



**PUNISHMENT AS AN INCENTIVE IN A PRINCIPAL-AGENT INTERACTION -
EVIDENCE FROM A PUBLIC GOODS GAME**

Lappeenranta–Lahti University of Technology LUT

Master's Programme in Strategic Finance and Business Analytics

2022

Ronja Sandström

Examiners: Associate professor Azzurra Morreale

Associate professor Päivi Majjanen-Kyläheiko

ABSTRACT

Lappeenranta–Lahti University of Technology LUT

LUT School of Business and Management

Business Administration

Ronja Sandström

Punishment as an incentive in a Principal-Agent interaction - evidence from a Public Goods Game

Master's thesis

2022

43 pages, 15 figures and 1 table

Examiners: Associate professor Azzurra Morreale, Associate professor Päivi Maijanen-Kyläheiko

Keywords: agency theory, agency problems, incentive, public goods game, punishment

This thesis examines the impact of punishment on the behavior and decision-making of agents when agency problems between principals and agents exist. In this thesis, agency problems arise from differences in remuneration between agents and principals. The aim of the thesis is to find out whether a punishment mechanism can reduce agency problems and act as an incentive for agents to behave as the principal desire. In the study, the principal is in the role of the manager and the agent is in the role of the employee.

An experimental study was used as a base study for the analysis of this thesis. The experimental study was conducted as a laboratory experiment and the impact of punishment was examined using a public goods game. Managers were able to use the punishment mechanism as an incentive to influence employees' choices. The punishment mechanism was used to influence the employees' project selection as well as the contributions to the projects.

The results of the study show that punishment had some impact on employees' choices. With the use of punishment, managers were able to influence employees' decisions in project selection. After the introduction of punishment, employees chose a project that offered a higher return to the manager more often. However, they were not able to influence the contributions of employees as they desired. Overall, the attitudes and thus behavior towards punishment were heterogeneous.

TIIVISTELMÄ

Lappeenrannan–Lahden teknillinen yliopisto LUT

LUT-kauppakorkeakoulu

Kauppatieteet

Ronja Sandström

Rangaistus kannustimena päämies-agenttivuorovaikutuksessa - näyttöä julkishyödykepelistä

Kauppatieteiden pro gradu -tutkielma

2022

43 sivua, 15 kuvaa ja 1 taulukko

Tarkastajat: Apulaisprofessori Azzurra Morreale ja Apulaisprofessori Päivi Maijanen-Kyläheiko

Avainsanat: agenttiteoria, agenttiongelmia, julkishyödykepeli, kannustin, rangaistus

Tässä tutkielmassa tarkastellaan rangaistuksen vaikutusta agenttien käyttäytymiseen ja päätöksentekoon silloin, kun päämiesten ja agenttien välillä on päämies-agentti-ongelmia. Tässä tutkielmassa agenttiongelmia johtavat agenttien ja päämiesten väliset palkkioeroista. Tutkielman tavoitteena on selvittää, voiko rangaistusmekanismilla vähentää agenttiongelmia ja kannustaa agenteja käyttäytymään päämiesten toivomalla tavalla. Tutkimuksessa päämies on johtajan ja agentti työntekijän roolissa.

Tämän tutkielman analyysin pohjatutkimuksena käytettiin kokeellista tutkimusta. Kokeellinen tutkimus toteutettiin laboratorioskokeena, ja rangaistuksen vaikutusta tutkittiin julkishyödykepelein avulla. Johtajat pystyivät käyttämään rangaistusmekanismia kannustimena vaikuttaakseen työntekijöiden valintoihin. Rangaistusmekanismien avulla oli mahdollista vaikuttaa työntekijöiden projektivalintoihin sekä projektien panostuksiin.

Tutkimuksen tulokset osoittavat, että rangaistuksella on jonkin verran vaikutusta työntekijöiden valintoihin. Rangaistuksen avulla johtajat pystyivät vaikuttamaan työntekijöiden päätöksiin projektin valinnassa. Rangaistuksen käyttöönoton jälkeen työntekijät valitsivat useammin projektin, joka tarjosi johtajalle korkeampaa tuottoa. Johtajat eivät kuitenkaan kyenneet rangaistusmekanismien avulla vaikuttamaan työntekijöiden panostuksiin haluamallaan tavalla. Kaiken kaikkiaan asenteet ja siten myös käyttäytyminen rangaistusta kohtaan olivat heterogeenisiä.

ACKNOWLEDGEMENTS

These years spent at LUT have been nothing but amazing and I have met so many wonderful people and experienced great things. I have gotten friendships that will surely last for a lifetime and memories that I will cherish for the rest of my life. Writing this thesis has been quite a long process and sometimes I have felt that it will never come to an end. However, now it is finally ready and a new chapter in my life can begin.

I would like to thank my supervisors, Azzurra Morreale and Päivi Maijanen-Kyläheiko. Your feedback has been helpful and valuable, and I appreciate it a lot.

I would also like to thank my friends, family and Riku. The support you have given me has been irreplaceable. Finally, I have more time to spend with you and I'm looking forward to starting this new phase in my life!

In Helsinki, 27th May 2022

Ronja Sandström

Table of contents

Abstract

Acknowledgments

1.	Introduction.....	1
1.1.	Background and motivation.....	2
1.2.	The research questions.....	4
1.3.	The theoretical framework of the thesis	4
1.4.	Structure of the thesis	5
2.	Theoretical framework.....	7
2.1.	Agency Theory	7
2.1.1.	Criticisms and modifications to the standard agency theory	10
2.2.	Experimental economics.....	11
2.2.1.	Public goods game.....	12
3.	Literature review.....	14
3.1.	Monetary incentives impact on behavior.....	14
3.1.1.	Monetary incentives in public goods game	16
3.1.2.	Monetary incentives in agency theory	18
4.	Research design	21
4.1.	Description of the research data and the data collection process	21
4.2.	Description of the research design.....	22
5.	The hypotheses of the thesis	25
6.	Results and the analysis	27
6.1.	First phase: decision-making without punishment	27
6.2.	Second phase: decision making under the possibility of punishment	32
6.2.1.	Project selection.....	32
6.2.2.	Contributions	36

7. Conclusions.....	40
7.1. Answers to the research question.....	40
7.2. Research limitations and suggestions for future research.....	42
References.....	44

Figures

Figure 1: The theoretical framework of the thesis.....	5
Figure 2: The formation of agency problems (adapted from Eisenhardt 1989)	8
Figure 3: Agency costs (Jensen & Meckling 1976).....	10
Figure 4: Gender and the field of study of the participants	21
Figure 5: Contributions and earnings in project A	23
Figure 6: Contributions and earnings in project B.....	24
Figure 7: The selection of project B on average - focusing on the first phase	28
Figure 8: The selection of project B at the group level	30
Figure 9: Contributions in the first phase	31
Figure 10: Selection of project B on average - focusing on the second phase	33
Figure 11: Punishment points assigned to change the project.....	34
Figure 12: Punishment points assigned to change the project - group level investigation.....	35
Figure 13: The contributions to the project during the second stage.....	37
Figure 14: Punishment points assigned to increase contributions	38
Figure 15: Ratio of actual contributions to total potential contributions (second phase)...	39

Tables

Table 1: Assumptions about the people in the agency relationship (adapted from Eisenhardt 1989).....	9
--	---

1. Introduction

Agency problems are common and they exist in many forms in organizations (Jensen & Meckling 1976). These problems occur when a principal and an agent have a conflict of interest and different preferences on risk but are required to interact. These problems might cause inefficiency, motivational problems, or even lead to bankruptcy as has been seen in the history, e.g., in the fall of Enron (Arnold & Lange 2004). Therefore, agency problems and how to manage them have been an interest of scholars for decades, and according to Fama and Jensen (1983), the control of agency problems is a key factor for the survival of an organization.

Appropriate financial incentives have been recognized to be an efficient way to solve conflicting interests between a principal and an agent (Jensen & Meckling 1976). A common idea among economists is that monetary incentives have the desired impact on individual behavior. Many studies have found monetary incentives to motivate people and drive them towards more efficient performance (e.g., Jenkins, Mitra, Gupta and Shaw 1988; Stajkovic & Luthans 2001). Especially punishment as an incentive has been seen to be influential (Fehr & Gächter 2000a; Cressman, Song, Zhang and Tao 2011). However, many scholars have found opposite evidence, arguing that extrinsic (i.e., monetary) incentives are not a good way to motivate people to act as desired and they may reduce intrinsic motivation (Kohn 1993; Fehr and Gächter 1998; Deci, Ryan and Koestner 1999).

According to Baker, Jensen and Murphy (1988), it is essential to understand incentives since they largely determine how people behave in organizations. However, the effectiveness of incentives in solving agency problems is still debated. In experimental studies, such as the public goods game, punishment as an incentive has been seen to have the desired influence on individuals. A public goods game is an experimental research method in which participants have an endowment from which they contribute tokens in a common public pot. This common public pot will be multiplied by a factor and then it will be shared equally among all participants. (Miltenburg, Buskens, Barrera & Raub 2014) Thus, contributions

accumulated to the public pot will be shared evenly among all participants regardless of the level of contribution.

This thesis follows this line of research and aims to find out whether and how punishment is an effective tool to influence the behavior and decision-making of agents when agency problems between principals and agents exist. The focus of this thesis is on the principal-agent relationship between managers and employees which is less studied than the typical agency relationship between shareholders and managers. Even though it is less covered in agency literature, it is still a very important issue that should be explored extensively.

1.1. Background and motivation

The principal-agent relationship has been an interest of scholars for a long time. Agency theory has been a dominating theory in its field and its thoughts on efficient incentive schemes have been used in many studies, especially in the studies of executive compensation. Agency theory is a multidisciplinary theory that has been utilized e.g., in economics, finance, marketing, accounting, and organizational behavior (Eisenhardt 1989). At first, agency theory concentrated on the risk-sharing problem between the parties of a principal-agent relationship, but later the concept of agency theory broadened and included differences in goals and work contributions into the theory as well (Jensen & Meckling 1976; Eisenhardt 1989). Even though agency theory has its long roots and has been well-studied, it is still a controversial theory that has its proponents and opponents. Many scholars have argued that agency theory does not resemble the real world and therefore have adjusted for instance the assumptions of the theory (e.g., Wiseman and Gomez-Mejia 1998).

Agency theory literature has been mostly concerned with agency problems between the shareholders and executives of the firm, (e.g., Agrawal & Knoeber 1996; DeFusco, Johnson & Zorn 1990; Hermalin & Weisbach 1991; Jensen & Meckling 1976; Garen 1994), shareholders being the principals and executives the agents in this relationship. But some studies have also researched agency problems in other relationships as well, for instance in supplier relationships (e.g., Zsidisin & Ellram 2003; Lassar & Kerr 1996; Camuffo, Furlan & Rettore 2007; Manatsa & McLaren 2008; Whipple & Roh 2010), manager-employee

relationships (e.g., Van Puyvelde, Caers, Bois & Jegers 2013) and outsourcing relationships (e.g., Logan 2000; Bahli & Rivard 2003).

When experimental economist Vernon Smith received the 2002 Nobel Prize in Economics with psychologist Daniel Kahneman, experiments experienced growth as a valid and accepted methodology in the field of economics (Croson 2005). Even though experimental studies had been conducted in the economic field already for a long time, it was still commonly argued that economics could not be an experimental science. However, nowadays experiments in economics have generalized and scholars are more and more interested in studying economic theories in the laboratory and in the field. One of the most common experiments in the field is the public goods game and it has been utilized to study the questions in economic theories. With the public goods game, the incentive effect in the group can be observed and some predictions made in the light of agency theory and prior literature on experimental studies. (Croson & Gächter 2010)

This study will contribute to the agency theory and experimental studies. As stated earlier, most of the prior agency theory studies have focused on the relationship between shareholders and executives. The manager-employee relationship on the other hand seems to be less studied in the agency theory context. From the organizational perspective, it is important to understand how incentives can reduce possible agency costs. Even though agency literature and incentives are much studied, public goods game as a study method is not that common in agency theory literature, at least to my knowledge, and it could give important insight into multiple agent-principal interactions and highlight the behavioral aspect of agency theory which is not included in the “traditional” agency theory. Furthermore, principal-agent issues are usually studied between one principal and one agent. However, this thesis studies the interaction between one principal and three agents. In this way, we can see how e.g., free-riding occurs in a principal-agent interaction and observe how an agent’s choices are affected by other agents’ actions.

