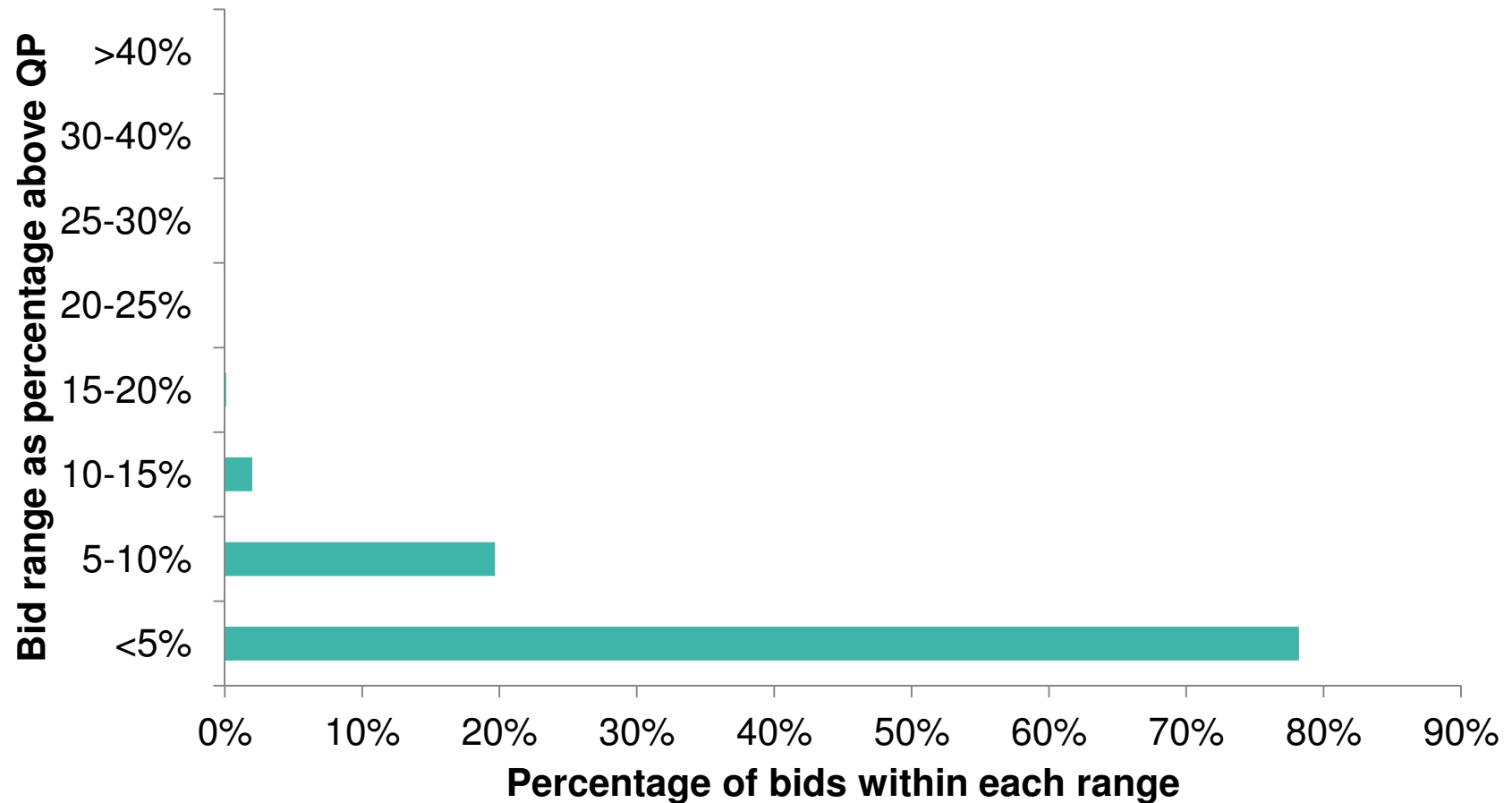
COE price = Between \$1,400 to \$2,300

Ave COE price = \$1,875

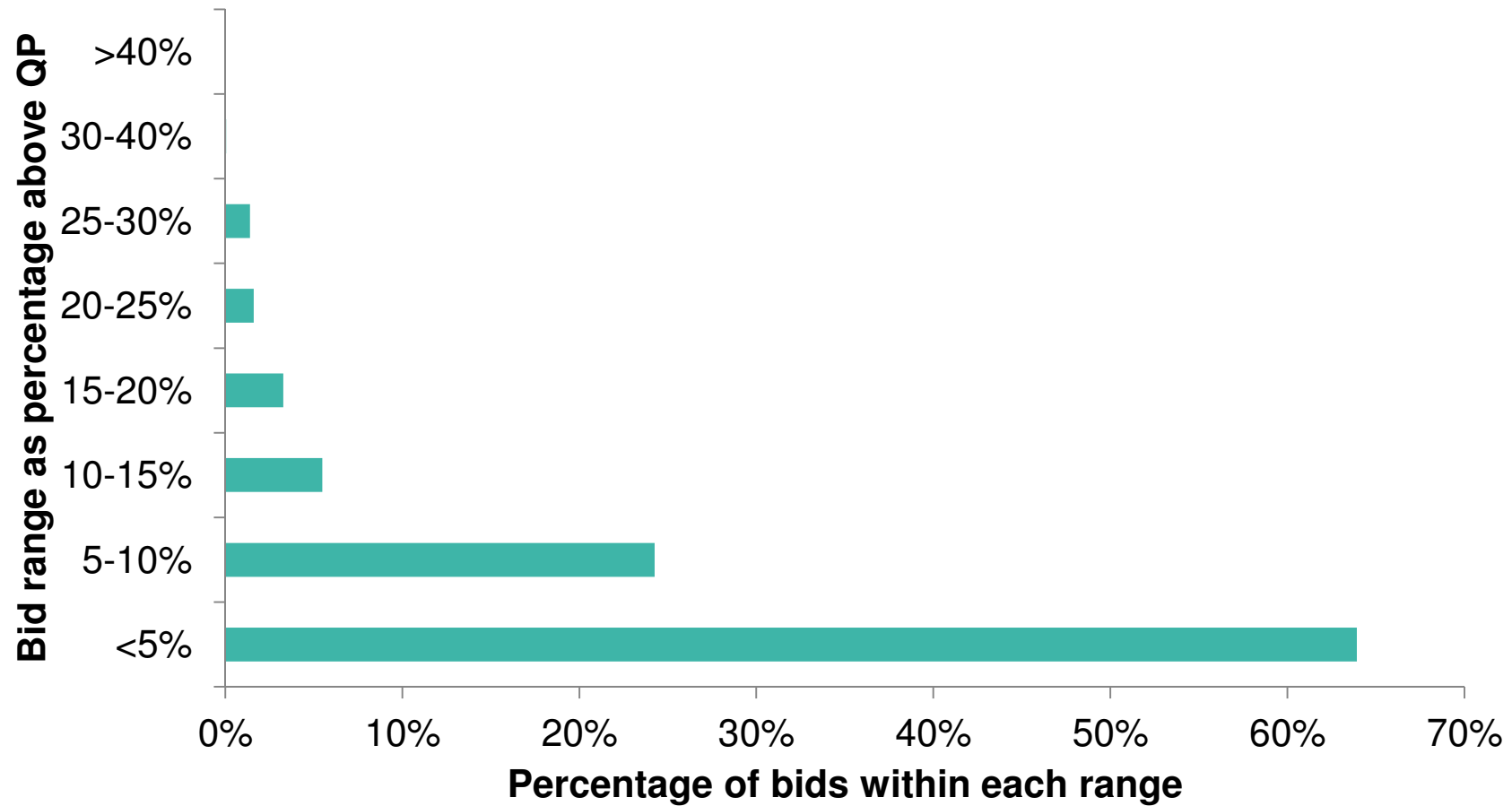
Outcome : **B, C, D and E who did not value the COE most, win.** F is not disgruntled as he did not want to pay more than \$1000. A is disgruntled as he did not secure the COE even though he would have gladly paid \$2,300. **Not an efficient outcome.**

