



Are Social Preferences Reference Dependent?

*A study of reference dependent social preferences among
students at The Norwegian School of Economics*

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This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible – through the approval of this thesis – for the theories and methods used, or results and conclusions drawn in this work.

Preface

This thesis represents my final contribution to the program Master of Science in Economics and Business Administration which I have attended at the Norwegian School of Economics (NHH), majoring in Economics. The thesis presents and analyses an experiment designed and conducted by The Choice Lab at NHH. The Choice Lab is a group of researchers, mainly from the Department of Economics, and their aim is to “[learn] more about how people make economic and moral choices, and how governments, corporations and non-governmental institutions can use insights from this research to improve their decision making” (The Choice Lab, 2013).

The data used in this thesis was collected through three experiments conducted by the scholars Alexander W. Cappelen, Matthew Rabin, Erik Sørensen and Bertil Tungodden as a part of their research on social preferences and reference dependence among students at The Norwegian School of Economics in Bergen. I was working as a research assistant on the last experiment carried out in August 2012. I would like to thank the four researchers for allowing me to participate in their research and for using their data in my thesis.

I would especially like to thank my supervisor Alexander W. Cappelen, for his ideas, enthusiasm and helpful guidance, and the rest of The Choice Lab’s scholars and administrative staff for useful help. My gratitude also goes to my loved ones, and particularly my dear Sølve for being the best boyfriend one could ask for, motivating and encouraging me when I did not think I would make it, and for useful feedback and proofreading.

Abstract

This thesis explores whether social preferences are reference dependent. More specifically it examines whether reference points, defined by expectations, regarding income inequality affect our willingness to redistribute income (pro-social behavior). The theoretical background for this thesis is two important insights from behavioral economics. The first insight comes from the theory of loss aversion – that people evaluate outcomes relative to a reference point shaped by their expectations. The second insight comes from the theory of social preferences – that people not only care about their own welfare (income), but also about other people’s welfare, and hence fairness and equality. Combined, these two insights suggest that people’s expectations regarding income inequality, as well as deviations from these expectations, influence how they evaluate their own utility – in addition to own income and deviations from own expected income.

This thesis reports the results from an economic experiment designed to study the role of expectations in explaining redistributive behavior. The analysis is based on data from three separate lab-experiments conducted on the student body at The Norwegian School of Economics in the spring and early fall of 2012. Designed as a dictator game, the students were tested on how their willingness to redistribute income was affected by the implementation of different reference points through the use of treatments altering their expectations.

The main finding of this thesis is that when people expect inequality they give away almost 30 percent less than when they expect equality, *ceteris paribus*. This is a huge effect, and demonstrates the importance of reference dependence in explaining pro-social behavior. The result may also be important in explaining why e.g. Americans redistribute a smaller share of their income than do taxpayers in Scandinavian countries, and to an extent why many welfare states differ to the degree which they do.

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1. Introduction

Even though originally designed to maintain social hierarchies and insure against social risk, most welfare states today are also redistributive in that they want to reduce social inequalities by ‘taking from the rich and giving to the poor’ (Barr, 2004). However, willingness to redistribute income differs greatly among people and can in part explain why welfare states vary to the extent that they do. For example, in Norway, which has less income inequality than most other countries in the world, people’s willingness to redistribute income is relatively large compared to countries like the United States (CIA, 2013). Furthermore, *why* people’s preferences for redistribution differ have classically been given one out of two explanations: One popular explanation is that some people consider fortunes and misfortunes to be related to external factors, as being born into money or falling sick, thus making society more inclined to redistribute income as blame is hard to direct, while others consider it to primarily be due to internal forces, as being hard-working or lazy, thus making society less inclined to redistribute income as it is up to each and everyone to take care of themselves. Another explanation often given is that people’s willingness to redistribute income is said to differ simply because some people (say Americans) are more selfish than others (like Norwegians). In addition, Alesina and Giuliano (2010) have recently tied people’s preferences for redistribution to individual characteristics and history, differences in cultural background, political ideology, differences in religion, as well as histories of macroeconomic volatility.

However, what if there is another explanation, where people’s preferences for redistribution do not depend on country-specific differences, what determines income inequality, nor people’s selfishness, but instead depend on people’s reference point with respect to income inequality. That is, what if people’s social preferences, their willingness to redistribute income, depend on their expectations regarding income inequality in society. Returning to the comparison of welfare states, can it be that Norwegians redistribute more of their income because the level of inequality which they expect and believe is acceptable is lower than what people like Americans expect and perceive as acceptable?

In order to understand how expectations influence people’s willingness to redistribute income, implications from two theories in behavioral economics have been combined into one model: In classic economic theory the idea is that people only care about their own

income and deviations from expected income. However, it has been shown that people also have social preferences, and subsequent that other people's welfare affects their utility level too. So, imagine instead that people's utility function consists of their own income, deviations from expected income, inequality in society, and also deviations from expected inequality. In short, this means that if the level of inequality in society does not match people's expectations, they will have a decrease in utility. This could again motivate them to redistribute more of their income to avoid the gap between their expectations and the de facto inequality level.

Hence, the main aim of this thesis is to study whether expectations regarding income inequality have an effect on, and if so to what degree, people's willingness to redistribute income. More precise, it presents the research question "Are Social Preferences Referent Dependent?" and with that aims to demonstrate the importance of loss aversion and reference dependence in explaining pro-social behavior. By studying under which conditions people are more in favor of, and when they are more opposed to, redistribution of income, we may increase our understanding of why countries differ with respect to income inequality, and maybe why some welfare states have a harder time getting people to accept redistributions of income than others. Throughout this thesis, I will assume that people share a desire for social justice or fairness, that social preferences for a reduction of income inequality induced by luck exist. Specifically, the assumption implies that even though not everyone share the same preferences for redistribution, most people can agree on, and do wish to prevent, inequality caused by factors beyond anyone's control (like falling ill, receiving a dependent child, or losing one's home due to bad weather).

With the aim of answering the research question, a lab-experiment was conducted on the student body at The Norwegian School of Economics. The experiment was designed as a dictator game and with the use of randomization and different treatments, the participants' expectations with regards to inequality were altered and their pro-social behavior subsequently measured. The inspiration for writing this thesis, and the foundation which it builds upon, is Köszegi and Rabin's (2006) paper *A model of Reference-Dependent Preferences*, as the researchers wanted to run a study on whether social preferences are reference dependent.

The main finding of this thesis is that when people expect inequality they redistribute almost 30 percent less than when they expect equality, *ceteris paribus*. Thus, the answer to the

research question of whether social preferences are reference dependent is “yes, they are”. The fact that people give away that much less when they expect inequality compared to when they expect equality demonstrates the importance of taking reference dependence into account when explaining pro-social behavior. The result is also important with respect to why some countries find it harder to redistribute income than others, and thus why welfare states differ to the degree which they do.

The remainder of this thesis is organized as follows: Chapter 2 contains a literature overview of both social preferences and loss aversion, while it ends with an introduction of reference dependent social preferences. Chapter 3 discusses experimental economics and its shortcomings, while chapter 4 presents the research design by describing the experiment. Next, chapter 5 motivates the empirical strategy. Chapter 6 presents the results and analysis, and to round it all up, chapter 7 summarizes and discusses the implications of the findings in addition to the results’ validity. As the experimental analysis in chapter 6 is relatively straightforward, I have chosen to discuss the theory behind these findings at length in chapter 2.

2. Theory

In the following section the theoretical background for social preferences and loss aversion, i.e. limited rationality through reference dependence, are outlined. Combined, they are the foundation on which the theory of reference dependent social preferences is built upon. This section serves as a backdrop for the empirical section and a point of departure for discussion and analysis throughout the thesis.

2.1 Social Preferences

In countless papers and under countless treatments it has been shown that people, in addition to own income and own welfare, also care about other people's income and welfare. Many influential economists such as Adam Smith, Kenneth Arrow and Paul Samuelson to name a few support this view and recognize that this may affect the way people go about making important economic decisions (Fehr & Schmidt, 2000). Still, most economists appear reluctant to give up the self-interest hypothesis which argues that homo economicus is, first and foremost, completely rational and narrowly self-interested, and with that that people only care about maximizing own income or own profits. Fehr and Schmidt (2000) point to two likely explanations to why this is so: First, the self-interest hypothesis has successfully predicted the outcome in many economic domains, e.g. in competitive markets with standardized goods. Second, there is a strong conviction in economics of not to change preferences in order to explain new observations as "everything" can be explained using the "correct" preferences. However, in recent experiments using modern tools of observation, researchers have shown that in environments where the assumptions for perfectly competitive markets are not in place, the self-interest hypothesis makes misleading predictions, and that changing the assumptions regarding people's preferences can be done without unleashing the wrath of the "everything goes"-mindset due to new and sophisticated experimental techniques (Fehr & Schmidt, 2000).

2.1.1 Evidence of social preferences –the dictator game

The strong commitment to the self-interested hypothesis started to weaken during the 1980s when experimental economists really began to study bilateral bargaining games in small groups in laboratory settings. One of those games was the dictator game (Fehr & Schmidt,

2000). What controlled experiments like the dictator game do, is that they give researchers complete control over the subjects' surroundings, and thus reduce the number of incentives influencing the subjects while making economic decisions. Thus, they are almost a perfect arena to test people's social preferences as they introduce complete anonymity and exclude other forms of incentives from the decision making (Cappelen & Tungodden, 2012). This stands in great contrast to data collected through observations in the real world, where it is indeed almost impossible to account for everything impacting people's decision making. For example, if someone was observed being given money and then told that they could either keep everything for themselves or choose to share it with a stranger, the "subjects" might choose to share just to avoid being seen as greedy or in fear of retaliation of some kind.

Daniel Kahneman, along with his co-authors, was the first to apply the dictator game in experimental economics, where the dictator in complete anonymity is the sole decision maker, determining the allocation of some endowment (or earned entitlement) between himself and his passive recipient, who typically only gets informed about the dictator's choice. The game was designed in order to try to refute the self-interest hypothesis; that when given the opportunity, dictators will choose to maximize own income and not allocate any positive amount to the recipient (Engel, 2011). Thus, the prime dependent variable is the mean fraction of the pie that dictators give to the recipients per treatment (Engel, 2011). For the self-interest hypothesis to hold, this has to be zero. However, already in the first experiment the hypothesis was proven wrong, and it has yet to be refuted – Engel (2010) presents in his meta-study on dictator games that on average, 63.89% of all the dictators choose to give a positive amount to their recipients. On the other hand, this also means that 36.11% did not. In addition, the distribution of means is left skewed, i.e. dictators are more likely to give less than 50% than more than 50%. Taking a closer look, Engel (2010), using his reconstructed dataset, finds that 36.11% of all dictators give nothing to the recipient, 16.74% choose to divide the money equally while 5.44% give away *everything* to the recipient, so that on average they end up giving away 28.3% of the pie. Summing up, it is clear that many people are in fact also utterly selfish, and that the evidence from dictator games should be read as an exploration into human heterogeneity more than as a theory of "one behavior fits all".

There would have been no need for researchers worldwide to conduct 129 experiments on dictator games if the only hypothesis they wanted to test was whether dictators allocate positive amounts to their respectful recipients (Engel, 2011). Instead, experiments have been

designed to test how treatments, i.e. the manipulation of factors in the game, affect the dictators' generosity. For example, if experiments are designed to increase social control by letting the recipient know who the dictator is, the dictators become both less likely to give nothing and less likely to give more than half the pie. However, when social control is reduced compared to the standard design of the game, and the dictators are given a chance to hide their decisions, they reduce their generosity (Engel, 2011).

2.1.2 A model of social preferences

Fong (2001) presents several alternatives as to where people's motivation to redistribute income comes from. For example, it may stem from pure self interest, where the healthy work hard and by redistribution of income create social insurance programs to benefit the less healthy, which also the redistributors may be in need of one day, or it may come from a desire to prevent crimes and other forms of social unrests from occurring. On the other hand, the motivation may also come from feelings of reciprocity and altruism towards other people (Fong, 2001). Classically, theories of social preferences are based upon people's attitudes towards fairness and equality, where a desire for fairness is said to be embedded in people's individual preferences. The notion of fairness is often invoked in people's personal interaction with others, both in private as well as professional settings. More importantly, they also shape the behavior of people in essential economic domains (Fehr & Schmidt, 2000). For example, the general work moral of employees is often affected by a perceived fairness of firm policy, feelings toward the appropriate income tax schedule are strongly affected by notions of merit and fairness, and the erosion of public support for the welfare state in the United States during the last two decades can be related to strong notions of reciprocal fairness –the poor should only receive public help if they bear their share of society's obligations (Fehr & Schmidt, 2000).

Furthermore, Fong (2001) argues in her paper *Social Preferences, Self-Interest, and the Demand for Redistribution* that income is a poor predictor of redistributive beliefs, and that rather beliefs about effort, luck and opportunity in life decides people's preferences for redistribution. She also finds that the beliefs about self and exogenous determination, which may be consistent with beliefs about fairness, are strong predictors of support for redistribution. That is, the more responsibility people place on exogenous factors for things happening in their lives, the more they are willing to redistribute of their income. This can also be linked to people's perceived prospect of social mobility related to occupation, as

social mobility is an exogenous factor, where inhabitants of countries with greater opportunities to climb the social ladder, say the United States, typically favor less redistribution than those living in say European countries with less social mobility (Alesina & Giuliano, 2010). Both these observations echoes the view presented in the introduction, that willingness to redistribute income may be influenced by whether people place their fortunes and misfortunes on internal or external factors. It is evident that people who place the blame for their misfortune on external factors perceive it as fair that other people should collectively, through redistribution, pay to correct them. This is especially true if they contribute to the redistribution through some form of taxation themselves.

However, why do people in lab settings, who are only to a certain extent subject to the learning process that usually takes place in repeated games (people learn, or more specifically decide, how to behave by considering the responses of the people they do the trade with), give away money when no one is watching and nobody expects them to? There are two main approaches which try to explain why this is so: The first approach assumes complete rationality and that at least some agents have social preferences, i.e. that their utility function not only depend on their own material payoff, but also on how much the other players receive. The second approach assumes that the players care about the intentions of their opponents, i.e. they mirror the behavior of their opponents and are nice if they play nice and selfish if they play selfish. In this thesis, we will only look at the first approach.

