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Where to Look for the Morals in Markets?

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ABSTRACT

Where to Look for the Morals in Markets?*

Markets are ubiquitous in our daily life and, despite many imperfections, they are a great source of human welfare. Nevertheless, there is a heated recent debate on whether markets erode social responsibility and moral behavior. In fact, competitive pressure on markets may create strong incentives for unethical practices (like using child labor) to increase competitiveness. While markets have been considered as detrimental for moral behavior, it has turned out a challenging task to identify where moral behavior is reflected in a market. Recent work has suggested that falling prices in markets with externalities are an indicator of declining morals. Here we examine the relation between trading volume, prices and moral behavior by presenting an experimental study where we let buyers and sellers interact on a double auction market. In one set of treatments, concluding a trade has no externality; in the other set, there is a negative externality by voiding donations for a potentially life-saving measles vaccine to UNICEF. We find that moral behavior reveals itself in lower trading volume in markets with an externality, but that market prices are hardly different between markets with or without an externality. We also vary the number of buyers and sellers and show that prices depend mainly on the relative number of buyers and sellers, but not on the existence of an externality. Hence, the market forces of supply and demand work equally well in determining prices whether or not trading has an externality.

JEL Classification: C92, D03, D62

Keywords: morals, markets, competition, experiment

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1 Introduction

In the early history of economic thought, some of the most important founders of modern economics dealt extensively with the relationship between markets and morals. Depending on their analysis, they often arrived at opposite conclusions. While Adam Smith, for instance, argued that markets would, in principle, have a civilizing effect on the behavior of market participants (Smith, 1978), Thorsten Veblen or Karl Marx expected markets to be destructive and bring out the worst in human beings (Marx, 1867; Veblen, 1899).

Given the ubiquity of markets in our daily life the question of how markets affect human, and in particular moral, behavior is an immensely important one. Yet, during the second half of the twentieth century the question of how markets relate to morals seems to have been relegated to the background of the academic debate. Only during the past decade the academic community has rediscovered this topic, probably fueled by scandals like Enron (Healy and Palepu, 2003), the revelation of massive child labor as a backbone of the global textile industry (Edmonds, 2007), or more recent scandals in the banking industry (Cohn et al., 2014). For instance, Shleifer (2004) has argued that the competitive pressure on markets creates strong incentives for unethical practices (like using child labor, creative accounting or corruption) to reduce costs and thus guarantee survival in a competitive market. Sandel (2012) has claimed on top of that that markets might undermine moral values per se by crowding out norms such as respect for human life or dignity.

Using experimental methods, Falk and Szech (2013) were the first to demonstrate under controlled laboratory conditions that, indeed, markets can undermine moral values. More precisely, they let subjects decide whether to take some money and let a mouse be killed or forgo the money and let the mouse live. The focus of their work was on comparing behavior when decisions were made individually and when subjects traded on a market. They found that experimental participants were more often willing to let a mouse be killed when trading the life of a mouse on a (double auction) market than when making an individual decision. Following their seminal work, several recent studies have tried to identify why markets might erode moral values. Among the most important explanations are diffusion of responsibility and lack of pivotality in markets, social information about the acceptability of a particular (unethical) behavior, or market framing that distracts attention from the moral dimension of the traded good (Bartling et

al., 2016; Breyer and Weimann, 2015; Cappelen et al., 2015; Falk and Szech, 2015; Gneezy et al., 2014; Irlenbusch and Saxler, 2015; Irlenbusch and Villeval, 2015; Kirchler et al., 2015). Despite these mechanisms working to undermine morals, Bartling et al. (2015) found that socially responsible behavior can survive in markets even in an environment where two types of goods – a cheaper good with a negative externality on unprotected bystanders, and a more expensive good without such an externality – are traded simultaneously on the market. Hence, some degree of moral behavior can persist on markets despite competitive pressure. Bartling et al. (2015) reported that the good without externality – that is more expensive to produce – is nevertheless traded even if sellers and buyers could make larger profits when trading only the good with the lower production costs that generates the negative externality. This is interpreted as social responsibility alias moral behavior on markets, where the indicator of morality is the price premium, i.e., how much more buyers are willing to pay for the moral good without the externality than the immoral good with the externality. Bartling et al. (2015) also noted that social concerns are less strong in a market environment than in a comparable individual choice context. Moreover, under increasing competition, the price premium gets smaller, but the market share for the moral good remains constant.

In our paper, we address the question of how one can exactly identify moral behavior in markets. Since both goods in the experiment of Bartling et al. (2015) differ not only with respect to the existence of an externality (on a third party), but also in its production cost, it is methodologically impossible in their paper to identify whether prices or quantities, or both, indicate the degree of moral behavior on markets. The same limitation applies to the seminal paper of Falk and Szech (2013) who have already touched upon our question where to look for the morals in markets. They set up a repeated double auction market where buyers and sellers can bargain about sharing a fixed pie and let a mouse be killed, or save the mouse and get no money. Their interpretation of the observed decline in prices across ten periods of their multilateral markets is the following: "*The downward trend provides a further indication of moral decay in the mouse market and is suggestive of social learning and endogenous social norm formation. Intuitively, observing low trading prices in the market may make it normatively acceptable to offer or accept low prices as well." (Falk and Szech, 2013, p. 709).* Note that Falk and Szech (2013) compare their mouse paradigm with a market where participants can trade vouchers for a university gift shop. In the latter treatment, they do not observe falling prices, and hence interpret the decline in prices in the mouse

paradigm as a decay in morals. Yet, the comparison to the treatment with vouchers entails three changes in comparison to the mouse paradigm, making causal inference difficult. The first change is that the mouse paradigm has an externality, while the voucher treatment has not. Second, the type of good traded on the market differs (mouse vs. voucher), and third, the traded good has a fixed, and exogenously given, monetary value in one case (the voucher), but cannot unambiguously be monetized in the other case (in the mouse market).

We introduce an experimental design that allows investigating whether prices or quantities, or both, are a good indicator of moral behavior in markets. While this question might sound only of academic interest to the non-academic community, it is of crucial importance as the answer to the question will inform policy makers about the target of potential interventions to increase moral behavior in markets. Furthermore, it can help us better understand the intricate relationship of morals and markets.

More precisely, we are going to argue that market prices and price trends are *not* an unambiguous indicator of the level of morality in a market setting. In order to show this, we keep the general simplicity of the design of Falk and Szech (2013) – by letting buyers and sellers trade in a setting where trading has a negative externality – and add a treatment variation that is completely identical, except that we remove the negative externality. This creates the simplest possible environment to assess how a negative externality affects market behavior and where to look for the morals in markets.

In our design, we let buyers and sellers trade in a double auction market in a sequence of ten periods in order to split a fixed sum of money between a buyer and a seller. We implement two sets of three treatments each. In each set, we vary the number of buyers and sellers systematically, such that in one treatment there are more buyers than sellers, in another treatment more sellers than buyers, and in a third one an equal number of sellers and buyers. The two sets of treatments differ in one crucial aspect: whether concluding a trade triggers an externality or not. In one set of treatments, striking a deal has only the consequence of distributing money between the buyer and the seller. In the other set, a deal entails the additional negative externality of voiding donations for a potentially life-saving vaccine that is provided by UNICEF to reduce the death toll of about 115,000 people that die each year because of measles (see the World Health Organization's factsheet at http://www.who.int/mediacentre/factsheets/fs286/en/).

By systematically varying the number of buyers and sellers we investigate how the competitive pressure on each market side affects the price dynamics. As standard microeconomic theory (Frank, 2006) would suggest, sellers should earn the highest profits when there are more buyers than sellers, intermediate profits if the number of sellers is equal to the number of buyers, and the lowest profits if there are more sellers than buyers. The reverse relation should hold for buyers. It seems reasonable to assume that the relation between the number of buyers and sellers will have an effect on the development of prices in our setting. Yet, our novel interest is in comparing the price developments in markets with and without an externality, holding the number of buyers and sellers constant, and investigating whether the externality creates a difference in trading volume or trading prices over time. Only then it is possible to interpret particular (differential) price developments (like a decline, for instance) as a signal of more or less moral behavior in markets with a moral externality. Varying the ratio of buyers and sellers allows us to examine whether markets react differently to the presence of an externality depending upon different levels of competitive pressure on each market side. In order to proceed with our research strategy, we keep our markets with and without externality as comparable as possible and therefore avoid introducing any production costs, because differences in the latter (as in Bartling et al., 2015) would make the unambiguous identification of morals in markets difficult.

We find that the moral behavior in our markets can be identified when looking at trading volume, but not when scrutinizing prices. This is important because it reveals that the moral decision is whether or not to become active in such a market. Prices are only formed after this decision, and there is hardly any difference between the prices in markets with or without a moral externality. This means that markets work very smoothly and react in a predictable way to the level of competition on the supply- and demand-side, with decreasing prices when there are more sellers than buyers, stable prices when there is an equal number of buyers and sellers, and increasing prices when there are more buyers than sellers. These price patterns are independent of the existence of a moral externality from trade, showing that market forces dominate the potential influence of negative externalities as far as prices are concerned. However, the externality affects market volume. The latter is therefore the place to look for morals, but price dynamics are not.