DISTRIBUTION OF SUCCESSFUL BIDS

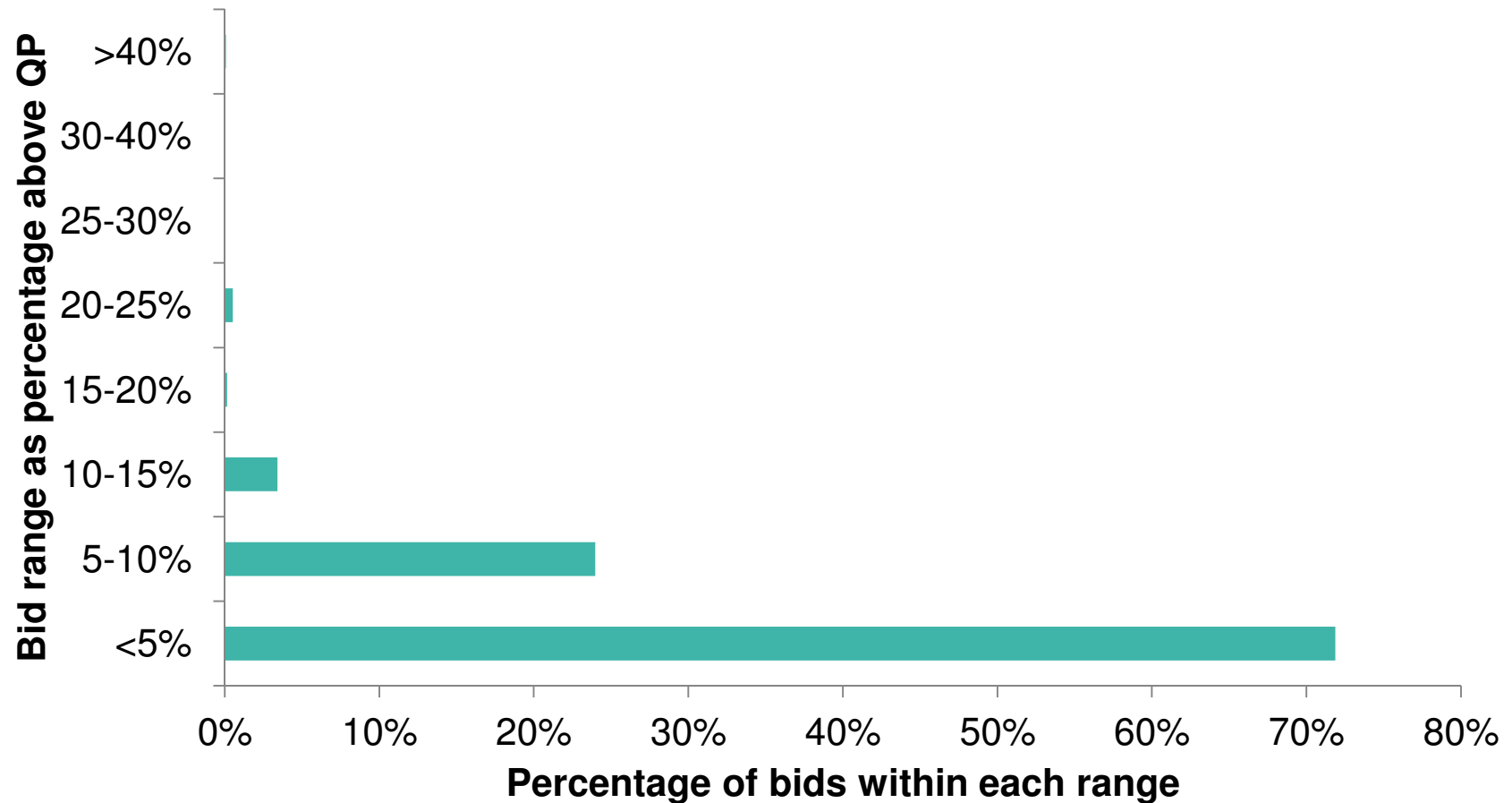
Distribution of Successful Bids Category A (June – Aug 2013)



