



An Overview of Recent Auction Formats

Prepared for the 6th annual European Spectrum Management Conference

Dr Soren Sorensen

Senior Consultant, NERA London

Brussels

14 June 2011

Some Recent Auction Formats



- Multiple Round Auctions
 - 1: Simultaneous Multiple Round Auction (SMRA)
(Germany, Spain, Italy)
 - 2: Simultaneous Multiple Round Auction with Switching
(Norway, Sweden, Finland)
 - 3: Combinatorial Clock Auction (CCA)
(Denmark, Ireland, Netherlands, Austria, UK, Switzerland)

- Sealed Bid Auctions
 - 4: Combinatorial Second Price Auction
(Portugal, Ireland)
 - 5: Combinatorial First Price Auction
(France)

Simultaneous Multiple Round Auction (SMRA)



- Basic SMRA in one paragraph:
 - Ascending prices for each spectrum block; standing high bidders can't switch; auction continues until no more bids are placed.

- Some key observations:
 - The SMRA is a simple format. Easy for bidders to understand.
 - The SMRA may introduce gaming opportunities (e.g. demand reduction) – but rules may mitigate this concern
 - The SMRA works best for substitutes. Aggregation risk if complementarities
 - The SMRA can mitigate aggregation risk by allowing withdrawals or by allowing standing high bidders to “switch”

Combinatorial Clock Auction (CCA)



- CCA in one paragraph:
 - Ascending clock for each group of generic spectrum blocks; package bids; auction continues until excess demand for each group is eliminated; final round of sealed bids; ‘opportunity cost’ pricing rule.

- Some key observations:
 - The CCA is a more complex auction format, but easier for bidders (no aggregation risk, bid true valuations)
 - The CCA requires bidders to develop valuations for many packages before the auction. Less price revelation than in an SMRA
 - The CCA can be seen as a sealed bid auction preceded by price discovery
 - The CCA is a flexible format, allows for spectrum floors and other constraints
 - The CCA involves a complex winner and price determination problem

