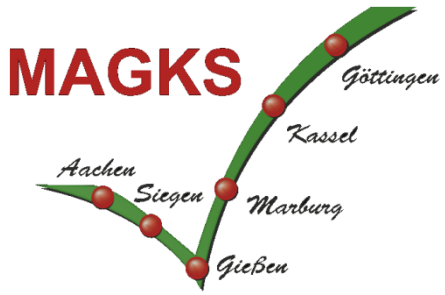

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Rating Agencies – An Experimental Analysis of their Remuneration Model

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Rating Agencies – An Experimental Analysis of their Remuneration Model

by Christoph Bühren[1] and Marco Pleßner[2]

ABSTRACT

Does it matter who pays for ratings? Yes, but not for the rating agencies' behavior. These are the findings of our experiment where we analyze the effect of the remuneration model of rating agencies on their assessments as well as on investors' and issuers' behavior. First, we find that rating agencies' assessments are comparable whether the agency is (partially) paid by issuers, investors, or solely by the experimenter. Issuers, on the other hand, more often do not return investor's trust when they or investors pay for ratings. Further, investors more often act according to the agencies' recommendations when they have to pay for this information.

JEL: C91, D03, G01

Keywords: rating, experiment, financial crisis

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INTRODUCTION

Rating agencies have existed for more than one century. In the U.S., almost all companies which operate in the financial market are rated externally by at least one of the three best reputed American agencies: Standard&Poor's (S&P), Moody's, and Fitch. Together, they have a market share of almost 95% with regard to revenues and more than 96% concerning the number of ratings (SEC 2013, p. 10). They played a focal role in the rise and spreading of the financial crisis that started in 2007 which also facilitated the emergence of the recent Eurozone crisis. Before the financial crisis, rating agencies assigned investment grade ratings to structured financial products such as Asset Backed Securities (ABS) that were in most cases secured with U.S. subprime mortgages. When the U.S. real estate market broke down, the agencies had to withdraw these ratings that were "too positive", thereby triggering fire sales of the respective products. Most interestingly, the agencies did not merely rate these products but also helped to create them.

Criticism of rating agencies exists as long as rating agencies themselves. For example, the concern about procyclicality of ratings was already mentioned by Hickman in 1944. According to Sylla (2002, p. 15), he specifically worried "*about the cyclical behavior of ratings upgrades in good times and downgrades in bad times when they happened to be used in conjunction with financial regulation*". However, with regard to sovereign ratings Gaillard (2013) found that credit ratings were more stable than market based indicators such as credit default swap-implied ratings (CDS-IRs). He does not deny that rating agencies played a procyclical role in the financial crisis from 2009 until 2012 but states that this role could have been much more severe if market based indicators had been taken into account instead of sovereign ratings by the big three. Moreover, he found that sovereign ratings published by Moody's even had countercyclical effects and therefore functioned as a protection shield against contagion.

Fight (2001) criticized the oligopoly status of the major Nationally Recognized Statistical Rating Organizations (NRSROs) they obtained through the regulatory use of ratings. Due to this and the unclear rules of the U.S. Securities and Exchange Commission (SEC) regarding the recognition of agencies as NRSROs, market entry for small agencies is almost impossible. In contrast, Camanho et al. (2012) developed a model in which rating

inflation is more severe in the case of competition than in the monopoly-case, subsequently leading to a decrease in expected welfare.

Another research focus is on the remuneration model. Until the 1970s, investors paid for rating agencies' assessments. Nowadays, rating agencies are paid by issuers. This leads to potential conflicts of interest. Especially in case of structured financial products, banks often directly discuss with rating agencies in order to elaborate how to optimally design financial products so as to receive certain investment grade evaluations (Cantor/Packer 1994, p. 19). These auxiliary services offered by rating agencies as well as their involvement in the early stages of the process of rating structured financial products carry enormous risks of conflicts of interest (Johansson 2010, p. 5). Sean Egan, co-founder of Egan-Jones Ratings Co. whose company charges investors for ratings, states that "*[u]nder the issuer-paid business model, a rating agency which does not come in with the highest rating will, before long, be an unemployed ratings firm*" (Westbrook 2009).

Against this background, we experimentally compared the issuer-pays and the investor-pays remuneration model with a baseline in which the rating agency is paid publicly, i.e. by the experimenter. We analyzed the agencies', investors' and issuers' behavior in a trust game with third party assessment and potential conflicts of interest that mainly resembles the experimental design used by Kataria and Winter (2013).

The remainder of our paper is structured as follows: The next section comprises literature that focuses on the investor- and the issuer-pays model as well as on the potential conflicts of interest in these models. Section 2 deals with our experimental setup and the results of our experiments, which are also discussed. In our last section, we call attention to the implications of our findings and give an outlook for possible future research in this field.

LITERATURE OVERVIEW

"Does it matter who pays for bond ratings?" Jiang et al. (2012) asked themselves this elementary question and succeeded in giving an empirically supported answer: yes. For this purpose, a sample of 797 corporate bonds rated by S&P and Moody's were analyzed that had been issued between 1971 and 1978. This time span is of great interest because the investor-pays model and the issuer-pays model simultaneously existed between 1971 and 1974. Moody's was the first agency to charge issuers of corporate bonds in October 1970 whereas S&P started in July 1974 (Jiang et al. 2012, p. 609). By comparing corporate bond ratings

from the two biggest and best reputed agencies in these almost four years, Jiang and his coauthors succeeded in showing that when S&P charged investors while Moody's already charged issuers, Moody's ratings were higher than S&P's on average. In the years after the transition (August 1974 – 1978), however, S&P's ratings substantially increased and could no longer be distinguished from Moody's judgments. This is a clear indicator that the issuer-pays remuneration model might induce more favorable ratings for issuers on average.

Hill (2004, p. 50) attributes this change in the remuneration model to the rise of photocopying (see also Cantor/Packer 1994, p. 3). The fax also contributed to this development. Xerox introduced the Xerox 914 in 1959 and the Magnafax Telecopier in 1966, making it notably easier for subscribers to share or even resell their information which in turn led to a considerable free rider problem (Jiang et al. 2012, p. 609). Duff (2009) states that investors' willingness to pay for external ratings faded when they became capable of performing the respective evaluations themselves.