1.2. The research questions

The aim of this study is to find out whether punishment as an incentive is an effective tool to align the interests of principals and agents, thus, getting agents to behave as desired by the principal. The empirical part of the study consists of an analysis of experimental research conducted by Viola Saredi and Luigi Mittone. This research is a laboratory experiment where a public goods game is used to examine the decision-making of agents when the punishment mechanism is not in use and when it is used. From the experiment, it can be observed how the contributions and project selections of employees (agents) change when the punishment mechanism can be used by principals and how these contributions change when the game is repeated. Literature and findings from prior studies about agency theory, incentives and the public goods game are used to support the findings and analysis. The main research question of this study is:

“What kind of an impact does punishment have on the project selection and contributions of employees in a principal-agent interaction within a public goods game?”

The sub-research questions that will assist to answer the main research question are the following:

“How do employees contribute when there is no punishment involved?”

“How do employees contribute when the punishment is introduced?”

“How does the decision-making about contributions and project selection change when the game is repeated, and employees are informed of each other’s decisions?”

1.3. The theoretical framework of the thesis

The theoretical framework illustrates the main concepts of the study and their relations. The main concepts of this study are agency theory, public goods game and punishment (figure

1). The theoretical framework shows that the impact of punishment on agent behavior is analyzed using agency theory and the public goods game. Some hypotheses of the thesis are drawn from the assumptions of agency theory and its view on incentives. In the study agency problems are present since there are differences in the remuneration of agents and principals and the principals wish that agents will make choices that offer principals a higher remuneration. The public goods game belongs to experimental economics, and it is a laboratory study where the factor of interest's impact can be studied by extracting other external factors that might influence the behavior. In this study incentives, and more precisely punishment, are the factor of interest and their impact on the behavior of agents will be observed.

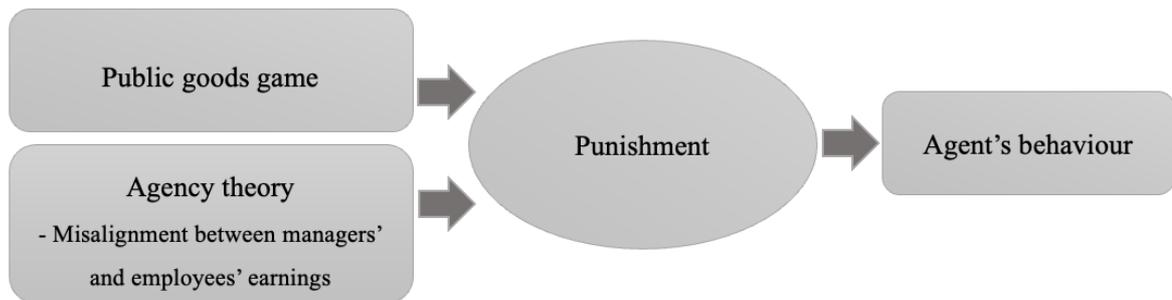


Figure 1. The theoretical framework of the thesis

1.4. Structure of the thesis

This thesis has seven chapters. The thesis begins with an introduction. The introduction chapter consists of an introduction to the topic, background and motivation for the research, the research questions, the theoretical framework of the thesis and structure of the thesis. The second chapter is a theoretical framework where central theories and concepts are presented. The third chapter is a literature review that gives an extensive overview of the topic. The literature review presents findings on how incentives have affected individual behavior and performance, highlighting experimental studies. The impact of incentives will be examined from the agency theory and public goods game context. In the fourth chapter, the research design and data will be introduced. The fifth chapter introduces the hypotheses of the study. In the sixth chapter, the results and analysis of the laboratory experiment are

presented. In the last chapter conclusions of the study are summarized and limitations and some suggestions for further research are presented.

2. Theoretical framework

This chapter presents the theoretical framework of the thesis, i.e., the main concepts and theories of the study. The first sub-chapter introduces agency theory. First, a simple model of agency theory is presented, and the basic assumptions of agency theory are briefly explained. Also, the sub-chapter of agency theory will go through some of the criticism the traditional agency theory has received and some extension that has been made to the assumptions. The second sub-chapter concerns experimental economics, focusing on a public goods game which is the experimental setting in this study. In the sub-chapter, the public goods game is presented as well as some strategies of the public goods game are introduced.

2.1. Agency Theory

Agency theory addresses problems that occur in a principal-agent relationship. Agency theory aims to make predictions about how rational individuals will behave when considering agency theory's assumptions about the parties in the agency relationship (Wright et al. 2001). In the principal-agent relationship, an agent acts on behalf of a principal and some decision-making authority is delegated to the agent. When the goals or preferences of the agent and the principal do not meet, agency problems may occur because the agent may not act in the best interest of the principal (McCoy & Flesher 1998). Agency problems may cause losses to parties and thus it is a desire of the principal to minimize these costs. Incentives are a central matter in agency theory because in the theory it is believed that by using incentives, it is possible to align the interests of the agent and the principal. (Eisenhardt 1989)

As said, agency problems occur in the agency relationship. According to Eisenhardt (1989), a few different reasons why agency problems occur can be identified. Firstly, agency problems arise when the agent and the principal have differing goals and interests. Secondly, problems arise when the principal has difficulties verifying what the agent is doing. The third problem that has been recognized is the risk-sharing problem which means that the

agent and the principal have different preferences on risk. This is a problem since the agent might act differently as it is hoped by the principal because the agent has a different attitude towards risk. Since the agent is the one performing the tasks on behalf of the principal, and the agent might have different goals or risk preferences regarding the task, the agent may not act in a way that is desired by the principal (Jensen & Meckling 1976; Wright, Ferris, Sarin & Awasthi 1996). Agency theory seeks to identify “a contract”, for instance, an incentive scheme, that minimizes the costs occurring from the principal-agent relationship (Wright, Mukherji, Kroll 2001).



Figure 2. The formation of agency problems (adapted from Eisenhardt 1989)

Agency theory is based on seven assumptions, According to Eisenhardt (1989), these assumptions are self-interest, bounded-rationality, risk-aversion, goal conflict, information asymmetry, information as a commodity and preeminence of efficiency. Acknowledging the assumptions of the agency theory, that is, helps to understand why agency problems occur and how and which kind of incentives can be used to minimize agency costs that arise from the agency relationship.

The assumptions about the people in the agency relationship are presented in Table 1. One of the key assumptions of agency theory, as in most economical theories, is that the principal and agent are both self-interested. This means that actors consider only their own utility maximization when making decisions. Another assumption is that principal and agent are boundedly rational. Bounded rationality means that instead of optimization, actors make decisions that satisfy them enough. The final assumption is that agents are considered to be

risk-averse and show risk-averse behavior in decision making (Wright, Mukherji & Kroll 2001). The risk aversion behavior stems from the idea that the agent's employment and income are tied to a single firm instead of diversifying it across multiple firms as the principal may do (Wiseman & Gomez-Mejia 1998). Because principals can diversify their ownership across many firms, principals are considered to be risk-neutral. Thus, when a decision-making situation includes uncertainty agency theory assumes that agents tend to choose a less-risky option where the return might be lower and hence might cause opportunity costs to principals who would prefer riskier and return-maximizing choices. (Eisenhardt 1989)

Table 1. Assumptions about the people in the agency relationship (adapted from Eisenhardt 1989)

Agency theory's assumptions	
Self-interest:	Actors make decisions based on own utility maximization
Bounded rationality:	Actors make decisions that satisfy them enough
Risk preferences:	Principal is risk-neutral Agent is risk-averse

As discussed earlier, in agency theory it is assumed that there is information asymmetry between principal and agent, which in this case means that it is expensive or difficult to verify what the agent is doing. Moral hazard and adverse selection are issues that are linked to the agency theory and are caused by information asymmetry. In agency theory moral hazard refers to a situation where an agent may be shirking and does not put the effort into the action as much as should, i.e., hidden action (Arrow 1985; Shapiro 2005). Adverse selection on the other hand means that an agent has claimed to have a specific skill or ability that the principal cannot verify to be true, i.e., hidden information (Arrow 1985; Shapiro 2005). (Eisenhardt 1989)

Agency problems cause agency costs. When the agent is the one performing the task and the decision-making authority is delegated to the agent, the agent may act as he wants and thus might create agency costs to the principal. Jensen and Meckling (1976) have identified three different types of agency costs that stem from agency relationships (figure 3). One type of

agency cost is the monitoring expenditures which result from monitoring activities on the actions of the agent on behalf of the principal. Another type of agency cost is bonding expenditures. Bonding expenditures are paid by the agent, and they work as an assurance that the agent will act as it is hoped by the principal, i.e., the agent does not act in a harmful way for the principal or if so, the loss in principal's welfare will be compensated. The residual loss that is the third type of agency cost reflects the loss that is due to the divergence between the principal's and the agent's interests. (Jensen & Meckling 1976)

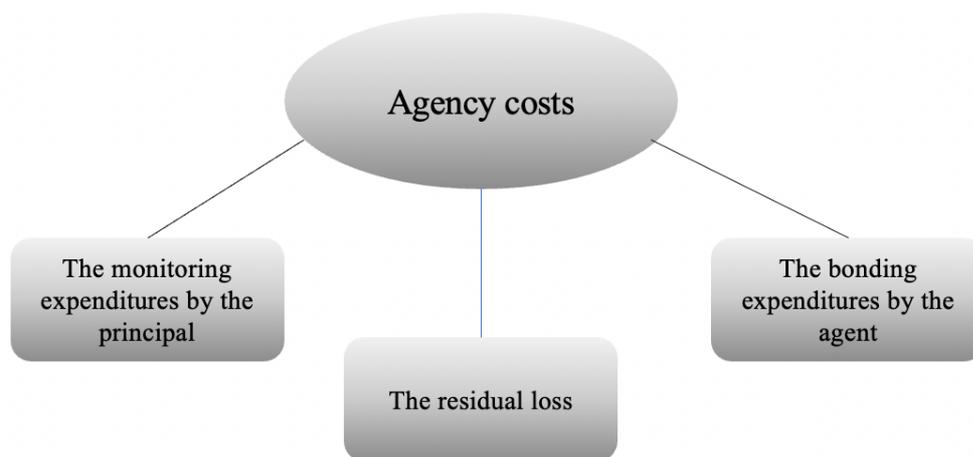


Figure 3. Agency costs (Jensen & Meckling 1976)

In agency theory, it is believed that appropriate incentives along with monitoring will reduce these agency costs and thus induce the agent to behave as it is hoped by the principal and take more risks even though agents are assumed to be risk-averse (Jensen & Meckling 1976). According to Eisenhardt (1989), agency theory seeks to find an efficient contract between the parties of the principal-agent relationship by taking the agency theory's assumptions into consideration. Thus, the primary goal is to identify the most efficient contract which takes into consideration the benefits and the costs of incentives and will lead to the desired outcome (Cuevas-Rodríguez, Gomez-Mejia & Wiseman 2012).

2.1.1. Criticisms and modifications to the standard agency theory

Agency theory has received criticism from many scholars. Agency theory has been criticized e.g., for its assumptions and views on how extrinsic incentives affect the behavior of the

agent. For instance, Wright et al. (2001) argue that agency problems may be very complex in real life and viewing them from the strict set of assumptions that agency theory has set may lead to wrong predictions about the agent's actions. The assumption of risk preferences has been challenged. As stated earlier, agency theory assumes that the principal is risk-neutral and the agent is risk-averse. Wiseman and Gomez-Mejia (1998) argued that the parties' attitudes toward risk are not as simple as it has been presented in the agency theory's assumptions. They researched executives' risk-taking in the context of agency theory and found that agents are not only risk-averse as it is assumed in agency theory, but they are also risk-seekers as well as risk-neutral. Also, MacCrimmon & Wehrung's (1986) research supports the claim that agents differ in their attitudes towards risk.

Bosse and Philips (2016) have challenged the assumption of narrow self-interest by proposing that actors are boundedly self-interested. They state that boundedly self-interested actors want to maximize their wealth, but it is not the only factor affecting their decision-making since they also think about fairness and reciprocity in their decision as well. This appears in such behavior that when an actor receives good treatment, they respond to it positive and cooperative manner and when the actor feels that he gets bad treatment, vice versa (Fehr & Gächter 2000b). Fehr and Gächter (2000b), Wright et al. (2001) and Güth, Klose, Königstein and Schwalbach (1998) among other scholars have also argued that the agent's behavior in the principal-agent relationship is sometimes better explained by reciprocity than extrinsic incentives.

2.2. Experimental economics

Experimental economics addresses economic theories and questions with the use of experimental methods. Experiments in experimental economics can be done in the field or in the laboratory. These experiments are done in a controlled environment, thus the impact of a particular factor on actors' behavior can be observed when the other factors are held constant and only the factor of interest varies in time. In these experiments, it is crucial to control the variations of factors in order to make causal conclusions. (Croson & Gächter 2010).

