Economics and Behaviour

Prof. Dr. Nora Szech

Wintersemester 2015

Karlsruher Institut für Technologie

Preface

This **unofficial** script has been created by Martin Belica in WS 2015/16 containing notes from the lectures by Prof. Dr. Szech at the KIT. This is an extended version, meaning it contains additional definitions and examples to round off the script, you can find the old version here.

The following pages try to offer insight into fundamental topics in behavioural economics with regard to contents and methods and to reflect different research methods and designs of economic experiments in the field of behavioural economics. The reader will be acquainted with reading and critically evaluating current research papers in the field of behavioural economics.

Prerequisites
None. Recommendations: Basic knowledge of microeconomics and statistics are recommended.

Exam information (unofficial)
The exam will last 1h with 60 points to achieve. It supposedly consists of 2-4 exercises of which each will have 2-4 subtasks. The theoretical bases are as important as well as the papers; for a given experiment one has to be able to explain the theoretical solution of the underlying game as well as recap the design and main questions, recall the results and argue about importance and improvement suggestions.

Contents

Introduction

In standard economic theory an agent is assumed to be an **homo oeconomicus**, which portrays the person as consistently rational and narrowly self-interested, usually pursuing his subjectively-defined end optimally; he therefore follows two main characteristics:

- **Rationality**
- **Maximising his utility**

However, human behaviour often stands in contrast to this theoretical concept. Behavioural economics examines actual economic behaviour, including widespread cognitive biases and other irrationalities. Some psychological, social, cognitive and emotional factors frequently elicit this deviation from standard predictions and therefore it is commonly observed in economical experiments, in which economists collect data to estimate effect size, test the validity of economic theories and illuminate market mechanisms.
For these experiments one generally adhere to the following methodological guidelines:

- Incentivise subjects with real monetary payoffs (trustworthy).
- Publish full experimental instructions (transparency).
- Do not use deception (honesty).
- Avoid introducing specific, concrete context (generalisation).

Throughout this script we have to keep in mind that every result can be interpreted in several reasonable ways. One could see game theory as a whole as a predictive tool for the behaviour of human beings, but also as simply a suggestion for how people ought to behave. Therefore we subsequently will distinguish between

- **prescriptive** - means containing an indication of approval or disapproval
- **normative** - means relating to a given model

1 Standard theoretic basics for analysis of strategic behaviour

First, a strategic interaction occurs when the utility of agents in a situation is mutually influenced by individual behavioural changes.

A **game** is a formal representation of a situation in which a number of individuals interact in a setting of strategic interdependence. It is necessary to clarify four points four a game:

- The players: Who is interacting?
- The rules: When do they move or what can they do?
- The outcomes: For each possible set of actions by the players, what is the outcome of the game?
- The payoffs: What are the players' preferences over the possible outcomes?

For example Tick-Tack-Toe games, auctions or even meetings can be described with games.

In the following two sections equilibria are one of our main focus point. Three properties describe such a state, where economic forces are balanced and in the absence of external influences the behaviour leading to the equilibrium will not change:

1. The behaviour of agents in such a point is consistent.
2. No agent has an incentive to change its behaviour.
3. The equilibrium is the outcome of some dynamic process (stability).

Furthermore, we subsequently distinguish between the formal representation which we use to model the conflict situation. However, all situations we will examine will have complete information, meaning perfect knowledge (esp. structure of the game, possible actions and payoff functions of all players) is available to all individuals.

1.1 Strategic form

In this first section we will merely consider **static games** where all players choose their individual actions simultaneously (*One-Shot games*). Yet, the term simultaneously is meant figuratively. It is not important that all players act at the same but that at the time of their choice the decisions of all other players are unknown. [1].

In static games of complete, perfect information, a strategic form or normal-form representation of a game is a specification of players' strategy spaces and payoff functions. In this script we will focus on games with a finite number of players.

First let's take a look at the definition of a strategy, which we will then use to define the strategic form of games:

Definition 1.1.1 (Strategy)
Let $\mathcal{H}_i$ denote the collection of player i's sets of information, $\mathcal{A}$ the set of possible actions in the game and $C(H) \subseteq \mathcal{A}$ the set of actions possible at information set H. A **strategy** for player i is a function $s_i \colon \mathcal{H}_i \to \mathcal{A}$ such that

$$s_i(H) \in C(H) \text{ for all } H \in \mathcal{H}_i$$

We call a set of strategies a **complete plan** of actions for each situation in a game and with S_{-i} we denote the strategies of all players except player i.

Definition 1.1.2 (Strategic form representation)
To be fully defined a game in **strategic form** must specify the set $\{N, S, u\}$ where

1. N is the finite number of players and for player i would that mean $i \in \{1, \dots, N\}$.
2. For each player i we have a set of strategies S_i, such that $S = \bigotimes S_i$.
3. For each player i we have an expected utility function $u_i : S \to \mathbb{R}$, such that $u = \{u_1, \dots, u_N\}$.

To visualise a static game with two players ($P1$ and $P2$) and a finite number of possible strategies (for simplicity lets assume that there are only two signals and call them a and b) one commonly uses the **matrix form**, where $u_i(x, y)$ represents the utility function for player i given the strategy x for $P1$ and y for $P2$ with $x, y \in \{a, b\}$.