Models of Fairness and Reciprocity

Models of social preferences assume that the dictator, the one who decides who gets what in a game, also cares about how much material resources are allocated to the recipient. This stands in great contrast to classic utility theory where the dictator has preferences over allocations of material outcomes and where these preferences satisfy rationality requirements such as completeness and transitivity, i.e. that the dictator only cares about the aspect of him getting the material resources (Fehr & Schmidt, 2000). To illustrate, let $\{1,2,\dots,N\}$ denote a set of individuals and let $x = x_1, \dots, x_N$ denote an allocation of physical resources out of some set X of feasible allocations where x_i denotes the material resources allocated to person i . With this, the self-interest hypothesis states that the utility of individual i depends on x_i only, while the individual is said to have social preferences if for any given x_i individual i 's utility is affected by variations of $x_j, j \neq i$ (Fehr & Schmidt, 2000). Following,

there will be a short presentation of some of the models in social preferences, where each assumes that the preferences of an individual depend on $x_j, j \neq i$, in a different way.

Altruism has been used to explain phenomena such as charitable donations and is found in people whose utility increases with the well being of others, i.e. when the first partial derivatives of $u(x_1, \dots, x_N)$ with respect to x_1, \dots, x_N are strictly positive (Fehr & Schmidt, 2000). A simple way to elicit altruistic preferences is to set up the dictator game. Let one agent allocate tokens between himself and another agent for a series of different budgets, and then let the tokens be exchanged into money at different rates for the two agents and the different budgets. The result, which also show that almost all of the subjects behaved consistently and rationally by checking for violations of the general axiom of revealed preferences, is striking; approximately 30 percent of the subjects give away tokens in a manner that equalizes the monetary payoff between the players, 20 percent of the subjects appear to maximize the weighted sum of monetary payoffs and 50 percent of the subjects hardly give away anything at all (Fehr & Schmidt, 2000). Additionally, it has also been shown that while the dictator cares about the well being of the recipient, he does so to a lesser extent the better off he is. In short, altruism does indeed exist and have been shown to be consistent with rational behavior, even though not everyone possesses the trait. However, it fails to explain observed behavior such as retaliation and the fact that subjects often hurt other subjects at great cost to themselves (typically to get even if they feel cheated by somebody who broke with consensus) in other bargaining games (Fehr & Schmidt, 2000).

An alternative theory called the *Relative Income Hypothesis* argues that people are not only concerned about the absolute amount of money which they receive, but also about how their payment performs compared to others (Fehr & Schmidt, 2000). The idea has been formalized through the use of an experimental bargaining game with two players, where the assumption is that $U_i(x_i, x_j) = u_i(x_i, \frac{x_i}{x_j})$ where $u(\cdot)$ is strictly increasing in its first argument and where the partial derivative with respect to $\frac{x_i}{x_j}$ is strictly positive for $x_i < x_j$ and equal to zero for $x_i \geq x_j$ (Fehr & Schmidt, 2000). In words, subject i suffers if she gets less than subject j , but does not care about the other subject if she becomes better off herself. The utility function implies that $\partial U_i / \partial x_j \leq 0$, which says that a positive change in the welfare of subject j reduces subject i 's welfare, which in fact is the opposite of altruism. This theory, even though found to be consistent with observed behavior in this game, fails to

explain behavior such as giving in other games like the dictator game (Fehr & Schmidt, 2000).

Both hypotheses discussed above assume that the subject's utility function should either be monotonically increasing or decreasing in the welfare of other subjects. However, a different approach called *Inequity Aversion* assumes that a subject is altruistic towards other subjects if their material payoffs are below an equitable benchmark, typically an equal monetary payoff for all subjects, and that they feel envy when the material payoffs of the other subjects exceed this level (Fehr & Schmidt, 2000). What is more, the theory predicts that the disutility from an unequal distribution for subject i is larger if another subject is better off than she is, than if another subject is worse off compared to her – people dislike seeing others outperform them more than they dislike outperforming others. Furthermore, this theory assumes that individuals are heterogeneous, and that the results sometimes will reflect cooperation (even though it is a dominant strategy for a selfish person not to do so) and other times reflect a complete lack of fairness considerations among the subjects –that both very unequal outcomes as well as very egalitarian outcomes are “normal” (Fehr & Schmidt, 2000). In other words, this theory is consistent with the observed fact that both positive and negative actions can be directed towards other subjects, and that we can expect both giving in dictator games as well as people placing costly punishments on free riders and rule breakers in other games.

Lastly, an explanation as to why we observe giving in some games and punishments in other games by the same person is given in a hypothesis called *Altruism and Spitefulness* that distinguishes between people who are either purely altruistic or purely spiteful, and people who are altruistic in one setting and spiteful in others (Fehr & Schmidt, 2000). For example, an altruistic player would feel more altruistic towards another altruist than towards a spiteful person, and thus act accordingly. In most games, the interaction among subjects is anonymous, which means that the decider does not know what kind of player the other subject is and thus have to form beliefs about him through repeated signaling in sequential games until he reaches his optimal strategy. Even though this hypothesis fits the data of many games, it also fails to explain positive giving in games like the dictator game (Fehr & Schmidt, 2000).

Criticism

When dictators are observed giving in bargaining games, their generosity should not automatically be interpreted as them solely being intrinsically morally motivated, i.e. that their motivation comes from within themselves. In recent literature there has been a concern that people in dictator games are additionally influenced by the fact that they are being observed by an anonymous recipient, i.e. extrinsically morally motivated, altering the behavior measured in economic experiments (Cappelen, Halvorsen, Sørensen, & Tungodden, 2013). Thus subjects in dictator games may be compelled to share in situations they otherwise would not, being extrinsically morally motivated by everything from guilt and shame to social esteem and pride. Consequently, it is important that this effect is measured and accounted for on its own. It is also important to note that behavior observed inside lab-experiments not necessarily comply with behavior observed outside the lab-setting (Cappelen, Halvorsen, Sørensen, & Tungodden, 2013). In the paper *Face-saving or fair-minded: What motivates moral behavior* (2013) the researchers find that intrinsically morally motivated subjects only share if there is a moral argument for sharing, say that the recipient is a less wealthy person living in an underdeveloped country, even if there is extrinsic social motivation to do so.

2.2 Loss Aversion and Reference Dependence

Loss aversion is an important psychological concept which has received ever increased attention in economic analysis after first appearing as one of the anomalies of prospect theory in Kahneman and Tversky's paper from 1979 (Schmidt & Zank, 2005). One of the main reasons as to why it has become so popular is that it can explain phenomena otherwise left as paradoxes in traditional choice theory, phenomena such as the endowment effect, the equity premium puzzle and the status quo bias (Schmidt & Zank, 2005).

According to its inventors, a person is loss averse "if he or she dislikes symmetric 50-50 bets and, moreover, the aversiveness to such bets increases with the absolute size of the stakes" (Schmidt & Zank, 2005, s. 153). Put more simply, people are loss averse if they dislike losses relative to a reference point more than they like the same sized gains. This is a behavioral concept defined in terms of preferences, and thus model independent. In other words, it is not restricted to Kahneman and Tversky's original framework.

In the subsequent section the underlying theory of reference dependent preferences and loss aversion, namely prospect theory, will be presented, along with evidence and a model of reference dependent preferences. Lastly, the two theories of social preferences and reference dependence will be merged into one model.

2.2.1 Prospect Theory –A Preface

When faced with risky choices, most people do not seem to consider the outcomes as final states of welfare, as stated in the classic expected utility theory, but rather as gains and losses relative to a reference point. The reference point is usually defined as a current asset state or an induced expectation (Kahneman & Tversky, 1979). For example, who would be considered to be the person with the best outcome among a silver- and bronze medalist? Obviously, the silver medalist performed better, but she also just lost out on the gold medal, keyword being lost, while the bronze medalist's counterfactual outcome was not to make it onto the medal stand at all, and in that sense "won" by beating the person receiving fourth place. Thus, since people are more sensitive to losses than to same-sized gains, the bronze medalist could easily end up as the happiest person on the stand (perhaps apart from the gold medalist). This theory, presented by Kahnman and Tversky (1979), is called prospect theory, and differed from existing theory at the time in that it was change that was seen as the carrier of value, and not final states of outcome. What is more, the theory was in line with accepted principles of perception, "that our perceptual apparatus is attuned to the evaluation of changes or differences rather than the evaluation of absolute magnitudes" (Kahneman & Tversky, 1979, s. 277). For example, when responding to sensory changes like volume and temperature, it is not the absolute magnitude or degree of the respective sound or coldness that people respond to, but to the reference point in the given context which they have become accustomed to (Kahneman & Tversky, 1979). Prospect theory also inhibits several anomalies, the most important being loss aversion and diminishing sensitivity, but it also captures the effect of the probability weighting function and the overweighting of small probabilities.

Furthermore, Kahneman and Tversky (1979) emphasized that although the carriers of value was seen as changes, the induced value from change was not independent from the initial position. Value should thus be treated as a function in two arguments, namely the reference point and the magnitude of the change (positive or negative) from this reference point (Kahneman & Tversky, 1979). How the value function was shaped, they said, was a result of

the fact that many sensory and perceptual dimensions share the property that psychological response is a concave function of the magnitude of physical change. This is the anomaly of diminishing sensitivity, that “people’s sensitivity to further changes in an outcome is smaller for outcome levels that are further away from the reference point” (Köszegi, 2010). Kahneman and Tversky (1979) proposed that the same had to apply to the evaluation of monetary changes; the difference in value between getting \$0 and \$50 appears to be greater than the difference in value between getting \$1000 and \$1050. The same goes for losses. Applying their theory on the traditional utility function, they hypothesized that the value function of changes in wealth would be concave above the reference point and convex below it as a result of diminishing sensitivity – that the marginal value of both gains and losses decreases with their magnitude, independent of whether the choice was made in a risky or riskless position. What is more important, they noted that as a result of loss aversion, the value function for losses would appear steeper than the value function for gains, as the attitude towards change seemed to be that losses aggravated people more than subsequent gains, see Figure 2.1.

2.2.2 Evidence of Reference Dependent Preferences

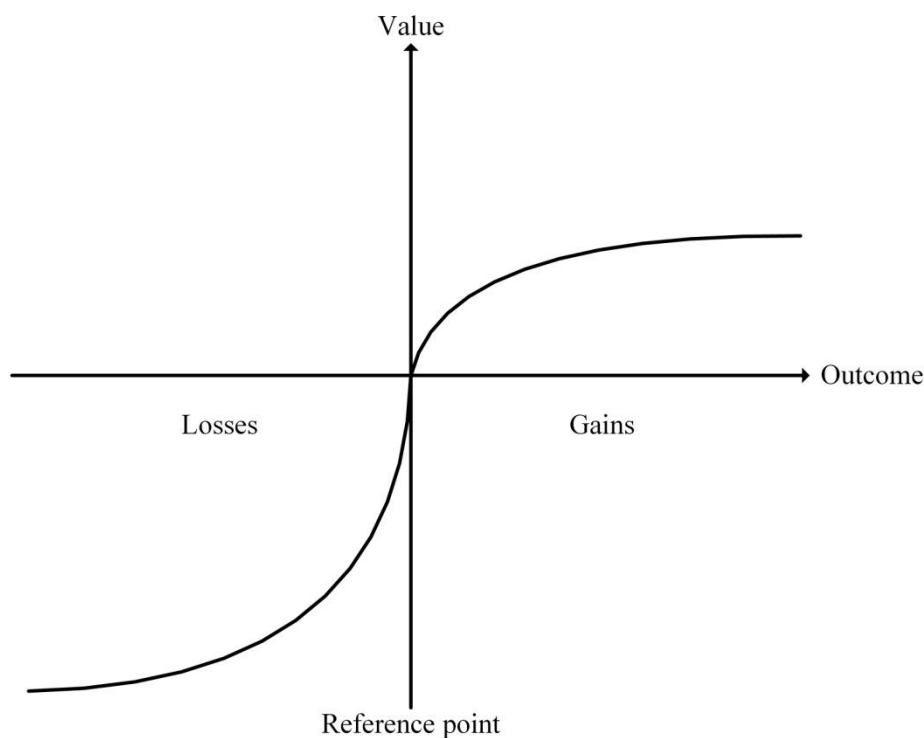
Building upon the theoretical framework of prospect theory, Daniel Kahneman and his co-authors published several papers on loss aversion in both risky and riskless choice. These will be the basis for the further discussion.

After thorough research, it is safe to say that in most people’s limited rationality lie reference dependent preferences; that we do not value an outcome in absolute, but in reference to previous experiences, status quo or expectations regarding the future. Loss aversion, as of that, is by definition a manifestation of reference dependent preferences –we simply prefer avoiding losses relative to our reference point to increasing gains. When studying risky choices Kahneman, Knetch, and Thaler (1991) find, as Kahneman and Tversky (1979) did before them, that “the significant carriers of utility are not states of wealth or welfare, but changes relative to a neutral reference point” (Kahneman, Knetsch, & Thaler, 1991, s. 199). That is, people are not merely happy because they ate waffles for breakfast this morning, but because they got to eat waffles *instead* of cereal –if they expected their breakfast to be waffles every day, the same sense of increased utility would not arise. They also find that outcomes below the reference state appear larger than corresponding outcomes above the

reference state, echoing the evidence of loss aversion found in prospect theory (Kahnman & Tversky, 1991).

When studying choices under risk, the typical value function, how we evaluate an outcome of risky prospects across different dimensions, is defined by three sets of characteristics; reference dependence – the carriers of value are gains and losses defined relative to a reference point, loss aversion – the function is steeper in the negative domain than in the positive domain (kink at zero), and diminishing sensitivity – the marginal value of both gains and losses decreases with their size (concavity in gains and convexity in losses) (Kahnman & Tversky, 1991). Combined, these properties produce an S-shaped value function concave above the reference point and convex below it. Looking at Figure 2.1 below, where the outcome c is being evaluated relative to its reference point r according to the value function $v(c - r)$, all of the characteristics can be identified (Köszegi, 2010).