In economic theories, the relationship between individuals' behavior and payoffs is studied, and it is assumed that the actors understand this relationship and their behavior can be predicted in the light of selected theories. In economic experiments, the context of the study is typically abstract. They are for instance told that they are contributing to projects with varying payoffs instead of saying that they are contributing to the public good. This is done to avoid e.g., noise to the data or systematic bias or demand effects. (Croson 2005)

2.2.1. Public goods game

The public goods game is one of the most widely used experiments in experimental economics. Public goods game is used to study behavior in situations including some sort of social dilemma (Kurzban & Houser 2001). Generally, in public goods game (PGG) player's contribution goes to a common pool where the pool will be multiplied by a factor, larger than one, and then distributed evenly among players (Guala 2005). The largest public pot and thus payoffs will be achieved when all participants contribute their whole endowment. However, usually, it is more tempting for players not to contribute to the public good since it will be distributed evenly among all participants despite the individual contribution and free riding could offer better payoffs considering the situation. (Guala 2005)

Classical strategies of the public goods game are to cooperate or defect. Simply, when there are only two players, cooperation as a strategy means that the player contributes to the public good and defection means that player will not contribute to the public good. In this situation, the dominating strategy is to defect. (Guala 2005) When the number of players increases, so do the possible strategies in the public goods game. When there are more players than two, cooperation in PGG means contributing above average whereas defection means contributing below average. In general, defection, i.e., free riding, is supposed to be the dominating strategy since contributing to the public good has a private cost that outweighs the private benefit received by the public good (Croson 2005). Also, for PGG, it is typical that the contribution levels usually diminish towards Nash equilibrium during the repetition of the game (Guala 2005).

In a linear public goods game, there can be identified two dominant strategies depending on whether the marginal return is below or above the cost of contributing. When the marginal

value of the public good is below the cost of contribution, the Nash equilibrium is to contribute nothing. Whereas if the marginal value is above the cost of contribution, the social optimum is to contribute as much as possible. However, it has been noted that in laboratory experiments, players do not typically follow these dominant extreme strategies. Anderson, Goeree and Holt (1998) argue that players contribute more than predicted when they should contribute nothing (Nash equilibrium is at zero) and contribute less than predicted when they should do the opposite (equilibrium is at full contributions). (Miltenburg, Buskens, Barrera & Raub 2014; Guala 2005)

Kurzban and Houser (2001) found individual differences between the participants of PGG. Even though the public goods experiments have predictions on how the participants would act in public goods situations, they found significant heterogeneity in the behavior of the participants. Some participants free ride completely whereas some contributed almost their full endowment even when there were free riders in the game. They identified player types of the public goods game which were strong free riders, conditional cooperators of reciprocators and strong cooperators. They were able to identify 82% of the participants of the game, and strong free riders accounted for 28% of the group, conditional cooperators of reciprocators accounted for 29% of the group and strong cooperators accounted for 25% of the group.

3. Literature review

This literature review aims to provide an overview of the topic and what has been studied in this research area. First, the incentives' effect on performance and behavior is generally introduced. In the sub-chapters, the incentives are studied in the context of agency theory and PGG. This literature review focuses on the experimental studies and highlights results obtained from the laboratory and field studies.

3.1. Monetary incentives impact on behavior

The impact of monetary incentives on behavior has been an arguable issue among scholars. Some scholars have been convinced that incentives have a considerable effect on behavior and performance, but some scholars have found evidence that incentives do not lead to an increase in performance as it has been alleged in incentive studies. Some studies have also brought up that intrinsic incentives, e.g., feeling of accomplishment, being valuable and satisfaction got from activity, weights more in decision-making situations than extrinsic incentives, such as rewards and punishments. This chapter will present notable findings made on this topic, highlighting the studies that have researched this issue experimentally.

Some scholars have conducted a meta-analysis about the impact of incentives. Jenkins, Mitra, Gupta and Shaw (1988) studied how financial incentives affect individuals' performance by examining the impact of incentives on performance quantity and quality by conducting a meta-analysis on experimental studies. From their meta-analysis, they found that financial incentives were not related to performance quality. However, incentives were related to performance quantity with an effect size of 0.34. When Bonner, Hastie, Sprinkle & Young (2000) performed an extensive review of laboratory studies about financial incentives, they found that incentives enhanced performance in half of the experiments. Interestingly when the tasks became more cognitively complex and thus the distance between task complexity and skill level increased when the level of skills was held constant, the incentives were less effective to raise performance.

Stajkovic & Luthans (2001) studied experimentally the effectiveness of monetary incentives and how they position compared to intrinsic incentives. Monetary incentives were found to be effective since the performance of participants got better, but also it was found that monetary incentives had a stronger influence (+31,7%) on the performance than intrinsic incentives, which were social recognition (+24%) and feedback (+20%). A meta-analysis conducted by Condly, Clark and Stolovitch (2003) obtained similar results on incentive schemes when they found that incentive programs accounted for a 22% gain in the overall average performance. Monetary and non-monetary incentives were also compared in the meta-analysis and monetary incentives resulted in higher performance than non-monetary. Hendijani, Bischak, Arvai and Dugar (2016) conducted an experiment on how monetary rewards and intrinsic motivation affect overall motivation and performance. In the research, monetary rewards had a positive impact on overall motivation and performance, regardless of the individual's level of intrinsic motivation.

When focusing on punishment as an incentive, many studies have found punishments to be an effective way to impact the behavior of individuals. Fehr & List (2004) studied the effect that punishment has on efficiency and observed that the efficiency is highest when the threat of punishment exists but is not used, and lowest when the punishment is actually used. Chen (2012) also found punishment to be an efficient way to increase effort when they were combined with a reward instead of using only rewards. When Hannan, Hoffman and Moser (2005) studied experimentally the effectiveness of bonus contracts and penalty contracts they found that employees prefer bonus contracts over penalty contracts. However, they found that effort was actually higher when penalty contracts were used. This was because employees want to minimize the risk of getting a penalty and thus work harder under a penalty contract. Nevertheless, they also found that employees wanted to work harder under a bonus contract, because of the effect of reciprocity, but the effect of loss aversion caused by a penalty contract had a stronger influence on the employees.

The main argument against incentives has been that they reduce intrinsic motivation and thus performance. Fehr and Gächter (1998) argued that punishment as an explicit incentive may actually reduce the performance since explicit performance measures might create an atmosphere of threat and therefore decrease the willingness to cooperate voluntarily. According to Deci, Ryan and Koestner (1999) and Jordan (1986) extrinsic incentives

decrease the intrinsic motivation and hence the performance of an employee. Kohn (1988) also argues that rewards may cause problems in many ways. Firstly, he argues that if people are given incentives, they do not focus on the quality of the work, instead, they will do the work as fast as they can in order to achieve the incentive. Secondly, he claims that intrinsic interest may be reduced by the use of extrinsic rewards. Lastly, he argues that if incentives are used, people may feel like they are controlled by the incentives and thus it can create a negative feeling for people.

The argument about extrinsic incentives reducing intrinsic motivation has been challenged in many studies as well. E.g., Eisenberger's and Cameron's (1996) analysis provided little evidence that extrinsic incentives would reduce an individual's intrinsic motivation. Cerasoli, Nicklin and Ford (2014) argued that extrinsic incentives did not reduce intrinsic motivation and that extrinsic incentives had a greater impact on performance quantity than intrinsic motivation. However, they found that intrinsic incentives had a greater impact on performance quality than extrinsic incentives. Also, they noted that intrinsic motivation and extrinsic incentives should not be considered necessarily as opposite matters and they are best considered simultaneously. Cameron and Pierce (1994) meta-analysis supported these findings as well.

Belle and Cantarelli (2015) studied the effect of incentives in the public sector. In their experiment, monetary incentives had no significant effect on the effort levels of the study participants. Weibel, Rost and Osterloh (2009) also conducted a meta-analysis on how effective incentives schemes are in the public sector. According to their study, incentives did generally increase the intention to make an additional effort. However, when they compared intrinsic and extrinsic motivation, intrinsic motivation outperformed extrinsic motivation in the public sector. When they used multilevel mixed-effects linear regression, they found that the beta of extrinsic motivation raises performance only a little ($\beta=0.11$) and intrinsic motivation on the other hand influenced performance strongly ($\beta=0.60$)

3.1.1. Monetary incentives in public goods game

Incentives, punishments and rewards, have been found to be successful solutions to promote cooperation and decrease free riding in the group. For instance, Balliet et. al. (2011) argue

that rewards and punishments increase cooperation and decrease free riding in PGG. Especially punishment has been seen as a successful way to promote cooperation and increase contributions in PGG experiments (Fehr & Gächter 2000a; Cressman, Song, Zhang and Tao 2011). Fehr and Gächter (2000a) researched the effect of punishment by conducting a public good experiment with and without punishment. In their research punishment had a positive effect on contribution level and with punishment, they were even able to achieve full cooperation. Whereas without punishment free riding was a dominant strategy and the contributions decreased nearly to a full defection situation. Sefton et. al. (2006) had similar results in their study when the level of contributions was higher when there was a possibility of getting a punishment. However, in their study, the use of punishment led to inefficiency at first since the costs of sanctions outweighed the impact of increased contributions. However, when the experiment progressed the possibility of being punished affected positively group performance.

Balliet et al. (2011) examined whether rewards and punishments promoted cooperation and what types of variables amplify the effect of incentives. They found that both incentive types did impact positively on the contributions of the participants. The variables that amplified the effect of incentive were the cost of incentive and the source of incentive. They found punishment to be more effective than rewards and they also found that the incentives were more effective when it was costly to administer rather than free. Szolnoki and Perc (2010) also found that costly punishment is more efficient than costly rewards. Centralization of the incentive on the other hand did not influence the effectiveness of the incentive (Balliet et al. 2011).

The repetition of the game has an impact on free riding behavior as well as the effectiveness of incentives. According to Andreoni (1988) the results obtained from laboratory experiments indicate that free-riding does not exist in single-shot games. However, when the game is repeated, the level of contributions decreases, and free riding tends to increase (Fehr and Gächter 2000a; Andreoni 1988). Based on the study conducted by Balliet, et al. (2011), punishments were more effective in repeated dilemmas when the same group continued to interact with each other. The findings were obtained by comparing a situation where the group changed after each trial and a one-shot dilemma.

Other factors, in addition to incentives, have been seen to influence the contributions of participants and thus free riding behavior by some scholars. Behavioral aspects, such as reciprocity, altruism and kindness have been brought up also in public goods experiments. Fischbacher, Gächter & Fehr (2001) brought up the concept of conditional cooperation in connection with PGG. By conditional cooperative people, they mean people that contribute more to the public pot when they believe that others contribute more as well. Even when there were conditionally cooperative participants, free riding is common in anonymous interactions. Andreoni (1995) argues that there are two main explanations that could explain why free riding is not the dominant strategy in the laboratory. These two main reasons for that are kindness and confusion. He conducted a public goods experiment where the incentives were controlled in a way that the best strategy was to be the biggest free rider of the group and contribute nothing. It was found that even though there were no monetary incentives in use, 75 percent of the participants were cooperative, from which half of this was accounted by kindness. The other half of the cooperation was due to confusion.

3.1.2. Monetary incentives in agency theory

Roth and O'Donnell (1996) studied the relationship between incentives and agency problems. In their research, incentives had a positive impact on effectiveness as long as the incentive scheme was aligned to the agency state. Anderhub, Gächter and Königstein (2002) studied incentives in a principal-agent relationship and found a positive relationship between incentives and performance. In their laboratory experiment, it was observed that the higher the return share was, the higher was the effort level of the agent, as the principal hoped. Grossman & Hart (1983) analyzed incentive schemes under the principal-agent relationship. In their study, they wanted to find the optimal incentive scheme in such a case where the agent's stance towards income risk is not dependent on action. They argued incentive scheme to be competent when it is monotonic, progressive and regressive.

Based on most research it seems that in this principal-agent relationship, the incentive does not have a great impact. Jensen and Murphy (1990) studied the compensation of CEOs and they found that the relationship between pay and performance was actually quite weak.

Garen (1994) found similar results since the overall explanatory power of the relationship between pay and performance was quite low. Wang (1997) used a dynamic agency model to examine the pay-for-performance sensitivity of CEOs. His study resulted in similar findings. The pay-performance sensitivity is positive and significant, but the impact is very small.

Reciprocity and fairness are issues that have also come up in the context of the principal-agent relationship. Many scholars have found that reciprocity and fairness have been more influential in the principal-agent relationship than has been believed. Fehr and Gächter (2000b) state that many people actually deviate from the self-interested behavior that is believed in the standard economic models such as agency theory and it is due to reciprocity. Anderhub et al. (2002) argued that reciprocity and fair sharing have a significant influence on an agent's behavior, also in more complex principal-agent dilemmas. Fehr and Gächter (2000c) have also argued that incentives may cause a crowding-out effect that is so strong that contracts that use incentives work actually worse than the ones without them. This is due to the fact that reciprocity-driven cooperation was crowded out by incentive contracts assigned to the agents.