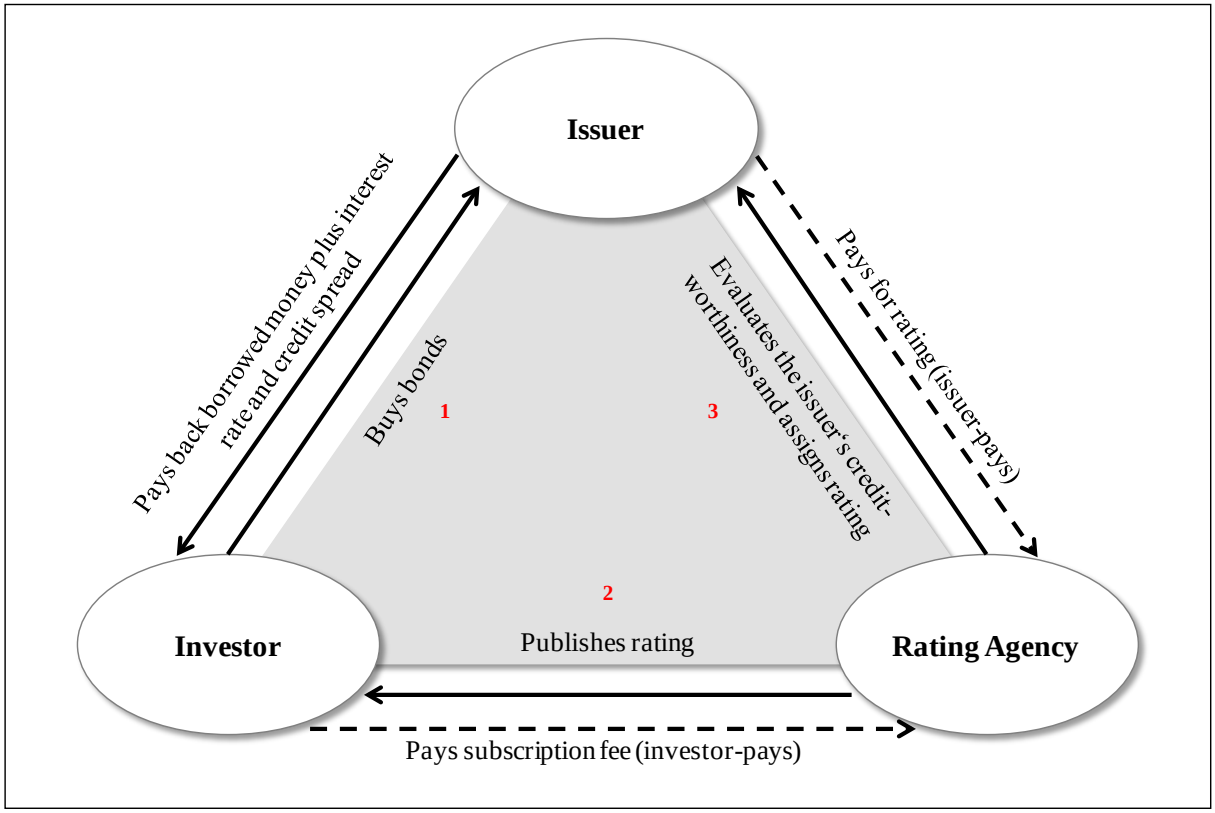
To avoid the erosion of revenues, agencies switched to the issuer-pays remuneration model which is still in force. Thereby, they generate most of their revenues from the issuers of bonds they rate. Besides the rise of photocopying and the fax machine, White (2010) offers three more explanations for this change.

First, he refers to the breakdown of Penn-Central Railroad in the year 1970. This event galvanized investors as well as issuers. The latter then wanted to convince investors of their creditworthiness, leading to a willingness to pay the rating agencies for evaluating their risk (Fridson 1999, cited in White 2010, p. 214). Cantor and Packer (1994, p. 4) also regard this historical default on $82 million of commercial paper as a "*catalyst in the transition to charging issuers*". Second, the rating agencies themselves understood that issuers of bonds were dependent on their seal of quality due to financial regulation (White 2010, p. 215). Without a positive signal of at least one of the "big three", no institutional investor was allowed to buy a bond. Third, he describes the bond rating market as a two sided market (White 2010, p. 215). Thus, revenues can be earned from issuers as well as from investors. He compares the rating market with markets of newspapers where the remuneration models can either focus on subscription fees or advertising revenues. Most newspapers practice a mix of these models, thereby generating revenues from both sides of the market.

In the issuer-pays as well as in the investor-pays remuneration model, there are potential conflicts of interest. Figure 1 visualizes the relationship between investor, issuer and

rating agency for both remuneration models (see Morkötter/Westerfeld 2008, p. 394 for a comparable figure). The conflicts of interest in this relationship can be analyzed with the aid of principal-agent theory (Jensen/Mecking 1976). In general, this theory models the relationship between a client (principal) and a commissioner (agent), who has a certain leeway in decision-making and is thus capable of influencing the principal's welfare.

Figure 1: Relationship between issuer, investor and rating agency



The notable asymmetry in information and the corresponding principal-agent problems between investors and issuers (1) are the main reasons for the necessity of rating agencies as financial intermediaries (Heinke 2000). When an investor (principal), who is seeking for investment opportunities, and a borrower or issuer of a bond (agent) bargain, the borrower has a substantial informational advantage. He knows exactly how he is going to invest the borrowed money and he can therefore better evaluate the inherent risk of his future projects. In order to persuade investors to lend money, the issuer must pay a premium or credit spread which increases with the perceived risk and the issuer's probability of default. Whether the offered risk premium is fair is not transparent to the investor due to possible hidden intentions or hidden action by the issuer. The risk of moral hazard remains but it can be alleviated by rating agencies.

Rating agencies help evaluate the issuer's probability of default by rendering it tangible with the aid of the well-known letter grades (Cantor/Packer 1994, p. 3). Therefore, rating agencies act as a kind of screening agents for investors (2) since they screen borrowers for investors (Lubig 2009, p. 142). In the original investor-pays model, the majority of the agencies' revenues consisted of subscription fees. Lewis Tappan, who founded the Mercantile Agency in 1841, developed a remuneration model in which the subscribers had to pay annual fees in order to get the relevant information, which was later adopted by the "big three" (Olegario 2001, p. 13). In Tappan's original model, fees ranged from $50 per year for companies with revenues under $50,000 up to $300 per year for big firms that generated revenues higher than $400,000 (Olegario 2001, p. 13).

Jiang et al. (2012, p. 609) argue that the investor-pays model is *"free of any conflicts of interest and helped build […] agencies' reputations for integrity"*. Yet one should take into account that some investors aim at low ratings so as to receive higher premiums, which leads to a potential conflict of interest in this model (Johansson 2010, p. 5). Since agencies are paid by investors, they might focus on the investor's welfare rather than on the issuer's. Thus, the risk of "too negative" ratings is inherent in this remuneration model. Furthermore, the rating information, which is nowadays public, would again become investor's private information, leading to a decline in market transparency (Morkötter/Westerfeld 2008, p. 396).

Rating agencies use quantitative as well as qualitative data in order to evaluate an issuer's creditworthiness (3). For this service, most rating agencies are currently paid by issuers of bonds. They usually receive approximately two or three basis points of the issued amount yearly (Partnoy 1999, p. 653) but payments of fixed sums are also possible. Austria, e.g., pays approximately € 700,000 yearly for its rating (Michaelis/Käfer 2012, p. 95 footnote 2). On the one hand, rating agencies in both remuneration models are issuers' agents and have an informational advantage concerning the rating process and the "formula" with which the rating is finally determined. On the other hand, they are also issuers' principals since they are completely dependent on the correctness and the soundness of the supplied data and information.

