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AN EXPERIMENTAL ANALYSIS OF THE STRUCTURE OF LEGAL FEES: AMERICAN RULE VS. ENGLISH RULE

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Abstract

The expanding volume of lawsuits and the ballooning of legal expenditures in recent years has attracted the interest, concern, and even anger of the American public and politicians. These developments have led law makers to consider alternative legal fee allocation rules as methods for administering justice more efficiently. Under the traditional American rule, parties to a lawsuit must each pay their own legal expenses. One reform proposal is the English rule, under which the losing party must pay the prevailing party's attorney fees in addition to her own expenses. To evaluate the different effects of these two rules on litigant behavior and legal outcomes, we conduct a theoretical and experimental analysis of environments which can be interpreted as legal disputes in which the probability of winning a lawsuit is partially determined by the legal expenditures of the litigants and partially determined by the inherent merits of the case. We investigate decisions regarding trial expenditure and examine the effects of the two allocation rules on pretrial issues of suit and settlement. The data demonstrate that game theoretic equilibrium models produce good qualitative predictions of the relative institutional response to changes in the allocation rule and to differences in such parameters as case merit and lawyer productivity. In our most significant result, we find that the English rule produces significantly higher expenditure at trial than the American rule. On the other hand, the frequency of trial is significantly lower under the English rule. Combining these two effects, we find that average expenditure per legal dispute is higher under the English rule than under the American rule.

An Experimental Analysis of the Structure of Legal Fees: American Rule vs. English Rule[*]

Peter J. Coughlan Charles R. Plott[**]

1 INTRODUCTION

The expanding volume of lawsuits and the ballooning of legal expenditures in recent years has attracted the interest, concern, and even anger of the American public and politicians. The number of lawsuits filed each year in the United States has grown steadily for several decades, with new filings in state and federal courts now approaching 19 million annually [The Economist 1992]. The American tort system is the most expensive in the world, with annual costs estimated at $117 billion [Hyde 1995]. Moreover, only about 40 cents from each dollar spent in this tort system actually serves to compensate victims while most of the rest pays for lawyer fees [O'Beirne 1995]. In addition, frequent examples of frivolous and outlandish suits in the popular media have also served to heighten public anger.

These developments have led law makers and legal professionals to consider alternative legal fee allocation rules as methods for administering justice more efficiently. Under the traditional American rule, parties to a lawsuit must each pay their own legal expenses. One reform proposal is the English rule (also known as the British rule, "loser pays" rule, or indemnity system) under which the losing party must pay the prevailing party's attorney fees in addition to his or her own expenses. Both houses of Congress have recently passed legislation that mandates adoption of a form of the English rule in certain federal court cases.

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Proponents of the English rule contend that its adoption would lead to fewer "frivolous" lawsuits and induce more of those suits that are filed to settle out of court. A change to the English rule, it is argued, would reduce the total volume of legal expenditure and eliminate the logjam of lawsuits that exists under the American rule. Nonetheless, there is considerable disagreement on whether or not application of the English rule would actually have these desired consequences in practice. As of yet, there is no consensus regarding the positive or negative effects of a change in legal fee allocation systems.

The implications of fee allocation rules are so widespread that any attempt to ascertain the full implications are far beyond the scope of this study. A narrowed focus is necessary. The four stages in the chronology of a legal dispute, as identified by Cooter and Rubinfeld [1989], are illustrated in Figure 1 and will help provide a context for appropriately focusing the study. At every stage of a legal dispute, the parties involved make decisions that are influenced by their expectations of what might occur at subsequent stages of the dispute. As a result of this backward induction process, the entire system of behavior is heavily influenced by behavior at the (final) trial stage. Therefore, to fully understand the effects of different fee allocation rules on behavior and outcomes in legal disputes, a first investigation must focus on the effects at trial. Much of our research design reflects this objective.

The primary focus of this paper is on the different effects of the American rule and English rule on behavior and outcomes at trial. We study environments which can be interpreted as a legal procedure in which the probability of winning a lawsuit is partially determined by the relative legal expenditures of the plaintiff and defendant and partially determined by the inherent merits of the case. In addition to investigating trial decisions regarding legal expenditure, we also examine the effects of the two allocation rules on pretrial issues of suit and settlement.

The research poses four main questions. Do the two fee allocation rules have different effects on the level of legal expenditure? Do they have different effects on the frequency of suit, settlement, or trial? Are there any other factors that influence such differences in behavior? What are the best models for understanding the behavior and outcomes observed?

2 EXISTING RESEARCH

Previous research into the legal and social effects of different legal fee allocation rules has resulted in a wide variety of conclusions. These conclusions are often completely contradictory, particularly in the field of research regarding the effects on the frequency of suit, settlement, and trial. Several authors have concluded that a move from the American rule to the English rule would result in an increase in the number of suits being filed and an increase in the number of suits which proceed to trial [Shavell 1982, Bebchuk 1984, P'ng 1987, Donohue 1991b, Hylton 1993]. On the other hand, several others have concluded that such a move would instead decrease the number of suits and decrease the number of trials [Bowles 1987, Hause 1989, Hersch 1990, Spier 1994]. Still others have concluded that the number of suits and trials would necessarily be the same under both rules [Reinganum and Wilde 1986, Donohue 1991a] or that the effect of a change from one rule to the other would be ambiguous [Braeutigam, Owen, and Panzar 1984, Katz 1987, Gravelle 1993, Beckner and Katz 1995].

All models applied to understand the impact of alternative legal fee allocation rules are based on similar game-theoretic principles. However, the papers reach different conclusions, in part, because of the variety of conflicting (and sometimes restrictive) assumptions that are made by different researchers. The most significant assumption that has been made affecting this field of interest is that legal expenditures are fixed and exogenously determined. Under this assumption, litigants do not choose levels of legal expenditure and such expenditure does not influence trial outcome. Therefore, there are no strategic decisions or implications after a case has proceeded beyond settlement to trial. The fixed expenditure assumption is prevalent in the classic law and economics literature as well as recent analyses of fee allocation rules [Shavell 1982, Posner 1986, Reinganum and Wilde 1986, Coursey and Stanley 1988, Donohue 1991a, Gravelle 1993, Hylton 1993, Spier 1994].

Several authors have, however, incorporated the trial effects of legal expenditure into their examinations of fee allocation rules [Braeutigam, Owen, and Panzar 1984, Katz 1987, Plott 1987, Hause 1989, Hersch 1990], and these authors have universally concluded that legal expenditure at trial would be higher under the English rule than under the American rule. Nonetheless, these authors differ in their conclusions about the degree of difference in legal expenditure under the two rules, and agreement does not exist on the specific effects on plaintiff versus defendant expenditure.

