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// TOBIAS RIEHM, NICOLAS FUGGER, PHILIPPE GILLEN,
VITALI GRETSCHKO, AND PETER WERNER

Social Norms and Market Behavior – Evidence From a Large Population Sample

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SOCIAL NORMS AND MARKET BEHAVIOR – EVIDENCE FROM A LARGE POPULATION SAMPLE

Tobias Riehm, ZEW – Leibniz Centre for European Economic Research, L7 1, 68161 Mannheim, Germany, email: tobias.riehm@zew.de

Nicolas Fugger, ZEW – Leibniz Centre for European Economic Research, and University of Cologne

Philippe Gillen, Kerkhoff Negotiations

Vitali Gretschko, ZEW – Leibniz Centre for European Economic Research, and University of Mannheim

Peter Werner, Department of Microeconomics and Public Economics, School of Economics and Business, Maastricht University

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Abstract

We test the importance of social norms for market interactions associated with negative real-world externalities in a large-scale experiment with a heterogeneous population sample from Germany. The majority of experimental participants refuses to trade, thus behaving in a moral way. Our data suggest the importance of norm conformity for the decision to trade as a significant share of buyers and sellers condition market entry on the decisions of others. Moreover, a majority of observers is willing to incur personal costs to sanction trading. Moral behavior is significantly linked to demographic characteristics and stated preferences and attitudes of the participants.

JEL Classification: D01, D62, D64, C93

Keywords: Markets, moral behavior, negative externalities, social norms, punishment, large population sample, experiment

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1 Introduction and related literature

The existence of negative externalities adds a moral dimension to buying and selling specific goods or services. Many goods differ in their environmental impact related to production and transport (for example, organic and conventional meat) but also concerning their effects in the social domain (for example, in terms of working conditions). In these cases, there is an inherent tension between the utility or profit of the consumer or firm and the degree to which consumption or production decisions impose harm on others. Decision-makers have to trade off their individual benefits and potential negative externalities.

There has been a growing debate about the importance of moral concerns for market interactions. Various scholars have argued that the interaction on markets might damage moral values, fostering unethical behavior in comparison to non-market transactions (see, for example, Sandel 2012). Experimental tests of the decisions of market participants in the presence of real-world externalities indicate a substantial heterogeneity in concerns for morality (Falk and Szech 2013, Deckers et al. 2016, Kirchler et al. 2016, Ockenfels et al. 2020, Sutter et al. 2020): While a significant share of participants is willing to impose negative

real-world externalities in order to achieve material payoffs, others forego these profits, indicating moral concerns against trading.[1]

By definition, market institutions are based on the interaction of many individuals. Therefore, the behavior and attitudes of other (potential) traders may crucially determine the decision to become active on a market in the presence of negative externalities. In this sense, traders' preferences to conform to social norms can become decisive for the outcomes of the market exchange and, eventually, the size of the negative externality created. For example, as Falk and Szech (2013) argue (p. 707), "observing others trading and ignoring moral standards may make the pursuit of self-interest ethically permissible". Also, the understanding of what constitutes morally appropriate behavior on markets might dramatically differ across contexts and population groups, highlighting the role of social norms. For example, Bartling et al. (2015) observe big across-country differences in the choices of experimental participants, concluding that "norms of socially responsible market behavior are weaker in our subject population in China than in Switzerland" (p. 224).

So far, no study has directly tested the relative impact of traders' concerns for norm conformity in market settings with negative externalities. In one of our treatments, buyers and sellers can explicitly condition their market entry on the

[1] Benabou et al. (2018a, 2018b) provide theoretical foundations for the nature of moral preferences and the influence of narratives and imperatives on moral behavior.

entry decision of other traders. This treatment allows us to find direct evidence for the effects of social norms on market outcomes and to shed light on the relative contribution of social norm orientation for (im-)moral behavior in markets. Moreover, in a further treatment, we test for the willingness of outside observers to enforce a norm for moral behavior by sanctioning those who are willing to impose the negative externality through their trading activity.

From a more general perspective, an essential contribution of our study is that we investigate concerns for moral behavior on markets in a heterogeneous and large population sample. Previous studies have investigated moral behavior predominantly in laboratory settings using student samples. Given the heterogeneity of subjects' responses to the externalities created in these laboratory markets, an important question is to what extent these findings can be extrapolated to non-laboratory settings. To the best of our knowledge, there is no study so far that measures moral preferences in market interactions within a large population sample, and little is known how decision-makers outside the laboratory trade off own monetary benefits against negative real-world externalities.

We close this gap by conducting a large-scale market experiment with a heterogeneous sample of the German population in which sellers and buyers can engage in profitable trade, which, however, leads to a negative real-world externality. In this setting, we investigate if and how preferences for moral

behavior are associated with demographic backgrounds, socio-economic characteristics, and stated attitudes concerning prosocial behavior and ethical consumption. Hence, our study adds to the relatively small literature that analyses individual preference measures (such as social preferences and risk preferences) within the general population (see, for example, Bellemare et al. 2008, Dohmen et al. 2009, Dohmen et al. 2011, Falk et al. 2013, Abeler et al. 2014, Falk et. al. 2018, Riedl et. al. 2019, Elias et. al. 2019).

Our experimental workhorses are large stylized markets in which sellers and buyers have to decide whether or not to enter, and conditional on entering the market, how much to bid for an experimental coupon. Buying or selling the coupon yields payoffs for the market participants. Still, at the same time, if a coupon is traded, less money will be donated to UNICEF for measles vaccinations. We compare a baseline treatment with two additional treatments to test the impact of social norms. In the first additional treatment, we directly test the relevance of concerns for norm conformity, as market participants can condition their market entry on the decisions of other sellers and buyers. The heterogeneous responses to trading in the presence of externalities found in previous studies might partially result from the uncertainty of a substantial share of subjects about the moral appropriateness to trade in these markets. To control for the inclination to follow social norms, subjects in our setting who are uncertain about the appropriateness of trading can make their decision

dependent on the decisions of a critical share of other participants. In the second additional treatment, we allow for the (costly) enforcement of a no-trading norm by third parties (external observers) and test whether the anticipation of sanctions prevent potential traders from entering the market.

Not entering the market as a trader and sanctioning trading as an observer are the main indicators for moral behavior in our setting. Irrespective of the treatment, we find that the majority of sellers and buyers act morally; these subjects do not enter the experimental markets at all and therefore forego all monetary payments. Moreover, the majority of observers sanctions trading behavior at a cost to themselves. Overall, moral concerns thus seem to be an essential motivation in our setting. Also, we find direct evidence for preferences for norm conformity: A significant share of buyers and sellers make their market entry conditional on what other traders do, pointing out the potential volatility of moral behavior on markets.

With respect to the correlation between individual characteristics and behavior in our experiment, we find that demographic factors (higher age, being female) and stated preferences and attitudes (altruism, ethical consumption, general cooperativeness) are associated with a higher likelihood of choosing a moral action. Importantly, similar characteristics and attitudes seem to be linked to both the decision to stay out of the market and to punish trading. At the same

time, socio-economic factors such as the level of education or income are not robustly correlated with patterns of moral behavior in our setting.

We derive a stylized model of norm uncertainty and market behavior. The main purpose of the model is to provide a simple analytical framework of norm uncertainty that includes main characteristics of the market interaction in our experiment and organizes our results with respect to conditional conformity behavior.

Related literature. A number of scholars discuss the relevance of the market interaction per se (as opposed to an individual transaction) for shaping the social norm. Sandel (2012) argue that the society's decision to trade a specific good in exchange for money on markets may corrupt it and crowd out its non-market value. Falk and Szech (2013) conjecture that the orientation on social norms may lead to an erosion of moral behavior on markets: When decision-makers observe that other traders are willing to impose negative externalities this might signal the social appropriateness of trading, thus inducing more subjects to engage in trade. Our results confirm this conjecture and provide direct evidence that social norms are relevant for trading decisions of a significant share of market participants. Moreover, our data show that, as in our case norm-sensitive participants require relatively low shares of other participants staying out of the market to refuse to trade as well, realized market entry, trading volumes and

thus the frequency of immoral behavior can decrease as the result of social norm orientation.

Recent findings from laboratory studies provide evidence for the importance of moral concerns on markets as they indicate the willingness of many market participants to bear additional costs in order to behave in a moral way. For example, Bartling et al. (2015) find that a substantial share of buyers is willing to pay higher prices for a product that avoids negative externalities, in line with a concern for the product's social impact. Relatedly, Pigors and Rockenbach (2016) observe that under competition, consumers choose firms engaging in socially responsible production and accept a price premium for social responsibility. In the experiment by Friedrichsen and Engelmann (2018), decision-makers exhibit substantial differences in the willingness to pay higher prices for fair-trade products, highlighting not only the importance of the intrinsic motivation to buy a fair product, but also the relevance for social image concerns in this context. Engelmann et al. (2018) find that fairness in a laboratory experiment is correlated with the choice of a fair-trade product.

Whereas a growing number of studies shows the relevance of social norms for altruistic behavior or cooperation (see, for instance, Andreoni and Bernheim 2009, Krupka and Weber 2013, Reuben and Riedl 2013, Kimbrough and Vostroknutov 2015, Dur and Vollaard 2015, Danilov and Sliwka 2017, Feldhaus et al. 2019), up to now, only a few studies have explicitly addressed

questions related to the influence of social norms in markets, and the evidence for the relevance of social norms is mainly indirect. Irlenbusch and Saxler (2019) consider bilateral interactions that cause negative real-world externalities and find that social information about previous moral behavior is effective to trigger further moral behavior. Falk et al. (2020) find that moral behavior declines when decision-makers are not pivotal for the negative externality. Relatedly, Bartling and Özdemir (2017) observe that the decision-maker's orientation on the "replacement excuse", the fact that if the specific decision-maker will not participate and obtain payoffs, someone else will do it, is highly dependent on the relevant social norm. Finally, Kirchler et al. (2016) test the effectiveness of different mechanisms in order to induce more moral behavior. In this study, third-party observers are willing to incur costs to sanction trading activities with negative externalities. Also, the anticipation of the possibility of punishment lowers trading volume in the first place. However, to the best of our knowledge, no study so far elicited a direct measure for the importance of norm-following by potential traders and analyzed its effect on the resulting market outcomes.

2 Experimental Design and expected behavior

2.1 Experimental Design

Our decision situation follows similar approaches by Falk and Szech (2013), Kirchler et al. (2016) and Sutter et al. (2020) that model trading behavior of buyers and sellers in the presence of negative externalities. We use the experimental designs of these studies as our starting point and adjust them for our large scale setting. In each of our treatments, subjects act in a large market, consisting of roughly 300 sellers and 300 buyers. Each seller (she) is endowed with a single coupon that she can potentially sell to one of the buyers (he). Buyers can buy at most one coupon from one of the sellers. After the experiment, a coupon that is not traded is converted into 50 doses of measles vaccinations. In order to do so, 18 Euros are donated to UNICEF for this particular purpose.[2] Yet, a coupon that is traded is converted into 18 Euros, which the buyer receives, resembling his valuation for the coupon. From these 18 Euros, buyers have to pay the market price to the seller. Hence, upon trading, a buyer receives 18 Euros minus the market price, and a seller receives the market price. Trading is associated with monetary profits for buyers and sellers, but triggers a negative externality: For each trade that is conducted, no money will be donated to UNICEF.[3]

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[2] UNICEF used the money in 2019 to vaccinate children on the Philippines against measles.
[3] In principle, some participants may doubt the possible positive effect of the vaccination on health. However, we have little indication from free-text answers that a non-negligible share of

Market participants make the following decisions: Frist, they decide if they are generally willing to enter the market and trade. Second, if so, they are asked to submit an offer. This offer has to be between 0 and 18 Euros. For a buyer the offer reflects the maximum amount he is willing to pay to receive a coupon. For a seller the offer reflects the minimum amount she wants to receive in order to trade a coupon. If participants decide not to enter the market, they forego all profit from the experiment.