$P1$ / $P2$	**a**	**b**
a	$(u_1(a,a), u_2(a,a))$	$(u_1(a,b), u_2(a,b))$
b	$(u_1(b,a), u_2(b,a))$	$(u_1(b,b), u_2(b,b))$

Example 1.1.3 (Prisoner's Dilemma)
Image, two members of a criminal gang are arrested and imprisoned. Each prisoner is in solitary confinement with no means of communicating with the other. The prosecutors lack sufficient

[1] Experiments have shown that even if theoretically the decision process should be the same people tend to behave differently if they have knowledge about a decision order (see Rapoport 1997, Guth, Huck und Rapoport 1998)

evidence to convict the pair on the principal charge. They hope to get both sentenced to a year in prison on a lesser charge. Simultaneously, the prosecutors offer each prisoner a bargain. Each prisoner is given the opportunity either to: betray the other by testifying that the other committed the crime, or to cooperate with the other by remaining silent. The offer is:

- If A and B betray each other, each of them serves 6 years in prison
- If A betrays B but B remains silent, A will be set free and B will serve 9 years in prison (and vice versa)
- If A and B both remain silent, both of them will only serve 1 year in prison (on the lesser charge)

P1 / P2	**defects**	**cooperates**
defects	$(-6,-6)$	$(0,-9)$
cooperates	$(-9,0)$	$(-1,-1)$

There are many different possibilities to extrapolate the Prisoner's Dilemma to apply it in a variety of problems, other interpretations are for example:

- Collusion on prices
- Investing in human capital vs. arming for a war
- Buying a SUV vs. a smaller car

Now that we got to know an example for a game we should discuss some solution concepts and the first obvious choice is the strict dominance.

Definition 1.1.4 (Strict dominance)
A strategy $s_i \in S_i$ is **strictly dominant** for player i if for all $s_i' \neq s_i (s_i' \in S_i)$:

$$u(s_i, s_{-i}) > u(s_i', s_{-i}), \quad \forall s_{-i} \in S_{-i}$$

Analysing Prisoner's Dilemma one can see that *cooperate* is strictly dominated by $defect$. Simply the elimination of strictly dominated strategies leads to the prediction that the players choose $(defects, defects)$ even though $(cooperates, cooperates)$ would result in a lower prison sentence.

This leads us to the elimination of irrational strategies:

Definition 1.1.5 (Best response)
The strategy s_i is a **best response** for player i to the opponents strategies s_{-i} if

$$u_i(s_i, s_{-i}) \geq u_i(s_i', s_{-i}) \text{ for all } s_i' \in S_i$$

A strategy s_i is never a best response if there is no s_{-i} for which s_i is a best response.

Definition 1.1.6 (Rationalisable Strategies)
The strategies that survive the iterated elimination of strategies that are never a best response are know as player i's rationalisable strategies.

Iteratively eliminating dominated strategies leads to a set of rationalisable strategies; for example:

P1 / P2	**l**	**m**	**r**
u	$(1,1)$	$(2,2)$	$(2,0)$
m	$(2,0)$	$(0,1)$	$(1,0)$
d	$(0,2)$	$(1,1)$	$(1,1)$

Here, an iterated elimination leads to (u, m) as rationalisable strategies:

- For Player 1 d is strictly dominated by u and should therefore never be played.
- For Player 2 r is strictly dominated by m.
- Since Player 1 would never play d, m dominates in the iterative subgame l
- Now knowing Player 2 should play m, u is the rational choice for Player 1

Important to notice is that here, the predictions we derived rely immensely on the rationality of all players.

Since there is not always a strictly dominant strategy we extend our solution concepts with the Nash-Equilibrium.

Definition 1.1.7 (Nash-Equilibrium)
A strategy set $s = (s_1, \ldots, s_N)$ constitutes a **Nash-Equilibrium** of a game if for every $i = 1, \ldots, N$ where N is the number of players

$$u_i(s_i, s_{-i}) \geq u_i(s'_i, s_{-i}) \text{ for all } s'_i \in S_i$$

In other words, a **Nash-Equilibrium** is the mutual best response for every player, therefore a set of strategies in which no player can do better by unilaterally changing their strategy.

Example 1.1.8 (Battle of the sexes)
Image a couple that agreed to meet this evening, but both individually cannot recall if they will be attending the opera or a football match. The husband would most of all like to go to the football game. The wife would like to go to the opera. Both would prefer to go to the same place rather than different ones.

Hence, the Battle of sexes in strategic form could, of course depending on their utility function, look something like:

M / F	**football**	**opera**
football	$(1,2)$	$(0,0)$
opera	$(0,0)$	$(2,1)$

and the two Nash-Equilibriums in this game are $(opera, opera)$ and $(football, football)$.

Example 1.1.9 (The Beauty-Contest)
John Keynes described the action of rational agents in a market using an analogy based on a fictional newspaper contest, in which entrants are asked to choose the six most attractive faces from a hundred photographs. Those who picked the most popular faces are then eligible for a prize. The agents has to consider that not his preferred choice is the optimal strategy but the one with the highest chances to be chosen by all others.

We can generalise this example to the following

Example 1.1.10 (Guessing-Game)
A Guessing-Game (e.g. the Beauty-Contest) is a game with at least two players in which the sequel can be described as follows:

- Every player guesses a number $b_i \in \{0, 1, 2, \dots, 100\}$
- The player with the closest guess to $\frac{p}{n} \cdot \sum_{i=1}^{n} b_i = p \cdot \varnothing, \quad p \in (0, 1)$ wins
- In case of tie a random device that is 'fair' decides who win the price $P > 0$

Assume now $p < 1$.
1. Question: Is $(0, \dots, 0)$ a Nash-Equilibrium?
Answer: Yes. Assume player i bids $b > 0$ and all other bid 0.

