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Speeding up Reforms? Fragmentation and Compensation Payments in an Experimental Design

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Abstract

Reform delays emerge frequently in politics but can be solved using compensation payments. A higher degree of fragmentation among the addressees may -according to the theory- reduce these costs. The number of groups and the inherent uncertainty normally influence agents' behaviour. When this prediction holds and behaviour is in fact influenced by the number of groups, fragmentation will not outperform a less fragmented society concerning compensation costs. An experiment is conducted to evaluate the effects of fragmentation on agents' decisions and shows that the theoretic result as such cannot be applied to the behaviour of agents.

Keywords: Ultimatum Game, Compensation-Payments, Experiment

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1 Introduction

The political arena is marked by fragmentation. Not only federalist states but also trade unions, labour unions or more political unions such as the EU are characterized by different actors. Government can be divided involving different parties or by their constitutional setting allowing more voting players. Fragmentation, however, has negative and positive aspects. Going together with a high number of decisive agents the preferences becomes even more heterogeneous. As diverging preferences regularly lead to a conflict or a dissent between agents, it seems logical that an increase in the number of agents will enhance the potential for conflicts. Therefore fragmentation is seen as well in theoretical approaches as in the empirical literature as the main factor causing reform blockades. Fragmentation is partly made responsible for the delayed stabilizations of the vast inflation in South America during the Eighties (Alesina/Drazen 1991) and the high budget deficits among the OECD countries (De Haan et al. 1999; Volkerink/de Haan 2001; Tsebelis/Chang 2004). In addition stalemates in the local, national or international levels ad the slow pace in decision-making processes especially in federalist systems (Schwarz 2006) are proscribed to effects of fragmentation. However, fragmentation can also have positive influences on reform blockades, as a rising number of groups allow the authority to avoid overcompensation (Buchanan/Tullock 1984; Ahlfeld 2008). Alas a reduction of compensation costs in a more fragmented society is based on the assumption of rational agents that agree to a decision that benefit them and reject decision that makes the worse off than the status quo. This assumption can be questioned, as myriads experiments in the behavioural literature shows that agents do not always act rationally and can be influenced by various factors (Kagel/Roth 1995). Following this the paper aims to evaluate the relationship of fragmentation and compensation payments and sheds some light on the psychological effects of fragmentation using an experimental design. Fragmentation exerts two main factors that have influences on decisions of agents: First, the number of groups increases in more fragmented societies and as a second device, the size of every group decreases. According to this fragmentation seems important for the voting-power of groups, the number of opponents and also may have some influence on uncertainty. If agents are unsure about the behaviour of opponents this uncertainty clearly increases with the number of opponents.

The relationship between fragmentation and compensation payments are tested in an ultimatum game including three different treatments that resemble the degree of fragmentation. In line with the prediction of former results it was found that agents do not strive to maximize their profits. A significant effect of fragmentation on the amount of compensation payments given could not be found, while it is significant that the price of a consenting vote increases with the degree of fragmentation. So, if offers do have an influence on the transfers made by the authority fragmentation may not have a cost reducing effect but in contrast may increase costs of a decision. Clearly these results cannot be directly transferred to the political arena because of the vast differences between the situation in the laboratory and the real world. Despite of these problems the experiment shows interesting insights in the relationship between fragmentation and compensation payments.

The paper is structured as follows: Section 2 explains the method to evaluate the problem at hand. Section 3 sums up expected reactions by decision-makers and policy addressees on fragmentation. Section 4 finally describes the experimental framework and Section 5 presents the results. A conclusion and a discussion of further possible research are presented in the last section.

2 Method

In the behavioural economic literature it is regularly found that groups or individuals can be influenced by certain factors and thus decisions deviate from the profit-maximizing solution. Against this background it is likely that individual behaviour depends on the degree of fragmentation. These effects and their connection with compensation payments are barely analyzed by field data. Compensation payments and their values are hard to measure as most transfers are not monetary. It seems impossible to evaluate the economic performance of fragmented and not fragmented societies when the preconditions, such as growth rates or the size of the country, differ. In addition such economic indicators may be biased by the motivation of politicians, which surely are not only affected by fragmentation, but by enhancing the welfare of the population. In a worse scenario politicians strive to more selfish motives, as re-election chances or he acts in favour of a certain lobby. No matter what guides their behaviour it is surely not dominated by the effects of fragmentation, although fragmentation may play a subordinated role in their behaviour. As the experiment at hand wants to stress the effects of fragmentation and these cannot be accurately isolated in field data it is more appropriate to apply an experiment.

