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Market Interaction and Pro-Social Behavior: An Experimental Study

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When actions generate negative externalities for third parties, incentives exist to pass these "morally costly" decisions to others. In laboratory experiments, we investigate how market interaction affects allocations when the right to divide a sum of money between oneself and a passive recipient is commoditized. Allocation to recipients is reduced by more than half when determined by subjects who purchase or keep the right to make the division as compared to a control where subjects are directly assigned the right. Sellers report accurate beliefs about recipient allocations and do not report feeling less responsible the more often they sell the allocation right. The market allocates the right to make divisions more frequently to buyers who allocate more to recipients, but sellers who allocate less to recipients tend to sell less often. Selection cannot solely explain the results, suggesting market interaction itself may directly impact behavior.

JEL Classification: D63, D47, C92

1. Introduction

Market transactions often impose negative externalities on third parties. Production of goods and services may coincide with any number of human costs; for instance: poor or risky working conditions, child labor, mandatory overtime, or localized pollution. Because one or both parties in such a transaction may express moral reservations concerning the outcome, there exist incentives for agency relationships to develop in such markets. For example, rather than hire poorly paid farmhands, a farmer with labor market power might subcontract for these services. Thus, the farmer, who might otherwise have chosen a "fair wage" for their workers if there were no possibility to subcontract, instead hires a subcontractor who is likely to pay workers less. Does subcontracting then absolve the farmer of responsibility for how the workers are treated? Does market competition for the contract give the subcontractor a "free pass" to poorly compensate workers? Does the lowest bidder get allocated the contract, or does the farmer internalize the price as a signal of how workers may be treated? In this study, we look at the impact of other-regarding behavior on a laboratory analogue for these more complex markets.

To operationalize our research questions, we collect and analyze data from a laboratory experiment in which participants first enter a market as "buyer" or "seller" for a claim on the right

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to divide a sum of money between themselves and a passive recipient. This division task is commonly known in the literature as the "dictator game" (Forsythe et al. 1994). In the canonical dictator game, the role of dictator is assigned randomly. We study what happens when random role assignment is replaced by a market allocation mechanism. In this mechanism, the right to play the dictator game is traded in a double auction preceding the allocation decision. We then compare dictator decisions following the market to a control treatment in which a different sample of subjects "replay" the (second stage) dictator game decisions resulting from the market (but with no market interaction).[1] This experimental design allows us to study these types of markets for agency while bridging two institutions that have been extensively studied: the double auction and dictator game.

What sort of outcomes might one expect to see? In neoclassical theory, a market's allocative efficiency may be measured by its ability to allocate goods to those with the highest willingness to pay for them from those with the lowest willingness to accept the price. With the potential for the expression of certain kinds of other-regarding preferences not normally tied to markets, the selection component of the market is more complex. For instance, a buyer may have a "high" value for a dictator game because she intends to choose a "selfish" division, but it is also possible for a buyer to possess a "high" value due to a strong preference for a more equitable or "fair" division with the passive recipient that she believes that other market participants do not have. A similar train of thought may be applied to sellers.

Our study enables a more detailed look at the market selection mechanism in the presence of other-regarding preferences over its outcomes. As a seller can always keep the dictator game and give however much she likes to the recipient, one might wonder why any transactions would take place, and what one can infer about the buyer and seller from such a transaction. We investigate whether or not individuals' social preferences *allow* markets to select certain actors over others to play the role of dictator. Further, we ask: Do buyers and sellers feel individually responsible for the allocation to recipients only when they themselves made the allocation decision? Do buyers or sellers deceive themselves about the types of divisions that can be expected from the opposing side of the market?

We find that approximately 40% of dictator games are traded in the market. Among traded games, prices are typically below but sometimes exceed the endowment to be divided in the dictator game. Compared to the control treatment, allocations to recipients in the presence of the market selection mechanism are considerably lower. A dichotomy among market roles appears to be responsible for much of this result: The most "generous" buyers buy the right to the dictator game more often and the more "generous" sellers sell the right to the dictator game more often. Interestingly, we find that a substantial number (approximately 40%) of games are bought and played at what ends up being a net loss to buyers (ostensibly, to secure a "fairer" division with recipients).

The article proceeds as follows: We review the related research in section 2 before providing a detailed description of our experimental design in section 3. Section 4 follows with development of a simple model and its theoretical predictions, section 5 presents the results of our experiment, and section 6 concludes with general remarks and avenues for further study.

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[1] Bartling and Schmidt (2015) similarly study bargaining with and without an ex ante contract, but where strategy spaces are equivalent entering the bargaining phase. They find that ex ante contracts act as a strong reference points in bargaining outcomes.

2. Related Literature

A growing area of research that closely fits with the current study deals with the ways in which market institutions influence behavior and beliefs. The social and psychological effect of markets is not a new area of study. Early economic philosophers pondered whether markets brought out the best or worst in human nature (see Hirschman 1977, 1982 for a history of the debate).

Experimental research in both economics and psychology suggests that people often exhibit other-regarding behavior that might be variously described as "pro-social" (cf. Camerer 2003). Economists used this body of evidence to develop several theories incorporating "social" preferences into the utility function (Rabin 1993; Fehr & Schmidt 1999; Bolton and Ockenfels 2000; Charness and Rabin 2002; Dufwenberg and Kirchsteiger 2004; Engelmann and Strobel 2004; Cox and Sadiraj 2012).

Recently, we see a wave of research that examines the limitations of other-regarding behavior. In a number of ways, many will choose selfish outcomes if they can evade responsibility.[2]

Studies of Market Influence

Using both lab and field experiments, economists have revived the question of how market interaction affects human behavior. In their seminal article, Fehr and Schmidt (1999) discuss a study by Roth et al. (1991) to show how proposer competition raises offers in an ultimatum framework where responders have market power. Henrich, Ensminger, and McElreath (2010) conduct a series of field studies across a range of cultural groups and find that degree of market activity correlates positively with measures of fairness, though no causality is established. Chen (2010) shows that laboratory participants become more deontological with increased exposure to tournament competition, and that high earners in the competitive treatment donate more of their winnings to charity than high earners in a piece-rate treatment. A recent article by Al-Ubaydli et al. (2013) finds that priming laboratory participants with market-centric language increases trusting behavior. In the same study, however, market primes did not affect altruistic behavior in a dictator game, contrary to the field study findings of Henrich, Ensminger, and McElreath (2010).

Herz and Taubinsky (2014) experimentally investigate an idea first proposed by Bowles (1998), who claimed that market interaction will influence an individual's preferences over norms and fairness outcomes. They find strong evidence in support of Bowles' hypothesis: Market experience shapes what people view as a fair transaction, driven by what the authors call "personal payoff experience" and simple "market observation."

Another article by Falk and Szech (2013) argues that market forces erode moral values (or rather, diminish one's tendency to act in concert with his or her moral values). In this study, participants chose to either receive an amount of money or save the life of a mouse. When asked individually, a majority chose to save the mouse rather than receive €10. In the market treatments, where some participants were endowed with a mouse and others with €20, bargaining over the selling price quickly led to over 70% successful transactions—at a price less than €10—that resulted in the mouse's death.

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[2] Two other related literatures of note are studies examining the role of earned status in pro-social behavior (e.g., Hoffman et al. 1994; Cherry, Frykblom, and Shogren 2002) and the effect of behavioral spillovers from playing in two different strategic settings (e.g., Bednar et al. 2012; Cason, Savikhin, and Sheremeta 2012; Savikhin and Sheremeta 2013).

Our study, therefore, offers an extension of these previous findings. Rather than prime subjects, as in Al-Ubaydi et al. (2013), we have subjects participate in a market prior to playing a dictator game. In this way, we can evaluate the causal effect of market interaction on dictator giving amounts. There are other significant differences in design, but it is worth noting that our results run counter to the notion that market experience increases fairness and pro-social behavior.

Studies of "Fairness Evasion"

Often, we find ourselves in a situation where other-regarding concerns may cause us to behave kindly toward somebody else. However, there are many responses to these situations that do not lead to "fair" outcomes. A common avenue may be to distance one's decision from the final outcome, exploiting diffusion of responsibility to achieve a self-interested outcome without overt selfish behavior.