- if bidder i bids 0 expected win equals $\frac{1}{n}P$
- we can rewrite p times the mean with

$$p \cdot \varnothing = p \cdot \frac{(n-1)0 + 1b}{n} = p \cdot \frac{b}{n}$$

  his expected profit is 0, as 0 is closer to $p \cdot \varnothing$ then the bet $b > 0$, since

$$\left| b - p \cdot \frac{b}{n} \right| = \left| (n-p) \cdot \frac{b}{n} \right| \overset{\substack{p<1 \\ n \geq 2}}{>} \left| p \cdot \frac{b}{n} \right| = \left| 0 - p \cdot \frac{b}{n} \right|$$

2. Question: Is $(0, \dots, 0)$ the unique Nash-Equilibrium here?
Answer: Yes, since:

$$b_i^* \leq \frac{1}{2} \frac{\sum_{j \neq i} b_j^*}{n-1}$$

$$\begin{aligned} \Rightarrow \sum_{i=1}^{n} b_i^* \leq \frac{1}{2} \frac{\sum_{i=1}^{n} \sum_{j \neq i} b_j^*}{n-1} &= \frac{1}{2} \frac{(n-1) \sum_{j=1}^{n} b_j^*}{n-1} \\ &= \frac{1}{2} \sum_{j=1}^{n} b_j^* \end{aligned}$$

$$\iff \sum_{i=1}^{n} b_i^* \leq \frac{1}{2} \sum_{i=1}^{n} b_i^*$$

therefore only $(0, \dots, 0)$ can be a Nash-Equilibrium in this situation.

3. Question: Is $(0, \dots, 0)$ also a strictly dominant strategy?
Answer: No. Imagine following situation:
If 48 of 50 players bid the number 100 and the 49th bids 0 then the best response for player 50 is to bid 97 [2], which especially larger than 0 and therefore 0 is not the best answer and cannot be a strictly dominant strategy.

[2] 97 is the closest whole number to $p \cdot \varnothing$

1.2 Extensive form

In game theoretic view the strategic and the extensive form are merely two different representations of the same strategic decision situation. But while the strategic form often only provides a static description of a game, the extensiv form provides additional properties like move order or level of information in a game.

Example 1.2.1 (Dictator-Game)
Image two players, a proposer P can split up 10 € (up to €-level) between him and a receiver R.

- Question 1: Assume for a minute P is totally selfish and only cares about his own profits. Is there a strictly dominant strategy for P?
  Yes! $(10, 0)$ (money proposer, money receiver) is strictly dominant.
- Question 2: What if P is a pure altruist and just cares about the money R receives?
  Then $(0, 10)$ is strictly dominant.

This simply example for a game we are now going to extend into a dynamic game with the addition that after the proposal the receiver can depending on the offer either accept or reject the proposal.

An extensive form is suitable to model games like this and later we will find not far to seek why it usually has the form of a tree. The definition of a game in extensive form consists of:

- A finite set of nodes $\mathcal{X}$, a finite set of possible actions $\mathcal{A}$ and a finite set of players $1, \ldots, N$
- A function $p\colon \mathcal{X} \to \{\mathcal{X} \cup \emptyset\}$ specifying a single immediate predecessor of each node $x \in \mathcal{X}$; except for x_0 is the **initial node**. The immediate successor nodes of x are $s(x) = p^{-1}(x)$. To have a tree structure, a predecessor can never be a successor and vice versa. The set of **terminal nodes** is $T = \{x \in \mathcal{X} : s(x) = \emptyset\}$. All other nodes $\mathcal{X} \setminus T$ are **decision nodes**.
- A function $\alpha\colon \mathcal{X} \setminus \{x_0\} \to \mathcal{A}$ giving the action that leads to any non-initial node x from its immediate predecessor $p(x)$ with

  $$x', x'' \in s(x); x' \neq x'' \Rightarrow \alpha(x') \neq \alpha(x'').$$

  The set of choices at decision node x is $c(x) = \{a \in \mathcal{A} : a = \alpha(x') \text{ for some } x' \in s(x)\}$
- A collection of information sets $\mathcal{H}$, and a function $H : \mathcal{X} \to \mathcal{H}$, assigning each decision node x to an information set $H(x) \in \mathcal{H}$ with $c(x) = c(x')$ if $H(x) = H(x')$. The choices available at information set H can be written as

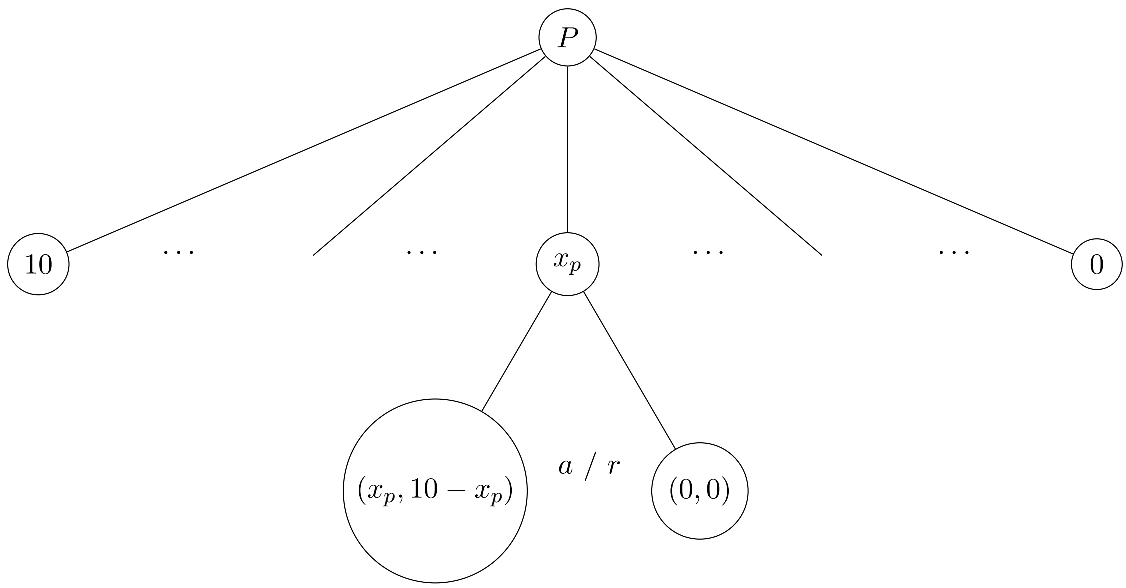
  $$C(H) = \{a \in A : a \in c(x) \text{ for } x \in H\}.$$
- A function $\tau : \mathcal{H} \to \{0, 1, \ldots, N\}$ assigning a player to each information set ($i = 0$ 'nature'). The collection of player i's information set is denoted by $\mathcal{H}_i = \{H \in \mathcal{H} : i = \tau(H)\}$.
- A function $\rho : \mathcal{H}_0 \times \mathcal{A} \to [0, 1]$ assigning a probability to each action of nature with $\rho(H, a) = 0$ if $a \notin C(H)$ and $\sum_{a \in C(H)} \rho(H, a) = 1$ for all $H \in \mathcal{H}_0$.
- A collection of payoff functions $u = \{u_1(\ldots), \ldots, u_N(\ldots)\}$, where $u_i\colon T \to \mathbb{R}$.