It is able to explain authorities' behaviour in the context of reforms and it might provide valuable information on compensation payments. In this paper a modified ultimatum game is used to describe the decision process. In the standard ultimatum game a proposer has to split a certain amount of money between himself and the responder. After the partitioning the responder can either accept or reject the offered share. When he accepts both agents are paid according to what has been agreed on. Otherwise no agent receives any profit (Gueth et al. 1983). The framework in our case is similar but differs in important aspects to integrate the effects of fragmentation. In our experiment the proposer is confronted with differing numbers of responder groups in three treatments to reflect the varying degree of fragmentation. To decide whether the project is accepted or not, a majority rule among the groups is applied. In contrast to the original framework responders are offered a project that generates profits for half of the responder groups and losses for the other half, different form the basic ultimatum game, where all agents start with a zero pay-off. Negative pay-offs are included into the framework to create a situation that reflects reality. This distribution makes it inevitable to compensate at least one loser group to win the poll independent of the number of groups. To measure the effect of the degree of fragmentation on the responders, they are asked to request a compensation payment from the proposer in order to agree to his project after having learnt about their individual pay-off from the offered project. The following steps resemble the basic

model of an ultimatum game. The proposer is endowed with a budget that he can either share with as many groups as he chooses or keep it for himself. This share can differ among the groups. To win the poll the proposer has to win more than half of the votes (or more than half of the groups). If the project is accepted every responder receives the pay-offs from the project plus the offered transfers and the proposer receives his budget minus the paid compensations. If the project is not accepted, no agent receives any pay-off as in the original ultimatum game.

The experiment strives to isolate the effects of fragmentation on decisions. Therefore every other effect, normally occurring in experiments, is excluded at its best from the framework, such as learning effects or groups discussions. To avoid learning effects the experiment is not repeated with the same persons and results were only shown at the end of the game.

Communication among and within the groups was not allowed to avoid effects usually emanating from group discussion (Messick et al. 1997). While communication might be an important factor, especially in the political sphere, its' effects on decisions seems hard to interpret. On the hand side groups are reported to act more rational the better the communication within the group (Sutter 2005) and on the other side groups are not found to act more rationally than single agents but just more extreme (Bosman et al. 2006). Other results suggest that effects of communication depend on the framework (Prasnikar/Roth 1992; Fehr/Schmidt 1999; Wildschut et al. 2003). Despite communication issues are surely important and also can be assumed to be fluent in politics the paper refrains from further discussing it, as to avoid probably emerging equivocal effects of group discussions. In addition not all decisions are based on communication. For instance in labour organizations or political parties members do not personally know every other member and a group discussion seldom happens or it involves prohibitive transaction costs so that only a little fraction of all group members takes part in such a discussion. Before turning to the special design of the experiment, the possible actions of agents are theoretical described.

3 Fragmentation and side-payments in the literature

4 General overview

In accordance with the basic ultimatum game the proposer should minimize the compensation payments he gives but the payment must be high enough to ensure a majority in the decision process to win the poll in order to maximize his profit. The responder should accept every offer making him marginally better off than in the status quo. Hence he should accept all transfers that offset his losses and offer him a marginal surplus. As half of the groups profit from the offered project ex-ante they can maximize their profit by accepting it. Consequently, the proposer should only compensate groups that suffer losses from the project. To win the poll he has to meet the majority rule (50%+ε, with $\varepsilon > 0$) what means a compensation of at least one group in each treatment. On the assumption that, all preconditions are met, equal profits

and losses per head, a constant number of agents and every agent plays the suggested strategy, the proposer should earn more points in cases where the population is more fragmented.

According to the findings of the behavioural economic literature, the agents are not likely to maximize their profits and hence will deviate from the 'rational' solution. The reason of deviant behaviour is controversially discussed in the literature. There is an in-depth discussion among researchers whether deviations stem from fairness motives or strategy(Gueth/Damme 1998). The empirical evidence here is controversial. Some experiments show that demands of agents that are not decisive are ignored (Oppenwal/Tougareva 1992; Kagel/Wolfe 2001)what suggests that deviations from the profit maximizing solution are more an indication of strategy than of fairness. Evidence from dictator games, in contrast, reveals other findings: Although the responder is not able to reject a given share and thus has no strategic influence in the game, most proposers tend to share their budget (Gueth/Damme 1998). Also, the definition of fairness hinges on certain factors, for example on the regarded game (Gueth et al. 2001; Bosman et al. 2006). The motive behind fairness is also important for the participants. An intentionally generated unfair distribution is regularly found to be perceived as more greedy than a randomly created unfair distribution (Bolton and Ockenfels 2003). The experiment at hand cannot deliver a final answer to this discussion but analyzing which groups are compensated gives further insight into the topic. Finally it is not expected that individuals strive to maximize their profit. Summing up it is assumed that factors such as fairness, strategy or envy that are already found in other experiments will appear.

Apart from this, findings of other experiments cannot be easily compared with the outcome of this experiment as the framework differs from the basic model as it incorporates different treatments with a different level of fragmentation what leads to a varying number of agents that are compensated to reach the majority. However, former research suggests that the proposer usually gives about half of his budget to a single responder, so this can be seen as a benchmark for further research.[1] The possible effects of fragmentation are discussed below.

