Do markets foster consequentialist decisions? Evidence from an online experiment

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Abstract

This paper investigates the influence of markets on morals. Whereas the current literature focuses on moral decisions *within* markets, little is known about how being exposed to markets shapes morals *outside* markets in unrelated environments. We adapt two concepts from philosophy to define morality: According to deontology, the morality of an action is evaluated by the action itself. According to consequentialism, the morality of an action is evaluated by its outcomes. In an online experiment, we expose participants to either a non-market or market environment, and elicit their subsequent decisions in a moral dilemma scenario. We hypothesize that the market environment induces cost-benefit analysis considerations, and thus, fosters consequentialist decisions. Compared to a baseline distribution of decisions in the moral dilemma, we find a substantial increase in consequentialist decisions in the market treatment. However, a similar increase can be observed in the non-market treatment, excluding a treatment effect of the market manipulation itself. We discuss potential explanations for these results, and suggest avenues for future research.

JEL classification: C90, D02, D44, D47, D61, D91

Keywords: morality, markets, deontology, consequentialism, oTree, online experiment

1 Introduction

Today, markets are widely recognized as an efficient way to organize production and distribution in an economy (Satz 2010). At the same time, markets expand to more and more spheres of society, and it seems that you can find a market for almost everything. Many things that used to be considered with non-market values now have a price. For example, surrogate mothers in India offer to bear babies for US families, the European Union sells carbon emission certificates that enable companies to buy and sell the right to pollute, or lobbyists who want to attend congressional hearings pay line-standing companies that hire homeless people to line up (Sandel 2012). Therefore, Sandel skeptically notices that we have drifted from *having* a market economy to *being* a market society. If markets are ubiquitous, what does constant exposure to markets mean for decisions that we make in private life or other unrelated decision environments? That is, are there spillover effects?

The question how markets may affect morals is an old one, and has been controversially discussed since the beginning of the history of economic thought (e.g., Montesquieu 1748, Condorcet 1795, Marx 1872, Veblen 1899). Recent experimental literature discusses the question whether markets erode moral values or social responsibility *within* markets (e.g., Falk & Szech 2013, Bartling et al. 2015, Irlenbusch & Saxler 2015, Kirchler et al. 2016, Pigors & Rockenbach 2016, Bartling & Özdemir 2017, Sutter et al. 2019). For example, Falk & Szech (2013) show that participants in a laboratory experiment have a higher willingness to take money

instead of preventing the death of a mouse when they are bargaining over the life of the mouse in double auction markets than when they are deciding individually. Therefore, the authors conclude that market interactions have a tendency to undermine moral values.

Whereas the experimental literature establishes a link between markets and morals *within* the institution of a market, less is known about the influence of markets on unrelated moral decisions *outside* markets. For example, imagine a passenger plane hijacked by terrorists is heading toward a packed soccer stadium. Should a fighter pilot shoot down the plane, killing 164 people to save 70,000 (von Schirach 2016)? This question arises beyond any market. We investigate whether people solve a moral dilemma differently due to increasing exposure to markets in many other areas of life. We run an experiment on Amazon Mechanical Turk ($n = 620$), exogenously vary whether participants are exposed to a non-market or market environment, and compare their subsequent moral decisions across treatments. Thus, we shed light on the question whether markets have consequences that go beyond the market sphere. For the current debate whether policy makers should limit the scope of markets, it is important to understand whether and how markets shape moral decisions in unrelated environments.

In our experiment, participants are randomly assigned to one of two treatments in a between-subject design: Participants in the non-market treatment play a repeated guessing game, whereas participants in the market treatment play a (payoff-equivalent) repeated double auction (DA) market game. Afterward, all participants make a decision in a moral dilemma scenario. In this moral dilemma,

participants have to imagine a situation in which harm cannot be avoided. They can choose to stay passive, and thus, let three people die. Alternatively, they can choose to actively intervene, and thus, sacrifice one person to save the lives of the three other people. We define morality based on two concepts from philosophy: Following deontology, the morality of an action is evaluated by the action itself. Following consequentialism, the morality of an action is evaluated by its outcomes. Related to the moral dilemma scenario, we interpret staying passive as the deontological action and actively intervening as the consequentialist action, where neither is judged to be superior to the other.

Markets are based on cost-benefit analysis considerations, which might have spillover effects on unrelated moral decisions. If we are constantly weighing costs and benefits, and thus, focus on outcomes, are we looking through the same lens when we make decisions outside the scope of markets? Evidence from psychology on habitual behavior and routines suggests that people show similar patterns of behavior in similar patterns of circumstances (e.g. Weiss & Ilgen 1985, Gersick & Hackman 1990), supporting the idea that we may also focus on outcomes outside markets. We hypothesize that participants in the market treatment are more likely to choose the consequentialist action compared to participants in the non-market treatment. Compared to a baseline distribution of decisions in the moral dilemma scenario without a preceding economic game, we find a huge and statistically significant increase of 17 percentage points in consequentialist decisions in the market treatment. However, we observe a similar increase in consequentialist decisions in the non-market treatment (15 percentage points), ruling out

that the market manipulation itself drives the result. It seems, instead, that the non-market and market manipulations share a common factor that drives consequentialist decisions. We discuss these potential factors, and suggest ideas for further research.

We proceed as follows: In section 2, we review the related literature. In section 3, we explain the experimental design and procedures. In section 4, we show the main results. In section 5, we discuss the results and suggest ideas for further research. In section 6, we conclude and give an outlook.

2 Related Literature

The early literature suggests two different views on how markets and moral values are related (Hirschman 1982). Some scholars argue in favor of a market society, and stress the civilizing effect that markets, or more specifically, commerce, bring along (Montesquieu 1748, Condorcet 1795, Paine 1792). For example, Montesquieu (1748) writes "commerce … polishes and softens barbaric ways as we can see every day" (p. 81). Another group of scholars takes the opposite view, and emphasizes that capitalist societies have a tendency to undermine the moral foundations on which they are based on (Marx 1872, Veblen 1899, Schumpeter 1942). Schumpeter (1942), for example, argues that "capitalism creates a critical frame of mind, which, after having destroyed the moral authority of so many institutions, in the end turns against its own" (p. 143). Taken together, the early literature clearly sees a connection between markets and morals, but remains unclear

whether markets promote or undermine moral values.