From the background information of our experimental participants, we can identify subjects' characteristics that are predictive of how frequently they become

active in the markets with the moral externality. Most importantly, we identify subjects' attitudes towards charitable giving as well as their political orientation as determinants of moral behavior. Subjects who have donated to charities in the past or who generally support donations to charities are less likely to trade on the market and are thus more likely to forgo own profits in order to support the measles-vaccination. Furthermore, subjects who consider themselves as more right-wing oriented on the political spectrum are less likely to avoid the negative moral externality from trading on the market. Gender and field of study are insignificant for explaining the decision to become active on the market.

In the next section, we introduce our experimental design and the details of the moral externality. Section 3 presents the experimental results, focusing first on the market level by examining trading volume and prices, and then analyzing the determinants of individual traders' behavior. Section 4 discusses our results and concludes the paper.

2 Experimental design

2.1 Treatments *without* an externality

We conduct three treatments where trading on a market does *not* generate a negative externality on an uninvolved third party. In all of these treatments, there are ten traders in the market, either in the role of buyer or seller. Each of them can place limit orders and accept them by posting market orders. These orders indicate how a fixed sum of 21.40 Euro shall be divided between a buyer and a seller. More precisely, buyers and sellers can submit orders to agree on a price P that has the following consequence: the seller receives P Euro as payment, and the buyer gets the remaining pie, i.e., $21.40 - P$ Euro. Trading rules are as in a classical double auction market and identical to Kirchler et al. (2015).[1] Orders are executed according to price and then time priority. Market orders have priority over limit orders and are always executed instantaneously. The trading screen provides real-time information about the current price in a chart and about the number of transactions in the period (see the instructions in the Appendix).

[1] In this previous paper (Kirchler et al., 2015) we address which kind of interventions could reduce the willingness to trade when trading causes negative externalities. There is a single treatment from Kirchler et al. (2015) that we also use here (the one that is called 6SELLERS_EXT below). We conducted additional experimental sessions for the current paper, and all other five treatments introduced below are novel and address a fundamentally different question from Kirchler et al. (2015).

Each trader can conclude at most one trade per period. Once this is the case, this trader's remaining open limit orders are removed from the order book and she cannot enter new orders. Each trading period lasts for three minutes. In total, subjects trade during ten periods. At the end of the experiment, one period is drawn randomly and implemented with all monetary consequences. If a subject has not traded in the randomly drawn period, then his or her earnings are zero. The three treatments differ with respect to the number of buyers and sellers in the market.

- SYMM has five sellers and five buyers, implying a maximum of five trades per period.
- 6SELLERS has six sellers and four buyers, allowing for a maximum of four trades per period.
- 6BUYERS has four sellers and six buyers, entailing four trades per period at most.

Our expectation is to observe three different price trajectories over the ten periods of trading. In SYMM, we expect flat prices across the ten periods, with buyers and sellers splitting the total pie of 21.40 Euro practically equally, yielding prices around 10.70 Euro. Social preferences (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002) can support such a fair split of the total pie. In 6SELLERS we expect lower (and declining) prices as a consequence of competitive pressure on sellers to accept lower prices in order to be able to strike a deal at all. 6BUYERS is expected to produce higher (and increasing) prices, because there the sellers are in the more powerful condition, as buyers must compete against each other to strike a deal with one seller (Holt, 1995).

2.2 Treatments *with* an externality

The three treatments *with* an externality also have ten traders each. Buyers and sellers can submit prices, and if a pair of them concludes a trade, the pie of 21.40 Euro is split according to price *P*. However, whenever a trade occurs, this triggers the externality that there will be no donation of 21.40 Euro to UNICEF for financing one package with 100 doses of (potentially life-saving) measles vaccine. One such package is sufficient to vaccinate 50 children twice, which yields full protection against measles. Thus, traders in these treatments face a trade-off between a monetary payment if a trade is concluded

and avoiding a negative moral externality if no trade occurs.[2] The three treatments with the externality are analogous to those without the externality.

- SYMM_EXT has five sellers and five buyers.
- 6SELLERS_EXT has six sellers and four buyers.
- 6BUYERS_EXT has four sellers and six buyers.

As with the markets without an externality, we expect stable prices in SYMM_EXT, declining prices in 6SELLERS_EXT, and increasing prices in 6BUYERS_EXT. Yet, to judge the significance of prices as an indicator of morals, we will focus on the pairwise comparisons between equivalent treatments with and without an externality, i.e., between SYMM and SYMM_EXT, between 6SELLERS and 6SELLERS_EXT, and between 6BUYERS and 6BUYERS_EXT.

2.3 Side experiments

In addition to the market experiment, we ran a battery of three side experiments and administered a questionnaire at the end of each experimental session to control for various economic preferences and background information. First, we measured risk-attitudes in a standard choice-list setting (Bruhin et al., 2010). Subjects could choose between a risky alternative, yielding either zero or 6 Euro with equal probability, and a safe payment that increased from 0.5 Euro to 6 Euro in steps of 0.5 Euro. Risk preferences were elicited because if the number of sellers and buyers is unequal, then it becomes risky for traders on the longer market side to conclude a trade. Risk preferences might play a role in submitting orders and concluding trades.

Second, we measured subjects' willingness to compete, following the design of Balafoutas and Sutter (2012). There were three stages, with feedback given only at the very end. In a first stage, subjects had to add up sets of five double-digit numbers within two minutes, and were paid 0.5 Euro for each correct solution. In a second stage, they had to compete in pairs of two, with only the winner getting paid 1 Euro per correct solution. In a third stage, subjects could choose whether they wanted to be paid a piece

[2] In Kirchler et al. (2015) we reported questionnaire evidence showing that trading in such a market with an externality is considered as significantly less moral than not trading. The questions on the assessment of the moral dimension were: "On a scale from 0 (very immoral) to 6 (very moral): How moral do you consider people who have traded in this experiment? On a scale from 0 (very immoral) to 6 (very moral): How moral do you consider people who have NOT traded in this experiment?" The average scores were 3.05 for the first question and 4.62 for the second question (Wilcoxon signed ranks test, $p < 0.001$, $N = 255$ respondents). For details see Kirchler et al. (2015).

rate like in stage 1 or according to the competitive scheme in stage 2. The latter choice is interpreted as a subject's willingness to compete, and this trait might be related to behavior in our experimental markets.

Third, we ran a dictator game where subjects had to decide how to split 5 Euro between themselves and another, anonymous participant in the room. Only after having taken the decision, their role in the dictator game as either dictator or recipient was revealed, i.e., we applied the strategy method (Brandts and Charness, 2011). The dictator game was used to elicit distributional preferences because they might influence whether and how a subject wants to split the fixed sum of 21.40 Euro in the market treatments.

At the end of a session, one of the three side experiments was selected randomly for payment. If the risk experiment was chosen, it was also determined which choice was relevant (one out of twelve choices). If the experiment on the willingness to compete was chosen, it was also randomly determined which stage was payoff-relevant (instructions for the side experiments are available upon request).

2.4 Experimental procedure

For each of our two experimental treatments with an equal number of buyers and sellers we conducted eight markets with ten subjects each and for the four treatments with an unequal number of buyers and sellers we had 12 markets with ten subjects each. No subject was allowed to participate in more than one session, i.e., we used a between-subject design. In total, 640 bachelor and master students from various fields of study participated in the experiment, using ORSEE by Greiner (2015) and HROOT by Bock et al. (2014) for recruitment. All sessions were run computerized (using zTree by Fischbacher, 2007) at Innsbruck EconLab at the University of Innsbruck.

Each experimental session lasted between 60 and 90 minutes. At the beginning, subjects had 15 minutes to read the instructions on their own and subjects' questions were answered privately. Afterwards the trading screen was explained, followed by a non-incentivized trial period of three minutes to become familiar with the trading interface. After subjects had read the instructions they had the possibility to leave the experiment if they felt to have a moral conflict in participating (only in the treatments with an externality). Subjects who left the experiment received the show-up fee of 10 Euro and were replaced with reserve candidates. The latter were assigned the roles of reserves before the experiment started, but were present from the beginning. In sum,

nine participants (out of 320 participants in the treatments with an externality) left a session and were replaced by reserve candidates.

After all experiments were finished, subjects had to answer a questionnaire about demographic background variables, including political attitudes. In addition to a show-up fee of 10 Euro, subjects received the payments from the market experiment and from one of the side experiments in private and anonymously by another researcher who was not in the room during the experiment. The average total payment was 21.72 Euro per subject.

In the treatments with an externality, subjects were informed in the instructions that we would send them a receipt about the amount donated in the sessions within the next two months. In total, we donated 920.20 Euro to UNICEF, making 4,300 measles vaccinations possible, thus protecting 2,150 children from a measles infection.