Our market is cleared with a uniform pricing rule. First, we rank the sellers' offers from lowest to highest. Second, we rank buyers' offers from highest to lowest. The market price then equals the lowest offer of a seller that does not exceed the respective offer of a buyer with the same rank.[4] Buyers with offers (weakly) above the market price receive a coupon at the market price. Sellers with offers (weakly) below the market price sell one coupon at the market price. If the number of sellers exceeds the number of buyers willing to trade at the market price, we implement a tie-breaking rule. If there are n sellers and m buyers willing to trade at market price, we randomly choose m – n sellers that do not trade. The case of an excess of buyers is handled in the same manner.

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participants in fact considered these vaccinations as detrimental. Moreover, to the extent that some participants had concerns against measles vaccinations and thus would have no moral objections against trading, our results would actually underestimate the impact of negative externalities on behavior in our experimental markets.

[4] An example screenshot explaining the pricing mechanism is shown in the Appendix of our paper.

Our experiment implements an abstract and stylized market setting that allows for a controlled analysis of moral behavior under negative externalities and its interaction with social norms. The setting ensures the anonymity of traders as well as a sufficient market size so that the individual trader is not pivotal for the price that emerges in equilibrium. Based on this basic market mechanism, we conduct three experimental treatments:

1. **BASE.** Our baseline treatment implements the basic market interaction described above and allows us to investigate to what extent sellers and buyers engage in trading to attain monetary profits given the negative externality of their actions.
2. **COND.** The second treatment (abbreviated as COND) allows for a controlled analysis of the inclination of sellers and buyers to follow social norms when they are uncertain about the appropriate action. In this treatment, traders have the possibility to condition their market entry decision on the behavior of other participants. In addition to unconditionally entering or not entering the market at all (the same options as in BASE), participants have a third option. They can choose a critical threshold X such that they forego entering the market if at least X% of the other participants do not enter the market either. Hence, subjects can make their entry conditional on their belief about the descriptive social norm in the market.

To determine which participants actually enter the market we proceed as follows in determining the fixed point for the share of participants who stay out of the market: We choose the maximum of all potential percentage thresholds X such that given that X% of all participants would not trade at this threshold, more than X% of all actual participants do not want to enter the market.[5] All participants that enter unconditionally or choose a critical X above the calculated fixed point enter the market, while all other participants do not enter. We hence take every hypothetical non-entry rate in 10%-steps from 0% to 100%, and check how many participants want to stay out of the market given that non-entry rate, combining traders who submitted both conditional and unconditional decisions. The fixed point is then the highest value X such that actual non-entry exceeds hypothetical non-entry. If, for example, 75% of participants choose a threshold value of 70% or lower (or do not enter unconditionally of other participants), and 78% of participants choose a threshold value of 80% or lower, the fixed point is 70%. This procedure ensures that each participant enters the market if and only if she has stated that she wants to enter given the decisions of all other

[5] Potentially, multiple fixed points could arise. In this case, we take the fixed-point with the largest X. However, in the collected data, the fixed-point is unique.

participants.[6] Importantly, the conditional entry decision in our setting gives participants the possibility to act in accordance with the prevailing social norm if they are uncertain about it. If they are unsure about whether it is appropriate to trade in the market, the procedure ensures that these participants only trade if sufficiently many other participants trade as well. This treatment thus directly tests whether the share of other willing traders is correlated with a subject´s decision to trade. At the same time, in case a trader is certain about the norm of trading, he/she can take the unconditional decision to entering the market or to stay out.

3. **PUN.** Our third treatment allows for the costly punishment of trading decisions. In this treatment, each buyer and seller is randomly assigned to an observer who is not active in the market so that every trader is matched with one observer. Buyers and sellers interact as in the BASE treatment. However, in addition to the decision situation in the baseline condition, the observer can choose to (costly) sanction the trader matched to herself. Here, punishment is conditioned on trading per se, but not on the level of profit that the trader achieved. Hence, in our setting punishment is made conditional on the immoral act rather than

[6] Due to the large markets it is highly unlikely to influence entry rates by one's own action, making subjects de-facto norm takers.

on the personal benefit the trader obtained from this immoral act.[8] Observers receive a fixed participation fee of 3 Euros and an additional endowment of 3 Euros. This endowment can either be kept or used to decrease the payoff of the respective market participant. Each Euro an observer spends decreases the respective buyer´s or seller´s payoff by 3 Euros in case of trading. Hence, an observer is enabled to impose punishment up to the level of the expected payoffs of a trader in our setting.[9] The endowment not spent on punishment is directly paid out to the observer. Moreover, the observer keeps the full endowment if the market participant assigned to him does not trade a coupon. We use this treatment to test whether third-party observers are willing to incur personal costs to sanction the immoral act of trading and therefore to impose a norm against trading. Moreover, we investigate whether traders are able to anticipate punishment and thus enter the market with a lower probability.

In each treatment, all information provided above is common knowledge among the participants. Due to the online implementation with a large population sample that limits the possible duration and the degree of interactivity, our

[8] Compared to laboratory studies on punishment (Kirchler et al. 2016 and related settings from the literature on social dilemmas), we implement a simplified punishment technology.
[9] We do not allow for negative payoffs; the buyer´s and seller´s minimum payoff is zero if the amount of punishment exceeds the profits from trade.

market treatments were conducted as one-shot experiments. As previous studies (e.g. Falk and Szech 2013, Kirchler et al. 2016) have shown substantial heterogeneity in the morality of trader decisions already from the first period on, our focus on a one-shot decision does not limit our analysis of the relevance of social norms for market interactions. Also, in Kirchler et al. (2016) an effect of (potential) punishment on trading decisions is visible in the first round of the game before the actual punishment is exerted. Hence, the expectation of norm enforcement seems to be already sufficient to induce more moral behavior.

2.2 Expected Behavior

Given our large markets and the uniform pricing rule, neither of the sellers or buyers should expect to be pivotal for setting the price. In this case, it is optimal for both sellers and buyers to state the true prices for which they are willing to engage in trade.

If participants do not have preferences for moral behavior and hence disregard the negative externality, buyers would be willing to pay up to 18 Euros and sellers would accept any positive price. As a consequence, the number of coupons traded would equal the number of buyers in the respective market.[10] However, if some market participants care about the negative externality and

[10] This is due to the fact that the number of sellers exceeds the number of buyers in all treatments.

experience moral costs, this could have two implications, both leading to a lower number of traded certificates: They either do not enter the market at all, or enter the market and ask for a higher compensation compared to the case without moral costs. Based on the argument by Sutter et al. (2020) we assume that the presence of moral costs for triggering the externality lowers the buyers' willingness to pay and increases costs for the seller, leading to lower bid prices and higher ask prices.[11] If the experienced moral costs are too high, it becomes optimal for these buyers and sellers to stay out of the market.

If social norms do not play a role in our setting, the share of other buyers and sellers who are willing to bid should be irrelevant for the decision to bid oneself. On the contrary, if some market participants have a desire to conform to the social norm about trading and are in addition uncertain about whether or not it is seen as appropriate to trade, we expect that in treatment COND, a share of participants condition their market entry on the decisions of other participants. In Section 5, we outline a formal framework to rationalize conditional entry decisions.

Finally, in the PUN treatment, strictly rational observers will refrain from sanctioning since it is associated with costs. At the same time, a large

[11] The formalization by Sutter et al. (2020) also implicitly incorporates inequality aversion of traders (Fehr and Schmidt 1999, Bolton and Ockenfels 2000) in the sense that they dislike to receive less surplus from the transaction than their counterpart.

experimental literature (see, for example, Fehr and Gächter 2000, Fehr et al. 2002, Herrmann et al. 2008, Chaudhari 2010, Balafoutas et al. 2014 and 2016) provides evidence that decision-makers are willing to incur non-negligible costs to sanction inappropriate behavior, for example, in dilemma games, but also in natural field settings. Hence, we expect to observe positive punishment levels on average and - to the extent that sellers and buyers foresee the punishment for engaging in trade – less frequent market entries compared to the control condition.

3 Experimental procedures and data sample

We conducted our experiment in cooperation with Infratest dimap, a German institute for political and electoral research. Infratest recruits participants from the Payback Panel. The Payback Panel consists of 115,000 Payback customers recruited by Payback, Germany's largest rebate program, with around 30.000.000 customers.[12] Members of the Payback panel regularly participate in online surveys.[13]

[12] Several large retail chains offer "Payback points" in connection to purchases at their shops. Payback points can then either be converted into Euros or used as a rebate for future purchases.
[13] Collecting demographic data of all panel members, Payback guarantees a proper representation of the German population (with respect to gender, age and education) within each survey by gradually inviting subjects with certain characteristics.

We conducted our study as an online experiment. Subjects were invited to participate via email. In this email, subjects learned that they receive a participation fee of 200 Payback points (equivalent to 2 Euros) and that they have the chance to earn an additional amount during the experiment.

Upon entering the experimental website, participants were displayed the instructions for the decision situation on the screen.[14] To facilitate understanding of the experimental decision situation, parts of the experiment were explained with the help of graphs, for example, with respect to the interaction of buyers and sellers and the determination of prices in the market. In the next step, participants had to answer a control question to test whether they had understood the basic market mechanism of the experiment. In this question, we hypothetically asked buyers/sellers (and their observers) regarding the consequences of an offer above/below equilibrium market price. Participants could choose between two potential answers, i.e., whether or not they trade in this particular scenario. If they provided the wrong answer, the correct one was stated on the screen in the next step.

After the participants had made their decisions in the experiment, they had to answer additional questions to elicit a number of prosocial preferences and attitudes (for example, measures for general altruism as well as the importance

[14] Screenshots of the experimental decision situation are available on request.

attached to ethical consumption) as well as the moral evaluation of trading behavior in the experimental market. The decisions and answers to the survey questions were matched to data on demographics from the Payback panel in a way that preserved anonymity of the subjects.

The field period was from November 30, 2018 to December 14, 2018. Since there was no direct interaction between participants, all decisions were collected until the end of the field period and matched thereafter. A total of 2,576 participants finished the experiment and answered all the questions.

Table 1 lists the number of participants for each role and treatment. Table A2.1 in the Appendix shows descriptive statistics of the participants' demographics across the experimental treatments as well as the probability to observe respective distributions under the assumption of independence (resulting from Pearson chi-squared tests). Importantly, the tests show that the randomized assignment of subjects to treatments was successful - demographic factors are not significantly related to the treatments. On average, participants earned 4.37 Euro (standard deviation 3.26 Euro) in the experiment, including the participation fee of 2 Euros. As we will see below, this average payment includes a substantial share of participants who did not receive any payoffs from the experimental decision at all.

The Payback account can be used as a rebate for purchasing a wide variety of items or as means of payment in a number of retail chains. Due to this procedure,

transaction costs for obtaining the payoffs from the experiment were minimized for the participants. As the result of the participants' decisions in the experiments, altogether 14,472 Euro were transferred to UNICEF as a donation, resulting in 40,200 doses of measles vaccinations.

4 Results

4.1 Decisions of sellers and buyers

Our analyses reported in the following refer to the entire sample of participants. In total, 378 out of 2,576 (14.7%) did not answer the control question correctly. Importantly, participant groups do not differ in their understanding of the control question if we compare the shares of participants per role and treatment who answered the control question incorrectly ($p = 0.23$, Chi-Square test). Our qualitative conclusions do not change if we conduct the analyses only with subjects who correctly solved the control question.

4.1.1 Market Entry

We start our analysis with the share of traders who are willing to become active on the market given the externality. In our setting, this decision is the clearest indication for moral concerns of a market participants, and we center our analysis on this variable in the following. Refraining from entering the market at all is the only way to make sure that a participant does not cause the negative externality, independent of her own potential earnings. Moreover, by not

entering the market, a participant maximizes the amount to be donated to UNICEF (18 Euros). Under the reasonable assumption that at least some traders will keep their profits, not entering the market is more efficient for a participant concerned with the externality than trading on the market for the realized market price and donating her surplus on her own. For these reasons, we use the decision to stay out of the market as our main proxy for the moral behavior of participants in the role of traders.[16]

We find substantial evidence for moral behavior in all treatments. Calculated over all participants, we observe a share of market entry of only 33%. In turn, this means that about two-thirds of the experimental participants seem to forego all monetary payoffs in order not to destroy the donation.