One way to add social distance is to involve others in the decision. Dana, Weber, and Kuang (2007) find that adding a second "dictator" to simultaneously make the allocation decision reduces the frequency of fair outcomes dramatically. Hamman, Loewenstein, and Weber (2010) find that when allocators in a dictator game are able to delegate their decision to a third party, they seek out an "agent" who will send the least amount to a recipient to achieve a self-interested outcome without feeling responsible for the low earnings of recipients.[3] Furthermore, Bartling and Fischbacher (2012), Oexl and Grossman (2013), and Coffman (2011) find that such hierarchies cause recipients to hold delegating dictators less accountable.

A second way in which people may respond to situations involving pro-social pressure is to avoid the decision entirely. Research that closely relates to this study demonstrates that individuals will often do just that. In three closely related articles researchers find that, when given the opportunity to play the role of allocator in a dictator game, individuals often prefer to quietly (and anonymously) exit. Lazear, Malmendier, and Weber (2012), hereafter LMW, find that allowing subjects to sort into or out of the dictator game—in the role of dictator—results in substantially lower sharing rates. Dana, Cain, and Dawes (2006) find that participants already assigned the role of dictator will pay to avoid playing the game. In their study, dictators could allocate $10 between themselves and a recipient, or receive $9 to avoid making the decision and prevent recipients from knowing the game would have been played. By taking the exit option, participants suggest that it is worth a dollar (at least) to remove them from the decision. Broberg, Ellingsen, and Johannesson (2007) devise an experiment to estimate the "exit reservation prices" observed in Dana, Cain, and Dawes (2006) and find that, on average, dictators will forego approximately 18% of the endowment to avoid the allocation decision.[4]

Taken together, the literature suggests that it may not be a preference for fairness per se that motivates us, but rather a preference for appearing to be fair—both to ourselves and others. This has led to several theories incorporating this desire for appearing pro-social and managing one's image (e.g., Murnighan, Oesch, and Pillutla 2001; Benabou and Tirole 2006).

One goal of this article, then, is to examine how these types of social preferences—whether outcome-based or action-based—persist in market settings. In our design, it is trivially simple for

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[3] Drugov, Hamman, and Serra (2014) also find that delegation reduces the moral cost of engaging in a corrupt action and, in turn, leads to higher levels of corruption overall.

[4] Still more research argues that giving may be due to feelings of shame (Tadelis 2007; Dillenberger and Sadowski 2012), guilt (Battigalli and Dufwenberg 2007), and social pressure from observers (Andreoni and Bernheim 2009).

Table 1. Summary of Experimental Design

	Market	Random Market	Control
Sessions	4	3	4
Subjects per session	24	24	24
Total observations	96	72	96
Total sellers, buyers, recipients	32, 32, 32	24, 24, 24	32, 32, 32

Source: In the Control treatment subjects counted as buyers "replay" dictator game decisions made by buyers in the Market treatment, and analogously for sellers.

decision makers in the dictator game to guarantee an outcome in line with their own preferences, so we may anticipate results in accordance with the distribution of outcome-based preferences mentioned at the outset of this section. However, if the market interaction changes an individual's psychological connection to the outcome or if market selection allocates decision rights to those with more or less concern for equity, market interaction may lead to behavior that influences the level of inequality.

Methodologically, our article also contributes to literature concerning dictator exit. Prior articles study exits with no transfer of responsibility; once a subject takes the outside option the game is voided. In our study, a "seller" who sells her allocation rights has exited the dictator game, but knows that the game must still be played between the buyer and recipient. We discuss the theoretical implications of this distinction in section 4.

3. Experimental Design

In the design of the experiment, we wish to address markets for agency in the presence of social preferences over the impact to third parties. (As an adjunct, we desire to learn more about pro-social preferences in a market setting). This motivation opens up many possibilities for designing experiments. While one might reasonably choose a design that replicates certain features of a specific market or markets, the alternative we use is to approach the research objective in a manner that can most easily be contrasted to and understood within the context provided by existing literature. To this end, we attempt to bridge two of the most well studied institution/environment combinations in the literature: the double auction and the dictator game.

The details of the experiment are summarized in Table 1. To avoid potential wealth effects or behavioral spillovers, all treatments described below are between-subject. We conducted a total of 11 sessions at the xs/fs laboratory at Florida State University, with 24 subjects in each session. In four of the sessions, labeled as the Market treatment, subjects participated in a real-time interactive market where they could buy or sell the right to play the role of dictator in a subsequent dictator game, with the role of recipient played by a passive third party. In the three sessions of our Random Market treatment, subjects interacted in a market otherwise identical to the one from the Market treatment, but each completed transaction had a 50% probability of being cancelled. The four Control sessions serve as a between-subjects control to the Market sessions by preserving the postmarket endowments from the Market treatment without actual market interaction. Subjects were recruited with ORSEE (Greiner 2015) and interacted through a computerized network via z-Tree (Fischbacher 2007). All sessions began with instructions read aloud by an experimenter while the subjects read along and were permitted to ask questions publicly, followed by a brief quiz about the experimental procedures. The sessions lasted approximately 1.5 hours.

In each session of the Market treatment, we split subjects into two groups of 12 and then assigned subjects to one of three roles: sellers, buyers, and recipients (referred to in instructions as Type A, Type B, and Type C, respectively). Subjects were told there would be four members of each role in their group and they would remain in these roles and in this group throughout the experiment. (See Supporting Information Appendix 2 for instructions.) Each Market session consisted of 10 periods, and each period consisted of two stages. In the first stage, all sellers began with a "virtual ticket" (representing the right to be dictator in the second stage) and were given the option of placing this ticket for sale in a double auction market. Sellers could accept a bid or submit an asking price between \$0.00 and \$18.00. Buyers were given an endowment of \$18 and could accept an ask or submit a bid between \$0.00 and \$18.00. Each market lasted 75 seconds and had exactly four buyers and four sellers, with only one transaction per subject permitted. All eight traders and four inactive recipients viewed full information in real time of the asking prices and bids available while the market was open. (See Supporting Information Appendix 3 for screen captures of the market stage.) Traders were permitted to submit, change, or remove their offers at any time, and could accept any outstanding offer from the other side of the market on a first-come first-served basis. Once an offer was accepted it was considered final and the buyer obtained the ticket from the seller at the agreed on price. Additionally, traders were permitted to effectively "leave" the market, which would make the screen go blank except for a button that allowed them to return.

In the second stage, buyers who purchased a ticket as well as the sellers who did not sell their ticket were asked to allocate \$16 between themselves and an anonymous recipient from the same group. Despite the anonymity of the recipient, each ticket was randomly matched to a specific recipient, and it was common knowledge that recipients observed all the action in the market corresponding to their ticket (including asking prices) even though they could not actively participate.

After the second stage, subjects saw a results page that gave the current period's balances for the buyer, seller, and recipient if the ticket was sold. Sellers who kept their ticket saw their balance and the recipient's, while buyers who did not buy saw only their own balance. A buyer's balance for a given period was \$18 if no ticket was purchased or \$18 plus the amount kept less the price, if a ticket was purchased in that period. Thus, the buyer was able to offer, or the seller to request, more than the \$16 endowment. A seller's balance was the amount kept, if the ticket was not sold, or the price, if the ticket was sold. Recipients' balances were always equal to the amount given to them by the dictator in stage two.

The Random Market sessions follow precisely the same procedure as the Market treatment with one difference: Each accepted transaction was cancelled with 50% probability. In other words, in the first stage subjects interacted in a market environment identical to the one described above. Buyers could bid for at most one ticket, and sellers could offer their ticket for sale. If a buyer and seller agreed on a price, that transaction was tentatively finalized. After the first stage was complete, the computer independently determined if each agreed-upon transaction would be executed (with 50% probability), or whether the sale would be canceled and the potential seller would keep their ticket (with 50% probability). The second stage is identical to the Market treatment, where all ticket buyers and all sellers who retained their ticket play the role of dictator to a passive recipient.

