Prosecutorial Discretion and Crime Decisions

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Abstract

How does prosecutorial discretion affect crime rates? We theoretically and experimentally explore the relationship between plea bargaining and crime rates.

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1 Theory

This section consists of six subsections. The first subsection focuses on setting up the theoretical environment. The second, third, and fourth subsections describe the trial, plea bargaining, and crime decision stages, respectively. The fifth subsection explains the equilibria that arise and the sixth subsection explains the effects of restricting prosecutorial discretion.

1.1 Setup

There is an individual who has the opportunity to commit a crime or engage in a productive activity. The individual can obtain v by committing the crime or can produce ω instead. If the individual commits the crime, she has probability g_G of getting arrested. If the individual does not commit the crime, she has probability g_I of being arrested. It is assumed that $g_G > g_I$.

If the individual (now a defendant) becomes arrested, she interacts with a prosecutor who may offer her a plea bargain b. If the defendant accepts the plea bargain, she obtains $-b$ and the prosecutor obtains b. It is assumed that there is no transaction cost of plea bargaining to either the defendant or the prosecutor. If the defendant rejects the plea bargain or the prosecutor does not offer a plea bargain, they both go to trial.

If a defendant goes to trial, she obtains $-s$ (and the prosecutor s) if she loses the trial and obtains 0 (and the prosecutor 0) if she wins the trial. It is assumed that there is a trial cost c for both the prosecutor and the defendant. A guilty defendant has the probability q_G of being convicted and an innocent individual has the probability q_I of being convicted. It is assumed that $q_G > q_I$.

1.2 Trial

We first start with the trial and then will move backwards. The expected marginal utility for an innocent defendant who reaches the trial stage can be written as

$$-sq_I - c,$$

while the expected marginal utility for a guilty defendant who reaches the trial stage can be written as

$$-sq_G - c.$$

The expected utility for the prosecutor upon reaching the trial stage can be written as

$$\rho(sq_I - c) + (1 - \rho)(sq_G - c),$$

where ρ is the probability that the defendant is innocent and $(1 - \rho)$ is the probability that the defendant is guilty.[1]

[1] We focus on the expected marginal utility for the defendant as the defendant has already obtained either v or ω before this stage. We focus on the expected utility for the prosecutor as the prosecutor has obtained no payoff before this stage.

1.3 Plea Bargaining

A defendant will accept a plea if and only if it results in an expected marginal utility that is at least as high as the expected marginal utility of going to trial. Thus, an innocent defendant will accept a plea bargain if

$$b \leq sq_I + c.$$

A guilty defendant will accept a plea bargain if

$$b \leq sq_G + c.$$

The prosecutor must decide whether to offer a plea bargain. In the case that a prosecutor offers a plea bargain, the prosecutor must decide the size of the plea bargain. The prosecutor will only offer a plea bargain if

$$b \geq \rho(sq_I - c) + (1-\rho)(sq_G - c).$$

When this condition holds, the prosecutor does at least as well in plea bargaining as she would by going to trial. Notice that a prosecutor can always offer a plea bargain of $sq_G + c$, which results in an expected utility of

$$\rho(sq_I - c) + (1-\rho)(sq_G + c).$$

This plea bargain results in a higher expected utility than the expected utility of trying everyone ($\rho(sq_I - c) + (1-\rho)(sq_G - c)$). Thus, the prosecutor will always offer a plea bargain. This is intuitive as you save the cost of going to trial against a guilty individual (and you still go to trial against an innocent individual).

There are two cases worth noting for plea bargaining. The first is a pooling plea bargain, where the prosecutor offers $sq_I + c$ to the defendant. In this case, both guilty and innocent defendants accept the plea bargain and no one goes to trial. Neither innocent nor guilty people have an incentive to deviate because they can not do better by going to trial. The second case is a plea bargain where the prosecutor offers $sq_G + c$. In this case, innocent individuals go to trial, while guilty people take the plea. There is again no incentive for innocent or guilty people to deviate as innocent people do better by going to trial and guilty people will not do better by going to trial.