Heinke (2000, p. 320) sees three major reasons for the presence of conflicts of interest in the issuer-pays model. First, he lists the aspect of (economic) dependency as the agencies are dependent on the fees issuers pay for the rating. This implies the risk of favorable ratings in order to keep up the business contact. If this argumentation is used with regard to the

investor-pays model, the opposite might be true. Second, he mentions self-interest and insufficient use of resources. By this, Heinke (2000) means that rating agencies are profit-oriented companies and act as such. They might aim at minimizing costs instead of maximizing quality of ratings, thereby not maintaining enough resources so as to guarantee timely and profound evaluations. This can also apply to the investor-pays model. Third, Heinke refers to multiple ratings. The U.S. Securities and Exchange Commission demands ratings of at least two of the "big three" agencies for securities that are publicly sold. According to Everling (1996, p. 8), this is an indication for missing confidence in single ratings.

Given these conflicts of interest inherent in the current issuer-pays model and the inglorious role rating agencies played in the financial crisis from 2007, some experts call for drastic measures such as nationalization of rating agencies (Theilacker 2009). When taking into account such arrangements, one should consider that publicly financed ratings can also reveal substantial problems: Governments have great interest in saving system-relevant companies or banks and positive evaluations might be a (cost-efficient) means of protection in this context (Johansson 2010, p. 5). Nonetheless, a publicly financed rating agency might function as a benchmark for private companies and an additional profound opinion could substantially enhance market transparency.

To sum up, the existing conflicts of interest in the issuer-pays model could induce biased, i.e. more favorable ratings. If this conflict of interest is disclosed, investors, who rely on ratings should discount this biased information in order to come closer to the truth. Caine et al. (2005) show experimentally that disclosure can have paradox effects. They find that people do not sufficiently discount biased information even if the underlying conflict of interest is known. In their setting, disclosure even exaggerated the bias since advisors felt "morally licensed" and "strategically elated" to overstate their assessments even more. They conclude that disclosure alone cannot cure issues that are induced by conflicts of interest and that disclosure may even worsen matters. Transferred to the problem described above, the findings pictured by Caine et al. (2005) could lead to "too positive" ratings in the issuer-pays model. On the other hand, disclosure of the underlying remuneration model and the sums being paid might lead investors to behave more cautiously but not cautiously enough. They might anticipate ratings to be too positive but still demand too small risk premiums. With regard to issuers' behavior, the conflicts of interest in the issuer-pays model and disclosure could lead to moral hazard.

The three remuneration models presented in this section (issuer-pays, investor-pays, public-pays) have not yet been put to a benchmark test with equal conditions. By testing them in an experimental framework, we tried to analyze the effect of the remuneration model on rating agencies' evaluations and investors' as well as issuers' behavior without confounding factors.

EXPERIMENTAL SETUP, RESULTS, AND DISCUSSION

Our experimental setup mainly resembles the one chosen by Kataria and Winter (2013). They tested the effect of promises and incentives on assessments by adding a third player, the "assessor", to a binary trust game. At the beginning of the game, the assessor had to evaluate whether a friend of his, the "trustee", would return given trust or whether he would commit a breach of confidence later in the game. This was possible since these two players were friends and therefore knew each other well. The judgment was shared with the "trustor" who had to make a decision whether to trust the "trustee" or not.

Kataria and Winter (2013) asked themselves whether it is possible to obtain adequate judgments from an assessor when conflicts of interest exist. They refer to the example of a professor who has to write a recommendation letter for one of his students. With their experimental setup they succeeded in showing that assessor's promises to give an honest evaluation substantially decreases advantageous judgments. Kataria and Winter also tested the effect of pecuniary incentives. They found that when the assessor is presented the prospect of higher payoffs in case his judgment is correct, favorable evaluations are reduced to the same extent as by promises or oaths.

Setup

Our experiment took place in June 2013 at the University of Kassel. 48 students of an Experimental Economics class took part and played at least two rounds. They had worked together for two months in groups of at least four people each to prepare, conduct, analyze, and present own experiments. Therefore, we could assign the role of rating agencies to participants who were able to assess the credibility of subjects in the role of issuers from the same group. We ensured rating agencies and issuers were always of the same gender and excluded the data from our analysis where this condition could not be fulfilled. Participants knew that they would play several rounds and that randomly one round would be paid. On average, participants earned 5.50 EUR in about 45 minutes.

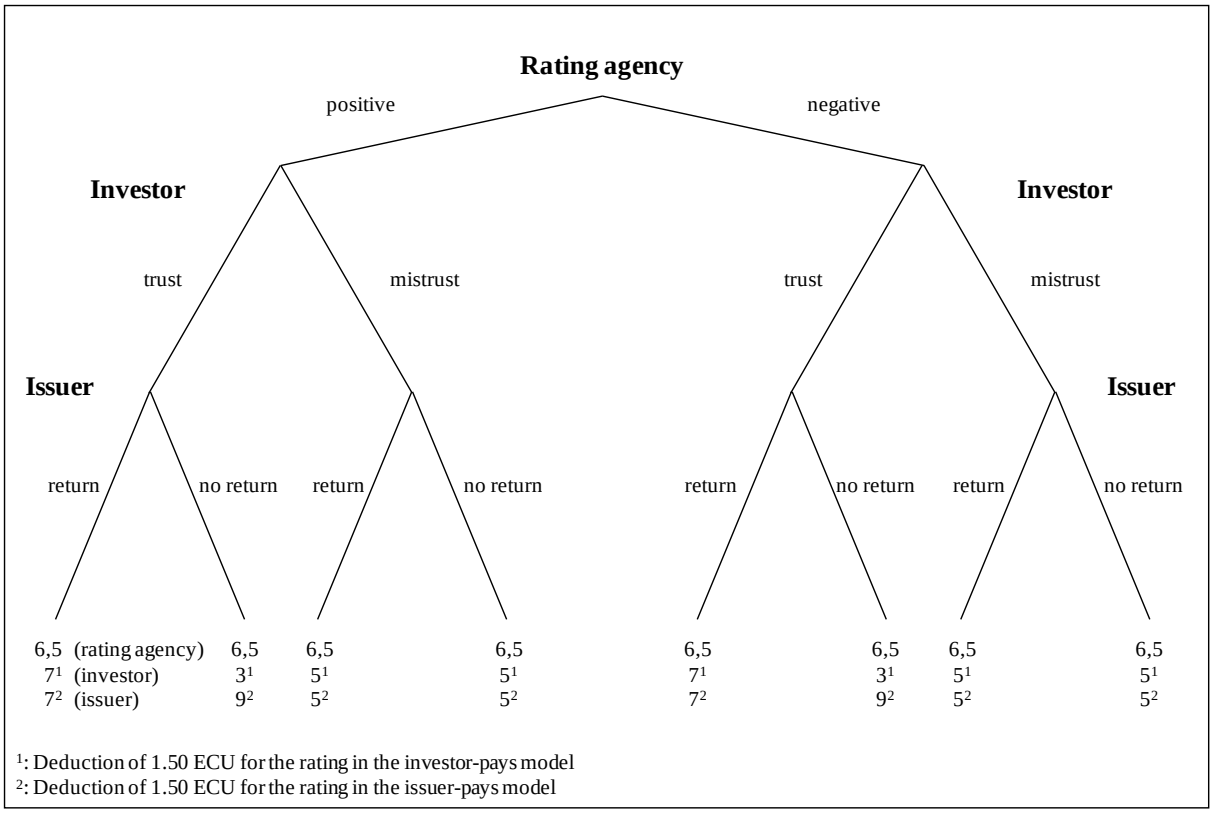
Figure 2 visualizes the setup we used to examine the effect of the remuneration model of rating agencies on their evaluations and investors' and issuers' behavior. The rating agencies' payoffs are in the first row, the investors' payoffs in the second and the issuers' payoffs in the third row.