The purpose of the Random Market treatment is to isolate the effect of market interaction on potential sellers who do not actually trade their right to be dictator. These sellers have the full experience of market participation: observing bid prices, considering the value of their ticket, and

ultimately deciding whether or not to sell; but 50% of the time their sale is rescinded. Thus, in the Random Market treatment, the market selection of certain subjects to play the role of dictator is orthogonal to a randomized intervention: the cancelation of a would-be transaction. With reservations, this permits some insight into the counterfactual of how a seller who chose to sell would have allocated the endowment in the dictator game.[5]

Control sessions were designed so that participants would effectively "replay" the dictator game portion of the Market session, and *only* this portion. To do this, the outcomes of prior Market sessions were used to replicate the exact allocations created by the markets, which Control participants then saw as a series of exogenously imposed initial allocations. A more detailed explanation of how this was implemented follows.

Each Control session was, to the extent possible, identical to one of the Market sessions, but with no market interaction in the first stage. Instead, Control participants were matched to the outcomes from a participant of the same role (Type A, B, or C) from a prior Market session. In other words, each Control session was paired to the first-stage data from a previous Market session. Then, within each Control session, each participant was paired with the stage one data from a previous Market participant.[6] The timing and outcomes of any market interaction in the paired Market treatment (ticket assignment and its effect on endowments) were carried through precisely to the paired Type A and B participants ("replaying" the roles of buyers and sellers, respectively) in the second stage of each period of the matching Control session.[7] As each participant was mirroring a participant from a Market session, Type A participants ("sellers") and recipients were still randomly matched in each period, as in the Market session. These pairings changed in each period as determined by the market outcomes from the Market session. Each control participant then effectively "replayed" all *second stage* (dictator game) decisions that the paired market participant made.

Control subjects began the second stage exactly as did their corresponding Market subjects, with identical endowments and ticket distribution. Specifically, all subjects were told that if the Type A participant received the ticket in Stage 1, the Type B participant would receive \$18, but if the Type B participant received the ticket, the \$18 would be divided between the Type A and Type B participant. So, for instance, if a Control subject was "replaying" the role of a buyer who had bought the rights to a game in Period 1 for \$14, the control subject would be allocated \$4 and would then divide a \$16 endowment. If the Market buyer did not buy a ticket in Period 2, then in Period 2 the Control subject would receive \$18 and would not play the dictator game. (The Control subject would be passive for that stage, just as the corresponding Market buyer had been.)

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[5] A reasonable concern is that allocations of sellers who chose to sell may be affected by having their transaction canceled. We test this by comparing average allocations to recipients for the 13 sellers in Random Market who had at least one instance each of a cancelled transaction and a nonsale; although the sample is small, a signed-rank test reveals no significant difference in per seller average allocations when a transaction is canceled vs. no sale ($p = 0.2945$). Note that there is a difference in the (overall) mean allocations to recipients in cancelled transactions (\$2.33) and without a sale (\$0.52), but then this may be related to the frequency with which certain sellers transact, rather than divergence in individual seller behavior resulting from cancellation; this is examined further in "*Explaining Low Giving in Market Treatment*."

[6] Necessarily, the Control treatments were run after all Market treatments had been completed. Each had the same number of sessions and subjects of the same type.

[7] See Supporting Information Appendix 2 for instructions. Importantly, we informed subjects that the ticket assignment and endowments had been made in a manner "predetermined by the experimenters," and that their actions in any period would not affect the allocation of tickets in any future period.

Therefore, the only decisions subjects made in each period of the Control treatment sessions were, for those who held a ticket, how to allocate the \$16 between themselves and a passive recipient. All other timings and allocations stemmed from importing the outcomes of the first stage of a paired prior Market session. This allows us to examine how dictator giving varies between two environments where the relevant differences are the sample of participants (drawn from the same population) and (crucially) whether or not dictators had participated in a market prior to making their allocation decision.

Subjects' payoffs were always denoted in dollars, and their balances reset after each period. Subjects were told that one randomly selected period would be drawn to count towards their payment. The round was predetermined and placed in an envelope in the front of the room. At the conclusion of the experiment, subjects in all sessions were given a questionnaire which consisted of incentivized recollection questions concerning their own decisions (when applicable), incentivized elicitations of beliefs about others' decisions, and a series of (unincentivized) questions concerning fairness and feelings of responsibility. Subjects were paid their earnings from the predetermined round, plus their questionnaire earnings, and a \$10 show-up fee.

4. Theoretical Predictions and Hypotheses

If all players in the double auction market and dictator game have standard self-interested preferences, there is a trivial prediction of \$0 given to the recipient, and no transactions (except perhaps at \$16) in the market. However, given the experimental results of involuntary generosity and fairness evasion detailed in section 2, we base our predictions in the market-dictator game on an extension of the model of "reluctant sharers" described in LMW where the utility received of an agent may depend on their sharing environment.[8]

Let $X=(x_1,\ldots,x_n)$ be a vector of the material payoffs for each player in the market-dictator game. Agents in our model have a utility of $u_i(D_i, x_i, X_{-i})$ where $D_i=1$ if agent i plays the role of dictator, and $D_i=0$ otherwise. This precisely follows LMW (where $n=2$), with the lone departure that $D=0$ in their model indicated that sharing was not possible and the potential recipient of money from the dictator game was never informed of their missed opportunity. In our version, $D_i=0$ merely reassigns the role of dictator to another agent rather than making the game itself disappear. If selling the right to be a dictator allows the seller to not feel responsible for the recipient's outcome in the same way that exiting the dictator game does, these two utility functions should account for the same behavior.

The LMW model formalizes reluctant sharing as agents who would give money in the dictator game, but prefer to opt out if compensated with the full endowment of the dictator game, or

$$u_i(1,\$16,\$0) < \max_{x_i\in[0,\$16]} [u_i(1,\mathrm{x}_i,\$16-x_i)] < u_i(0,\$16,\$0)$$

LMW report an average of 37% of subjects classified as reluctant sharers and only 30.5% as willing sharers (pg. 157). The remaining subjects are primarily considered self-interested nonsharers, with only a few unclassified subjects. We apply this classification to agents in our market dictator game

[8] While it is possible to make more precise predictions about market outcomes by making additional assumptions about the form of the agents' utility functions, we are compelled by the scope of our study to restrict analysis to the more general case presented here.

in the following way. If a seller is a reluctant sharer and chooses not to sell the dictator game, she will attain an expected utility of

$$\max_{x_i \in [0,16]} E_{X_{-i}(x_i)}[u_i(1, x_i, X_{-i}(x_i))]$$

where $X_{-i}(x_i)$ represents other players' payoffs given that x_i is kept in the dictator game, with the expectation over all allocations weighted by their likelihood. If, however, this seller chooses to sell the dictator game at a price, p, she receives an expected utility of

$$E_{X_{-i}(p)}[u_i(0, p, X_{-i}(p))]$$

which we assume is continuous and increasing in p for all agents.[9]

We can, therefore, establish each seller's willingness to accept, z_i as the price where the expected utility of selling equals the expected utility of keeping the game, or

$$\max_{x_i \in [0,16]} E_{X_{-i}(x_i)}[u_i(1, x_i, X_{-i}(x_i))] = E_{X_{-i}(z_i)}[u_i(0, z_i, X_{-i}(z_i))]$$

Note that z_i is not a prediction of the asking price of a seller, rather the minimum price a seller would accept. With minimal assumptions about agent i's other-regarding preferences,[10] we can say that a reluctant sharer must have $z_i < \$16$. For self-interested sellers, $z_i = \$16$, while for willing sharers there is no clear prediction for z_i because it will depend on their beliefs about buyers' behavior.

On the buyer's side, it is straightforward that self-interested subjects will make offers less than \$16, with a maximum willingness to pay of \$16. Reluctant sharers would have a maximum willingness to pay of less than \$16, while willing sharers may be above or below depending on their beliefs. This, however, is enough to generate the theoretical prediction that there would be an excess supply of dictator games at a price of \$16 because at least the self-interested and reluctant sharers are willing to sell, while at most the self-interested and willing sharers are willing to buy. As LMW find more reluctant sharers than willing sharers, we hypothesize that there will be downward pressure at a price of \$16, and a market clearing "equilibrium" price will be less than \$16 in the market dictator game.

Hypothesis 1: The average price of dictator games sold in Market will be less than \$16.