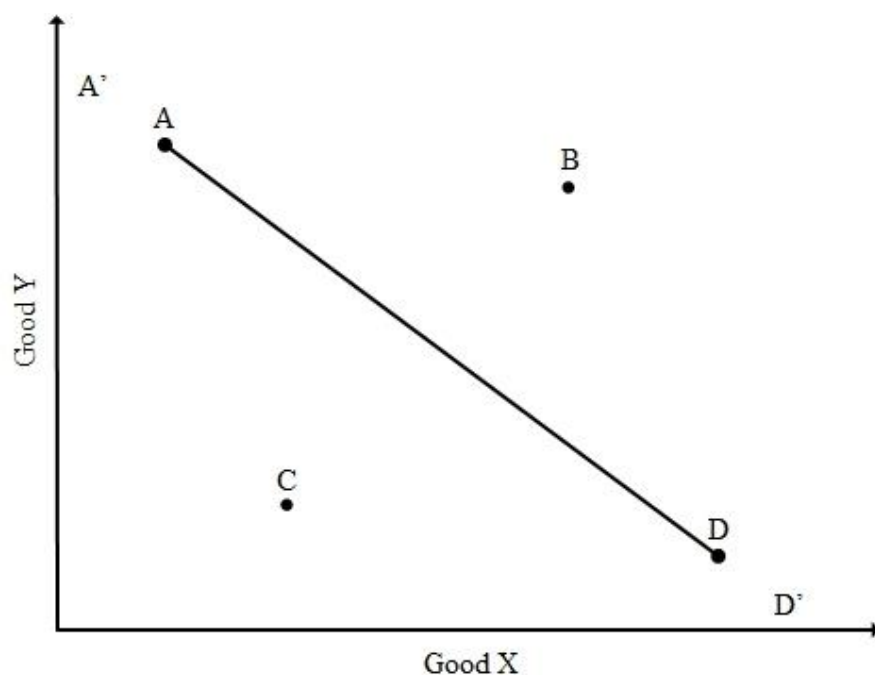
Figure 2.1: A Model of Loss Aversion



When applied in riskless choice, loss aversion can be described as evaluations of gains and losses, made in trade and other transactions, relative to a neutral reference point (Kahneman, Knetsch, & Thaler, 1991). Imagine, for example, that people have to make a choice between state A, where they will have more of good Y and less of good X, and state D, where they

will have more of good X and less of good Y, as illustrated in Figure 2.2. With several reference points, they face a positive choice between two gains if the reference point is C (both A and D is better), a negative choice between two losses if their reference point is B (both A and D is inferior), and a choice between two indifferent exchanges if the reference points are A or D, respectively (Kahneman, Knetsch, & Thaler, 1991). This implies that, “in general, a given difference between two options will have a greater impact if it is viewed as a difference between two disadvantages than if it is viewed as a difference between two advantages” (Kahneman, Knetsch, & Thaler, 1991, s. 200).

Figure 2.2: An Example of Loss Aversion in Riskless Choice



Immediate consequences of loss aversion in riskless choice include phenomena such as the endowment effect, the status quo bias, improvements vs. tradeoffs, as well as advantages and disadvantages, all of which represent psychological barriers to trade and thus deserve a short discussion (Kahnman & Tversky, 1991). The endowment effect captures the inconsistency that an object’s value appears to change the instance an individual is given the property rights over it – the loss of utility associated with giving up the good suddenly becomes greater than the gain associated with receiving it (Kahnman & Tversky, 1991). It appears that it is not so much an unanticipated increase in the pleasure of owning the object, as it is an aversion to be parted with the endowment that leads to the increase in perceived value, and thus reluctance to trade it.

The status quo bias is defined as the irrational preference for current state of affairs, or the status quo, over other options (Kahnman & Tversky, 1991). Loss aversion seems to make people automatically favor an endowment more just because they are already in possession of it, and thus less likely to trade it away. Examples of the status quo bias can be found in brand loyalty, aversions to changes in medical plans, jobs, automobile colors, financial investments, and policy issues, to name a few (Kahnman & Tversky, 1991). Still, it is important to note that factors like transaction costs and psychological commitments to prior choices can induce a status quo bias even in the absence of loss aversion (Kahnman & Tversky, 1991).

The phenomena of improvements vs. tradeoffs refers to the shown preference for improving on what you already got vs. trading off what you got for something else (Kahnman & Tversky, 1991). Loss aversion imply that people are averse in giving up their reference gift, or endowed objects, and with that prefer to get more of similar objects than more of something totally different. For example, if someone were given a free dinner at a restaurant whilst someone else got a gift certificate to a store valued at the same price, people would be more likely to want a free dinner for themselves and a friend if they got the chance to trade up, than a gift certificate from the store when they had already been given the restaurant dinner. It seems as though people place an increased value on objects received and accepted compared to equally valuable objects that are not in their possession (Kahnman & Tversky, 1991).

Lastly, advantages and disadvantages in loss aversion represent the attribute that greater weight will be given to the same difference between two options if it is viewed as a difference between two disadvantages than is it is viewed as a difference between two advantages (Kahnman & Tversky, 1991). In other words, this refers to the extra weight people place on losses when deciding between two options –if an object has a positive as well as a negative side to it, most people will let the negative effects, even though they are of the same size as the positive effects, be the decider in whether to keep the object vs. throw the object, buy the object vs. not buy the object, etc.

Criticism

However, not all current research supports the view that loss aversion exists to the extent presented above. Kahneman and Novemsky (2005) for example, study the boundaries of loss aversion in both risky and riskless choice and focus especially on the non-existing

endowment effect found in transactions taking place in the marketplace, i.e. that loss aversion typically do not exists in routine transactions. The key results are presented as three propositions, each derived from Kahneman and Novemsky's data or previous research on the topic.

The first proposition states that "The value attached to a consumption good given up in an exchange reflects loss aversion" (Kahneman & Novemsky, 2005, s. 123). In short, this translates into the much discussed reluctance to exchange one good for another as people place a higher value on endowed objects than they do on objects that are not in their possession. However, it is not difficult to think of circumstances under which this proposition would fail; if the object given up is almost identical to the object obtained, it is very unlikely that people will experience any sense of loss aversion. In general, when all the benefits of the good given up are present in the acquired good, this proposition does not hold.

The second proposition states that "Goods that are exchanged as intended are not evaluated as losses" (Kahneman & Novemsky, 2005, s. 124). Here, "as intended" is key; for a merchant this would typically entail giving goods up in exchange for money, and thus not result in any sense of loss aversion, while for a private owner receiving a good would typically mean keeping it for own usage and thus lead to an experience of loss aversion if forced to be parted with it. Previously accepted theory on the other hand, have argued that loss aversion would apply to any loss from status quo, including money spent in routine purchases. These opposing views arose most likely from the way the experiments were conducted, and further research is necessary to settle the dispute.

The third and last proposition states that "There is no risk aversion beyond loss aversion in balanced risks" (Kahneman & Novemsky, 2005, s. 125). In other words, by extending prospect theory to riskless choice, loss aversion can provide a complete account of risk aversion for risks with equal probabilities to win or lose if two conditions hold. First, income effects, which differ in risky and riskless choices, must be negligible. That is, the good in question cannot have such a great value that it significantly changes people's future consumption if sold. Second, the evaluation of the good given up and the money received must be separate, i.e. one should not expect a good to be replaced if sold. It is apparent that both of these conditions can easily be violated.

Combined, these three propositions represent limits to loss aversion, and the extent to which it can be applied.

2.2.3 A Model of Reference Dependent Preferences

An extended and more generally applicable model of reference dependent preferences and loss aversion was developed by Köszegi and Rabin (2006), where they propose that people's utility consist of a gain-loss utility in addition to the usual consumption utility found in standard economic theory, and that the reference point is determined endogenously by the economic environment and defined as rational expectations held in the recent past about outcomes. According to the authors, how a person assesses the outcome of a choice is often determined as much by its contrast to a reference point, i.e. expectations, as by the intrinsic taste for the outcome itself (Köszegi & Rabin, 2006).

Reference Dependent Utility

In their paper *A Model of Reference-Dependent Preferences*, Köszegi & Rabin (2006) present a basic utility-framework of a consumer who's utility not only consist of the classical K-dimensional consumption bundle c , but also a reference bundle r . A utility function is thus given by $U(F|r) = \int u(c|r)dF(c)$ when c is drawn according to the probability measure F (Köszegi & Rabin, 2006). It is also necessary to allow for the reference point itself be stochastic as they assume that the reference point is beliefs about outcomes; if G is a probability measure over a person's reference point, and consumption is still defined as the probability measure F , a person's utility is given by $U(F|G) = \iint u(c|r)dG(r) dF(c)$, where the utility of each outcome in F is the average of how it feels relative to each possible realization of the reference point (Köszegi & Rabin, 2006). In words, whether a person feels he has endured a gain or a loss from a given consumption outcome is determined by comparing the consumption outcome with all the possible outcomes under the reference gamble.

Declaring that a person's utility depends on a reference gamble in addition to the actual outcome is similar to what has been presented in many previous theories. However, while accepting that preferences are reference dependent, Köszegi and Rabin (2006) also propose that gains and losses are not all that people care about. Indeed, people care about the increased sum of money gains and avoided losses comes with and the effect it has on their utility, but according to the researchers, they also care about the absolute pleasure an

outcome, e.g. consumption, represents. Thus, in contrast to how the value function previously had been defined, Köszegi and Rabin (2006) make explicit the way that preferences also depend on absolute levels. This is illustrated in the function of overall utility, which is given by $u(c|r) \equiv m(c) + n(c|r)$, where $m(c)$ is the classic consumption utility studied in economics, while $n(c|r)$ is referred to as the gain-loss utility and can be either positive or negative depending on people's reference point. Both utilities are also separable across dimensions, i.e. $m(c) \equiv \sum_k m_k(c_k)$ and $n(c|r) \equiv \sum_k n_k(c_k|r_k)$ and each $u_k(\cdot)$ differentiable and strictly increasing. In words, when evaluating an outcome, people will assess the gain-loss utility in each dimension separately. What is more, Köszegi and Rabin (2006) suggest that there is a strong relationship between the two utility measures: The model assumes that how a person feels about gaining or losing in a dimension depends in an universal way on the changes in consumption utility associated with such gains or losses, $n_k(c_k|r_k) = \mu(m_k(c_k) - m_k(r_k))$, where μ is a universal gain-loss function (Köszegi & Rabin, 2006)¹.

The Reference Point

In addition to proposing that people's preferences depend on both an absolute utility level as well as a gain-loss utility dependent on people's reference points, Köszegi and Rabin (2006) also propose that the same reference points are people's probabilistic beliefs held in the recent past about outcomes, i.e. recent expectations. This contrasts the existing belief that reference points are either equated with the status quo, other people's outcomes, or goals and aspirations. The reason, according to Köszegi and Rabin (2006), that the prevailing belief had been the accepted assumption was that almost all of the evidence had come from experiments where subjects reasonably expected their circumstances to remain approximately the same, so that the presence of expectations had been difficult to account

¹ It also assumes that μ satisfies the following properties,

A0. $\mu(x)$ is continuous for all x , twice differentiable for $x \neq 0$ and $\mu(0) = 0$.

A1. $\mu(x)$ is strictly increasing, meaning more is always better.

A2. If $y > x > 0$, then $\mu(y) + \mu(-y) < \mu(x) + \mu(-x)$, which represents loss aversion for large stakes.

A3. $\mu''(x) \leq 0$ for $x > 0$ and $\mu''(x) \geq 0$ for $x < 0$, which says that more is always better, but only marginally better.

It also captures another important feature of gain-loss utility, namely diminishing sensitivity; that people are more sensitive to changes near their reference point than changes remote from their reference point.

A4. $(\mu_{-}^{-\lambda}(0))/(\mu_{-}^{+\lambda}(0)) = \gamma > 1$, where $\mu_{-}^{+\lambda}(0) \equiv \lim_{\tau \rightarrow 0} \frac{\tau}{\tau + \lambda} \mu'(\tau)$ and $\mu_{-}^{-\lambda}(0) \equiv \lim_{\tau \rightarrow 0} \frac{\tau}{\tau - \lambda} \mu'(-\tau)$, which represents loss aversion for small stakes.

for – problems would thus arise when expectations and the status quo differed, as they often do in the economic environment. An example of this confusion is the commonly discussed phenomena of employees’ aversion to wage cuts in economics. Here, a decrease in salary is not a reduction in the status quo level of wealth, but rather a reduction in the expected rate of increase in wealth – employees expected a certain positive increase and got a reduced positive increase instead (Kőszegi & Rabin, 2006). What's more, the status quo theory also fails when being applied to economic activities which involve fleeting consumption opportunities and no ownership of physical assets – if a person who is about to travel expects to take a vaccine and then later finds out that it is not necessary after all, she may feel a sense of gain. However, there is no meaningful way in which her status quo endowment of vaccines would differ from somebody who never expected the vaccine, thus irrespective of expectations, a status quo theory would always predict the same gain-loss utility of zero from this experience.

By substituting expectations with the status quo, Kőszegi and Rabin (2006) states that better predictions of people’s outcome (utility) can be made. For example, the theory predicts, in line with common view, that the endowment effect found in experiments is caused by loss aversion, as the owners’ loss of the object looms larger than non-owners’ gain of the object. In addition, Kőszegi & Rabin (2006) take into account the less common prediction, first presented by Kahneman and Tversky (1991), that if assuming that people’s expectations about the environment are rational and that they have some ability to predict their own reaction to this environment, the endowment effect found among owners and non-owners with no predisposition to trade will vanish among sellers and buyers in real-world markets where people expect to trade.

By transforming consumption utility into a reference-dependent utility, and defining the reference point as being endogenously determined as rational expectations about recent outcomes, this theory acts as an algorithm for translating a classic reference-independent model into a reference-dependent one (Kőszegi & Rabin, 2006). Following are some of the implications this framework can have for consumer and labor-supply decisions: In intertemporal choice, expectations-based preferences can generate behavior that can be mistaken for present-biased preferences, as surprising oneself with immediate consumption tends to be more pleasurable than unsurprising planned future consumption. In principal-agent models, performance-contingent pay may not only directly motivate the agent to work harder in pursuit of higher income, but also indirectly motivate him by changing his

expected income and effort. Lastly, to take an early stand in bargaining may not only be done to influence the opponent's beliefs about achievable outcomes, but also to influence the opponent's preferences over outcomes through this change in beliefs.