4.1 Effects of fragmentation in theory

The existence of a greater number of groups gives the proposer the chance to increase his profit by minimizing compensation payments. In a more fragmented society groups are smaller and more numerous so that overcompensation can be avoided. Transfers can be more accurately distributed to meet the given majority rule. Hence, fewer responders must be compensated and compensating costs will decrease. However, this effect presupposes that every agent acts rationally. The properties of fragmentation can influence the result in different ways. Foremost fragmentation entails a higher number of groups. At the same time more consenting votes are needed to gain the majority for a project. These changes may lead to a deviation from the rational solution.

[1] See a survey by Camerer and Thaler(1995).

The possible changes in the behaviour of the proposer can stem from fairness motives and uncertainty about the behaviour of opponents(Messick et al. 1997; Levine 1998). In the case of a fair proposer a fragmented society may have no significant effects on the behaviour compared with the case of a less fragmented society. He may feel obliged to treat the responders in the same way independent of the number of groups. Aside from that with a higher degree of fragmentation the proposer needs the acceptance of more groups and thus more consenting decisions. Thus his uncertainty about the other agents' behaviour becomes more prevalent.[2] At least he may reduce his uncertainty with the help of compensation payments by paying more transfers in treatments with higher group numbers. From this it follows that the changes of compensation payments in more fragmented treatments will possibly have no effect, either due to uncertainty or to fairness motives.

A higher number of groups may have an effect on the responders, having an influence on the responders' requests in the different treatments and on his final decision concerning the project. However, the final decision can be influenced by compensation payments given by the proposer and the pay-offs of other responder groups. To isolate the effects of fragmentation the final decision is neglected and the focus is put on the development of the requests, which are not biased by other effects. The development of these requests may be influenced by certain factors connected with a higher degree of fragmentation. A lower group number gives every single group a larger voting power in the poll. Hence, when the population becomes more fragmented the price for a consenting vote falls and responders should request less money. As already mentioned communication within the group has the greatest impact on group behaviour(Kocher/Sutter 2007) but restricted in this experiment. Anyway larger groups provide other effects that do not depend on communication. For example large groups make the action of certain individuals unidentifiable(Wildschut et al. 2003) and thus a large group can act more competitively than a single individual or a small group. In line with these motives responders could request a larger share when the degree of fragmentation is low and groups are large.

However there are reasonable arguments yielding to the opposite. Requests could increase with a higher degree of fragmentation. Confronted with a higher number of rival groups, fears of being exploited increase and may prompt the responder to request more money. Wildschut et al.(2003) for example mention that groups distrust each other as they fear exploitation and try to outperform rival groups. This effect was also reported in other experiments involving single agents(Messick et al. 1997; Levine 1998). Finally responders may be aware of the greater uncertainty of the proposer and may try to exploit this by requesting more money for their approval. The expectation that groups will request more points in treatments with a higher group number is in line with earlier findings. To conclude, there is more than one reaction possible as well for the proposer as for the responder.

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5 Design

The experiment was conducted with 110 individuals in the computer laboratory at Humboldt-University Berlin. Most of the participants were economics students aged between 19 and 48. The 110 participants comprised 22 proposers (henceforth *As*) and 88 responders (henceforth *Bs*).[3] Every agent played one session, comprising three treatments. The experiment was programmed using z-tree software (Fischbacher 2007). Before the experiment instructions were given to all participants and questions were privately answered. In every session eight *Bs* and two *As* participated. The *Bs* were paid a show-up fee of four points. The rate of exchange between Euro and Points was 1:14. After the experiment participants were asked to fill in a questionnaire about their strategies and motives.

The roles of the participants were randomly assigned and were kept for the whole session. The *Bs* were randomly matched to build groups to satisfy the rules of the relevant treatment. Treatments differ with respect to the number of groups and to the group sizes, while the number of overall responders and respective pay-offs remained constant. To test for sequence effects in the treatments the order of treatments was randomly chosen for treatment 1 to 3. According to statistical tests significant effects of sequence could not be found.[4]

A has to propose a certain project that generates losses for half of all *Bs* and profits for the other half[5]. The groups have all the same size within a treatment. The size of groups changes with the treatment and hence with the number of groups. Table 1 shows the pay-offs generated by the project. In all treatments losses per head (-10) and profits per head (+40) are constant. *A* had in every treatment 70 points which he could share with as many groups as desired or keep them in his own pocket. After having showed *Bs* this pay-off scheme for all groups (so that perfect information is given) and having told them that *A* had a budget of 70 points they were asked to request a certain amount of points from *A*. This request was not binding for the decision of *Bs* and also was not transmitted to the *A* to avoid any influence on him by the responders.

Table 1: Pay-off Scheme

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[3] Due to a programming failure the datasets of the first four sessions are damaged. To correct this fault all observations of Bs in session 1 to 4 were eliminated from the dataset. The observations of *As* were not affected by that failure.

