The Lone-Chooser Method

Lecture 11
Section 3.3

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1. Assignment

2. The Lone-Chooser Method

3. Example – 3 Players
Assignment

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Outline

1. Assignment
2. The Lone-Chooser Method
3. Example – 3 Players
Definition (The Lone-Chooser Method)

In the lone-chooser method, one player is designated to be the chooser. The other players (the dividers) divide the assets among themselves. (They may use the lone-divider method). Then each of the dividers divides his share into equal subshares. The chooser then chooses one subshare from each of the dividers. The dividers keep the subshares that are left.
The Lone-Chooser Method

The players and the assets.
John is the lone chooser. Joe and Jim use divider Chooser method.
The Lone-Chooser Method

Joe divides. Jim chooses.
The Lone-Chooser Method

John (lone chooser)
Jim (divider)
Joe (divider)

Share 1
Share 2

Joe has Share 1. Jim has Share 2.
The Lone-Chooser Method

Joe and Jim subdivide their shares.
The Lone-Chooser Method

John (lone chooser)

Joe (divider)

Jim (divider)

John chooses one subshare from each.
The Lone-Chooser Method

Everybody is happy.
The Lone-Chooser Method

John (lone chooser)  Joe (divider)  Jim (divider)

Subshare 1  Subshare 2  Subshare 1
Subshare 2  Subshare 3  Subshare 3

How come?
1 Assignment

2 The Lone-Chooser Method

3 Example – 3 Players
Example (The Lone-Chooser Method – 3 Players)

- John, Joe, and Jim are dividing 4 pies: apple, cherry, lemon, and pecan.
- The value systems of the players are as follows.

<table>
<thead>
<tr>
<th></th>
<th>Apple</th>
<th>Cherry</th>
<th>Lemon</th>
<th>Pecan</th>
<th>Fair Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>John</td>
<td>12</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Joe</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Jim</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

- Jim is the lone-chooser.
- John and Joe use the divider-chooser method, with John the divider.
Example (The Lone-Chooser Method – 3 Players)

- John divides into
  - Share 1 = Apple + Cherry (value 18).
  - Share 2 = Lemon + Pecan (value 18).
- Joe chooses Share 2 (value 12) over Share 1 (value 9).
- John gets Share 1.
Example

Example (The Lone-Chooser Method – 3 Players)

- John divides Share 1 into subshares.
  - Subshare 1 = $\frac{1}{2}$ Apple (value 6).
  - Subshare 2 = $\frac{1}{2}$ Apple (value 6).
  - Subshare 3 = $\frac{1}{3}$ Apple + Cherry (value 6).

- Joe divides Share 2 into subshares.
  - Subshare 1 = $\frac{1}{2}$ Lemon (value 4).
  - Subshare 2 = $\frac{1}{2}$ Lemon (value 4).
  - Subshare 3 = Pecan (value 4).
Example (The Lone-Chooser Method – 3 Players)

- Jim values John’s subshares as follows.
  - Subshare 1 has value 3.
  - Subshare 2 has value 3.
  - Subshare 3 has value 4.

- Jim values Joe’s subshares as follows.
  - Subshare 1 = has value 1.
  - Subshare 2 = has value 1.
  - Subshare 3 = has value 6.
Example

Example (The Lone-Chooser Method – 3 Players)

- Jim chooses Subshare 3 from John and Subshare 3 from Joe, for a value of 10.
- John is left with his Subshares 1 and 2, for a value of 12.
- Joe is left with his Subshares 1 and 2, for a value of 8.
Example (The Lone-Chooser Method – 3 Players)

- What if Jim were the first divider, John the first chooser, and then Jim and John the subdividers and Joe the second chooser?
- What if Joe were the first divider, Jim the first chooser, and then Joe and Jim the subdividers and John the second chooser?
- In general, which role would you prefer to be in?
Example (The Lone-Chooser Method – 4 Players)

- John, Joe, Jim, and Jack are dividing 3 pies: apple, cherry, and lemon.
- Their value systems are as follows.

<table>
<thead>
<tr>
<th></th>
<th>Apple</th>
<th>Cherry</th>
<th>Lemon</th>
<th>Fair Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>John</td>
<td>12</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Joe</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Jim</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Jack</td>
<td>9</td>
<td>8</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

- First, John divides in halves and Joe chooses.
- Second, John and Joe divide into thirds and Jim chooses.
- Finally, John, Joe, and Jim divide into fourth and Jack chooses.