An additional assumption that influences the conclusions in this field of research is that plaintiffs will bring suit if and only if they prefer trial to not filing suit [Shavell 1982, Hause 1989, Beckner and Katz 1995]. Such an assumption excludes consideration of forward looking plaintiffs who measure the expected gains from settlement as well as the expected gains from trial when considering whether or not to file suit. This assumption seems particularly troublesome when it is considered that at least 10 suits are settled out of court for every one suit that is resolved at trial [Boggs 1991].

The most significant empirical investigation of legal fee allocation rules has been conducted by Hughes and Snyder [1990, 1995], who examined trial data related to the State of Florida's temporary adoption of the English rule for medical malpractice legislation from 1980 to 1985. Hughes and Snyder concluded that the English rule produced significantly higher legal expenditure at trial but also reduced the number of trials by increasing the probability that claims would be dropped and increasing the likelihood of pretrial settlement for those claims that were not dropped. Plaintiff success rates at trial, average jury awards, and the value of out-of-court settlements were also all higher under the English rule than under the American rule.

Experimental research in the field of legal fee allocation mechanisms is very limited, although a few authors have done important work. Coursey and Stanley [1988] investigated the effect of legal fee allocation rules on pretrial bargaining, observing that the English rule tended to induce more settlements than the American rule. This work is limited, however, by the previously mentioned assumption of exogenously determined, fixed legal expenditures. Thomas [1994] incorporated the concept of endogenously chosen legal expenditures in an experimental investigation of the trial selection effect, however this work is not directly related to the issue of legal fee allocation rules.

3 EXPERIMENTAL ENVIRONMENT AND PROCEDURE

This section introduces an experimental environment which can be interpreted as a legal dispute resolution procedure. This environment will facilitate an investigation of the different implications of the American and English rules.

3.1 NOTATION

The following notation will be necessary:

A	=	amount of lawsuit
C_P	=	fixed cost to plaintiff for bringing suit
C_D	=	fixed cost to defendant for going to trial
x_P	=	legal expenditure of plaintiff at trial
x_D	=	legal expenditure of defendant at trial
α	=	relative productivity of lawyers in influencing legal outcome ($0 \le \alpha \le 1$) (portion of outcome probability determined by legal expenditures)
π	=	relative merit of plaintiff's case ($0 \le \pi \le 1$) (probability plaintiff wins case in the absence of lawyer influence)
$P(x_P,x_D,\alpha,\pi)$	=	probability that plaintiff wins the case

3.2 DEFINITION OF FEE ALLOCATION RULES

Applying the above notation, we can now formally define the American and English rules for allocation of legal fees.

American Rule: If the plaintiff wins the case at trial, the payoff to the plaintiff is $\Pi_P^A = A - C_P - x_P$ while the payoff to the defendant is $\Pi_D^A = -A - C_D - x_D$. If the defendant wins the case at trial, the payoff to the plaintiff is $\Pi_P^A = -C_P - x_P$ while the payoff to the defendant is $\Pi_D^A = -C_D - x_D$.

English Rule: If the plaintiff wins the case at trial, the payoff to the plaintiff is $\Pi_P^A = A - C_P$ while the payoff to the defendant is $\Pi_D^A = -A - C_D - x_P - x_D$. If the defendant wins the case at trial, the payoff to the plaintiff is $\Pi_P^A = -C_P - x_P - x_D$ while the payoff to the defendant is $\Pi_D^A = -C_D$.

3.3 LEGAL TECHNOLOGY

We will use a very explicit yet easily generalizable legal technology in this analysis. This technology is embodied in the function $P(x_P,x_D,\alpha,\pi)$, that is, the probability that the plaintiff wins the case. This probability is partially determined by the legal expenditures of the litigants (and therefore by the activity of lawyers) and partially determined by the inherent merits of the case. The specific functional form is as follows:

$$P(x_P, x_D, \alpha, \pi) = \alpha\left(\frac{x_P}{x_P + x_D}\right) + (1-\alpha)\pi$$

This function has several interesting properties:

- The probability the plaintiff prevails at trial is positively related to the merit of the case, π.
- For $\alpha > 0$, the probability the plaintiff wins increases as he increases his legal expenditure at trial. The same is true for the defendant.
- The marginal productivity of legal expenditure is given by $\frac{\partial P(x_P,x_D,\alpha,\pi)}{\partial x_P} = \frac{\alpha x_D}{(x_P + x_D)^2}$
- The marginal productivity of legal expenditure increases as the productivity of lawyers, α, increases
- The marginal productivity of legal expenditure decreases as total legal expenditure, x_P+x_D, increases.
- Setting $\alpha = 0$ is equivalent to making the popular assumption that legal expenditure has no influence on trial outcome.
- For all values of x_P and x_D, $(1-\alpha)\pi \le P(x_P,x_D,\alpha,\pi) \le \alpha+(1-\alpha)\pi$.

3.4 STRUCTURE OF THE EXPERIMENTAL LEGAL DISPUTE

The flow chart in Figure 2 illustrates the specific structure of the experimental legal dispute within which litigant behavior under the two alternative allocation rules is evaluated. During the actual experiments, neutral non-legal terminology is used to identify roles and actions, however to avoid confusion, we use the equivalent legal terminology in the description that follows.

At the beginning of each legal dispute, every subject is randomly paired with another subject in the room. The identity of the persons they are paired with is never revealed to the subjects. After pairs are assigned, each member of each pair is randomly assigned a role, either plaintiff or defendant.

After roles are assigned, a level of π, or merit of the case, is randomly assigned to each pair. The three possible levels of π are 0.25, 0.50, or 0.75. We will sometimes refer to a lawsuit with π=0.25 as a "frivolous" lawsuit, a lawsuit with π=0.50 as a "closely contested" lawsuit, and a lawsuit with π=0.75 as a "strong" lawsuit.

Next, each subject's role and merit is revealed to him or her. During the first series of experiments, Series 1, the assigned merit is revealed to the subjects with certainty. During Series 2, however, the merit is revealed with uncertainty, with each subject having a 60% chance of having the correct merit revealed to him or her and a 20% chance of having each of the other two incorrect merits revealed. For example, if a pair of subjects is assigned a merit of $\pi = 0.50$, each subject in the pair would have a 60% chance of being shown $\pi = 0.50$, a 20% chance of being shown $\pi = 0.25$, and a 20% chance of being shown $\pi = 0.75$.

Series 1 experiments will be referred to as "known merit" experiments while Series 2 experiments will be called "uncertain merit" experiments. The uncertain revelation of merit in the Series 2 experiments can be seen to represent incomplete discovery or imprecise communication between lawyer and client prior to trial. The subjects for the Series 2 experiments are selected from experienced subjects who have previously participated in Series 1 experiments.