3 Experimental results

3.1 Trading volume

Figure 1 presents the average relative trading volume per period, calculated as the actual number of trades divided by the maximum number of trades possible, which is four in the treatments with an unequal number of sellers and buyers, and five in the symmetric treatments. We always present the corresponding treatments with and without an externality next to each other. While all treatments *without* an externality have mean relative trading volumes above 97% (ranging from 97.75% in SYMM to 99.79% in 6BUYERS), thus exploiting essentially all opportunities to trade, the treatments *with* an externality have considerably lower relative trading volumes, ranging from 67.25% in SYMM_EXT to 92.71% in 6BUYERS_EXT. Using the average relative trading volume across the ten periods of one market as the unit of observation and testing for pairwise differences in the trading volume with non-parametric Mann-Whitney U-tests, we find significantly lower trading volumes in the treatments *with* the externality: $p < 0.001$ for SYMM vs. SYMM_EXT ($N = 16$), $p = 0.018$ for 6SELLERS vs. 6SELLERS_EXT ($N = 24$), and $p = 0.021$ for 6BUYERS vs. 6BUYERS_EXT ($N = 24$). Table 1 confirms these non-parametric results. It presents three fraction (logit) panel regressions (see Papke and Wooldridge, 1996), with clustered standard errors on the market level, separately for three matched treatments (with and without externality), and with the relative trading volume as the dependent variable. As explanatory variables we include a dummy for

whether the market has an externality (EXT), PERIOD for periods 1 to 10, and an interaction term of PERIOD and EXT to account for potentially different trading volume developments in treatments with an externality. We note that the relative trading volume is significantly lower when an externality arises from trading (see the significant dummy EXT in the first two columns and the significant negative interaction term in the third column), which can also be seen in Figure 2 that shows the relative trading volume over time.

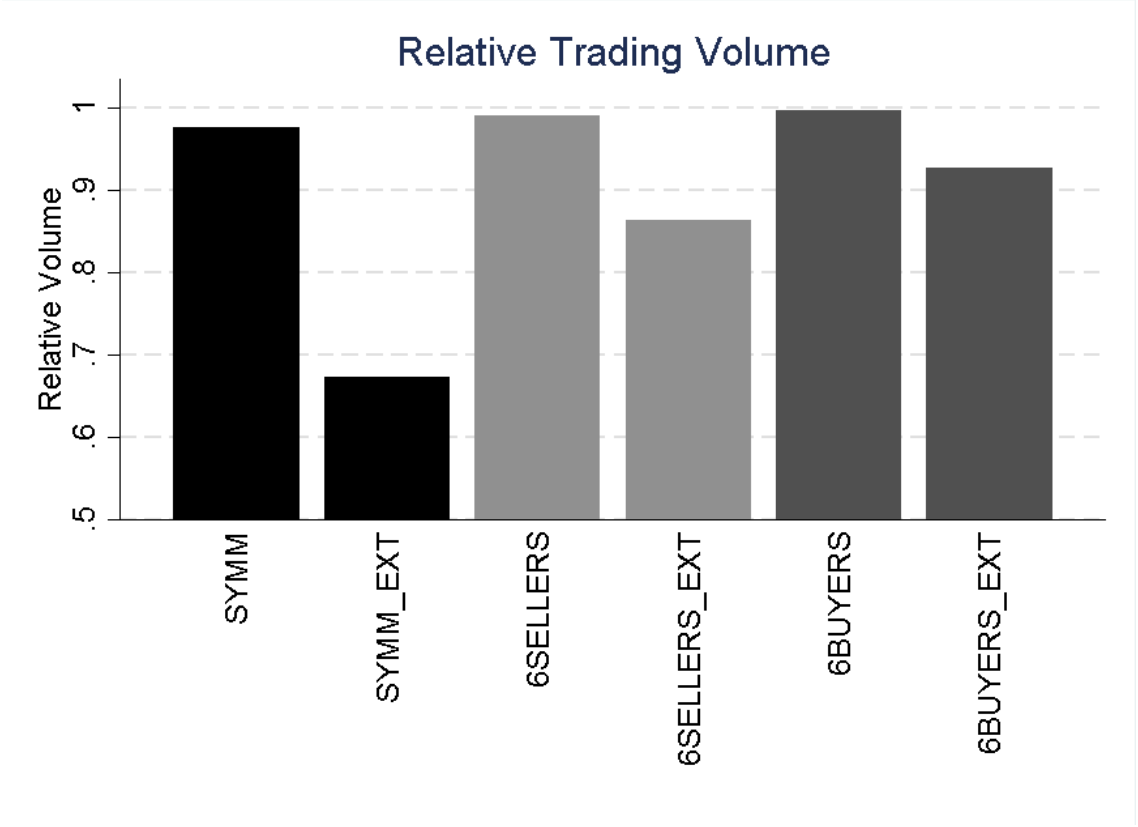

Figure 1. Average relative trading volume across treatments

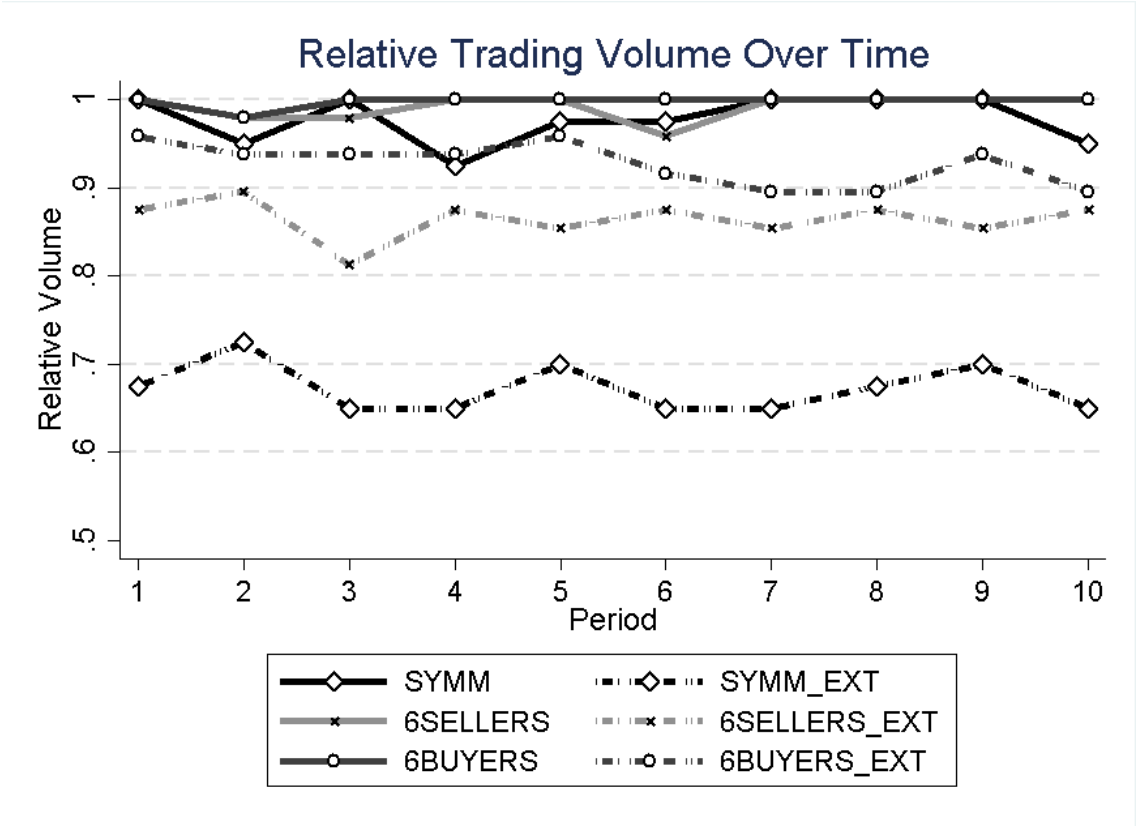

Figure 2. Average relative trading volume across periods

Table 1. Regressions on relative trading volume

	(1) SYMM and SYMM_EXT	(2) 6SELLERS and 6SELLERS_EXT	(3) 6BUYERS and 6BUYERS_EXT
EXT (=1)	–2.82 (0.37)***	–2.14 (1.07)**	–0.83 (1.19)
PERIOD	–0.03 (0.08)	0.16 (0.09)*	0.69 (0.00)***
PERIOD*EXT	-0.04 (0.09)	–0.16 (0.09)*	–0.78 (0.04)***
constant	3.59 (0.33)***	4.00 (1.00)***	3.87 (0.99)***
N	160	240	240

Fraction (logit) regression with clustered standard errors on market level. Dependent variable is the relative trading volume in each period. The total number of trades in a period is divided by the maximum number of trades (5 in SYMM and SYMM_EXT, and 4 in the other treatments), thus ranging from 0 to 1. Coefficients are reported. Robust standard errors are given in parenthesis. *, ** and *** represent the 10%, 5% and the 1% significance levels of a two-sided test.