Because they have the strongest incentive to sell, we hypothesize that most subjects who sell the right to play as dictator will be reluctant sharers. Subjects choosing to buy may be self-interested or willing sharers, but we predict self-interested buyers will be more likely to purchase the right to be a dictator, in particular because any price below \$16 would immediately be attractive to them. Therefore, we predict a market selection effect as follows: More self-interested subjects will obtain the right to be dictator during the market phase from reluctant sharers, which

[9] This assumption is equivalent to assuming that any disutility arising from the expectation that increasing the transaction price results in a less favorable distribution among other players is less than the utility of receiving a higher price.

[10] As reluctant sharers prefer (0, \$16, \$0) to (1, \$16, \$0) in the two player game, to show a reluctant sharer prefers to sell at \$16 in the full game we only need to assume (i) adding additional agents with fixed payoffs does not change this preference (since selling at \$16 when the buyer keeps all of it does not change payoffs), and (ii) the agent does not prefer a more unequal split among other agents (so that the agent does not mind if the buyer gives money to the recipient).

causes a decrease in the average amount allocated to the recipient as compared to the Control treatment where the right to be dictator is assigned randomly.

> Hypothesis 2: Dictators in the Market treatment will give less money to recipients on average than dictators in the Control treatment on average.

The Random Market treatment is identical to the Market treatment, but 50% of the would-be transactions are cancelled. This means that the market's ability to transfer the dictator game from reluctant sharers to self-interested dictators is weakened. Specifically, the market selection effect formalized above should be 50% as strong in the Random Market treatment as it is in the Market treatment. Therefore, we predict that the average allocation to dictators in Random Market to be equal to the average of giving in Market and Control.

> Hypothesis 3: Average giving by dictators in the Random Market treatment is equal to the average of giving in the Market and Control treatments.

5. Results

We first address our hypothesis that trade will occur at prices below the endowment. Next, we compare the amount given by dictators in the Market treatment to the amount given in the Control treatment, paying close attention to the different behavior of buyers and sellers. Lastly, we use data from survey measures and an incentivized questionnaire to examine the role of beliefs in decision-making. Unless otherwise noted, all pairwise comparisons use two-tailed rank-sum tests.

Transactions and Prices in the Market Treatment

As detailed below, subjects in the Market treatment utilized the market frequently, often with substantial monetary consequence. The dictator game in the Market treatment was exchanged in 40.3% of all possible transactions, with participation fairly consistent across sessions and periods.[11] At least 29% of the dictator games were traded in each session with no notable change in the frequency of exchange over time.

Figure 1 provides a visual illustration of timing of bids, asks, and price formation in the market for the four Market sessions. Bids and asks tend to converge from the bottom, moving up toward \$16 (the size of the endowment), with prices rising and offers becoming tighter as each session progresses. The average price for dictator games sold was \$14.76, with a standard deviation of \$2.43, and a 95% confidence interval for the estimate of the mean price of [\$14.46, \$15.06].

Table 2 summarizes the average prices and standard deviations across sessions grouped into 5-period blocks. Prices were higher in the second 5-period block than in the first block in three out of four sessions, and overall average prices rose from \$14.10 in the first block to \$15.44 in the second.[12]

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[11] Note that the observed rate of transactions (40.3%) is nearly identical to the "exit" rate seen in Dana et al. (2006).

[12] For each of the 46 buyers and sellers that made at least one allocation to a recipient in both 5-period blocks, we compare the per-subject average allocations in the first block to the same subjects' averages in the second; a signed-rank test indicates a significant difference ($p < 0.0001$).

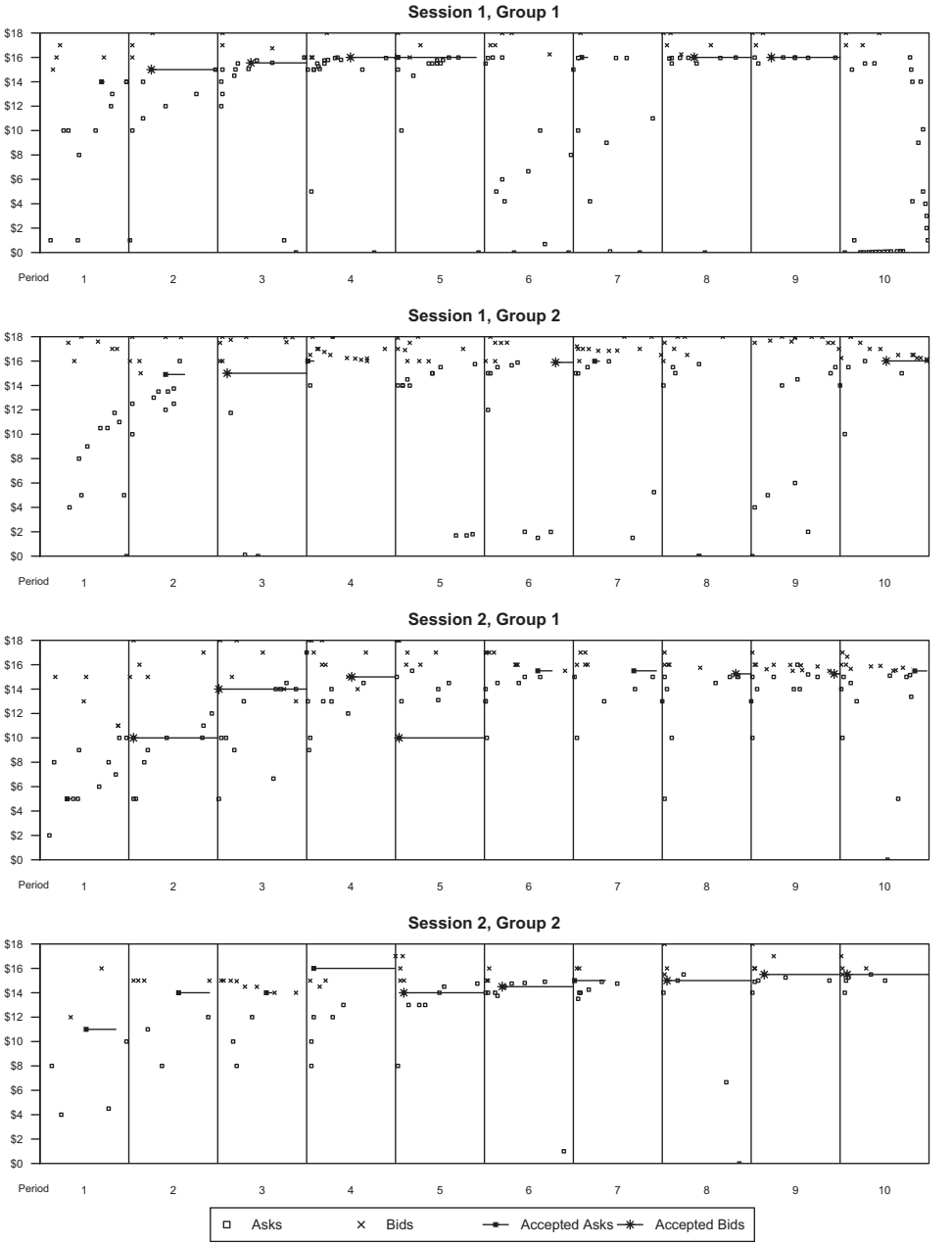

Figure 1. Bids, Asks, and Prices in Market Sessions.