After the revelation of roles and merits, the plaintiff in each pair is asked to choose whether to file suit or not file suit. If the plaintiff chooses to not file suit, the period ends for that pair and each receives a payoff of 0. If the plaintiff chooses to file suit, he incurs the fixed cost of C_P for filing suit and the defendant is then asked whether she wants to settle or not settle.

In this experimental legal dispute, settlement means that the defendant simply pays the plaintiff the amount, A, for which the plaintiff is suing. We call this the "forfeiture settlement mechanism." This form of settlement is obviously extreme in the sense that no compromise is possible, however, this mechanism was chosen for several important reasons. First of all, theoretical and experimental analysis of the settlement bargaining process is a field of research

without consensus about the proper model, and thus a somewhat arbitrary decision must be made when choosing a settlement mechanism. Moreover, in order to maintain adequate experimental control, we must employ a mechanism that minimizes the number of variables by limiting the interaction between litigants. The forfeiture settlement mechanism achieves this objective while still providing a reasonable opportunity for a significant number of disputes to be resolved prior to trial. Furthermore, although a restrictive mechanism may reduce the number of disputes settled, divergence in the frequency of settlement still provides valuable information about the different settlement incentives under the two alternative fee allocation rules. Lastly, since our primary interest is expenditure decisions at trial, we need to use a restrictive settlement mechanism to ensure that a sufficient number of legal disputes proceed to trial.

If the defendant chooses to settle, the plaintiff receives a payoff of $A-C_P$, while the defendant receives a payoff of -A. If the defendant chooses to not settle, the case proceeds to trial and each subject in the pair then chooses an amount, x_P or x_D, to invest in legal expenditure at trial.

The probability that the plaintiff wins the case at trial is given by the legal technology function, $P(x_P,x_D,\alpha,\pi)$, specified above. The verdict is then determined by a random draw. If the plaintiff prevails at trial, he receives a payoff of $A-C_P-x_P$ under the American rule or $A-C_P$ under the English rule, while the defendant receives a payoff of $-A-C_D-x_D$ or $-A-C_D-x_P-x_D$ under the two rules respectively. If the defendant prevails at trial, she receives a payoff of $-C_D-x_D$ under the American rule or $-C_D$ under the English rule, while the plaintiff receives a payoff of $-C_P-x_P$ or $-C_P-x_P-x_D$ under the two rules respectively.

3.5 EXPERIMENTAL DESIGN PARAMETERS

A total of six experimental sessions were conducted with 10 or 12 students at the California Institute of Technology participating as subjects in each session. The experiments were conducted using a network of computers among the subjects, with subjects making decisions by pressing the appropriate keys on the keyboard.

The sessions are broken into 40 experimental periods, with each subject participating in a separate legal dispute each period. Half of all experimental disputes are conducted under the American rule, and half are conducted under the English rule.

During each experimental session, the productivity of lawyers, α, is fixed at either 0.25 (low productivity), 0.50 (medium productivity), or 0.75 (high productivity). Two sessions have been conducted for each different level of lawyer productivity.

The currency used in the experiments is "francs," with five francs equivalent to one cent. Each experimental period, subjects receive a payment of 400 francs in addition to their payoff or loss from the legal dispute during the period. In all experimental sessions, the amount of the dispute, A, is set equal to 240 francs and the fixed costs, C_P and C_D, are both set equal to 10 francs. In addition, the chosen levels of legal expenditure at trial, x_P and x_D, are permitted to be any value between 0 and 1000 francs. In the end, the average cash payout for each experiment conducted was between 25 and 30 dollars per subject.

For additional clarification of the experimental environment and procedures, complete instructions and subject handouts from one experiment are included in the Appendix.

4 MODELS AND PREDICTIONS

In this section we discuss the predictions of behavior provided by the solution concepts of Nash equilibrium and subgame perfect equilibrium.

4.1 EXPECTED PROFIT FUNCTIONS

The definitions and legal technology function specified previously allow us to explicitly identify the expected profit function for each party when the legal dispute is to be resolved at trial. These expected profit functions will, of course, differ under the two alternative fee allocation rules.

Under the American rule, the expected profit for the plaintiff is given by:

$$\begin{aligned} E\Pi_P^A(x_P, x_D, \alpha, \pi) &= P(x_P, x_D, \alpha, \pi)A - x_P - C_P \\ &= A\alpha\left(\frac{x_P}{x_P + x_D}\right) + A(1-\alpha)\pi - x_P - C_P \end{aligned}$$

Similarly, the expected profit for the defendant under the American rule is given by:

$$\begin{aligned} E\Pi_D^A(x_P, x_D, \alpha, \pi) &= P(x_P, x_D, \alpha, \pi)(-A) - x_D - C_D \\ &= -A\alpha\left(\frac{x_P}{x_P + x_D}\right) - A(1-\alpha)\pi - x_D - C_D \end{aligned}$$

Under the English rule, the expected profit for the plaintiff is given by:

$$\begin{aligned} E\Pi_P^E(x_P, x_D, \alpha, \pi) &= P(x_P, x_D, \alpha, \pi)A + (1 - P(x_P, x_D, \alpha, \pi))(-x_P - x_D) - C_P \\ &= A - (A + x_P + x_D)(1 - P(x_P, x_D, \alpha, \pi)) - C_P \\ &= A - (A + x_P + x_D)\left(\alpha\left(\frac{x_D}{x_P + x_D}\right) + (1-\alpha)(1-\pi)\right) - C_P \end{aligned}$$

Similarly, the expected profit for the defendant under the English rule is given by:

$$\begin{aligned} E\Pi_D^E(x_P, x_D, \alpha, \pi) &= P(x_P, x_D, \alpha, \pi)(-A - x_P - x_D) - C_D \\ &= -(A + x_P + x_D)\left(\alpha\left(\frac{x_P}{x_P + x_D}\right) + (1-\alpha)\pi\right) - C_D \end{aligned}$$

4.2 MODEL PREDICTIONS: LEGAL EXPENDITURE AT TRIAL

Proposition 1: Under the American rule, if both parties are expected profit maximizers, the unique Nash equilibrium levels of legal expenditure at trial are:

$$x_P^A = x_D^A = \frac{A\alpha}{4}.$$

Proof: The plaintiff's objective is to

$$\max_{x_P} \left[A\alpha\left(\frac{x_P}{x_P + x_D}\right) + A(1-\alpha)\pi - x_P - C_P \right]$$

The first order condition is

$$A\alpha\left(\frac{x_D^A}{(x_P^A + x_D^A)^2}\right) - 1 = 0$$

$$A\alpha x_D^A = (x_P^A + x_D^A)^2$$

Similarly, solving the defendant's maximization problem, we get

$$A\alpha x_P^A = (x_P^A + x_D^A)^2$$

Combining these equations, we have

$$A\alpha x_P^A = A\alpha x_D^A$$
$$x_P^A = x_D^A$$

and thus

$$A\alpha x_P^A = (x_P^A + x_P^A)^2$$
$$A\alpha x_P^A = 4x_P^{A2}$$
$$A\alpha = 4x_P^A$$
$$\frac{A\alpha}{4} = x_P^A = x_D^A$$

It is easily verified that these levels of expenditure at trial do indeed maximize the associated objective functions.

