

# Game Theory for Managers

(B3MIN1003)

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# Agenda:

- 1 Interaction (examples);
- 2 Game theory;
- 3 Aims and topics of the elective;
- 4 Grading;
- 5 Evaluations.

# 1 Interaction

An important feature of persons, firms, and countries is that they **interact** (strategically), which may be competitive or cooperative.

# Game theory:

*A unified analytical structure  
for studying all situations*

*of  
conflict*

*or*

*cooperation*

(which has been awarded 10 Nobel prizes).

Mastering the basics of game theory  
takes only 2 classes.

The focus is on applications.

## Example 1:

### Multiperson interactions in a recruitment example:

- Various trainees are hired by enterprises, i.e. good and brilliant trainees;
- A good trainee is trying to disguise not being brilliant for the manager;
- A brilliant trainee is trying to distinguish herself from a good trainee;
- The manager is trying to sort this all out in an attempt to determine which employee should be retained.

# Example 2: Russia – Ukraine war

- Deception;
- Renegotiation;
- Beliefs;
- Poetin's type;
- Past behavior;
- Ambiguity;
- ...

Example 3:

What is the effect of transparency in wage negotiations?



# Logic behind transparency

- Workers don't know what the employer is willing to pay for their labor;
- Transparency reveals employer's willingness to pay, and is used to renegotiate;
  - Wages go up through renegotiation (especially for low wage workers).

Conclusion: Workers are better off with transparency.

Direct effect on average wages?

**7%**

Equilibrium effects  
have to be taken into account.

Are there other effects,  
i.e. how will employers respond?

# Logic behind equilibrium thinking

If transparency and renegotiation  
are common,  
employers will alter  
their wage-setting policies.

These indirect equilibrium effects shift bargaining power away from workers, and lower average wages.

Total effect on average  
wages?

$$7\% - 9\% = -2\%$$

## 2 Game theory

**Game theory** (with 10 Nobel prizes)  
addresses these **human interactions**  
in a unified way  
and formulates precise predictions.

Game theory sounds cool and mysterious,  
and it is,  
but it is simple due to one basic concept.

# Strategic intelligence:

- capacity to think ahead;
- attend to detail;
- grasp how other think and behave;
- strategies of screening and signaling;
- role of uncertainty;
- emergence of cooperation;
- coordination.



Paul Samuelson:

‘To know game theory  
is to change  
your lifetime way of thinking.’

Game theory is used extensively in many fields  
such as  
business, economics, law, psychology, sociology,  
anthropology, computer science, engineering, and  
biology.

Last year students from various departments of Erasmus University  
(Business, Economics, Law, Psychology, Health Management, Education Sciences, and the Medical School)  
took the course.

There were also students from  
Delft University (Engineering, Aerospace, Computer science),  
University of Leiden (Political Science, Physics).

Prerequisites:

None,  
and the mathematics  
consists only of  
comparing two numbers  
in a certain sequence.

## 3 Aims and topics of the elective

# Aims of the elective:

- master the game theoretic way of thinking;
- be able to improve multi-person situations by redesigning the game.

# Outline of Topics:

- 1: *Strategic interactions*, with applications regarding bargaining, strategic delegation, and agenda control.
- 2: *Information structure*, i.e. *taking turns in the dark* and *I know something you don't know*. How to address situations with conflicting interests and asymmetric information, such as contracts and hiring decisions?
- 3: *Beliefs / perceptions*, i.e. *what you do, tells me who you are*.
- 4: *Coordination*, e.g. *do we go on a honeymoon trip, the Norwegian Dream crash*. How to address situations with joint interests and asymmetric information?
- 5: *Repeated games* may overcome the two seemingly opposing perspectives of competition (war) and cooperation (peace). These ideas are applied to address reputation, empowerment, cartel stability, and the transaction platform eBay.
- 6: *Strategy typology*, i.e. structuring the market to your own advantage, with applications regarding marketing, technology, finance, organizations, and HRM.
- 7: *Cooperative game theory*, i.e. *unstructured interactions*, with applications such as power, cost allocation, coalitional formation, and matching mechanisms.

# 4 Grading

- Team assignments:  $9 \times 4\% = 36\%$
- Paper: 30%;
- Exam: 34%.



# 5 Evaluations

- The professor managed to explain very complex subjects in a very simple and clear way. I am very much impressed at how much I managed to learn from this course. The professor was always willing to help students really understand the material. I really appreciated his support and willingness to help.
- Mr. Hendrikse is really kind and enthusiastic and he really tries to explain everything in such a way all the students understand it. He is very patient and flexible.
- It gives a different perspective on managerial problems, which is interesting. I will definitely use some concepts to think about decisions when many people are involved.



# Citations from student evaluations:

- 'It's a very challenging minor but the professor makes sure everybody understands the subjects. I have enjoyed his lectures very much and applaud him for his support whenever you had a question.'
- 'I loved the content of this minor. The professor knows everything about this subject and is always available to discuss topics and give advice. He knows all the Noble prizes by heart and not just the basics about it, but in detail and can explain it in such a way that, even though this minor was only 10 weeks, it was very easy to follow.'
- 'Good and clear teacher. Learned a lot of new things.'