[4] We tested results for the compensation paid to winner groups, the proposer's hypothetical pay-off, the decision and requests of responders. For the responder we found no significant result. With regard to the proposer a significant result for treatment one for the fraction of the points given to winning groups is found. Actually as this is the only indication of effects of the sequence we neglect this result.

[5] Originally the experiment encompassed four treatments. To ensure winning possibilities for every *B*, the pay-off of the project was positive in two treatments and negative in the other two treatments.

	Number of Groups	Agents per group	Winner				Loser			
Treatment 1	2	4	160				-40			
Treatment 2	4	2	80		80		-20		-20	
Treatment 3	8	1	40	40	40	40	-10	-10	-10	-10

As were only shown the pay-off structure. Then they could individually decide which groups they want to compensate and which amount they are willing to give to each group. The project was accepted when more than half of the groups gave their consent (50%+ ε). If the project was accepted all participants were paid. *A* received his budget minus the compensation he paid and the *Bs* received the pay-off generated by the project plus the compensation payments offered by *A*. In case of rejection no agent received any pay-off. *A's* offers were only paid out when the respective group voted for and not against the project. One offer of the two *As* was randomly selected and the resulting pay-off structure was then submitted to the *Bs*. Due to full information every *B* was shown the pay-offs of every other *B*. Thereafter *Bs* decided to reject or accept the proposed project taking into account *A's* offers. Every *B* was asked to vote. Finally one *B* of every group was randomly selected and the answer of this *B* was counted as representative for the whole group. Finally a majority rule was applied to these 'representative' votes to decide whether the project was accepted or not. All results of all treatments were submitted not before the end of the session.

If both agents are profit maximizers their reactions can be predicted. When *B's* pay-off is positive he should accept the project and reject it when his pay-off turns out to be negative. The level of profit should not influence the decision. To maximize his pay-off *A* should give the lowest transfer that ensures the realization of the project. Winning groups should accept the project anyhow and losing groups should give their consent if transfers offset their losses. The 'rational' solution is shown below[6]:

Table 2: Expected Transfers

Treatment	Winner	Loser	Compensation payment	Hypothetical pay-off
Treatment 1	160	-40 + **40 + ε**	40+ **ε**	30 - **ε**

[6] In this paper a rational solution always means the solution that maximizes profits under the precondition that all other participants do also act rationally from the outset. For example a proposer that pays more compensations to ensure a realization of his project because he anticipates that some of the responders will reject the project although they received a transfer can also be rational and also will try to maximize his profit but these cases are not seen as 'rational' in this experiment.

Treatment 2	80		80		-20 + **20 + ε**		-20		22+ ε	48 - ε
Treatment 3	40	40	40	40	-10 + **10 + ε**	-10	-10	-10	11+ ε	59 - ε

Regarding the profit maximizing solution in Table it is concluded that the earnings of *A* must increase with the number of groups, as transfers will decrease.

6 Results

6.1 General overview

Considering the rational solution *A's* profit should increase with the number of groups. It can be seen in and Table 3 that this prediction is met. *As'* profit rises but differs from the predictions. In treatment 1 for example *As'* profits are zero and the differences between treatments 2 and 3 are quite small and not significant.

Figure 1: Profits (mean) of *A* [7]

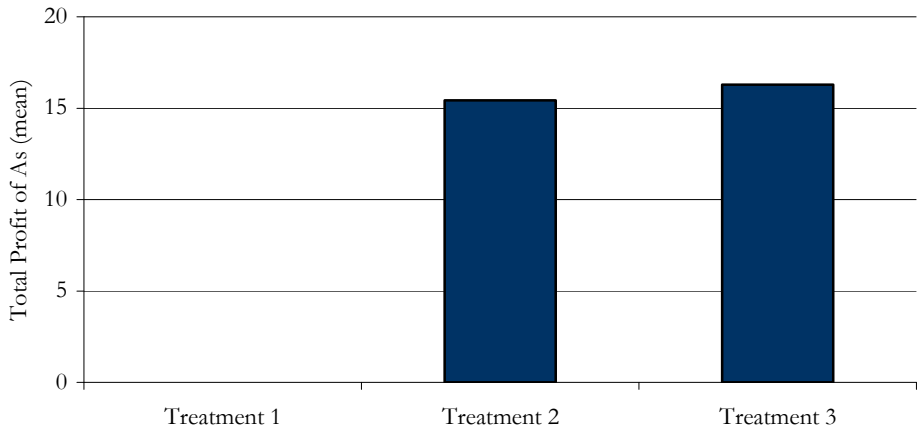

Table 3: Profits (mean) of *A*[7]

	Total	Treatment 1	Treatment 2	Treatment 3
Mean profit (A)	13.905	0	15.429	16.286

[7] For analysing the profit of *A* only the data from *As* in sessions 5 to 11 were used. Also profits were regarded of those *As* whose offers were actually transferred to the responders. In all other computations concerning the proposer all observations from all sessions were included independent of the fact if their decision was relevant for the poll.