At first, the rating agency, i.e. the assessor, gave a positive or negative judgment concerning the estimated behavior of the issuer, i.e. the trustee. The investor, i.e. the trustor, received the judgment and had to make a decision whether to trust the issuer or not. Finally, the issuer decided whether he wanted to return trust or not, not knowing how the investor and the rating agency had decided beforehand.

In our experiment, we used three treatments that differed concerning the rating agency's payment. *First*, we analyzed a remuneration model in which rating agencies are publicly financed. In this baseline, the agency received its remuneration (6.50 Euro) solely from the experimenter. *Second*, we tested the investor-pays model. Here, the rating agency was paid by the experimenter (5 Euro) *and* by the investor (trustor) (1.50 Euro). *Third*, we examined the issuer-pays model where the agency was paid by the experimenter (5 Euro) *and* by the issuer (trustee) (1.50 Euro). We avoided the terms rating agency, investor and issuer throughout the experiment in order not to induce priming effects. Instead, we used neutral vocabulary: player A for investor/trustor, B for issuer/trustee and C for rating agency/assessor.

As in Kataria and Winter (2013), we also used strategy eliciting of trustees/issuers in order to obtain enough data of their decisions and the correctness of the agencies'/assessors' evaluations. In contrast to Kataria and Winter (2013), our agency was paid partially by our issuers or investors respectively, not solely by the experimenter. Further, our pool of participants consisted of students who had worked together beforehand but who did not necessarily regard each other as friends, which was a precondition in Kataria and Winter (2013). Thereby, we could assess evaluations that are more closely related to our context. Furthermore, our participants played several rounds instead of one as in the experiment conducted by Kataria and Winter. Rating agencies and issuers played with switched roles. In order to reduce the probability of reciprocal effects, we did not announce the results of each round. To avoid experimenter demand effects, players did not switch treatments.

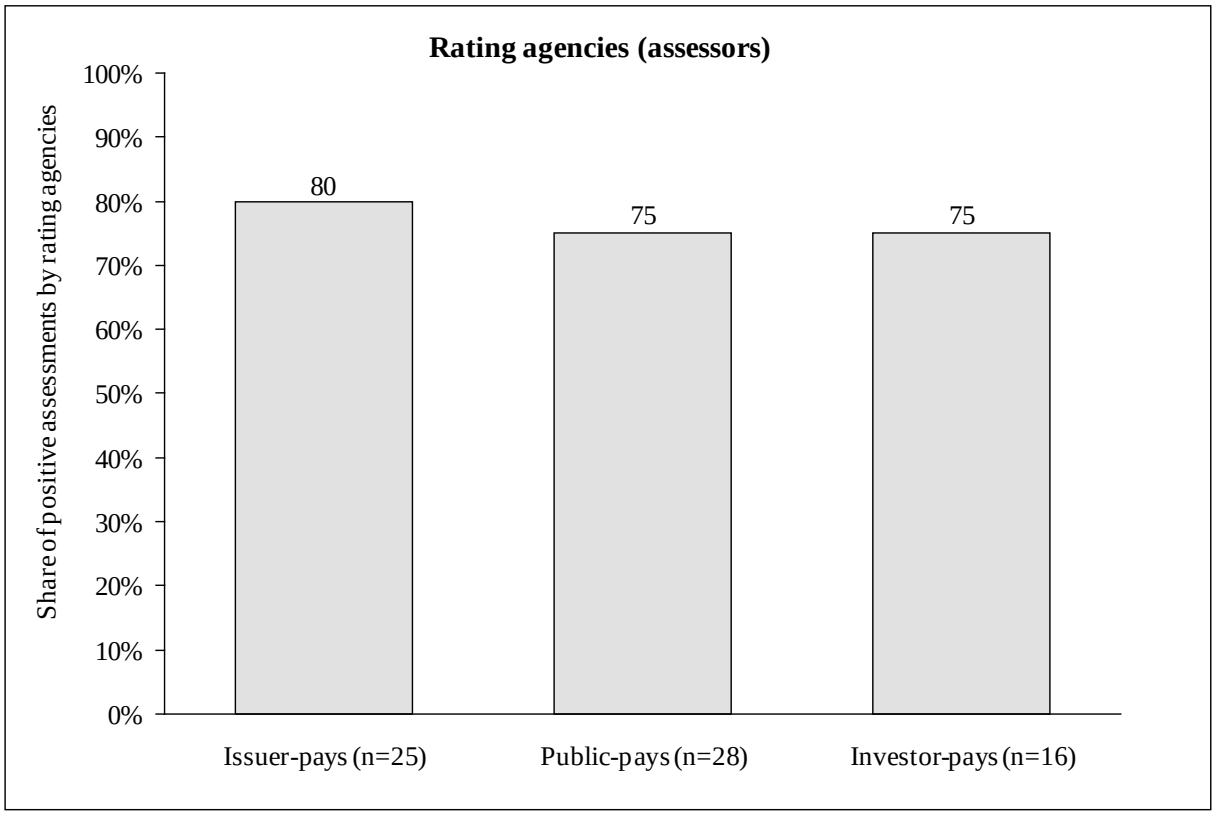
Figure 2: Experimental setup



Results

First, we analyzed the share of positive assessments by rating agencies ("assessors"). Figure 3 gives an overview of the positive judgments given by assessors in our three treatments.

Figure 3: Proportions of positive assessments by rating agencies



The share of positive assessments was largest with 80 percent in the issuer-pays treatment in which the rating agency (assessor) was paid by the experimenter *and* the issuer (trustee). In the investor-pays and the public-pays treatment, this share was slightly lower with 75 percent. Yet Fisher exact tests reveal no differences of assessments by treatment.