The effectiveness of incentives depends also on whether the monetary incentives are offered to an individual or a team. Holmstrom (1982) examined the incentive effect in a situation where there were multiple agents with asymmetric information about other actions, i.e., moral hazard. In the study, it was found that if there is higher uncertainty about the output measures and the team is bigger, an efficient incentive scheme is harder to define. The reason why group incentives might not be efficient, especially in large groups, is that in groups free riding is a tempting choice. Fong and Tosi (2007) have raised some claims on agency theory and incentives by saying that the agent's decision-making process is more complex than presented in agency theory. Based on their research it is unique how incentives affect the agent's behavior.

As presented above, agency theory has been applied to incentive-related studies. A large body of literature has been interested to examine how effective incentives are in the principal-agent relationship, especially in executive compensation. Even though agency theory is a well-known theory, not many agency theory-related studies have explored other

relationships than the shareholder-executive agency relationship. Also, one principal and multiple agents' dilemma is less studied in agency theory-related experimental studies. Hence, this study aims to find answers to these research gaps since it examines the agency relationship between managers and employees, and there are many groups with multiple agents and one principal. Studies that have examined the effectiveness of incentives in the principal-agent relationship have focused mainly on the reward aspect, e.g., pay-for-performance and bonuses tied to performance measures. The effect of punishment has thus been less explored (Etchart-Vincent & l'Haridon 2011). The punishment has however found to be more effective in incentive studies (Fehr & List 2004; Chen 2012; Hannan, Hoffman & Moser 2005). As mentioned, PGG has been successfully implemented in studies that focus on the effect of the punishment. However, PGG is not that much used in agency theory-related studies that have examined the impact of punishment. Hence, this study uses PGG to study the impact of punishment in the principal-agent interaction.

4. Research design

The study which is used as a base study for the analysis is a laboratory experiment where public goods game is used to examine how employees decide how much and to which project to contribute when there is a misalignment of incentives between the managers and employees. The study is carried out by researchers Luigi Mittone, Viola Saredi, Azzurra Morreale and Päivi Maijanen-Kyläheiko.

4.1. Description of the research data and the data collection process

The experiment was conducted at the Cognitive and Experimental Economics Laboratory (CEEL) of the University of Trento. Students from the university took part in the experiment. Two sessions were conducted, and 40 students took part in the experiment in total. The average age of participants was 23.3, and 18 females and 22 males took part in the experiment. Of 40 participants 22 of them were students of economics, 7 of social sciences, 5 of law, 5 of engineering and 1 of humanities (figure 4). The participants were not informed about the purpose of the experiment, and they were able to take part in the experiment once.

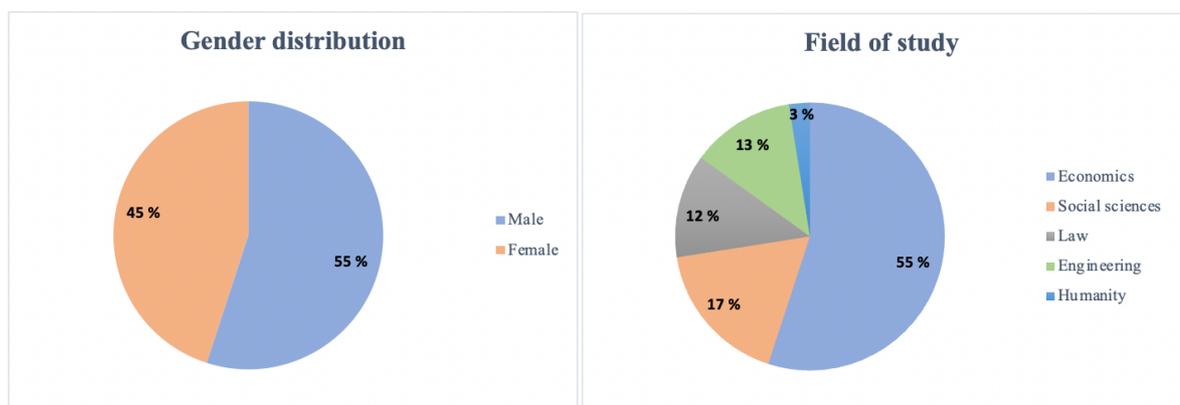


Figure 4. Gender and the field of study of the participants

The experiment proceeded as followed. Participants had a computer workstation to which they were randomly assigned. After that, the instructions were communicated to participants,

and they had to answer some questions to be clear that they understood the instructions. After the experiment, participants filled out a questionnaire about the experiment, such as the overall impression of the game and behavior of other participants and what they would have liked to communicate to other participants if they could have done that. Each participant received 3€ for being present on time, plus an amount according to his choices. On average, each participant earned an average of 12€.

4.2. Description of the research design

The research is conducted as a laboratory experiment and the results are obtained by using PGG as the experimental game. Two experimental sessions were conducted. Groups 1 to 5 were part of the first experimental session. Groups 6 to 10 were part of the second experimental session in which the participants were able to interact with each other. In each experiment session, there are five groups, having four participants in each group. One participant in the group has the role of manager (principal) and three others have the role of employee (agents). In the game, each employee has an endowment of 20 tokens to contribute in each period. Tokens represent the amount of effort or number of working hours used to pursue specific objectives set by the organization. Managers do not contribute to the projects; the remuneration of all participants depends on the contributions of employees.

The experiment is divided into two phases to see how punishment/the threat of punishment affects the project selection and the contributions of employees. The first phase has five periods. The punishment is only hypothetical during the first phase, and it does not have a cost to the managers, nor does it affect the returns of employees. The second phase has twenty periods, and the manager of the group has the possibility to punish the employees by assigning punishment points to them. The punishment points will decrease employees' returns by ten percent. Assigning punishment points has also a cost to the manager and the cost is based on a cost function that is known by managers. The points can be assigned based on two reasons: 1) the manager wants the employee to choose a different project and 2) the manager wants an employee to increase his contribution. The same employee can receive points based on either one or both reasons. The reason why employees received punishment points is communicated to the employee if points have been assigned to them.

Participants receive feedback during the experiment. Feedback is given after each period. First, the employees receive information about the total number of employees that have selected the project he has chosen. Second, the overall contribution of the group in the chosen project is told. Subsequently, the value of project C as well as their share of it is told to employees. Managers are informed about the total number of employees in project A and the overall contributions to project A. Managers are also informed about their share in project C.

Figure 5 illustrates the returns obtained from project A and the endowments of employees. For simplicity, only managers and one of the employees (E1) returns and endowments are shown in the figure. Every employee has the same number of tokens to contribute to each period and the same remuneration. The returns are represented by the blue arrow. The immediate return that an employee obtains from the public good A is equal to his share of the remuneration based on the contributions of his group, that is $0.4 \sum$ contributions to project A. The manager's remunerations are calculated as $0.6 \sum$ contributions to project A. Hence, the manager receives higher remuneration from project A and wishes employees to choose project A. Employees' contributions are presented by grey arrows. Employees have twenty tokens to contribute to each period, but they do not have to contribute if they do not want to.

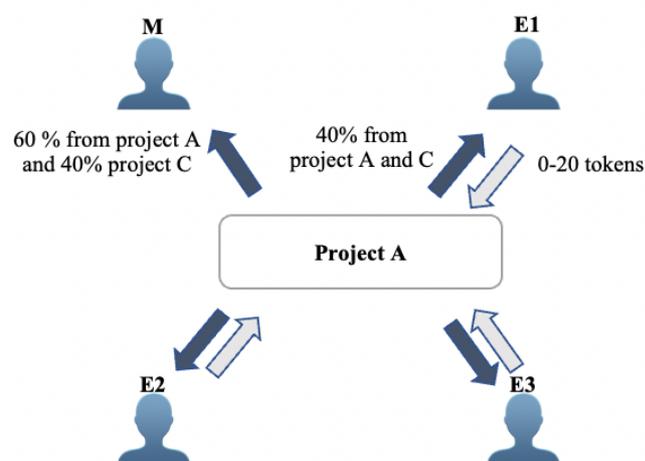


Figure 5. Contributions and earnings in project A

Figure 6 illustrates the formation of public goods B and the remuneration obtained from the project. When an employee contributes to project B, he will receive the same immediate

return as from project A which is $0.4 \sum$ contributions to project B. Manager does not receive an immediate return from project B but he receives the same share from project C as everyone else. Thus, the manager's return obtained from project B is lower than the return obtained from project A. The endowment for project B is the same, i.e., twenty tokens. Contributing to project B offers employees a possibility to earn additional returns since the contributions made to project B activates public good C. If employees decide to contribute to project B, they have a possibility to earn additional returns and thus project B should be the project that employees should contribute if they want higher returns. Hence, the managers obtain better remuneration from project A and employees have a possibility for better remuneration if they contribute to project B.

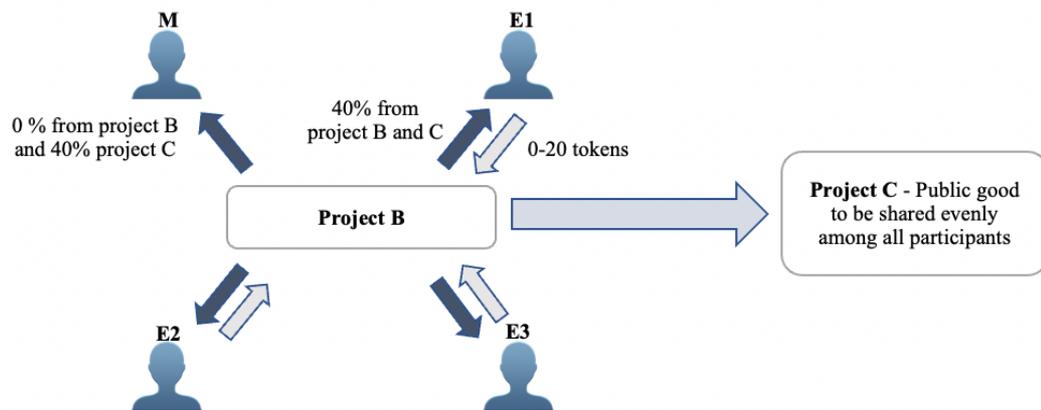


Figure 6. Contributions and earnings in project B

5. The hypotheses of the thesis

The hypotheses of this thesis are derived from agency theory and public goods game studies. The first hypothesis concerns the agent's decision-making when punishment is not in use. The second and the third hypotheses concern the agent's decision-making when incentive, i.e., punishment, can be used. The fourth hypothesis of the study concerns the repetition of the game and how it affects the decision-making of the agent. Hypotheses are constructed to support the sub-research questions.

Many prior studies have evidence that in a principal-agent situation agent tends to base their decisions on their best interest, that is choosing the option that they believe to benefit them the most. Based on agency theory, it is predicted that the agent will choose the project from which he can derive the best payoff and not the principal. (Eisenhardt 1989) Since there are two projects and it is possible to earn higher profits from contributing to the project B, it is expected that when the punishment is only hypothetical, employees will choose the project that gives them the highest profit, project B, instead of the project that will benefit the manager the most.

H1: When the punishment is not in use, self-interested agents will choose project B which gives them a higher payoff.

When the punishment mechanism can be used to affect employee decision-making, based on expectations of agency theory, it is assumed that employees will switch their decision and choose the project that will give managers higher benefits if the contract, i.e., incentive, is efficient enough (Jensen & Meckling 1976). So, the hypothesis based on the agency theory is that punishment will align the interests of principals and agents, thus agents will choose the project that yields managers the higher payoff, project A. However, it should be noted that some studies (e.g., Fehr and Gächter 1998) have found evidence that some people do not react to punishments well since it creates a hostile environment, thus the punishment as an incentive may not work for every employee.

H2: When the punishment mechanism is in use, most agents will choose project A which gives the principals a better payoff.

The contribution levels of employees are expected to increase after the introduction of punishment based on prior incentive studies. E.g., Fehr and List (2004) and Hannan, Hoffman and Moser (2005) have found punishment to have a positive impact on the behavior of employees. However, it must be noted that Fehr and List (2004) also found that the punishment was more efficient only when it was a threat not when it was used. Hence, if punishment is used to affect employees' decision-making, it may actually work against the desires of the principal.