2.3 Reference Dependent Social Preferences

The purpose of this thesis is to combine two implications given by the theories above – the theory of social preferences, where it is shown that people not only care about themselves, but also about equality and what is perceived as fair, and the theory of loss aversion and in that loss aversion towards inequality and subsequent that preferences are reference dependent – into one new theory. In short, I wanted to study whether social preferences are reference dependent. Following is a description of this model.

2.3.1 Predictions

How people choose to redistribute their income may depend on their reference point with respect to the level of income inequality in society. However, for this to be true, people need to be loss averse in their expectations – if the reference point is shaped by expectations, then people will strive to comply with these expectations. In societies where people expect a certain degree of social inequality, the model predicts that the same people may choose to redistribute *less* of their income compared to more equal societies, as the discomfort tied to inequality is somewhat smaller when it is expected. The same logic applies to societies with little inequality, but here the model predicts that people will choose to redistribute *more* of their income because of the presence of equality – they expect there to be little inequality and thus want to contribute to the fulfillment of that expectation as an increase in the level of inequality would be relatively unpleasant.

In the experiment, the dictators' behavior, or redistributive preferences, were observed as they held three sets of different expectations: In the first treatment T1, the possible outcomes were (100,100), (100,100) or 200 to be distributed by the dictator, then in the second treatment T2 the possible outcomes were (190,190), (10,10) and 200 to be distributed by the dictator, finally in the third treatment T3, the possible outcomes were (190,10), (10,190) and 200 to be distributed by the dictator. All the treatments had the same probability distribution. Consequently, the dictator expected fixed equality in T1, i.e. he expected a non-risky outcome for both himself and his recipient. However, in T2 the dictator expected risky

equality, i.e. he expected that he himself and his recipient would either be granted a relatively large sum or a relatively small sum. While, in T3, he knew that he should expect risky inequality, that the pair of them would receive alternating outcomes and that only one of them would receive the biggest outcome. Subsequently, the dictator was studied as he chose how to distribute his 200 NOK in each treatment. Keep in mind that he also knew that they both had worked and completed the same production task and with that, earned the same entitlements.

2.3.2 Model

As summarized above, we assume that people care about own income, income inequality, deviations from own expected income and with it deviations from expected income inequality. With this, depending on their preferences, people will consciously or unconsciously maximize their utility. The theory behind the concept of utility and the following utility function is assumed to be known in this thesis. Here, utility is increasing in income, but depending on people's preferences, decreasing if the level of actual inequality exceeds what is expected. An optimal allocation will thus depend on the weight each person place on the four factors included in their utility function. The more a person cares about own income, and possible deviations from expected own income, the more he will allocate to himself. On the other hand, if he cares more about inequality, and expects there to be little inequality between himself and the recipient, he will allocate more to his recipient.

The model in this thesis is built upon a very simple utility function, where the theories of loss aversion and social preferences gradually are combined into one theory. When modeling social preferences in a dictator game, where the money to be distributed is an endowment, the classic assumption made is that people are motivated by both a desire for income as well as a fairness ideal – what they perceive as a fair distribution (Bolton & Ockenfels, 2000):

$$U_i(y_i, m_i) = \alpha_i y_i - \beta_i v_i(y_i - m_i)$$

where y_i is player i 's income, α_i is the weight he puts on his own income, m_i the sum of money he believes he should receive (thus implicit what he should redistribute) and β_i the weight he attaches to fairness considerations. In a dictator game, m is often defined as $\frac{1}{2}X$, where X is the overall endowment or earned entitlement to be distributed by the dictator, so that

$$U_i(y_i, X) = \alpha_i y_i - \beta_i v_i \left(y_i - \frac{1}{2} X \right)$$

Moreover, Fehr and Schmidt (1999) propose a similar model of social preferences in which the players also care about the payoffs of the other participants in addition to their own payoffs. Given a vector of material payoffs $x = (x_1, \dots, x_n)$:

$$U_i(x) = x_i - \alpha_i \frac{1}{n-1} \sum_{j \neq i} \max\{x_j - x_i, 0\} - \beta_i \frac{1}{n-1} \sum_{j \neq i} \max\{x_i - x_j, 0\}$$

where n are the number of players, $0 \leq \beta_i \leq 1$ and $\alpha_i \geq \beta_i$. The model proposes that players dislike inequality $\alpha_i, \beta_i \geq 0$, that they dislike being behind more than being ahead $\alpha_i \geq \beta_i$ and that the players do not choose to throw away money in order to reduce inequality $1 \geq \beta_i$ (Fehr & Schmidt, 1999).

Combined with Köszegi and Rabin's (2006) model of reference dependent preferences, $u(c|r) \equiv m(c) + n(c|r)$, which states that people care about the absolute amount of an outcome, as well as how this outcome performs compared to a given reference point, the above preferences are incorporated into a very simple and straightforward model of reference dependent social preferences:

$$U_i(y_i, e) = y_i - v(\bar{y}_i - y_i) - e + f(\bar{e} - e)$$

Here, U_i is person i 's utility, y_i his actual income while \bar{y}_i is person i 's expected income. Following, v is then a function of the deviation between expected and actual income, and measures the weight this deviation is given on person i 's utility. Subsequent, e is the absolute income inequality between two people, say person i and a person j who he compares himself with, $e = |y_i - y_j|$, while \bar{e} is the expected income inequality between them. Then, f is a function measuring to what degree the deviation between the expected and actual income inequality influences person i 's utility. For example, some may experience a large drop in utility if they find the level of income inequality greater than expected, whilst others may see it as a lesser problem.

However, in this thesis, not all the parameters in the model above will be measured. In fact the only term of importance is the latter term – whether people are loss averse with respect to income inequality, i.e. if expectations regarding income inequality and thus deviations between expected and actual income inequality have an effect on people's utility and thus

their pro-social behavior. Previously, models of social preferences have failed to incorporate a reference dependent term measuring the possible effect a deviation between expected and actual income inequality might have on people's utility, thus predicting that treatments, which only difference is the introduction of expected income inequality, are equal. This model stands to correct this prediction and to measure whatever effect such a deviation may have on people's pro-social behavior.

3. Experimental Economics

When conducting research within the field of social sciences, one very often cannot take advantage of experimental data as the treatments are morally difficult or impossible to assign to a group. In this experiment however, the participants ran no risk of suffering or otherwise be negatively affected by the treatments. In this chapter, a short presentation of the advantages and disadvantages associated with experimental economics is given.

3.1 Advantages

Experiments have been conducted for centuries and long been a major contributor to the development of scientific fields such as chemistry, physics, medicine and psychology (Cappelen & Tungodden, 2012). Economics, however, has long been standing on the side line with respect to experimentation and the use of laboratories as controlled environments, and it was not until Kahneman and his fellow researchers some 50 years ago introduced economic experiments in their teaching and research that the seed of experimental economics really started to grow. Today, experimental research is considered a true to be reckoned with within the field of economics, driving forth new and accepted truths by challenging classic economic theories, the motivation behind people's self interest and how people go about making their economic decisions. To measure people's actual economic response, the subjects are motivated by monetary incentives, just like in the real world. And just like in the real world, the subjects usually know how much money is at stake (Cappelen & Tungodden, 2012).

Previously, the consensus among scholars and economists was that it was impossible to conduct controlled experiments to test hypotheses regarding economic decisions as one could never control for all the factors influencing, and thus not reflect, real-life decision making. This was the accepted view, despite the fact that economic models and theories failed to capture all the aspects of real world situations, and the data collected often contained too much noise. Yet today, experimental research is considered a proven and powerful tool in testing economic theories and hypotheses, and has become one of the most influential approaches in developing new insight into economic topics ranging from

development economics to finance (Cappelen & Tungodden, 2012). This change of heart, and the reason why experimental economics and with it the field of behavioral economics² have become so widely accepted and encouraged among economists is mainly due to the features of these experiments and what they can provide; control and randomization (Guala, 2005).

A big issue facing researchers trying to interpret data on people's behavior and economic actions is that these actions and this specific behavior can have many explanations; a person donating \$100,000 to charity can do so because he is motivated by altruism, because he knows his peers will think better of him, because he knows someone who will benefit from his donation, or because the donation is tax deductible. Experiments give researchers the control they need to lock in and measure the causal effect they wish to study. It is useful to distinguish between two dimensions of control: control over a variable changed or manipulated by the experimenter, and control over background conditions and variables present in the experiment (Guala, 2005). If for example they wish to study people's true degree of altruism in a dictator game, but believe that the subjects might give away more if their identity is revealed or if they operate in fear of retaliation, they can manipulate the experiment by letting everyone and every decision be anonymous.

A second beneficial feature of controlled economic experiments is that it allows for randomization, i.e. objects or individuals are by chance randomly assigned to an experimental group. This again makes it possible to establish causal relationships and not just correlations (Cappelen & Tungodden, 2012). While correlations are easy to detect, it is not always easy to detect which is the cause and which is the effect; do rich people eat healthier because they are rich, are they rich because they eat healthier, or is there a third variable affecting both their wealth and their health? Controlled experiments let researchers eliminate the effects all the other variables have on the dependent variable, except the variable at question, by making sure they are equal in the experimental groups (ibid). A typical experimental design is one where the subjects are drawn at random and then placed in either a treatment group or a control group. Since the treatment is the only factor separating

² Behavioral economics seek to provide the field of economics with a more realistic foundation, and with that improve its ability to explain economic phenomena and behavior observed in economic agents.

them, the researchers know that any difference observed between the two groups is related to the treatment.

3.2 Shortcomings

Regardless of the many benefits of economic experiments, there are still reasons why researchers should not exclusively rely on the results from these experiments. Most of the critique directed towards experimental economics points to their external validity and generalizability. This in turn refers to how certain the researchers are that their observations, made in closed lab settings, actually can say something about events and behavior observed in the real world. The validity problem however is more or less related to a number of other issues that has to do with the methodology of experimental economics (Guala, 2005):

The Hawthorne Effect

The Hawthorne Effect refers to the idea that subjects alter their behavior when taking part in experiments, thus trying to behave in a manner which they believe to be in line with what the experimenters want (Cappelen & Tungodden, 2012). This in turn implies that the subjects would have behaved differently in similar situations in the real world, and that the data the experiments produced not necessarily reflect genuine economic behavior.

Weak monetary incentives

Another shortcoming of the use of experiments to capture economic behavior is the use of weak monetary incentives (Cappelen & Tungodden, 2012). In real life, most people cannot afford to give up everything they own for charity, even though they choose to do so in an experiment. Nor can they afford to gamble it all away, even though that is what they do in experiments studying risk aversion. In other words, experiments can end up over- or underestimating behavioral responses because the stakes are too small compared to what they are in real life.

Lack of Representativeness

When the sample of subjects in an experiment inhibits characteristics which greatly differ from those of the population it is trying to represent, the sample cannot be considered representative. Thus the conclusion drawn from the experiment should not automatically be transferred on to the other population (Falk & Heckman, 2009). As highlighted by Cappelen and Tungodden (2012), one of the most common subject pools used in economic

experiments is business students, and these students do not necessarily have the same attributes as the rest of the general population. Furthermore, studies done in one country may not apply to populations in other countries, just as studies done on the world's richest people not necessarily transfers on to populations living beneath the UN's poverty line.

Difference in experience

The last shortcoming of experimental economics to be presented here is that experimenters not necessarily distinguish between inexperienced and experienced subjects, even though it is well known that experience, learning etc. affect people's behavior (Guala, 2005). Because of this, it is also important to make sure that the subjects are comfortable with the lab setting and that of being a part of the experiment (Cappelen & Tungodden, 2012).

4. Experimental design

The data used in this thesis was collected from three separate lab-experiments conducted on the student body at The Norwegian School of Economics in Bergen. The three lab-experiments had only minor differences and will from now on be described as one experiment. Designed as a dictator game, the students were tested on how their willingness to redistribute income was affected by the implementation of different reference points in the treatments, which again altered their expectations. This chapter will present the experiment's context (treatments and sample) and design (production and distribution phase as well as the Big Five personality test).

4.1 Context

The experiment was designed and carried out by scholars from The Choice Lab and Matthew Rabin of UC Berkeley at The Norwegian School of Economics. It was designed to showcase how and to what degree loss aversion, or more precise reference dependence, affects people's willingness to redistribute income, i.e. their pro-social preferences. To do that, expectations had to be manipulated across different treatments to study the causality of expectations on the willingness to redistribute income.

I was working as a research assistant the third time the experiment was conducted and thus got to help with the set-up, meet the people working on, as well as see the student body participating in, the experiment, and contribute while the experiment was running. My assigned task was to help assemble the equipment, register participants and administer the money distribution.

After registering the participants for the appropriate session, making them draw a random number out of a box and together with the other student assistants assist them to their work stations, I closed the door to the session and the leader could start giving his introduction. Any questions regarding the introduction were answered by the other student assistants on an individual level, as I made my way to the back room where the final payments to the participants later would take place.

4.1.1 Treatments

In each of the sessions of the experiment, the participants were randomly assigned to one of three treatments, so that we got approximately 42 observations from each treatment. The experiment consisted of three parts, where part one and part two consisted of the three treatments being run on the three groups of participants. The participants were randomly assigned to be a stakeholder (dictator) in one part and a spectator (passive recipient) in the other part, merely switching roles after completing part one. Thus, both of them got to decide on a distribution as a dictator, but only one of their two distributions was chosen (at random) to count as the final outcome. In all the treatments participants were told that if they satisfied a form of requirement, the production phase, they would be matched with another participant who had also satisfied the same requirement, and be able to take part in the distribution phase.