Coming back to Figure 1, it is noticeable that the relative trading volume is clearly lower in SYMM_EXT than in either 6SELLERS_EXT or 6BUYERS_EXT ($p < 0.02$ in each pairwise comparison; Mann-Whitney U-tests), whereas the relative trading volume between 6SELLERS_EXT and 6BUYERS_EXT is not significantly different ($p = 0.378$; Mann-Whitney U-test; $N = 24$). Hence, the trading volume drops more strongly with an externality when the number of sellers and buyers is equal than when their numbers are unequal. The larger reduction in trading volume in SYMM_EXT compared to the asymmetric treatments (6BUYERS_EXT and 6SELLERS_EXT) may be due to the higher pivotality of traders in the former: if one of the ten traders refuses to trade (e.g., for moral reasons), this implies a reduction in trading volume by 20 percent (one out of five possible trades) in SYMM_EXT. In the asymmetric treatments, there is only a reduction if the trader is on the shorter side. In this case there is a reduction by 25 percent (one out of four trades), but if she is on the longer side there is no reduction of trading volume. As the chance to be on the shorter side is 40 percent (four out of ten traders), in the asymmetric treatments trading volume falls, on average, by only 10 percent (25 percent times 40 percent) if one trader refuses to trade, compared to 20 percent reduction in SYMM.

Thus, in the following we do not compare the asymmetric treatments of 6SELLERS_EXT and 6BUYERS_EXT with SYMM_EXT, because, first, the differences in trading volume are a consequence of the different numbers of buyers and sellers. A second reason to abstain from a direct comparison of the two types of markets is that in the asymmetric treatments two donations are made anyways, which might have an influence on subjects' moral stance towards trading. Finally, note that the focus of our paper is to examine how moral externalities affect trading volume and prices, for which reason our main comparison is always between matched treatments with or without an externality, holding the number of buyers and sellers constant.

Taken together, Figure 1 and Table 1 show a clear effect of the externality on trading volume, meaning that traders are significantly less willing to split the pie of 21.40 Euro among themselves and are more likely to forgo the money when it is donated to UNICEF for measles vaccine.

While we are going to analyze the determinants of individual trading behavior in section 3.3, already at this point we would like to briefly show that the fraction of subjects who rarely or never trade differs widely between the treatments with and without externality. In treatments with externalities, 10.63% of subjects never trade, and

a further 5.31% trade only once or twice (out of ten periods). In comparison to these 15.93% of subjects with at most two trades, there are only 1.88% of subjects with two or less trades in the treatments without an externality. Overall, each subject trades on average in 7.02 periods when there is an externality, but in 8.56 periods when there is none,[3] and this difference is highly significant ($p < 0.001$, Mann-Whitney U-test with the average relative trading volume in a market as unit of observation, $N = 64$). These differences in the individual willingness to trade generate the lower trading volume in the treatments with an externality.

So far, we have shown evidence that the potential negative externality of trade reduces the trading volume. This can be interpreted as an indication of moral behavior, because the monetary incentives for traders are the same in both sets of treatments, those with and those without the externality. The next question is to examine whether we can also trace a moral component when looking at prices.

3.2 Market prices

Figure 3 presents the average transaction prices across all periods in each of the six treatments. The first finding to notice is that average prices are lowest when there are more sellers than buyers (in 6SELLERS and 6SELLERS_EXT), intermediate when the number of buyers and sellers is equal (in SYMM and SYMM_EXT), and highest when there are more buyers than sellers (in 6BUYERS and 6BUYERS_EXT).[4] This ordering of prices is as expected, and the differences are all significant.[5]

The most important finding of Figure 3, however, is the fact that average prices are essentially the same in each pair of corresponding treatments. This is markedly different from the findings with respect to trading volume, where the externality reduced volume significantly. When looking at prices the externality has no significant effect, compared to the same market setting without an externality. No pairwise

[3] In the appendix, we show in Table A.1 how many subjects concluded how many trades in each of our six treatments.

[4] It is noteworthy, however, that the prices in the case of six sellers are a mirror image of the prices with six buyers, with no significant differences. For instance, sellers earn on average 7.34 Euro in 6SELLERS_EXT, which is not significantly different from buyers' mean earnings of 6.44 Euro in 6BUYERS_EXT ($p = 0.356$; Mann-Whitney U-test, $N = 24$). The same pattern holds without externalities where sellers earn on average 5.64 Euro in 6SELLERS, and buyers earn 5.13 Euro in 6BUYERS ($p = 0.525$; Mann-Whitney U-test, $N = 24$).

[5] Wilcoxon signed ranks tests of mean prices per market: $p < 0.001$ for SYMM vs. 6SELLERS ($N = 20$); $p < 0.001$ for SYMM vs. 6BUYERS ($N = 20$); $p < 0.001$ for 6BUYERS vs. 6SELLERS ($N = 24$); $p = 0.007$ for SYMM_EXT vs. 6SELLERS_EXT ($N = 20$); $p = 0.002$ for SYMM_EXT vs. 6BUYERS_EXT ($N = 20$); $p < 0.001$ for 6SELLERS_EXT vs. 6BUYERS_EXT ($N = 24$).

comparison of average prices per market is significant (p = 0.75 for SYMM vs. SYMM_EXT, N = 16; p = 0.11 for 6SELLERS vs. 6SELLERS_EXT, N = 24; and p = 0.12 for 6BUYERS vs. 6BUYERS_EXT, N = 24; Mann Whitney U-tests). Hence, from looking at average prices it would not be possible to judge which treatment has an externality and which one does not.