There are no other offers worth considering. The prosecutor will not offer a plea bargain $b < sq_I + c$ because both innocent and guilty defendants will accept this plea bargain and the prosecutor can do better by offering $sq_I + c$. The prosecutor will not offer a plea bargain b that is in between $sq_I + c$ and $sq_G + c$ because innocent people will not accept and guilty people will accept. The prosecutor will do better by offering $sq_G + c$. The prosecutor will not offer $b > sq_G + c$ because no one will accept and we have shown that the prosecutor is better off offering $b = sq_G + c$ then having everyone go to trial.

The prosecutor will offer the pooling offer when the expected utility from a pooling offer is greater than the expected utility from a separating offer. This occurs when

$$sq_I + c > \rho(sq_I - c) + (1-\rho)(sq_G + c).$$

The prosecutor will offer the separating offer when the expected utility from a separating offer is greater than the expected utility from a pooling offer. This occurs when

$$\rho(sq_I - c) + (1-\rho)(sq_G + c) > sq_I + c.$$

We can simplify this and show that the pooling offer is chosen if

$$\frac{s(q_G - q_I)}{2c + s(q_G - q_I)} < \rho$$

and the separating offer is chosen if

$$\frac{s(q_G - q_I)}{2c + s(q_G - q_I)} > \rho.$$

The prosecutor is indifferent between a pooling and separating offer when

$$\frac{s(q_G - q_I)}{2c + s(q_G - q_I)} = \rho.$$

1.4 Crime Decisions

We can now consider crime decisions. In the case that a pooling offer will be offered, an individual will commit a crime if

$$v - g_G(sq_I + c) \geq w - g_I(sq_I + c).$$

In the case that a separating offer will be offered, an individual will commit a crime if

$$v - g_G(sq_G + c) \geq w - g_I(sq_I + c).$$

The equations show that the benefit from committing a crime is greater under a pooling offer than a separating offer (as $q_I > q_G$).

1.5 Equilibria

In this subsection, we assume that w is distributed from a distribution $f(w)$. We need the probability that an individual is innocent to be at least $\left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right)$ at the plea bargaining stage for a pooling equilibrium to hold. Given the arrest rates g_G and g_I, we need the probability that a randomly chosen individual does not commit a crime to be at least $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$. When this holds,

$$\rho \geq \frac{g_I\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)}{g_I\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right) + g_G\left(\frac{(2c)(g_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)} = \left(\frac{s(q_G - q_I)}{2c + s(q_G - q_I)}\right).$$

In order for the probability that a randomly chosen individual does not commit a crime to be at least $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$, we need the following condition to hold.

$$v - g_G(sq_I + c) \leq F^{-1}\left(1 - \frac{sg_G(q_G - q_I)}{(g_I)(2c) + g_G(s(q_G - q_I))}\right) - g_I(sq_I + c). \tag{1}$$

This condition states that an individual with any wealth level that is in the top $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$ percent of wealth will not commit a crime. Thus, this results in a pooling equilibrium.

We need the probability that an individual is innocent to be at most $\left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right)$ at the plea bargaining stage for a separating equilibrium to hold. Given the arrest rates g_G and g_I, we need the probability that a randomly chosen individual does not commit a crime to be at most $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$. When this holds,

$$\rho \leq \frac{g_I\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)}{g_I\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)+g_G\left(\frac{(2c)(g_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)} = \left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right),$$

In order for the probability that a randomly chosen individual does not commit a crime to be at most $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$, we need the following condition to hold.

$$v - g_G(sq_G+c) \geq F^{-1}\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right) - g_I(sq_I+c). \tag{2}$$

This condition states that an individual with any wealth level that is in the bottom $\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$ percent of wealth will commit a crime. Thus, there is at most a $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$ probability that an individual does not commit a crime and we have a separating equilibrium.