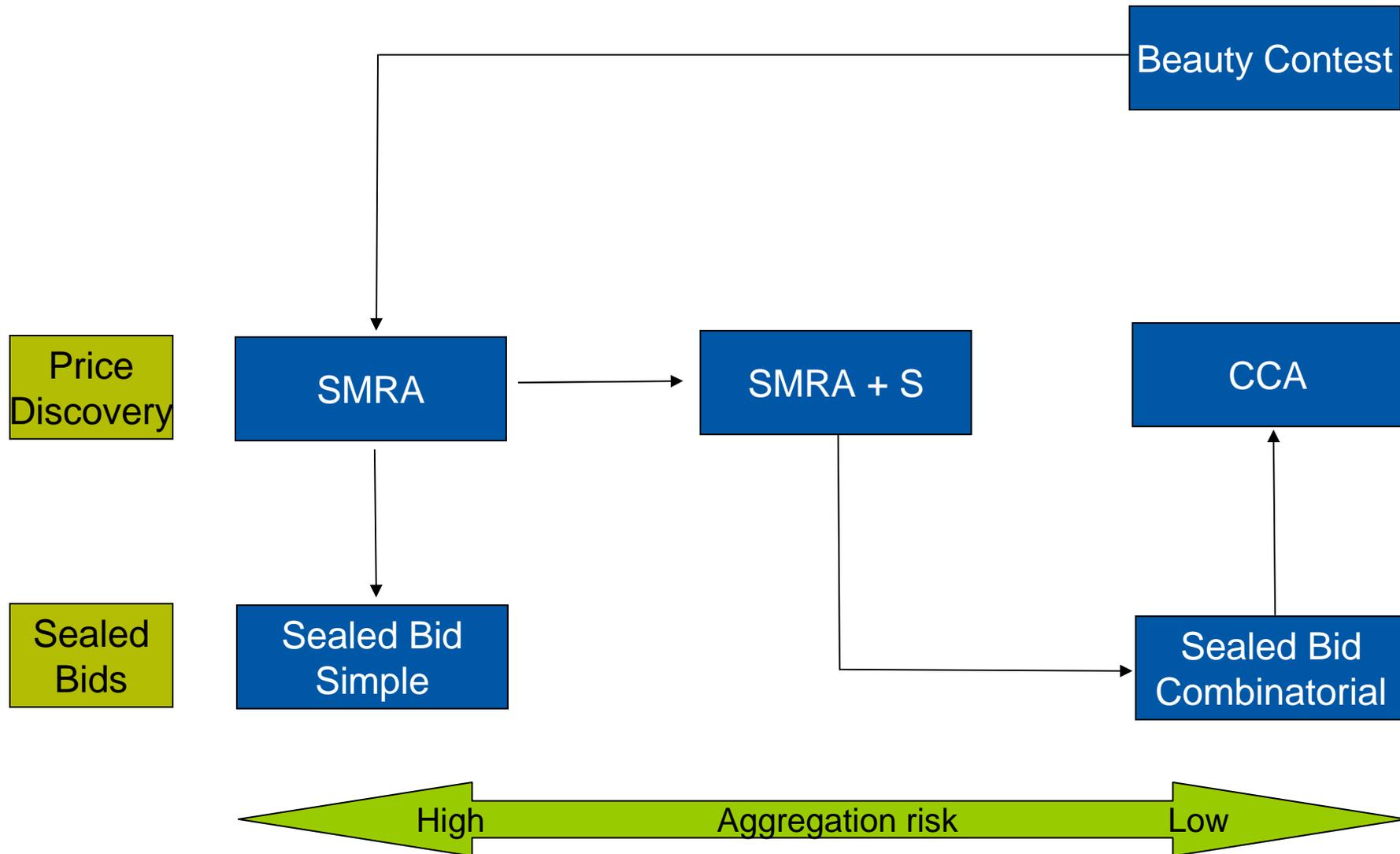
Sealed Bid Auction



- Sealed Bid Auction in one paragraph:
 - Bids are submitted in one bidding round; no price revelation; no opportunity to improve bids

- Some key observations:
 - Sealed bid auctions can be combinatorial or non-combinatorial
 - Sealed bid auctions can be first price or second price
 - Sealed bid auctions allows for easy introduction of ‘multi-attribute bids’ (price, coverage etc.). Bids can be ranked by ‘score’ instead of price alone
 - Sealed bid auctions are conceptually simple, but the format shifts complexity to bidders. Bidding strategies involves ‘guessing’ the bidding strategies of rival bidders