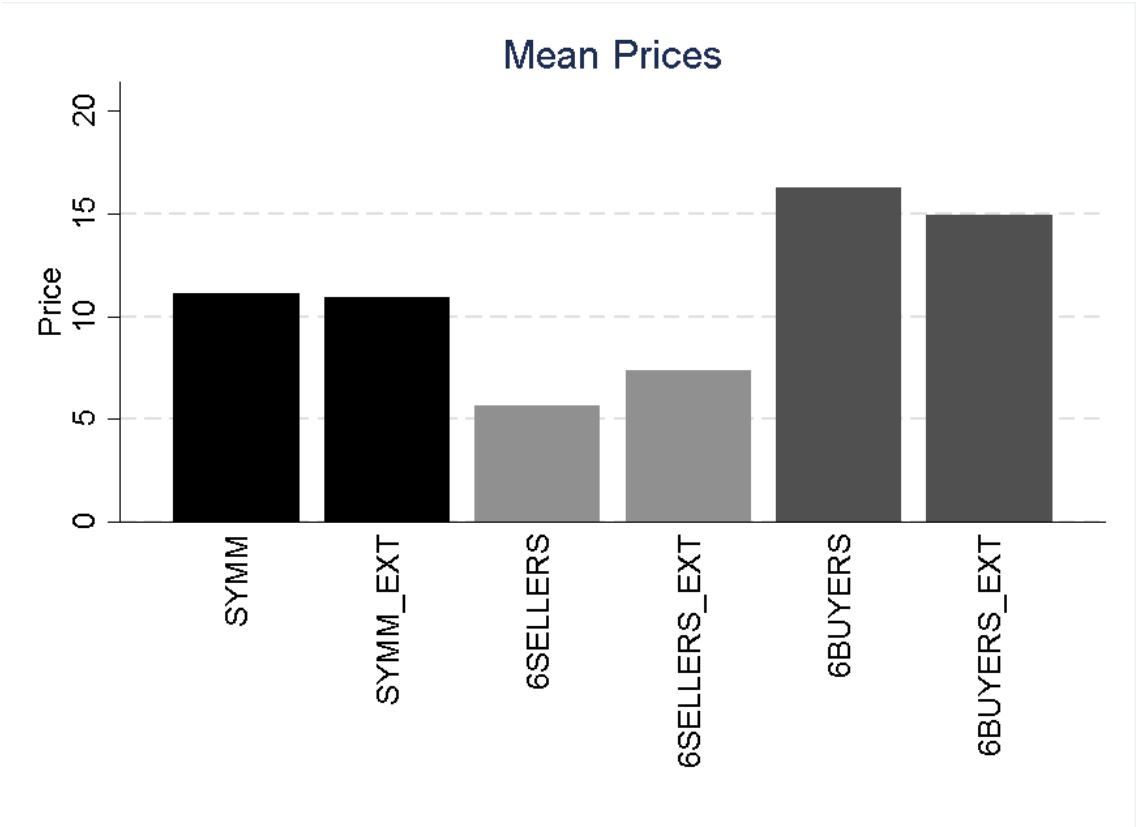

Figure 3. Mean prices across treatments

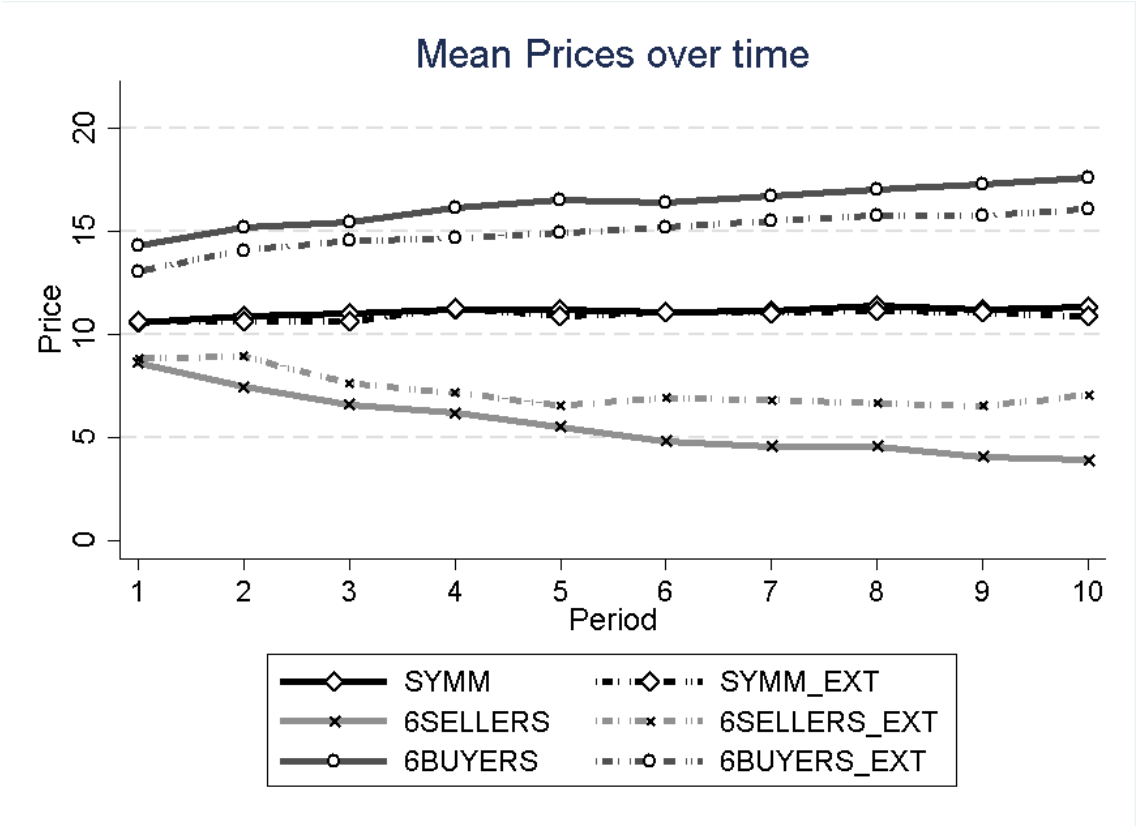

Figure 4. Mean prices across periods

In Figure 4 we take a closer look at the price dynamics, i.e., the development of mean prices over the ten periods, because Falk and Szech (2013) argued that price dynamics are an indicator of morals. Here we see that prices are already different between treatments in the first round – as a consequence of the different level of competitive pressure on a particular market side – and then drift apart steadily, with prices in the symmetric treatments staying essentially constant across all periods. Prices in markets with more buyers than sellers increase over time, while those with more sellers than buyers decrease over time. This suggests some tendency towards the extremes (of zero in case of more sellers than buyers, and 21.40 Euro if there are more buyers than sellers), as has been found in markets with different numbers of buyers and sellers (but without externalities) before (e.g., Cason and Williams, 1991). It might be that fairness concerns (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Cooper and Kagel, 2015) prevent the more powerful market side to exploit their power to the fullest extent and that lead the less powerful market side to reject extremely uneven splits of the pie.

Table 2. Regressions on mean prices

	(1) SYMM and SYMM_EXT	(2) 6SELLERS and 6SELLERS_EXT	(3) 6BUYERS and 6BUYERS_EXT
EXT (=1)	–0.06 (0.84)	0.23 (0.83)	–1.10 (0.71)
PERIOD	0.07 (0.03)**	–0.50 (0.04)***	0.33 (0.05)***
PERIOD*EXT	–0.02 (0.11)	0.26 (0.10)***	–0.04 (0.10)
constant	10.76 (0.62)***	8.37 (0.60)***	14.48 (0.55)***
N	160	240	240

GLS panel regressions with clustered standard errors on market level. Dependent variable is the mean price in each period. Coefficients are reported. Robust standard errors are given in parenthesis. *, ** and *** represent the 10%, 5% and the 1% significance levels of a two-sided test.

Table 2 presents a GLS panel regression with clustered standard errors on the market level, separately for three paired treatments (with and without externality). The dependent variable is the mean market prices per period. As explanatory variables we include a dummy for whether the market has an externality (EXT), PERIOD for periods 1 to 10, and an interaction term of PERIOD and EXT to account for potentially different price developments in treatments with an externality. Column (1) refers to the treatments with an equal number of sellers and buyers. Here we note that EXT is insignificant and so is the interaction term PERIOD*EXT. PERIOD is significant, but of small magnitude (0.07), reflecting the slight increase of average prices from 10.6 in period 1 to 11.2 in period 10. Column (2) refers to the two treatments with six sellers. Again, EXT is insignificant, indicating that there is no general price difference between 6SELLERS and 6SELLERS_EXT. The PERIOD-variable is significantly negative, as prices decrease over the course of the experiment. Here, the interaction term is also significant, and positive, since the decline in prices seems less marked when externalities arise from trading. In further regressions (available upon request) and in Figure 4 we see that this significant difference is driven by the latter half of the experiment, i.e., by periods 6 to 10 only. Column (3) refers to the treatments with six buyers, and here we only see a significant PERIOD-variable, showing that prices increase over the ten periods, but neither EXT nor the interaction term are significant. Hence, with the small exception of later periods in the case of six sellers, prices do not differ between matched treatments that either have or do not have an externality.

Recall that Falk and Szech (2013) argued that the falling prices observed in their mouse market are an indicator of decreasing morals. Note that in their market there were also two more sellers than buyers, as in our 6SELLERS_EXT treatment. Our data suggest that falling prices are neither a good nor an unambiguous indicator for decreasing morals for two reasons. First, there is already a price decline when there is no externality at all in 6SELLERS, a treatment that differs from 6SELLERS_EXT only in that it has no externality from trading. Second, when there are more buyers than sellers in the market, prices *in*crease. Hence, we prefer to interpret the price dynamics (falling or increasing) as the expected outcome when the competitive pressure on each market side changes with the number of buyers and sellers, but that price dynamics are not indicative of increasing or decreasing morals. This is all the more evident when we combine the price dynamics with the development of the relative trading volume. Consider first that prices are falling in 6SELLERS_EXT and increasing in 6BUYERS_EXT. These price dynamics imply that trading becomes more and more attractive (in monetary terms) for the shorter market side of four buyers in 6SELLERS_EXT, respectively of four sellers in 6BUYERS_EXT, because traders on the shorter market side make higher profits when prices become more extreme (i.e., lower in 6SELLERS_EXT and higher in 6BUYERS_EXT). If this is the case, the relative trading volume should *increase* as a consequence of the observed price dynamics, because at the margin traders on the shorter market side should be more likely to accept a trade rather than abstain from trade in order to avoid the externality (of voiding donations for measles vaccine). Yet, Figure 2 and Table 1 show that this is not the case. If anything, the relative trading volume with an externality is *decreasing* across periods, despite of the more attractive prices for the shorter market side. We believe that this further corroborates our conclusion that moral behavior reveals itself in the decision to enter the market or not. Yet, after the decision to trade, market forces of supply and demand determine prices, irrespective of whether an externality exists or not.

3.3 Determinants of individuals' propensity to trade in markets with an externality

So far, we have concentrated on aggregate market data. Given that we have argued that trading volume is indicative of moral behavior, we now turn to an analysis of individuals' propensity to trade in the markets with an externality. In this analysis,

we disregard the markets without externalities, because there trading volume is almost at 100% and because we are interested to understand which personal characteristics and economic preferences of a particular subject might be able to explain how often (out of a maximum of ten potential trades) this subject concluded a trade.

Table 3 presents results from an ordered probit regression with clustered standard errors on the market level.[6] The dependent variable is a subject's total number of concluded trades in the experiment, ranging from 0 to10. As independent variables, we include gender (FEMALE = 1), field of study (taking natural sciences as the benchmark), behavior in the three side experiments and three questions from the questionnaire. Concerning the side experiments, TRANSFER measures the share of the endowment in the dictator game that is transferred to the recipient, ranging from zero to five. RISK measures a subject's risk preferences. This variable is calculated as the number of lotteries that are preferred over a safe amount (ranging thus from zero to twelve). Finally, COMPETITIVE takes on the value of 1 if a subject preferred the competitive payment scheme over the piece rate in the competition experiment, and zero otherwise. The three questions from the post-experimental questionnaire are captured by DISPOS-INCOME, NO-DONATIONS and RIGHT-WING. DISPOS-INCOME reports the disposable monthly income of subjects and is ordered in five categories from 1 to 5 (<400, 400-800, 800-1200, 1200-1600, >1600 Euro). A value of 1 for NO-DONATIONS indicates that a subject stated in the questionnaire that he or she had not donated in the past or does not want to donate any money to a charity. RIGHT-WING is a variable ranging from 0 for very left-wing political attitudes to 5 for very right-wing attitudes.

