Examples:

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Loyalty</th>
<th>Exit</th>
<th>Voice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in taxes</td>
<td>Pay taxes, keep mouth shut</td>
<td></td>
<td>Reallocate portfolio to avoid tax increase</td>
</tr>
<tr>
<td>Local jurisdiction restrictions</td>
<td>Turn in guns, keep mouth shut</td>
<td></td>
<td>Join NRA, militia group, etc.</td>
</tr>
<tr>
<td>Money stop for trade voucher</td>
<td>Sell vouchers, keep mouth shut</td>
<td></td>
<td>Complain to state owner</td>
</tr>
<tr>
<td>Government places $1,000 withdrawal limit on bank accounts</td>
<td>Lose weight</td>
<td></td>
<td>Set fire to government buildings, throw president out of office,</td>
</tr>
</tbody>
</table>

Citizen’s response depends on expected response of the state

State’s response depends on its expectation of citizen’s response

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Description</th>
<th>Voice assigned by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>State keeps benefit of new situation; Citizen opts for some substitute</td>
<td>S, C</td>
</tr>
<tr>
<td>2</td>
<td>State keeps benefit of new situation and support of citizen; Citizen suffers loss</td>
<td>1, S</td>
</tr>
<tr>
<td>3</td>
<td>State citizens benefit but keeps support of citizen</td>
<td>1, S</td>
</tr>
<tr>
<td>4</td>
<td>Same as 2</td>
<td>1, S</td>
</tr>
<tr>
<td>5</td>
<td>Same as 3</td>
<td>S</td>
</tr>
</tbody>
</table>

Turning outcomes into pay-offs

Exit Voice Game with Outcomes

Exit-Voice Game With Pay-offs
Definitions

A **strategy** is a complete plan that specifies what an actor would do at any conceivable decision point (node).

A **Nash equilibrium** is a set of strategies that are best replies to each other on the equilibrium path.

A **subgame** is a part of a game beginning at one node and including all succeeding nodes that forms a game by itself.

A **subgame perfect equilibrium** is a set of strategies such that each player plays a Nash equilibrium in every subgame.

Equilibrium behavior when citizen has credible exit threat (0<E<1) and state is dependent (S>1).

Equilibrium behavior when: 1.) value citizen places on a substitute is more than what it gets from loyalty, but not so high that its better than a return the status quo ante (0<E<1)

2.) State depends on support (S>1)

Eq. Strategy: (C’s 1st action, C’s 2nd action; S’s action)

(V,E,R) is a sub-game perfect equilibrium

State’s response to voice when exit threats are credible (E>0)

Equilibrium behavior when: 1.) value citizen places on a substitute is more than what it gets from loyalty, but not so high that its better than a return the status quo ante (0<E<1)

2.) State depends on support (S>1)

Eq. Strategy: (C’s 1st action, C’s 2nd action; S’s action)

(V,E,R) is a sub-game perfect equilibrium

Definitions

A **strategy** is a complete plan that specifies what an actor would do at any conceivable decision point (node).

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A **subgame perfect equilibrium** is a set of strategies such that each player plays a Nash equilibrium in every subgame.
Equilibrium behavior when citizen has no credible exit threat (E<0) and state depends on citizen’s support (S>1).

\[(L, L, I) \text{ is subgame perfect}

Equilibrium behavior when citizen has a credible exit threat (E>0) and state is relatively autonomous (S<1).

\[(E, E; I) \text{ is subgame perfect}

Summary of subgame perfect equilibria

<table>
<thead>
<tr>
<th>State is</th>
<th>Relatively autonomous (S&lt;1)</th>
<th>Dependent (S&gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has credible exit threat</td>
<td>(E, Exit, Ignore)</td>
<td>(Exit, Exit, Respond)</td>
</tr>
<tr>
<td>Does not have credible exit threat</td>
<td>(Loyalty, Loyalty, Ignore)</td>
<td>(Loyalty, Loyalty, Ignore)</td>
</tr>
</tbody>
</table>