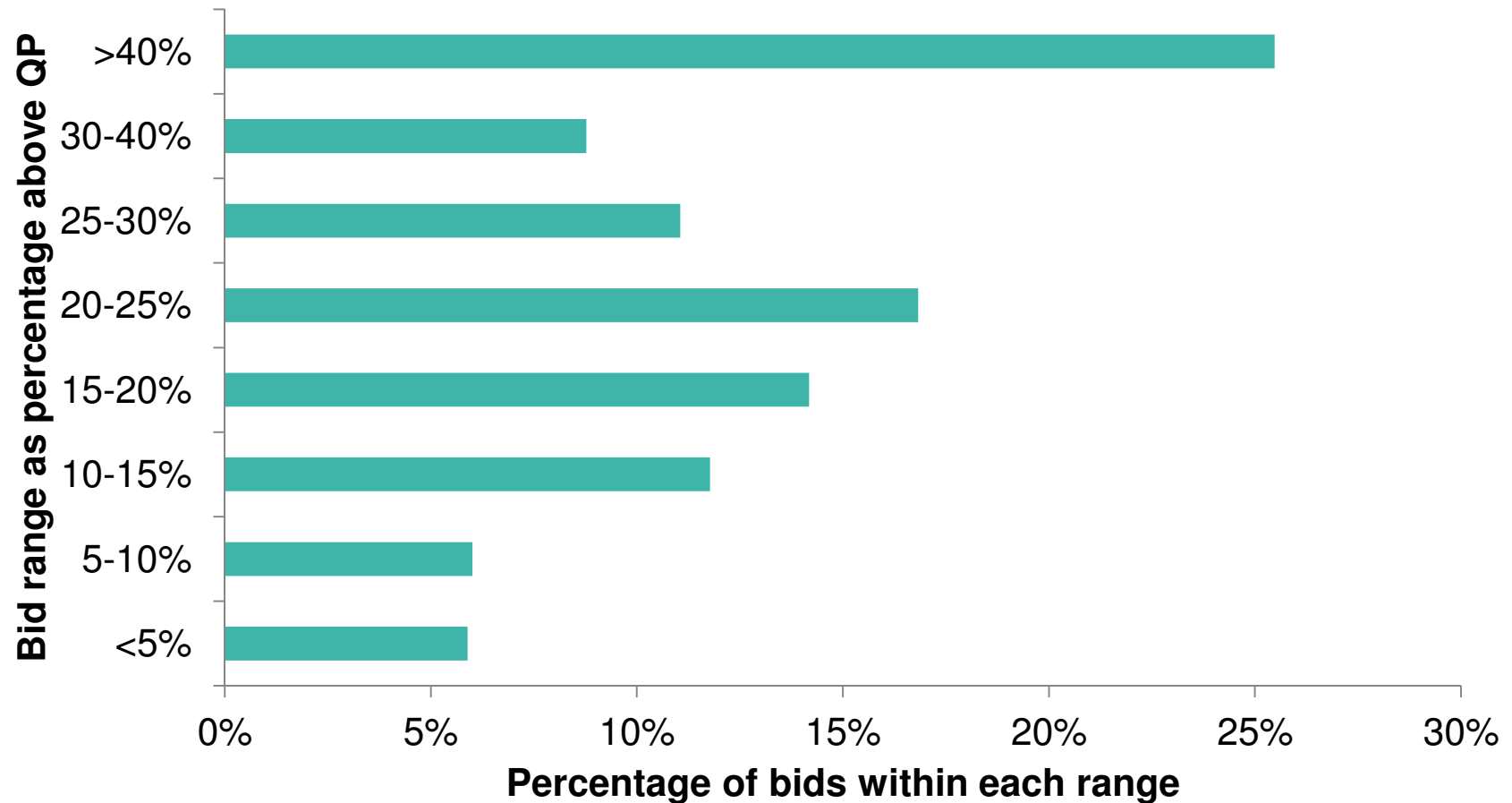
Distribution of Successful Bids Category B (June – Aug 2013)



Distribution of Successful Bids Category C (June – Aug 2013)



Distribution of Successful Bids Category D (June – Aug 2013)



Distribution of Successful Bids Category E (June – Aug 2013)