The three treatments were designed as follows, where A and B were expectations and C was the distribution made by the dictator. In the first treatment T1, the participants were told that there were three possible outcomes in the payment phase; A, B and C. A and B would both take place with 45 percent probability each, while C would occur with 10 percent probability. In A and B they each would receive 100 NOK, giving this outcome a total probability of 90 percent, but if C occurred, the dictator would get to determine how to distribute 200 NOK between himself and the other participant. In the second treatment T2 the participants were again told that there were three possible outcomes in the payment phase; A, B and C. A and B would both happen with 45 percent probability each, while C would occur with a 10 percent probability. In A, they would each be paid an equal amount of 190 NOK, while in B they would each be paid an equal amount of 10 NOK. Thus, it was equally likely that they both got the high payment, as it was that they both got the small payment. In C, the dictator would get to determine how to distribute 200 NOK between him and the other participant. In the last treatment T3 the participants were yet again told that there were three possible outcomes in the payment phase; A, B and C. A and B would both take place with 45 percent probability each, while C would occur with 10 percent probability. In A and B the two subjects would be paid unequal amounts. In A one of them would receive 190 NOK, while the other would receive 10 NOK. In B the distribution was the other way around. In C, the dictator would get to determine how to distribute 200 NOK between him and the other participant. Total earnings from the experiment for a participant

would then be the sum of the randomly drawn outcome from one of the two parts, in addition to the show up fee, and the outcome from part three, which was an entirely different experiment conducted at the same time on the same participants.

In short, the expectations held were (100,100) and (100,100) in T1, (190,190) and (10,10) in T2, and (190,10) and (10,190) in T3, with equal probability. Treatment T1 and its following implications will only be mentioned in short, as this thesis focus is solely on the comparison between T2 and T3. In T1, the participants expected a non-risky equal outcome, and by comparing the degree of redistribution in T1 with T2, where the participants expected a risky but equal outcome, the researchers can study whether the introduction of risk itself imposes more giving. However, by looking past T1, the experiment had created an environment where the only factor differing between the treatments was the introduction of expected inequality. By comparing T2 and T3, a case where the participants expect little inequality to a case where they expect a lot of inequality, we can observe whether expectations regarding inequality affect people's willingness to redistribute income. That is, would the dictators in T2 redistribute more to their respective recipients than the dictators in T3?

4.1.2 Sample

All of the 424 participants in the experiment were recruited among students from The Norwegian School of Economics, located in one of Bergen's suburbs and being home to more than 3000 students and 400 employees. The participants were students from both the bachelor program of Economics and Business Administration as well as the different master programs. The distribution between the two programs was 39 master students and 384 bachelor students. The subjects were invited through the university email, but not informed about the purpose of the experiment, only that they were invited to take part in a research project. In the invitation, it was specified that they would receive 100 NOK just to show up, and that they would get the chance to earn more money, depending on their luck and the choices made by themselves and others. The students wishing to partake in the experiment signed up at one of the four to six sessions, fitting their time schedule. Each student was only permitted to participate once.

Overall, 44.8 percent of the participants were female and 55.2 percent were male, ranging from age 18 to 37. However, the average age was 20.8 years, and 60 percent were between 20 and 24 years old. This again reflects the true age distribution at NHH as most students are

between 21 and 25 years old, making the sample representative of a student population (Database for statistikk om høyere utdanning, 2013). One of the variables included in the experiment was a standard IQ-test, but only 306 subjects got to perform it as it was not included in the first experiment. However, the average score of those who did get to answer it was 21.8 out of a total of 26. The participants also got to perform a Big Five personality test, and the scores there were an average of 37.9 percent for extraversion, 62.4 percent for agreeableness, 64.3 percent for conscientiousness, -41.5 percent for neuroticism, and 18.1 percent for openness to new experiences. All the experiments were carried out in a building located conveniently in the middle of campus, so we assume there to be no selection effect³ in that some students chose/did not choose to participate due to the experiment's location.

4.2 Design

The experiment was a version of the dictator game with production, i.e. the participants did not simply receive an endowment, but had to “work” to get the chance to earn money. Both the participants acting as dictators and their fellow recipients had to work, but the distribution of their payment was dependent on factors both within and beyond the dictators' control. The experiment was conducted in a computer lab designed solely for this purpose, and all communication was anonymous and conducted through a web-based interface – it was a so-called “double-blind” in that neither subjects nor the experimenters could link decisions with particular participants. All the information given to the subjects were in English, and in addition to having sets of instructions given to them continually on the screen, the leader followed up on the session by giving them status updates as the experiment progressed. Questions from the participants during the experiment were answered by student assistants present in the room.

The experiment was divided into three parts, and at the end the participants had to complete a standard IQ test, a Big Five personality test and answer some background questions about age and gender. The first part consisted of the three treatments being run with randomly chosen dictators and respective recipients. The treatments were again divided into a production phase and a distribution phase.

³ Selection effect is a statistical error which can occur when choosing the subjects which are to take part in a scientific study. The error causes one sampling group to be selected more often than other groups included in the experiment.

4.2.1 The Production Phase

At the start of each treatment, everyone was told that they first had to work on a production task and that they had 15 minutes to satisfy a production requirement. The production phase was introduced to ensure that everyone had the same entitlements to what was to be distributed later in the experiment, which thereby guaranteed that entitlement considerations did not differ across treatments. The participants were also told that if they satisfied the production requirement, they would take part in the distribution phase later on, and if they did not, that they would not earn any money from this part of the experiment.

In the production phase, the participants were presented with a matrix of numbers and then asked to tick off each occurrence of a given number. For each correct number they ticked off, they would get one point. Each time an incorrect number was ticked off, a point was subtracted. They could always push the button to progress to a new matrix of numbers with the same task (but maybe a new number to look for). Throughout the production, the participants could see the total number of points they had collected so far on the screen. The production requirement they had to fulfill was to collect 100 points in 15 minutes.

The task and the length of the production phase was the same for participants in all the three treatments. The treatments differed only with respect to the information the participants received about earnings from the production phase, which then again shaped their expectations.

Before the participants began with the production, they were told that there would be three possible outcomes in the following distribution phase. In the first treatment, outcome A would happen with 45 percent probability and would generate a distribution of (100,100), outcome B would happen with 45 percent probability and would generate a distribution of (100,100), while outcome C would happen with 10 percent probability and give the chosen dictator in this round the opportunity to distribute 200 NOK as he pleased between himself and his recipient. For the following two treatments the distributions were similar to the description above in section 4.1.1.

4.2.2 The Distribution Phase

After the participants had read the instructions and completed the production phase, the dictator was presented with a choice of how much he wished to distribute of the 200 NOK to

his recipient if the randomly drawn outcome became C. In a box on his screen he had to write down the exact amount he wished to contribute, and was then given another opportunity, now visualizing the distribution in the form of a pie chart on the screen, to revise his decision. The dictator could choose to distribute any share of the money as he saw fit, knowing nothing about the recipient except that he had completed the production phase just like himself. It is worth to keep in mind that the dictator also knew it was only a 10 percent probability for this scenario to take place. This distribution process occurred once in every treatment.

The second part of the experiment consisted of switching the role as dictator around, so that the participant who was not a dictator before now was granted the part. Neither the person chosen to be dictator in part one nor his recipient were informed that the recipient in their game would get the part as dictator later on in the experiment. In the second part, the receivers were given the exact same information about the production phase as the dictators with whom they were matched-up with were given in the first part. However, the “ex-dictators” were now (after the production phase) simply informed that they had not been chosen to be dictator in this game and therefore would not get to make any decisions themselves. The pair of dictator and recipient did not know that they were the same pair in both rounds. The third part of the experiment consisted of another research-topic, not related to the first two parts of the experiment, and not relevant for this thesis.

The participants were strongly incentivized throughout the experiment by the promise of payment. The payments were organized so that when the participants had finished the incentivized parts of the experiment, which were everything except the IQ-test, Big Five personality test and background information, lists of payments and individual codes were printed in the backroom. This was where I was stationed, and while the participants finished up the non-incentivized part of the experiments, I was responsible for writing down the codes onto envelopes and matching them with the correct amount of money which the individual participants had earned. The envelopes were then given to the leader in the room, and in full anonymity handed out to the participants by the student assistants.

4.2.3 The Big Five Personality Test

At the end of the experiment, before receiving payment for their work, the participants had to take part in a standard IQ test and a Big Five personality test. The latter is a standard

taxonomy of five broad dimensions of personality traits used to describe the human personality. They are Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience (Barrick & Mount, 1991).

The trait of Extraversion, sometimes referred to as Enthusiasm, implies “an energetic approach towards the social and material world” and includes more specific traits such as sociability, activity, talkative and assertiveness (John, Naumann, & Soto, 2008, s. 120). The second dimension has been interpreted as Agreeableness or Likability and “contrasts a pro-social and communal orientation towards others with antagonism” and includes traits like altruism, trust and modesty (John, Naumann, & Soto, 2008, s. 120). The third trait is referred to as Conscientiousness or Conscience and describes “socially prescribed impulse control that facilitates task- and goal directed behavior, such as thinking before acting, delaying gratification, following norms and rules and planning, organizing and prioritizing tasks” (John, Naumann, & Soto, 2008, s. 120). The fourth dimension is called Neuroticism and “contrasts emotional stability and even-temperedness with negative emotionality such as feeling anxious, nervous, sad and tense” (John, Naumann, & Soto, 2008, s. 120). The fifth and last dimension may be the most difficult to identify of the five and is called Openness to Experience (Barrick & Mount, 1991). It describes “the breadth, depth, originality, and complexity of an individual’s mental and experiential life” (John, Naumann, & Soto, 2008, s. 120).

However, it is important to note that the Big Five has received more than just praise. Both its scope as an explanatory and predictive theory has come into question, especially because of the many variances in human behavior it does not account for (Jackson & Paunonen, 2000).

5. Empirical Strategy

First, the dataset was cleaned up using a few simple commands in STATA, dropping observations that had a multiplier other than one, and also dropping observations that did not fit into the categories of fixed equality (100,100/100,100), risky equality (190,190/10,10) or risky inequality (190,10/10,190).

Furthermore, given the experimental design presented above, the following regression could be used to study whether social preferences are reference dependent, i.e. to measure the degree of redistribution in a dictator game where the treatments only differ with respect to expected inequality:

$$Y = \alpha + \beta T1 + \delta T3 + \gamma X + \varepsilon$$

where Y is the dependent variable – the mean share given by the dictator to the recipient under the treatment risky equality. $T1$ and $T3$ are dummy variables assigned to fixed equality and risky inequality respectfully, where $T1 = 1$ if assigned to fixed equality and $T1 = 0$ otherwise, and $T3 = 1$ if assigned to risky inequality and $T3 = 0$ otherwise, X is background variables, and ε is the error term. The β -coefficient measures the change in Y with respect to $T1$, ceteris paribus. In words, it measures the effect the treatment fixed equality has on the dictator's willingness to redistribute. Also, the δ -coefficient measures the change in Y with respect to $T3$, holding all other factors fixed, meaning it measures the effect the treatment risky inequality has on the dictator's willingness to redistribute. The background variables are included in the regression in order to control for the effect other variables may have on the measure of share given. Furthermore, background variables are often included to avoid the omitted variable bias⁴ and to ensure a ceteris paribus analysis.

The experiment was designed using three treatments: $T1 =$ fixed equality, $T2 =$ risky equality and $T3 =$ risky inequality. When creating the regression model, the second treatment, $T2$, was chosen as the dependent variable, while the remaining two treatments were designed as the dummy variables $T1$ and $T3$. That is, when running the regression the

⁴ The Omitted Variable Bias occurs when a regression model is created which incorrectly leaves out one or more important causal variables, so that the model compensates for the missing factor by over- or underestimating the effect of one of the other variables. For the omitted variable bias to exist in a linear regression, the omitted variable must both be a determinant of the dependent variable and correlated with one or more of the included independent variables (Wooldridge, 2006, ss. 96-99).

coefficient in front of T3, *ceteris paribus* (T1 necessarily has to be zero when T3 = 1) will show the change in the dictators' mean share given when facing risky inequality, compared to when they face risky equality. The coefficients in front of each of the background variables display the effect that variable has on the mean share given. A positive coefficient in front of the treatment variable T3 would mean that on average, a dictator facing risky inequality (when one gets 190 and the other gets 10 or vice versa, with 90 percent probability) would redistribute more to his recipient than a dictator facing risky equality (they both get 190 each or they both get 10 each, with 90 percent probability), while a negative coefficient in front of T3 would mean that the average dictator would redistribute less – which is what we are hoping to prove in this thesis! The standard errors of the coefficients can be used to construct a confidence interval⁵ in which the variables' coefficient is expected to be.

To measure the change in willingness to redistribute income when expectations concerning income inequality are altered, I compare the results from treatments T2 and T3 (where the only difference is the introduction of expected inequality). Since T2 is the reference point, being the dependent variable, it is sufficient to look at the coefficient of T3. In order to test the hypothesis that expecting inequality leads to less pro-social behavior, i.e. that the mean share given by the dictators decrease when they expect inequality, the coefficients in front of the treatment variables and their standard errors are measured. The H_0 is that the coefficient in front of T3 is zero, which means that the introduction of expected inequality do not impact the mean share given. The most common hypothesis test is the t-test, and it is used to evaluate the difference in means between two groups, e.g. subjects in two treatments. The test assumes that the dependent variable has a normal distribution with the same variance in each group, and these conditions are normally met if the sample size is about medium, i.e. exceeds 30 subjects. This requirement is more than fulfilled in our experiment as it contains more than 400 subjects. The null hypothesis is that once all the background variables have been accounted for, the treatments have no additional effect on the on the measure of the dependent variable (Wooldridge, 2006). The t-statistic is defined as

$$t - statistic = \frac{coefficient}{standard\ error\ of\ coefficient}$$

⁵ A confidence interval is a statistical range with a specified probability that a given parameter (coefficient) lies within the range (The Free Dictionary, 2009).

In this experiment, the expected effect is that the introduction of risky inequality will *decrease* the dictators' redistribution. Thus, a one-sided alternative hypothesis test should be conducted as we do not care what the effect is if it is different from negative (Wooldridge, 2006). What's more, the value of the t-statistic is then compared to a critical value, determined by the significance level and degrees of freedom, from a t-distribution table. If the level of the t-statistic is below that of the critical value, the null hypothesis can be rejected (Wooldridge, 2006).