In Kataria and Winter's study (2013), 89 percent of all assessors in the treatment without incentives for their evaluations gave a positive assessment. This treatment can be compared to our baseline (75% in public-pays). This difference might be explained by the fact that in our experiment assessor (rating agency) and trustee (issuer) did not necessarily regard each other as friends but as colleagues who had worked together beforehand. Leising et al. (2010) found that people who like persons they have to evaluate describe them more positively on average than if they just knew each other.

Although investors seldom doubted the rating agencies' assessments in the investor-pays treatment, it is interesting to know that the share of correct ratings was actually lowest in this model (44 percent). It was highest in the public-pays treatment (63 percent). In the issuer-pays model about 52 percent of all evaluations were found to be correct.

In Figure 4, the shares of investors (trustors) who granted trust to issuers (trustees) depending on the rating agency's assessment and the treatment are displayed.

Figure 4: Proportions of investors granting trust to issuers

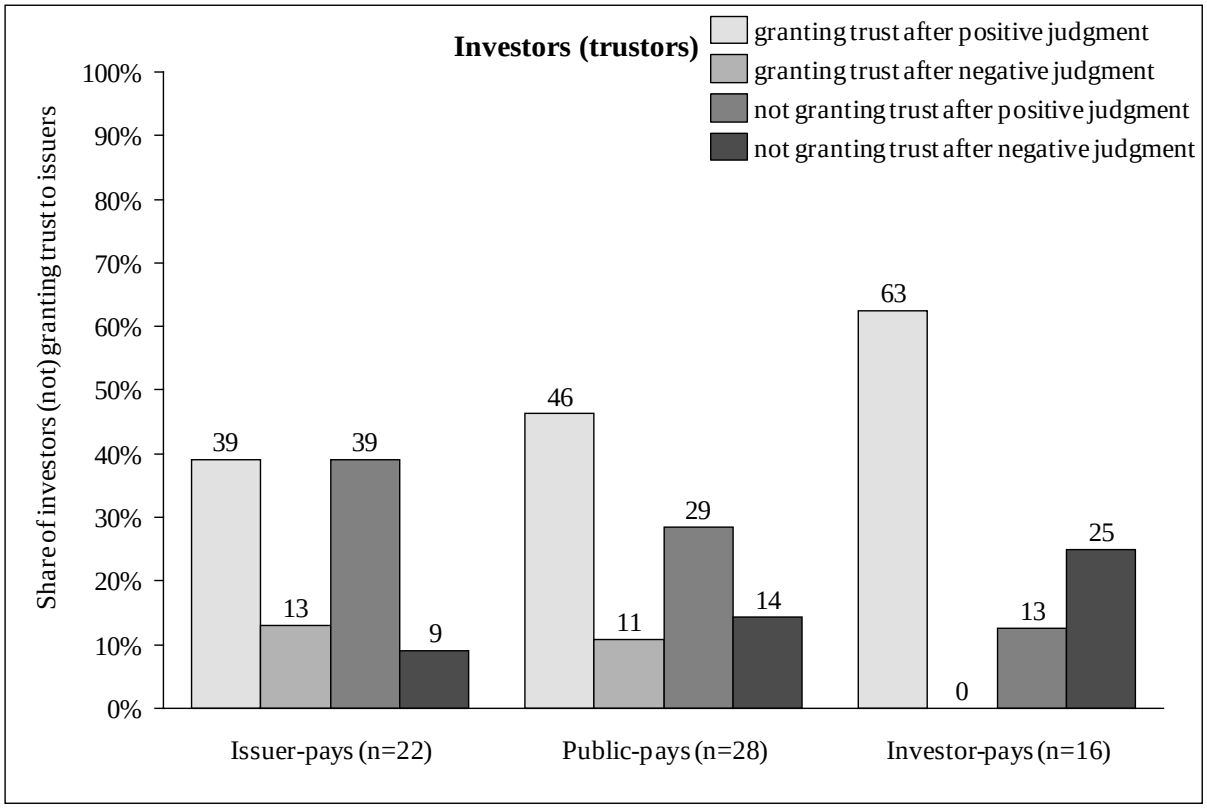
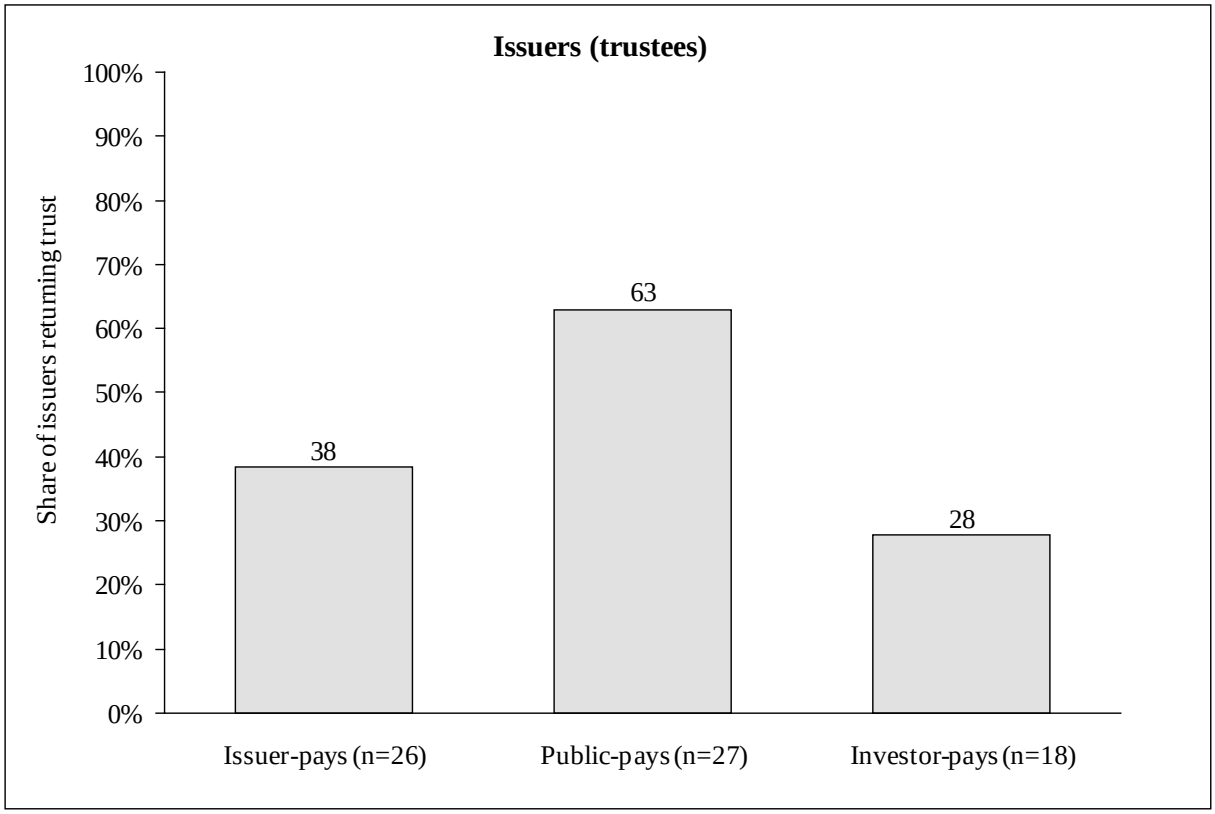


Figure 4 shows that the assessors' judgments were a crucial criterion for investors' decisions. Only few participants decided to grant trust when the assessor uttered a negative assessment (13 percent in the issuer-pays, 11 percent in the public-pays and 0 percent in the investor-pays model). However, the assessors' positive judgments were often doubted, especially in the issuer-pays model.