Q.E.D.

Proposition 2: Under the English rule, if both parties are expected profit maximizers, the unique Nash equilibrium levels of legal expenditure at trial are:

$$x_P^E = \frac{A\alpha\pi}{1-\alpha} \qquad \text{and} \qquad x_D^E = \frac{A\alpha(1-\pi)}{1-\alpha}.$$

Proof: The plaintiff's objective is to

$$\max_{x_P} \left[A - (A + x_P + x_D)\left(\alpha\left(\frac{x_D}{x_P + x_D} \right) + (1-\alpha)(1-\pi) \right) - C_P \right]$$

The first order condition is

$$(A + x_P + x_D)\alpha\left(\frac{x_D}{(x_P + x_D)^2}\right) - \left(\alpha\left(\frac{x_D}{x_P + x_D}\right) + (1-\alpha)(1-\pi)\right) = 0$$

$$(A + x_P + x_D)\alpha x_D - \alpha x_D(x_P + x_D) - (1-\alpha)(1-\pi)(x_P + x_D)^2 = 0$$

$$A\alpha x_D - (1-\alpha)(1-\pi)(x_P + x_D)^2 = 0$$

$$\frac{A\alpha x_D}{(1-\alpha)(1-\pi)} = (x_P + x_D)^2$$

Similarly, solving the defendant's maximization problem, we get

$$\frac{A\alpha x_P}{(1-\alpha)\pi} = (x_P + x_D)^2$$

Combining these equations, we have

$$\frac{A\alpha x_D}{(1-\alpha)(1-\pi)} = \frac{A\alpha x_P}{(1-\alpha)\pi}$$

$$x_D = \frac{(1-\pi)x_P}{\pi}$$

Thus,

$$\frac{A\alpha x_P}{(1-\alpha)\pi} = \left(x_P + \frac{(1-\pi)x_P}{\pi}\right)^2$$

$$\frac{A\alpha x_P}{(1-\alpha)\pi} = \frac{x_P^2}{\pi^2}$$

$$x_P = \frac{A\alpha\pi}{1-\alpha}$$

and

$$x_D = \frac{(1-\pi)}{\pi}\left(\frac{A\alpha\pi}{1-\alpha}\right) = \frac{A\alpha(1-\pi)}{1-\alpha}$$

It is easily verified that these levels of expenditure at trial do indeed maximize the associated objective functions.

Q.E.D.

As further illustration of the Nash equilibrium predictions, Figure 3 illustrates the specific point predictions of legal expenditure at trial for the actual parameter values used in the experimental sessions.

4.3 MODEL PREDICTIONS: FORM OF RESOLUTION

To more clearly illustrate the predictions about the form of dispute resolution, we will assume in the following propositions that $C_P = C_D = C$. That is, we will assume that both parties face the same fixed costs, as is the case in the actual experimental sessions. Allowing these fixed costs to differ does not qualitatively change the predictions, however it adds unnecessary confusion.

We first note that in the trivial case in which C > A, the legal dispute will always be resolved with no lawsuit being filed. In other words, if the fixed costs of pursuing legal action exceed the possible gain for the plaintiff, she will never file suit. For this reason, the following propositions also assume that C is strictly less than A.

Proposition 3: Under the American rule, if both parties are expected profit maximizers, the unique subgame perfect equilibrium resolutions are as follows:

$$\text{(i) Settlement} \Leftrightarrow \pi > \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}$$

$$\text{(ii) No Suit} \Leftrightarrow \pi \leq \min\left\{ \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}, \quad \frac{4\frac{C}{A} - \alpha}{4(1-\alpha)} \right\}$$

$$\text{(iii) Trial} \Leftrightarrow \text{Otherwise}$$

Proof: Combining the expected profit functions with the equilibrium trial expenditure predictions produces the following expected equilibrium profit functions under the American rule:

$$\begin{aligned} E\Pi_P^A(x_P, x_D, \alpha, \pi) &= A\alpha\left(\frac{x_P}{x_P + x_D}\right) + A(1-\alpha)\pi - x_P - C \\ &= A\alpha\left(\frac{1}{2}\right) + A(1-\alpha)\pi - \frac{A\alpha}{4} - C \\ &= A(\tfrac{1}{4}\alpha + \pi(1-\alpha)) - C \end{aligned}$$

$$E\Pi_D^A(x_P, x_D, \alpha, \pi) = -A\alpha\left(\frac{x_P}{x_P + x_D}\right) - A(1-\alpha)\pi - x_D - C$$
$$= -A\alpha\left(\frac{1}{2}\right) - A(1-\alpha)\pi - \frac{A\alpha}{4} - C$$
$$= -A(\tfrac{3}{4}\alpha + \pi(1-\alpha)) - C$$

Thus, the defendant strictly prefers settlement to trial if and only if

$$-A(\tfrac{3}{4}\alpha + \pi(1-\alpha)) - C < -A$$
$$\tfrac{3}{4}\alpha + \pi(1-\alpha) + \tfrac{C}{A} > 1$$
$$\pi(1-\alpha) > 1 - \tfrac{3}{4}\alpha - \tfrac{C}{A}$$
$$4\pi(1-\alpha) > 4 - 3\alpha - 4\tfrac{C}{A}$$
$$\pi > \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}$$

Provided C < A, the plaintiff will always prefer settlement to no suit. Thus, whenever the above inequality holds, the unique subgame perfect equilibrium resolution is for the plaintiff to file suit and for the defendant to subsequently settle.

Note that a defendant who maximizes expected utility is actually indifferent between settlement and trial whenever $\pi = \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}$. We have chosen to define the equilibrium choice of the defendant to be trial in this case, but note that we could have instead said that the defendant chooses settlement in this knife-edge situation. This would not change any of the substantive predictions of the model, and would simply require switching some strict inequalities to weak inequalities and vice versa (including changing the condition for no suit from a weak inequality to a strict inequality).

The plaintiff weakly prefers no suit to trial if and only if

$$A(\tfrac{1}{4}\alpha + \pi(1-\alpha)) - C \leq 0$$
$$\tfrac{1}{4}\alpha + \pi(1-\alpha) - \tfrac{C}{A} \leq 0$$
$$\pi(1-\alpha) \leq \tfrac{C}{A} - \tfrac{1}{4}\alpha$$
$$4\pi(1-\alpha) \leq 4\tfrac{C}{A} - \alpha$$
$$\pi \leq \frac{4\frac{C}{A} - \alpha}{4(1-\alpha)}$$

Thus, the plaintiff prefers to not file suit whenever the defendant would not choose to settle and the above inequality holds. That is, the plaintiff will not file suit if and only if

$$\pi \leq \min\left\{ \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}, \quad \frac{4\frac{C}{A} - \alpha}{4(1-\alpha)} \right\}$$

The legal dispute will obviously be resolved at trial whenever neither the conditions for settlement nor the conditions for no suit are met.