The more recent economic literature sheds new light on this research topic, and yields several theoretical and empirical contributions. In a theoretical work, Bowles (1998) argues that preferences are endogenous, and that markets not only allocate goods and services but also influence the evolution of tastes and values. Similarly, Shleifer (2004) theoretically investigates the consequences of market competition, and finds that competitive pressure creates incentives for unethical practices (such as child labor) to reduce costs and guarantee survival in a competitive market. Opposing evidence comes from empirical, cross-sectional studies: Henrich et al. (2001) find that the higher the degree of market integration within a society, the more people cooperate in experimental games. In a more recent study, they find additional evidence that the spread of markets is also positively correlated with fairness (Henrich et al. 2010). Again, the more recent theoretical and empirical literature establishes a link between markets and moral or prosocial behavior, but yields opposite results.

The first experimental contribution on the interplay of morals and markets is the seminal paper by Falk & Szech (2013). They exogenously induce different institutions, and thus, establish a causal relationship between markets and moral decisions. In their experiment, participants are randomly assigned to one of three treatments: In the *individual* treatment, participants face the choice between taking 10 euros and killing a mouse, or not receiving the money and preventing the death of the mouse. In the *bilateral market* treatment, two participants are bargaining over the life of the mouse in a double auction market over 10 rounds.

The *multilateral market* treatment works the same, except that nine sellers and seven buyers bargain over prices (and the lives of nine mice). Results show that 45.9% of the participants are willing to kill the mouse in the individual treatment. This share increases to 72.2% in the bilateral and to 75.9% in the multilateral market treatment. Thus, the authors conclude that market interactions erode moral values.

The study by Falk & Szech (2013) received a lot of attention in the media (e.g. Spiegel 2013, Zeit 2013, SRF 2015) and in the academic world, starting a new wave of research on the interplay of markets and morals (e.g., Bartling et al. 2015, Irlenbusch & Saxler 2015, Kirchler et al. 2016, Pigors & Rockenbach 2016, Bartling & Özdemir 2017, Sutter et al. 2019). For example, Bartling et al. (2015) investigate a laboratory product market, in which producers and consumers can mitigate a negative externality affecting an uninvolved third party by incurring additional production costs. They find a substantial demand for, and supply of, socially responsible products across various conditions. However, comparing the level of socially responsible behavior in the market to an individual choice setting reveals that participants behave less socially responsible in the market compared to the non-market setting. Kirchler et al. (2016) build on the experimental design by Falk & Szech (2013) and test how different interventions affect moral behavior in an individual choice list versus a double auction market condition. In both conditions, participants can decide between taking money for themselves and forgoing a donation to UNICEF to finance measles vaccine, or not taking the money and thus, making the donation. The authors find that in both conditions, the

potential threat of monetary punishment by an external observer promotes moral behavior, whereas removing anonymity by making participants identifiable promotes moral behavior only in the individual, but not in the market condition. The authors explain the latter result by the possibility to diffuse responsibility in the market condition, which cannot drive behavior in the individual choice list condition.

Some scholars are also critical of the work by Falk & Szech (2013): Breyer & Weimann (2015) argue that Falk & Szech (2013) interpret their results incorrectly, as the individual treatment is what corresponds most closely to the kind of market we encounter in the real world; namely, that consumers act as price takers and do not bargain over prices. Bartling et al. (2019) address the critical point that the number of repetitions varies across treatments and find that the adverse effect of markets on morals disappears if the number of rounds is held constant. Thus, overall, the explanatory power of the study by Falk & Szech (2013) remains open to debate.

One important feature of studying the interplay of markets and morals is the definition of what is considered *moral*. The experimental literature thus far has focused on moral behavior *within* the institution of the market, and mostly defined an immoral action as agreeing to trade at the expense of a third party, or put differently, as willingly causing a negative externality that harms an unrelated person or animal. Because we are interested in investigating moral decisions in decision environments *outside* markets, we need another approach to define morality: Following the principle of *deontology*, the morality of an action is evaluated by the

action itself (Kant 1785). Following the principle of *consequentialism* (to which utilitarianism belongs), the morality of an action is evaluated by its consequences (Bentham 1789, Mill 1863). Whereas deontology prohibits any harmful action irrespective of its consequences, and emphasizes absolute and inviolable rights and duties, consequentialism aims at maximizing benefits and minimizing costs across affected individuals, and emphasizes the process of cost-benefit analysis (Greene et al. 2008, Cushman & Greene 2012, Barak-Corren et al. 2018). Importantly, we do not take a normative stance on the evaluation of the moral principles, and do not judge whether one is superior to the other.

The tension between the two principles can be captured in so-called moral trolley problems. These thought experiments stemming from philosophy represent a dilemma situation, as the only way to prevent harm to one group of people is to harm someone else or a smaller group of people (Bauman et al. 2014). In the original trolley problem (Foot 1967, Thomson 1985), a runaway trolley is heading toward five people, and about to kill them. In one version, one can save the five people by diverting the trolley onto a side track, where another person is standing, and will be killed instead. In the footbridge version, one can save the five people by pushing another person off a footbridge in front of the trolley, stopping the trolley, but killing the one person. A prototypical consequentialist would always become active, that is, killing the one person to save the other five people, to serve the greater good. A prototypical deontologist would never intervene, and consider killing the one person as an unacceptable violation of a right or duty (Greene et al. 2008). A robust result is that most people agree to hit the switch to divert the

trolley to the other track, but disagree with pushing the person off the footbridge (Greene et al. 2001).