According to a Kruskall Wallis Test the treatments exhibit differences in profits of *A* (χ^2=8.089 df=2, p<0.05), but it is quite obvious and statistically significant that these differences result only from the outcome of treatment 1. When conducting the test excluding treatment 1, results become highly insignificant (U= 56.5, p>0.1). The observed profits are determined by different parameters. At first, it is observed that *A* paid very high transfers compensating more groups than necessary to win and also groups that win from the outset. Secondly, the rejection rate was quite high so that only 13 out of 21 projects were realized. In treatment 1 not one project was accepted, while in the other treatments about half of the projects were carried out.[8] Besides the actual rejection rate for the experiment, ex-post a more democratic decision in every group was computed, that incorporated the votes from all participants. Within the group a decision was computed using a majority rule (50% + ε) that was applied to find the final decision. The final decision was computed in the same way. The results though are not very different. It has to be pointed out that in treatment 1 the majority of the rejected projects showed an equal distribution between acceptance and rejection. So polls were quite close. Third, it cannot be said that a higher degree of fragmentation increases the chance of acception. Apart from the first treatment the rejection rates independent of the voting rule applied in treatment 2 and 3 are the same (democratic rule: 43% for both).

The obvious results concerning the rejection rates and the profit of *A*, does not go along with the rational solution presented here. In a next step the behaviour of *As* and *Bs* are analyzed in detail. Contrary to the rational solution, *A* made high compensation payments (roughly 60% of his budget) and these payments do not change in treatments with a higher fragmentation. Only in treatment 1 compensation payments matched the rational solution.[9] The same applies to the number of groups he compensated. According to a Mann Whitney Test, observed and expected values for compensated groups as well as for compensated winning groups are significantly different from the rational solution. All treatments show significant results.[10] A closer look at the observations shows that proposers acted in different ways and that their strategies were not similar. This is best shown by regarding *As'* behaviour towards winning groups.[11] While 27% of all proposers compensated all winning groups in each treatment, 45% of the proposers compensated not even one of the winning groups in each treatment. Finally 82% of all proposers have a constant strategy towards winning groups, compensating winners in all or no treatments. These findings cannot answer the question whether proposers are guided by motives of fairness. It is obvious that giving

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[8] The adoption rate was computed only using the sections 5 to 11.

[9] The hypothesis that observed and expected values are similar was rejected at p>0.1 for treatment 2 (U= 22), and treatment 3 (U=0) while the hypothesis cannot be rejected for treatment 1 (U=176; p=0.09).

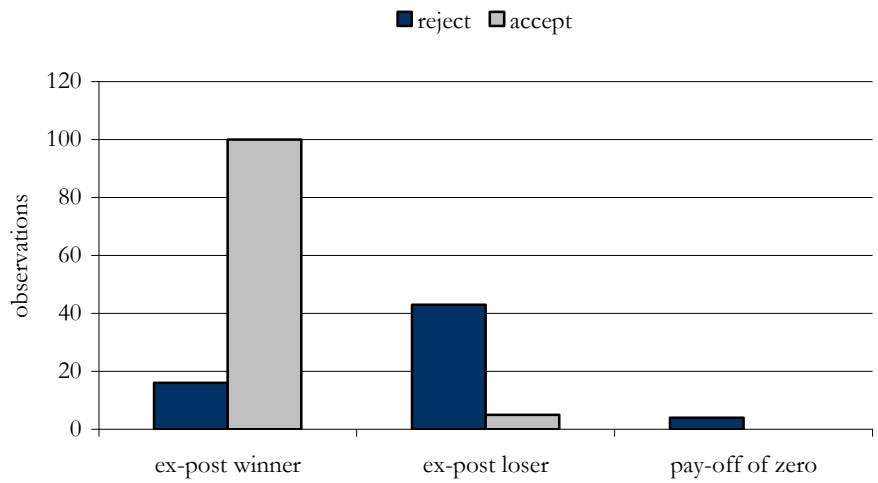
[10] Results:

[11] Winning and Loser groups are defined as groups that profit or suffer losses from the project from the outset. Probable compensation payments are neglected in this definition. Groups that have a positive or respectively a negative hypothetical profit (profit in case that the project was realized) are defined as ex-post winners or ex-post losers.

points to groups that win from the outset when the project is realized is surely not motivated by altruism. Paying only losing groups could actually be a sign of fairness but this reaction might also show that the proposer only wants to be sure that his project is accepted by a sufficient number of groups to meet the majority rule. Finally, it is found that the fraction of points that was assigned to losing groups was significantly different from the fraction given to winning groups, what support the idea of fairness. In a Wilcoxon Test the fractions were significantly different at $p=0.01(W = -2.993)$ and these fractions do not differ significantly between the treatments ($\chi^2(2) = 2.753$, $p>0.1$). These results are in line with earlier findings. In the literature agents have different personalities and that therefore results hinge on the characteristics of the agent (Huck 1999). Although the variance of strategies and compensation payments is quite large, compensation payments do not decrease with a higher degree of fragmentation for a single proposer.