Figure 2 shows a histogram of the distribution of prices in $0.50 intervals. Not surprisingly, there is a noticeable cluster of games sold at or near $16. Fewer than 15% of the transactions occurred at price of $16, meaning that the vast majority of exchanges cannot be explained merely by self-interest and indifference. Nearly 70% of games were sold for a price less than $16 and almost 16% were actually sold for more than $16. Therefore, while we see that the majority of

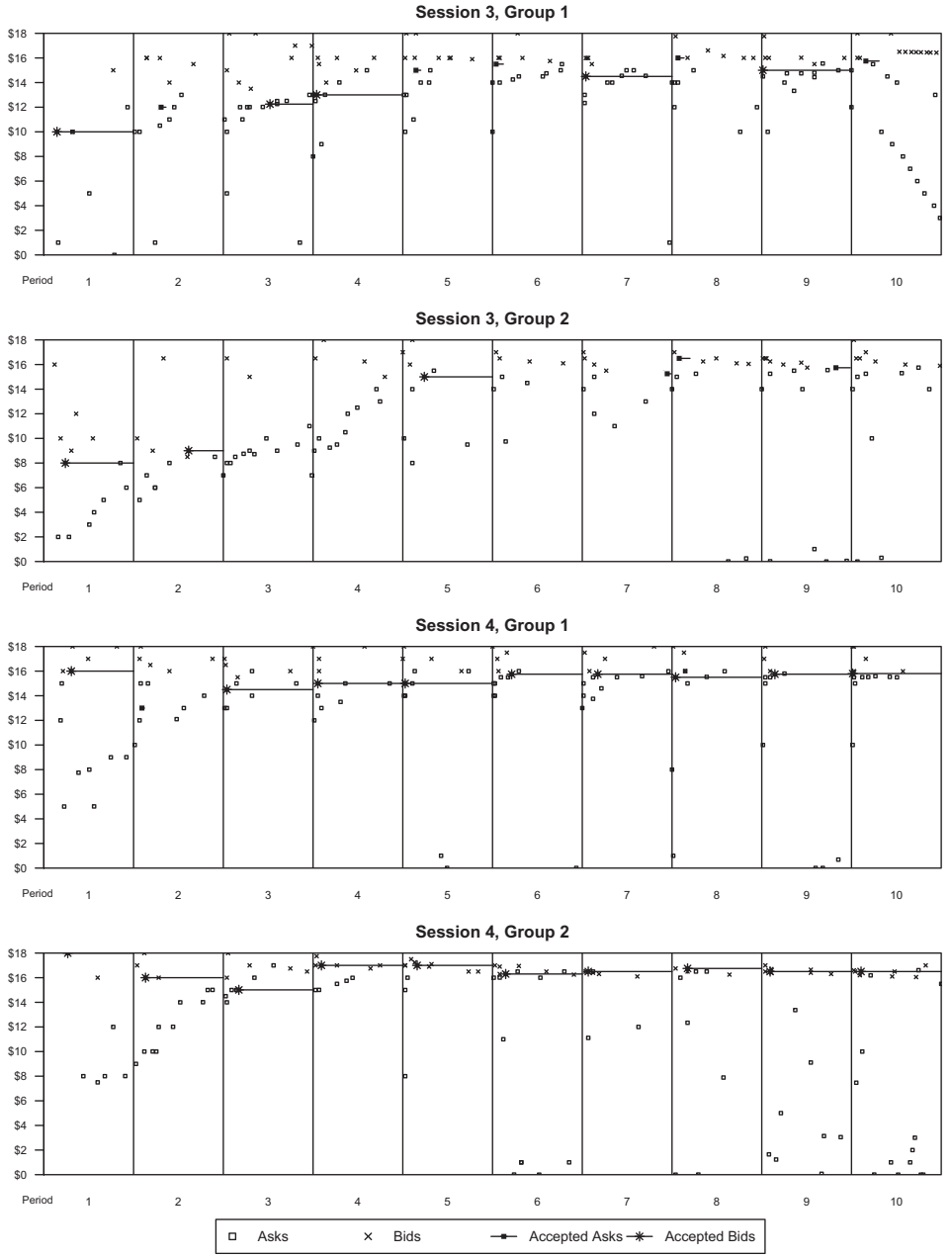

Figure 1. (Continued)

games are sold for less than \$16, the individual-level analogue of Hypothesis 1 which predicts all trades will be conducted at a price less than \$16 is not satisfied by a sizable portion of the data.[13]

[13] Over the entire Market treatment, we reject that the average price of a game is \$16 (t-test, $p < 0.01$), and that prices are symmetric around \$16 (rank-sum $p < 0.01$). However, we cannot reject that the prices in the *final period* of the Market treatment (22 trades) have an average that differs from \$16 (t-test $p = 0.12$), nor that prices are symmetric around \$16 (rank-sum $p = 0.17$).

Table 2. Market Transactions by Session, Period

Session	Period	Number of Transactions	Price#Average	Standard Deviation
Session 1	Period 1–5	12/40 (30%)	$15.70	$0.97
	Period 6–10	11/40 (28%)	$14.55	$4.80
Session 2	Period 1–5	18/40 (45%)	$13.00	$2.83
	Period 6–10	18/40 (45%)	$15.22	$0.30
Session 3	Period 1–5	16/40 (40%)	$12.27	$2.57
	Period 6–10	13/40 (33%)	$15.48	$0.54
Session 4	Period 1–5	20/40 (50%)	$15.61	$1.40
	Period 6–10	21/40 (53%)	$16.08	$0.39

The bulk of prices just under $16 support the theory that a large number of sellers are reluctant sharers (per LMW), as they accept offers of almost the full endowment in order to not play the role of dictator. Despite earning less than the full endowment, reluctant sharing sellers benefit greatly from the market: They manage to earn more money than the average dictator earned in the Control treatment without having to be directly responsible for the very low earnings of recipients. In the next subsection, we examine how markets influence the dictator game allocation decisions.

Giving to Recipients by Treatment

Central Tendencies in Giving to Recipients

Hypothesis 2, that dictators in the Market treatment will give less money to recipients on average than in the Control treatment, is strongly supported by the data. The left column of Table 3 reports the breakdown of average giving by treatment and role. In the dictator game following the Market, the dictators gave an average of 7.3% of the endowment, or an average of $1.17 with a 95% confidence interval of the mean of [$0.91, $1.43]. In contrast, dictators in the Control treatment gave a little over twice as much: around 15.7% of the endowment, or an average of $2.51 with a 95% confidence interval of [$2.14, $2.88]. As a group, the buyers who bought a

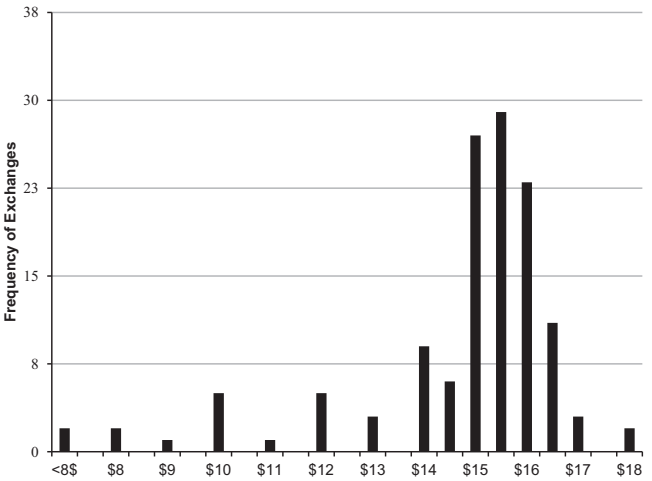

Figure 2. Prices of Dictator Games Sold in Market.
Notes: The number of dictator games sold at a price within each $0.50 interval is shown. Intervals begin at prices of even dollars and 50 cents above even dollars.

Table 3. Summary of Dictator Game Allocations by Treatment and Role

Treatment and Role	Average Allocation to Recipients	Reweighted Average Allocation to Recipients
Market treatment	\$1.17	\$1.48
	(\$2.33)	(\$2.36)
All buyers	\$1.68	\$1.48
	(\$2.59)	(\$2.20)
All sellers	\$0.82	\$1.48
	(\$2.09)	(\$2.53)
Random market treatment	\$0.89	\$1.45
	(\$2.09)	(\$2.40)
All buyers	\$1.11	\$1.47
	(\$1.98)	(\$2.51)
All sellers	\$0.84	\$1.43
	(\$2.12)	(\$2.32)
Control treatment	\$2.51	\$2.48
	(\$3.39)	(\$2.83)
All buyers	\$1.75	\$1.94
	(\$2.74)	(\$2.57)
All sellers	\$3.03	\$2.97
	(\$3.68)	(\$3.01)

Source: "Average Allocation to Recipients" is an average calculated by weighing each dictator game equally. "Reweighted Average Allocation to Recipients" is calculated by finding the average amount allocated by each dictator, and then calculating the mean of these averages. Thus, the left column weights *the allocation in each game* equally, while the right weights *the mean allocation by each dictator* equally. Standard deviations are in parentheses.

dictator game in the Market gave an average of 10.4% to the recipients. Compare this to the sellers that kept the dictator game in the Market, who only gave 5.1%. In the Control, this asymmetry was flipped. Dictators replaying buyer decisions gave an average of 10.9%, while dictators replaying seller decisions gave 18.9%.