H3: The agents will contribute more after the introduction of punishment

As presented earlier, plenty of public goods game studies have found that when the game is repeated, the contributions of the participants will decrease (Fehr and Gächter 2000a; Andreoni 1988). This behavior is mostly due to free riding behavior which is rather common in a situation where a common pool will be distributed evenly among all participants and the amount of the common pool depends directly on the contributions of the participants. Many studies have found that when the game is repeated the contributions are diminishing and participants free ride more towards the end of the experiment. The increase in free riding, i.e., a decrease in contributions, is also expected to happen in this study as well when the game is repeated. However, the decrease in contributions is expected to not be as large as it would be if there would be no punishment mechanism since punishment has been found to be an efficient way to promote cooperation and thus decrease free riding in a public goods game (Fehr Gächter 2000a; Cressman, Song, Zhang and Tao 2011).

H4: As the game progresses, agents begin to free ride and the effect of punishment will be diminishing.

6. Results and the analysis

This chapter will present the results obtained from the laboratory experiment combined with a discussion based on prior literature on incentive studies, agency theory and the public goods game. The results and figures are from the laboratory experiment conducted by Viola Saredi and Luigi Mittone. The project selections and contributions of employees as well as the progress of the experiment will be examined. The sub-research questions will be addressed in this section. The first sub-chapter addresses how employees have contributed when the punishment proposed by managers is only hypothetical and managers are not able to reduce the returns of the employees with the punishment mechanism. The second sub-chapter concentrates on the impact of the punishment mechanism. In other words, addresses how employees decide how much, and to which project they will contribute when managers are able to affect employees' decision-making through punishment mechanism. Punishments will affect the employees' profits but also the managers' profits since the punishment will have its costs. How the experiment and thus employees' decision-making change as the game proceeds, which is the third sub-research question, will be analyzed throughout this section.

6.1. First phase: decision-making without punishment

The first phase consists of five periods. In this phase, the punishment mechanism is only hypothetical and does not reduce employees' returns if it's used. Thus, in the first phase employees' behavior without the threat of punishment can be observed. However, agency problems exist already in this phase, that is asymmetry of returns and thus differing interests between the managers and employees. As mentioned earlier, contributing to project B accumulates additional contributions to common project C, which will be shared evenly among all participants and will offer a greater overall payoff to employees. Project A offers the same marginal return as project B, but it does not accumulate additional contributions to project C. For the manager, project A offers a marginal return of 0.6 and project B offers zero profit, however, managers get the same return from project C as everyone else. Thus, project B is the least beneficial to managers, but managers cannot affect employees' profits

and thus decision-making in the first phase. The hypothesis for the first phase was “When the punishment is not in use, self-interested agents will choose project B that gives them a higher payoff.”.

When the punishment mechanism is only hypothetical, the employees (agents) tend to choose project B over project A. For the first phase, the expectation is that the employees are self-interested and rational, and they will choose project B since they understand that they are able to derive better overall earnings from project B. In this phase, at least two out of three select project B on average (figure 7). As mentioned earlier, contributing to project B enables better payoffs for employees through project C and is thus more advantageous. On average, employees prefer project B in each of the five periods. These results are in line with agency theory which argues that agents are self-interested, at least boundedly, and thus will make decisions in the way that benefits them most (Eisenhardt 1989).

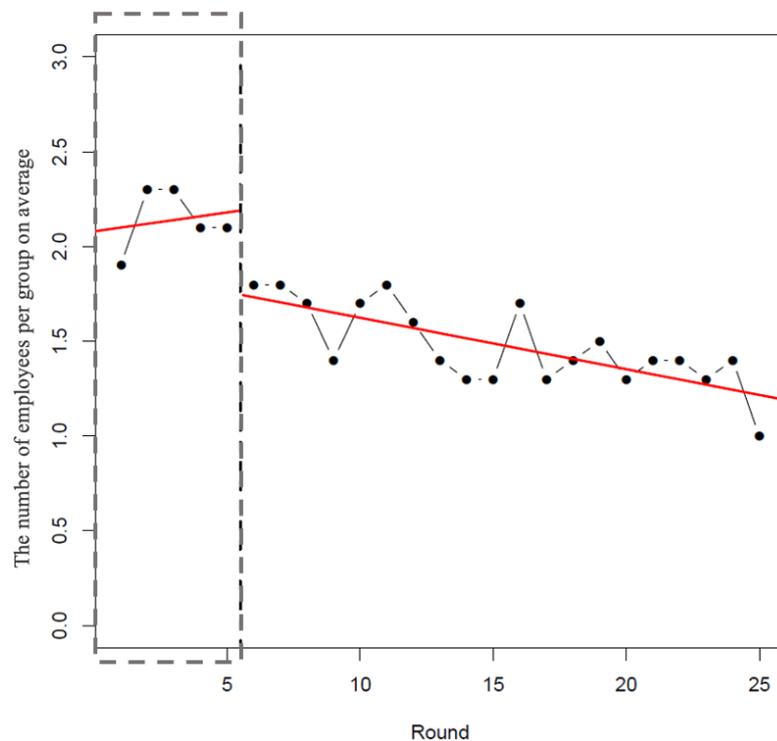


Figure 7. The selection of project B on average - focusing on the first phase

However, 1 out of 3 selected project A so there is evidence of some irrational behavior which is contrary to the beliefs of agency theory. The hypothesis was that agents will choose project B because they are self-interested and choosing B over A offers them higher earnings. Since

some employees did choose project A, the hypothesis is not fully achieved. Punishment might have had an influence on employees' decision-making even though it is only hypothetical in the first phase. Managers assigned punishment points in the first stage (see figure 11), so employees might have reacted to them already even though they did not have an earning decreasing impact.

Also, many agency theory studies have brought up fairness and reciprocity as factors that impact agents' decision-making (e.g., Fehr and Gächter 2000b; Anderhub et al. 2002). Hence, some employees might have felt it fair to contribute to a project that gives managers a reasonable profit. Also, they might believe that if they are nice to the managers, they might be able to avoid punishment in later rounds (reciprocity). When looking at how decision-making has changed during the first stage, a slightly increasing trend can be seen (represented by the red line in the figure). This might be due to the behavior that when group members observe that most people have chosen project B, they change their choice of project in the hope of higher earnings. It can also be that there are conditional cooperators in the group which means that they contribute more to the public good because they believe that others will contribute more as well (Fischbacher, Gächter & Fehr 2001).

When observing project selection from figure 7, most employees choose project B instead of A in the first phase. However, in a group-level investigation (figure 8), heterogeneity in the behavior of employees can be observed. Heterogeneous behavior is very typical in the public goods game and many studies have found participants to behave differently from each other (e.g., Kurzban & Houser 2001). There are employees who are very stable in their choices and employees who are not quite sure to which project they should contribute.

First, it can be noted that in half of the groups, the choices are stable in the first five periods (groups 1, 2, 3, 5 and 8). In these groups, project B was the preferred project among the group. Groups 4, 6, 7, 9 and 10 varied a bit more in their choices. From these groups 4, 6 and 9 preferred project B and 7 and 10 preferred project A during the first phase. Thus, when observing the group-level results, only in two out of three groups the selection of project B was less than two. All employees in groups 1 and 2 choose project B. This is the outcome that is expected from a rational decision-maker that is assumed in traditional economic

theories such as agency theory. But as said, the behavior is already quite heterogenous in the first phase and not all employees behave as it is expected by agency theory.

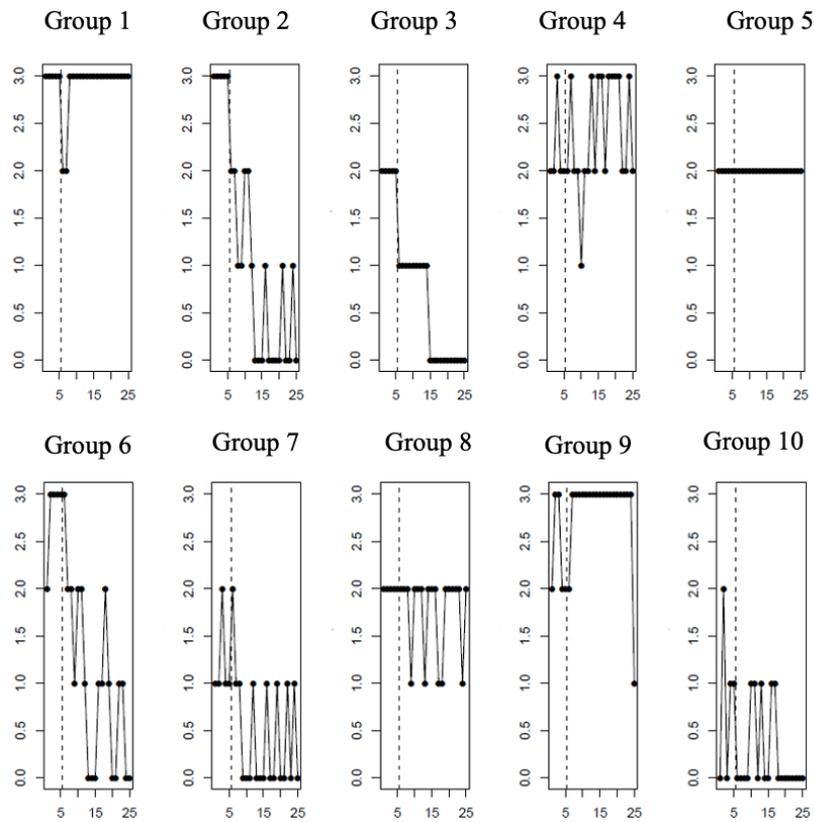


Figure 8. The selection of project B at the group level

The boxplot (figure 9) illustrates how employees have contributed to the projects in the first phase. When examining the contributions to projects A and B, some interesting observations can be made. The average of the contributions is higher in project A than in project B in every five periods. Also, the median and the average contribution of the whole phase are higher in project A. In project A the average is above ten and below fifteen whereas in project B the average is above five and below ten in every period. It was recognized that employees prefer project B in the first phase, but they actually contribute more to project A. This might indicate that employees believe that their group members would also choose project B and thus better free riding profits would exist in project B.

The Nash equilibrium in the public goods game is to contribute nothing or to contribute the whole endowment (Guala 2005; Anderson, Goeree & Holt 1998). But as it has been noticed in many other laboratory experiments as well, it is usually not the case, nor it is now. If the

participants would have been purely self-interested, they would have contributed nothing to the public good because self-interested agents would free ride and take advantage of other agents' contributions (Fehr & Gächter 2000b). Here, employees that chose project A, contributed more than half of the possible total endowment on average. Employees that chose project B also contributed quite a lot considering that free riding was a possibility. But as Anderson, Goeree and Holt (1998) argued, the participants of PGG usually behave against expectations and contribute more than predicted when they should contribute nothing and contribute less than predicted when they should contribute the whole endowment.

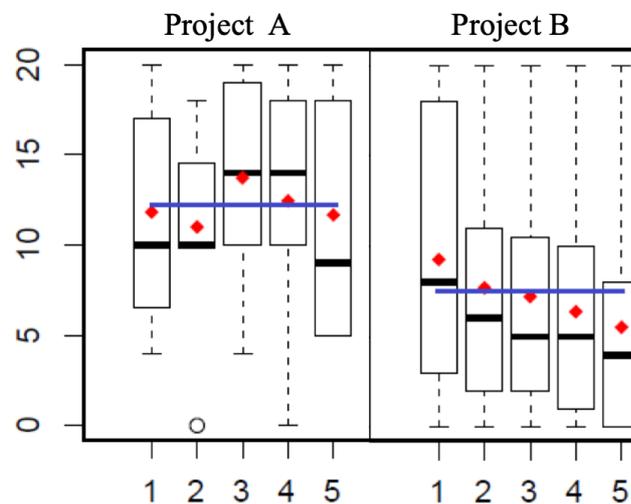


Figure 9. Contributions in the first phase

When observing the trend during the first phase it can be seen that participants who have chosen project B free ride more as the game proceeds. Employees who have chosen project A do not have such a trend, they contribute the most in periods 2 and 3 and the least at the beginning and end of the first phase. In project B the spread covers the whole scale which means that there are employees that contribute zero (defectors) but also employees that contribute their whole endowment (cooperators). Yet again heterogeneity in the behavior of employees can be observed. E.g., Kurzban and Houser (2001) argued that participants of the public goods game are different from each other. In project B there seems to be a large dispersion in how much employees contribute to the first period, but the scale of contributions narrows to the end of the first stage which might indicate that employees have noticed that free riding offers better profits when other members of the group free ride as well.

6.2. Second phase: decision making under the possibility of punishment

In the second phase, punishment can be used by the manager (principal) to affect the decision-making of the employee (agent). The impact of incentives is researched in agency theory and PGG studies. Many scholars are convinced that incentives are an effective solution to reduce agency costs and affect agents' decision-making. However, some scholars do not believe that punishment could reduce agency costs because there are many factors, such as fairness and intrinsic motivation that play a role in this kind of situation (e.g., Bosse & Phillips 2016; Fong & Tosi 2007). As it has been said earlier, the public goods game literature has seen incentives to affect participants' behavior, at least to some extent. The hypotheses for the second phase are "When the punishment mechanism is in use, most agents will choose project A which gives the principals a better payoff" and "The agents will contribute more after the introduction of punishment".