Now, back to our example:

Example 1.2.2 (Ultimatum-Game)
Given two players one of them, the proposer P, receives a sum of money ($M = 10$) and decides how to divide the sum between himself and another player, the receiver R, where P receives (x_p) (with $x_p \in \{0, 1, 2, \ldots, 10\}$) and R collects $(10 - x_p)$. After the proposer's decision the responder can either accept or reject this offer, if he accepts the money is split according to the proposal if he rejects neither player receives any money.

To sum it up:

- P proposes split up $(x_p, 10 - x_p)$
- R accepts or rejects
  - If R accepts (a) proposal becomes implemented. P receives x_p and R $10 - x_p$
  - If R rejects (r) the payout for both players is 0.



A strategy set in this game, as it needs to specify a complete action plan, would have to look similar to

- Proposer sets a x_p
- Receiver decides for *any* x_p that might come up if he'd accept or reject that offer.

1. Question: Can the outcome $(5, 5)$ be stabilised as a Nash-Equilibrium?
Answer: Yes. Say P proposes $x_p = 5$ and the strategy set for R is defined by accepting for any value of $x_p \leq 5$ and rejecting the offer for values larger than 5.
In this situation $(5, 5)$ would be stabilised as a Nash-Equilibrium.

2. Question: Is there another Nash-Equilibrium that stabilises the $(5, 5)$ outcome?
Answer: Yes. If P again proposes $x_p = 5$ and the strategy set for R is defined by accepting for only $x_p = 5$ and rejecting for any other case, so $x_p \neq 5$.

3. Question: Can $(0, 10)$ be stabilised as a Nash-Equilibrium?
Answer: Yes. We set the strategy for P as $x_p = 0$ and for R demand accepting for $x_p = 0$ and rejecting for any other case, meaning for $x_p \geq 1$.

As we can see the Nash-Equilibrium can lead to an infinite amount of outcomes some of them even with implausible threats. We'd therefore like to refine this kind of equilibrium which leads us to the (sub-game) perfect Nash-Equilibrium.

Definition 1.2.3 (Sub-game)
A sub-game is any part of a game that meets the following criteria:

- It has a single initial node that is the only member of that node's information set (i.e. the initial node is in a singleton information set).
- If a node is contained in the sub-game then so are all of its successors
- If a node in a particular information set is in the sub-game then all members of that information set belong to the sub-game.
- and finally the node must not contain a deterministic state but instead at least one non-trivial choice

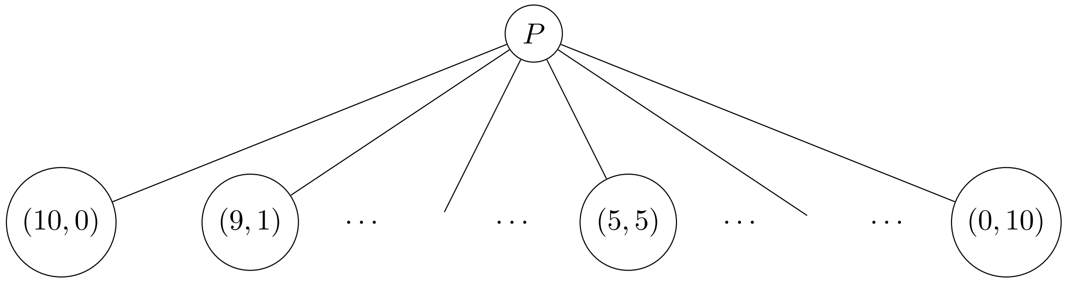
Definition 1.2.4 ((Sub-game-)Perfect Nash-Equilibrium)
A strategy profile is a Sub-game-Perfect Nash-Equilibrium if it represents a Nash equilibrium of every sub-game of the original game. Informally, this means that if the players played any smaller game that consisted of only one part of the larger game and their behaviour represents a Nash equilibrium of that smaller game, then their behaviour is a sub-game perfect equilibrium of the larger game.

How to find a Perfect Nash-Equilibrium:

1. Define (one set of) optimal actions for the last sub-game
2. Replace that decision nodes with the respective outcome
3. Repeat (1) and (2) until the initial decision node.

Example 1.2.5 (Sequel to the Ultimatum-Game)
Searching for the Perfect Nash-Equilibrium in this case leads to:

1. Defining the optimal actions
   - In the case P offering 0 ($x_p = 10$), R receives nothing and is therefore indifferent between refusing and accepting. Let's assume for now he'd accept.
   - For $x_p \in [0, 10)$ R always has to accept the offer since $10 - x_p > 0$.
2. Assuming R always accepts, we now can reduce the game to



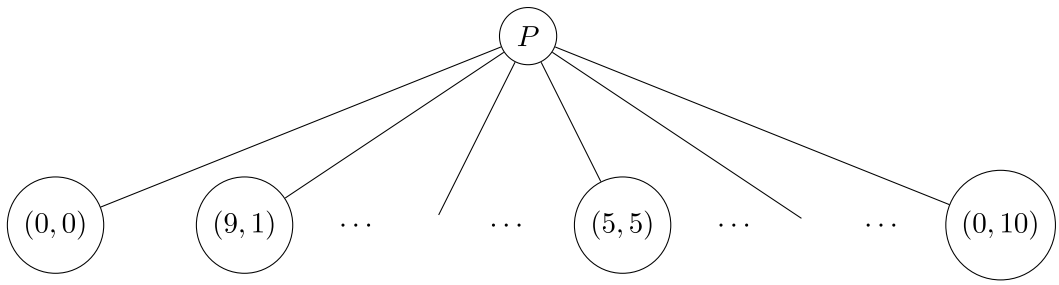
3. A simple search in the reduced game tree for the strategy with the highest expected payoff for P yields the Sub-Game-Perfect Nash-Equilibrium as we have reached the initial node.