Figure 1 displays the share of participants entering the market per role and treatment. For the COND treatment, the figure refers to the actually realized entries, taking into account both unconditional and conditional decisions.

In the baseline treatment, 39% (40%) of buyers and sellers enter the market. In COND, realized entry rates are only 25% and 26% respectively, while market entry in PUN accounts for 37% in case of buyers and 29% in case of sellers. Comparing overall entry rates in the treatment variations with the baseline

[16] In the Appendix we conduct additional robustness checks by comparing shares of traders willing to cause the externality if they receive a monetary compensation of x Euros, with x between 0 and 18. Doing this we confirm our main findings.

condition indicates that the likelihood to enter is significantly lower in COND and PUN ($p = 0.03$ and $p < 0.01$, two-sample tests of proportions).[17] Moreover, the lower entry rate in PUN is driven mainly by sellers, as we find a significant difference in entry rates between PUN and BASE for sellers ($p < 0.01$, two-sample tests of proportions), but not for buyers ($p = 0.68$, two-sample tests of proportions).[18]

Hence, in the PUN treatment, the possibility of the enforcement of a no-trading norm via punishment is associated with less frequent market entry, similar to the observation by Kirchler et al. (2016). In our case, it seems that this deterrence effect is driven predominantly for the participants in the role of sellers who seem to react more strongly to the threat of punishment. A potential reason for this result may be that the moral evaluation of trading varies depending on whether a trader buys or sells the coupon. We will come back to this possibility when we analyze the moral evaluations of buyer and seller decisions from the post-experimental survey below.

Moreover, the possibility of making market entry contingent on the decisions of others leads to substantially less actual entry in our setting. To obtain more insights into the drivers behind this result, we focus on the conditional and

[17] Overall entry rates are 39% in BASE, 25% in COND and 33% in PUN.
[18] In COND, both the share of buyers and the share of sellers who entered the market are lower than in BASE (both two-sample tests of proportions yield p-values of $p < 0.01$).

unconditional choices of traders in the next step. In our COND treatment, participants who are not sure whether trading (and thereby causing a negative externality) is a violation the social norm can ensure themselves against taking an inappropriate decision by entering the market conditional on other subjects' entries.

A non-negligible share of participants indeed makes conditional entry decisions. Figure 2 displays the decisions of buyers and sellers in COND and contrasts it to the decisions of buyers and sellers in BASE.

About a quarter of the traders (23%) decide to make the market entry conditional on the decisions of other traders. At the same time, 24% of subjects enter unconditionally, while 52% refrain from entering independent of the decision of others in the COND treatment.

The significant share of the traders who condition their market entry provides clear evidence for the relevance of the desire to conform to social norms in our setting. Yet, the comparison with the unconditional entry and no-entry decisions in the BASE treatment in Figure 2 also highlights that the effect of norm compliance for trading activities on markets can go in either direction: If all conditional traders stayed out, we would observe substantially less market entry than in BASE. If however all conditional traders entered the market, the entry rate would be higher than in BASE. This indicates the importance of social norms for moral behavior on markets, as, depending on the particular market

environment, decreasing uncertainty about the existing norm can either improve or deteriorate moral outcomes. More generally, the relatively large share of conditional entries in our setting may explain the heterogeneity of moral behavior in different market settings – the actual willingness to create negative externalities through trading activity may depend on the participants' belief about the prevalent social norm.

In general, participants are heterogeneous concerning their required thresholds of other traders who do not enter. Modal threshold choices are 50% or 60% (these thresholds are each selected by about 27% of the conditional traders), suggesting a focus on majority decisions of these traders. At the same time, a non-negligible share of traders choose smaller or larger thresholds (please see Figure A2.1 in the Appendix for the distributions of the thresholds).[19]

In the present setting, a combination of two factors leads to the low realized entry rates in the COND treatment: First, we observe a relatively high share of unconditional non-entrants. Second, many conditional entrants choose relatively low threshold values – some 22% of the conditional traders require a

[19] One could hypothesize that some traders may state motivated beliefs about the required shares of other participants who stay out of the market. One example for such pattern would be to state a very high threshold that the trader does not genuinely believes to be achieved. While we generally cannot rule out such motivated beliefs, we note that the share of very high required thresholds (80% or 90%) stated by the experimental traders is only marginal in our setting (less than 5%).

share of other participants not entering the market of 40% and below to not enter themselves. Given our mechanism of determining the actual entry, participants' decisions in COND thus result in a fixed point with a share of non-entrants of 75%.[20]

4.1.2 Bidding behavior

As argued above, the second possible response of traders who experience moral costs related to the destruction of the donation is to ask for a compensation of these moral costs.[22] We now turn our attention to the monetary amounts asked by subjects who entered the market in order to be willing to trade.[23]

As illustrated in Figure 3, sellers generally ask for higher monetary compensations than buyers on average. This difference is significant in BASE, where buyers (sellers) ask for 8.45 Euros (10.46 Euros, $p < 0.01$, two-sided Mann-Whitney U-test, MWU), and in COND, where buyers (sellers) ask for 8.45 Euros (10.38 Euros, $p < 0.01$, two-sided MWU), whereas it is not significant in PUN (9.01 Euros vs. 9.34 Euros, $p = 0.86$, two-sided MWU). At

[20] In our case, 75% of entrants do not want to enter with a hypothetical non-entry-rate of 70%, and with a hypothetical non-entry-rate of 80%, 76% of entrants do not want to enter.
[22] Cumulative distributions of sellers´ and buyers' bids and the resulting equilibria per treatment can be found in the appendix.
[23] Note that the monetary compensation asked by sellers equals their bid, while the monetary compensation asked by buyers equals 18 minus their bid.

the same time, when comparing compensations between treatments jointly for both roles, we do not observe significant differences.[24]

Overall, sellers who enter the market seem to require a higher amount in order to be willing to trade than buyers. This difference might be due to an endowment effect (Kahneman et al. 1991) in the sense that assigning the coupon to the seller creates a sense of ownership for which the seller has to be additionally compensated. At the same time, the higher required compensation might reflect higher moral costs associated with the act of trading. Our setting does not allow us to distinguish between these two possible mechanisms. However, we can use data from survey answers to get an indication whether moral costs might be relevant for the result.

As part of our study, we elicited the moral perception[25] of buyers and sellers who trade on our market. In the questionnaire, we asked all subjects how immoral they perceive trading of buyers and sellers, ranging from 1 (not immoral at all) to 7 (very immoral). The data on the moral perception of trade allows us to further investigate whether a larger moral burden tends to lie on the supply or demand side of our market. Figure 4 breaks down the morality

[24] Comparing BASE and PUN results in a p-value of 0.41 (two-sided MWU), and comparing BASE and COND results in a p-value of 0.98 (two-sided MWU).
[25] The moral perception was elicited after the experimental decision situation to rule out that subjects were primed on the immorality of trading prior to their trading and punishment decisions.

perception separately for the role of the trader. The light bars display how immoral buyers, sellers and their respective observers perceive buyers who trade, while the black bars do the same for sellers who trade.

Figure 4 shows that irrespective of the role of the experimental participant who evaluates the morality, selling is considered to be significantly less moral than buying ($p < 0.01$, two-sided Wilcoxon Matched-Pairs Signed Ranks tests for all groups of participants). While the average level of immorality of buyers who trade accounts for 3.63, the same value for sellers is 3.99.[26] The evidence that trading of the sellers is generally viewed as less morally appropriate than trading of buyers seems to be in line with the interpretation that moral costs are at least partially responsible for the differences in the required compensation of buyers and sellers in our experiment.

4.1.3 Determinants of the decision to trade

In the next step, we analyze to what extent demographic and socio-economic characteristics as well as expressed preferences and attitudes of the participants are correlated with the decision to trade. For this purpose, we calculate probit models with a binary dependent variable equal to one if the participant entered

[26] Interestingly, sellers seem to assess the moral burden of trading in a self-serving manner: Sellers perceive trading (of both sellers and buyers) as generally less problematic than all other roles do (two-sided MWU tests comparing moral assessments of sellers to moral assessments of all other participants yield $p = 0.06$ for buyers who trade and $p < 0.01$ for sellers who trade). Moreover, the moral self-perceptions of buyers who trade (3.79) and sellers who trade (3.91) do not differ significantly ($p= 0.13$, two-sided MWU test).

the market (Models 1 and 2 in Table 2) and linear regression models with the compensation in Euros requested by market entrants (Models 3 and 4 in Table 2) as the dependent variables. In these models we successively add variables from the panel database and the experimental survey.

We first concentrate on the effect of the experimental treatments, the roles of participants, and the demographic background of the decision-maker. In all models displayed in Table 2, we include binary variables for the respective treatments PUN and COND (the reference condition is BASE) and a binary variable equal to one if a participant is a seller. Moreover, Models 2 and 4 add controls for demographic backgrounds: A binary variable equal to one if a participant is female, and the participant´s age in years. Models 1 and 2 in Table 2 confirm the previous conclusions from the non-parametric analyses that in PUN and COND entry is significantly lower. In these models, we find no significant impact of the role of the participant for market entry. Moreover, older participants and females are less likely to enter the market and thus show a stronger aversion against causing negative externalities in our setting. This result seems to correspond to previous findings that older decision-makers and women seem to behave more altruistically although the evidence is not conclusive (see, for example, Sutter and Kocher 2007; Bellemare et al. 2008; Croson and Gneezy 2009; Engel 2011; Matsumoto et al. 2016; Niederle 2016 and the references cited therein).

It is also in line with the finding from the laboratory data of Deckers et al. (2016) that female participants are more likely to behave in a moral way than men. Looking at the compensation that market entrants require in order to trade (Models 3 and 4), we observe in line with our previous results that sellers ask for significantly higher values. Moreover, the required compensation increases with age. The coefficient for the dummy variable capturing female traders is positive but insignificant, and our experimental treatments do not play a role for the level of compensation. Hence, bids of those participants who enter the markets do not seem to respond to the treatment variations. Given that, as argued above, the decision to not enter the market is an unambiguous signal for the presence of moral concerns against the externality, and behavioral responses to the treatments seem to occur predominantly in this domain, we concentrate on market entry as the dependent variable for our further analyses of moral behavior.

In the next step, we add variables capturing the socioeconomic backgrounds of the participants as well as variables concerning attitudes and preferences to the models in order to test for systematic correlations with moral behavior in our setting. Table 3 lists the respective specifications in which we add successively the following independent variables. First, as controls for the socio-economic background of a participant, we include the variables *High School* (binary variable equal to one if a participant has the general qualification for university

entrance)[27], *net income* (indicating a participant´s household (net) income in Euros/month)[28] and *persons household* (the number of persons living in the participant´s household). As measures for attitudes and preferences, we add the variables *Altruism* (a combined measure of altruism based on the general willingness to give money to charity and the amount a participant would donate to charity, if he/she surprisingly wins 1000 Euros)[29], *Ethical consumption* (a categorical variable indicating the importance of buying products for political, ethical or ecological reasons with values ranging from 1: Not important at all; to 4: Important)[30], *Voluntary work* (a variable capturing the number of hours per month the participant engages in unpaid work for a good cause), *Trade immoral* (a binary variable equal to one if a participant has stated some moral objection against trade, i.e. whether the average moral evaluation of trade by buyers and sellers described above exceeds a value of 2) and finally, as a measure for general cooperativeness, the variable *Non-voter* (a binary variable equal to one

[27] In Germany this is a requirement to study at a university. Around 32% of the German population are in possession of this qualification.
(https://www.destatis.de/DE/Presse/Pressemitteilungen/2019/02/PD19_055_213.html).
[28] Participants stated their income in 500-Euro increments between 0 and 5000 Euros.
[29] This variable was taken from the 'Preference Survey Module' (Falk et al. 2018).
[30] This variable was taken from Starr (2009).

if a participant has stated that she would not vote or vote in an invalid way in the next election).[31]

Model 1 tests for the impact of socio-economic factors which, however, only seem to have a weak impact. Only the net income has weakly significant sign, indicating that decision-makers with higher incomes are less likely to enter the market. The other variables capturing the socio-economic background do not have a significant effect. Models 2 to 6 test the role of preferences and attitudes of the participants for entry decisions. Here, most of the variables are significant and correlate with entry behavior in the intuitive direction: More altruistic participants, participants who attach higher importance to ethical consumption and who assign a higher degree of immorality to trade are less likely to enter, whereas less cooperative participants enter with a higher likelihood.[32] Therefore, actual moral behavior of the traders in our experiment reasonably correlates with stated attitudes related to pro-sociality and morality. Moreover, our results are in line with findings from student samples that stated attitudes concerning altruism and socially responsible consumption are linked to ethical behavior in laboratory settings (Bartling et al. 2018, Sutter et al. 2020).