One thing to notice about equations (1) and (2) is that it is possible for neither of these conditions to hold.[2] In this case, there is neither a pooling nor a separating equilibrium. This arises as the incentives for committing a crime are different between the two conditions. Notice that $v - g_G(sq_I+c) > v - g_G(sq_G+c)$ and the right-hand side of equations (1) and (2) are the same. In this case, an "equilibrium" with a pooling offer would result in $\rho < \left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right)$ and an "equilibrium" with a separating offer would result in $\rho > \left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right)$ because of the differing crime incentives.

In the case that neither a pooling equilibrium nor a separating equilibrium exists, we can show that there exists a partial-pooling equilibrium. Under a partial-pooling equilibrium, the prosecutor offers

$$\begin{cases} (sq_I+c) & \text{w/ probability } \sigma^* \\ (sq_G+c) & \text{w/ probability } 1-\sigma^*. \end{cases}$$

For a partial-pooling equilibrium to occur, the prosecutor must be indifferent between offering (sq_I+c) and (sq_G+c), which occurs when

$$\frac{s(q_G-q_I)}{2c+s(q_G-q_I)} = \rho.$$

All we need to show that a partial-pooling equilibrium exists is to show that there exists a σ such that the probability that a defendant is innocent at the plea bargaining stage is

[2] It is not possible for both of these equations to hold as this would only occur if $q_G = q_I$.

innocent is $\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}$ (in expectation). This holds when

$$v-g_G\left(\sigma(sq_I+c)+(1-\sigma)(sq_G+c)\right)=F^{-1}\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)-g_I(sq_I+c). \tag{3}$$

This condition guarantees that the probability that a randomly drawn individual commits a crime is equal to $\left(\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)$. Thus, the probability that a defendant at the trial stage is innocent is equal to $\left(\frac{s(q_G-q_I)}{2c+s(q_G-q_I)}\right)$. The left-hand side of equation (3) arises from the fact that guilty individuals always accept $b \leq sq_G + c$. Notice that innocent people are always guaranteed to lose $sq_I + c$ in expectation after arrest in any equilibrium and thus the right-hand side is unchanged from equations (1) and (2). Innocent individuals can always go to trial to get $sq_I + c$ in expectation. We can use equation (3) to solve for σ^*, which results in this equilibrium. Solving for σ^* in equation (3) gives us

$$\sigma^*=\frac{\left(\frac{\left(F^{-1}\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)-g_I(sq_I+c)-v\right)}{g_G}+sq_G+c\right)}{sq_G-sq_I}.$$

Equations (1), (2), and (3), give us three possible equilibria that can arise in this game. We will now show that these equilibria cover all of the parameter space. As mentioned earlier, the right-hand side of equations (1), (2), and (3) are the same. Thus, we just need to show that there exists a σ such that equation (3) holds when equations (1) and (2) do not hold. When equations (1) and (2) do not hold,

$$v-g_G(sq_G+c)<F^{-1}\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)-g_I(sq_I+c)<v-g_G(sq_I+c).$$

As $v - g_G(\sigma(sq_I + c) + (1-\sigma)(sq_G + c))$ is a linear combination of $v - g_G(sq_G + c)$ and $v - g_G(sq_I + c)$, there must exist a σ in this case such that

$$v-g_G\left(\sigma(sq_I+c)+(1-\sigma)(sq_G+c)\right)=F^{-1}\left(1-\frac{sg_G(q_G-q_I)}{(g_I)(2c)+g_G(s(q_G-q_I))}\right)-g_I(sq_I+c).$$

Thus, one of the three equations must always hold.

1.6 Restricting Prosecutorial Discretion

We can now explain the effects of restricting prosecutorial discretion. Assume that the plea bargain that a prosecutor can offer is exogenously restricted. Let $\underline{b}$ be the lowest plea bargain that a prosecutor can offer under this restriction. We will focus on the effects that restricting the plea bargain has on each equilibrium.