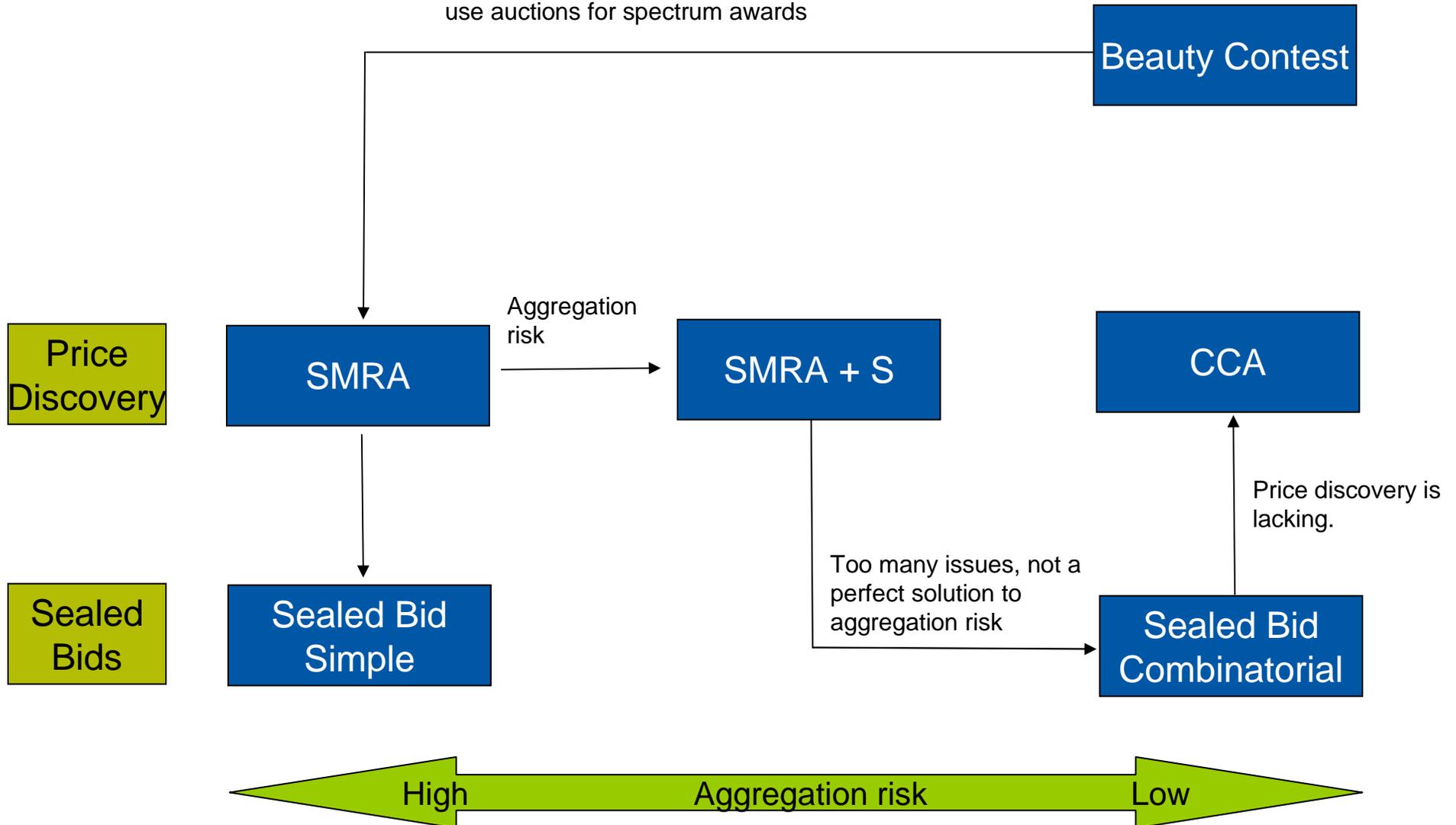
How it all Fits Together



How it all Fits Together



Too arbitrary. Keep it simple and we can use auctions for spectrum awards



Concluding Remarks



- There is no single ‘best’ auction format. Many formats/variations are used, and there is no obvious correlation between auction formats and auction outcomes
- Have auction formats become too complex?
- What do we mean by ‘complexity’ of auction format?
 - Conceptually complex (is the auction format difficult to understand, e.g. bidder optimal core pricing in the CCA)
 - Complexity of bidding strategies (are there incentives to shade bids, e.g. first price versus second price auctions)
 - Complexity of valuation analysis (e.g. price discovery in SMRA versus sealed bid combinatorial auction)
- Not straight forward to rank auction formats in terms of complexity – changes to detailed rules may also greatly impact types of complexity
- Should we prefer conceptually complex auction formats which encourage simple straight forward bidding, or conceptually easy auction formats with complex gaming/strategy opportunities for bidders?
- Answer may vary depending on spectrum band and government objectives!



Thank you!

Contact NERA:

Dr Soren Sorensen

Senior Consultant
NERA London
soren.sorensen@nera.com
Tel: +44 20 7659 8808