What explains these differences? In the Market treatment, dictator games are only played by those buyers who successfully buy a game in Stage 1 and those sellers who choose not to sell their game in Stage 1. An examination of Figure 3 suggests that the low giving in the Market treatment is driven by reduced giving from both buyers and sellers, but particularly by the lack of generous sellers. It appears that while some buyers divide the endowment almost evenly, virtually no sellers do. Since roles are randomly assigned, one explanation might be that individuals behave differently (perhaps more or less "selfishly") due in part to some inherent (possibly emergent) characteristic of the assigned role. Alternatively, the cause may be the propensity of the market to systematically select some buyers and sellers more than others. We investigate these hypotheses in more detail in "*Explaining Low Giving in Market Treatment.*" For now, we compensate for selection by calculating the average of each dictator's allocation and then averaging across dictators, as opposed to simply averaging across all games. Thus, instead of weighing *the allocation in each game* equally, the *reweighted average allocation* weighs *the mean allocation by each dictator* equally. We report this number in the right column of Table 3.

In the Market, the mean of the average amount given by sellers is within one fifth of a cent of that given by buyers. In the Control, the reweighted average allocation of dictators replaying seller decisions is almost a dollar more than the amount given by dictators replaying buyer decisions.

Reweighted allocations let us control, albeit crudely, for dependence in decisions made by the same subject. In testing the differences in reweighted allocations by treatment, we find there is a marginally significant difference between allocations in the Market and the Control ($p = 0.06$).

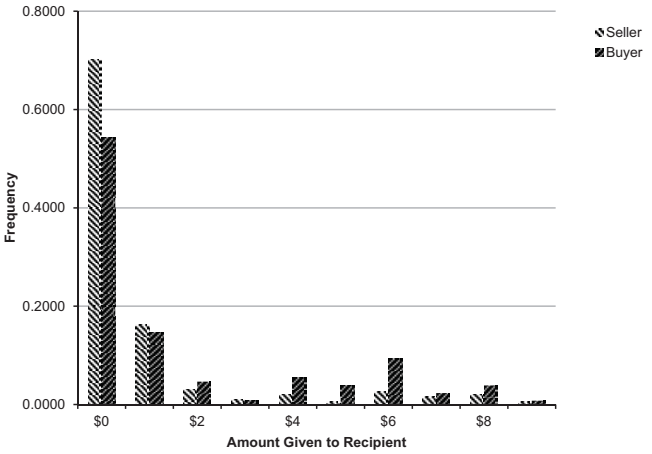

Figure 3. Amounts Given to Recipient in Market.
Notes: The Frequency of Dictators giving an Amount to the Recipients within a $1.00 Interval is Reported. The Instance of exactly $0 given is Reported. Every other Interval begins at one Cent above an even Dollar, up to an even Dollar.

In the Market, there is clearly no significant difference in the central tendency of dictator allocations made by buyers and sellers (right-hand column of Table 3, $p = 1$). Rather, the fact that sellers give less than buyers overall appears to originate in the selection process inherent to the market. That is, buyers and sellers that play the dictator game a certain way are more likely to buy or sell the game, other things equal. In the Control treatment, while there is a larger gap for dictators replaying buyer and seller decisions, this difference is not significant ($p = 0.16$).

Analyzing and Interpreting Giving to Recipients

A better understanding of the aggregate differences between giving in the Market and Control requires accounting for unobserved individual heterogeneity and possible censoring of dictator behavior in the observed data.[14] With this aim, we report the results of three Random Effects Tobit Regressions in Table 4, both pooling the Market, Random Market, and Control treatments; and for each separately. We regress giving in the dictator game on the dictator's role (with a dummy for Buyer) and the Period number. For the regression on the pooled data, we also include a dummy for the Market, Random Market, and interaction terms. (We report linear regressions in Supporting Information Table A1.)

When pooling the Control, Market, and Random Market data (Model 1), we find that participating in the Market selection mechanism has a significant and negative impact on the amount allocated to recipients. Further, we find that in all regressions, allocation to recipients significantly decreases with period, and more so for the Market than the Control. While the signs on the Buyer dummy and its treatment interactions are of the sign one might expect based on the analysis in the previous section (negative and positive respectively), neither is significant nor are they jointly significant ($p = 0.89$ by Likelihood Ratio Test). Similarly, we find that the coefficient estimates on the

[14] This specification presumes that a latent sentiment may exist to "take" a recipient's wealth in excess of taking the entire endowment (Bardsley 2008), but that this sentiment is censored by the $0 lower bound on giving (and analogously at $16 for the most "generous" dictators).

Table 4. Random-Effects Tobit Regression of Giving

	All Treatments, Pooled (1)	Market Only (2)	Random Market Only (3)	Control Only (4)
Constant	2.6318***	0.7004	−0.0500	2.5378***
	(0.7887)	(0.7593)	(0.8665)	(0.8591)
Market	−2.0265*	—	—	—
	(1.1352)			
Random market	−3.1571**	—	—	—
	(1.2351)			
Buyer	−1.3889	0.7309	1.0178	−1.4225
	(1.0926)	(0.5735)	(1.2033)	(1.1882)
Period	−0.1602***	−0.2986***	−0.1358*	−0.1665***
	(0.0523)	(0.0589)	(0.0604)	(0.0576)
Market * Buyer	2.1419	—	—	—
	(1.5596)			
Random * Buyer	2.6698	—	—	—
	(1.7056)			
Market * Period	−0.1444*	—	—	—
	(0.0808)			
Random Market * Period	0.0114	—	—	—
	(0.0922)			
S.D. of R. effect	3.8987	3.5777	3.6606	4.2308
Obs (subjects)	880 (162)	320 (59)	240 (44)	320 (59)

Source: Dependent variable is amount given to recipient in dollars. The data are grouped unevenly by subject, as some subjects played the dictator game more than others. Random effects are at the subject level. Three (***), two (**), and one (*) stars indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are reported in parentheses. An upper limit of $16 and a lower limit of $0 were used in the Tobit. All Random Effects were significant at the 1% level ($p < 0.001$ for all). Linear regressions with the same data are reported in Supporting Information Table A1.

Buyer dummy exhibits the expected sign in the Market-only and Control-only regressions (Models 2 and 4, respectively), but neither is significant.[15]

In the next section, we turn our attention to explaining why dictator allocations are lower in the Market than the Control by breaking down buyer and seller behavior.

Explaining Low Giving in Market Treatment

Buyer Behavior

Buyers who buy the dictator game more often tend to give more to the recipients. The data show that 87.5% of buyers bought the game at least once, with a per-buyer average of 4.03 games purchased (of a possible 10). Of these, the buyers who obtained the dictator game more often than average gave an average of $2.04 to the recipients, whereas the buyers who played the dictator game fewer times only gave an average of $0.91. This is illustrated by the solid trend line in Figure 4. Its upward slope indicates that buyers who played the game more often tend to give more to the recipients.

We now consider the relationship between the price at which a dictator game is sold and the amount the "successful" buyer allocates to recipients. Figure 5 provides a graphical representation of the data. Table 5 reports three Tobit regressions of the amount allocated by buyers who

[15] As a robustness check, the models reported in Tables 4 and 5 were also estimated with period dummies and as linear models with cluster-robust standard errors. There is no change in the sign and little variation in the significance of the estimated coefficients. This additional analysis is available on request from the authors.