$\Rightarrow$ P playing $x_p = 10$ together with R always accepting constitutes a Sub-game-Perfect Nash-Equilibrium.

Now changing our assumption about player R's decision in case of the offer 0 leads to

- Again, for $x_p \in [0, 10)$ R receives $10 - x_p > 0$, therefore he'd have to accept the offer in these situations.
- For the remaining offer 0 ($x_p = 10$), it would be just as plausible to refuse the offer, since he is indifferent between both choices. Hence, accepting for $x_p \in [0, 10)$ and refusing for $x_p = 10$ is also a sub-game perfect strategy.

and even if the tree changes only slightly a different Sub-game-Perfect Nash-Equilibrium occurs:



$\Rightarrow$ P playing $x_p = 9$ together with R always accepting if $x_p < 10$ and refusing for $x_p = 10$ also constitutes a Sub-game-Perfect Nash-Equilibrium.

2 How strategic interdependence can change subjective decisions

2.1 An ultimatum game with multidimensional response strategies

- Güth, W.; Levati, M.V.; Nardi, C.; Soraperra, I. (2014): *An ultimatum game with multidimensional response strategies.* In Jena Economic Research Papers, FriedrichSchiller University and Max Planck Institute of Economics, Jena, Germany (Ultimatum Game)
  - We enrich the choice task of responders in ultimatum games by allowing them to independently decide whether to collect what is offered to them and whether to destroy what the proposer demanded. Such a multidimensional response format intends to cast further light on the motives guiding responder behavior. Using a conservative and stringent approach to type classification, we find that the overwhelming majority of responder participants choose consistently with outcomebased preference models. There are, however, few responders that destroy the proposer's demand of a large pie share and concurrently reject their own offer, thereby suggesting a strong concern for integrity.

2.2 Cooling Off in Negotiations: Does It Work?

- Oechssler, J.; Roider, A.; Schmitz, P. (2015): Cooling Off in Negotiations: Does it Work?. Journal of Institutional and Theoretical Economics JITE J Inst Theor Econ 171, (2015). (Ultimatum Game)
  - Negotiations frequently end in conflict after one party rejects a final offer. In a large-scale Internet experiment, we investigate whether a 24-hour cooling-off period leads to fewer rejections in ultimatum bargaining. We conduct a standard cash treatment and a lottery treatment, where subjects receive lottery tickets for several large prizes. In the lottery treatment, unfair offers are less frequently rejected, and cooling off reduces the rejection rate further. In the cash treatment, rejections are more frequent and remain so after cooling off. We also study the effect of subjects' degree of "cognitive reflection" on their behaviour.

2.3 Level k as a prominent example of a nonstandard/behavioural approach

Unraveling in Guessing Games: An Experimental Study

- Nagel, R. (1995): *Unraveling in Guessing Games: An Experimental Study.* In: American Economic Review.
  - Consider the following game: a large number of players have to state in several rounds simultaneously a number in the closed interval [0, 100]. The winner is the person whose chosen number is closest to the mean of all chosen numbers multiplied by a parameter p, where p is common knowledge. The payoff to the winner is a fixed amount, which is independent of the stated number and p. If there is a tie, the prize is divided equally among the winners. The other players whose chosen numbers are further away receive nothing.

More than Meets the Eye

- Müller, J.; Schwieren, C. (2011): *More than Meets the Eye: an Eye-tracking Experiment on the Beauty Contest Game*
  - The beauty contest game has been used to analyse how many steps of reasoning subjects are able to perform. A common finding is that a majority seem to have low levels of reasoning. We use eye-tracking to investigate not only the number chosen in the game, but also the strategies in use and the numbers contemplated. We can show that not all cases that are seemingly level-1 or level-2 thinking indeed are – they might be highly sophisticated adaptations to beliefs about other people's limited reasoning abilities.

3 Organisations and Markets: The role of market incentives

3.1 Pay Enough or Don't Pay at All

- Gneezy, U.; Rustichini, A. (2000): *Pay Enough or Don't Pay at All*. In: Quarterly Journal of Economics.
  - Economists usually assume that monetary incentives improve performance, and psychologists claim that the opposite may happen. We present and discuss a set of experiments designed to test these contrasting claims.
    We found that the effect of monetary compensation on performance was not monotonic. In the treatments in which money was offered, a larger amount yielded a higher performance. However, offering money did not always produce an improvement: subjects who were offered monetary incentives performed more poorly than those who were offered no compensation. Several possible interpretations of the results are discussed.

3.2 A Fine is a Prise

- Gneezy, U.; Rustichini, A. (2000): *A Fine is a Prise*. In: The Journal of Legal Studies. (monetary incentives)
  - The deterrence hypothesis predicts that the introduction of a penalty that leaves everything else unchanged will reduce the occurrence of the behaviour subject to the fine. We present the result of a field study in a group of day-care centers that contradicts this prediction. Parents used to arrive late to collect their children, forcing a teacher to stay after closing time. We introduced a monetary fine for late-coming parents. As a result, the number of late-coming parents increased significantly. After the fine was removed no reduction occurred. We argue that penalties are usually introduced into an incomplete contract, social or private. They may change the information that agents have, and therefore the effect on behaviour may be opposite of that expected. If this is true, the deterrence hypothesis loses its predictive strength, since the clause "everything else is left unchanged" might be hard to satisfy.