Thus far, economists have been reluctant to include the philosophical perspective when studying morality. One exception is the study by Chen & Schonger (2017), who present an economic approach to elicit consequentialist, deontological, and mixed consequentialist-deontological motivations. They suggest a revealed preferences approach to detect the different motivations, by varying the probability that a decision is implemented: A pure consequentialist always focuses on the outcomes, and does not react to varying probabilities with which decisions are implemented. For a pure deontologist, the decision is also independent of the probability, because the action per se determines what to do, independent of any consequences. Only mixed consequentialist-deontological motivations change a decision, as the probability that the decision is implemented varies. In another study, Chen (2016) examines the influence of the structure of employment on consequentialist versus deontological values. Participants in an online experiment are randomly assigned to a competitive or a piece-rate condition for a data-entry task in a between-subject design. Afterward, they make a decision in a moral trolley problem. Chen (2016) finds that experiences with a competitive work environment foster deontological decisions in the moral trolley problem. However, the impact of competition on deontological decisions depends on economic development: In rich countries, competition in the employment structure makes people more consequentialist. We take this finding as the very first hint that markets might generally foster consequentialist decisions, and design a new experimental

paradigm to examine our research question.

3 Experimental Design

Our experiment consists of three stages: a manipulation, a moral dilemma, and a questionnaire. The experiment has two treatments: a non-market treatment and a market treatment. Whereas the moral dilemma and the questionnaire are identical for both treatments, the manipulation differs across treatments: Participants in the *non-market* treatment engage in a transcription task, and play a guessing game; participants in the *market* treatment play a DA market game.

3.1 Stage 1: Manipulation

Non-market treatment

In the first step, participants in the non-market treatment engage in a transcription task for 10 minutes. They see "lorem ipsum" sentences, and are asked to copy these sentences into an input field. If the participants commit more than two errors in one sentence, they are asked to correct the mistakes before they can proceed with the next sentence. We are not interested in the performance on the transcription task per se. However, the manipulation in the market treatment takes more time, and is cognitively more demanding than the guessing game. Therefore, we add the transcription task before the guessing game to keep the cognitive load similar across treatments. In the second step, participants in the non-market treatment play 10 rounds (plus 2 additional test rounds) of a guessing

game, which works as follows: Participants are assigned to groups of nine. In each round, their task is to guess one number out of the set $G \in \{20, 30, 40, ..., 100\}$. Subsequently, a random device assigns each value of the set G once to one of the participants. If a participant's guess coincides with the randomly assigned number, this participant wins, and receives a payoff of $\pi_W = 50$.[1] Otherwise, the participant loses, and receives a payoff of $\pi_L = [0, 10, 20, 30, 40]$ with probabilities $p_L = [\frac{1}{2}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}]$. The expected payoff of one round of the guessing game is equal to $E[\pi_G] = \frac{1}{9} \cdot 50 + \frac{8}{9} \cdot \frac{1}{8} \ (10 + 20 + 30 + 40) = \frac{50}{3} \approx 16.67$. We will later show that we hold the expected payoff constant across treatments. For the treatment comparison, it is important that in the non-market treatment, the payoff of one participant does not depend on the interaction with another participant, but is determined only by luck. After each round, participants get feedback, and learn whether they won or not. At the end of the experiment, one round of the guessing game is randomly chosen, and accounts for payment.

Market treatment

In the market treatment, participants play a continuous DA market consisting of 9 buyers and 9 sellers over 10 rounds (plus 2 additional test rounds). We assign participants randomly to the role of either a buyer or seller. Participants keep their role for the entire 10 rounds. In every round, they can trade a fictional good for 60 seconds. Every subject can trade at most once per round. At the beginning of each round, buyers privately learn their valuation of the good, and sellers privately learn their production costs of the good. Valuations and costs are randomly drawn from

[1]The currency used in the experiment is points. One point is worth \$0.15.

the sets $v \in \{30, 40, 50, ..., 110\}$ and $c \in \{10, 20, 30, ..., 90\}$. In each round, every value can appear only once among the buyers and sellers. While the distribution of demand and supply is common knowledge, the realization of v (for a buyer) or c (for a seller) is private knowledge to each market participant. In each round, sellers and buyers randomly receive a new display ID to avoid reputation effects.

Sellers can sell, and buyers can buy, one unit of the fictional good in each round. Once the market opens, sellers can submit asks, that is, the price at which they are willing to sell the product. Buyers can submit bids, that is, the price at which they are willing to buy the product. All asks and bids appear in the table "Current bids and asks," and are observable to all market participants (see Appendix A for a screenshot). A trade occurs if a seller makes an ask that is lower than a current bid or if a buyer makes a bid that is higher than a current ask. The trade is closed at the price of the bid, or the ask that was posted first. A trade is also possible by directly accepting a bid or ask that appears in the table. Sellers and buyers can modify their asks and bids until the market closes, as long as they have not traded yet. If a trade occurs, the payoffs are $\pi_s = price - costs$ for a seller and $\pi_B = valuation - price$ for a buyer. Production costs occur only when trading, which means that it is not possible that a seller produces the good at a personal cost but cannot sell it on the market.

Competitive equilibrium theory predicts an average trading price of 60 with a frequency of trades of between 5 and 6 per round. In equilibrium, only buyers with high valuations ($v \geq 60$) and sellers with low production costs ($c \leq 60$) end up trading. Before learning whether production costs are high or low, a seller

expects to have production costs above the equilibrium price with probability $\frac{3}{9}$ (in which case, he would not trade and would receive zero payoff) and below or equal to the equilibrium price with probability $\frac{6}{9}$ (in which case, he can sell the product). A seller, therefore, has an expected payoff of $E[\pi_S] = \frac{6}{9} \cdot [p - c | c \leq 60] = \frac{50}{3} \approx 16.67$. The same logic holds true for the expected payoff of a buyer, that is, $E[\pi_B] = \frac{6}{9} \cdot [v - p | v \geq 60] = \frac{50}{3} \approx 16.67$. We keep the expected payoff of participants in the guessing game and in the market game constant, and thus, provide the same monetary incentives across treatments. After each round, sellers and buyers receive feedback, and see a table with all trades and prices for which goods were traded (see Appendix A for a screenshot). At the end of the whole experiment, one round of the DA market is randomly chosen, and accounts for payment (with one point worth \$0.15).