The responder was slightly more rational.[12] When emanating from a profit maximizing behaviour, no ex-post winning group should reject and no ex-post losing group should accept the offered project and the accompanying pay-off structure. An ex-post winning group can be defined as any group that has a positive pay-off after the project is realized, combining the transfer of the proposer and the pay-off from the project (henceforth the hypothetical profit). Ex-post losing groups are defined vice versa. As shown in the next figure the fraction of deviant *Bs* was quite small but according to a Binomial Sign Test significantly different from the rational solution. Besides that both groups differ significantly from each other as shown by a Binomial Sign Test.[13]

Figure 2: Decisions of *B*



[12] In every following analysis all observation of *Bs* in sessions 5 to 11 are included, independent if his decision was submitted to the *A*.

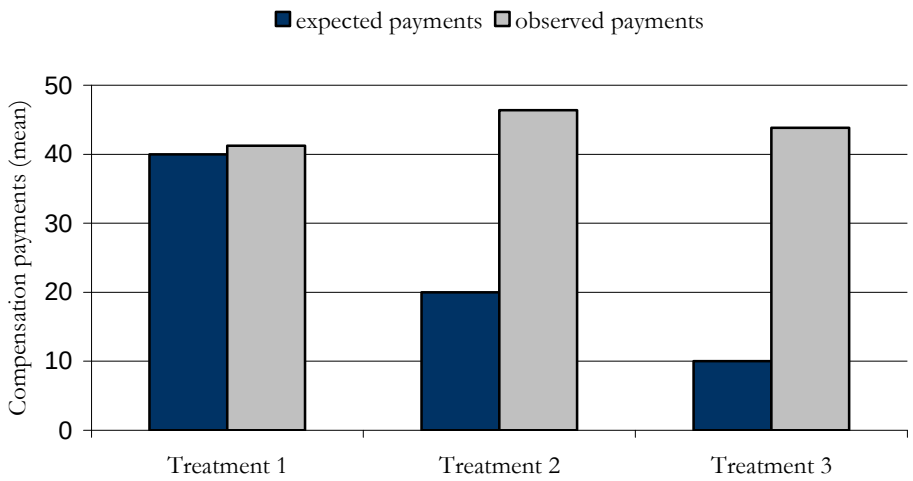
[13] For loser a Binomial Sign Test show the following result: Asymptotic p = 0.091 and for winner asymptotic p = 0.00

The treatments themselves show interesting patterns for the decisions of ex-post winning groups. In treatment 2 and 3 their actions were closer to what was predicted and thus the results are not significantly different from the rational solution.[14] The deviance of *Bs* may be explained by motives of envy: About 21% of ex-post winning responders that faced the situation that at least one other agent gained more or the same profit rejected the project. It turns out that the hypothetical profit of these agents was very low. Ten responders out of sixteen had a profit lower than 5 points. Therefore envy may not be a proper explanation of the real motive behind the rejection of the project. These findings are thus in line with previous results. As a next step it is evaluated whether and in what way fragmentation influenced the results.

7 Observed effects of fragmentation

Fragmentation within the population can lower compensation payments to meet the majority rule as shown in previous sections. In the foregoing analysis it is shown that this prediction is not met at all. There exists no significant difference between offered transfers in the treatments ($\chi^2(2) = 3.397$, $p>0.1$). More transfers and more groups were paid than necessary in treatments with higher group numbers. It follows that the difference between expected and observed transfers increases with the number of groups and hence with the treatment.

Figure 3: Difference in Observed and Expected Transfers



[14] P values are p=0.427 for treatment 2 (n=38) and p=0.011 for treatment 3 (n=38).

These differences are significant according to a Friedman's Anova ($\chi^2(3) = 32.554$, $p < 0.01$)[15] and the effects are quite high (r1-2 = 0.837; r2-3 = 0.447; r1-3= 0.876). The idea of lowering costs stems from the possibility of compensating fewer groups and thus fewer agents in treatments with a higher group number. However, proposers obviously did not follow this line of argument. A Friedman's Anova shows that the number of compensated agents varies significantly between the treatments ($\chi^2(2) = 5.344$; $p < 0.1$) but the results are not very robust. Applying a post hoc test and a Bonferroni Correction no treatment exhibited a significant difference.[16] However, it needs to be considered, that the informational value of these results is restricted because of the designs of the treatments. In addition, the observations involve many ties and so their statistical power is reduced. The same problem applies to the fraction of compensated winning groups. No significant difference between the compensation of winners in treatment 1 to 3 was found ($\chi^2(2) = 3.714$, $p > 0.1$).