The regression results show that gender, field of study, disposable income and none of the economic preferences captured in our side-experiments have any significant explanatory power. Only two questions from the questionnaire are significant. NO_DON is significantly positive, showing that subjects who are averse to donations (by never having donated in the past or by objecting donations in general) conclude significantly more trades than subjects who favor donations (see List, 2011, for a review of the determinants of charitable giving). This seems a reasonable result, since in the experiment the externality was a donation to UNICEF, which is typically regarded as a charitable organization.

The second significant variable is also interesting. It is the (self-attributed) political attitude of a subject, measured with the variable RIGHT-WING. Subjects who consider themselves more right-wing oriented in their political attitude are more likely to conclude more trades in the course of the ten periods, and are thus more likely to trigger a negative externality, a finding reminiscent of recent work by Cappelen et al. (2015).

Table 3. Regressions on subjects' number of trades

FEMALE (=1)	–0.08 (0.11)
TRANSFER	–0.02 (0.04)
RISK	–0.05 (0.04)
COMPETITIVE	–0.12 (0.14)
DISPOS-INCOME	0.02 (0.13)
NO-DONATIONS	0.52 (0.20)***
RIGHT-WING	0.15 (0.06)**
Study law	0.19 (0.33)
Study economics and business	0.06 (0.14)
Study social sciences	0.26 (0.27)
Study medicine	0.06 (0.21)
Study humanities	–0.20 (0.18)
N	300

Ordered probit regression with clustered standard errors on market level. Dependent variable is the total number of trades (ranging from 0 to 10) for each subject. Natural sciences serves as baseline study. Coefficients are reported. Robust standard errors are given in parenthesis. *, ** and *** represent the 10%, 5% and the 1% significance levels of a two-sided test.

[6] Personal background data was not recorded in one session, i.e. for two markets, unfortunately. For this reason, we have only 300 observations instead of 320 in the analysis of Table 3.

4 Discussion and conclusion

Given the ubiquity of markets in daily life, it is important to understand how markets affect human behavior. While markets do so in many ways, for instance by shaping the way in which we bid for objects, depending on the institutional rules of the market (Roth and Ockenfels, 2002), by affecting trading behavior through bonus systems in financial markets (Rajan, 2006; Kleinlercher et al. 2014), or by influencing the level of cooperative behavior in response to exposure to market economies (Ockenfels and Weimann, 1999), a powerful recent debate has revolved around the question whether markets reduce moral behavior. The main thrust of the debate seems to be the claim that markets may undermine moral behavior, but that social responsibility can at least partly be sustained in markets.

Here we have developed an experimental design that allows us to address the important question where to look for individuals' moral decisions in markets. While seemingly a trivial question, its answer is not straightforward. It has been argued that falling prices in markets for the life of a mouse indicate a decay in morals (Falk and Szech, 2013) or that social responsibility lets subjects prefer goods with higher production costs but no negative externalities on uninvolved third parties, over goods with lower production costs that have such an externality (Bartling et al., 2015). The latter finding is reminiscent of markets for "fair trade" products (Moore, 2004), where consumers are willing to pay higher prices, based on their assumption that producing a particular good under fair conditions will increase production costs and hence lead to higher prices. Accepting this logic, the moral behavior reveals itself by the existence of such a fair trade market segment that has presumably higher production costs. Note, however, that this market segment has higher prices not the least due to the higher production costs, and it cannot be concluded that the higher prices for the goods without externality are an indicator of more moral behavior. Hence, it is problematic to interpret prices as a signal of morals, because the traded goods are not identical with respect to production costs. In the design of Falk and Szech (2013), the conclusion that falling prices indicate a decay in moral values has been drawn without analyzing what happens when there would be more buyers than sellers (in which case prices would go up) and without providing a carefully controlled comparison treatment that has no externality.

We have designed our experiment in order to provide a clean comparison of trading volume and trading prices in markets with a moral externality and other markets

without such an externality. The key of our design is to proceed along two paths. First, we create two sets of markets that are identical, except that one type has a negative externality if a trade is concluded, while the other one has not. Second, we keep the total number of traders in the market constant, but change the number of buyers and sellers systematically, thus creating different levels of competitive pressure on any of the two market sides.

We find that when there are more buyers than sellers, sellers gain higher profits as prices increase over time, and buyers earn more money when there are more sellers than buyers. Most importantly, we observe as our main contribution that these basic effects of market forces are at work *irrespective* of the presence and absence of a negative moral externality. Prices are therefore practically indistinguishable between markets with an externality and markets without an externality. So, the formation of prices in markets works in line with what standard theory would predict when both sets of markets have identical costs (in our case of zero), identical trading rules and when they differ only in the presence or absence of an externality. The crucial difference between both types of markets is the significant reduction in relative trading volume in markets with an externality. The moral decision is, therefore, whether to engage in trading in the market. After market entry, however, the forces of supply and demand determine prices, and the latter are not an indicator of morals. In light of these findings, it is probably no surprise that in reality in many countries we often see bans rather than price caps on activities that would be considered immoral, like selling young infants, for example (Sandel, 2012). If prices would be a good indicator of morals, legislators could have determined minimum prices for selling children – in order to secure a minimum level of morality – but instead they want to avoid market entry by making such activities illegal.

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Appendix: Where to look for the morals in markets?

A1. Additional descriptive statistics

In Tables A1, A2 and A3, we show how many subjects concluded how many trades in each of the six treatments.

Table A1. Trading Behavior – SYMM and SYMM_EXT

	SYMM		**SYMM_EXT**	
Number of Trades	Number of Subjects	Percentage	Number of Subjects	Percentage
0	0	0.00	11	13.75
1	0	0.00	0	0
2	0	0.00	1	1.25
3	0	0.00	2	2.50
4	0	0.00	4	5.00
5	0	0.00	6	7.50
6	0	0.00	8	10.00
7	0	0.00	6	7.50
8	2	2.50	10	12.50
9	14	17.50	6	7.50
10	64	80.00	16	32.50
Total	80	100.00	80	100.00

Table A2. Trading Behavior – 6SELLERS and 6SELLERS_EXT

	6SELLERS		6SELLERS_EXT	
Number of Trades	Number of Subjects	Percentage	Number of Subjects	Percentage
0	1	0.83	13	10.83
1	0	0.00	4	3.33
2	1	0.83	3	2.50
3	5	4.17	2	1.67
4	4	3.33	8	6.67
5	10	8.33	3	2.50
6	14	11.67	8	6.67
7	10	8.33	8	6.67
8	12	10.00	16	13.33
9	11	9.17	15	12.50
10	52	43.33	40	33.33
Total	120	100.00	120	100.00

Table A3. Trading Behavior – 6BUYERS and 6BUYERS_EXT

	6BUYERS		6BUYERS_EXT	
Number of Trades	Number of Subjects	Percentage	Number of Subjects	Percentage
0	1	0.83	10	8.33
1	1	0.83	6	5.00
2	2	1.67	3	2.50
3	4	3.33	1	0.83
4	9	7.50	5	4.17
5	7	5.83	3	2.50
6	5	4.17	3	2.50
7	11	9.17	11	9.17
8	12	10.00	9	7.50
9	13	10.83	17	14.17
10	55	45.83	52	43.33
Total	120	100.00	120	100.00

A2. Post-experimental questionnaire

Below we present the final questionnaire conducted at the end of each experimental session (before payment):

Age:

Gender:

Field of Study:

- Business and economics
- Law
- Medicine
- Social sciences
- Humanities
- Natural sciences

Which religious community do you feel related to?

- None
- Roman Catholic
- Protestant
- Islam
- Greek Orthodox
- Other Christian community
- Other

On a scale from 0 to 5, how do you assess your political attitude?
(0= left wing, 5= right wing)

Have you donated money in the last 12 months?

- Yes, regularly
- Yes, sporadically
- No.

After your rent and housing costs, how much money do you have at your disposal per month (in Euro)?

For which of the following purposes did you make a donation or can you think of doing so?

- Animal welfare
- Environmental protection
- Development aid Africa
- Development aid Asia
- Development aid South America
- Emergency aid foreign countries
- Emergency aid home country
- The elderly
- The disabled
- Refugees and asylum seekers
- Homeless and addicts
- Health
- Human rights
- Sports and leisure
- Culture
- None

A3. Instructions for the treatments without an externality

In what follows the instructions for Treatment SYMM are provided. Instructions for Treatments 6SELLERS and 6BUYERS are identical except for the number of sellers and buyers.

Thank you very much for participating in the experiment! For your participation you will in any case receive 10 Euro. You can earn an additional amount of money. At the end of the experiment you will receive your money from a researcher who is not present in the room during the experiment. Neither the other participants of the experiment nor the experimenter will be able to see how much money you have earned.

Please note: Throughout the whole experiment communication between the participants is not allowed. Also no use of cell phones or calculators is allowed. On the computer please only use the functions intended to be used. If you do not abide to these rules you risk forfeiting all your earnings. If you have questions please raise your hand. Your question will then be answered at your cubicle!