6.2.1. Project selection

When observing the results, it can be seen that the introduction of the punishment increases the selection of project A over project B (figure 10). When the punishment was only hypothetical, project B was the more preferred option on average in every period. Now when employees might receive punishment points from managers, the selection of project B has a negative trend and clearly suffers a reduction. This observation supports the studies that believe that punishment could be an efficient way to guide an agent's decision-making towards choices that are desired by the principal. As said, agency theory believes that agents will act as hoped by the principal if appropriate incentives are in use. Some studies have found such an impact in their studies as well. E.g., Roth and O'Donnell (1996) and Anderhub, Gächter and Königstein (2002) found in their study that punishment can be used to direct the behavior of agents in a principal-agent relationship.

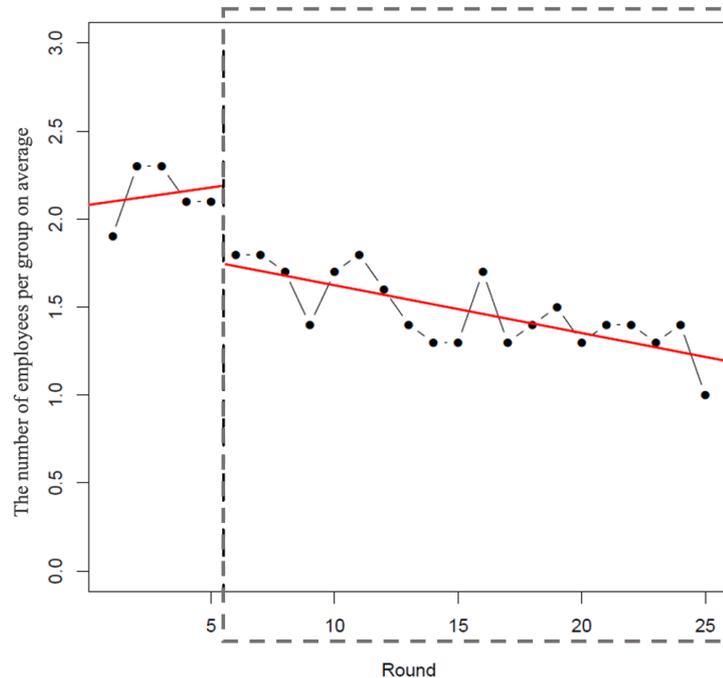


Figure 10. Selection of project B on average - focusing on the second phase

The selection of projects at the group level was presented in figure 8. When focusing on the second phase, a few considerations can be made. First, it can be noted that the behavior among groups is heterogeneous, as it was already in the first phase. Another observation is that in group 5, the selection of projects is stable during the whole second phase. Also, in group 1 the selection of projects is stable after the sixth period. In group 9 the selection of projects was also quite stable, only having different choices in the sixth and twenty-fifth periods, that is the first and last period in the second stage. The common factor with these groups having quite stable behavior during the second phase is that project B was chosen more on average. In group 3 the choices were also quite stable in the second phase. One employee in this group chose project B over A but after the 14th period switched to project A and it is quite distinct that the employee changed his choice because he noticed that other group members kept choosing project A over project B and thus project A offered better earnings. Also, the employee was aware that he would avoid possible punishment points by choosing project A since the manager would not punish him for switching from project B to A but vice versa it would have been a possibility.

When observing figure 8, it seems that the groups that were affected by the possibility of getting punishment were groups 2, 3, 6, 7 and 8. Group 10 also preferred project A over project B but based on this information it is hard to say whether the punishment had an

impact on that since group 10 chose project A over project B already in the first section. Group 7 also favored project A on average, but there can be observed a level of decrease in choosing project B when the possibility of punishment was introduced, hence it can be thought that punishment has an impact on some employees in this group.

To get a full picture of how punishment may have affected the project selection of employees, the punishment points assigned to change the project selection must be analyzed. As it can be observed from figure 11, managers assigned more punishment points in the first phase when punishment had no effect. Punishment points had no cost to the leader in the first phase so it was expected that managers assign punishment points more in the first phase. However, the selection of project B increased during the first phase, so the punishment points did not really have an effect on employees during the first period. Balliet et al. (2011) found that punishments in PGG are more effective when they are costly to the giver of the punishment rather than free. This sort of behavior can be seen in this experiment as well. The decreasing trend in the use of punishment might be due to the fact that during the experiment employees switch to project A as the time proceeds, thus the punishment is not needed anymore since it already had an impact in the early stage.

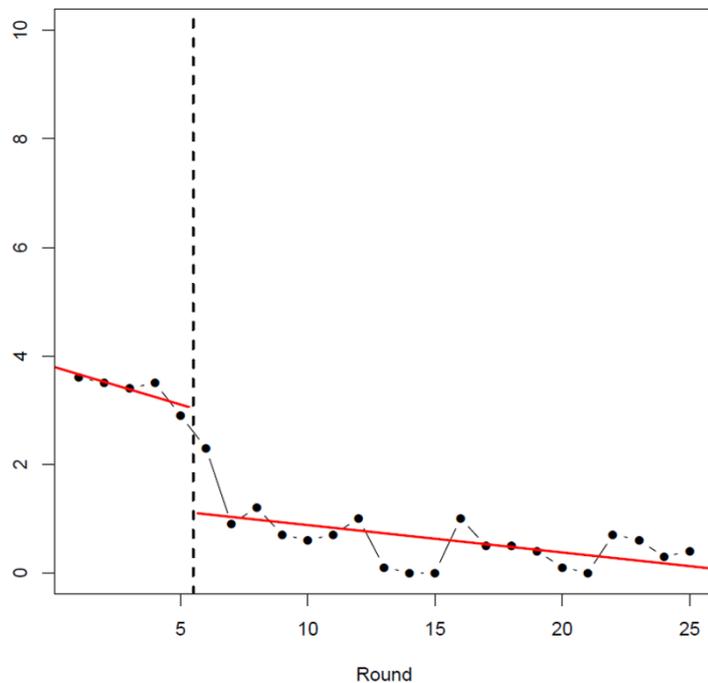


Figure 11. Punishment points assigned to change the project

In the group-level investigation (figure 12), it can be seen that some managers assigned more punishment points than others. First, it can be noted that in groups 3, 4 and 5 no punishment points were assigned by the managers, not even when the points had no cost to managers. In groups 4 and 5 project B was the preferred project so it is interesting that managers did not use the punishment mechanism to affect the choices of employees of their group. It might be that managers wanted employees to contribute to project B since it enables more efficiently functioning administration and better overall earnings for employees. However, it must be noted that even though managers do not receive the return from project B, they receive the return from project C. Thus, they receive some return even when the employee chooses to contribute to project B. In group 3 on the other hand, the selection of project A increased in the second phase so the manager may have felt that the punishment is not needed, after all punishment has its costs to the manager as well.

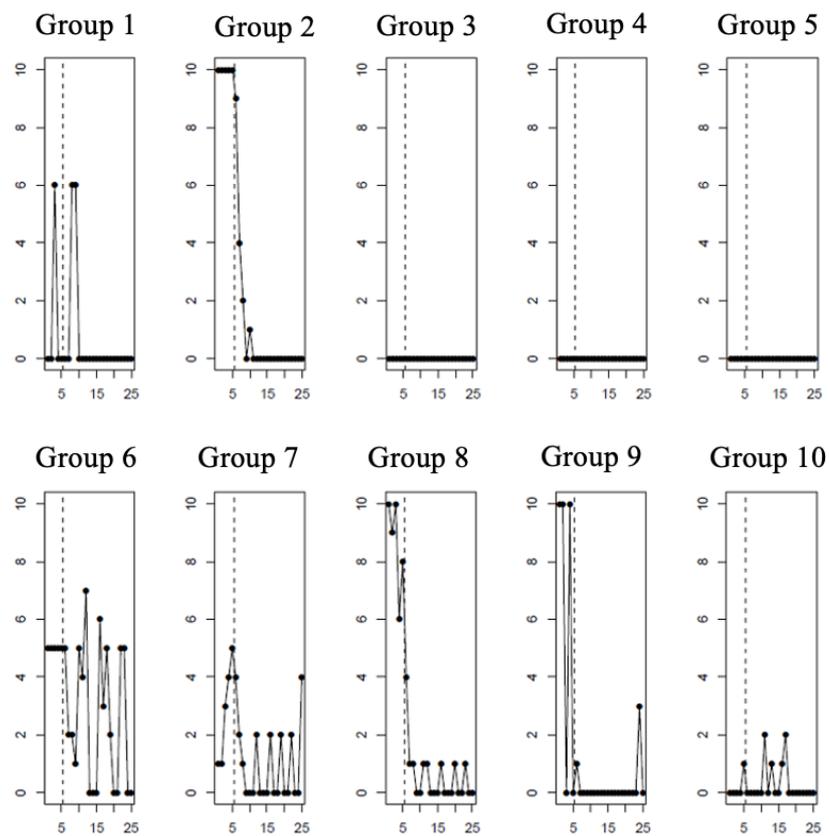


Figure 12. Punishment points assigned to change the project - group level investigation

Managers of groups 2, 8 ja 9 assigned punishment points a lot during the first phase. In the first phase, project B was the preferred project in these groups so managers of these groups

wanted their employees to switch to project A so that they would get higher earnings. In the first phase, these punishments did not have an impact on the employees since their selections of the project stayed the same during the whole first phase. During the second phase, the managers did not assign as many punishment points as in the first phase. However, it seems that the few punishment points assigned at the beginning of the second phase did have an impact on the employees of group 2. Also in group 8, a reduction in the selection of project B was observed. In group 9, the manager only assigned punishment points in the 6th and 24th rounds and a decrease in the selection of project B can be seen in round 25th so the punishment most likely has an impact in that round.

The managers that assigned punishment points throughout the experiment, in the first and second phases, were managers of groups 6, 7 and 10. The manager of group 6 assigned quite a lot of punishment points and as said earlier, the punishment may have had an impact on this group since it was observed from figure 8 that there was quite a clear reduction in the selection of project B in group 6. In group 7, the manager assigned punishment points in some rounds and in some rounds he did not. It seems that he was targeting one employee of his group who chose project B in some rounds and project A in some rounds. It may be that the punishment points had an impact, but the impact was not strong since the employee still kept choosing project B in some rounds. Also in group 10, a similar behavior on the behalf of the manager could be observed since almost every employee in his group chose project A but one chose project B in some rounds, and it seems that the manager tried to influence him. Also, as in the case of group 7, the punishment may have had an impact but not a very strong one.

6.2.2. Contributions

Now when looking at the contributions from the boxplot (figure 13) employees still contributed more to project A than project B on average but it can be noted that the gap between project A's and B's contributions on average has narrowed in the second phase. Project A's contributions on average have decreased and on the other hand, project B's has slightly increased. Thus, based on this it can be said that the introduction of the punishment mechanism had the opposite impact on employees' contributions as principals hoped. It is

interesting that the introduction of punishment increased the selection of project A, but the contribution levels decreased.