Taking positive and negative judgments together, investors followed the advice of rating agencies significantly more often if they paid for the assessment according to two-sided Fisher exact tests: 88% of investors (63% after positive and 25% after negative judgments) decided according to the agency's assessment in the investor-pays model compared to 60% (46%+14%) in the public-pays and 48% (39%+9%) in the issuer-pays model ($p=0.089$ and $p=0.017$, respectively).

Figure 5 gives a graphical impression of the issuers' choices.

Figure 5: Proportions of issuers returning trust

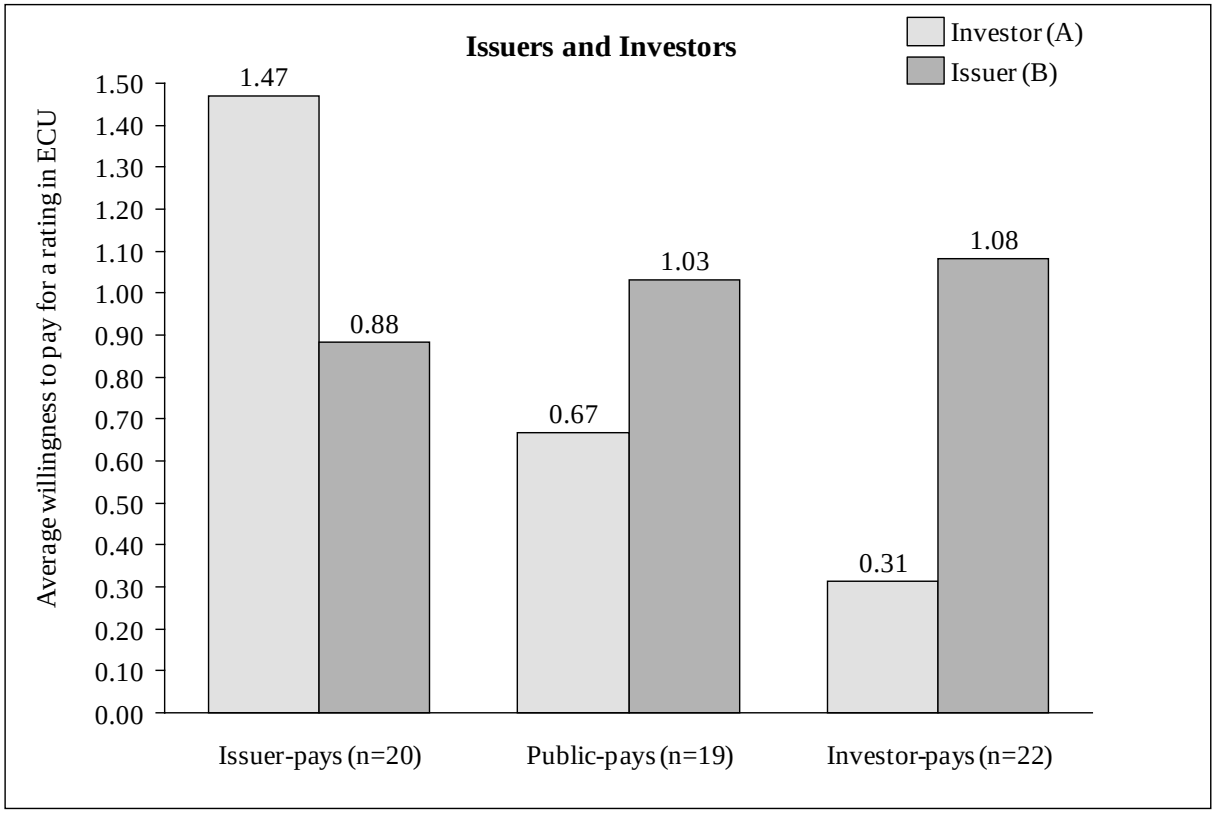


The proportion of issuers (trustees) who returned trust to investors (trustors) was 38 percent (issuer-pays), 63 percent (public-pays), and 28 percent (investor-pays), respectively. The difference between the issuer-pays and the investor-pays treatment was not significant. However, the share of issuers who returned trust in the public-pays model differed significantly from the respective share in the investor-pays model ($p = 0.038$, two sided Fisher exact test). The difference between the issuer-pays and public-pays treatment was not significant ($p=0.102$) but amounted to almost 25 percentage points.

We asked investors (trustors) and issuers (trustees) in all treatments to tell us how much they would be willing to pay for the rating agency's (assessor's) evaluation in order to assess the value participants assigned to the rating. We stressed that this was only additional information which would have no consequences for their payoffs. Figure 6 visualizes the average willingness to pay of investors and issuers in the respective treatments. Investors were willing to pay the most for the additional information in the issuer-pays model (1.47 Euro on average) – significantly more than in the public-pays (0.67 Euro on average, two-sided Mann-Whitney U test: $Z=2.34$, $p=0.02$) and in the investor-pays treatment (0.31 Euro

on average, Z=2.47, p=0.01).[3] Issuers' willingness to pay was highest in the investor-pays treatment (1.08 Euro) which was, however, not significantly different from the other treatments.

Figure 6: Average willingness to pay for ratings



In order to better explain the decisions of our investors and issuers, we added a post experimental questionnaire and conducted multivariate analyses with the help of this data. The data also comprised treatment dummies, the willingness to pay for ratings, and the evaluation of the rating agencies. In the post experimental questionnaire, besides feedback questions, we measured trust by means of the trust construct of the German Socio-Economic Panel Study (SOEP) (Naef/Schupp 2009). Duff and Einig (2009) showed that trust is an important determinant of the quality of the relationship between rating agencies, investors, and issuers. Further, we measured financial risk taking with the German versions of the DOSPERT-subscales "Gambling" and "Investing" (Blais/Weber 2006).

In our probit regressions, we used the investor's decision to follow the advice of the rating agency and the issuer's decision to return the trust of the investor as the dependent

[3] Although we stressed that WTPs do not affect subjects' payoffs, answers may have been strategically biased in a way that participants announced lower WTPs in treatments where they actually had to pay for the rating agencies.

variables. In Table 1, we see that, compared to the public-pays (baseline) treatment, investors more often acted according to the rating agencies' evaluations in the investor-pays treatment. This is in line with our analysis in Figure 4. Additionally, the regression shows that, ceteris paribus, investors followed the advice of rating agencies more often in case of negative assessments. Further control variables did not seem to play an important role for investors' choices.