3.3 The Currency or Reciprocity

- Sebastian Kube, Michel Andre Marechal and Clemens Puppe (2012): *The Currency or Reciprocity: Gift Exchange in the Workplace*. In: American Economics Review. (money versus non-monetary incentives)

- The psychological impact of providing tangible or intangible gifts to employees is likely to depend not only on the magnitude of the gifts but also on the gifts being seen as (...) costly to the donor in terms of time or effort.

3.4 Creativity and Financial Incentives

- Charness, G.; Grieco, D. (2014): *Creativity and Financial Incentives*
  - Creativity is a complex and multi-dimensional phenomenon with tremendous economics importance. Yet, despite this importance, there is very little work on the topic in the economics literature. In this paper, we consider the effect of incentives on creativity. We present a first series of experiments on individual creativity where subjects face creativity tasks where, in one case, ex-ante goals and constraints are imposed on their answers, and in the other case no restrictions apply. The effects of financial incentives in stimulating creativity in both types of tasks is then tested, together with the impact of personal features like risk and ambiguity aversion. Our findings show that, in general, financial incentives affect "closed" (constrained) creativity, but do not facilitate "open" (unconstrained) creativity. However, in the latter case incentives do play a role for ambiguity-averse agents, who tend to be significantly less creative and seem to need extrinsic motivation to exert effort in a task whose odds of success they don't know. The second set of experiments aims at exploring group creativity in contexts where the "corporate culture" is either cooperative or individualistic. Our results show that, in the case of closed tasks, financial incentives and collectivist attitudes foster creativity, but only with cooperative corporate culture.

4 Organisations and Markets: The role of moral dimensions of markets

4.1 Morals and Markets

The possibility that market interactions may erode moral values is a long-standing, but controversial, hypothesis in the social sciences, ethic and philosophy. Markets are accused to transform human values in exchange blues and goods into commodities. It has also been argues that market institutions may influence preferences in general with a tendency to make people.

Michael Sandal analysed that with technological progress and the increasing ubiquity of market ideas, since markets continue to enter further and further domains of our social life.

Further, there is the doux commerce hypothesis, meaning that the entering of market in our social life might improve our situation in many ways...

- Falk, A.; Szech, N. (2013): *Morals and Markets.* In: Science (moral dimensions)
  - The possibility that market interaction may erode moral values is a long-standing, but controversial, hypothesis in the social sciences, ethics, and philosophy. To date, empirical evidence on decay of moral values through market interaction has been scarce. We present controlled experimental evidence on how market interaction changes how human subjects value harm and damage done to third parties. In the experiment, subjects decide between either saving the life of a mouse or receiving money. We compare individual decisions to those made in a bilateral and a multilateral market. In both markets, the willingness to kill the mouse is substantially higher than in individual decisions. Furthermore, in the multilateral market, prices for life deteriorate tremendously. In contrast, for morally neutral consumption choices, differences between institutions are small.

Examples for market designs where the idea of introducing a free market (money based) is current:

- trading markets for emission certificates. To reduce pollution by restricting emission output per country a contract was design, which nevertheless allowed trading of those certificates. M. Sandel was concerned that if we put a money value on pollution it might become less moral concerning to pollute.
- Allocation of organs markets: one might be able to trade an incompatible organ for an compatible if available. People started discussing if money should not be introduced in this market instead of just a trading market.
- Adoption: high income families might be able to provide better for adopted children and therefore could be preferred on an adoption list

- In California child baring is allowed to be traded for money

Restricted markets:

- Employment markets are regulated, so exploitation is not (so) present.

4.2 You Owe Me

- Malmendier, U.; Schmidt, K. (2012): *You Owe Me.* In: DOI (moral dimensions)
  - In many cultures and industries gifts are given in order to influence the recipient, often at the expense of a third party. Examples include business gifts of firms and lobbyists. In a series of experiments, we show that, even without incentive or informational effects, small gifts strongly influence the recipient's behaviour in favour of the gift giver, in particular when a third party bears the cost. Subjects are well aware that the gift is given to influence their behaviour but reciprocate nevertheless. Withholding the gift triggers a strong negative response. These findings are inconsistent with the most prominent models of social preferences. We propose an extension of existing theories to capture the observed behaviour by endogenising the "reference group" to whom social preferences are applied. We also show that disclosure and size limits are not effective in reducing the effect of gifts, consistent with our model. Financial incentives ameliorate the effect of the gift but backfire when available but not provided.

4.3 How Customers' insurance coverage induces sellers' misbehaviour

- Kerschbamer, R.; Neururer, D.; Sutter, M. (2014): *How Customers' insurance coverage induces sellers' misbehaviour in markets for credence goods*
  - Markets for credence goods are characterised by informational asymmetries between expert sellers and their customers, which creates strong incentives for fraudulent behaviour of sellers that results in estimated annual costs to customers and the society as a whole of billions of dollars in the US alone. Prime examples of credence goods are all kinds of repair services, the provision of medical treatments, the sale of software programs, and the provision of taxi rides in unfamiliar cities. In this paper, we examine in a natural field experiment how insurance coverage on the side of the consumer – often prevalent on important markets such as the health care or repair services sectors – can seriously exacerbate inefficiencies in the provision of credence goods by inducing misbehaviour on the side of the seller. Specifically, we study how computer repair shops take advantage of customers' insurance for repair costs. In a control treatment, the average repair price is about Euro 70, with the repair bill increasing to Euro 129 when the service provider is informed that the insurance would reimburse the bill. Our design allows for a decomposing of the sources of this economically impressive and statistically highly significant difference showing that this is mainly due to the over-provision of parts and overcharging of working time. Overall, our results strongly suggest that insurance coverage greatly increases the extent of misbehaviour of sellers in important sectors of the economy

with potentially huge costs to customers and whole economies.