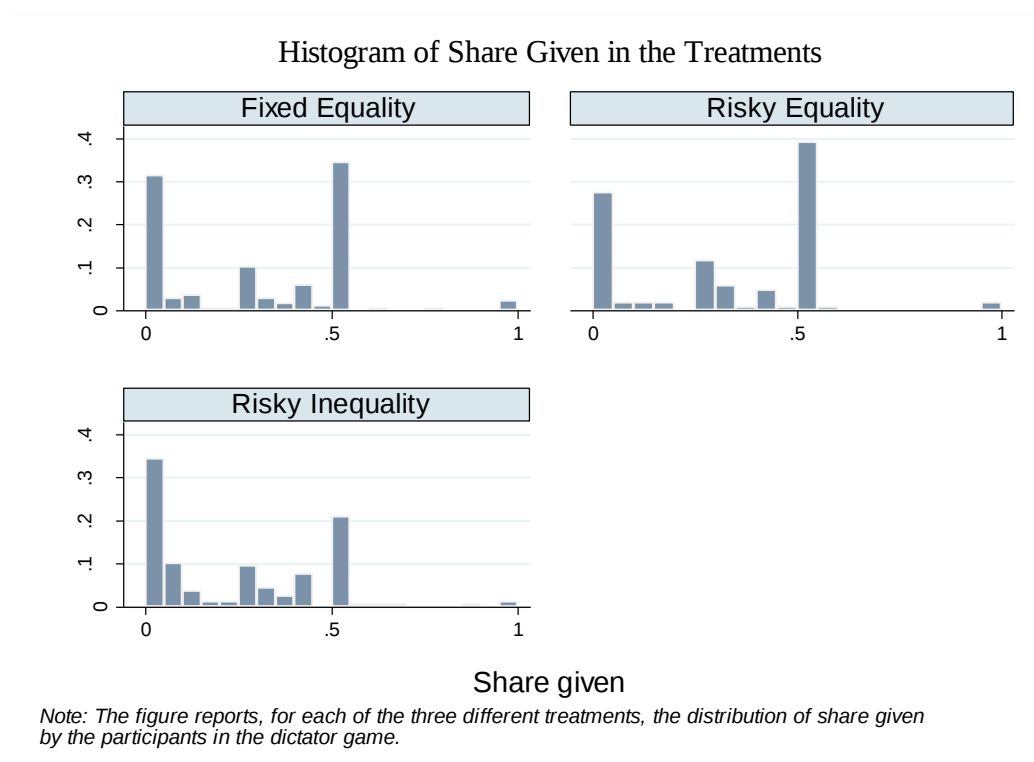
On the other hand, a t-statistic can be used to compute the p-value; the smallest significance level at which the null hypothesis can be rejected. If the coefficient is said to be significant at a 5 % level, then the p-value is 0.05 and there is a 5 % chance that the null hypothesis will be rejected when it is true. With this, it can be said that the coefficient is less than zero with a 95 % certainty (Wooldridge, 2006).

6. Results

This chapter will present the main results of the experiment. First there will be a review of the general observations, and then a more in-depth analysis of the regression equation. The results will be discussed in light of the theory presented in chapter 2.

6.1 Descriptive statistics

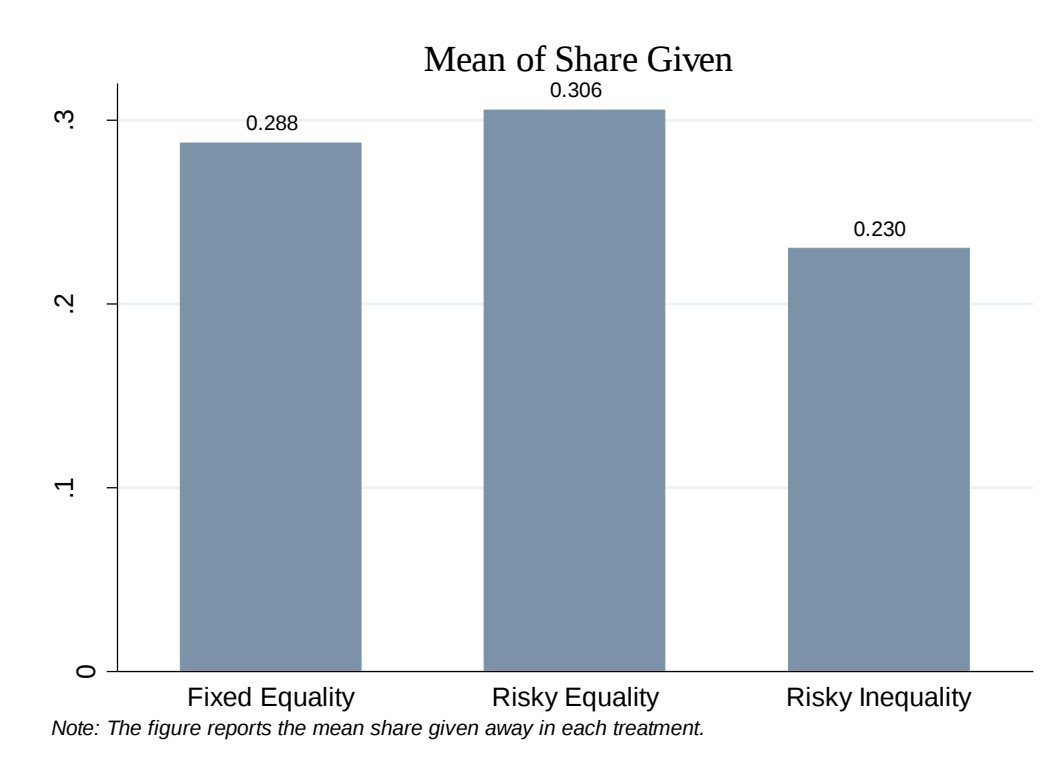
Figure 6.1: Distribution of share given in three situations



Looking at Figure 6.1, the most obvious observation is that the participants reacted quite differently to the three treatments, resulting in different shares given. In fixed equality, the participants gave almost exclusively either an equal share or nothing at all. However, an even more striking difference is found comparing the share given in risky equality and risky inequality: The participants acting as dictators give away considerable more when they expect equality than when they expect inequality. Also, the fact that the equal sharing bar is the tallest reveals that most participants prefer an equal distribution where both players receive half the share each when they expect equality, while a dominating zero sharing bar says that most of participants prefer to give nothing, i.e. keep everything for themselves,

when they expect inequality. What is more, almost none of the participants give away more than half the share in either of the treatments, which is consistent with existing theory (Engel, 2011).

Figure 6.2: Mean of share given by the dictators in three treatments

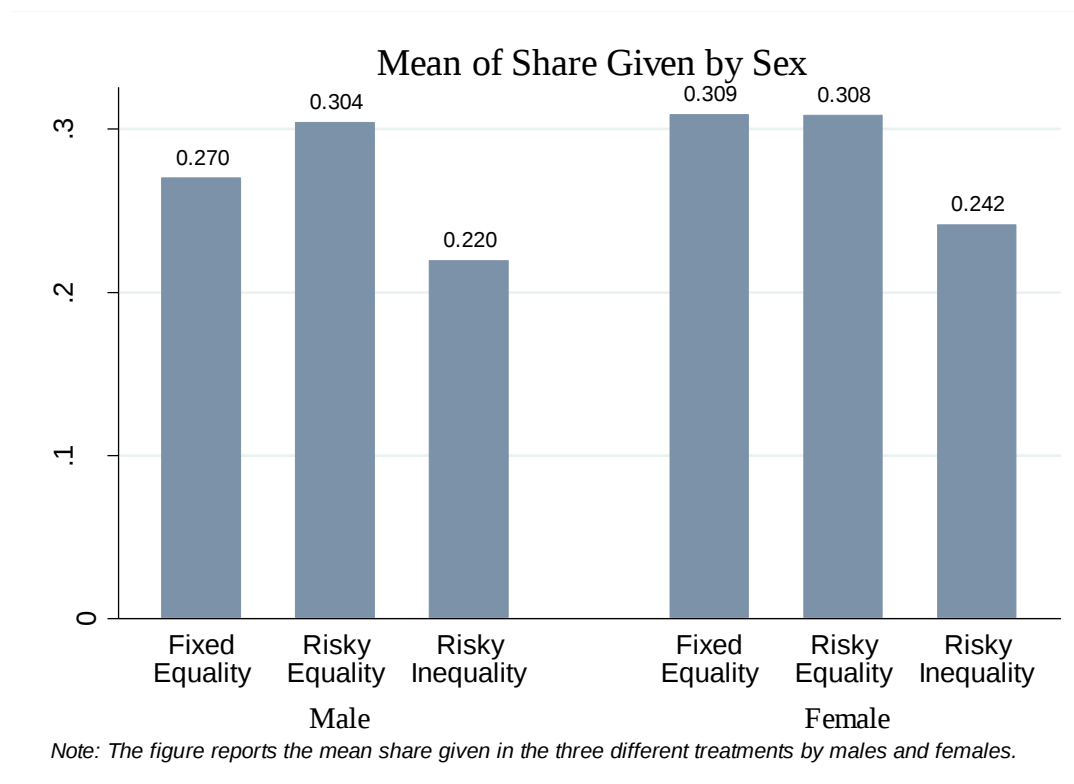


In Figure 6.2, the large differences between share given in the treatments become even more apparent: Under fixed equality, the participants give an average of almost 29 percent. When faced with the outcome distribution presented in risky equality, the participants give an average of approximately 31 percent of the 200 NOK they had at their disposal. In contrast, the participants facing the outcomes in risky inequality give away a mere average of 23 percent of the same 200 NOK. By comparing the two latter treatments, we have that people give approximately 30 percent less on average when they expect inequality. This is indeed a huge and striking result: It seems as though people prefer to redistribute a larger share of their income when they expect equal outcomes than when they expect unequal outcomes.

By looking at the results and the predictions made by the model, particularly the predictions made with regards to people's loss aversion and following reference dependence with respect to income inequality, presented in section 2.3, there is no doubt that the predictions were correct – when the participants' expectations entail equality, they allocate a larger share

of their income to their respective recipients. In contrast, when the participants expect inequality, they redistribute a smaller share of their income. What is more, the preceding results also comply with the rest of the model in section 2.3: The participants seem to first and foremost care about own income, thus they keep a larger share of the money for themselves. However, they also appear to have social preferences, thus give away a share of their available income to their respective recipients (even though no one is looking).

Figure 6.3: Mean of share given by sex in the three treatments



As pointed out in section 2.2, women do generally inhibit stronger social preferences and thus give away a larger share of their income than what men do, and this is also reflected in Figure 6.3: Independent of treatment, female participants in the experiment seem to redistribute a larger share of the available 200 NOK than their male counterparts. However, as the regression equation will show further down, this is not a gender story, i.e. the difference between share given by females and males is not significantly so, concluding that here, not such difference has been found.

6.2 Regression analysis

In order to study the share given in more detail, and see whether the observed differences also are statistically significant when background variables like gender, age, student level and the Big Five personality traits are included, the regression equation in Table 6.1 is run.

Table 6.1: Regression of share given on situation type and background info

	(1) Share given	(2) Share given
T1=Fixed Equality	-0.02 (0.03)	-0.02 (0.03)
T3=Risky Inequality	-0.08** (0.03)	-0.08*** (0.03)
Female		0.01 (0.03)
Age		0.00 (0.01)
Master student		-0.04 (0.04)
Extraversion		-0.06** (0.02)
Agreeableness		0.09*** (0.03)
Conscientiousness		-0.01 (0.03)
Neuroticism		0.04* (0.02)
Openness		0.04 (0.02)
Constant	0.31*** (0.02)	0.28** (0.12)
Observations	424	423
R-squared	0.018	0.067

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Female and master student are dummy variables, controlling for gender and the level of schooling, respectfully, while age controls for the participants' age. The Big Five variables simply control for the participants' score in the Big Five factors. Column (1) reports the effect the treatments fixed equality and risky equality have on share given, where share given is the treatment risky equality. (2) adds background variables and controls for the effect gender, level of schooling, age and the Big Five factors might have on share given in the different treatments.

The first column in Table 6.1 displays the main findings of this thesis by reporting how risky inequality, and thus the introduction of expected inequality, affects giving in dictator games. The table shows that the mean difference between share given in the treatments risky equality and risky inequality, T3=Risky Inequality, is large and significant ($p < 0.05$). That is, the participants give away almost 30 percent less⁶ when they expect inequality compared to when they expect equality. This is a huge effect! The H_0 presented in chapter 5, being that the introduction of expected inequality will not have an impact on the mean share given, is thus rejected at a 5% significance level as the p-value for T3 is < 0.05 . Table 6.1 also reports that there is no significant difference between share given in fixed equality and risky equality. Thus, with respect to social preferences, the introduction of risk does not by itself impose more or less giving.

The second column in Table 6.1 includes background variables on the participants and thus controls for any effect gender, age, personality and whether the participants were master students or bachelor students might have on share given. Including these background variables do not change the point estimate. In fact, the mean difference between share given in risky equality and risky inequality becomes even more statistically significant, and we can reject the H_0 at a 1% significance level. Moreover, there is no significant effect related to gender, so this does not appear to be a gender story as it often is when studying giving in dictator games. Nor does age have any effect. Whether the participants are master or bachelor students do not have a significant effect on share given either, and it is not surprising considering the relatively narrow age span resulting from it being a student sample.

However, out of the five personality traits three of them are significant on a 10% significance level, where two of them have a small but positive effect and one a slight negative effect on share given. It is worth remembering that people's personality describes their stable pattern of behavior, thought and emotion (BBC: Lab uk, 2013). With this in mind, people who score high on extroversion is here observed giving a bit less on average, implying that people who are social and attracted to stimulating experiences in the company of others also behave more selfish and have weaker pro-social preferences. This is hard to

⁶ $\frac{(0.31-0.08)-0.31}{0.31} = -0.26$ and $\frac{(0.28-0.08)-.28}{0.28} = -0.29$

explain assuming that people are rational and their personality consistent across different situations, and should thus be interpreted with care. Furthermore, people scoring high on both agreeableness and neuroticism is here observed giving slightly more on average, implying that particularly compassionate and anxious people also are concerned with other people's welfare. This, on the other hand, can be explained assuming rational and socially conscious people. Nonetheless, this is of course only one of many possible interpretations, and should not be taken too seriously, but if the observed effects were to become stronger it would be interesting to try to connect them to observed behavior in the lab.

One of the individual attribute variables was not included in the regression, namely IQ. It was excluded as it only had been included in some of the experiments, thus creating an uneven effect in the regression equation.