Table 1: Probit regression of investor's decision to follow the advice of the rating agency

Follow advice	Coefficient	Robust St. Err.	Marginal Effect
Issuer-pays	0.4136	0.6747	0.1463
Investor-pays	1.7163**	0.8235	0.4652***
WTP	-0.1153	0.1370	-0.0417
Trust	0.2806	0.3226	0.1016
Risk taking	-0.5296	0.4297	-0.1917
Assessment agency	0.9563*	0.5618	0.3643*
Constant	0.1680	1.7501	
N = 44, Pseudo R^2 = 0.2192 Notes: reference category: public-pays, Std. Err. are adjusted for 22 clusters in subjects, *: p<0.1, **: p<0.05, ***: p<0.01, Marginal effects at sample averages			

Table 2 shows that, compared to our baseline, issuers more often did not return investor's trust in the issuer- and investor-pays model. Furthermore, it shows that issuers returned trust more often if they generally trusted other people and if they were less risk averse. The WTP and the agency's assessment did not significantly explain the issuer's decision.

Table 2: Probit regression of issuer's decision to return investor's trust

Return trust	Coefficient	Robust St. Err.	Marginal Effect
Issuer-pays	-1.1953**	0.5191	-0.4358***
Investor-pays	-1.0959**	0.5104	-0.3872***
WTP	0.9372	0.1762	0.0371
Trust	0.2854*	0.1642	0.1131*
Risk taking	0.4638*	0.3370	0.1839*
Assessment agency	0.3935	0.5618	0.1525
Constant	-3.5124	1.5648	
N = 68, Pseudo R^2 = 0.1315			
Notes: reference category: public-pays, Std. Err. are adjusted for 32 clusters in subjects, *: p<0.1, **: p<0.05, ***: p<0.01, Marginal effects at sample averages			

Discussion

In the light of agency theory outlined above, one might expect that the share of positive ratings is highest in the issuer-pays treatment. As Figure 3 indicates, the share of positive ratings in the issuer-pays treatment exceeded the respective shares of the other treatments by 5 percentage points. Yet this difference is not significant. This could be explained by the fact that the amount of money the rating agency received was always the same in all treatments and that merely the distribution changed. Therefore, rating agencies had no monetary incentive to assign favorable or overcautious ratings. Kataria and Winter (2013) found that monetary incentives lead to a substantial reduction of positive assessments in their experimental setting. The assessor received 10 Euro in case his evaluation was correct and 3 Euro if not. If we had incentivized the rating agencies' assessment monetarily, especially in the investor-pays model and the public-pays treatment, we might have seen less favorable evaluations on average.

On the one hand, we found that investors trust rating agencies' evaluations most in the investor-pays treatment where they had to give an amount of 1.50 Euro for the rating. One reason for this can be that they had to pay the amount and therefore value this additional information more highly. Another explanation might be that they became more risk-seeking

and wanted to gamble for higher payoffs which they could only receive by choosing to trust the issuer, hoping that he would return trust.

On the other hand, investors mistrusted the agencies' assessments most in the issuer-pays model. In the instructions of all treatments, every participant was informed how the rating agencies' payoff was composed. In anticipation of biased evaluations, investors might have discounted this advice, subsequently leading to a lower share of investors who granted trust. Caine et al. (2011) claim that this discounting is often not sufficient when conflicts of interest are disclosed since the evaluators feel morally licensed to exaggerate even more. Our findings point in a similar direction. Issuers received about the same evaluations in the issuer-pays as in the public-pays treatment but issuers more often behaved unfairly (i.e. they did not return trust) in the issuer-pays model. This morally hazardous behavior might have been motivated by the remuneration structure. Issuers had to pay 1.50 Euro for the evaluation, which the investor received from the rating agency. In order to retract this payment, they might have been inclined not to return trust so as to maximize their payoff. In our experiment, the most unfair behavior of issuers was found in the investor-pays model where merely 28 percent of all issuers returned trust (Figure 5).

The investors' willingness to pay for a rating also differed by treatment. Investors were willing to pay the most for assessments in the issuer-pays treatment. Here they might have expected the most striking conflicts of interest. This underlines the assumption that investors assign a value to this assessment which helps them make their investment decision. They were willing to pay substantially less in the investor-pays treatment.

Issuers' willingness to pay for an assessment of their potential behavior did not differ by treatment. Nonetheless, it was positive for every treatment and highest in the investor-pays model. Issuers seem to appreciate the opportunity to send signals to investors in order to convince them of their soundness. The average willingness to pay of issuers was lowest in the issuer-pays model, in which they actually had to pay 1.50 Euro for the rating. The same pattern emerged when we compared investors' willingness to pay in the public-pays and in the investor-pays treatment: Investors exhibited a higher willingness to pay on average when the public, i.e. the experimenter, pays for the rating.

CONCLUDING REMARKS

Our experiment findings suggest that the remuneration model does not have substantial influence on the rating agencies' assessments. Although rating agencies tend to give more favorable ratings in the issuer-pays treatment, these differences are not statistically significant. But the remuneration model seems to have consequences for the other market participants' behavior. Specifically, in case investors pay for the rating, they follow the assessor's advice more often than if they do not pay for the additional information. Issuers tend to behave more unfairly when they or investors pay for ratings rather than when ratings are publicly financed.

All in all, the public-pays treatment performs a bit better than the investor- and the issuer-pays models. In our public-pays treatment, issuers behave more fairly than in the other treatments. Moreover, investors do not (blindly) trust the rating agencies' assessments like in the investor-pays model but approach their evaluations with (healthy) skepticism. Besides these findings, the share of correct ratings is highest in the public-pays treatment. The unfair behavior of issuers in the issuer-pays and in the investor-pays treatments speak against these remuneration models.

Practically, a return to the investor-pays model would be difficult. Ratings are more or less public goods nowadays because the information can quickly spread or be resold. Therefore, a great share of revenues of the rating agencies would be at stake, leading to cost-cuts and declining quality. A change from the recent issuer-pays to a public-pays approach might have similar consequences. Moreover, in times of crises, this model might also lead to "too positive" ratings since these evaluations might be a cost-efficient means to support systemically important firms and banks.

One way to incentivize correctness of ratings is to introduce legal liability of rating agencies for their assessments. E.g., Partnoy (2009) calls to disestablish rating agencies' exemption from liability for their ratings. He argues this to be necessary considering the immense influence of their judgments, especially with regard to institutional investors portfolio structuring. Ratings come under the freedom of speech as their evaluations are recognized as "opinions" despite their regulatory use. Kataria and Winter (2013) showed that the share of favorable ratings decreases when monetary incentives for correctness come into play. With the help of monetary consequences for the correctness of ratings, the effect of legal liability could be tested in our three treatments.