The degree of fragmentation thus influences the behaviour of the proposer and his compensation payments but does not make decisions less costly but rather more expensive compared to what is necessary. This result is in line with the argumentation in section 3 and may stem form two possibilities: Either the number of groups enhances uncertainty or the situation causes the proposer to be fair and give the same number of points irrespective of the number of groups. The last argument though is not in line with the fact that also winning groups were compensated. However, it was recognized that the behaviour of the proposers varies strongly and thus a generalization of his reaction to the degree of fragmentation might not be possible.

The responders show a more uniform behaviour. Two variables describe the reaction of Bs**, their decision regarding the project and their requests. As already mentioned in section** 3 **the decision can be influenced by other factors than fragmentation. A logistic regression (which is shown in the Appendix) shows that the number of groups is not a relevant factor for the decision. The important criteria for 'accepting' or 'rejecting' the project are the hypothetical profit, the fraction of compensation that is paid to groups that would win from the realization of the project and whether and to what extent requests were met. The importance of these factors is also supported by the remarks in the questionnaires. Thus the decision does not directly depend on the design of the treatment. Factors that influence the decision itself depend surely on the number of groups as was previously shown. Nevertheless we abstain from a further analysis of decisions and instead focus on the evaluation of the requests in the first three treatments. These treatments have the**

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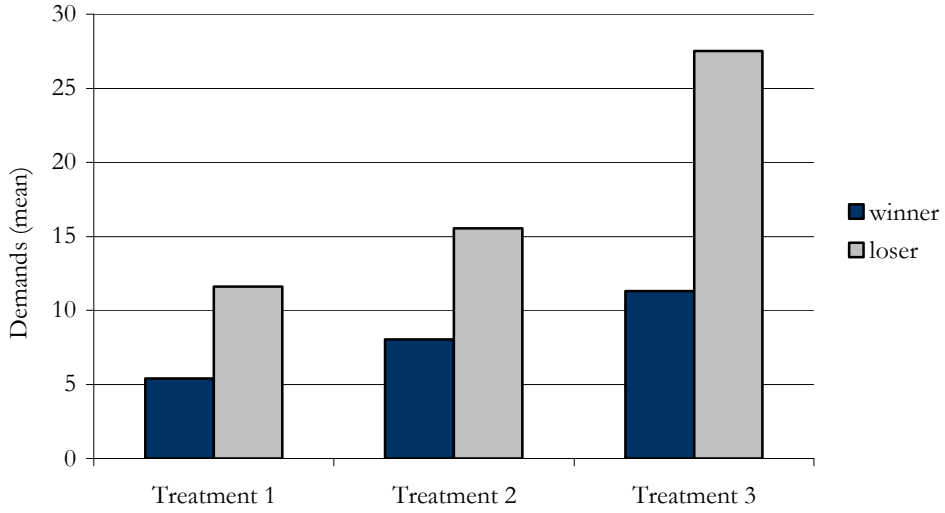
[15] We also applied a Wilcoxon Match Pair Test as Post Hoc Test including a Bonferroni Correction at a 0.0167 level of significance and found that treatments are significantly different, except treatments two and three. This result actually would be significant at the 5% level without a Bonferroni Correction.

[16] A Wilcoxon Test shows the following results: For the comparison of treatment 1 and treatment 2 p is 0.027 and for the comparison of treatment 1 and 4 p is 0.08. Conducting a Bonferroni Correction no comparison is significant at the 5% level (or after correction 0.0167).

same profit and the same losses per head. They only differ in the number of groups and their sizes. In section 3 **it was mentioned that a higher number of opponents could lead to higher requests**(Messick et al. 1997; Levine 1998; Wildschut et al. 2003)**, in contrast to the rational solution. In line with these results we predict that groups will request more compensations in treatments with higher group numbers. The requests of winning and losing groups are shown in** Figure 4.

Figure 4: Requests



It can be seen that requests increase for winning and losing groups. The treatments are different according to the difference of observed and expected requests (those requests that would ensure an output of zero). This result is significant according to a Kruskall Wallis Test.[17] So the results are in line with the predictions made in section 3. Either the uncertainty of A is anticipated and induces Bs to raise their requests, or groups acted more competitively in the face of more opponents. There is a possibility that some Bs did not recognize the fact that all losses, profits and requests were allocated to the group as a whole and not to the single individual. Therefore requests may reflect their individual expectations. But the chance for such behaviour is small as the programming made quite clear that all results were meant to be for the group as a whole.

It can be concluded that fragmentation influences both the proposer and the responder. Obviously a deviation from the rational solution is the greater the higher the degree of fragmentation. Requests rise with a higher group number and also compensation payments are higher than the situation demands.

[17] A Kruskall Wallis Test shows the following results: $\chi^2(2) = 6.455$, $p<0.05$ (losing groups), $\chi^2(2) = 6.032$, $p<0.05$ (winning groups). The Post Hoc Test is not significant according to the Bonferroni correction. Only between treatment 1 and treatment 3 for both types, winners and losers, results are significant at the 10% significance level ($U_{1\text{-}3\ losers}= 57.5$ $n_{1\text{-}3\ losers} =30$; $U_{1\text{-}3\ winner}=524.5$ and $n_{1\text{-}3\ winner} =78$.)