[31] Previous research identified a positive correlation between an experimental cooperativeness measure and the likelihood to participate in a national election which can be interpreted as a public good (Barr et al. 2014). Moreover, non-voting has been found to be negatively correlated with solidarity preferences in a large population sample from the Netherlands (Riedl et al. 2019).
[32] The hours of voluntary work are not correlated with entry decisions in our setting.

Finally, the previously reported effects of the experimental treatments and the demographic factors remain robust in all specifications.

4.2 Behavior of observers

4.2.1 Punishment Decision

In the next step of our analysis, we focus on the willingness of observers to impose costly punishment on sellers and buyers in case they trade. In our analyses we focus both on the share of observers that choose a positive amount of punishment (left part of Figure 5), as well as the actual amount observers spend on punishing their counterpart (right part of Figure 5).

Figure 5 shows that the large majority of observers (around 86%) chooses costly punishment. Moreover, on average, observers spend more than half of their extra budget of 3 Euros for punishment. Thus, we find strong evidence for the willingness to sanction the immoral action of trading in our setting. Interestingly, although the perceived immorality of trading elicited in the survey is higher for sellers, observers do not differentiate between buyers and sellers[33] – both the

[33] This result is derived from between-observers comparisons. We acknowledge, that a more direct test for the differentiation of moral sanctioning between different trader roles would have been to assign one observer only to both seller and buyer and assign a budget for punishment that would then have to be split between the two. We did not implement a within-subject variation, however, as we did not have an a-priori hypothesis on a potential differentiation in sanctions for buyers and sellers.

punishment probability and the average amount for punishment are virtually the same.[34]

Compared to other studies, the frequency and the average punishment levels are very high in our setting. For example, in their laboratory market experiment, Kirchler et al. (2016) report relatively low levels of average punishment in comparison to the endowments of the observers. One factor that might contribute to the high willingness to punish in our setting is that observers had to state their decisions about punishment prior to becoming informed about the actual decisions of traders, and unconditional on the realized profit from trade. Moreover, punishment and the associated costs for the observers were only implemented when the assigned seller or buyer actually had traded; otherwise observers kept their entire budget. This insurance against wasteful punishment might have increased the willingness to punish on the side of the observers.[35]

[34] 87% of observers of buyers and 85% of observers of sellers choose costly punishment, resulting in an average punishment of 1.77 Euros and 1.79 Euros. Conducting two-sample t-tests with equal variance we observe no significant differences between roles (p-values of 0.63 and 0.86 respectively).

[35] Moreover, the high share of punishment rates might be related to the fact that we allowed only for a coarse punishment that could not be tailored towards the profit of the seller. While it would be interesting to analyze punishment patterns in our setting when sanctions can be implemented in a more fine-grained way, we note that the general willingness to punish immoral behavior in our experiment is qualitatively in line with the previous literature on altruistic punishment.

4.2.2 Determinants of Punishment

Next, we focus on the influence of demographic characteristics and stated attitudes of the participants on the decision to sanction trade, analogous to our analysis of trader behavior. In Table 4, we calculate probit models with a binary dependent variable equal to one if the participant chooses a positive amount of punishment (Model 1) and a linear regression model with the punishment in Euros (Model 2), adding the controls for the demographic variables from the panel database. As demonstrated in Table 4, we observe similar correlates of demographic factors with sanctions compared to the model on trader decisions, although the effects are weaker and sometimes only marginally significant which might be partially attributed to the smaller size of the observer sample: Older participants are significantly more likely to punish and tend to punish to a stronger extent. Females are not more likely than men to punish at all, while the absolute level of punishment by female participants is weakly significantly higher. In the final step we add the same independent demographic, preference and attitude variables as in the models for trader behavior. Here, we focus on the observer's decision whether or not to inflict costly punishment on the matched trader. In addition, we include a binary variable equal to one if a participant is the observer of a seller to control for the role of a trader.

Table 5 lists the estimation results. Similar to the models for trader decisions, we do not find strong links between socio-economic factors and the decision to

punish. Only the number of persons in the household are weakly significantly positively correlated with the decision to punish, perhaps reflecting a higher importance of norm enforcement among participants who live within a larger group of persons. More importantly, specifications 2 to 6 show that very similar attitudes of observers are linked to the decision to punish traders and the decision of traders to not enter the market. Self-stated altruism, the importance attributed to ethical consumption and the perceived immorality of trade are significantly positively linked to punishment. All other independent variables are not significantly correlated with punishment.

Finally, we note that multiple motivations might in principle contribute to the decision to punish the trader, thereby reducing her payoffs. In particular, depending on the beliefs about the surplus that a buyer or seller generates from trading (up to 18 Euros), aversion against disadvantageous inequality (Fehr and Schmidt 1999, Bolton and Ockenfels 2000) might motivate observers who receive relatively low endowments (between 3 and 6 Euro) to reduce the traders' payoff. However, in the light of the result that similar demographic factors and attitudes are correlated with the moral decision of traders (not to enter the market) and the decision to sanction trading by observers, it seems safe to conclude that a non-negligible part of the punishment decisions in our setting are triggered by moral objections against the market externality and thus by the goal to enforce the social norm of not trading.

5 A simple model of norm conformity and entry decisions

In this section we present a simple model to organize our results. The main purpose of the model is to provide a simple analytical framework of norm uncertainty that includes main characteristics of the market interaction in our experiment and can organize our results with respect to conditional conformity behavior.

5.1 The model

Consider a continuous society of agents. Here, society may reflect, for example, the group of potential market participants in our experiment. The agents of the society trade in a double auction market with a uniform pricing rule. Half of the agents are sellers, half are buyers. Offers from sellers are ranked from lowest to highest. Offers from buyers are ranked from highest to lowest. Pick the lowest offer of a seller that does not exceed the respective offer of a buyer with the same rank. The market price is the average of the offers of this seller and this buyer.[36] Buyers with offers (weakly) above the market price buy at the market price. Sellers with offers (weakly) below the market price sell at the market price. Each buyer's valuation of the good is $v \in \mathbb{R}_+$, each seller's cost is zero. The trade of the good induces an externality normalized to 1. Agents differ in

[36] For convenience of notation, this is a different pricing rule than in the experiment. However, with a continuous population every uniform pricing rule yields the same results.

the extent to which they consider externalities they generate by trade as immoral. That is, each agent is represented by a (morality-)type θ. Sellers and buyers are uniformly distributed across the society. That is, for each given agent θ it is equally likely that this agent is a seller or a buyer. The society is either "immoral" or "moral". If the society is "immoral", each agent is represented by a morality type $\theta \in [0, b]$. If the society is "moral", each agent is represented by a morality type $\theta \in [a, c]$, with $0 < a < b < c$. Hence, we define morality within a society as the distribution of moral concerns; the "moral" society here consists of a larger proportion of agents who experience relatively large moral costs due to the externality. Agents are ex-ante uncertain in which society they live and both societies are equally likely. A graphical illustration of the model can be found in Figure 6 below.

Observation 1. *Agents with types strictly below a learn from observing their type that the society is "immoral". Agents with types strictly above b learn that the "society" is "moral". Agents with types between a and b are uncertain about the society.*

Our modelling reflects that market participants with low morality concerns believe that the society is less concerned with the externality. If the morality type increases, so does the perception of the morality in the society. Our model is a simple way to incorporate such dynamics.

To simplify notation, we define $\mu_\theta(x)$ as the density of the morality distribution in the society from the point of view of agent θ. That is, for agents with $\theta < a$, $\mu_\theta(x)$ is $1/b$ for $0 < x < b$ and zero otherwise. For agents with $\theta > b$, $\mu_\theta(x)$ is $1/(c-a)$ for $a < x < c$ and zero otherwise. For agents with $a < \theta < b$, $\mu_\theta(x)$ is $0.5/c$ for $0 < x < c$ and zero otherwise.

Agents do not only care about their own perception on whether trade is immoral but also about the average perception of all other agents in the society. The relative importance of the society's types is measured by $\gamma > 0$. The willingness to pay for the good of a buyer is

$$v - \theta - \gamma \int_{x\in[0,c]} x\, \mu_\theta(x) dx$$

and the willingness to accept of a seller x is

$$\theta + \gamma \int_{x\in[0,c]} x\, \mu_\theta(x) dx\,.$$

That is, each agent cares about her own externality-type and the average type in the society and experiences disutility both from causing the externality and deviating from the average morality in society. We denote by

$$\mathbb{E}(\theta) = \int_{x\in[0,c]} x\, \mu_\theta(x) dx$$

the expected average morality type in the society for each type θ.

Our goal is to organize the results from the COND treatment along the lines of a simple model. Thus, to keep exposition as clear as possible we make the following assumption.

Assumption 1. *The market is covered and morality is relevant. That is,* $b + \gamma\frac{a+c}{2} > v > a + \gamma\frac{b}{2}$.

This assumption guarantees that all low morality types enter the market (the market is covered), while all high morality types do not enter (morality is relevant).

Assumption 2. *The market is symmetric. That is,* $a = c - b$.

Assuming symmetry greatly simplifies exposition without influencing main intuitions.

5.2 Unconditional market entry

Consider the set-up of the BASE treatment. Each agent decides whether to enter the market and which price to bid conditional on entry. The following proposition summarizes equilibrium bidding.

Proposition 1. *Entering the market whenever* $\theta \leq \breve{\theta} = v - \gamma\frac{a+b+c}{4}$, *bidding*

$$p(\theta) = \begin{cases} v - \gamma \frac{b}{2} - \theta & \theta < a \\ v - \gamma \frac{a+b+c}{4} - \theta & a < \theta < b \end{cases}$$

for buyers, and bidding

$$p(\theta) = \begin{cases} \gamma \frac{b}{2} + \theta & \theta < a \\ \gamma \frac{a+b+c}{4} + \theta & a < \theta < b \end{cases}$$

for sellers constitutes a Bayes-Nash equilibrium of the double auction with unconditional entry.

Proof. The proof is relegated to appendix A4

□

Proposition 1 reflects that in a uniform price auction with many agents, a single agent is not pivotal for setting the price. Thus, sellers offer their willingness to accept and buyers bid their willingness to pay given their information. The bidding functions reflect the moral concerns: Buyers and sellers have to be compensated both for their personal moral costs associated with the externality and for the disutility caused by deviating from the social norm. As the market is symmetric, the price does not carry any information about the morality of the society. Agents, therefore, bid according to their prior. Agents with low types

know that they live in an “immoral” society thus they bid more aggressive as agents who are uncertain.

□

5.3 Conditional market entry

Consider the set-up of the COND treatment. Each market participant decides whether she wants to enter the market unconditionally, whether she wants to not enter the market unconditionally, or whether she wants to condition her market-entry on the decisions of other agents. If she decides to make a conditional decision, she can choose a critical threshold α such that she foregoes entering the market if at least α of the other participants do not enter the market either. To determine which participants then actually enter the market, a fixed point α^* is calculated such that given α^* of all participants do not trade, more than α^* of all participants do not want to trade. If more than one such fixed point exists, take the maximum α^*. All participants that enter unconditionally or choose a critical α larger than α^* enter the market, while all other participants do not enter.