Manipulation check

After the manipulation, we add a manipulation check to test whether being exposed to a subtle situational cue, such as a market environment, activates certain mental concepts (e.g., Cohn & Maréchal 2016). Therefore, we employ a word-completion task as used by Shu et al. (2012). We present participants 14 word fragments in a random order and ask them to complete the fragments as the first words that come to their mind. We chose the words such that nine of these words (e.g., _ O N E Y) can be completed as market-related words (MONEY) or neutral words (HONEY). Five additional words serve as control, and can (only) be

completed with a neutral meaning (for the full list of words, see Appendix B).[2] We calculate the manipulation check score by counting the number of completed market-related words. We hypothesize that participants in the market treatment are more likely to complete the word fragments as market-related words than participants in the non-market treatment. Thus, we expect a higher manipulation check score in the market treatment compared to the non-market treatment.[3]

3.2 Stage 2: Moral dilemma

In the second stage, participants are presented with a moral dilemma scenario, and have to make a decision. We build on the classical moral trolley problem literature (Foot 1967, Thomson 1985), and present participants the footbridge (drop) version, as recently employed by Barak-Corren et al. (2018). In this scenario, participants have to imagine that they are working by the train tracks when they observe a boxcar breaking loose and speeding down the tracks. This boxcar is heading toward three workers who do not have enough time to get off the track. Participants further have to imagine that above the track there is a platform with another worker. This worker is not threatened by the boxcar, but he is standing over a trap door. Participants have to choose between two options: They can choose to *stay passive*, and let the boxcar head toward the three workers. The consequence is that the worker over the trap door stays unharmed, and the three

[2] We follow the framework by Koopman et al. (2013) to construct reliable and valid word fragments. Therefore, we pretested a list of 34 word fragments, and chose 14 words that participants completed with a neutral or a market-related meaning with sufficient variance. Importantly, we did not use words that appeared in either of the two instructions, to avoid participants completing the word fragments from their short-term memory.

[3] In a pretest, we elicited a baseline average score of 3.5. We hypothesize that this score increases if participants previously played the DA market game compared to the guessing game.

workers die. Alternatively, they can choose to *actively intervene* by using a switch that opens the trap door and drops the one worker in front of the boxcar. Thus, the worker's body gets caught in the wheels of the boxcar and slows it down. The consequence is that the one person dies, and the three workers stay unharmed. We present participants Figure 1 as an illustration next to the instructions (see Appendix C for the exact wording).

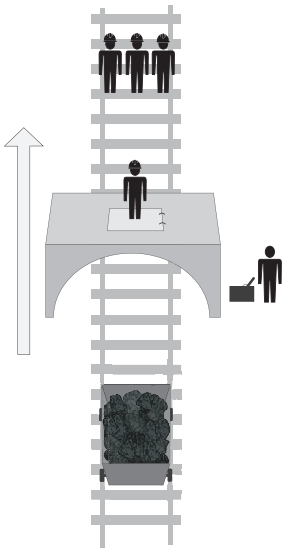

Figure 1: The boxcar dilemma (own illustration)

We ask participants if they would stay passive or actively intervene in the described scenario. We randomize the order of the answer choices to exclude any order effects. We interpret staying passive as deciding according to the deontological principle and actively intervening as following the consequentialist principle. We hypothesize that participants in the market treatment are more likely to actively intervene (consequentialist decision) than participants in the non-market treatment. The argument is that markets induce cost-benefit analysis considerations, which might have spillover effects on subsequent moral decisions.

3.3 Stage 3: Questionnaire

In the third stage of the experiment, and before participants get feedback on their payoff, they are asked to fill out a questionnaire. We first test whether participants understood the description of the moral dilemma correctly. Next, participants answer questions about their perceived performance in the game they played, the satisfaction with their decision, if they thought about their decision, and their mood. We further ask if participants have experience with negotiating. Additionally, we ask participants for their experience with moral trolley problems in general. Finally, we elicit information on risk and trust preferences and basic socio-demographic variables, such as gender and age.

3.4 Procedure

We preregistered the study in the American Economic Association's (AEA) registry for randomized controlled trials.[4] For this purpose, we ran a power analysis that suggested we should collect a total of $n = 700$ observations. For this power analysis, we elicited the baseline distribution of moral decisions. Therefore, we collected $n = 103$ observations including only the moral dilemma scenario.[5] We implemented the experiment with oTree (Chen et al. 2016), and used the DA market game of Crede et al. (2019). We ran the experiment online on Amazon

[4]https://www.socialscienceregistry.org/trials/2707/history/32548

[5]We elicited the baseline distribution of moral decisions on Amazon Mechanical Turk in December 2017. The baseline treatment yielded 35% of the decisions were consequentialist. Thus, we assumed 35% of the decisions were consequentialist for the non-market treatment and a 5 percentage point increase in consequentialist decisions for the market treatment. We further assumed a t-test, an alpha of 0.05, and a power of 0.8, which yielded the required number of observations of $n = 690$, which we rounded to $n = 700$.

Mechanical Turk between November 2018 and May 2019. We restricted participation to workers located in the US. Sessions were run between 11 a.m. (EST) and 6:30 p.m. (EST). Participants earned, on average, \$5.64 (\$3.00 participation fee plus the bonus from the guessing game/DA market game), and needed approximately 40 minutes to complete the experiment. Overall, we collected $n = 720$ observations in 26 sessions. In every session, we included the non-market and market treatments to minimize session effects. We had to drop 100 observations from participants who did not answer the control questions correctly,[6] resulting in a total of $n = 620$ observations for the data analysis (non-market: $n = 292$, market: $n = 328$).