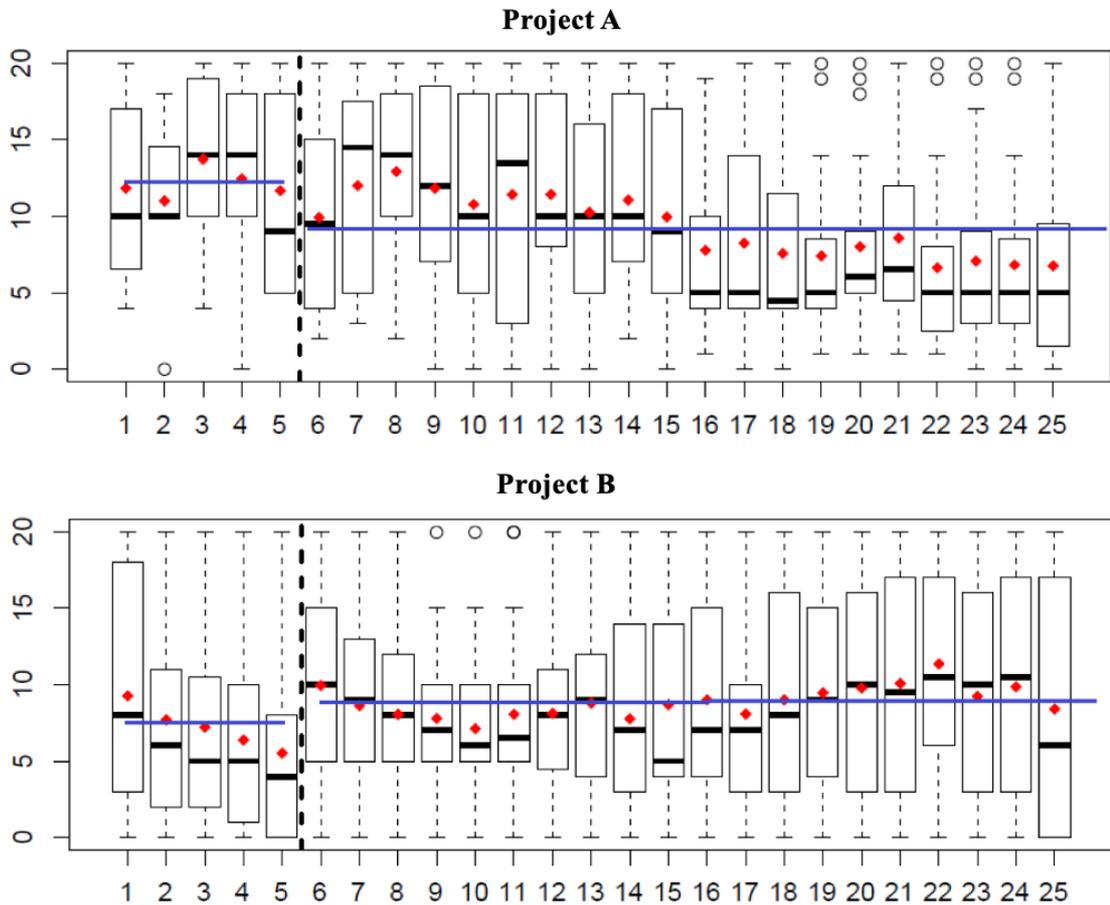


Figure 13. The contributions to the project during the second stage

In the first half of the second phase, the contributions in project A were higher than on average. However, in the second half of the second phase, the contributions fell below the average. Project A might have offered better free riding profits and thus it has been selected as a project to contribute. In public goods game experiments, it is typical that the contributions will decrease towards the end (Fehr and Gächter 2000a; Andreoni 1988). As mentioned, contributions to project A decrease as the game proceeds. In project B, there is no such trend in contributions. The level of contributions varies during the time period and actually in periods 20-24 employees contribute more than the average of the phase. Also, in project A, there are more outliers which indicates that there are employees that actually contribute quite a lot and employees who tend to lean towards free riding. But as it can see from the boxplot in project B free riding is present in every period.

When observing the punishment points given to increase contributions (figure 14), it can be seen that punishment points were given more in the first phase than in the second phase. When assigning punishment points is free, punishment points are used more than when they are costly during the second phase. This kind of behavior was also observed in figure 11. The fact that punishment points were used more in the first phase, may have been the reason why employees in project A have contributed more during the first phase. In the second phase contributions to project A suffers a decrease but also punishment points were assigned less. When conducting a more in-depth analysis it can be seen for example that in the 10th round punishment points were assigned more and it seems to have an impact since the contributions increased in the period after that. However, after the fifteenth period the contributions to project A only decreased even though punishment points were assigned more, e.g., in periods 18 and 21.

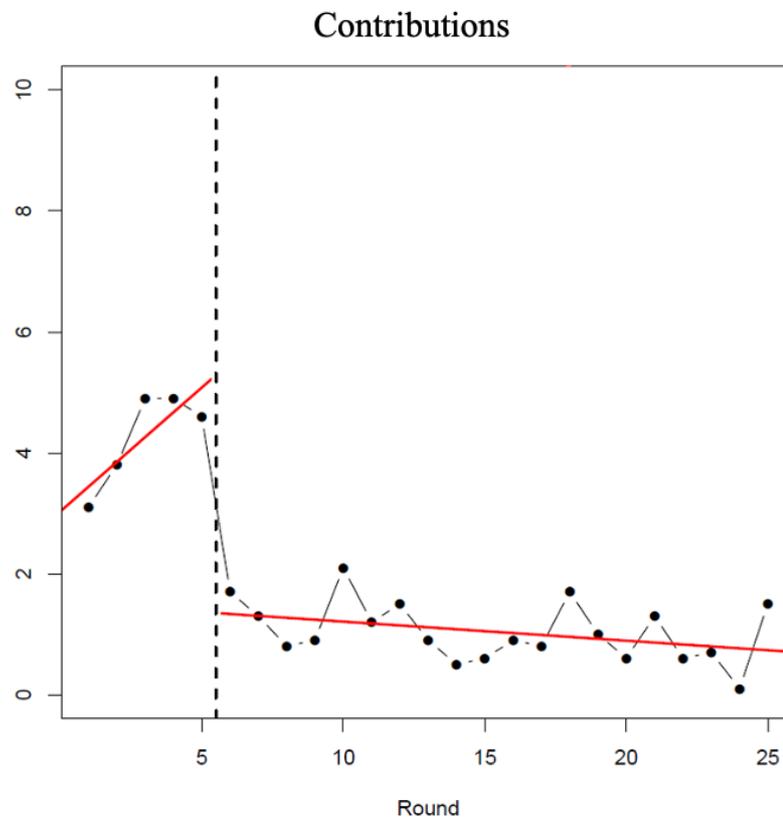


Figure 14. Punishment points assigned to increase contributions

In figure 15 the ratio of actual contributions to total potential contributions is presented. That is., if two people have chosen project A, the total potential contribution is forty and the group contribution has been calculated as a percentage of it. At first, it can be noted that project A's contributions have a negative trend, i.e., free riding is more common in project A. In project B on the other hand, the trend is positive. The employees in project B contribute more as the game progresses which is not expected in the public goods game. However, since choosing project B enables a better functioning organization it may be that employees may feel some intrinsic motivation to contribute to project B because of that. After all, many PGG and incentive studies have raised the issue of intrinsic motivation (e.g., Bosse & Phillips 2016; Fong & Tosi 2007). Employees in project A clearly contribute more in the first half of the second period and they start to contribute less after the tenth round of the second phase. Employees in project B do not have such a clear pattern in behavior. All in all, when looking at this figure it can be said that the punishment mechanism was unable to align the interests of principals and agents since the ratio of contributions in project A had a decreasing trend and in the final stages the ratio was lower than in project B. Whereas in project B the ratio increased as the game proceeded and in the end, it was higher than in project A even though project B was selected less as the game progressed.

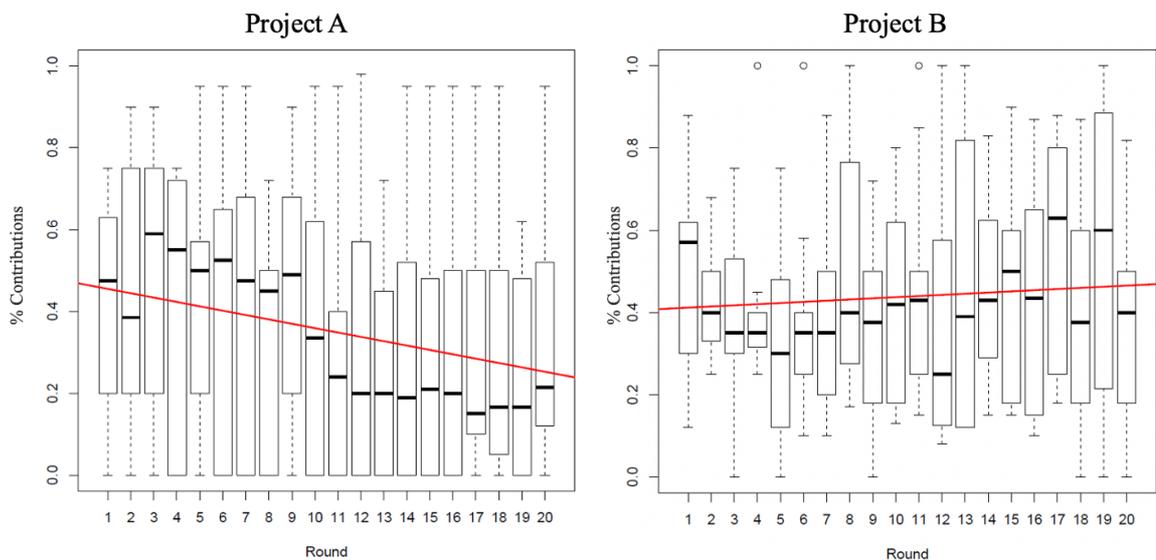


Figure 15. Ratio of actual contributions to total potential contributions (second phase)

7. Conclusions

This thesis examined the impact of punishment in a principal-agent interaction. The aim was to see whether punishment can be used as an efficient incentive when there is a differing interest between principals and agents. The thesis focused on experimental economics and researched how the impact was shown in the public goods game when there are many groups including multiple agents and one principal.

7.1. Answers to the research question

The first sub-question was *“How do employees contribute when there is no punishment involved?”*. According to the prior literature and agency theory, the hypothesis was that when the punishment is not in use, self-interested agents will choose the project that gives them the higher payoff, i.e., project B. From the results, it was observed that most employees do choose project B in the first phase. However, on average one out of three chose project A over project B already in the first phase. This might be due to the fairness and reciprocity which have been seen to influence agents in the agency relationship. Also, it was seen that the employees do not behave in the same way and there are differences between the employees. However, there were only two groups that clearly preferred project A. Rest of the groups preferred project B which was the expected outcome of this study. Although, when observing the contributions made to these projects it was observed that the employees who chose project A contributed more than the ones who chose project B. This means that employees who wanted to free ride chose project B in the hope of better free riding profits during the first phase when the manager was not able to influence their choices through punishment.

The second sub-question was *“How do employees contribute when the punishment is introduced?”*. From PGG and incentive literature no unified conclusion on the impact could have been made since the results have been quite scattered. However, many PGG studies have found punishment to be an influential incentive in social dilemmas. Based on the PGG studies and agency theory it was expected that the punishment will affect the decision-making of the employees so that they will choose project A more in the second period. The

results were somewhat as expected. Overall, an increase in the selection of project A was observed. However, not all employees were affected by the punishment. Also, some employees might have changed the selection of the project purely because project A offered better free riding profits later on.

However, when the contributions were under observation, it was seen that contributions to project A actually decreased in the second phase whereas contributions to project B increased. However, in some periods employees did contribute more when punishment points were assigned but in some periods the punishment points had no impact. This indicates that punishment was not an effective incentive since in most cases the managers were unable to influence the decision-making of employees with it. Also, employees may have felt that the punishment is a negative thing rather than a positive incentive and because of that, they have chosen to contribute less. This would support Fehr and Gächter's (1998) findings in which the results indicated that punishment creates an atmosphere of threat that is viewed as a negative thing.

The third sub-research question was *“How does the decision-making about contributions and project selection change when the game is repeated, and employees are informed of each other’s decisions?”*. Based on prior literature, it was expected that the contributions would decrease when the game is iterated. As in many PGG studies (e.g., Fehr and Gächter 2000a; Andreoni 1988), contributions did decrease in project A when the game proceeded. However, in project B, no such trend was recognized. For some reason, employees wanted to keep contributing to project B. As the game proceeded, employees increased their contributions to project B. Fairness and reciprocity might for instance be the explanatory issues behind this sort of behavior. Also, it must be noted that project B generates public good C and that might be why employees kept contributing to it. In addition, employees might have felt forced to choose project A and contribute to it which might affect their willingness to contribute to that project. For instance, Kohn (1988) has argued that incentives may create a sense of being controlled and thus have a negative impact on people. Hence, the impact of punishment was not desirable for the manager when considering these results.

The main research question was *“What kind of an impact does punishment have on the project selection and contributions of employees in a principal-agent interaction within a*

public goods game?”. The answer to this question was sought through sub-research questions. Firstly, the introduction of a punishment mechanism did seem to have an impact on project selection. In the first phase, project B was the preferred project and two out of three selected it on average. When the manager was able to use a punishment mechanism, the selection of project B decreased and the selection of project A increased. However, the punishment was unable to influence the contributions of the employees. Employees contributed more to project A on average during the whole experiment, both in the first and the second phase. However, in the second phase, the contributions to project A decreased and to project B increased. It might be that the employees who tend to free ride chose project A since they felt that it offered better free riding profits in the second phase. Employees may have observed that when the game proceeded, project A was selected more frequently which indicated better earnings from that project and by choosing project A it is possible to avoid punishment points given to change the project selection. When the ratio of actual contributions to total potential contributions was under examination it showed that the punishment did not have the desired influence on employees’ decision-making.

7.2. Research limitations and suggestions for future research

It must be noted that there were only forty participants who took part in the experiment. This is a quite small dataset and thus no certain conclusions can be drawn from the results. Also, the participants of the experiment were students, and they were not managers or their direct employees in real-life. The choices of the participants may have been different if the participants were actually managers and their direct employees. The participants of the experiment were all from the same university, hence the results cannot be generalized well.