First, consider a pooling equilibrium. In this equilibrium, the prosecutor offers $sq_I + c$ and all defendants accept. If $\underline{b} \leq sq_I + c$, then there is no effect on prosecutor or defendant behavior by restricting the plea bargain. If $sq_I + c < \underline{b} \leq sq_G + c$, then the prosecutor will offer $b = sq_G + c$ as this maximizes the prosecutor's expected utility conditional on all innocent individuals going to trial. In this case, the crime rate is monotonically decreasing as guilty individuals accept a higher plea bargain ($sq_G + c$) than they did before ($sq_I + c$) and innocent individuals have the same expected utility. If $sq_G + c < \underline{b}$, then regardless of what the prosecutor offers, everyone goes to trial. Once again, the crime rate is monotonically decreasing as guilty individuals have a lower expected utility than before and innocent individuals have the same expected utility.

Second, consider a partial-pooling equilibrium. In this equilibrium, the prosecutor offers $sq_I + c$ with probability σ^* and $sq_G + c$ with probability $(1 - \sigma^*)$. If $\underline{b} \leq sq_I + c$, then there is once again no effect on prosecutor or defendant behavior by restricting the plea bargain. If $sq_I + c < \underline{b} \leq sq_G + c$, then the prosecutor will offer $b = sq_G + c$ as the prosecutor can no longer get innocent individuals to go to trial with any positive probability. Thus, in this case, the crime rate is monotonically decreasing as guilty individuals accept a higher plea bargain than they did before and innocent individuals have the same expected utility. If $sq_G + c < \underline{b}$, then regardless of what the prosecutor offers, everyone goes to trial. Once again, the crime rate is monotonically decreasing as guilty individuals have a lower expected utility than before and innocent individuals have the same expected utility.

Third, consider a separating equilibrium. In this equilibrium, the prosecutor offers sq_G+c, which leads to guilty defendants accepting and innocent defendants going to trial. If $\underline{b} \leq sq_G + c$, then there is no effect on prosecutor or defendant behavior by restricting the plea bargain. If $sq_G + c < \underline{b}$, then prosecutor and defendant behavior is affected. Regardless of what prosecutors offer, all defendants will go to trial. This will have no effect on crime as both innocent and guilty defendants have the same expected utility as they did in a separating equilibrium.

It is clear that restricting the plea bargain that prosecutors can offer never leads to an increase in the crime rate. Restricting the plea bargain that prosecutors can offer will either decrease the crime rate or leave the crime rate unchanged. The effect that restricting the plea bargain has depends on the equilibrium before the restriction (thus, depends on the underlying parameters) and the restriction put in place. This analysis suggests that restricting the plea bargain that can be offered is a way to potentially decrease crime.

2 Experimental Design

The experiment is designed with two goals in mind. The first goal is to uncover whether prosecutors make plea bargains that are consistent with theory. The second goal is to uncover whether restricting prosecutorial discretion can reduce crime.

2.1 Treatments and Parameters

The experiment consists of four treatments: (i) the Pooling treatment, (ii) the High Crime Value treatment, (iii) the Truncated Wealth treatment and (iv) the Restricted Plea Bargain treatment. We use a between-subjects design where each subject faces 25

Treatment	v	s	c	q_i	q_g	g_i	g_g	$\overline{w}$	$\underline{b}$
Pooling:	\$5.00	\$4.00	\$1.00	0.25	0.50	0.25	0.50	\$10.00	\$0.00
High Crime Value:	\$7.50	\$4.00	\$1.00	0.25	0.50	0.25	0.50	\$10.00	\$0.00
Truncated Wealth:	\$5.00	\$4.00	\$1.00	0.25	0.50	0.25	0.50	\$6.15	\$0.00
Restricted Plea Bargain:	\$5.00	\$4.00	\$1.00	0.25	0.50	0.25	0.50	\$10.00	\$3.00

Table 1: Parameters for each treatment. Numbers highlighted in red denote differences between the given treatment and the pooling treatment.