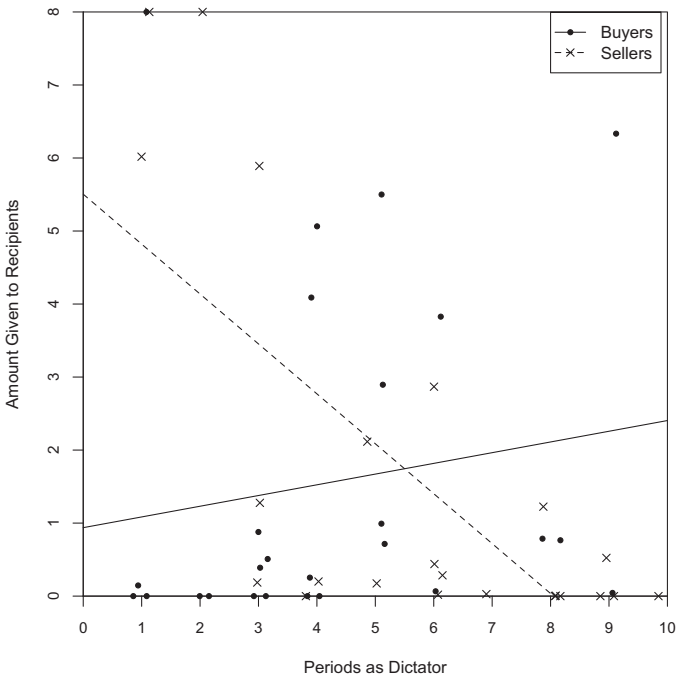

Figure 4. Giving as a Function of Dictator Games Played in Market.
Notes: Linear Trend Lines for Buyer and Seller Giving are Graphed. Point Observations are Slightly "Jittered" for Clarity.

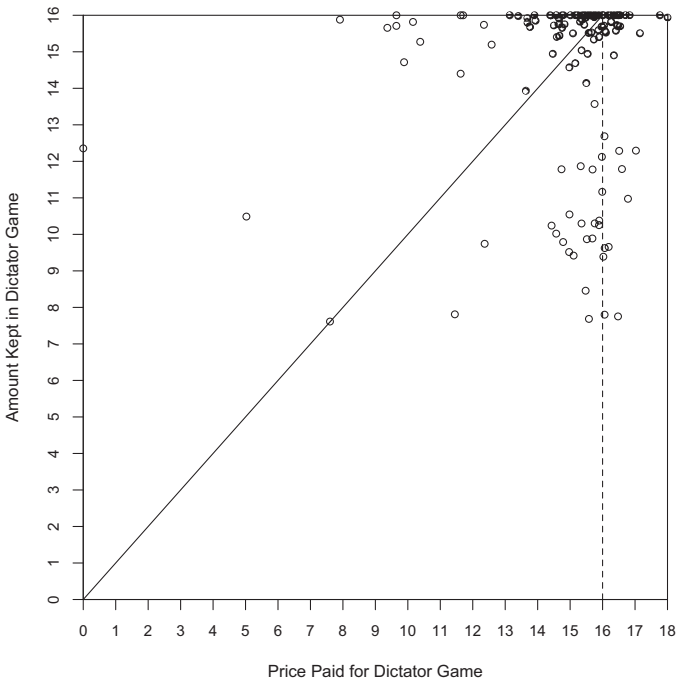

Figure 5. Amount Kept in Dictator Game versus Price Paid in Market.
Notes: 129 Observations of Transactions in Market are Reported. Point Observations are Slightly "Jittered" for Clarity.

Table 5. Random-Effects Tobit Regression of Giving for Buyers Who Bought

	All Treatments, Pooled (5)	Market Only (6)	Random Market Only (7)	Control Only (8)
Constant	3.0761***	4.6934***	2.7110***	2.4198
	(1.0883)	(1.5974)	(0.8731)	(1.7880)
Market	0.2931			
	(1.1017)			
Random market	−0.2112			
	(1.3322)			
Period	−0.1083	−0.2652***	−0.2330***	−0.1272
	(0.0769)	(0.0904)	(0.0602)	(0.0866)
Price	−0.1287**	−0.2380**	−0.0568	−0.0819
	(0.0592)	(0.1071)	(0.0436)	(0.1222)
Market * Period	−0.1812*			
	(0.1072)			
Random market * Period	−0.1056			
	(0.1585)			
S.D. of R. Effect	3.3615	1.9672	2.8355	3.7148
Obs (Subjects)	309 (76)	129 (28)	51 (20)	129 (28)

Source: Dependent variable is amount given to recipient in dollars. The data are grouped unevenly by subject, as some buyers bought the dictator game more than others. Random effects are at the subject level. Three (***), two (**), and one (*) stars indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are reported in parentheses. An upper limit of $16 and a lower limit of $0 were used in the Tobit. All Random Effects were significant at the 1% level ($p < 0.001$ for all). Linear regressions with the same data are reported in Supporting Information Table A2.

purchased a game on period, price, and an interaction term, with random effects at the buyer level. (We report a similar table for sellers in the Supporting Information Table A3.) As before, regressions are reported for the Market, Random Market, Control, and pooled data, with the last of these containing a dummy for the Market, Random Market, and interaction terms. (We report linear regressions in Supporting Information Table A2. We also report a figure mirroring Figure 5, but for the Control treatment, as Supporting Information Figure A1.)

The estimated coefficient on the time trend is not significant at the 10% level in the pooled data (Model 5) or the Control (Model 8), but it is different from zero and negative in the Market (Model 6). We find further that while Market allocations "start out" higher for the Market, they are significantly inversely related to price in the Market and not so for the Control. This suggests that buyers react more strongly and consistently in a negative manner to paying a higher price in the Market than when simply confronted with a disadvantageous initial allocation in the Control.

The model predicts that the same buyer in the Market allocates less to the recipient for every dollar spent buying the game. One hypothesis that could explain this result is that some buyers use the market price to justify selfish behavior. Low giving may be necessary after a high price is paid in order to roughly break even on the transaction, and some buyers may believe that such behavior is (more) acceptable if the recipient gets nearly as much the seller would have given.

Conversely many buyers are clearly not concerned with turning a profit. In fact, in Table 6, we see that while a plurality of exchanges resulted in a profit for buyers, in 40% of the exchanges the buyers were actually taking a loss. Furthermore, the magnitude of loss was larger than that of gains, meaning that on average buyers actually *lose money* by participating in the market. A little over half of the transactions (53%) resulted in a net benefit for the buyer between –$1.00 and $1.00. The relationship of price and amount kept is suggestive. One possible explanation is that buyers may attempt to absolve themselves of the responsibility of the generally poor outcomes for

Table 6. Net Benefit of Dictator Game to Successful Buyers in the Market

Net Benefit to Buyers	Number of Transactions	Average Net Benefit
Profit (Price < Amount kept)	62 (48%)	$1.94
Zero (Price = Amount kept)	16 (12%)	$0.00
Loss (Price > Amount kept)	51 (40%)	–$3.48
Total	129	–$0.43

the recipient by reasoning that recipients' fortunes would not be much different if the seller had kept the dictator game. This raises the question: How did sellers behave?

Seller Behavior

Sellers who sell the dictator game less often tend to give less to the recipients.[16] The steep slope of the dashed trend line of Figure 4 illustrates that sellers who play the game more often tend to be less generous. We note that about 94% of sellers sold the game at least once, and all but one retained the game at least once. The sellers who remained dictator more often than average gave an average of only $0.26 to the recipient, while sellers who remained dictator less than average gave a much more respectable $2.47 on average to the recipients.

Why do sellers who sell less often give less to the recipients? Consider the three types of sellers, defined in section 4 based on the LMW specification: self-interested, willing sharers and reluctant sharers. When there is an outstanding bid above $16, both self-interested and reluctant sharers would like to accept it. However, when the only available bids are below $16, only reluctant sharers would accept. Due to the spread of incoming bids, we would expect that reluctant sharers find acceptable trading partners more often than self-interested sellers, even though they are relatively generous when they end up keeping the game. The trend for sellers pictured in Figure 4 echoes this result and suggests that this kind of market selection occurs in our experiment.

However, another surprising result in our data suggests that market selection alone cannot explain our results. Specifically, out of 32 sellers in our Market condition there is not one who consistently refused to sell the dictator game *and* gave an amount to the recipients at least as large as the average seller in the Control. Recall that LMW find that 30% of subjects are willing sharers. Willing sharers should not sell their dictator game unless they believed that the buyer would be even more generous to the recipient, but when we elicit their beliefs (as detailed in the next section) we find that sellers do not expect buyers to be generous. It seems as though willing sharers simply do not exist on the seller side of the market, even though they should exist in equal proportions among buyers and sellers. Instead, market interaction may be affecting sellers (of each type) by monetizing the dictator game and reducing the amount of money they feel obligated to give to the recipients. We test the hypothesis that the available market price affects the amount sellers who keep the dictator game choose to give, but we find no significant effect.