All statements made in these instructions are true. Your decisions in this experiment will not be known to any other participant, i.e., your anonymity is ensured.

Overview over the experiment

In this experiment you trade in a market with a total of 10 traders in a sequence of 10 periods. 5 sellers can sell to 5 buyers for a maximum price of 21.40 Euro. You will learn at the beginning of the experiment whether you are buyer or seller. Your role will remain unchanged over all 10 periods. Each trading period lasts 3 minutes.

If there is no trade the amount of 21.40 Euro is not divided between buyer and seller and there are no consequences. If a trade happens between a buyer and a seller, the 21.40 Euro are distributed between them, depending on the transaction price (details follow below). Thus in the sequence of 10 periods you can decide how you claim money for yourself and a trading partner.

Detailed information on the market

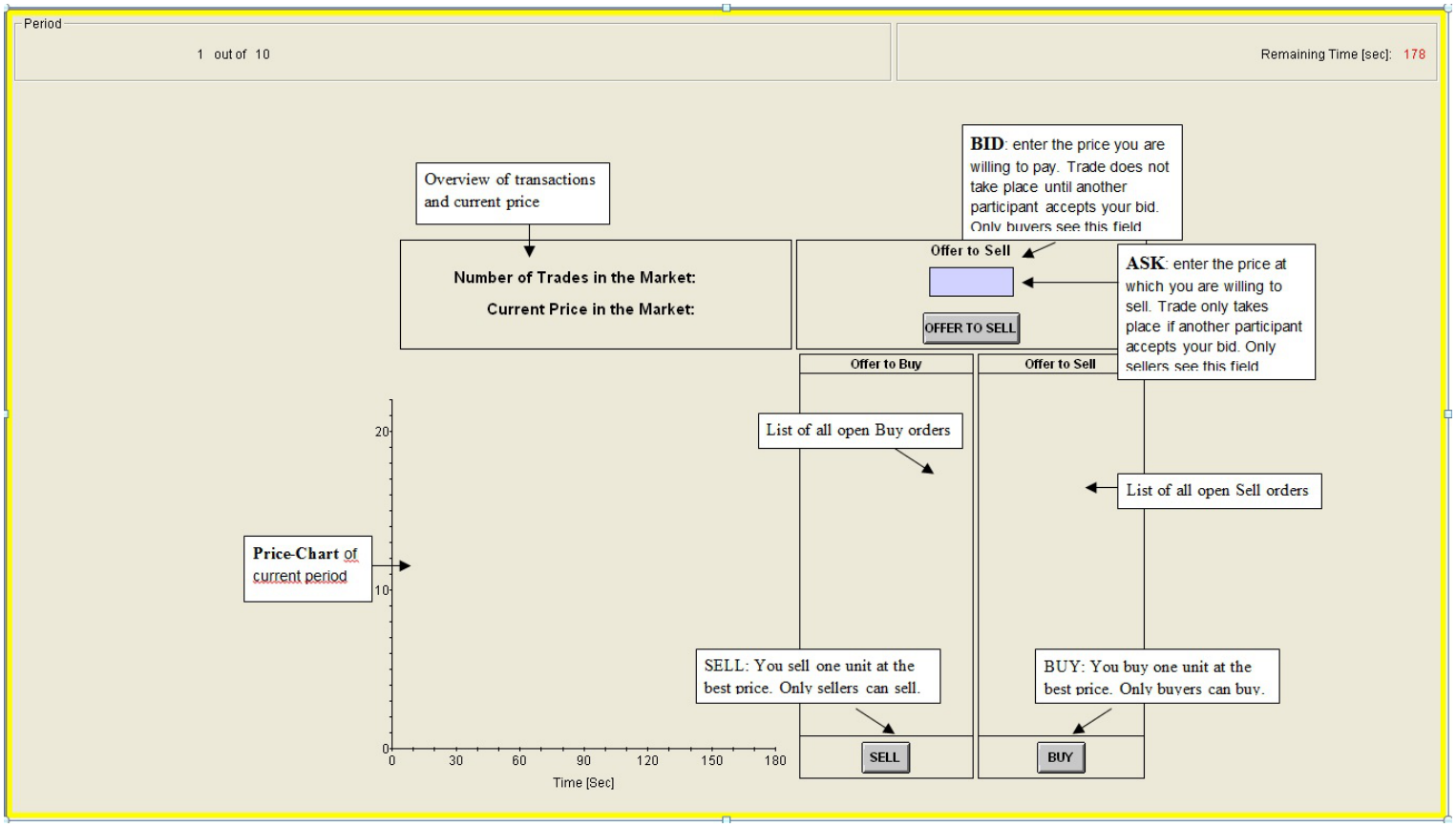
- In each trading period the computer opens a new market. In each period the same 10 people participate in the market.

- A buyer can submit offers to buy to all sellers. Each seller can submit offers to sell to all buyers. Own offers are written in blue on the trading screen.
  You can enter your offers on the trading screen (shown below). All prices between 0 and 21.40 Euro in steps of 10 Eurocents are allowed. Possible prices are thus 0€, 0.10€, 0.20€, 0.30€, etc. up to 21.40€.

- A trade is concluded if a buyer accepts an offer to sell from a seller or a seller accepts an offer to buy of a buyer. No separate confirmation by the buyer or seller who made the offer is necessary.
  A buyer can accept an offer to sell and a seller an offer to buy at any time. Only the best offers can be accepted. The best offers are written on top of the lists of all offers to buy/sell and are highlighted. If you want to accept an offer, click the "SELL"-, respectively "BUY"-button at the bottom of the trading screen. Doing so you conclude a trade with the buyer/seller who submitted the best offer to buy/sell.
  Each trading period you can make a maximum of one trade. This means once you concluded one trade this period, you cannot accept offers or submit own offers in this period. Once a trader has concluded a trade all his open offers are deleted from the list of open offers.
  On the top right of the trading screen you always see the remaining trading time.

- No trader knows with whom in the room he/she has traded, i.e., your anonymity is ensured.

Example of the Trading Screen for a seller can be seen below:



Payment

One of the 10 periods is randomly selected. This period is then relevant for payment. The payment from this randomly chosen period is added to the initial endowment of 10 Euro.

How is the payment calculated for a buyer for a randomly selected period?

- When the buyer trades then she earns

  Earnings of a buyer = 21.40 – accepted price

- If a buyer does not trade she earns zero in this part of the experiment.

How is the payment calculated for a seller for a randomly selected period?

- If a seller trades she earns

  Earnings of a seller = accepted price

- If a seller does not trade she earns zero in this part of the experiment.

Summary outline

In the market 5 buyers and 5 sellers can trade. Buyers and sellers can make price offers, but they need not. If a price offer is accepted a trade is concluded. The seller earns the price, the buyer earns 21.40 minus the price. In total there are 10 trading periods. Each buyer and each seller can conclude a maximum of one trade per period. At the end of the experiment one period is randomly selected to be implemented with all consequences for payments. For the trades in this period the 21.40 Euro are divided among the buyer and seller (depending on the price).

Before the 10 periods start there will be one training period, which is not relevant for your payment. This training period serves to familiarize you with the decision screen and sequence.

Please note: By participating in the experiment you confirm that you have understood the rules and that you participate voluntarily.

A4. Instructions for the treatments with an externality

In what follows the instructions for Treatment SYMM_EXT are provided. Instructions for Treatments 6SELLERS_EXT and 6BUYERS_EXT are identical except for the number of sellers and buyers.

Thank you very much for participating in the experiment! For your participation you will in any case receive 10 Euro. You can earn an additional amount of money. At the end of the experiment you will receive your money from a researcher who is not present in the room during the experiment. Neither the other participants of the experiment nor the experimenter will be able to see how much money you have earned.

Please note: Throughout the whole experiment communication between the participants is not allowed. Also no use of cell phones or calculators is allowed. On the computer please only use the functions intended to be used. If you do not abide to these rules you risk forfeiting all your earnings. If you have questions please raise your hand. Your question will then be answered at your cubicle!

All statements made in these instructions are true. Your decisions in this experiment will not be known to any other participant, i.e., your anonymity is ensured.

Overview over the experiment

In this experiment you trade in a market with a total of 10 traders in a sequence of 10 periods. 5 sellers can sell to 5 buyers for a maximum price of 21.40 Euro. You will learn at the beginning of the experiment whether you are buyer or seller. Your role will remain unchanged over all 10 periods. Each trading period lasts 3 minutes.

If there is no trade the amount of 21.40 Euro is not divided between buyer and seller, but instead for each person who has not traded a donation of 10.70 Euro will be made to UNICEF by the experimenters. A donation of 10.70 Euro represents half of a package of 100 doses of measles vaccine (see below for more details). Hence, for every two people who do not trade this adds up to 21.40 Euro, which represents a full package of measles vaccine.

If a trade happens between a buyer and a seller, the 21.40 Euro are distributed

between them, depending on the transaction price (details follow below). In this case no donation is made. Thus in the sequence of 10 periods you can decide whether you claim money for yourself and a trading partner, or have money donated to UNICEF.