4 Results

4.1 Manipulation check

We first look at the manipulation check, which we elicited only during the first 4 sessions, yielding $n = 106$ observations (non-market treatment: $n = 54$, market treatment: $n = 52$).[7] We did not include the manipulation check for all sessions, as we wanted to avoid the manipulation check itself manipulating participants' mindsets. To calculate the manipulation check score, we count the number of completed market-related words, and build the average within treatments. Figure 2 shows the results.

[6] Results remain qualitatively the same if we include all observations.

[7] We ran a power analysis to determine the sample size for the manipulation check. Therefore, we assumed a t-test, a baseline score of 3.5 (as our pretest showed), an increase in the score of one word for the market treatment, an alpha of 0.05, and a power of 0.95, which yielded a total sample size of $n = 100$.

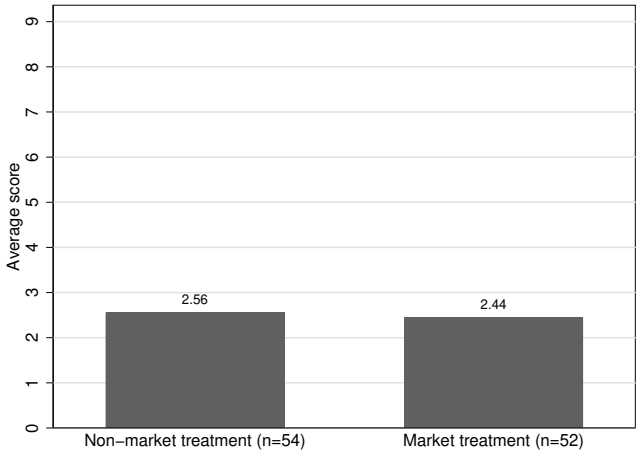

Figure 2: Results of the manipulation check

The average score of market-related words is 2.56 in the non-market treatment and 2.44 in the market treatment. This difference is not statistically significant (Mann-Whitney U test, $p = 0.5577$). Thus, being in the market treatment compared to the non-market treatment does not seem to change participants' mindset such that they have different concepts in mind when they complete the presented word fragments.

4.2 Moral dilemma

In the next step, we look at the decisions participants made in the moral dilemma scenario. To get an idea of the baseline distribution of decisions for the power analysis, we presented participants only the moral dilemma scenario, without a previous manipulation stage. Figure 3 shows the distribution of decisions in the baseline.

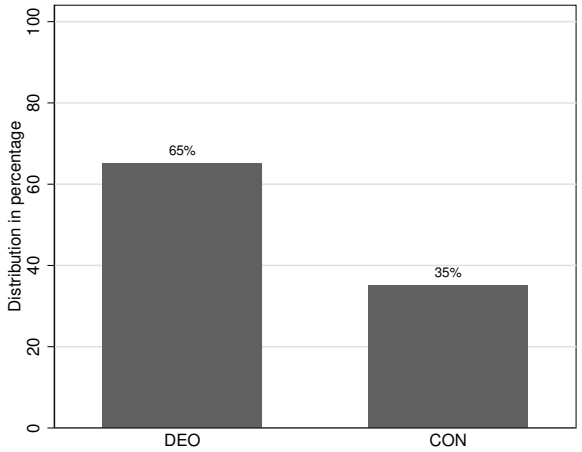

Figure 3: Distribution of decisions in the baseline (DEO: deontological, CON: consequentialist)

As Figure 3 shows, 65% of participants decided to stay passive and act according to the deontological principle, whereas 35% of participants chose to actively intervene, and thus, followed the consequentialist principle. A recent study by Barak-Corren et al. (2018) yields similar results: In the corresponding treatment of their study, 59% of participants decided according to the deontological principle, whereas 41% of participants decided according to the consequentialist principle. Thus, we find a comparable baseline distribution for the footbridge (drop) dilemma.

In the market treatment, participants first engage in a DA market and trade over 10 rounds, before they make a decision in the moral dilemma scenario. We find an increase of 17 percentage points in consequentialist decisions between the baseline and the market treatment: Whereas 35% of participants chose according to the consequentialist principle in the baseline, this share goes up to 52% in the market treatment. This difference is highly statistically significant (t-test, $p = 0.0026$). This result supports our hypothesis that markets foster consequen-

tialist decisions. However, taking into account the non-market treatment does not support this observation, as a similar increase in consequentialist decisions (15 percentage points) can be observed. Figure 4 compares the distribution of moral decisions in the baseline to the non-market and market treatments.

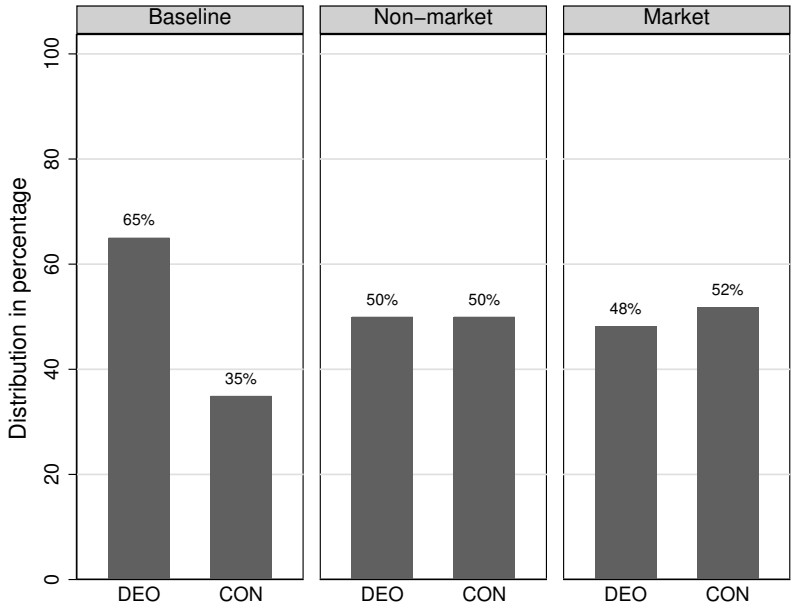

Figure 4: Distribution of decisions in the baseline versus the non-market and market treatments (DEO: deontological, CON: consequentialist)

As Figure 4 shows, 50% of participants in the non-market treatment chose to actively intervene, which yields a statistically significant increase in consequentialist decisions compared to the baseline (t-test, $p = 0.0083$). Table 1 summarizes the results.