First, since this experiment consisted only of forty participants it would be interesting to see what kind of conclusions could be drawn from a larger dataset. Secondly, it would be interesting to see what would be the impact of rewards in a similar experimental setting including agency problems. Rewards are typically more used as an incentive in real-life and thus it would be interesting to see if the reduction of agency costs could be done by using rewards. At least to my knowledge, not many incentive studies have explored that in the context of agency theory.

In addition, many scholars have raised criticism about agency theory's view of people and how extrinsic incentives have been seen to be the only source of motivation. Scholars have argued that reciprocity, fairness and intrinsic source of motivation are also factors that affect agents' decisions in this sort of decision-making situation. Hence, it would be interesting to take the research further by implying questions about whether these above-mentioned factors affected participants' decisions in addition to extrinsic incentives.

References

Agrawal, A. & Knoeber, C. 1996. Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders. *Journal of Financial and Quantitative Analysis*. Vol. 31, No. 3, pp 377-397.

Anderson, S., Goeree, J. & Holt, C. 1998. A theoretical analysis of altruism and decision error in public goods game. *Journal of Public Economics*. Vol, 70, No. 1, pp. 297–323.

Andreoni, J. 1988. Why free ride? Strategies and Learning in Public Goods Experiments. *Journal of Public Economics*. Vol. 37, No.1, pp. 291-304.

Andreoni, J. 1995. Cooperation in Public-Goods Experiments: Kindness or Confusion? *The American Economic Review*. Vol. 85, No. 1, pp. 891-904.

Anderhub, Gächter and Königstein 2002. Efficient Contracting and Fair Play in a Simple Principal-Agent Experiment. *Experimental Economics*. Vol 5, No. 1, pp. 5–27.

Arnold, B. & Lange, P. 2004. Enron: an examination of agency problems. *Critical Perspectives on Accounting*. Vol. 15, No. 6–7, pp. 751-765.

Bahli, B. and Rivard, S. 2003. The Information Technology Outsourcing Risk: A Transaction Cost and Agency Theory-Based Perspective. *Journal of Information Technology*. Vol.18, No. 3, pp. 211–221.

Baker, G., Jensen, M. & Murphy, K. 1988. Compensation and Incentives: Practice vs. Theory. *Journal of Finance*. Vol. 43, No. 3, pp 593-616.

Belle, N. & Cantarelli, P. 2015. Monetary Incentives, Motivation, and Job Effort in the Public Sector: An Experimental Study With Italian Government Executives. *Review of Public Personnel Administration*. Vol. 35, No. 2, pp 99–123.

Bosse, B. & Phillips, R. 2016. Agency theory and bounded self-interest. *Academy of Management Review*. Vol. 41, No. 2, pp. 276–297.

Cameron, J. & Pierce, W. 1994. Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis. *Review of Educational Research*. Vol. 64, No. 3, pp. 363-42.

Camuffo, A., Furlan, A. & Rettore, E. 2007. Risk sharing in supplier relations: an agency model for the Italian air-conditioning industry. *Strategic Management Journal*. Vol. 28 No.12, pp.1257-66.

Chen, M. 2012. The Effect of Leader Reward and Punishment Behaviors on Subordinates' Budget Reports. *The Engineering Economist*. Vol. 57, No. 1, pp. 41-54.

Condly, S., Clark, R. & Stolovitch, H. 2003. The Effects of Incentives on Workplace Performance: A Meta-analytic Review of Research Studies. *Performance Improvement Quarterly*. Vol. 16, No. 3, pp. 46-63.

Croson, R. 2005. The Method of Experimental Economics. *International Negotiation*. Vol. 10, No. 1, pp. 131–148.

Croson, R. & Gächter, S. 2010. The science of experimental economics. *Journal of Economic Behavior & Organization*. Vol. 73, No. 1. pp. 122–131.

Cuevas-Rodríguez, G., Gomez-Mejia, L. & Wiseman, R. 2012 Has Agency Theory Run its Course?: Making the Theory more Flexible to Inform the Management of Reward Systems. *Corporate governance: an international review*. Vol. 20, No. 6, pp. 526-546.

Deci, E., Ryan, R. & Koestner, R. 1999. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*. Vol. 125, No. 6, pp. 627-668.

DeFusco, R., Johnson, R. & Zorn, T. 1990. The Effect of Executive Stock Option Plans on Stockholders and Bondholders. *The Journal of Finance*. Vol 45, No. 2, pp. 617–627.

Eisenberger, R., & Cameron, J. 1996. Detrimental effects of rewards: Reality or myth? *American Psychologist*. Vol. 51, No. 11, pp. 1153–1166.

Eisenhardt, K. 1989. Agency Theory: An Assessment and Review. *The Academy of Management Review*. Vol. 14, No. 1 pp. 57-74.

Etchart-Vincent, N. & l'Haridon, O. 2011. Monetary incentives in the loss domain and behavior toward risk: An experimental comparison of three reward schemes including real losses. *Journal of Risk and Uncertainty* volume. Vol. 42, No. 1, pp 61–83.

Fama, E. & Jensen, M. 1983a. Agency Problems and Residual Claims. *Journal of Law and Economics*. Vol. 26, No. 2, pp. 327-349.

Fehr, E. & Gächter, S. 2000a. Cooperation and Punishment in Public Goods Experiments. *American Economic Review*. Vol. 90 No. 4, pp. 980-994.

Fehr, E. & Gächter, S. 2000b. Fairness and Retaliation: The Economics of Reciprocity. *Journal of Economic Perspectives*. Vol. 14, No. 3, pp. 159-18.

Fehr, E. & Gächter, S. 2000c. Do incentive contracts crowd out voluntary cooperation? *SSRN Electronic Journal*.

Fehr, E. & Gächter, S. 1998. Reciprocity and Economics: The Economic Implications of Homo Reciprocans. *European Economic Review*. Vol. 42, No. 3-5, pp. 845-859.

Fehr, E. and List, J.A. 2004. The Hidden Costs and Returns of Incentives - Trust and Trustworthiness among CEOs. *Journal of the European Economic Association*. Vol. 2, No. 5, pp. 743-77.

Fischbacher, U., Gächter, S. & Fehr, E. 2001. Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, Vol. 71, No. 3, pp 397-404.

Fong, E. & Tosi, H. 2007. Effort, Performance, and Conscientiousness: An Agency Theory Perspective. *Journal of Management*. Vol. 33, No. 2, pp. 161–179.

Garen, J. 1994. Executive Compensation and Principal-Agent Theory. *Journal of Political Economy*. Vol. 102, No. 6, pp. 1175–1199.

Grossman, S. & Hart, O. 1983. An Analysis of the Principal-Agent Problem. *Econometrica*. Vol. 51, No. 1, pp. 7-45

Guala, F. (ed.) 2005. *The Methodology of Experimental Economics*. [E-book]. [Cited 13.5.2022]. Available: <https://web-p-ebsohost.com.ezproxy.cc.lut.fi/ehost/ebookviewer/ebook/ZTAwMHh3d19fNTI3NTU5X19BTg2?sid=0f42915b-eb89-4fc2-9064-e4c9859cebe5@redis&vid=0&format=EB&rid=1>

Güth, W., Klose, W., Königstein, M. & Schwalbach, J. 1998. An Experimental Study of a Dynamic Principal-Agent Relationship. *Managerial and Decision Economics*. Vol. 19, No. 4-5, pp. 327-341.

Hendijani, R., Bischak, D., Arvai, J. & Dugar, S. 2016. Intrinsic motivation, external reward, and their effect on overall motivation and performance. *Human Performance*. Vol. 29, No. 4, pp.251–274.

Hermalin, B. & Weisbach, M. 1991, The Effects of Board Composition and Direct Incentives on Firm Performance, *Financial Management*. Vol. 20, No. 4, pp. 101-112.

Holmstrom, B. 1982. Moral Hazard in Teams. *The Bell Journal of Economics*. Vol. 13, No. 2, pp. 324-340.

Jenkins, G.D., Mitra, A., Gupta, N. & Shaw, J.D. 1998. Are Financial Incentives Related to Performance? A Meta-Analytic Review of Empirical Research. *Journal of applied psychology*. Vol. 83, No. 5, pp.777-787.

Jensen, M. & Meckling W. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership. *Journal of Financial Economics*. Vol. 3, No. 4, pp. 305-360.

Jensen, M. & Murphy, K. 1990. Performance Pay and Top-Management Incentives. *Journal of Political Economy*. Vol. 98, No. 2, pp. 225-264.

Jordan, P. 1986. Effects of an extrinsic reward on intrinsic motivation: A field experiment. *Academy of Management Journal*. Vol. 29 No. 2, pp. 405–412.

Kurzban, R. & Houser, D. 2001. Individual Differences in Cooperation in a Circular Public Goods Game. *European Journal of Personality*. Vol. 15, No. 1, pp. S37–S52.

Kohn, A. 1993. Why incentive plans cannot work. *Harvard Business Review*. Vol. 71, No. 5, pp.54-63.

Kohn, A. 1988. Incentives Can Be Bad for Business. *INC*, pp.93-94.

Logan, M. 2000. Using agency theory to design successful outsourcing relationships *International Journal of Logistics Management*. Vol. 11, No. 2, pp. 21-32.

Manatsa, P. & McLaren, T. 2008. Information sharing in a supply chain: using agency theory to guide the design of incentives. *Supply Chain Forum: International Journal*. Vol. 9 No.1, pp.18-26.

McCoy, T. & Flesher, D. 1998. A case of an early 1900s principal-agent relationship in the Mississippi lumber industry. *Accounting, Business & Financial History*. Vol. 8, No. 1, pp. 13-31.

Van Miltenburg, N., Buskens, V., Barrera, D. & Raub, W. 2014. Implementing Punishment and Reward in the Public Goods Game: The Effect of Individual and Collective Decision Rules. *International Journal of the Commons*. Vol. 8, No. 1, pp. 47-78.

Van Puyvelde, S., Caers, R., Bois, C. & Jegers, M. 2013 Agency Problems between Managers and Employees in Nonprofit Organizations: A Discrete Choice Experiment. *Nonprofit Management and Leadership*. Vol, 24, No. 1, pp. 63-85.

Roth, K. & O'Donnell, S. 1996. Foreign subsidiary compensation strategy: An agency theory perspective. *Academy of Management Journal*, Vol. 39, No. 3 pp. 678-703.

Sefton, M., Shupp, R. & Walker, J. 2006. The Effect of Rewards and Sanctions in Provision of Public Goods. *Economic Inquiry*, Western Economic Association International. Vol. 45, No. 4, pp. 671-690.

Shapiro, S. 2005. Agency Theory. *Annual Review of Sociology*. Vol. 3, No. 1, pp. 263-284

Stajkovic, A. & Luthans, F. 2001. Differential Effects of Incentive Motivators on Work Performance. *Academy of Management Journal*. Vol. 4, No. 3, pp. 580-590.

Szolnoki, A. and Perc, M. 2010. Reward and cooperation in the spatial public goods game. *Europhysics Letters*. Vol. 92, No. 3.

Lassar, W. & Kerr, J. 1996. Strategy and Control in Supplier-Distributor relationships: An Agency Perspective. *Strategic Management Journal*, Vol. 17, No. 8, pp. 613-632.

Wang, C. 1997. Incentives, CEO Compensation, and Shareholder Wealth in a Dynamic Agency Model. *Journal of Economic Theory*. Vol. 76, No. 1, pp 72-105.

Weibel, A., Rost, K. & Osterloh, M. 2009. Pay for Performance in the Public Sector—Benefits and (Hidden) Costs. *Journal of Public Administration Research and Theory*. Vol. 20, No. 2, pp. 387–41

Wiseman, R. & Comez-Mejia, L. 1998. A Behavioral Agency Model of Managerial Risk Taking. *The Academy of Management Review*. Vol. 23, No. 1, pp. 133-153.

Wright, P., Ferris, S., Sarin, A. & Awasthi, V. 1996. Impact of Corporate Insider, Blockholder, and Institutional Equity Ownership on Firm Risk Taking. *Academy of Management Journal*. Vol.39 No. 2, pp.441-463.

Wright, P., Mukherji, A. & Kroll, M. 2001. A reexamination of agency theory assumptions: extensions and extrapolations. *Journal of Socio-Economics*, Vol. 30, No. 5, pp. 413–429.

Whipple, J. & Roh, J. 2010. Agency theory and quality fade in buyer-supplier relationships. *The International Journal of Logistics Management*. Vol. 21 No.3, pp.338-52.

Zsidisin, G. & Ellram, L. 2003. An agency theory investigation of supply risk management. *Journal of Supply Chain Management*. Vol. 39, No. 3, pp. 15-27.