Proposition 2. *The following constitutes a Bayes-Nash equilibrium of the double auction with conditional entry. All types* $\theta \leq v - \gamma \frac{a+c}{2}$ *enter*

unconditionally. All types $\theta \geq v - \gamma \frac{b}{2}$ *stay out of the market unconditionally. All types* $\theta \in \left(v - \gamma \frac{a+c}{2}, v - \gamma \frac{b}{2}\right)$ *choose*

$$\alpha = \frac{b - v + \gamma \frac{a+c}{2}}{b}.$$

Buyers entering unconditionally bid

$$p(\theta) = \begin{cases} v - \gamma \dfrac{b}{2} - \theta & \theta < a \\ v - \gamma \dfrac{a+b+c}{4} - \theta & a < \theta \end{cases}$$

Sellers entering unconditionally bid

$$p(\theta) = \begin{cases} \gamma \dfrac{b}{2} + \theta & \theta < a, \\ \gamma \dfrac{a+b+c}{4} + \theta & a < \theta. \end{cases}$$

Buyers entering conditionally bid

$$p(\theta) = v - \gamma \frac{b}{2} - \theta.$$

Sellers entering conditionally bid

$$p(\theta) = \gamma \frac{b}{2} + \theta_x.$$

Proof. The proof is relegated to Appendix A5.

□

With conditional entry the agents who are uncertain about the morality of the society, can make sure that they enter only when it is socially appropriate to do so, i.e. if and only if the society is "immoral". If the society is "moral", there are no agents with types below a who enter no matter what. However, there are agents with types above b who stay out no matter what. Thus, uncertain agents can choose a threshold such that they stay out whenever enough agents also stay out, i.e. the morality types above b.

We now compare the cut-off types with conditional market entry to the cut-off type of the unconditional market. We illustrate that allowing for conditional market entry draws some types who entered in the unconditional market and some types who stayed out in the unconditional market.

Corollary 1 *Allowing for conditional entry draws morality type who stay out and morality types that enter the market in an unconditional market. That is,* $\underline{\theta} < \breve{\theta} < \overline{\theta}$.

Proof. Observe that $\underline{\theta} = v - \gamma \frac{a+c}{2} < v - \gamma \frac{c}{2}$. Due to symmetry $v - \gamma \frac{c}{2} = v - \gamma \frac{a+b+c}{4} = \breve{\theta}$. Moreover, $v - \gamma \frac{a+b+c}{4} = \breve{\theta} < v - \gamma \frac{b}{2} = \overline{\theta}$. This yields the result.

Our simple model organizes the results of the experiment well. Corollary 1 is in line with the observation that the share of entrants in BASE exceeds the share of unconditional entrants in COND, and the share of non-entrants in BASE exceeds the share of unconditional non-entrants in COND. Or, in other words, there exist types that enter in BASE and enter conditionally in COND, as well as types that do not enter in BASE and enter conditionally in COND. If the society turns out to be "moral", however, the realized entry is lower in the COND treatment as in the BASE treatment.

Figure 6 shows a specific example for our model with $v = 18,\ a = 3,\ b = 15,$ $c = 18$, and $\gamma = 0.65$. In this case, in the unconditional market all types below 12.1 enter the market and the rest stays out. In the conditional market, agents with relatively low moral costs (all types below 11.1) enter unconditionally, whereas relatively moral agents (all types above 12.75) stay out unconditionally. All types with intermediate moral costs (in this example between 11.1 and 13.1) stay out of the market conditionally and set a threshold of $\alpha = 0.3$.

6 Discussion and Conclusion

We have conducted a large-scale market experiment with a heterogeneous large population sample from Germany in which trading creates a negative externality by destroying donations for measles vaccinations. In this setting, we provide a direct test of the importance of norm conformity for moral decisions of sellers and buyers.

In our large population sample, we find, qualitatively in line with previous laboratory studies, that moral concerns affect both trading and sanctioning decisions. In our case, the majority of potential traders decides to stay out of the experimental market in order not to trigger the negative externality of destroying donations. Still, a substantial share of participants is willing to trade, preferring individual profits to charitable donations. Moreover, in our setting a large share of observers incurs personal costs to sanction trading activities in the market.

Furthermore, our experiment provides direct evidence that the desire for norm conformity affects market behavior and the resulting market outcomes. About a quarter of the participants decides to condition market entry on the decisions of other traders. In our case, such conformist behavior is associated with significantly lower market entry rates compared to the other experimental treatments and thus to substantially lower externalities. That said, we acknowledge that concerns about norm conformity are not only reflected in conditional entry decisions. As we show in our model, there may also be participants who care about the social norm but at the same time are sufficiently

certain about the appropriateness of trading and thus, depending on their moral concerns, either stay out of the market or enter unconditionally. Overall, the direct insight from the conditional entries that social norms are relevant for a substantial fraction of traders can be in principle utilized by clever market designs in which information about the prevailing social norm is provided to potential traders in order to shift beliefs as to induce more moral behavior.

More generally, the result that social norms matter for traders in the presence of negative externalities might be particularly relevant on markets for novel products in which the uncertainty about the social appropriateness of trading is usually high. At the same time, norm uncertainty can also persist among traders in established markets, as in many markets participants can only observe prices, but not exact trading volumes or other indicators of the moral perceptions of other (potential) market participants. Hence, information provision about the prevailing social norm should also be effective to shift behavior on more established markets.

Our large population sample allows us to link moral behavior to the demographic and the socio-economic backgrounds of participants. We find an important role of demographics: Older and female participants are less likely to enter the experimental market, and there is an indication that older and female subjects tend to punish trading behavior to a stronger extent. At the same time, socio-economic factors do not seem to be robustly linked to decisions in our

experiment. Finally, stated preferences and attitudes regarding altruism, ethical consumption and general cooperativeness are generally positively correlated with moral behavior. Overall, these analyses suggest that moral behavior is not robustly associated with socio-economic factors, but linked to a stronger extent to factors linked to the personality of decision-makers which has a significant impact in laboratory samples (Deckers at al. 2016). Importantly, on our settings roughly the same variables seem to correlate both with the decision to not enter the market and to sanction trading. This is an indication that there might be moral "types" in the population whose moral behavior in one particular setting is predictive for moral behavior in other domains.

At the same time, we elicit moral concerns in a setting that considers only one specific tradeoff between personal gains and negative externality. Hence, our design does not allow us to gain insights into the rate at which individual decision-makers trade off own profits against the damage done to third parties. In our case, traders receive 9 Euros in expectation for causing an externality of 18 Euros. A potential trader who would weigh the negative externality half as high as her own monetary payoff would thus be indifferent between participating and not participating. It would be interesting to elicit the willingness to cause negative externalities for own profits for a variety of potential size of externalities. This would make it possible to understand better the empirical distributions of the underlying individual moral costs of decision-

makers. As this goes beyond the scope of the present study, we leave this question for further research.

Acknowledgments

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Appendix (For Online Publication)

A1. Example Price Determination

Figure A1.1 is a screenshot of the instructions that all participants received. Seller´s offers (on the left) are ranked from lowest to highest, and buyer´s offers (on the right) from highest to lowest. The market price then equals the lowest offer of a seller that does not exceed the respective offer of a buyer with the same rank. In this case, a market price of 6 Euros is realized, and a total of 3 coupons are traded.

FIGURE A1.1: SCREENSHOT INSTRUCTIONS PRICE DETERMINATION

Angebote Verkäufer		Angebote Käufer
1€	<	16€
3€	<	11€
6€	<	9€
11€	>	5€
13€	>	3€
16€	>	2€

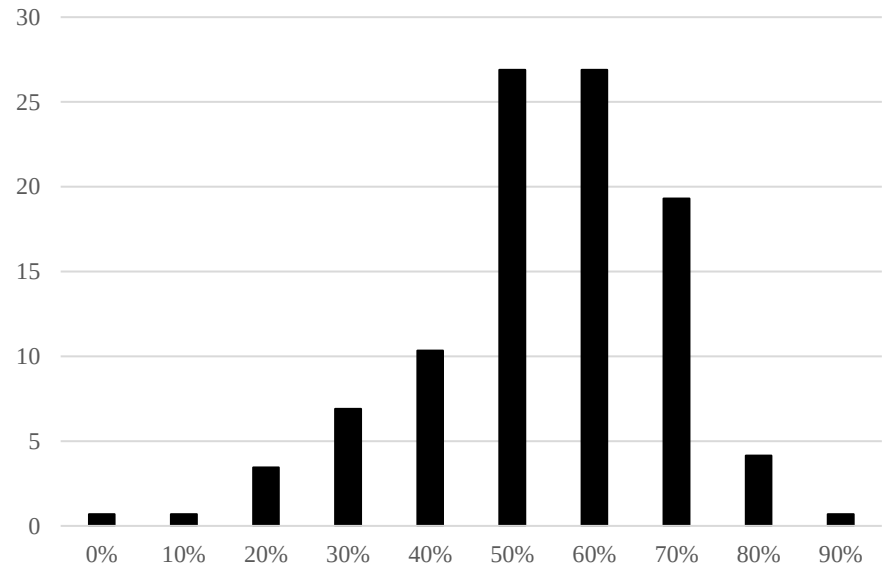
A2. Additional analyses

TABLE A2.1: DESCRIPTIVE STATISTICS – RANDOMIZATION CHECK

Treatment (role)	Participants	Age, mean (min. – max.)	Female (%)	High School (%)
BASE (buyer)	321	51.4 (19 – 90)	0.48	0.35
BASE (seller)	324	52.3 (19 – 85)	0.52	0.29
COND (buyer)	317	50.5 (19 – 82)	0.52	0.34
COND (seller)	318	52.3 (19 – 85)	0.48	0.33
PUN (buyer)	316	48.4 (19 – 95)	0.51	0.31
PUN (seller)	320	52.6 (20 – 93)	0.51	0.30
PUN (observer of buyer)	331	51.1 (19 – 86)	0.53	0.25
PUN (observer of seller)	329	51.0 (19 – 90)	0.54	0.32
p-values (Pearson Chi-Square tests)[39]		0.78	0.79	0.15

[39] We conducted Pearson Chi-Square tests to test whether participants were assigned randomly into treatments and roles. By doing so we found no significant dependence between any of the three demographic variables and the different roles/treatments.

FIGURE A2.1: THRESHOLD VALUES FOR SHARES OF TRADERS WHO STAY OUT OF THE MARKET REQUIRED BY CONDITIONAL ENTRANTS IN COND (IN %)



A3. Willingness to trade depending on monetary compensation

As a robustness check we introduce the concept of 'willingness to trade' (WTT). A seller´s WTT is defined as her bid if she enters the market and a value larger 18 otherwise. Vice versa, a buyer´s WTT equals 18 minus his bid if he enters and a value larger 18 otherwise. It hence represents the minimum amount a market participant asks in order to cause the negative externality. We thus implicitly assume that the moral costs of a participant for causing the externality can be expressed in monetary terms. Considering WTTs allows for direct comparisons between buyers and sellers. Furthermore, it prevents selection

effects due to different market entry which might occur when simply comparing bids between treatments and roles[41].