8 Conclusion

Reform deadlocks can be seen on a daily basis. Trying to avoid or dissolve these side payments can be used. Theoretically it can easily be shown that fragmentation, in the form of more but smaller groups, can reduce compensation payments to reach a decision. The question remains whether agents change their behaviour in a more fragmented society. The situation was simulated in a modified ultimatum game using different group numbers to reflect the degree of fragmentation. It was found that the theoretical hypothesis, that fragmentation has a positive influence on compensation costs, cannot be supported. As having showed that proposers neglects the opportunity to pay fewer transfers in situation with more groups. Instead proposers tend to pay half or more than half of their budget to compensate responders to ensure the acceptance of their project irrespective of the number of groups. Fragmentation has also an effect on the behaviour of the responders. Instead of lowering their requests in treatments with higher group numbers they tend to request a greater share of the budget. This is not in line with market rules as in treatments with higher group numbers the price of a single vote should fall and hence requests should be reduced. In this experiment the requests are not connected with the offers, as the requests were not presented to the proposer. However, other authors found such a connection(Rankin 2003). When requests increase with growing fragmentation, offers do increase as well and side payments become even more costly. Additionally, it is not found that in treatments with higher group numbers more polls were won and thus more projects were realized. We see that in treatment 1 that incorporated two groups, no project was realized and the rejection rate decreased strongly in treatment 2. However, this trend is not constant and a final conclusion cannot be drawn.

The effects of fragmentation definitely need further research to find robust results. To my knowledge there exists no evaluation of the topic of fragmentation using an experimental design. Therefore it was not possible to compare our results with other findings. It is thus imperative to modify the experiment to recheck the findings. It could be possible that higher pay-offs or another exchange rate could lead to a more competitive behaviour, although it is shown that money does not really matter in the experiments (Camerer/Thaler 1995). Apart from more technical aspects, it might help to evaluate whether the special pay-off structure, including negative pay-offs, has an influence on the agents. A variation of these payoffs, including unequal losses or profits, seems necessary to find out whether the results are robust. Also, the experiment presented here allows no communication within groups. The result may change when communication is allowed. Recent findings on group behaviour predicts that groups act more rationally if group communication is allowed (Sutter 2005). Perhaps most interesting could be the question, whether the request of responders have a constant influence on offers in a more fragmented framework.

If these results can be transferred to the political is unsure and can only give a hint about possible reasons of behaviour. Surely the political sphere is not led by maximizing profits and reducing compensation costs, but by other motives, that will clearly affect their decisions.

Appendix

Logistic Regression

dependent variable: decision of B

the following variables are included:

- Hypothetical Profit (FL)
- Difference between offers and requests (Difference_request_offer)
- Group (Group)
- Fraction of Points to Winning Groups (Fraction_Points_Win)
- Hypothetical earnings of the proposer (FL_A)

		B	S.E.	Wald	df	Sig.	Exp(B)	95,0% confidence interval EXP(B)	
								Lower	Upper
Step 1	FL	,089	,013	45,240***	1	,000	1,093	1,065	1,121
	Group	,055	,107	,267	1	,605	1,057	,857	1,304
	Difference_request_offer	-,063	,024	7,098***	1	,008	,939	,897	,984
	Fraction_Points_Win	-2,056	1,026	4,019**	1	,045	,128	,017	,955
	FL_A	-,013	,017	,650	1	,420	,987	,955	1,019
	Konstante	,341	,849	,162	1	,688	1,407		
Step 2	FL	,089	,013	45,397***	1	,000	1,093	1,065	1,121
	Difference_request_offer	-,059	,022	7,062***	1	,008	,943	,903	,985
	Fraction_Points_Win	-2,067	1,025	4,069**	1	,044	,127	,017	,943
	FL_A	-,015	,016	,881	1	,348	,985	,954	1,017
	Konstante	,624	,654	,910	1	,340	1,866		
Step 3	FL	,090	,013	45,625***	1	,000	1,094	1,066	1,123
	Difference_request_offer	-,060	,022	7,138***	1	,008	,942	,902	,984
	Fraction_Points_Win	-1,693	,950	3,179*	1	,075	,184	,029	1,183
	Konstante	,093	,320	,084	1	,772	1,097		

p* = p<0.1;p**=p<0.05, p***=p<0.01

Step	-2 Log-Likelihood	Cox & Snell R-Quadrat	Nagelkerkes R-Quadrat
1	109,641(a)	,489	,666
2	109,910(b)	,488	,665
3	110,816(b)	,485	,661

The variable 'group' indicating the different treatments is not significant. Previous logistic regressions showed that the coefficient is not significant in every combination of variables and also the Wald Statistic shows no significant result. We can thus conclude that the treatment itself has no influence on the decision of *Bs*.

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