Even though only half of the explanatory variables are significant and the model's goodness of fit, R^2 , is rather low, it does not mean that the model and its results should be discarded. For example, a low goodness of fit does not automatically translate into the model being a poor predictor, only that it cannot explain much of the observed variance. However, it is often quite difficult to explain the observed variance in regressions, particularly when it comes to people's behavior, regardless of how the model is specified. Here, the main focus is the difference in share given by the participants in risky equality and risky inequality, which is large and significant. Additionally, the mean share given by the dictators is approximately 28 percent, which corresponds to what has been found in many previous studies, thus supporting the validity of the model (Engel, 2011).

After running the regression on the treatments and background variables, I also included an interaction term over the treatment risky inequality and the binary variable female. Interaction effects represent the combined effect variables can have on the dependent variable, altering the dependent variable from the value which it gets when the variables are considered separately: If an interaction effect is present, the impact of one variable will depend on the level of another variable. Here, the interaction term was included to check for the possibility that females in the treatment risky inequality might be giving differently than males, driving the observed effect in one particular direction. In short, it was testing whether females were more or less affected by the treatment than males. However, there seemed to be absolutely no significant interaction effect between females and the treatment risky

inequality. Thus, females cannot be said to be more affected by this treatment effect than males.

7. Summary of Findings

This thesis reports the results from an economic experiment designed to study the role of expectations in explaining redistributive behavior. Specifically, the experiment was conducted to search for evidence of reference dependent social preferences. It was designed as a dictator game, and included treatments where under the participants' expectations, with respect to income inequality, were altered and their subsequent share given measured. As the only difference between the two treatments risky equality and risky inequality was the introduction of expected inequality, it was made possible to measure the effect reference dependence had on pro-social behavior by comparing share given in the respective treatments.

The main finding of this thesis is that when people expect inequality, they give away almost 30 percent less than when they expect equality, *ceteris paribus*. This huge effect is statistically significant, and thus a very interesting one, possibly with implications for how we view the varying income inequality in different countries. Thus, the answer to the research question "Are social preferences reference dependent?" is a resounding "yes, they are".

The fact that people give away 30 percent less when they expect inequality compared to when they expect equality demonstrates how important reference dependence is in explaining pro-social behavior. What is more, this showcases the central part played by expectations, and possibly the fulfillment of these, in dealing with people's preferences, and that it is not necessarily only a desire for a more equal society that drives people's redistributive behavior. Previous theories and models have related people's varying preferences with respect to redistribution to country specific differences, the determinants of income inequality, and degree of selfishness, among others. However, the purpose of creating a model of reference dependent social preferences is not to attempt to replace any of the existing theories, but instead to increase our understanding of what affects preferences for redistribution. The fact that pro-social behavior also is affected by people's expectations towards inequality can be useful when trying to understand why countries differ with respect to income inequality.

7.1 Implications

While Köszegi and Rabin (2006) proposed a general model of reference dependent preferences, where people's utility consisted of both the classic consumption utility and a reference dependent gain-loss utility, this thesis aimed to study whether social preferences also are reference dependent, and thus what motivates pro-social behavior. Social preferences play a prominent role in explaining people's redistributive behavior, motivated by factors such as fairness and equality, but to the best of my knowledge, we have yet to discover whether the degree of redistribution is a result of social preferences being reference dependent. I argue that this model, and thus the result from the experiment, can in part explain why countries such as Norway and the United States differ with respect to redistribution, and contribute to the understanding of why some countries find it harder to redistribute than others.

The modern welfare state has two main objectives; to provide social insurance and redistribute from the richer to the poorer (Alesina & Giuliano, 2010). However, redistribution of income from rich to poor is considerably more limited in the United States than in continental Western Europe, and has become a popular research topic. For example, in a paper by Alesina and Angeletos (2005), they relate the differences in redistribution to different, albeit self-fulfilling, beliefs about the sources of income inequality⁷. In contrast, other researchers relate the difference in redistribution to the opportunity (or perceived opportunity) of social mobility, where being poor is not seen as affecting future income (Alesina, Di Tella, & McCulloch, 2004).

The finding of this paper, however, explains the differences in redistributive policies as partly being a result of expectations held by the population; that people who expect little inequality, like Norwegians, want to redistribute more than people who expect a lot of inequality, like Americans, all else being equal. Instead of perceiving Norwegians as especially concerned with fairness and Americans as greedy⁸ and less willing to redistribute income in absolute terms, people's preferences for redistribution should, according to the

⁷ Where some argue that effort and thus little taxation (i.e. redistribution) is just others argue that luck (and typically being unlucky) and thus much more taxation is desirable (Alesina & Angeletos, 2005).

⁸ Americans do not appear to be any less altruistic than Europeans (Alesina & Glaeser, 2004).

result of this experiment, be interpreted in connection with the strong prevailing expectations of equality and inequality in their respective societies. Why different expectations with respect to income inequality lead to different preferences for redistribution, the experiment does not give an answer to, but it could be the result of a simple desire to comply with given expectations, or that people tie certain characteristics, like low effort and few aspirations, to societies with more inequality, and thus want to redistribute less as long as they expect the income inequality to prevail (and thus the characteristics to prevail). For example, if the general population in a country, independent of opinions concerning the source of inequality, expects there to be a certain level of inequality, the mere desire to comply with these expectations could result in people redistributing less than if they expected a more equal society. The result of the experiment can also be applied to a country which usually would find it relatively difficult to increase the level of redistribution, and would want to implement more progressive taxes. Then, an alternation of people's expectations, that a more equal society would be beneficial in such and such a way, could be beneficial in order to avoid a reduction in people's utility when their expectations were not met.

Lastly, the knowledge provided by the experiment increases our understanding of what motivates pro-social behavior. This again may result in increased attention and weight given to behavioral economics as a field of study, arguing that economic models should try to take into account the less rational and not so selfish version of homo economicus, and that in order to correctly predict true economic behavior the models should try to reflect the real world as best they can. As better and more precise models are being developed, we can hope to make better and more informed real life decisions as both human beings and as a society.

7.2 Validity

In section 3.2 I mentioned that economic experiments have certain shortcomings and limitations, and this section will contain a short evaluation of this experiment's validity and further applicability.

First, whether there is a Hawthorne effect in this experiment is hard to tell. The participants were fully aware that they were part of an experiment, and subsequent there is a risk that they altered their behavior and thus weaken the validity of the results. However, since the experiment contained real money, although the amounts were relatively small, there is also a chance that it managed to provoke genuine behavior. Second, the monetary amounts at

stakes might be too small to have triggered real world economic behavior. Compared to many real life scenarios, 200 NOK or 600 NOK might be low, but it is certainly not without value for a student living in Norway in 2013. Thus, it should be safe to say that the money managed to serve as true incentives for the participants. Third, in order to draw conclusions about the whole population from the results of the experiment, the sample had to be drawn in complete random. Here, all the participants, with their varying backgrounds, chose to attend NHH and chose to participate in the experiment. What is more, student samples tend to differ to a great extent from the general population. Even if the sample is assumed to have been relatively representative of the Norwegian student population, the results cannot be applied to the rest of the population without precaution. Fourth, differences in experience could only to a lesser degree have altered the participant's behavior here, as none of the participants had undergone any of the treatments presented in this experiment before. Older students who have attended previous experiments would have an idea about what the experiment could yield (at least a chance to get paid), but not much more.

In sum, it could in fact be that the finding presented in this thesis is valid and applicable to the world outside the laboratory. The result of the experiment is especially important when studying what motivates people's pro-social behavior, and is thus encouraged to be included in future research. However, for future research it would be interesting to study whether the strong result prevails if similar experiments are carried out on samples better reflecting the general population.

8. References

- Alesina, A., & Angeletos, G. M. (2005). Fairness and Redistribution: US versus Europe. *American Economic Review*, Vol. 95, pp. 913-935.
- Alesina, A., & Giuliano, P. (2010). Preferences for Redistribution. In J. Benhabib, M. O. Jackson, & A. Bisin, *Handbook of Social Economics* (pp. 93-131). North-Holland.
- Alesina, A., & Glaeser, E. L. (2004). *Fighting Poverty in the US and Europe: A World of Difference*. Oxford University Press, UK.
- Alesina, A., Di Tella, R., & McCulloch, R. (2004). Inequality and Happiness: Are Americans and Europeans Different? *Journal of Public Economics*, Vol.88 (9-10), pp. 2009-2042.
- Barr, N. (2004). *Economics of the Welfare State*. Oxford: Oxford University Press.
- Barrick, M. R., & Mount, M. K. (1991). The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Journal of Personnel Psychology*, Vol. 44, pp. 1-26.
- BBC: Lab uk. (2013, April 3). *About the Big Personality Test*. Retrieved from <http://www.bbc.co.uk/labuk/articles/personality/>
- Bolton, G. E., & Ockenfels, A. (2000, March). ERC: A Theory of Equity, Reciprocity, and Competition. *The American Economic Review*, Vol. 90 (1), pp. 166-193.
- Cappelen, A., & Tungodden, B. (2012). Adferdsøkonomi og økonomiske eksperimenter . *MAGMA*, 26-30.
- Cappelen, A., Halvorsen, T., Sørensen, E. Ø., & Tungodden, B. (2013, February 20). *Face-saving or fair-minded: What motivates moral behaviour?* Retrieved from Social Science Research Network: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2229899
- CIA. (2013, March 10). *The World Factbook*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2172rank.html>
- Database for statistikk om høyere utdanning. (2013, May 14). *Studenter fordelt på alder [Internet]*. Retrieved from http://dbh.nsd.uib.no/dbhvev/student/aldersfordeling_rapport.cfm?instttype=02&grupperingstring=16s20%2C21s25%2C26s30%2C31s35%2C36s40%2C41s45%2C46s50%2C51s55%2C56s60%2C61s65%2C66s70%2C71s75%2C76s80%2C81s85%2C86s90%2C91s95&arstall=2013&semester=1&sti_valgt=i
- Engel, C. (2011). Dictator Games: A Meta Study. *Experimental Economics*, Vol. 14, pp. 583-610.
- Falk, A., & Heckman, J. (2009, October). Lab Experiments Are a Major Source of Knowledge in the Social Sciences. *Science*, Vol. 326, pp. 535-538.
- Fehr, E., & Schmidt, K. M. (1999, August). A Theory of Fairness, Competition and Cooperation. *The Quarterly Journal of Economics*, Vol. 114 (3), pp. 817-868.

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- Fehr, E., & Schmidt, K. M. (2000, December 23). Theories of Fairness and Reciprocity -Evidence and Economic Applications. *Munich Discussion Paper*, pp. 1-46.
- Fong, C. (2001, October). Social Preferences, Self-Interest, and The Demand for Redistribution. *Journal of Public Economics*, Vol. 82 (2), pp. 225-246.
- Guala, F. (2005). *The Methodology of Experimental Economics*. Cambridge University Press.
- Jackson, D. N., & Paunonen, S. V. (2000, October). What is Beyond the Big Five? Plenty! *Journal of Personality*, Vol. 68 (5), pp. 821-835.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm Shift to the Integrative Big Five Trait Taxonomy: History, Measurement, and Conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin, *Handbook of Personality: Theory and Research* (pp. 114-158). New York: The Guilford Press.
- Kahneman, D., & Novemsky, N. (2005, May). The Boundaries of Loss Aversion. *Journal of Marketing Research*, Vol. 42 (2), pp. 119-128.
- Kahneman, D., & Tversky, A. (1979, March). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, Vol. 47 (2), pp. 263-292.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *The Journal of Economic Perspectives*, Vol. 5 (1), pp. 193-206.
- Kahnman, D., & Tversky, A. (1991, November). Loss Aversion in Riskless Choice: A Reference-Dependent Model. *The Quarterly Journal of Economics*, Vol. 106 (4), pp. 1039-1061.
- Köszegi, B. (2010, October 15). *Introduction to Reference-Dependent Preferences: Economics for Neuroscientists Lecture, 2010*. Retrieved from Society for Neuroeconomics: http://www.neuroeconomics.org/conference/Koszegi_Workshop2010.pdf
- Köszegi, B., & Rabin, M. (2006, November). A Model of Reference-Dependent Preferences. *The Quarterly Journal of Economics*, Vol. 121 (4), pp. 1133-1165.
- Schmidt, U., & Zank, H. (2005). What is Loss Aversion. *The Journal of Risk and Uncertainty*, Vol. 30 (2), pp. 157-167.
- The Choice Lab. (2013, April 10). Retrieved from About The Choice Lab: http://blogg.nhh.no/thechoicelab/?page_id=23
- The Free Dictionary. (2009, March 22). *The American Heritage® Dictionary of the English Language*. Retrieved from <http://www.thefreedictionary.com/confidence+interval>
- Wooldridge, J. M. (2006). *Introductory Econometrics: A Modern Approach*. Toronto, ON: Thompson South-Western.

9. Appendix

These screenshots represent the main part, i.e. the incentivized part, of the experiment, and were also the instructions given to the participants on the computer screen. Not all of the screenshots from part two have been included as they are identical to the ones presented in part one.

9.1 Screenshots from the experiment

Welcome to the experiment!



We have to wait before the action starts.

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Instructions, part 1

In this part, we first ask you to work on a production task, where you have 15 minutes to satisfy a production requirement. If you satisfy the production requirement, you will also take part in a payment phase. If you do not satisfy the production requirement, you will not take part in a payment phase and you will not earn any money from this part of the experiment.

In the production phase, you will see a matrix of numbers, and you are asked to tick off each occurrence of a given number. For each correct number you tick off, you will gain one point. Each time you tick off the wrong number, one point will be subtracted. You can always push the button to progress to a new matrix of numbers with the same task (but perhaps a different number to look for). Throughout the production phase, you can see the total number of points you have collected so far on the screen.

The production requirement is that you collect a total of 100 points in the 15 minutes you have available.



In the payment phase you will be matched with another participant who also has satisfied the production requirement.

There are three possible outcomes in the payment phase, A, B, and C. The outcomes A and B happen with 45% probability each and C happens with 10% probability. Below is an overview of the three outcomes.

Color codes:

You: 
The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:   You determine

Amounts: (100,100) (100,100) 200 in total

The first number in parentheses refers to your income in NOK, the second to that of the other participant.

In A and B, you and the other participant are paid an equal amount of 100 NOK. In C, you determine how to distribute NOK between you and the other participant.