Q.E.D.

Proposition 4: Under the English rule, if both parties are expected profit maximizers, the unique subgame perfect equilibrium resolutions are as follows:

(i) Settlement $\Leftrightarrow \pi > \left(1 - \frac{C}{A}\right)(1-\alpha)$
(ii) No Suit $\Leftrightarrow \pi \leq \min\left\{ \left(1 - \frac{C}{A}\right)(1-\alpha), \quad \frac{C}{A}(1-\alpha) + \alpha \right\}$
(iii) Trial $\Leftrightarrow$ Otherwise

Proof: Combining the expected profit functions with the equilibrium trial expenditure predictions produces the following expected equilibrium profit functions under the English rule:

$$E\Pi_P^E(x_P, x_D, \alpha, \pi) = A - (A + x_P + x_D)\left(\alpha\left(\frac{x_D}{x_P + x_D}\right) + (1-\alpha)(1-\pi)\right) - C$$

$$= A - \left(A + \frac{A\alpha}{1-\alpha}\right)(\alpha(1-\pi) + (1-\alpha)(1-\pi)) - C$$

$$= A - \left(\frac{A}{1-\alpha}\right)(1-\pi) - C$$

$$= \frac{A - A\alpha - A + A\pi}{1-\alpha} - C$$

$$= \frac{A(\pi - \alpha)}{1-\alpha} - C$$

$$E\Pi_D^E(x_P, x_D, \alpha, \pi) = -(A + x_P + x_D)\left(\alpha\left(\frac{x_P}{x_P + x_D}\right) + (1-\alpha)\pi\right) - C$$

$$= -\left(A + \frac{A\alpha}{1-\alpha}\right)(\alpha\pi + (1-\alpha)\pi) - C$$

$$= \frac{-A\pi}{1-\alpha} - C$$

Thus, the defendant strictly prefers settlement to trial if and only if

$$\frac{-A\pi}{1-\alpha} - C < -A$$

$$\frac{\pi}{1-\alpha} + \frac{C}{A} > 1$$

$$\pi > \left(1 - \frac{C}{A}\right)(1-\alpha)$$

Provided C < A, the plaintiff will always prefer settlement to no suit. Thus, whenever the above inequality holds, the unique subgame perfect equilibrium resolution is for the plaintiff to file suit and for the defendant to subsequently settle.

Note that a defendant who maximizes expected utility is actually indifferent between settlement and trial whenever $\pi = \left(1 - \frac{C}{A}\right)(1-\alpha)$. We have chosen to define the equilibrium choice of the defendant to be trial in this case, but note that we could have instead said that the defendant chooses settlement in this knife-edge situation. This would not change any of the substantive predictions of the model, and would simply require switching some strict inequalities to weak

inequalities and vice versa (including changing the condition for no suit from a weak inequality to a strict inequality).

The plaintiff weakly prefers no suit to trial if and only if

$$\frac{A(\pi-\alpha)}{1-\alpha} - C \leq 0$$
$$\frac{\pi-\alpha}{1-\alpha} - \frac{C}{A} \leq 0$$
$$\pi \leq \frac{C}{A}(1-\alpha)+\alpha$$

Thus, the plaintiff prefers to not file suit whenever the defendant would not choose to settle and the above inequality holds. That is, the plaintiff will not file suit if and only if

$$\pi \leq \min\left\{\left(1-\frac{C}{A}\right)(1-\alpha),\ \frac{C}{A}(1-\alpha)+\alpha\right\}$$

The legal dispute will obviously be resolved at trial whenever neither the conditions for settlement nor the conditions for no suit are met.

Q.E.D.

As further illustration of the subgame perfect equilibrium predictions, Figures 4 and 5 illustrate the form of resolution predictions for the actual parameter values used in the experimental sessions.

4.5 OBSERVATIONS ABOUT MODEL PREDICTIONS

Observation 1. For $\alpha \in [0,1)$, total equilibrium trial expenditures under the English rule are <u>always</u> at least twice as large as the total equilibrium trial expenditures under the American rule:

$$x^{A}_{Total} = x^{A}_{P} + x^{A}_{D} = \frac{A\alpha}{4} + \frac{A\alpha}{4} = \frac{A\alpha}{2}$$
$$x^{E}_{Total} = x^{E}_{P} + x^{E}_{D} = \frac{A\alpha\pi}{(1-\alpha)} + \frac{A\alpha(1-\pi)}{(1-\alpha)} = \frac{A\alpha}{(1-\alpha)}$$
$$0 \leq \alpha \leq 1 \Rightarrow 1-\alpha \leq 1 \Rightarrow \frac{1}{1-\alpha} \geq 1 \Rightarrow \frac{A\alpha}{1-\alpha} \geq A\alpha$$
Thus, $x^{E}_{Total} \geq 2 \cdot x^{A}_{Total}$

Observation 2. For $\alpha \in (0,1)$, equilibrium trial expenditure for the plaintiff is higher under the English rule than under the American rule iff $\pi > \frac{1}{4} - \frac{\alpha}{4}$, while equilibrium trial expenditure for the defendant is higher under the English rule than under the American rule iff $\pi < \frac{3}{4} + \frac{\alpha}{4}$:

$$\pi > \frac{1}{4} - \frac{\alpha}{4} \;\Leftrightarrow\; \frac{\pi}{1-\alpha} > \frac{1}{4} \;\Leftrightarrow\; \frac{A\alpha\pi}{1-\alpha} > \frac{A\alpha}{4} \;\Leftrightarrow\; x_P^E > x_P^A$$

$$\pi < \frac{3}{4} + \frac{\alpha}{4} \;\Leftrightarrow\; 1-\pi > \frac{1}{4} - \frac{\alpha}{4} \;\Leftrightarrow\; \frac{1-\pi}{1-\alpha} > \frac{1}{4} \;\Leftrightarrow\; \frac{A\alpha(1-\pi)}{1-\alpha} > \frac{A\alpha}{4} \;\Leftrightarrow\; x_D^E > x_D^A$$

Note that the above observation implies that, whenever $0.25 < \pi < 0.50$, equilibrium trial expenditures for both the plaintiff and defendant are higher under the English rule than under the American rule for any $\alpha \in (0,1)$.