In future studies, the effect of split revenues on rating agencies', investors', and issuers' behavior could be analyzed. One could test experimentally how these three parties behave when issuers and investors pay an identical amount for the rating.

Rating agencies are highly dependent on their reputation which de facto represents their capital (Dittrich 2007). Our experiment is a one-shot game where rating agencies do not have the possibility to build up a reputation. Results of previous rounds were not made public and the group constellation changed from round to round. In future research, our experiment could be played several rounds with constant roles. The results of each round could be announced and rating agencies would have the chance to build up a reputation for future rounds.

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APPENDIX

Instructions

Welcome and thank you for participating in this experiment. Please read the instructions carefully. During the experiment, you will have the opportunity to make money. The amount depends on both your decisions and the decisions of the other participants. You will play several rounds. At the end, one round will be drawn randomly and all participants will be paid according to their decisions and the other participants' decisions. Therefore, all decisions are potentially binding.

In the experiment, all amounts are expressed in ECU (*experimental currency units*). All earned ECU are converted to Euro at the end of the experiment, with the following exchange rate:

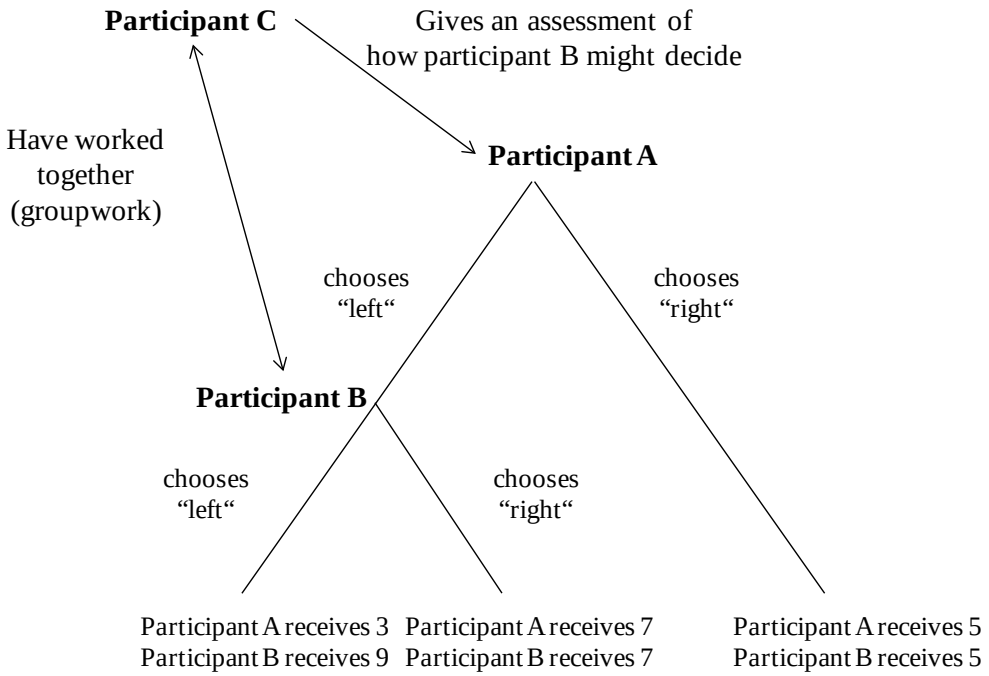
1 ECU = 1 €

Please stop any conversations with your neighbors from now on. Turn off your cell phone and remove anything from your table that you do not need for the experiment. It is important that you follow these rules, otherwise we have to exclude you from the experiment, and thus also from any payment. If you have any questions, please raise your hand and we will answer them individually where you are seated.

Some of you will be assigned to a group with one fellow student of the same gender and whom you already know from a joint group work.

The Decision Problem

In this task, there are three roles, namely the roles of participants A, B, and C. **Participants B and C already know each other through their joint participation in a group work** Participant A has the choice between the options "right" or "left". If participant A decides "right", the decision problem is complete. Only if participant A decides "left", participant B needs to decide between the options "left" and "right". The decision problem is then complete.



To illustrate this, you can see the decision-making process outlined graphically above. At the top of the diagram, participant A has to decide whether he selects option "right" or "left". Only if he opts for "left", the choice of participant B between "left" and "right" plays a role. The payoffs are indicated at the bottom of the graph. The upper line is participant A's payoff and the bottom line shows participant B's payoff. That is, if participant A selects the option "right", participants A and B will each receive ECU 5, regardless of what party B chooses. If participant A decides to take the "left" option, the payout is dependent on the decision of participant B: If participant B decides "left", participant A receives ECU 3 and subscriber B receives ECU 9. If participant B, however, chooses "right", both get ECU 7.

We now come to the decision of participant C. Participant C has worked together with participant B before and is supposed to assess whether participant B is going to choose "left" or "right". Participant A can then make his or her decision based on this assessment.

"Public pays" (Baseline):

The assessment of participant C has no effect on his or her payoff. For participation in the experiment he receives 6.50 ECU from the experimenter.

"Investor pays":

The assessment of participant C has no effect on his or her payoff. For participation in the experiment he receives ECU 5 from the experimenter. In addition, he receives **ECU 1.50** from

participant A. Example: If A chooses right, he will receive 5 ECU but he has to give 1.50 ECU to participant C (see figure above for payoffs).

“Issuer pays”:
The assessment of participant C has no effect on his or her payoff. For participation in the experiment he receives ECU 5 from the experimenter. In addition, he receives **ECU 1.50** from **participant B.** Example: If B chooses right after A has chosen left, participant B will receive 7 ECU but he has to give 1.50 ECU to participant C (see figure above for payoffs).

During the decision problem, participant A is asked how he will decide. Participant A knows participant C’s assessment (B chooses "left" or "right"). Of course, participant A can decide freely how he wants to respond to this assessment.

Before party B makes a decision, he will neither be informed of the decision of participant A nor the decision of participant C. The reason for this is that we want to know how participant B would respond to the choice "left", even if participant A has chosen "right". If you are in the role of participant B and have to choose between “left” and “right”, you should therefore imagine that participant A has chosen "left". The choice of participant B will only be relevant for the payout if participant A has actually selected "left".

You will now receive decision forms which tell you if you are player A, B or C.
If you have any questions, please raise your hand now.

Decision forms

Decision form participant C

Pseudonym: Group:

Gender: m f

What is your assessment? Will participant B choose “left“ or “right“?

left right

You may justify your decision on the back of the form.

Decision form participant A

Pseudonym: Group:

Gender: m f

You can see participant C’s assessment with respect to the decision of participant B. How do you decide? left right

How much would you be willing to pay for C’s assessment? The answer does not have any consequences for your payoff.

You may justify your decision on the back of the form.

Decision form participant B

Pseudonym: Group:

Gender: m f

You know neither participant C’s assessment nor the decision player A made. How do you decide? left right

How much would you be willing to pay for C’s assessment? The answer does not have any consequences for your payoff.

You may justify your decision on the back of the form.