Treatment	Crime Rate	Plea Offered	Innocent Outcome	Guilty Outcome
Pooling:	0.45	\$2.00	Accept Plea	Accept Plea
High Crime Value:	0.65	\$3.00	Trial	Accept Plea
Truncated Wealth:	0.65	\$3.00	Trial	Accept Plea
Restricted Plea Bargain:	0.40	\$3.00	Trial	Accept Plea

Table 2: Predictions for each treatment. "Crime Rate" denotes the predicted rate of crime in each treatment. "Plea Offered" denotes the predicted plea bargain offered by the prosecutor. "Innocent Outcome" refers to the predicted outcome for innocent individuals. "Guilty Outcome" refers to the predicted outcome for guilty individuals.

periods of the criminal justice game. Table 1 displays the parameters for each treatment. One thing to notice is that the non-Pooling treatments only differ from the Pooling treatment by one parameter. The High Crime Value treatment has a larger value of v than the pooling treatment as the benefit of committing a crime increases from \$10.00 to \$20.00. The Truncated Wealth treatment has a smaller value of $\overline{w}$ as the highest possible wealth value goes from $\overline{w} = \$25.00$ to $\overline{w} = \$10.72$. The Restricted Plea Bargain treatment has a higher value of $\underline{b}$ as the lowest possible plea bargain goes from $\underline{b} = \$0.00$ to $\underline{b} = \$7.50$.

Table 2 displays the predictions for each treatment. In the Pooling treatment, we expect a crime rate of 0.35 and a pooling plea bargain of \$5.00. In the High Crime Value treatment, we expect a crime rate of 0.70 and a separating plea bargain of \$7.50. In the Truncated Wealth treatment, we expect a crime rate of 0.70 and a separating plea bargain of \$7.50.[3] In the Restricted Plea Bargain treatment, we expect a crime rate of 0.30 and a separating plea bargain of \$7.50.

[3]The predicted crime rates are slightly different in the High Crime Value and Truncated Wealth treatments. In the High Crime Value treatment, the predicted crime rate is 0.70. In the Truncated Wealth treatment, the predicted crime rate is approximately 0.6996. For the purpose of our analyses, we will treat these two predicted crime rates as identical.

2.2 Experiment

Instructions for the experiment were displayed on each subject's computer. After subjects read the instructions, they completed five comprehension questions that were each worth \$0.50. Upon completion of the comprehension questions, the experiment began.

We use the pooling treatment as an example of the experiment. In the pooling treatment, subjects are randomly matched into pairs. There are two subjects randomly matched in a pair: (i) a (possible) defendant and (ii) a prosecutor. Subjects are fixed in their roles throughout the experiment. At the start of a period, the defendant has an opportunity cost w that is randomly drawn from a uniform distribution with support between (inclusive) \$0.00 and \$25.00.[4] Both the defendant and the prosecutor are also given an initial endowment of \$5.00.[5] The defendant can commit a crime by taking \$10.00. If she takes \$10.00, she will get charged with 50% probability. If she does not take \$10.00, she receives w and is charged with 25% probability. If she is not charged with theft, the period ends. If she is charged with theft, the period continues to the prosecution stage.

In the prosecution stage, the prosecutor can offer a plea bargain b. We restrict the plea bargain b to be between \$0.00 and \$12.50.[6] If the defendant accepts the plea bargain, the period ends. The defendant loses b in a plea bargain, while the prosecutor gains b in a plea bargain. If the defendant rejects the plea bargain, the defendant and the prosecutor both go to trial. Both the defendant and the prosecutor pay a cost of \$2.50 when they go to trial. At trial, an innocent individual has a 25% chance of being convicted and a guilty individual has a 50% chance of being convicted. If the defendant is convicted, she loses \$10.00, while the prosecutor obtains \$10.00. If the defendant is acquitted, both the defendant's and the prosecutor's payoffs are unchanged.