[16] One might ask if sellers who sell less, give less, because they retain the game to keep more, or because dictators give less over time and sellers with fewer games played them more in the early rounds. The data supports the former interpretation. We regress (OLS, not reported) giving of sellers on a time trend and a running count of number of games played, per subject, by a given period, and find no significant time trend ($p = 0.58$), but a significant and negative effect of number of games played ($p = 0.02$).

In the next section, we evaluate the results of Random Market and further demonstrate that market selection *alone* cannot explain the reduced giving that occurs following participation in a market.

Results of Random Market

We observe dictators in Market giving \$1.17 on average, which is significantly less than the \$2.51 dictators give on average in Control. Hypothesis 3 predicts that giving in Random Market will fall halfway between \$1.17 and \$2.51, at \$1.84. However, the average amount given to recipients in Random Market is only \$0.89, with a 95% confidence interval of the mean of [\$0.63, \$1.16], allowing us to reject the hypothesis. The Random Market treatment failed to improve the outcomes for recipients because it was not able to effectively preserve the pro-social behavior seen in Control, even when subjects had their transactions canceled. The fact that Random Market did not mitigate the decrease in giving found in Market indicates that subjects' attitudes about fairness, altruism, or norms of sharing are fundamentally different after having participated in a market. The results are consistent with market forces overriding or eroding the otherwise pro-social attitudes of sellers when the opportunity presents itself, as argued in Falk and Szech (2013).

Of all possible exchanges in Random Market, 35% were attempted and just under 14% were completed.[17] Furthermore, prices in the Random Market were lower and more variable than in the Market treatment. The average price in Random Market was \$12.45, while the average price in Market was \$14.76.[18]

Broken down by type, the giving behavior of subjects in Market and Random Market does not appear to be meaningfully different. On average, allocations to recipients by successful buyers was \$1.11 in Random Market and \$1.68 in Market; this difference was not significant ($p = 0.63$). Allocations to recipients by sellers was, on average, \$0.84 in Random Market and \$0.83 in Market (also ns).[19]

In "*Seller Behavior*," we showed that sellers in Market who frequently do not sell the right to play the dictator game give the least to recipients. This selection effect is even more pronounced in Random Market. In Random Market, giving by sellers who kept the dictator game because they did not agree to an exchange was, on average, \$0.52, while sellers who did agree to an exchange but their trades were invalidated gave \$2.33 on average. This is over four times as much as those who did not intend to trade, but still smaller than the \$2.51 given in Control. If market participation did not erode pro-social behavior, we would expect sellers with invalidated transactions to give more than the average giving in Control and not less. This is because sellers who sell the dictator game often are the ones who give more on average to recipients.

Attitudes and Beliefs

In order to learn more about subjects' feelings of responsibility, we asked subjects to report their attitudes toward fairness and responsibility using a 5-point scale from 1 (strongly disagree) to 5

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[17] Around 39% of negotiated transactions were completed. Given the exogenous 50% cancellation rate, the probability of a completion rate this low was less than 4%.

[18] The difference in average prices is not significant, taking the group as the independent unit of observation ($p = 0.35$).

[19] Allocations to recipients in Random Market are not different from the Control treatment for buyers ($p = 0.24$), but are different and greater for sellers ($p < 0.0001$).

Table 7. Average Beliefs of Buyers and Sellers in Market

Group [Observations]	Belief of Average Giving of Buyers	Belief of Average Giving of Sellers
All buyers [32]	\$1.73	\$1.37
All sellers [32]	\$1.02	\$1.67
Sellers (frequent seller) [18]	\$1.21	\$1.61
Sellers (infrequent seller) [14]	\$0.95	\$1.70
True values	\$1.67	\$0.82

Source: Average beliefs of subjects elicited from a postexperimental questionnaire is reported. Subjects were paid \$1.00 for a perfectly correct answer and lost one cent for every cent difference between their answer and the correct answer.

(strongly agree). Supporting Information Table A4 displays averages of these reports by role, as well as looking at different subgroups of buyers and sellers split at the median point.

Buyers and sellers in the Market treatment are slightly more likely to consider their own decisions to be fair than those of other buyers and sellers ($p = 0.04$). Below-median givers correctly believe that recipients will view their actions as less fair ($p < 0.01$) and report less feeling of responsibility for the recipient outcomes ($p = 0.02$). Frequent sellers report feeling just as responsible as infrequent ones ($p = 1$). This suggests that the act of selling is not a direct means of reducing one's feeling of responsibility for an unequal outcome. The reduced feelings of responsibility may instead come from the interaction of the market, which monetizes the value of being dictator for buyers and sellers alike.

In Table 7, we report incentivized elicitations of how much subjects believe that buyers and sellers as a whole would give to recipients on the average.[20] It suggests that sellers are not fooling themselves into believing that by allowing someone else to play the role of dictator, they are not harming recipients. In fact, sellers (paid for accuracy) actually guessed that recipients were receiving \$0.65 less than they actually were! Buyers and sellers believed that sellers were giving more than they actually were when they decided not to sell ($p = 0.04$). Although speculative, we note that pro-social buyers may have been more willing to buy the dictator game if they knew exactly how little sellers were giving.

6. Discussion

When negative externalities fall upon third parties, there are incentives to sell off these "morally tough" decisions to others. In this vein, we study a laboratory market where the role of dictator is put up for auction rather than being assigned at random. We find over 40% of games are traded in this market. We also find aggregate giving after assignment in the Market is *less than half* of what it was in a Control treatment where subjects are directly assigned that right.

Why do participants in the Market treatment give less than in the Control? Our analysis admits at least two possibilities. Market interaction may fundamentally alter an individual's propensity to exhibit pro-social behavior, thereby changing the distributional outcomes. Additionally, the market may systematically transfer decision rights to individuals whose other-regarding preferences toward the third party (i.e., the recipient) are less pro-social.

[20] For belief elicitations, subjects were paid \$1.00 minus absolute deviation from the true value (also measured in dollars), to a minimum of \$0.00.

Caution is warranted in trying to distinguish exposure to the market from the effects of selection. Participating in a market *is* participating in a selection mechanism, and it may not be possible to fully disentangle the impact of selection from the exposure to participating in the market. However, the results of our Random Market treatment show that the negative impact of the market on the pro-social preferences of both buyers and sellers cannot be explained by selection alone, or else it would have been mitigated by the fact that one-half of the transactions were canceled.

Setting this point aside, selection does appear to contribute directly to decreased giving. We find that both "more generous" buyers buy more often and that, in aggregate, the trade in dictator games represents a net loss to buyers. But at the same time, we see that prospectively "more generous" sellers sell more often. This dichotomy is not easily explained. Buyer and sellers are drawn from the same population, and yet buyers that appear more pro-social (at least in how they play the dictator game) use the market to buy largely from sellers who are also more pro-social than their counterparts who did not sell.

What does this tell us about markets for agency for "morally costly" decisions? In our experiment, while more generous buyers of agency rights are more likely to buy, they appear to buy from sellers who might otherwise be more generous themselves. The net effect (in our experiment) is that the presence of the market materially harms passive recipients. This experiment is a simplified and very specific case. Yet our findings are consistent with the broader literature suggesting that markets, directly and via selection, dilute the potential for pro-social preferences to be realized in outcomes for those external groups that are indirectly impacted by market activity.

In attempting to explain this result, one might ask whether sellers are deluding themselves into believing that buyers give more than they do, or similarly for buyers. Using incentivized belief elicitation tasks, we show that our results are not driven by ignorance, willful or otherwise, about the eventual outcomes of recipients. Therefore, the deleterious effect of market interaction cannot simply be corrected by ensuring that market participants have better knowledge of the indirect effects of their actions. If there is an undesirable side-effect of certain interactions in a market, the broader literature (consistent with the results of this study) suggests that one way to reduce such externalities may be to make participants feel more responsible for their actions. As we learn more about the way our preferences for fairness interact with our market experiences, we may discover if, where, and how endogenous institutional innovations in markets or market intervention may impact the type of distributional outcomes seen in the field.

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Supporting Information

Additional Supporting Information may be found in the online version of this article.