FIGURE A3.1: WILLINGNESS TO TRADE DEPENDING ON MONETARY COMPENSATION (ALL SUBJECTS)

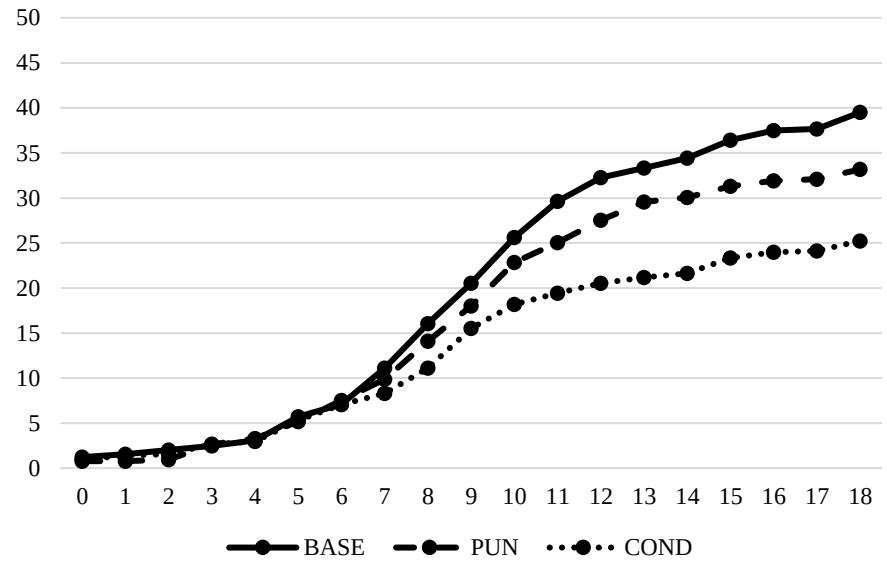
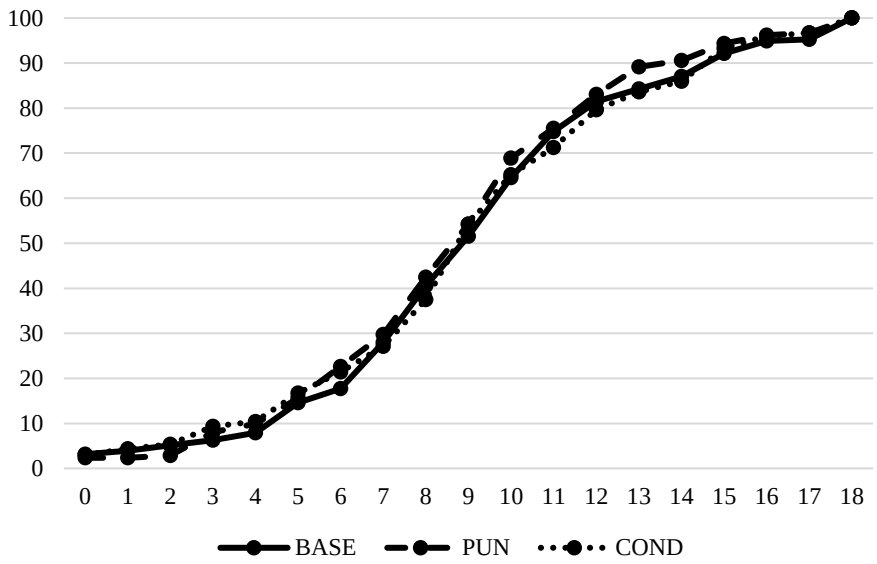


Figure A3.1 displays the cdfs of WTTs in BASE, PUN and COND. Conducting multiple two-sample tests of proportions, we do not observe a significant difference between any two treatments for values between 0 and 7. Yet, for all values above 7 the share of participants willing to trade in BASE significantly exceeds those shares in PUN and COND. Hence for any compensation above 7 Euros, the share of participants who are willing to cause the negative externality (and in turn receive the compensation) is highest in BASE, second highest in

[41] If, for example, in treatment A all participants enter, while in treatment B only participants enter that do not care for the negative externality, lower bids of sellers in in treatment B are caused by this endogeneity.

PUN and lowest in COND[42]. Conducting Whitney-Mann U tests we show that all differences are significant. (BASE vs. PUN p=0.037; BASE vs COND p <0.001; PUN vs. COND p = 0.004).[43]

FIGURE A3.2: WILLINGNESS TO TRADE DEPENDING ON MONETARY COMPENSATION (ENTRANTS ONLY)



It is however notable that treatment effects on WTTs are solely driven by the differences in entry rates. When comparing WTTs between market entrants (see Figure A3.2), we do not find any significant effects.

A4. Supply and Demand

[42] This is again based on observed entry.

[43] For these tests, we assign each subject who did not enter the market a value equal to 19.

In this section the realization of equilibria in the three treatments is illustrated. For each price between 0 and 18 Euros, Figure A4.1, Figure A4.2 and Figure A4.3 show how many buyers and sellers are willing to trade. It hence shows the cumulative distribution of supply and demand. As a result of our market clearing rule the market price was 10 Euros in BASE and COND, and 9 Euros in PUN.[44]

[44] According to our market clearing rule, the market price is the lowest price p such that the number of sellers willing to trade at p exceeds the number of buyers willing to trade at p+1.

FIGURE A4.1: SUPPLY AND DEMAND BASE

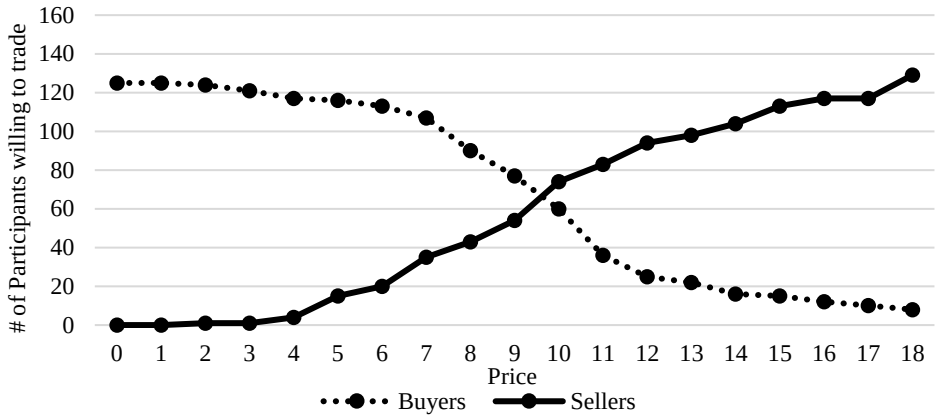


FIGURE A4.2: SUPPLY AND DEMAND PUN

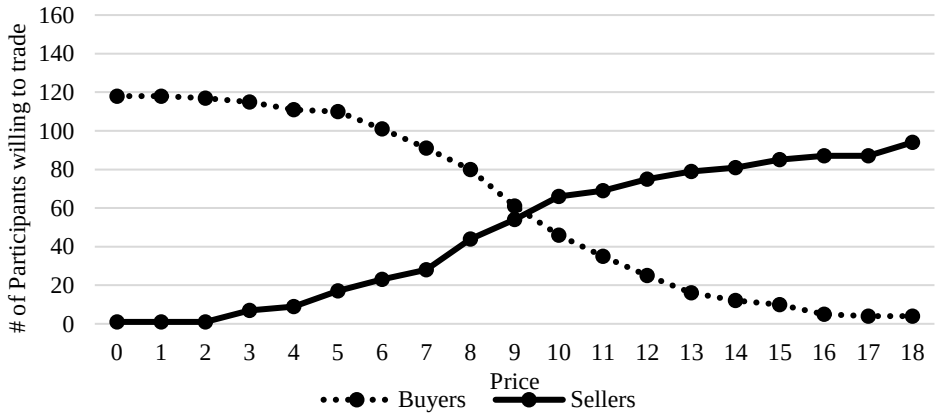
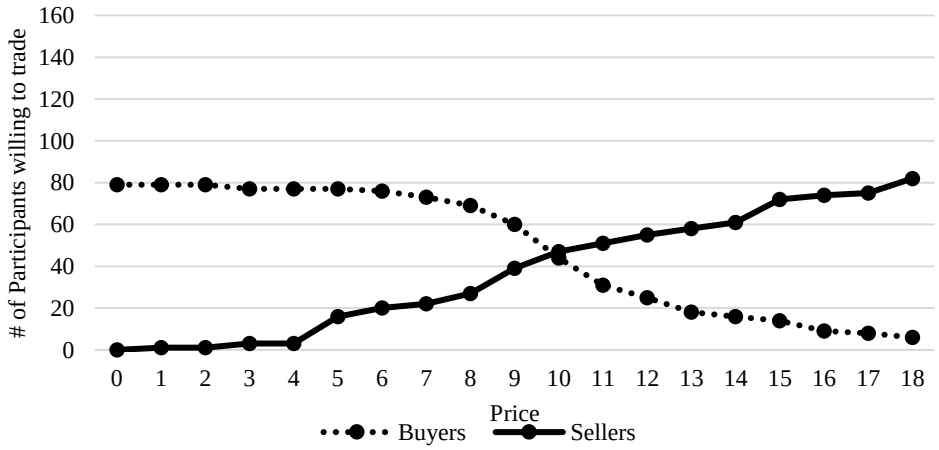


FIGURE A4.3: SUPPLY AND DEMAND COND



A5. Experimental Instructions

In the following a translation of the experimental instructions and decision situation of sellers in COND is displayed. The other treatments and roles were given similar instructions, which can be provided on request. In addition all participants filled in a survey on demographics, opinions and other outcome variables which can also be provided on request.

*"**Page 1***
Welcome to a new survey in the PAYBACK Online Panel.

*Thank you very much for your willingness to participate in this scientific experiment, which we are conducting on behalf of **infratest dimap**. The experiment was designed by a research team led by Prof. Vitali Gretschko (Centre for European Economic Research in Mannheim) and Prof. Peter Werner (University of Maastricht in the Netherlands) and will subsequently be evaluated by them.*

*The participation takes about 20 minutes. You will be credited **200 Payback points** for fully answering today's survey.*

*In this study, you have the **opportunity to earn additional money**. The amount depends, among other things, on how you decide during the experiment. About three weeks after the end of the study, you will receive information as to whether and how much additional money you have earned. You can transfer the additional money you have earned to your bank account or have it paid out in PAYBACK points.*

PLEASE NOTE: The participation via PC, Laptop or Tablet is clearly more comfortable.

Your decisions and answers will of course be evaluated anonymously. Your possible payoffs will not be communicated to any other participant. Likewise, you will not be informed of any payoffs made by other participants. Your

decisions and answers will be anonymously linked with demographic data (e.g. gender or marital status) and socio-economic data (e.g. occupation or income). Thereby it can be used to investigate whether there are differences between decisions and responses from different groups of participants.

No personal information about your persona is passed on to third parties, and it is not possible to identify people at any time during the statistical evaluation.

Thank you very much for your support and enjoy filling out the questionnaire.

Your PAYBACK Online Panel Team

Page 2

This study is an experiment in which you participate either as a buyer or as a seller. As a result of the experiment, you can either earn additional money or ensure that children in developing countries are vaccinated against measles.

On the following pages the rules of the experiment are explained. It is determined by chance whether you belong to the group of buyers or sellers. All information is true, and all decisions are implemented exactly as described. After the experiment, you will receive proof of the money paid for measles vaccinations upon request. All participants receive exactly the same information about how this experiment works.

Please read the descriptions carefully and do not proceed with the study until you have understood everything.

The Continue button will be activated after 10 seconds.

Page 3

The experiment is about ***vaccinations against measles****.*

Measles are highly contagious and spread rapidly, especially in overcrowded shelters and refugee camps. In case of weakened children, the infectious disease is often fatal. Vaccinations offer reliable protection against measles. Especially after natural disasters or in crisis regions, UNICEF organises large vaccination campaigns that reach millions of children.

(Source: UNICEF)

Page 4

*You're a **seller** in this experiment.*

In this experiment a large number of buyers and sellers (more than 100 each) face each other on a market.

Sellers have coupons and can decide whether they want to keep them or sell them.

Buyers can decide whether they want to buy coupons or not.

You are one of those sellers who each has a coupon.

Page 5

The decisions of buyers and sellers have the following consequences:

1. If the coupon remains in the seller's possession, it will be exchanged for 50 vaccinations against measles at the end of the experiment. For this purpose, 18 Euro will be donated to UNICEF.

2. If the coupon is bought by a buyer at market price, it will be exchanged for 18 Euro after the experiment. Then the seller receives the market price in Euro, and the buyer receives 18 Euro minus the market price.

The payoffs are then:

Payoff seller = market price in Euro

Payoff buyer = 18 Euro - market price in Euro

Page 6

You and the other sellers face a large number of potential buyers.

As a seller, you now have two options, which you can make dependent on how other participants behave on the market:

1. You are not trading. Thus, at least your coupon is not traded, and is exchanged accordingly in 50 vaccinations against measles. You will then not receive any payment in Euro.

2. You are trying to sell a coupon and thereby receive a payment in Euro.

Page 7

If you want to sell the coupon, you have to make an offer between 0 and 18 euros. The offer is the ***minimum*** *amount you would like to receive for the coupon.*

Page 8

Besides you, there are other sellers who make offers on the market, there is a market for sellers and buyers. The buyers in turn make offers on how much money they want to spend maximally for one coupon (0 to 18 euros).