Table 1: Pairwise comparisons between treatments

	Deontological	Consequentialist	Pairwise comparisons (t-test)
Baseline ($n = 103$)	65.05%	34.95%	Baseline vs. non-market: $p = 0.0083$
Non-market ($n = 292$)	50.00%	50.00%	Baseline vs. market: $p = 0.0026$
Market ($n = 328$)	48.17%	51.83%	Non-market vs. market: $p = 0.6499$

As can be seen in Table 1, the difference of 1.83 percentage points in consequentialist decisions between the non-market and market treatments is not statistically significant (t-test, $p = 0.6499$). Thus, we do not find support for our hypothesis that the market manipulation fosters consequentialist decisions. Instead, it seems that some characteristic (or a combination of several characteristics) that is common to the non-market and market manipulations drives the increase in consequentialist decisions. We will discuss these potential drivers in the next section. In the last step, we investigate whether additional factors influence the decision to act according to the consequentialist principle, and run probit regressions with the moral decision (0: deontological, 1: consequentialist) as the dependent variable. Table 2 shows the results.

As the regression confirms, the market treatment has no statistically significant impact on the decision to act according to the consequentialist principle. Experience with negotiating and a general willingness to take risks increase the likelihood of choosing the consequentialist action, whereas being male has a slightly negative impact on the likelihood of choosing the consequentialist action. The bonus points, perceived performance, satisfaction with the own decision, having thought about the own decision, mood, experience with trolley problems, and age do not have any influence on the moral decision.

Table 2: Probit regression with the moral decision (0: Deontological, 1: Consequentialist) as dependent variable

	Model 1	Model 2	Model 3	Model 4
Market Treatment	0.046	0.090	0.090	0.042
	(0.101)	(0.104)	(0.105)	(0.108)
Bonus		0.000	0.000	-0.000
		(0.002)	(0.002)	(0.002)
Perceived Performance		0.119**	0.104*	0.055
		(0.052)	(0.057)	(0.058)
Satisfaction			-0.018	-0.037
			(0.033)	(0.035)
Thought			0.007	0.029
			(0.054)	(0.058)
Mood			0.043	0.006
			(0.061)	(0.063)
Experience Negotiation				0.193***
				(0.056)
Experience Trolley				-0.004
				(0.108)
Risk				0.058***
				(0.021)
Trust				-0.013
				(0.020)
Male				-0.180*
				(0.109)
Age				-0.008
				(0.005)
_cons	-0.000	-0.400**	-0.459	-0.362
	(0.073)	(0.197)	(0.416)	(0.519)
N	620	620	620	620
Pseudo-R^2	0.000	0.006	0.007	0.049

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Discussion

Summarizing the results, we do not find a statistically significant difference in the word completion task between the non-market and market treatments; that is, participants in the market treatment do not complete the word fragments as market-related words more often than participants in the non-market treatment. One reason could be that the manipulation did not work or was too subtle, meaning that the experience of the market did not activate certain mental concepts, compared to the experience of the guessing game. Another potential reason is linked to the current replication crisis, revealing that many effects uncovered in experiments cannot be replicated (e.g., Camerer et al. 2016, Verschuere et al. 2018). Especially the literature on priming has been criticized due to failed replications of some prominent studies (e.g., Yong 2012).

Further, we do not find a statistically significant difference in the moral dilemma scenario between the non-market and market treatments; that is, participants in the market treatment do not choose the consequentialist action more often than participants in the non-market treatment. The small difference in consequentialist decisions of 1.83 percentage points between the two treatments goes in the direction of our hypothesis, but is far from statistically significant. Interestingly, however, we find a huge and statistically significant increase in consequentialist decisions between the baseline of the moral dilemma scenario and *both* the non-market treatment (15 percentage points) and the market treatment (17 percentage points).

Several reasons could drive these results. First, it could simply be that there is no effect of markets on subsequent moral decisions, which is why we do not find a difference between the non-market and market treatments. Another explanation could be that we cannot uncover a potential effect with our experimental design. One question is whether we chose an appropriate market manipulation to induce the experience of interacting in a market and to appeal to cost-benefit analysis considerations, or whether the effect does not persist until the moral dilemma stage is reached. Whereas some scholars argue that a double auction market is a very typical market institution, and use it to experimentally implement a market condition (e.g., Falk & Szech 2013), others argue that in real life, we act as price takers, and therefore, experience markets differently than represented by a double auction market (e.g., Breyer & Weimann 2015). Thus far, there is no unifying framework or definition determining what a market actually incorporates. It would be interesting for further research to disentangle the single components a market might include (like money, competition, diffusion of responsibility, etc.) to see if the market as a whole or single factors drive behavior. Another question is whether we chose the appropriate non-market manipulation. We designed the guessing game such that important characteristics of the manipulation are kept equal (e.g., the expected monetary payoff, being part of a group of nine, and playing over 10 rounds), while other aspects are in clear contrast to the market treatment (e.g., no interactions with other participants). Still, the challenge is to determine how the suitable control for a market should look.

The higher share of consequentialist decisions in both treatments suggests that

one (or several) factor(s) that the non-market and market treatments have in common drive the change in moral decisions. One such factor could be cognitive fatigue: Both manipulations presumably fatigue participants cognitively, as they need to understand the rules of the game, answer control questions, and then play a game over 10 rounds. The cognitive load was lower in the baseline, as participants made only the decision in the moral dilemma scenario (which took, on average, eight minutes). Thus, we hypothesize that cognitive fatigue might increase consequentialist decisions. In a recent study, Timmons & Byrne (2019) examine whether moral fatigue affects people's deontological and consequentialist judgments. They find that participants who have completed a cognitively tiring task tend to judge that killing a person to save several others is *less* permissible compared to participants who have completed a less cognitively tiring task. Put differently, cognitive fatigue seems to reduce consequentialist actions. This result contradicts our hypothesis that cognitive fatigue could drive the increase in consequentialist decisions in both treatments. Other factors that might be common to both treatments could be a general focus on outcomes (as both treatments included a bonus), playing a game to earn money, a group feeling, the degree of perceived luck determining the payoff, or a general payoff uncertainty (as participants learned only at the very end how much they earned). For all these potential similarities across the two manipulations, we would need to run additional treatments. At this point, we cannot finally identify the driver of the increase in consequentialist decisions in the two treatments compared to the baseline.