The other treatments are similar to the pooling treatment except that each has one difference. The High Crime Value treatment differs from the Pooling treatment as the benefit of committing a crime, v, increases from \$10.00 to \$20.00. The Truncated Wealth treatment is similar to the Pooling treatment except that the maximum wealth, $\overline{w}$, decreases from \$25.00 to \$10.72. The Restricted Plea Bargain treatment is similar to the Pooling treatment except that the minimum allowable plea bargain, $\underline{b}$, increases from \$0.00 to \$7.50.

2.3 Additional Tasks

After subjects complete the 25 periods of the criminal justice game, subjects complete a few additional tasks. Subjects complete a risk aversion task and complete a short survey.

[4] More specifically, we draw w randomly from $\{\$0.00, \$0.01, ..., \$24.99, \$25.00\}$.

[5] This is done to reduce the possibility of subjects obtaining losses and to provide prosecutors a payment in the case that the period ends after the crime decision.

[6] We restrict the plea bargain between 0 and 12.50 as \$12.50 is the most amount of money that can be lost at the trial stage. This restriction reduces the amount of money that can be lost in a period if both a defendant and prosecutor make a mistake.

2.4 Predictions

In this subsection, we go over the hypotheses that we test for the experiment. Our first hypothesis focuses on the differences between the Pooling and High Crime Value treatments. We focus on how the crime rate changes between these treatments and how the offered plea bargain changes between these treatments.

Hypothesis 1: *Both crime rates and offered plea bargains are higher in the High Crime Value treatment than the Pooling treatment.*

The second hypothesis focuses on the differences between the Pooling and Truncated Wealth treatments. We once again focus on how the crime rate and offered plea bargain changes between these treatments.

Hypothesis 2: *Both crime rates and offered plea bargains are higher in the Truncated Wealth treatment than the Pooling treatment.*

The third hypothesis focuses on the difference between the Pooling and Restricted Plea Bargain treatments. We compare the crime rate and offered plea bargain between these treatments.

Hypothesis 3: *The crime rate is higher in the Pooling treatment than the Restricted Plea Bargain treatment. The offered plea bargain is higher in the Restricted Plea Bargain treatment than in the Pooling treatment.*

The fourth hypothesis focuses on the point predictions for the offered plea bargains. In this hypothesis, we focus on whether the plea bargains offered are consistent with theory and the "shadow of the future" predictions made in the plea bargaining literature.

Hypothesis 4: *The plea bargains offered in each treatment are as predicted.*

2.5 Procedures

The experimental sessions were run at Utah State University in AA, BB. For each treatment, we recruited AA subjects. The experiment lasted AA minutes. The experiment was coded in oTree (Chen et al., 2016). Subjects are paid a $7.50 show-up fee. In addition to the show-up fee, subjects are paid for their answers to the five comprehension questions, for one random period of the criminal justice game, and for the additional tasks.[7]

[7] If subjects lose money from the random period selected, that money will be deducted from their payment for the additional tasks. The experiment is set up such that subjects should never lose more money in a random period than they gain from the additional tasks.

References

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A Instructions

This experiment is a study of economic decision making. The amount of money that you earn depends partly on the decisions that you make and thus you should read these instructions carefully. The money that you earn will be paid privately to you, in cash, at the end of the experiment.

At the start of the experiment, you can earn \$2.50 by answering five comprehension questions about these instructions. For each correct answer to a question you will earn \$0.50. You can refer to these written instructions as you answer the questions.

Overview

In this experiment, there will be 25 periods. In each period, you will be in one of two roles: (i) the Chooser or (ii) the Offeror. The role that you are initially assigned to will be your role throughout the experiment. Half of the subjects in the session are Choosers and half are Offerors. In each period, a Chooser and an Offeror will be randomly paired and will be each given an initial \$5.00.

