Intro to Negitiation Summary

Frédéric Vogel `vogelfr@ethz.ch` , ETH Zürich, FS18

Definitions

Negotiation
Process resolving a conflict of needs between 2 or more parties to arrive at a joint decision that entails joint consequences, or payoffs, for each party.

Distributive negotiation
Competitive negotiation over one issue, a win-lose situation.

Integrative negotiation
Negotiation that can look for win-win solutions or problem solving in order to have mutual gain.

Mediation
Any action taken by an actor that is not a direct party to the crisis, that is designed to reduce or remove one or more of the problems of the bargaining relationship, and therefore to facilitate the termination of the crisis itself.

Descriptive orientation
How decisions are made. How and why individuals act the way they do.

Normative orientation
How decisions should be made. How *idealized, rational* people *should* act.

Prescriptive orientation
How decisions could be made better. What *can* a *real* person actually do to make better decisions?

Rationality

Symbol	Desription
$a \in \mathbf{A}$	Action, set of alternative actions
$\omega \in \mathbf{\Omega}$	Outcome, set of all possible outcomes
u	Utility
λ	Lottery, set of probabilities for the occurence of every $\omega \in \mathbf{\Omega}$
$p(\omega \vert \lambda)$	Probability of outcome ω in lottery λ

Utility function
Function $u : \mathbf{\Omega} \to \mathbb{R}$ such that:

$$u(\omega_1) > u(\omega_2) \Leftrightarrow \omega_1 \succ \omega_2,$$
$$u(\omega_1) = u(\omega_2) \Leftrightarrow \omega_1 \sim \omega_2$$

Payoff function

Function $\pi : \mathbf{A} \to \mathbb{R}$

Expected utility

With $\lambda(a)$ denoting a lottery chosen by selecting action a

$$\pi(a) = \sum_{\omega \in \mathbf{\Omega}} p(\omega|\lambda(a)) \cdot u(\omega)$$

Definition of rationality

Rational under certainty

An individual is *rational under certainty* if his preferences for outcomes $\omega \in \mathbf{\Omega}$ satisfy the following conditions:

1. Completeness
   Either $\omega_1 \succcurlyeq \omega_2$ **or** $\omega_2 \succcurlyeq \omega_1$
2. Transitivity
   If $\omega_1 \succcurlyeq \omega_2$ and $\omega_2 \succcurlyeq \omega_3$, **then** $\omega_1 \succcurlyeq \omega_3$

Rational under uncertainty

An individual is *rational under uncertainty* if his preferences for lotteries satisfy the following conditions:

1. Completeness
   Either $\lambda_1 \succcurlyeq \lambda_2$ **or** $\lambda_2 \succcurlyeq \lambda_1$
2. Transitivity
   If $\lambda_1 \succcurlyeq \lambda_2$ and $\lambda_2 \succcurlyeq \lambda_3$, **then** $\lambda_1 \succcurlyeq \lambda_3$
3. Monotonicity
   If $\lambda_1 \succ \lambda_2$ and $q_1 > q_2$, **then** $q_1\lambda_1 + (1 - q_1)\lambda_2 \succ q_2\lambda_1 + (1 - q_2)\lambda_2$
4. Continuity
   If $\lambda_1 \succcurlyeq \lambda_2$ and $\lambda_2 \succcurlyeq \lambda_3$, **then** there exists probabilty q such that $\lambda_2 \sim q\lambda_1 + (1 - q)\lambda_3$
5. Independence
   If $\lambda_1 \succ \lambda_2$, **then** $q\lambda_1 + (1 - q)\lambda_3 \succ q\lambda_2 + (1 - q)\lambda_3$

Not very useful in practice since test not possible.

Basic Concepts

Target Point
Aspired goal of negotiator

Resistance Point
Negotiator’s bottom line (reservation price)