5 Ethics in science

5.1 Pleasures of Skill and Moral Conduct

Background:

- Jeremy Bentham pointed fourteen different "simple" sources of pleasures for humans out
- In this short list, number three is the "pleasure of skill" while number five is "the pleasure of a good name".
- Yet if being skilful is of crucial importance to people than this can oppose the possibility to keep a good name

As an example: The Manhattan Project. After the dropping of the plutonium bomb on Nagasaki, numerous members of the Manhattan Project started worrying about moral implications. Many of the scientists suffered from e.g depressions.

The Self-Image is so relevant in this concept. Both the desire for mastery and acting in accordance with moral values originate from the same source, a desire for positive self-image.

The remaining question is therefore: does morality in some (everyday) situations get traded off against skilfulness?

- Falk, A.; Szech, N. (2016): *Pleasures of Skill and Moral Conduct.* KIT working paper. (non-monetary incentives and morals)
  - As was recognised by Bentham, skilfulness is an important source of pleasure. Humans like achievement and to excel in tasks relevant to them. This paper provides controlled experimental evidence that striving for pleasures of skill can have negative moral consequences and causally reduce moral values. In the study, subjects perform an IQ-test. They know that each correctly solved question not only increases test performance but also the likelihood of moral transgression. In terms of self-image, this creates a trade-off between signalling excellence and immoral disposition. We contrast performance in the IQ-test to test scores in an otherwise identical test, which is, however, framed as a simple questionnaire with arguably lower self-relevance. We find that subjects perform significantly better in the IQ-test condition, and thus become more willing to support morally problematic consequences. Willingness to reduce test performance in order to behave more morally is significantly less pronounced in the IQ versus the more neutral context. The findings provide controlled and causal evidence that the desire to succeed in a challenging, self-relevant task has the potential to seduce subjects into immoral behaviours and to significantly decrease values attached to moral outcomes.

5.2 The Social Responsibilities of Scientists

- Russell, B. (1960): *The Social Responsibilities of Scientists*. In: Science, New Series.
  - A scientist can no longer shirk responsibility for the use society makes of his discoveries.

5.3 The Moral UnNeutrality of Science

- William 0. Baker and more (1961): *The Moral UnNeutrality of Science*: The scientist's special responsibility are examined an address given at the 1960 AAAS annual meeting. In: Science.
  - The scientist's special responsibilities are examined in an address given at the 1960 AAAS annual meeting

6 Non-standard utility

Anticipatory utility

The standard utility approach states an already deterministic situation on an individuals anticipatable behaviour and this means his utility function is static and can't be changed by additional information. Nevertheless:

- Some students decide not to look up their exam grades while on vacation, therefore they refuse gathering free and more important static information to (better) enjoy their free time
- Some people with potentially severe diseases avoid getting tested for them.

One could argue that even with a bad result they don't have to act upon it, they don't have to behave differently, so why do this situation occur?

Maybe learning about the future affects well-being today derived from their **beliefs** about the future.

In Psychology one distinguishes between:

- monitors: people who really want to know what is going to happen. E.g. some people want to know every step of their upcoming surgery even though it won't change the outcome
- blunders: subjects who don't want the additional information

Behavioural Economics by Caplin/Leahy (2001, 2004) tries to combine those two fields

Maybe some people prefer to stick to their Bayesian's priors instead of getting tested because they incorporate their **beliefs** into their well-being (utility)

What if there is an instrumental cost in getting tested?

- Caplin/Eliaz (2003): examined social cost (e.g. HIV tests in america)
- Köszegi (2003, 2006): (studied the some problem as the next paper)
- Szech/Schweizer (2015): look at individual well-being as instrumental cost

As solution is proposed in both papers the one from Caplin/Eliaz and the one from Szech/Schweizer: coarse tests may be helpful.

Some people even bias their own beliefs away from the Bayesian:

Brunnermeier and Parker (2005) and also Oster, Shoulsen, Dorsey (2013) showed that some people might have high risk of inheriting diseases but can convince themselves that the risk is way lower, where this is more than simple optimism.

6.1 Paying Not to Go to the Gym

- Stefano DellaVigna and Ulrike Malmendier : *Paying Not to Go to the Gym.* (26 pages)
  - How do consumers choose from a menu of contracts? We analyse a novel dataset from three U.S. health clubs with information on both the contractual choice and the day-to-day attendance decisions of 7,752 members over three years. The observed consumer behaviour is difficult to reconcile with standard preferences and beliefs. First, members who choose a contract with a flat monthly fee of over $70 attend on average 4.3 times per month. They pay a price per expected visit of more than $17, even though they could pay $10 per visit using a 10-visit pass. On average, these users forgo savings of $600 during their membership. Second, consumers who choose a monthly contract are 17 percent more likely to stay enrolled beyond one year than users committing for a year. This is surprising because monthly members pay higher fees for the option to cancel each month. We also document cancellation delays and attendance expectations, among other findings. Leading explanations for our findings are overconfidence about future self-control or about future efficiency. Overconfident agents overestimate attendance as well as the cancellation probability of automatically renewed contracts. Our results suggest that making inferences from observed contract choice under the rational expectation hypothesis can lead to biases in the estimation of consumer preferences.

6.2 The Challenge of Mountaineering

- George Loewenstein: *Because It Is There: The Challenge of Mountaineering... for Utility Theory.* (15 pages)
  - This paper presents experimental evidence for an intrinsic preference for information. In two experiments we find that the demand for information about a future experience, controlling for its usefulness, is increasing in the expected future consumption utility. In the first experiment subjects obtain information about the outcome of a lottery now or later. The information is useless for decision making, but the larger the reward, the more likely subjects are to pay to obtain the information early. In the second experiment subjects may pay to avoid being tested for herpes simplex virus 1 and the more highly feared herpes simplex virus 2. Subjects are about twice more likely to avoid information for herpes simplex virus 2, suggesting that more aversive outcomes lead to more information avoidance. In addition, we find that positive affect (i.e. good mood) is associated with lower demand for information as predicted by theory, and information avoidance is associated with ambiguity aversion.