The period consists of up to three phases. The first phase is the **choosing phase**. In the choosing phase, the Chooser chooses between taking money from one of two boxes: (i) the left ("L") box and (ii) the right ("R") box. The L box always contains \$5.00. The R box contains a random amount of money between \$0.00 and \$10.00. Each amount of money between \$0.00 and \$10.00 is equally likely to be in the R box. Only the Chooser will be told the amount of money in the R box; the Chooser will be told the amount of money in the R box before making a decision.

If the Chooser takes money from the L box, the period has a 50% probability of continuing to the second phase. If the Chooser takes money from the R box, the period has a 25% chance of continuing to second phase. It is as if a four-sided die (numbered 1 through 4) is rolled after the Chooser chooses a box. If the Chooser takes money from the L box, the period will continue if the die lands on the number 1 or 2; otherwise, the period ends. If the Chooser takes money from the R box, the period will continue if the die lands on the number 1; otherwise, the period ends. If the period ends here, the Chooser's earnings for the period would be \$5.00 plus the contents of their chosen box. The Offeror's earnings for the period would be \$5.00.

The second phase is the **offer phase**. In the offer phase, the Offeror makes an offer to the Chooser. The Offeror can make any offer between \$0.00 and \$5.00. If the Chooser accepts the offer, the Chooser loses that amount of money and the Offeror gains that amount of money. For example, if the Chooser accepts an offer of \$4.00, she loses \$4.00

and the Offeror gains $4.00. The period ends if the offer is accepted; the period continues to the third phase if the Chooser rejects the offer. If the period ends here, the Chooser's earnings for the period would be $5.00 plus the contents of their chosen box minus the accepted offer. The Offeror's earnings would be $5.00 plus the accepted offer.

If the offer is rejected, the period continues to final phase, which is the **resolution phase**. Neither the Chooser nor the Offeror makes a decision in this phase. In the resolution phase, the Chooser and Offeror each lose $1.00. If the Chooser took from the L box, she has a 50% chance of losing an additional $4.00 and a 50% chance of losing no additional money. If the Chooser took from the R box, she has a 25% chance of losing an additional $4.00 and a 75% chance of losing no additional money. If the Chooser loses this additional $4.00, the Offeror gains an additional $4.00. It is as if a new four-sided die (numbered 1 through 4) is rolled in the resolution phase. If the Chooser took from the L box, she will lose an additional $4.00 if the die lands on the number 1 or 2. If the Chooser took from the R box, she will lose an additional $4.00 if the die lands on the number 1. Notice that the outcome of this die roll is separate from the previous die roll that determined whether the period continued to the offer phase. If the period ends here, the Chooser's earnings for the period would be $5.00 plus the contents of their chosen box minus $1.00 and any additional loss. The Offeror's earnings would be $5.00 minus $1.00 plus any additional gain.

One period in this experiment will be chosen for payment for everyone in the session. You will be paid for this random period of the experiment (and for your answers to the comprehension questions). When a period ends, you will be informed of your earnings from that period and how it was derived.

Summary

- The Chooser chooses between taking money from an L box that contains $5.00 and an R box that has a random amount of money (between $0.00 and $10.00).
- If the Chooser chooses the L box, there is a 50% chance of the period continuing to the offer phase. If the chooser chooses the R box, there is a 25% chance of the period continuing to the offer phase.
- In the offer phase, the Offeror can make an offer between $0.00 and $5.00. If the Chooser accepts, the Offeror gains this money and the chooser loses this money.
- If the Chooser rejects the offer, there is a resolution phase where both the Chooser and Offeror pay a $1.00 up-front cost. A Chooser who chose the L box has a 50% chance of losing an additional $4.00. A Chooser who chose the R box has a 25% chance of losing an additional $4.00. If the Chooser loses this additional $4.00, the Offeror gains an additional $4.00.

- You will be paid for one random period of the experiment and for your answers to the five comprehension questions.