6 Conclusion

The question whether markets influence morals is a longstanding one that is still important today. Given that markets capture more and more spheres of human life, a current debate raises the question whether policy should limit the scope of markets (Satz 2010, Sandel 2012). The far-reaching answer to this question requires robust empirical evidence. The current literature establishes a negative impact of markets on moral decisions, but the overall results are mixed, and policy implications are not clear. In addition, the existing literature focuses on what the influence of markets on moral decisions might be *within* the scope of markets. We go one step further by focusing on moral decisions *outside* markets, and by taking a non-judgmental philosophical perspective to define morality. Thus, we investigate how the constant exposure to markets influences moral decisions in unrelated decision environments.

To examine this research question, we exogenously assign participants to two different institutions in a between-subject design: In the non-market treatment, participants play a guessing game. In the market treatment, participants play a DA market game. We then compare the subsequent moral decisions made in a moral dilemma scenario. To the best of our knowledge, we are the first to use economic games to induce a market mindset. Our hypothesis was that interacting in a market environment triggers cost-benefit analysis considerations, and puts a focus on consequences, which might have spillover effects on unrelated moral decisions, and thus, foster consequentialist decisions. The results of this study do

not support this hypothesis, as we do not find a difference between the non-market treatment and the market treatment. However, we discussed potential avenues for further research to get a more comprehensive answer to our research question.

Finding an answer to the question whether markets have an impact on the way we make moral decisions in environments outside the realm of markets is very important. Consider the example from the introduction: Imagine a passenger plane hijacked by terrorists is heading toward a packed soccer stadium. Should a fighter pilot shoot down the plane, killing 164 people to save 70,000? If we generally appreciate the fundamental value that one human life cannot be offset against another human life, we need to know if the exposure to markets changes how we react to such a moral dilemma. More specifically, it seems important to understand if markets shift our moral perspective such that we focus more on the outcome, and thus, disregard the action leading to this specific outcome.

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Appendix A: Screenshots DA market game