Zone of Potential Agreement (ZOPA)
Spread between resistance points of parties

Steps in integrative solution

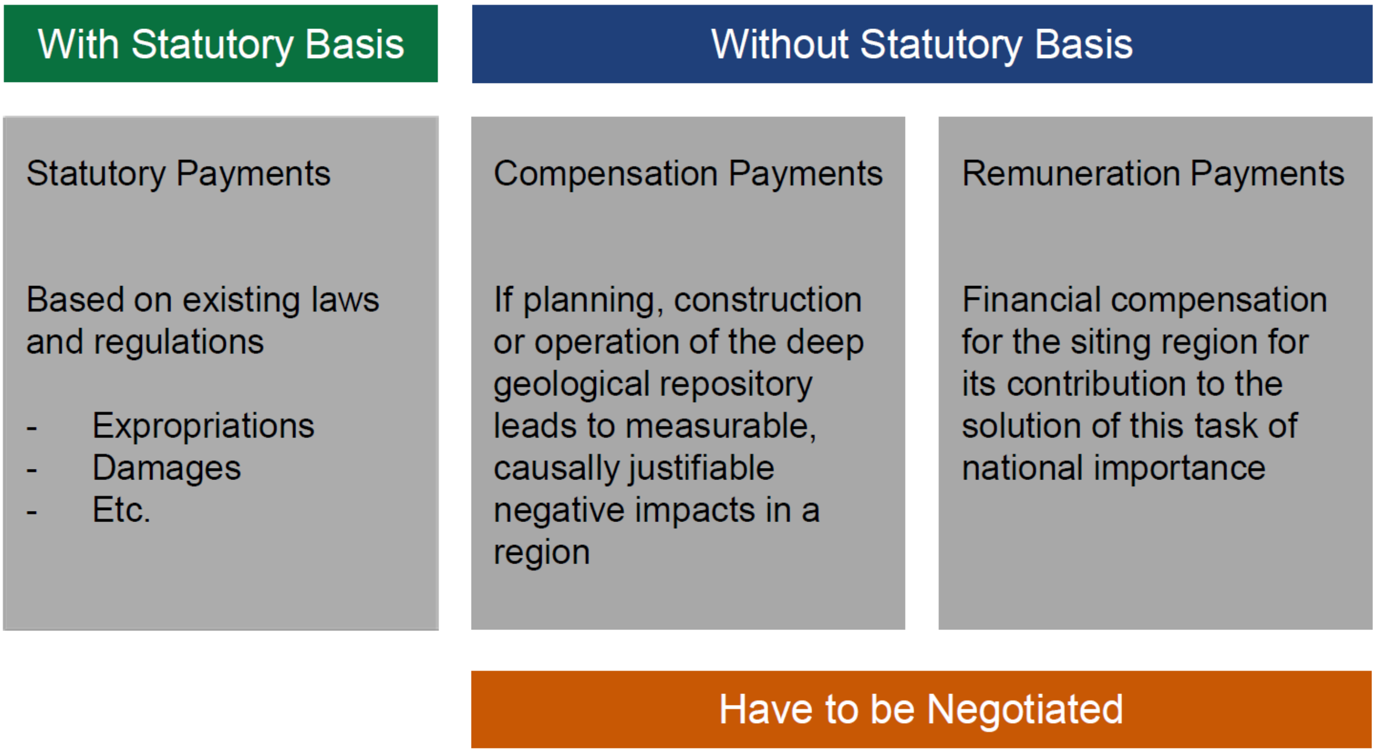
1. Sides need to agree on *what the problem is*
2. What are the *interests* behind the positions
3. Generate *alternative* solutions:
    - Redefine the problem (Expand pie, logroll, offer compensation in other area, minimize costs, bridge)
    - Generate solutions for the given problem
4. Make a *list* of solutions
5. Prioritize options and *reduce* the list
6. Select a *solution*

Getting to Yes

5 principles:

1. People: Separate people from problem
2. Interests: Focus on interest, not positions
3. Options: Invent options for mutual gain
4. Criteria: Insist on using objective criteria
5. Alternatives: Know your best alternative to a negotiated agreement (BATNA)

Case 1: Nuclear Waste



Goal developing a negotiation framework

- Negotiation are voluntary, therefore framework has only a value if all parties accept it

Problems:

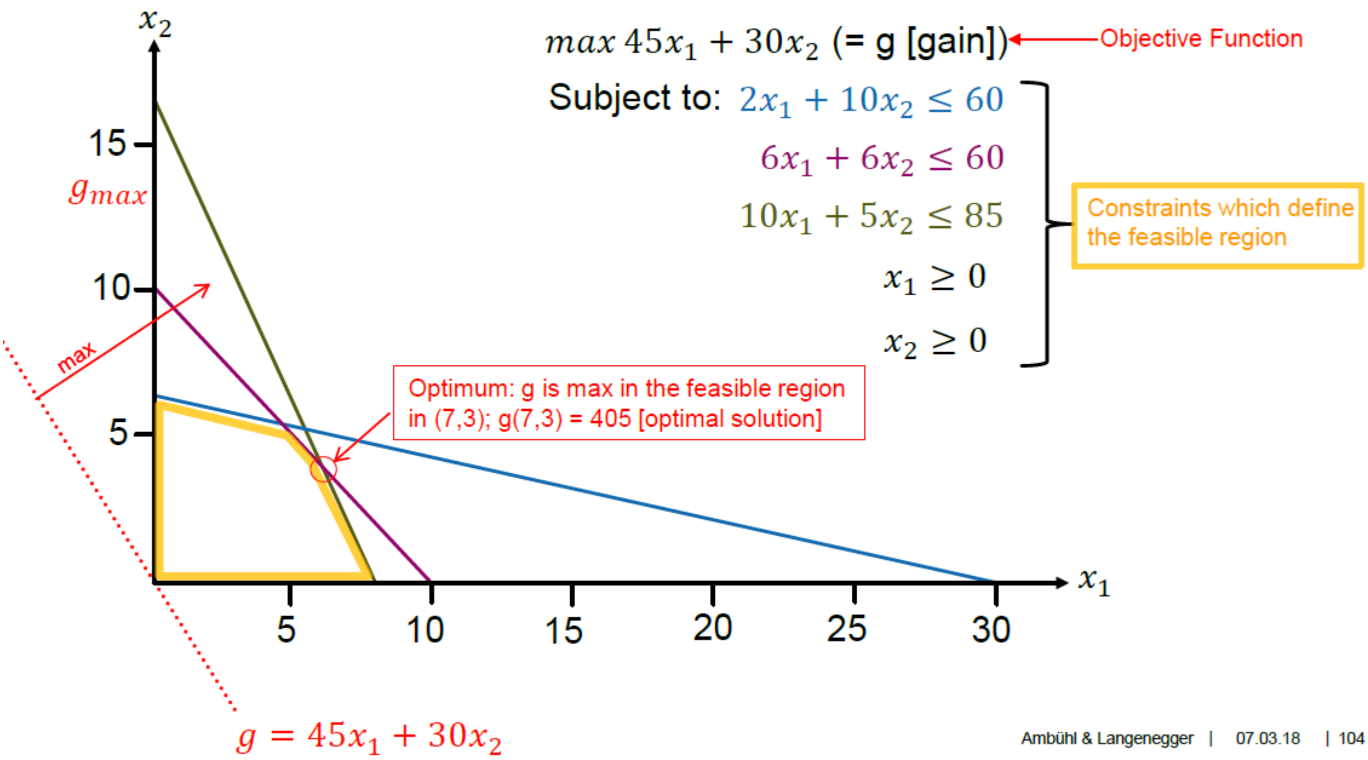
- Framework requires concensus with all involved parties
- Negotiation objective was not clear
- Negotiation parties were not clear
- Beginning of negotiation was not clear
- Entry into force of contract
- Commitment to negotiation framework

Result:

- Declaration
- 20 signatures
- Negotiation framework (12 articles)

Examples

Linear programming



Secretary problem

- Look at $\frac{n}{e}$
- Take first that is better than all others before

Casino

1. Probabilities known: choose action to maximize your expected payof
2. Probabilities unknown: assume choises are equally possible, choose action to maximize expected payoff
3. Maxmin: choose maximum of minimum payoff
4. Maxmax: choose maximum of maximum payoff
5. Optimism coefficient θ: choose maximum of $\theta(\max_{row}) + (1-\theta)(\min_{row})$ (Mix between maxmin and maxmax)
6. Maxmin on regret matrix: regret matrix $R_{i,j} = M_{i,j} - \max(M_{:,j})$

Game Theory

Zero-sum games

- Sum payoffs in each cell is 0
- If strategy forms equilibrium (*saddle point*) then maxmin payoff to A = - maxmin payoff to B

Nash-Equilibrium

- Given the strategies of the other players, decide what maximizes your payoff
- Nash-Equilibrium: Every player’s action is a best response to the other player’s actions
    - No one has an incentive to change his strategy **unilaterally**!
- Mixed strategy profile:
    - Player 1 chooses A with probability p and B with $1 - p$
    - Player 2 is indifferent between playing A or B if the following holds: $\pi_2(A, A) \cdot p + \pi_2(A, B) \cdot (1 - p) = \pi_2(B, A) \cdot p + \pi_2(B, B) \cdot (1 - p)$

Pareto Optimal

- An outcome is pareto optimal if there is no other outcome that increases payoff to one player *without* decreasing payoff to another player