When you have read the instruction, push the button to go on.

Production

Reminder: If you collect 100 points, you will be matched with another participant who has also collected 100 points. Then, with 45% probability A will happen and the pair of you earn (100,100); with 45% probability B will happen and the pair of you earn (100, 100); with 10% probability you determine how 200 is distributed. (The first number in the parentheses refers to your payment in NOK, the second number to the other participant's payment.)

You collect one point per correct tick-off.

In the table below, tick off the number **134**

831	127	620	588	127	688	688	688	127	722	688	722	688	260	727
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
611	522	522	727	620	456	134	536	588	522	831	244	522	620	522
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	522	588	244	134	127	611	620	722	831	260	260	324	722	536
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	127	456	244	536	456	260	134	831	244	688	260	260	688	688
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
831	620	620	611	127	620	611	522	611	831	324	134	536	127	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
727	722	831	324	536	727	831	522	456	831	722	611	588	134	127
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	456	324	134	688	324	127	727	324	620	127	260	831	244	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
127	134	127	127	127	127	831	611	324	134	688	536	536	260	456
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	127	727	831	620	324	831	127	588	831	722	260	260	588	831
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
727	588	522	688	611	536	456	727	244	536	536	831	611	456	727
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	727	620	522	456	260	324	831	588	831	588	536	134	127	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	611	522	831	722	244	456	522	588	127	688	260	244	536	536
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Introduction to the payment phase, part 1

You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

There are three possible outcomes, A, B, and C in this phase. The outcomes A and B happen with 45% probability each and C happens with 10% probability. The outcomes are as follows:

Color codes:

You: 
The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:  You determine

Amounts: (100,100) (100,100) 200 in total

The first number in parenthesis refers to your income, the second to that of the other participant.

Your task in this phase is to determine how 200 NOK should be distributed between yourself and the other participant in outcome C.

Press the button below when you are ready to make this decision.

Distribution

Reminder: You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

Color codes:

You:



The other:



Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:



You determine

Amounts:

(100,100)

(100,100)

200 in total

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

In the box below, write down how much of the 200 NOK **the other participant** should receive if the outcome is C.

To the other participant if outcome is C:

Make choice


Was this what you intended?

This is an overview of the three possible outcomes, A, B, C after your decision.

You have the opportunity of going back to revise your choice.

Color codes:

You: 

The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:



Amounts: (100,100) (100,100) (143, 57)

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

Is this what you intended?

Instructions, part 1

In this part, we first ask you to work on a production task, where you have 15 minutes to satisfy a production requirement. If you satisfy the production requirement, you will also take part in a payment phase. If you do not satisfy the production requirement, you will not take part in a payment phase and you will not earn any money from this part of the experiment.

In the production phase, you will see a matrix of numbers, and you are asked to tick off each occurrence of a given number. For each correct number you tick off, you will gain one point. Each time you tick off the wrong number, one point will be subtracted. You can always push the button to progress to a new matrix of numbers with the same task (but perhaps a different number to look for). Throughout the production phase, you can see the total number of points you have collected so far on the screen.

The production requirement is that you collect a total of 100 points in the 15 minutes you have available.



In the payment phase you will be matched with another participant who also has satisfied the production requirement.

There are three possible outcomes in the payment phase, A, B, and C. The outcomes A and B happen with 45% probability each and C happens with 10% probability. Below is an overview of the three outcomes.

Color codes:

You: 
The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:   You determine

Amounts: (190,190) (10,10) 200 in total

The first number in parentheses refers to your income in NOK, the second to that of the other participant.

In A, you and the other participant are paid an equal amount of 190 NOK. In B, you and the other participant are paid an equal amount of 10 NOK. In C, you determine how to distribute NOK between you and the other participant.

When you have read the instruction, push the button to go on.

Production

Reminder: If you collect 100 points, you will be matched with another participant who has also collected 100 points. Then, with 45% probability A will happen and the pair of you earn (190,190); with 45% probability B will happen and the pair of you earn (10, 10); with 10% probability you determine how 200 is distributed. (The first number in the parentheses refers to your payment in NOK, the second number to the other participant's payment.)

By now you have collected 7 points.

You collect one point per correct tick-off.

In the table below, tick off the number 540

401	155	670	578	486	578	565	401	578	417	703	480	746	486	670
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
461	461	133	560	540	578	565	486	461	486	461	133	560	269	703
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
480	480	133	486	486	401	565	417	670	417	133	155	269	461	461
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
578	578	670	417	155	670	540	401	560	133	133	670	133	540	578
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
486	578	401	417	155	565	560	560	486	269	486	560	565	486	417
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
461	480	540	461	155	480	269	269	155	703	560	133	155	269	401
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
401	578	480	269	565	560	578	670	565	540	578	540	480	155	401
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
560	401	565	560	133	746	560	565	417	565	540	703	703	578	746
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
565	670	269	486	540	703	461	565	269	540	486	560	486	269	560
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
486	560	578	269	486	401	540	155	746	565	401	133	401	461	269
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
133	560	560	133	746	560	269	401	401	461	417	486	417	401	155
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
540	401	670	417	461	417	746	269	703	417	461	540	269	155	670
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>


Introduction to the payment phase, part 1

You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

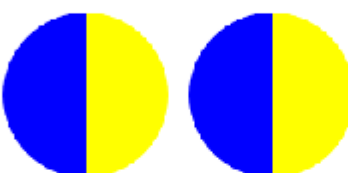
There are three possible outcomes, A, B, and C in this phase. The outcomes A and B happen with 45% probability each and C happens with 10% probability. The outcomes are as follows:

Color codes:

You: 

The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:  You determine

Amounts: (190,190) (10,10) 200 in total

The first number in parenthesis refers to your income, the second to that of the other participant.

Your task in this phase is to determine how 200 NOK should be distributed between yourself and the other participant in outcome C.


Press the button below when you are ready to make this decision.

Distribution

Reminder: You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

Color codes:

You: 

The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:  You determine

Amounts: (190,190) (10,10) 200 in total

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

In the box below, write down how much of the 200 NOK **the other participant** should receive if the outcome is C.

To the other participant if outcome is C:

Copyright Department of Economics, Norwegian School of Economics.

Was this what you intended?

This is an overview of the three possible outcomes, A, B, C after your decision.

You have the opportunity of going back to revise your choice.

Color codes:

You:



The other:



Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:



Amounts:

(190,190)

(10,10)

(172, 28)

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

Is this what you intended?

Yes, I confirm my choice

No, I want to revise my choice

What was the motivation for your decision?

Please explain (briefly) the motivation for your decision for the C outcome:

Enter text here:

Submit Query

Instructions, part 1

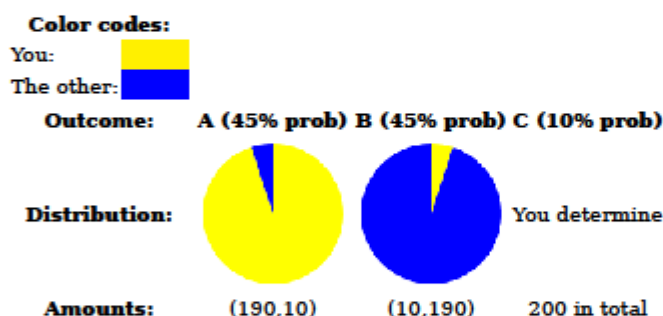
In this part, we first ask you to work on a production task, where you have 15 minutes to satisfy a production requirement. If you satisfy the production requirement, you will also take part in a payment phase. If you do not satisfy the production requirement, you will not take part in a payment phase and you will not earn any money from this part of the experiment.

In the production phase, you will see a matrix of numbers, and you are asked to tick off each occurrence of a given number. For each correct number you tick off, you will gain one point. Each time you tick off the wrong number, one point will be subtracted. You can always push the button to progress to a new matrix of numbers with the same task (but perhaps a different number to look for). Throughout the production phase, you can see the total number of points you have collected so far on the screen.

The production requirement is that you collect a total of 100 points in the 15 minutes you have available.

In the payment phase you will be matched with another participant who also has satisfied the production requirement.

There are three possible outcomes in the payment phase, A, B, and C. The outcomes A and B happen with 45% probability each and C happens with 10% probability. Below is an overview of the three outcomes.



The first number in parentheses refers to your income in NOK, the second to that of the other participant.

In A and B, you and the other participant are paid unequal amounts. In A, you receive 190 NOK and the other participant receives 10 NOK. In B, you receive 10 NOK and the other participant receives 190 NOK. In C, you determine how to distribute NOK between you and the other participant.

When you have read the instruction, push the button to go on.

Production

Reminder: If you collect 100 points, you will will be matched with another participant who has also collected 100 points. Then, with 45% probability A will happen and the pair of you earn (100,100); with 45% probability B will happen and the pair of you earn (100, 100); with 10% probability you determine how 200 is distributed. (The first number in the parentheses refers to your payment in NOK, the second number to the other participant's payment.)

You collect one point per correct tick-off.

In the table below, tick off the number **134**



831	127	620	588	127	688	688	688	127	722	688	722	688	260	727
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
611	522	522	727	620	456	134	536	588	522	831	244	522	620	522
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	522	588	244	134	127	611	620	722	831	260	260	324	722	536
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	127	456	244	536	456	260	134	831	244	688	260	260	688	688
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
831	620	620	611	127	620	611	522	611	831	324	134	536	127	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
727	722	831	324	536	727	831	522	456	831	722	611	588	134	127
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	456	324	134	688	324	127	727	324	620	127	260	831	244	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
127	134	127	127	127	127	831	611	324	134	688	536	536	260	456
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	127	727	831	620	324	831	127	588	831	722	260	260	588	831
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
727	588	522	688	611	536	456	727	244	536	536	831	611	456	727
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
688	727	620	522	456	260	324	831	588	831	588	536	134	127	244
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
620	611	522	831	722	244	456	522	588	127	688	260	244	536	536
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Introduction to the payment phase, part 1

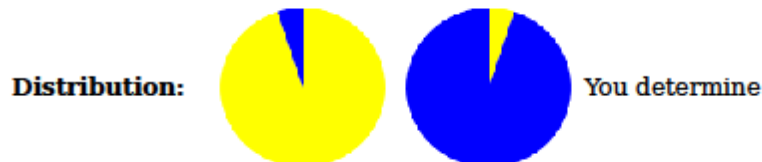
You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

There are three possible outcomes, A, B, and C in this phase. The outcomes A and B happen with 45% probability each and C happens with 10% probability. The outcomes are as follows:

Color codes:

You: 
The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)



Amounts: (190,10) (10,190) 200 in total

The first number in parenthesis refers to your income, the second to that of the other participant.

Your task in this phase is to determine how 200 NOK should be distributed between yourself and the other participant in outcome C.


Press the button below when you are ready to make this decision.

Distribution

Reminder: You have satisfied the production requirement and you are matched with another participant who has also satisfied the production requirement.

Color codes:

You: 

The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:



You determine

Amounts:

(190,10)

(10,190)

200 in total

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

In the box below, write down how much of the 200 NOK **the other participant** should receive if the outcome is C.

To the other participant if outcome is C:

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Was this what you intended?

This is an overview of the three possible outcomes, A, B, C after your decision.

You have the opportunity of going back to revise your choice.

Color codes:

You: 
The other: 

Outcome: A (45% prob) B (45% prob) C (10% prob)

Distribution:



Amounts: (190,10) (10,190) (122, 78)

The first number in parenthesis refers to your income in NOK, the second to that of the other participant.

Is this what you intended?

What was the motivation for your decision?

Please explain (briefly) the motivation for your decision for the C outcome:

Enter text here:

Submit Query

Instructions, part 2

We would again like to ask you to complete a production task within 15 minutes. If you satisfy the production requirement, you will also take part in a payment phase. If you do not satisfy the production requirement, you will not take part in a payment phase and you will not earn any money from this part of the experiment.

In the production phase, you will see a matrix of numbers, and you are asked to tick off each occurrence of a given number. For each correct number you tick off, you will gain one point. Each time you tick off the wrong number, one point will be subtracted. You can always push the button to progress to a new matrix of numbers with the same task (but perhaps a different number to look for). Throughout the production phase, you can see the total number of points you have collected so far on the screen.


The production requirement is that you collect a total of 100 points in the 15 minutes you have available.

In the payment phase you will be matched with another participant who also has satisfied the production requirement.

There are three possible outcomes in the payment phase, A, B, and C. The outcomes A and B happen with 45% probability each and C happens with 10% probability. Below is an overview of the three outcomes.

Color codes:

You: 

The other: 

Outcome: **A (45% prob)** **B (45% prob)** **C (10% prob)**

Distribution:   Determined by the other participant

Amounts: (100,100) (100,100) 200 in total

The first number in parentheses refers to your income in NOK, the second to that of the other participant.

In C, the other participant determines the distribution of NOK between you and him- or herself.

When you have read the instruction, push the button to go on.

Instructions, part 2

We would again like to ask you to complete a production task within 15 minutes. If you satisfy the production requirement, you will also take part in a payment phase. If you do not satisfy the production requirement, you will not take part in a payment phase and you will not earn any money from this part of the experiment.

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There are three possible outcomes in the payment phase, A, B, and C. The outcomes A and B happen with 45% probability each and C happens with 10% probability. Below is an overview of the three outcomes.

Color codes:

You: 

The other: 

Outcome: **A (45% prob)** **B (45% prob)** **C (10% prob)**

Distribution:   Determined by the other participant

Amounts: (190,190) (10,10) 200 in total

The first number in parentheses refers to your income in NOK, the second to that of the other participant.

In C, the other participant determines the distribution of NOK between you and him- or herself.

When you have read the instruction, push the button to go on.

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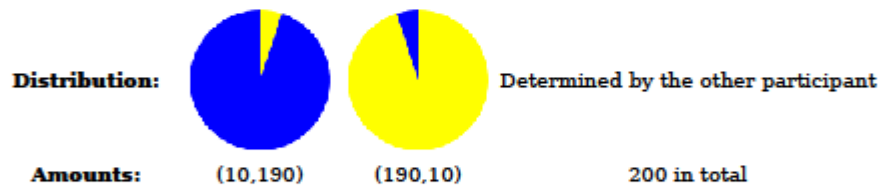
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Color codes:

You: 
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