6.3 Fantasy and Dread

- Ananda Ganguly and Joshua Tasoff (2014): *Fantasy and Dread: An Experimental of Attentional Anticipatory Utility.* (66 pages)
  - This paper presents experimental evidence for an intrinsic preference for information. In two experiments we find that the demand for information about a future experience, controlling for its usefulness, is increasing in the expected future consumption utility. In the first experiment subjects obtain information about the outcome of a lottery now or later. The information is useless for decision making, but the larger the reward, the more likely subjects are to pay to obtain the information early. In the second experiment subjects may pay to avoid being tested for herpes simplex virus 1 and the more highly feared herpes simplex virus 2. Subjects are about twice more likely to avoid information for herpes simplex virus 2, suggesting that more aversive outcomes lead to more information avoidance. In addition, we find that positive affect (i.e. good mood) is associated with lower demand for information as predicted by theory, and information avoidance is associated with ambiguity aversion.

    Critique: just a small fraction was actually being tested.

Exams

Here, the memory minutes of the past exams from 19.02.2016:

Exercise 1 (19 Points)

a) Define the term *homo oeconomicus* (4 Points)

b) Sketch the structure of an ultimatum game and provide a game tree. (8 Points)

c) Explain the design of the experiment in Oechssler, J., Roider A., Schmitz, P. (2015): *Cooling Off in Negotiations: Does It Work?*. (7 Points)

Exercise 2 (21 Points)

a) Illustrate the design used for the experiment in the paper Charness, G., Grieco, D.; (2014): *Creativity and Financial Incentives.* (8 Points)

b) Elaborate one aspect you liked and one aspect you disliked about the design. (4 + 4 Points)

c) Suggest one reasonable extension to the design. (5 Points)

Exercise 3 (20 Points) In a modified Beauty-Contest with 5 players each player i has to choose a number x_i between 0 and 100, winner is the one closest to half times the average $(\frac{1}{2}\sum_{i=1}^{n}\frac{x_i}{5})$. If a draw occurs the player with the smallest index i wins the toss.

a) Define level-0, level-1, level-2 and level-3. (5 Points)

b) Is $(0, \ldots, 0)$ a Nash-Equilibrium? (5 Points)

c) Is 0 a dominant strategy? (5 Points)

d) Is $(0, \ldots, 0)$ the unique Nash-Equilibrium? (5 Points)

Bibliography

- Prof. Dr. Szech's lecture about Economics and Behaviour in 2015
- Berninghaus, Ehrhart, Gueth: Strategische Spiele, 2002
- Kahnemann, Daniel: Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.
- Ariely, Dan: Predictably irrational. New York: Harper Collins, 2008.
- Ariely, Dan: The Upside of Irrationality. New York: HarperCollins, 2011.
- Güth, W.; Levati, M.V.; Nardi, C.; Soraperra, I.: An ultimatum game with multidimensional response strategies, 2014.
- Oechssler, J.; Roider A.; Schmitz, P. (2015) "Cooling Off in Negotiations: Does It Work?"Journal of Institutional and Theoretical Economics JITE J Inst Theor Econ 171, no. 4 (2015): 565-88.
- Nagel, R. (1995) "Unraveling in Guessing Games: An Experimental Study."American Economic Review Vol. 85, No. 5 (Dec., 1995), pp. 1313-1326
- Müller, J.; Schwieren, C. (2011) "More than Meets the Eye: an Eye-tracking Experiment on the Beauty Contest Game"
- Gneezy, U.; Rustichini, A. (2000): „Pay Enough or Don't Pay at All*". In: Quarterly Journal of Economics. 115 (3), S. 791-810, DOI: 10.1162/003355300554917.
- Gneezy, U.; Rustichini, A. (2000): „A Fine is a Price". In: The Journal of Legal Studies. 29 (1), S. 1-17, DOI: 10.1086/468061.
- Kube, Sebastian, Michel André Maréchal, and Clemens Puppe. 2012. "The Currency of Reciprocity: Gift Exchange in the Workplace.İn: American Economic Review, 102(4): 1644-62.
- Charness, G.; Grieco, D.; (2014): Creativity and Financial Incentives
- Falk, A.; Szech, N. : Morals and Markets, 2013. In: Science. 340 (6133), S. 707-711, DOI: 10.1126/science.1231566.
- Malmendier, U.; Schmidt, K. (2012): "You Owe Me". In:, DOI: 10.3386/w18543. (moral dimensions)
- Kerschbamer, R.; Neururer, D.; Sutter, M. (2014): "How customers' insurance coverage induces sellers' misbehavior in markets for credence goods"
- Falk, A.; Szech, N. (2016): "Pleasures of Skill and Moral Conduct" KIT working paper (non-monetary incentives and morals)
- Russell, B. (1960): Science, New Series, Vol. 131, No. 3398. (Feb. 12, 1960), pp. 391-392. Science 27 Jan 1961: Vol. 133, Issue 3448, pp. 255-262 DOI: 10.1126/science.133.3448.255
- Snow: „The Moral Un-Neutrality of Science. In: Science. 133 (3448), S. 255-262, DOI: 10.1126/science.133.3448.255, 1961.
- Della Vigna, Stefano; Malmendier, Ulrike (2006): „Paying Not to Go to the Gym". In: American Economic Review. 96 (3), S. 694-719, DOI: 10.1257/aer.96.3.694.
- Loewenstein, George (1999): „Because It Is There: The Challenge of Mountainee-

ring... for Utility Theory“. In: Kyklos. 52 (3), S. 313-343, DOI: 10.1111/1467-6435.00090.

- Ganguly, Ananda R.; Tasoff, Joshua (o. J.): Fantasy and Dread: An Experimental Test of Attentional Anticipatory Utility“. In: SSRN Electronic Journal., DOI: 10.2139/ssrn.2370983.

Index