Observation 3. Under both fee allocation rules with $\pi \in (0,1)$, equilibrium legal expenditure at trial increases as the productivity of lawyers increases:

$$\frac{\partial x_P^A}{\partial \alpha} = \frac{\partial x_D^A}{\partial \alpha} = \frac{A}{4} > 0$$

$$\frac{\partial x_P^E}{\partial \alpha} = \frac{A\pi}{(1-\alpha)^2} > 0$$

$$\frac{\partial x_D^E}{\partial \alpha} = \frac{A(1-\pi)}{(1-\alpha)^2} > 0$$

Observation 4. Under the American rule, equilibrium legal expenditure at trial is always no greater than one-fourth the amount of the suit:

$$x_P^A = x_D^A = \frac{A\alpha}{4} \leq \frac{A}{4} \qquad \forall \alpha \in [0,1]$$

Observation 5. Under the English rule with $\pi \in (0,1)$, equilibrium legal expenditure at trial increases without bound as the productivity of lawyers increases:

$$\lim_{\alpha \to 1} x_P^E = \lim_{\alpha \to 1} \frac{A\alpha\pi}{1-\alpha} = \infty \qquad \forall \pi \in (0,1]$$
$$\lim_{\alpha \to 1} x_D^E = \lim_{\alpha \to 1} \frac{A\alpha(1-\pi)}{1-\alpha} = \infty \qquad \forall \pi \in (0,1]$$

Observation 6. Under the American rule, equilibrium trial expenditure is independent of the merit of the case:

$$\frac{\partial x_P^A}{\partial \pi} = \frac{\partial x_D^A}{\partial \pi} = \frac{\partial}{\partial \pi}\left(\frac{A\alpha}{4}\right) = 0$$

Observation 7. Under the English rule with $\alpha \in (0,1)$, as the merit of the case increases, the equilibrium trial expenditure of the plaintiff increases and the equilibrium trial expenditure of the defendant decreases:

$$\frac{\partial x_P^E}{\partial \pi} = \frac{A\alpha}{1-\alpha} > 0$$
$$\frac{\partial x_D^E}{\partial \pi} = \frac{-A\alpha}{1-\alpha} < 0$$

Observation 8. In equilibrium under the English rule with $\alpha \in (0,1)$, (a) plaintiff expenditure at trial is less than defendant expenditure at trial iff $\pi<0.50$, (b) plaintiff expenditure at trial is equal to defendant expenditure at trial iff $\pi=0.50$, and (c) plaintiff expenditure at trial is greater than defendant expenditure at trial iff $\pi>0.50$:

$$x_P^E < x_D^E \Leftrightarrow \frac{A\alpha\pi}{1-\alpha} < \frac{A\alpha(1-\pi)}{1-\alpha} \Leftrightarrow \pi < 1-\pi \Leftrightarrow 2\pi < 1 \Leftrightarrow \pi < 0.50$$
$$x_P^E = x_D^E \Leftrightarrow \frac{A\alpha\pi}{1-\alpha} = \frac{A\alpha(1-\pi)}{1-\alpha} \Leftrightarrow \pi = 1-\pi \Leftrightarrow 2\pi = 1 \Leftrightarrow \pi = 0.50$$
$$x_P^E > x_D^E \Leftrightarrow \frac{A\alpha\pi}{1-\alpha} > \frac{A\alpha(1-\pi)}{1-\alpha} \Leftrightarrow \pi > 1-\pi \Leftrightarrow 2\pi > 1 \Leftrightarrow \pi > 0.50$$

Observation 9. Under both fee allocation rules with $\alpha \in [0,1)$, equilibrium trial expenditure increases (or remains constant) as the amount of the lawsuit increases:

$$\frac{\partial x_P^A}{\partial A} = \frac{\partial x_D^A}{\partial A} = \frac{\alpha}{4} \geq 0$$
$$\frac{\partial x_P^E}{\partial A} = \frac{\alpha\pi}{1-\alpha} \geq 0$$
$$\frac{\partial x_D^E}{\partial A} = \frac{\alpha(1-\pi)}{1-\alpha} \geq 0$$

Observation 10. Under both fee allocation rules, if the fixed costs are more than half the amount of the suit $\left(\frac{C}{A} > \frac{1}{2}\right)$, no dispute will ever go to trial:

$$\frac{C}{A} > \frac{1}{2} \Rightarrow 4\frac{C}{A} > 2-\alpha \qquad \forall \alpha \in [0,1]$$
$$\Rightarrow 8\frac{C}{A} > 4-2\alpha$$
$$\Rightarrow 4\frac{C}{A} - \alpha > 4-3\alpha-4\frac{C}{A}$$
$$\Rightarrow \frac{4\frac{C}{A}-\alpha}{4(1-\alpha)} > \frac{4-3\alpha-4\frac{C}{A}}{4(1-\alpha)}$$

Therefore, in this case, the conditions of Proposition 3 become

(i) Settlement $\Leftrightarrow \pi > \dfrac{4-3\alpha-4\frac{C}{A}}{4(1-\alpha)}$

(ii) No Suit $\Leftrightarrow \pi \leq \dfrac{4-3\alpha-4\frac{C}{A}}{4(1-\alpha)}$

(iii) Trial $\Leftrightarrow$ Otherwise

Thus, all disputes result in either settlement or no suit under the American rule.

$$\frac{C}{A} > \frac{1}{2} \Rightarrow \frac{C}{A} > \frac{1-2\alpha}{2(1-\alpha)} \qquad \forall \alpha \in [0,1]$$
$$\Rightarrow 1-2\alpha < 2\frac{C}{A}(1-\alpha)$$
$$\Rightarrow 1-\alpha < 2\frac{C}{A}(1-\alpha)+\alpha$$
$$\Rightarrow \left(1-\frac{C}{A}\right)(1-\alpha) < \frac{C}{A}(1-\alpha)+\alpha$$

Therefore, in this case, the conditions of Proposition 4 become

(i) Settlement $\Leftrightarrow \pi > \left(1-\frac{C}{A}\right)(1-\alpha)$

(ii) No Suit $\Leftrightarrow \pi \leq \left(1-\frac{C}{A}\right)(1-\alpha)$

(iii) Trial $\Leftrightarrow$ Otherwise

Thus, all disputes result in either settlement or no suit under the English rule as well.