Page 9

After sellers and buyers have submitted their offers, the ***market price*** *is determined: Therefore the sellers' offers are sorted from the smallest to the largest and the buyers' offers from the largest to the smallest.*

Page 10

The ***market price*** *is the highest bid of a seller which does not exceed the buyer's bid in the same row.*

In this example, the market price is 6 Euros.

- *In this example, if you offered €3, which is less than the market price, you would sell your coupon and receive €6.*
- *In this example, if you offered €11, which is greater than the market price, you would keep your coupon. In this case your coupon would be exchanged for 50 vaccinations.*

Page 11

You can only sell your coupon if your offer is ***not above*** *the determined market price. If there are more sellers than buyers who want to trade at this market price, it is randomly determined which sellers are trading.*

Page 12

If you trade, you sell your coupon to a buyer and receive the market price in Euro. The buyer then receives the difference between 18 Euro and the market price.

Page 13

*If your offer is **above** the determined market price, you will not sell your coupon and will not receive money. In this case your coupon will be exchanged for 50 vaccinations against measles.*

Page 14

If you additionally would like to make your participation in the market dependent on how other market participants behave, you have the following options:

You can specify what percentage of other market participants would have to forego trading in order for you to also forego trading.

On the basis of the information provided by the other participants, we then evaluate whether or not you forego trading.

Page 15

Example:

You indicate that you would forego trading if at least 60% of the other market participants did the same. Now there are two possibilities:

1. At least 60% of the other participants answered the question with a value of 60% or less or in principle forego trading. In this case, you and these participants will not trade.

2. Less than 60% of the other participants answered the question with a value of 60% or less or in principle forego trading. In this case you will trade.

Page 16

We would like to ask you now a comprehension question about the experiment we just described:

What happens if you submit an offer of 10 euros, thus demand at least 10 Euros for your coupon, and the market price determined at the end is 9 euros?

a) I sell my coupon at the market price of 9 Euro

b) I do not buy my coupon and my coupon is exchanged for 50 measles vaccinations

Page 17

Please indicate if you want to make an offer to sell a coupon or if you do not wish to trade.

a) I would not like to trade

b) I would like to forego trading if at least {0;10;…;100} % of other market participants decide that way.

c) I would like to make an offer to sell the coupon in any case.

Please submit your offer now. Your offer is the minimum amount you would like to receive for the coupon: €0 - €18.

Page 18

You require at least €9 for your coupon.

1. If the market price determined at the end is smaller than €9 or at least 30% of the other market participants forego trading, you do not trade. One coupon will be exchanged for 50 vaccinations against measles.

2. If the market price determined at the end is €9 or more, you would like to trade and therefore forego a donation if not at least 30% of the other market participants do not trade.

a) Confirm the offer

b) Change the offer

***Page 19** (only if participant indicated that she wants to change the offer)*

Please indicate under which conditions you would like to make an offer to sell the coupon.

You will not be able to change this offer afterwards. Please enter only whole numbers and tens steps for the percentage (0, 10, 20, 30 etc.).

a) I would like to forego trading if at least {0;10;…;100}% of other market participants decide that way.
b) I would like to make an offer to sell the coupon in any case.

Please submit your modified offer now. Your offer is the maximum amount you would like to spend on the coupon.
You cannot change this offer afterwards."

A6. Proof of Proposition 1.

Due to the continuum of agents, each agent has a weight of zero and her bid does not change the price. Therefore, it is optimal to (i) enter whenever a positive gain from trade is possible, and (ii) bid the price at which an agent is indifferent between trading and not trading considering the information about the society contained in the price.

That is, a buyer bids

$$v - \theta - \gamma \mathbb{E}(\theta | p_\theta) = p_\theta$$

and a seller bids

$$\theta_x + \gamma \mathbb{E}(\theta | p_\theta) = p_\theta.$$

With $\mathbb{E}(\theta|p)$ denoting the conditional expectation of the morality in the society of type θ given the equilibrium price p. As the demand of the buyers is symmetric to the supply of the sellers, the equilibrium price is $v/2$ almost surely. That is, in the situation at hand, the equilibrium price contains no information with probability one. To see this more formally, pick the lowest offer of a seller that does not exceed the offer of the buyer with the same rank. Denote the offer

of this seller by s^* and the offer of the respective buyer by b^*. As the society is continuous and each type is equally likely to be a seller or a buyer, it holds that the probability of the event $b^* - s^* < \epsilon$ is one for all $\epsilon > 0$. From the proposed bidding functions it follows that for the type of the buyer θ_{b^*} and for the type of the seller θ_{s^*}, it holds $\theta_{s^*} - \theta_{b^*} < \epsilon$ with probability one for all $\epsilon > 0$.

The price is determined by

$$0.5\left(v - \theta_{b^*} - \gamma\frac{b^*}{2}\right) + 0.5\left(\theta_{s^*} + \gamma\frac{b}{2}\right) = p.$$

or

$$0.5\left(v - \theta_{b^*} - \gamma\frac{a+b+c}{4}\right) + 0.5\left(\theta_{s^*} + \gamma\frac{a+b+c}{4}\right) = p$$

As $\theta_{s^*} - \theta_{b^*} < \epsilon$ with probability one for all $\epsilon > 0$, both equations reduce to $p = \frac{v}{2}$ with probability one.

Given that the price contains no information, a buyer bids $p_\theta = v - \theta - \gamma\mathbb{E}(\theta)$ and a seller $p_\theta = \theta + \gamma\mathbb{E}(\theta)$. For agents with types below a, $\mathbb{E}(\theta) = b/2$, for types between a and b, $\mathbb{E}(\theta) = (a+b+c)/4$. Types above b never enter due to Assumption 1. This yields the bidding functions from Proposition 1. The cut-off type θ_α, who is indifferent between entering and not entering, is determined by $\theta_\alpha = v - \gamma\mathbb{E}(\theta)$. Due to Assumption 1, substituting $\mathbb{E}(\theta) = \frac{a+b+c}{4}$ into the bids and the cut-off type yields the remaining result.

A7. Proof of Proposition 2.

We start with the observation that by choosing $\alpha = \frac{b-v+\gamma\frac{a+c}{2}}{b}$ all conditional types make sure that they enter if and only if the society is "moral". This choice of α equals the total share of conditional entrants and unconditional non-entrants if the society is "moral". Thus, it is smaller than the total share of conditional entrants and unconditional non-entrants in case the society turns out to be "immoral".

An agent is indifferent between entering unconditionally and entering conditionally, if her expected gains from trade are the same for conditional and unconditional entry. Hence, the cut-off type $\underline{\theta}$ is determined by $v - \gamma\frac{a+b+c}{4} - \theta_\beta = \frac{1}{2}\left(v - \gamma\frac{b}{2} - \theta_\beta\right)$. An agent is indifferent between entering conditionally and not entering, if her expected gain from (conditional) trade equals zero. That is, the cut-off type $\bar{\theta}$ is determined by $\frac{1}{2}\left(v - \gamma\frac{b}{2} - \theta_\delta\right) = 0$.

As in the proof of Proposition 1, once entered, there is no additional information contained in the equilibrium price. Thus, agents bid according to their expected gains from trade (conditional on trading). Simple calculations then yield the remaining results of Proposition 2.

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Figures and Tables

FIGURE 1: REALIZED MARKET ENTRY PER ROLE AND TREATMENT (IN %)

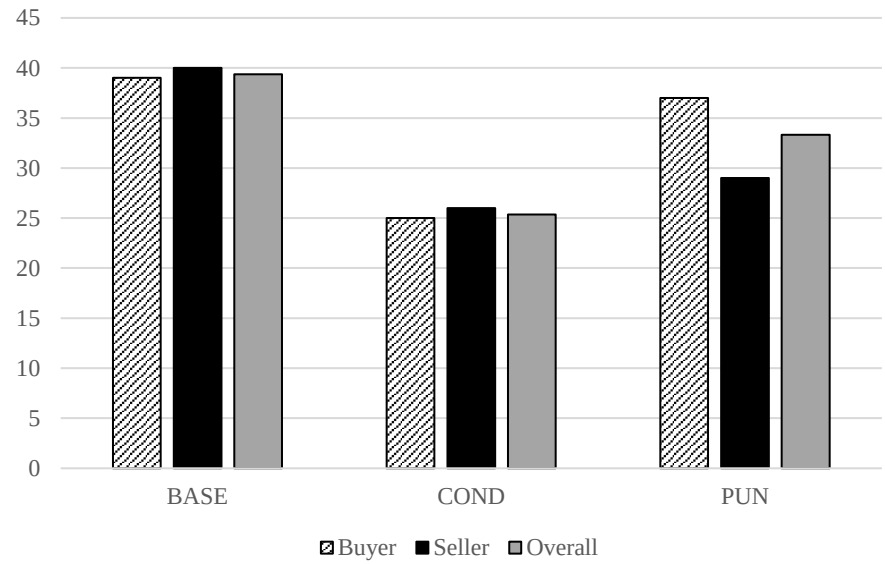


FIGURE 2: TRADER DECISIONS IN COND AND BASE (IN %)

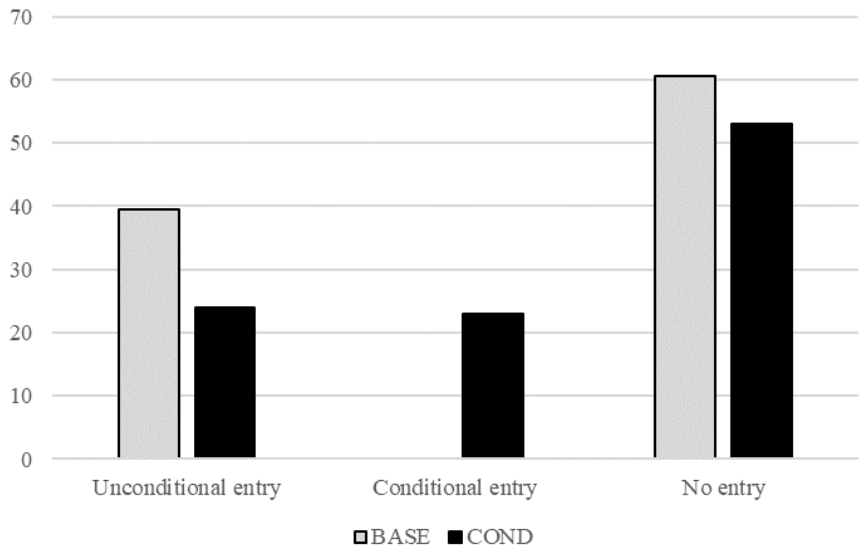


FIGURE 3: AVERAGE MONETARY COMPENSATIONS ASKED BY MARKET ENTRANTS, PER TREATMENT AND ROLE (IN EURO)