Detailed information on the market

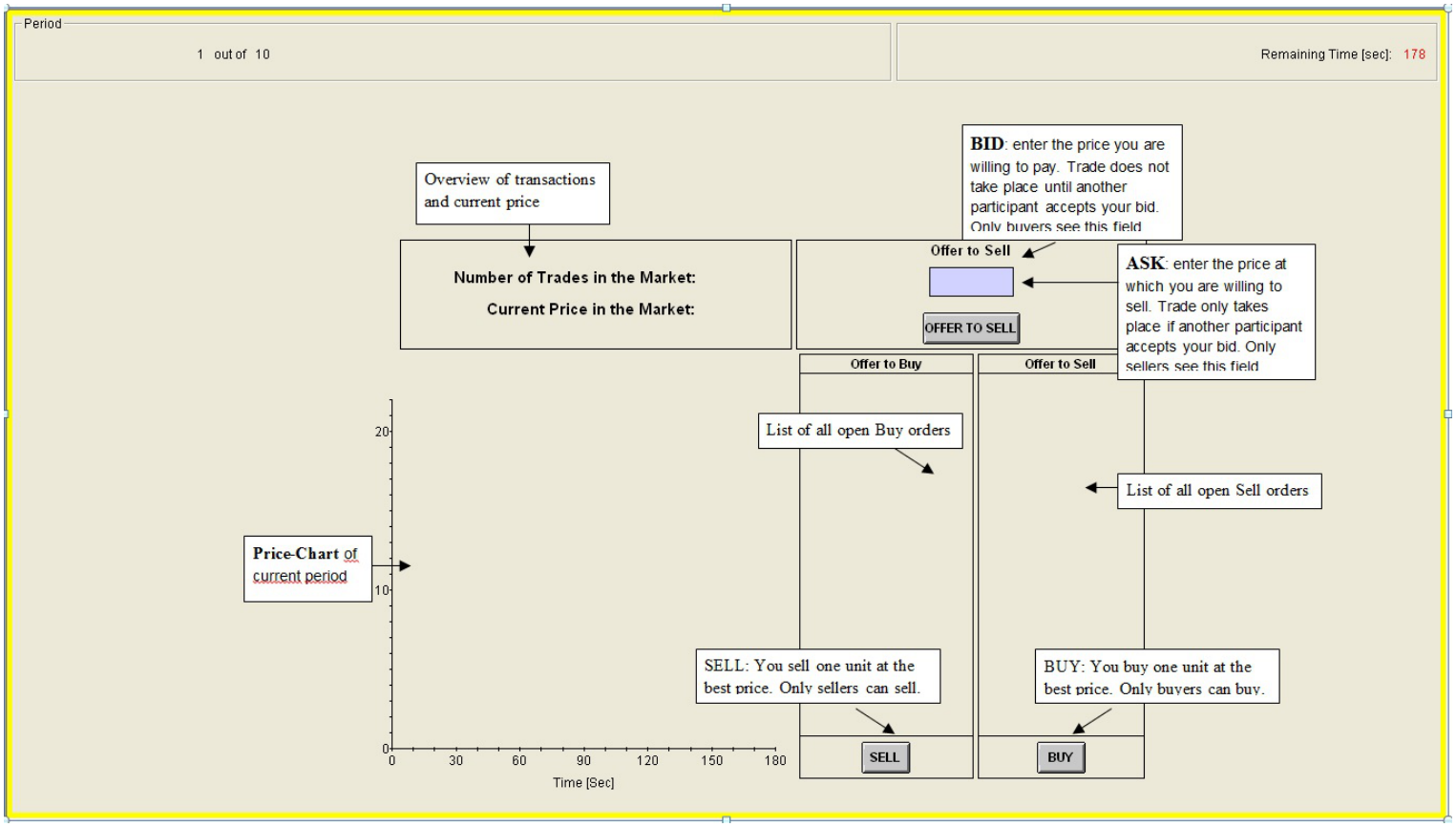
- In each trading period the computer opens a new market. In each period the same 10 people participate in the market.

- A buyer can submit offers to buy to all sellers. Each seller can submit offers to sell to all buyers. Own offers are written in blue on the trading screen.
  You can enter your offers on the trading screen (shown below). All prices between 0 and 21.40 Euro in steps of 10 Eurocents are allowed. Possible prices are thus 0€, 0.10€, 0.20€, 0.30€, etc. up to 21.40€.

- A trade is concluded if a buyer accepts an offer to sell from a seller or a seller accepts an offer to buy of a buyer. No separate confirmation by the buyer or seller who made the offer is necessary.
  A buyer can accept an offer to sell and a seller an offer to buy at any time. Only the best offers can be accepted. The best offers are written on top of the lists of all offers to buy/sell and are highlighted. If you want to accept an offer, click the "SELL"-, respectively "BUY"-button at the bottom of the trading screen. Doing so you conclude a trade with the buyer/seller who submitted the best offer to buy/sell.
  Each trading period you can make a maximum of one trade. This means once you concluded one trade this period, you cannot accept offers or submit own offers in this period. Once a trader has concluded a trade all his open offers are deleted from the list of open offers.
  On the top right of the trading screen you always see the remaining trading time.
  If you do not conclude a trade in a given period, then 10.70 Euro are donated to UNICEF for each person who did not trade if that period is chosen for payment (see below for details on payment).

- No trader knows with whom in the room he/she has traded, i.e., your anonymity is ensured.

Example of the Trading Screen for a seller can be seen below:



Payment

One of the 10 periods is randomly selected. This period is then relevant for payment. The payment from this randomly chosen period is added to the initial endowment of 10 Euro.

How is the payment calculated for a buyer for a randomly selected period?

- When the buyer trades then she earns

  Earnings of a buyer = 21.40 – accepted price

- If a buyer does not trade she earns zero in this part of the experiment. Instead, 10.70 Euro are donated to UNICEF on behalf of this trader (as each trader needs a counterpart for transaction, the two non-trading subjects are responsible for a total donation of 21.40 Euro).

How is the payment calculated for a seller for a randomly selected period?

- If a seller trades she earns

  Earnings of a seller = accepted price

- If a seller does not trade she earns zero in this part of the experiment. Instead, 10.70 Euro are donated to UNICEF on behalf of this trader (as each trader needs a counterpart for transaction, the two non-trading subjects are responsible for a total donation of 21.40 Euro).

Details on the donation

A donation of 10.70 Euro represents half of a package of 100 doses of measles vaccine (see below for more details). Hence, two actions not to trade add up to a full package of measles vaccine. From the randomly selected period the actions not to trade by all subjects are added up and the money is donated to UNICEF by the experimenters. This is done for all sessions of the experiment. If one half-package of vaccine is missing, the experimenters would contribute this. A receipt/ confirmation of the donation to UNICEF will be sent to you within a month of this experimental session to allow you to verify the correctness of the statements made here.

Summary outline

In the market 5 buyers and 5 sellers can trade. Buyers and sellers can make price offers, but they need not. If a price offer is accepted a trade is concluded. The seller earns the price, the buyer earns 21.40 minus the price. In total there are 10 trading periods. Each buyer and each seller can conclude a maximum of one trade per period. At the end of the experiment one period is randomly selected to be implemented with all consequences for payments and donations. If a trade was concluded in that period, there will be no donation to UNICEF on behalf of the two involved traders, but the 21.40 Euro are divided among the buyer and seller (depending on the price). For each subject that does not trade 10.70 Euro (and hence 21.40 Euro for two traders) are donated to UNICEF to buy a package of measles vaccine.

Before the 10 periods start there will be one training period, which is not relevant for your payment. This training period serves to familiarize you with the decision screen and sequence.

Please note: By participating in the experiment you confirm that you have understood the rules and that you participate voluntarily. After finishing reading the instructions you have two minutes to decide whether you see a moral conflict which you want to avoid. In this case you can now leave the experiment. You will then get 10 Euro for the time you have spent.

Supplement 1: Excerpt from the donation information to UNICEF (Source: UNICEF, translation from the German version at https://www.unicef.at/stores/connect/shoparticle/masern-impfstoff-30-stuck/ shop/catalog/product/view/208/shop for life/)

Measles vaccine, 100 doses
Article-Nr. S359163

Measles are highly infectious and very often deadly. Each day hundreds of children become victims of this disease. The survivors often suffer consequences for their whole life, like blindness or brain damages. This, even though protecting the children would be so easy to prevent.

Measles are extremely infectious and spread especially fast when many people live densely together, as in refugee camps. Especially with weakened children the disease often ends deadly or leads to lasting physical or mental damages. Measles are one of the main caused for blindness among children and often become critical when no medical help is available. This, even though measles vaccination offers quick, reliable, and cheap protection. UNICEF conducts major vaccination campaigns, especially after natural disasters and in other emergency situations, to prevent the spreading of the disease. With a measles vaccination you do not only protect the children, but you also reduce the risk for all who get in contact with them.

Figure A1: Left: ©UNICEF/ NYHQ06-1800/ Josh Estey;
Right: ©UNICEF/NYHQ2010-1454/ Christine Nesbitt.