Observation 11. Under the American rule, if fixed costs are sufficiently small $\left(\frac{C}{A} < \frac{\alpha}{4}\right)$, all legal disputes will be resolved at trial:

If $\frac{C}{A} < \frac{\alpha}{4}$, the conditions of Proposition 3 become

(i) Settlement $\Leftrightarrow \pi > \dfrac{4-3\alpha-4\frac{C}{A}}{4-4\alpha} > \dfrac{4-4\alpha}{4-4\alpha} = 1$

(ii) No Suit $\Leftrightarrow \pi \leq \dfrac{4\frac{C}{A}-\alpha}{4(1-\alpha)} < \dfrac{\alpha-\alpha}{4(1-\alpha)} = 0$

(iii) Trial $\Leftrightarrow$ Otherwise

Since $0 \leq \pi \leq 1$, all disputes will be resolved at trial

Observation 12. If $\frac{C}{A} < \frac{1}{4}$, then every dispute that would go to trial under the English rule would also go to trial under the American rule:

First of all, it can be shown that

$$\tfrac{C}{A} < \tfrac{1}{4} \Rightarrow (1-\tfrac{C}{A})(1-\alpha) < \frac{4-3\alpha-4\frac{C}{A}}{4(1-\alpha)}.$$

Thus, if the defendant prefers trial to settlement under the English rule, he will also prefer trial to settlement under the American rule. Furthermore, if we additionally note that we only need consider cases with $\alpha < \tfrac{1}{2}$ (we will show below that no cases go to trial under the English rule when $\alpha \geq \tfrac{1}{2}$), it can also be shown that

$$\tfrac{C}{A} < \tfrac{1}{4} \Rightarrow \tfrac{C}{A}(1-\alpha)+\alpha > \frac{4\frac{C}{A}-\alpha}{4(1-\alpha)}$$

Thus, if the plaintiff prefers trial to settlement under the English rule, he will also prefer trial to settlement under the American rule. Therefore, if $\tfrac{C}{A} < \tfrac{1}{4}$, then every dispute that would go to trial under the English rule would also go to trial under the American rule.

Observation 13. Under the English rule, a legal dispute will go to trial only if $\alpha < \pi \leq 1-\alpha$:

Suppose that $\pi > 1-\alpha$. In this case, we have $\pi > 1-\alpha \Rightarrow \pi > (1-\tfrac{C}{A})(1-\alpha)$, and such a legal dispute would therefore result in settlement under the English rule. Now suppose that a legal dispute does <u>not</u> result in settlement $\left(\text{i.e. } \pi \leq (1-\tfrac{C}{A})(1-\alpha)\right)$ and that $\pi \leq \alpha$. In this case, we have $\pi \leq \alpha \Rightarrow \pi \leq \tfrac{C}{A}(1-\alpha)+\alpha \Rightarrow \pi \leq \min\left\{(1-\tfrac{C}{A})(1-\alpha),\ \tfrac{C}{A}(1-\alpha)+\alpha\right\}$ and such a legal dispute would therefore result in no suit being filed under the English rule. Thus, a legal dispute will go to trial under the English rule only if $\alpha < \pi \leq 1-\alpha$.

Note that the above observation also implies that, if the productivity of lawyers is greater than or equal to one-half $(\alpha \geq \tfrac{1}{2})$, no dispute will ever go to trial under the English rule.

Observation 14. Under the American rule, if the fixed costs are less than one-fourth the amount of the suit $(\tfrac{C}{A} < \tfrac{1}{4})$, then the likelihood of trial increases (or does not change) as the productivity of lawyers, α, increases:

$$\tfrac{C}{A} < \tfrac{1}{4} \Rightarrow \frac{\partial}{\partial\alpha}\left(\frac{4-3\alpha-4\frac{C}{A}}{4(1-\alpha)}\right) = \frac{1-4\frac{C}{A}}{16(1-\alpha)^2} > 0$$

$$\tfrac{C}{A} < \tfrac{1}{4} \Rightarrow \frac{\partial}{\partial\alpha}\left(\frac{4\frac{C}{A}-\alpha}{4(1-\alpha)}\right) = \frac{4\frac{C}{A}-1}{16(1-\alpha)^2} < 0$$

$$\tfrac{C}{A} < \tfrac{1}{4} \Rightarrow 4\tfrac{C}{A} < 2-\alpha \qquad \forall \alpha \in [0,1]$$
$$\Rightarrow 8\tfrac{C}{A} < 4-2\alpha$$
$$\Rightarrow 4\tfrac{C}{A} - \alpha < 4-3\alpha-4\tfrac{C}{A}$$
$$\Rightarrow \frac{4\tfrac{C}{A}-\alpha}{4(1-\alpha)} < \frac{4-3\alpha-4\tfrac{C}{A}}{4(1-\alpha)}$$
$$\Rightarrow \min\left\{\frac{4-3\alpha-4\tfrac{C}{A}}{4(1-\alpha)}, \frac{4\tfrac{C}{A}-\alpha}{4(1-\alpha)}\right\} = \frac{4\tfrac{C}{A}-\alpha}{4(1-\alpha)}$$

This means that the range of π values for which settlement is predicted and the range of π values for which no suit is predicted both get smaller as α increases. Therefore, if $\frac{C}{A} < \frac{1}{4}$, then as α increases, the likelihood of trial also increases.

Observation 15. Under the English rule, the likelihood of trial decreases (or does not change) as the productivity of lawyers, α, increases:

Suppose that $\frac{C}{A}(1-\alpha)+\alpha \geq \left(1-\frac{C}{A}\right)(1-\alpha)$. In this case, all disputes result in either settlement or no suit, so the likelihood of trial is zero for all α. Now suppose instead that $\frac{C}{A}(1-\alpha)+\alpha < \left(1-\frac{C}{A}\right)(1-\alpha)$. In this case, since C < A, we have that

$$\frac{\partial}{\partial\alpha}\left(\left(1-\tfrac{C}{A}\right)(1-\alpha)\right) = \tfrac{C}{A} - 1 < 0$$
$$\frac{\partial}{\partial\alpha}\left(\tfrac{C}{A}(1-\alpha)+\alpha\right) = 1-\tfrac{C}{A} > 0.$$

This means that the range of π values for which settlement is predicted and the range of π values for which no suit is predicted both get larger as α increases. Therefore, the likelihood of trial decreases as α increases.

Observation 16. Under both fee allocation rules, as the merit of the case, π, increases, the likelihood of settlement increases and the likelihood of no suit decreases:

Under both rules, settlement occurs if π is greater than some threshold while no suit occurs if π is less than or equal to some other threshold. Therefore, as π increases, the likelihood of settlement increases and the likelihood of no suit decreases.

Observation 17. Under both fee allocation rules, the likelihood of trial is greatest for closely contested lawsuits (π=0.50):

For any given value of π, the likelihood of trial depends upon the range of different α values for which trial is the predicted form of resolution. Under the American rule, trial occurs if and only if $\frac{4\frac{C}{A} - \alpha}{4(1-\alpha)} < \pi \leq \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}$.

The likelihood of trial is therefore maximized when π is precisely the midpoint between the lower and upper bounds of this inequality. This midpoint is given by:

$$\frac{1}{2}\left(\frac{4\frac{C}{A} - \alpha}{4(1-\alpha)} + \frac{4 - 3\alpha - 4\frac{C}{A}}{4(1-\alpha)}\right) = \frac{4\frac{C}{A} - \alpha + 4 - 3\alpha - 4\frac{C}{A}}{8(1-\alpha)} = \frac{4 - 4\alpha}{8(1-\alpha)} = \frac{1}{2}.$$

Under the English rule, trial occurs if and only if $\frac{C}{A}(1-\alpha) + \alpha < \pi \leq \left(1 - \frac{C}{A}\right)(1-\alpha)$.

