The Method of Sealed Bids

Lecture 18
Section 3.5

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Mon, Oct 2, 2017

1. The Method of Sealed Bids
2. An Example – 3 Players, 2 Assets
   - The Bidding
   - The Allocation
   - The First Settlement
   - The Division of the Surplus
   - The Final Settlement
3. Another Example – 5 Players, 3 Assets
4. Another Example – 2 Players, 4 Assets
5. Assignment

Outline

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The Method of Sealed Bids

- The method of sealed bids is used to divide assets that cannot be subdivided.
- For example, if there are 2 assets to be divided 3 ways, then either
  - Two players get the two assets and the third player is compensated in cash, or
  - One player gets both assets and the other two players are compensated in cash.
- The first step is for each player to submit a sealed bid for each asset.

The Method of Sealed Bids

- The five steps (to be explained) are
  - The bidding
  - The allocation of assets
  - The first settlement
  - Dividing the surplus
  - The final settlement

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The Method of Sealed Bids

Example (3 Players, 2 Assets)

- Three children, John, Joe, and Jim, are dividing two assets of their parents' estate.
- The assets are
  - The house
  - The yacht.

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The Method of Sealed Bids

The Bidding

- Each player submits a bid on each asset.
- No player knows any other player's bids.
- Each player's bids determine his fair share.

The Method of Sealed Bids

Example (3 Players, 2 Assets)

	House	Yacht	Total Value	Fair Share
John	100	200	300	100
Joe	180	150	330	110
Jim	150	90	240	80

- Each player bids on each asset.
- The table shows their bids (in \$1000s) and their fair shares.

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The Method of Sealed Bids

Allocation of Assets

- The allocation of the assets is based on the bids.
- Each asset goes to the highest bidder for that asset.

The Method of Sealed Bids

Example (3 Players, 2 Assets)

- Joe gets the house, worth $180,000 (to him).
- John gets the yacht, worth $200,000 (to him).
- Jim gets nothing, yet.

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The Method of Sealed Bids

The First Settlement

- In the first settlement, the players pay or receive cash to compensate for getting to little or too much in the allocation of assets.
- If the assets won by a player exceed his fair share, then he pays the difference in cash to the surplus.
- If the assets won (if any) by a player fall short of his fair share, then he receives the difference in cash from the surplus.

The Method of Sealed Bids

Example (3 Players, 2 Assets)

- We use cash to even things up.
  - Joe's fair share is \$110,000 and he got the house (worth \$180,000), so he pays \$70,000.
  - John's fair share is \$100,000 and he got the yacht (worth \$200,000), so he pays \$100,000.
  - Jim's fair share is \$80 and he got nothing, so he receives \$80,000.

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The Method of Sealed Bids

Dividing the Surplus

- Whatever is left over is the surplus.
- The surplus is divided equally among all the players.

The Method of Sealed Bids

Example (3 Players, 2 Assets)

- Joe paid \$70,000 and John paid \$100,000, for a total of \$170,000.
- Then Jim received \$80, leaving \$90,000.
- So the surplus is \$90,000.
- We will divide it equally among the players, with each receiving \$30,000.

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The Method of Sealed Bids

The Final Settlement

- The final settlement is a summary that describes for each player
  - Which assets he won (if any).
  - The net amount of cash that he paid or received.

The Method of Sealed Bids

Example (3 Players, 2 Assets)

- The final settlement is as follows:
  - John wins the yacht and pays $70,000 in cash.
  - Joe wins the house and pays $40,000 in cash.
  - Jim receives $110,000 in cash.

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The Method of Sealed Bids

Example (3 Players, 2 Assets)

- Five children, John, Joe, Jim, Jack, and Jeff are dividing three old camping items.
- The assets are
  - A tent
  - A stove
  - A backpack

The Method of Sealed Bids

Example (The Bidding)

	Tent	Stove	Backpack	Total Value	Fair Share
John	80	20	50	150	30
Joe	120	30	40	190	38
Jim	100	35	45	180	36
Jack	65	30	80	175	35
Jeff	150	20	60	230	46

The Bids

The Method of Sealed Bids

Example (The Allocation of Assets)

- Jeff gets the tent, worth $150.
- Jim gets the stove, worth $35.
- Jack gets the backpack, worth $80.

The Method of Sealed Bids

Example (The First Settlement)

- John receives \$30 in cash.
- Joe receives \$38 in cash.
- Jim receives \$1 in cash.
- Jack pays \$45 in cash.
- Jeff pays \$104 in cash.

The Method of Sealed Bids

Example (Dividing the Surplus)

- The surplus is \$80, to be divided 5 ways.
- So, each player gets \$16.

The Method of Sealed Bids

Example (The Final Settlement)

- The final settlement is
  - John receives $46 in cash.
  - Joe receives $54 in cash.
  - Jim gets the stove and receives $17.
  - Jack gets the backpack and pays $29.
  - Jeff gets the tent and pays $88.

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The Method of Sealed Bids

Example (2 Players, 4 Assets)

- Two children, John, Joe, are dividing four assets.
- The assets are four paintings

The Method of Sealed Bids

Example (The Bidding)

	Painting 1	Painting 2	Painting 3	Painting 4	Total Value	Fair Share
John	100	600	2000	1500	4200	2100
Joe	300	500	1000	1000	2800	1400

The Bids

The Method of Sealed Bids

Example (The Allocation of Assets)

- John gets Paintings 2, 3, and 4, worth $4100.
- Jim gets Painting 1, worth $300.

The Method of Sealed Bids

Example (The First Settlement)

- John pays \$2000 in cash.
- Joe receives \$1100 in cash.

The Method of Sealed Bids

Example (Dividing the Surplus)

- The surplus is \$900, to be divided 2 ways.
- So, each player gets \$450.

The Method of Sealed Bids

Example (The Final Settlement)

- The final settlement is
  - John receives Paintings 2, 3, and 4 and pays \$1550 in cash.
  - Joe receives Painting 1 and receives \$1550 in cash.

The Method of Sealed Bids

Example (The Final Settlement)

- The final settlement is
  - John receives Paintings 2, 3, and 4 and pays \$1550 in cash.
  - Joe receives Painting 1 and receives \$1550 in cash.
- Had John known Joe's value system, might he have bid differently?

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- Chapter 3: Exercises 43, 44, 46, 47, 48.