Equilibrium behavior when citizen prefers substitute to the benefit of state response (E>1-c) and state is dependent (S>1)

\[(E, E; R) \text{ is subgame perfect}

Equilibrium behavior when citizen prefers substitute to the benefit of state response (E>1-c) and state is relatively autonomous (S<1)

\[(E, E, I) \text{ is subgame perfect}

(E, E, I) is subgame perfect
Summary of subgame perfect equilibria

When voice is intrinsically beneficial to the citizen (c<0), the citizen has a credible exit threat (E>0), and the state is relatively autonomous (S<1)

Conclusions

• Influence is relevant only when perfect substitutes are not available (i.e. when exit is costly)
• When voice is likely to be effective states have an incentive to prevent bad shocks
• Voice is effective only when it is costly

Conclusions – when voice is costly

• Voice is used only when exit threats are credible and the state depends on citizen’s support
• Loyalty is used when exit threats are not credible
• Exit is used when state is relatively autonomous and exist threats are credible
  – Thus, when the state observes the use of voice, it can learn something about the citizen
Conclusions – when voice is intrinsically beneficial

- Voice is used all the time
  - So the state can not learn anything about the citizen by observing voice

Life in the state of nature is like a prisoner’s dilemma (Hobbes, Rousseau)

\[
\begin{array}{c|cc}
 & C & D \\
\hline
C & (3,3) & (1,4) \\
D & (4,1) & (2,2) \\
\end{array}
\]

(D;d) is a Dominant Strategy
Equilibrium in Prisoner’s Dilemma

- A strategy is a list of actions that states what a player will do at every point in a game when that player can act.
- A strategy (S_i) is a dominant strategy for actor i if i’s pay-off is higher when playing that strategy than it would be if i played any other strategy (¬S_i) no matter what all the other players do. That is, a dominant strategy is a “best response” to all the strategies that all the other actors in the game.
- A Dominant strategy equilibrium is strategy combination such that all players play a dominant strategy.

Nash equilibrium in Prisoner’s dilemma

- A set of strategies form a Nash Equilibrium when each player’s strategy is a best response to what the other players are conjectured (by the equilibrium) to do.
- Thus, a Nash equilibrium is a “self-enforcing” agreement. It is “self-enforcing” in that if the players share a common conjecture about what the others will do, no player has an incentive to unilaterally depart from the conjectured behavior.

Pareto Optimality in Prisoner’s dilemma

- An outcome is Pareto optimal if no other outcome exists such that at least one player would be made better off, and no player is made worse of.
- An outcome is Pareto inferior if there exists otherwise.
- Pareto optimal outcomes are said to Pareto dominate Pareto inferior outcomes
- C,C is the pareto optimal outcome in singleshot PD

Life in Civil Society: If the state punishes, cooperation between citizens is possible

\[
\begin{array}{c|cc}
 & C & D \\
\hline
C & (3,4-p-t) & (1,4-p-t) \\
D & (4-p-t,1-t) & (2-p-t,2-p-t) \\
\end{array}
\]
And if the state doesn’t charge too much tax (3-t>2, or 1>t), life is better in civil society

<table>
<thead>
<tr>
<th>Without the state</th>
<th>With the state</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>(3,3)</td>
<td>(5,3-t)</td>
</tr>
<tr>
<td>D</td>
<td>(4,1)</td>
</tr>
<tr>
<td>(4,1)</td>
<td>(2,2)</td>
</tr>
<tr>
<td>(1-t,4-p-t)</td>
<td>(2,2)</td>
</tr>
<tr>
<td>(3-t,3-t)</td>
<td>(2,2)</td>
</tr>
</tbody>
</table>

What states do:

1. **War making**: Eliminating or neutralizing their own rivals outside the territories in which they have clear and continuous priority as wielders of force.
2. **State making**: Eliminating or neutralizing their rivals inside those territories.
3. **Protection**: Eliminating or neutralizing the enemies of their clients.
4. **Extraction**: Acquiring the means of carrying out the first three activities.

Conclusion

This “predatory state” approach is instructive because it:

1. gives view of rulers as egoistic maximizing rational actors
2. shows how goal oriented behavior leads to changes in institutional environment
3. shows how changes in institutional environment might change behavior

In so doing, the approach it:

1. explains why units grew larger over time - increasing economies of scale in violence
   And
2. has potential of explaining why rulers would share power and/or limit extraction