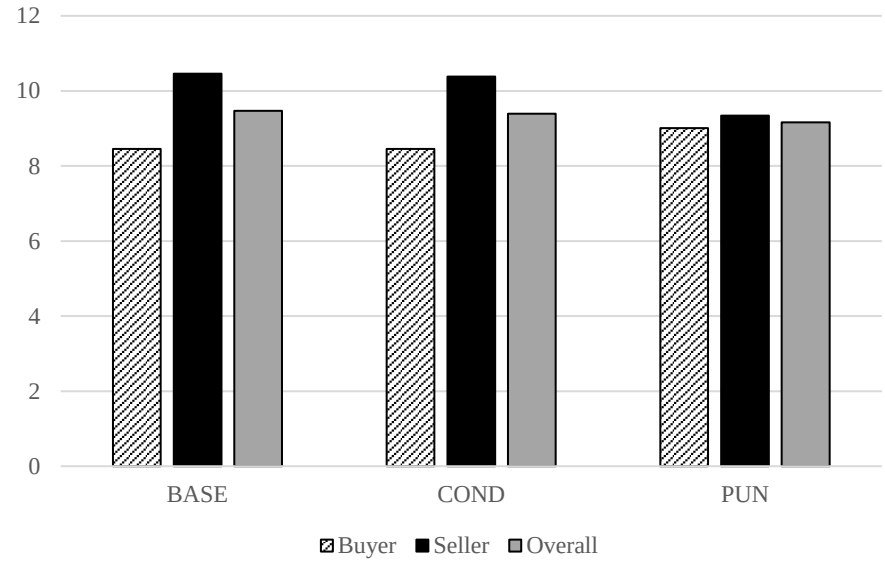
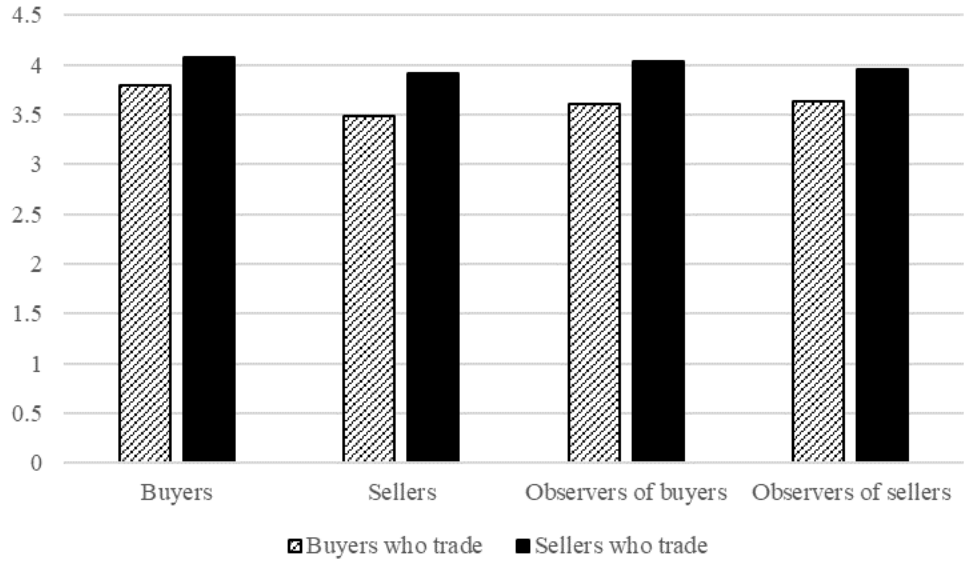


FIGURE 4: AVERAGE PERCEPTION OF THE IMMORALITY OF TRADE



Moral evaluations of buyers and sellers who trade were elicited on a scale ranging from 1 (not immoral at all) to 7 (very immoral).

FIGURE 5: SHARE (IN %) AND AMOUNT OF PUNISHMENT (IN EUROS) PER OBSERVER

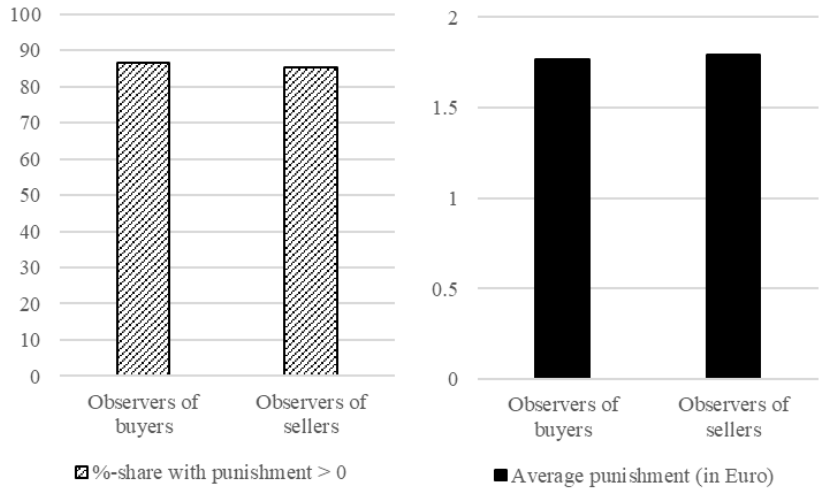


FIGURE 6: EXAMPLE FOR THE MODEL WITH V=18, a=3, b=15, c=18, AND γ=0.65.

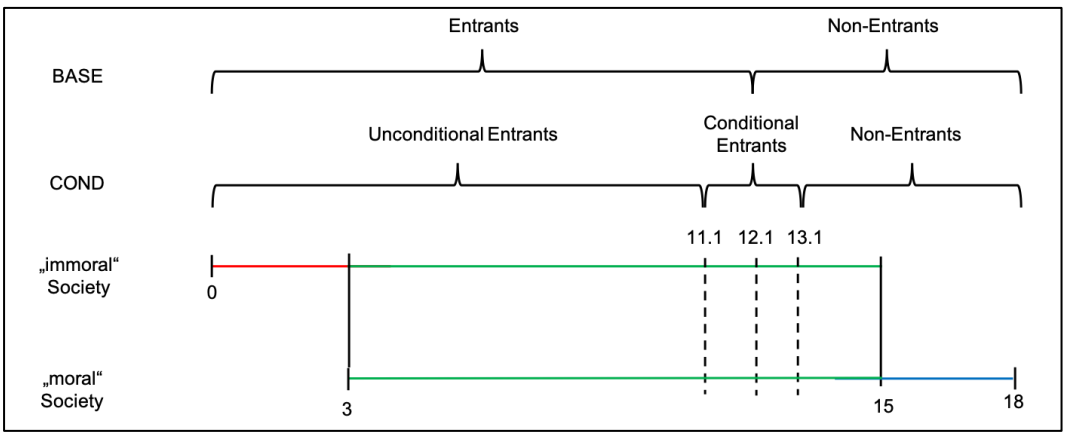


TABLE 1: NUMBER OF PARTICIPANTS PER ROLE AND TREATMENT

Treatment	Sellers	Buyers	Observers
BASE	324	321	--
COND	318	317	--
PUN	320	316	329 (sellers), 331 (buyers)[45]

TABLE 2: DETERMINANTS OF TRADER DECISIONS

Model No.	1	2	3	4
Dependent Variable	Market entry - Yes/No	Market entry - Yes/No	Compensation required	Compensation required
COND	-0.394***	-0.413***	-0.048	-0.068
	[0.074]	[0.074]	[0.331]	[0.329]
PUN	-0.162**	-0.181**	-0.215	-0.072
	[0.072]	[0.073]	[0.362]	[0.361]
Seller	-0.058	-0.04	1.516***	1.545***
	[0.060]	[0.060]	[0.281]	[0.279]
Female		-0.339***		0.397
		[0.061]		[0.284]
Age		-0.010***		0.026***
		[0.002]		[0.008]
Constant	-0.241***	0.410***	8.699***	7.178***
	[0.058]	[0.112]	[0.282]	[0.519]
Model	Probit	Probit	OLS	OLS
Observations	1916	1916	765	765

Models 1 and 2 are probit specifications that use a dummy dependent variable equal to one if the trader decided to enter the market. Models 3 and 4 are linear specifications with a trader's minimum required compensation (0 to 18 Euro) as the dependent variable. Standard errors are given in brackets. *, ** and *** denominate significance on the 10%-, 5%- and 1%-level, respectively. The reference category for the experimental treatment consists of observations from treatment BASE.

[45] We randomly assigned one observer to each market participant in PUN. Observers that were not assigned to a market participant simply kept their additional endowment of 3 Euros.

TABLE 3: DETERMINANTS OF ENTRY DECISIONS – IMPACT OF SOCIOECONOMIC BACKGROUND AND STATED ATTITUDES

Model No.	1	2	3	4	5	6
Dependent Variable	Market entry - Yes/No	Market entry - Yes/No	Market entry - Yes/No	Market entry - Yes/No	Market entry - Yes/No	Market entry - Yes/No
COND	-0.389***	-0.397***	-0.419***	-0.414***	-0.446***	-0.416***
	[0.083]	[0.075]	[0.075]	[0.074]	[0.076]	[0.074]
PUN	-0.143*	-0.166**	-0.179**	-0.181**	-0.173**	-0.182**
	[0.082]	[0.073]	[0.073]	[0.073]	[0.074]	[0.073]
Seller	-0.054	-0.04	-0.043	-0.04	-0.1	-0.034
	[0.068]	[0.061]	[0.061]	[0.060]	[0.062]	[0.061]
Female	-0.316***	-0.294***	-0.302***	-0.340***	-0.327***	-0.349***
	[0.068]	[0.061]	[0.061]	[0.061]	[0.062]	[0.061]
Age	-0.009***	-0.008***	-0.009***	-0.009***	-0.010***	-0.009***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
High School	0.043					
	[0.078]					
Persons household	0.032					
	[0.033]					
Net income	-0.025*					
	[0.015]					
Altruism		-0.251***				
		[0.039]				
Ethical consumption			-0.141***			
			[0.038]			
Voluntary work				-0.001		
				[0.002]		
Trade immoral					-0.824***	
					[0.074]	
Non-voter						0.349***
						[0.121]
Constant	0.406**	0.312***	0.815***	0.413***	1.086***	0.360***
	[0.170]	[0.114]	[0.157]	[0.112]	[0.131]	[0.113]
Model	Probit	Probit	Probit	Probit	Probit	Probit
Observations	1524	1916	1916	1916	1916	1916

Models 1 to 6 are probit specifications that use a dummy dependent variable equal to one if the trader decided to enter the market. Standard errors are given in brackets. *, ** and *** denominate significance on the 10%-, 5%- and 1%-level, respectively. The reference category for the experimental treatment consists of observations from treatment BASE.

TABLE 4: DETERMINANTS OF PUNISHMENT

Model No.	1	2
Dependent Variable	Punish - Yes/No	Punishment Euro
Female	0.089	0.134*
	[0.122]	[0.080]
Age	0.008**	0.005*
	[0.004]	[0.002]
Constant	0.643***	1.473***
	[0.194]	[0.132]
Model	Probit	OLS
Observations	660	660

Model 1 is a probit specification that uses a dummy dependent variable equal to one if the observer decided to punish the trader. Model 2 is a linear specification with an observer's chosen level of punishment (0 to 3 Euro) as the dependent variable. Standard errors are given in brackets. *, ** and *** denominate significance on the 10%-, 5%- and 1%-level, respectively.

TABLE 5: DETERMINANTS OF PUNISHMENT – IMPACT OF SOCIOECONOMIC BACKGROUND AND STATED ATTITUDES

Model No.	1	2	3	4	5	6
Dependent Variable	Punishment - Yes/No	Punishment - Yes/No	Punishment - Yes/No	Punishment - Yes/No	Punishment - Yes/No	Punishment - Yes/No
Seller	-0.032	-0.05	-0.027	-0.049	-0.049	-0.059
	[0.137]	[0.123]	[0.124]	[0.123]	[0.123]	[0.122]
Female	0.083	0.049	0.076	0.101	0.079	0.094
	[0.142]	[0.124]	[0.123]	[0.123]	[0.123]	[0.123]
Age	0.011**	0.008**	0.007**	0.008**	0.008**	0.008**
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
High School	-0.04					
	[0.168]					
Persons household	0.113*					
	[0.067]					
Net income	0.007					
	[0.030]					
Altruism		0.211***				
		[0.072]				
Ethical consumption			0.176**			
			[0.073]			
Voluntary work				0.012		
				[0.007]		
Trade immoral					0.366**	
					[0.156]	
Non-voter						-0.072
						[0.226]
Constant	0.232	0.690***	0.153	0.622***	0.354	0.683***
	[0.322]	[0.206]	[0.297]	[0.207]	[0.247]	[0.207]
Model	Probit	Probit	Probit	Probit	Probit	Probit
Observations	520	660	660	660	660	660

Models 1 to 6 are probit specifications that use a dummy dependent variable equal to one if the observer decided to punish the trader. Standard errors are given in brackets. *, ** and *** denominate significance on the 10%-, 5%- and 1%-level, respectively.

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ZEW – Leibniz-Zentrum für Europäische Wirtschaftsforschung GmbH Mannheim
ZEW – Leibniz Centre for European Economic Research

L 7,1 · 68161 Mannheim · Germany
Phone +49 621 1235-01
info@zew.de · zew.de