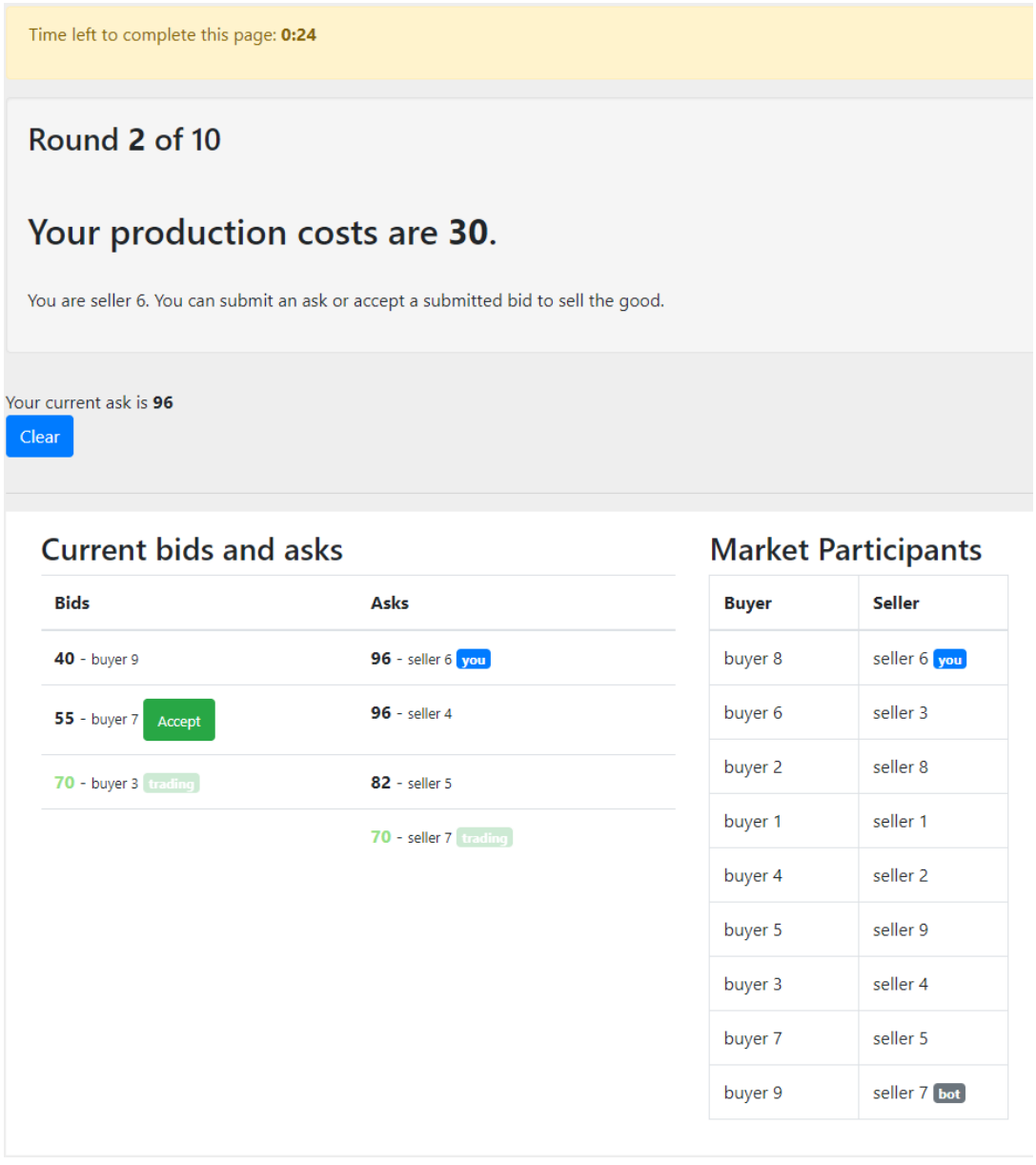

Figure 5: The Graphical User Interface of the DA market

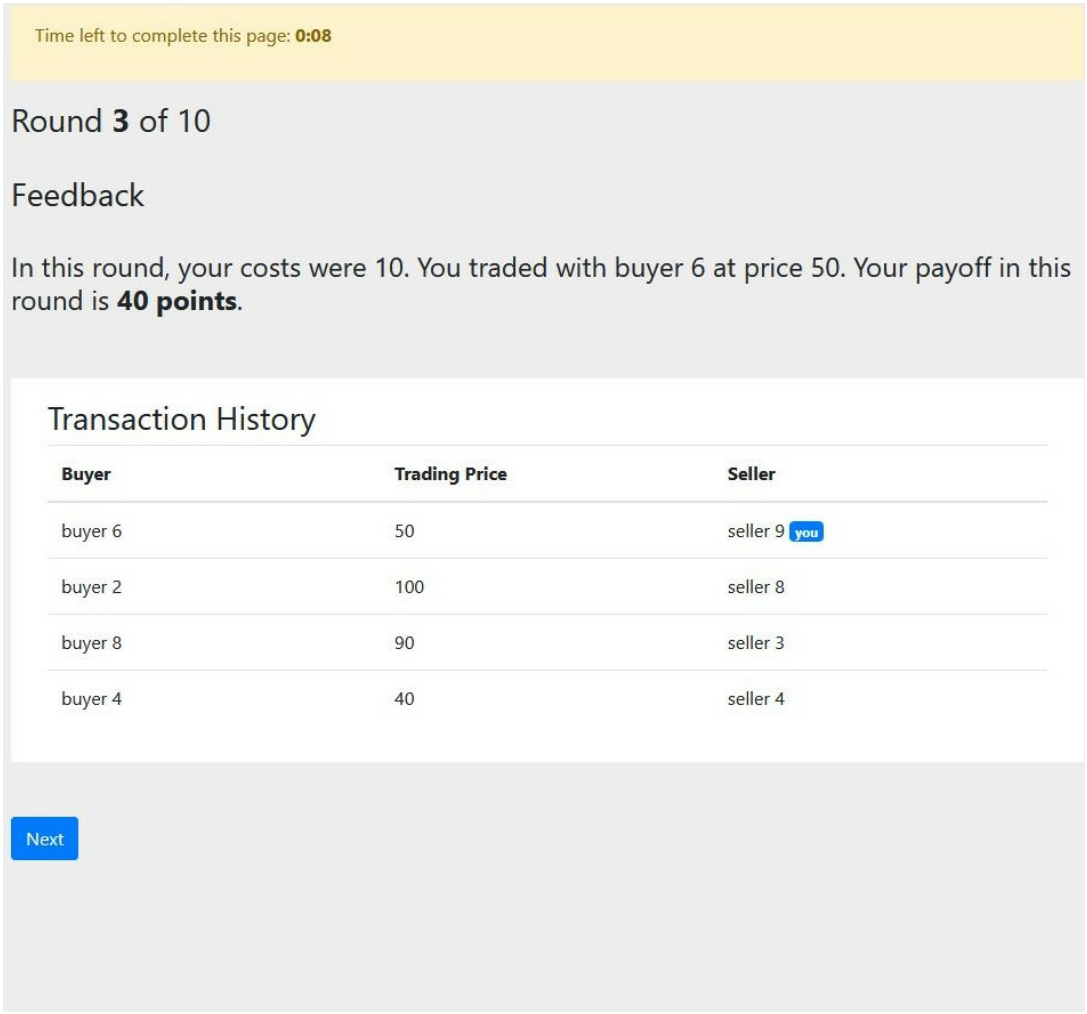

Figure 6: The feedback screen of the DA market

Appendix B: Word completion task

Table 3: Full list of word fragments and the corresponding market and non-market solutions. Words 10–14 served as control and could only be completed with a neutral meaning. Note that there might be additional solutions.

No.	Word fragment	Market-related	Non-market
1	M A _ L	MALL	MAIL
2	C A S _	CASH	CASE
3	_ O N E Y	MONEY	HONEY
4	_ A X	TAX	FAX
5	S U P P _ _	SUPPLY	SUPPER
6	S A L _	SALE	SALT
7	B R _ _ C H	BRANCH	BRUNCH
8	_ _ D G E T	BUDGET	WIDGET
9	S H _ P	SHOP	SHIP
10	F R _ _ T	-	FRUIT
11	T _ _ L E	-	TABLE
12	B E _ _	-	BEAR
13	B R _ _ C H	-	BREACH
14	C A B _ _	-	CABLE

Appendix C: Moral dilemma scenario

In this part, please try to imagine the following situation:

You are working by the train tracks when you see an empty boxcar break loose and speed down the tracks. The boxcar is heading toward three workers who do not have enough time to get off the track. Above the track is a platform with another worker. This worker is not threatened by the boxcar. However, he is standing over a trap door.

You have two options:

Actively intervene
You use a switch that opens the trap door and drops the one worker in front of the boxcar. Thereby, the worker's body gets caught in the wheels of the boxcar and slows it down. That means the one worker dies and the three workers stay unharmed.

Stay passive
You stay passive and let the boxcar head toward the three workers. Thereby, the worker over the trap door stays unharmed and the three workers die.

Sidenote:
In any case, you are protected from the boxcar and stay unharmed. Furthermore, assume that you will not face any legal consequences for either action. Accept only the information given and try not to introduce additional assumptions that go beyond the problem as stated.