The likelihood of trial is again maximized when π is equal to the midpoint between the lower and upper bounds of this inequality. This midpoint is given by:

$$\frac{1}{2}\left(\frac{C}{A}(1-\alpha) + \alpha + \left(1 - \frac{C}{A}\right)(1-\alpha)\right) = \frac{1}{2}\left(\alpha + (1-\alpha)\right) = \frac{1}{2}.$$

Thus, under both fee allocation rules, the likelihood of trial is highest when π=0.50.

Observation 18. There exist additional Nash equilibria which are not subgame perfect. These Nash equilibria are characterized by strategies off the equilibrium path in which the defendant chooses to go to trial when he would prefer settlement or in which one party chooses a very high level of legal expenditure at trial making trial prohibitively unattractive to the other party.

5 EXPERIMENTAL RESULTS

The experimental results under the different parameter configurations are summarized in Figure 7 for the American rule and Figure 8 for the English rule. For each fee allocation rule, 320 experimental legal disputes were conducted, and therefore the behavior of 640 litigants was observed. Not included in these numbers and not reflected in Figures 7 and 8 are the experimental legal disputes that were conducted under the uncertain merit conditions. The uncertain merit experiments account for 340 additional disputes and will be discussed separately below.

In this section we discuss the patterns of subject behavior observed in the experimental sessions and discuss the influence of various factors on this behavior. These experimental results are broken into five subject areas: (1) behavior under alternative allocation rules, (2) impact of lawyer productivity, (3) influence of case merit, (4) effect of uncertain merit, and (5) performance of model predictions.

5.1 BEHAVIOR UNDER ALTERNATIVE ALLOCATION RULES

The first three results summarize litigant behavior under the two legal fee allocation rules. If a dispute is resolved at trial, the total legal expenditure at trial is greater under English rule than under American rule (Result 1). While the English rule does discourage trials (Result 2) this effect is not strong enough to offset the greater expenditure. The net effect of a move to the English rule is to increase legal expenditure per dispute (Result 3).

Result 1. The English rule produces significantly greater legal expenditure at trial than the American rule.

Support. Figure 9 shows that 96% of all trial expenditures under the American rule were at or below 100 francs, 100% were at or below 200 francs, and the mean expenditure was 45 francs. On the other hand, trial expenditures under the English rule were distributed throughout the allowed range of 0 to 1000 francs with a mean expenditure of 580 francs, almost 13 times higher than the mean under the American rule. The difference in mean expenditure under the two different rules is statistically significant at the 1% level. Furthermore, Figures 7 and 8 indicate that for every one of the nine combinations of α and π and for both plaintiff and defendant, mean expenditure at trial was always at least 5.3 times larger under the English rule than under the American rule (α=0.25, π=0.75, defendant) and was as much as 28.6 times larger (α=0.50, π=0.75, plaintiff).

Result 2. Under the English rule, legal disputes are less likely to result in a trial than under the American rule.

Support. Figure 10 shows that 80% of all disputes were resolved at trial under the American rule while only 12% of all disputes were resolved at trial under the English rule. This difference in proportion of disputes resolved at trial under the two different rules is statistically significant at the 1% level. Furthermore, Figures 7 and 8 reveal that for every one of the nine combinations of α and π, the frequency of trial was always at least 2.8 times higher under the American rule than under the English rule (α=0.25, π=0.50). For all nine parameter combinations, no fewer than 60% (α=0.50, π=0.25) and as many as 96% (α=0.50, π=0.50) of all disputes were resolved at trial

under the American rule. In contrast, no more than 34% (α=0.25, π=0.50) and as few as 0% (α=0.50, π=0.25, and α=0.75, π=0.75) of disputes resulted in trial under the English rule.

Result 3. Total expenditure per legal dispute is higher under the English rule than under the American rule

Support. According to the data from Figures 9 and 10, under the American rule, trial occurred in 80.0% of all disputes and the mean expenditure at trial was 44.9 francs. Thus, the average expenditure at trial per person per dispute under the American rule was 35.9 francs. If we also include the fixed costs incurred for cases that were resolved by settlement or trial, this figure becomes 44.3 francs. Under the English rule, trial occurred in 12.5% of the cases and the mean expenditure at trial was 580.2 francs. Thus, the average expenditure at trial per person per dispute under the English rule was 75.5 francs. If we also include the fixed costs incurred for cases that were resolved by settlement or trial, this figure becomes 78.7 francs, approximately 78% higher than under the American rule. This difference in mean expenditure per dispute under the two different rules, with or without inclusion of the fixed costs, is statistically significant at the 1% level.

The next three subsections explore several parameters that influence the level of expenditure and form of resolution in a legal dispute. The dispute parameters investigated are lawyer productivity, case merit, and uncertainty of merit. After the impact of these factors is discussed, the analysis moves in subsection 4.5 to consider models that may serve as underlying explanations of the effects of different allocation rules and dispute parameters.

5.2 IMPACT OF LAWYER PRODUCTIVITY

Result 5. Under both fee allocation rules, legal expenditure at trial increases as the productivity of lawyers increases. This trend is more significant under the English rule than under the American rule.

Support. Figure 11 clearly illustrates that mean legal expenditure at trial is higher for higher values of α under both the American and English rules. This trend is particularly significant under the English rule with mean expenditure jumping from 438 when α=0.25 to 630 when α=0.50 to the expenditure ceiling of 1000 when α=0.75. The difference in mean expenditure

between α=0.25 and α=0.50 under the English Rule is statistically significant at the 2% level while the difference in mean expenditure between α=0.50 and α=0.75 is statistically significant at the 1% level. Mean expenditure under the American rule, on the other hand, increases more modestly from 35 to 49 to 53 for the three different levels of α. The difference in mean expenditure between α=0.25 and α=0.50 under the American Rule is statistically significant at the 1% level, however the difference in mean expenditure between α=0.50 and α=0.75 is not statistically significant.

Result 5. Under both fee allocation rules, the frequency of trial decreases as the productivity of lawyers increases. This trend is more significant under the English rule than under the American rule.

Support. Figure 12 illustrates the frequency of trial for various levels of α. As α changes from 0.25 to 0.50 to 0.75, the percentage of disputes resolved at trial under the American rule drops from 83% to 81% to 76%, however neither of these differences in percentages are statistically significant. Similarly, the percentage of disputes resolved at trial under the English rule drops from 17% to 15% to 5%. The latter difference (between α=0.50 and α=0.75) is statistically significant at the 1% level in this case.

5.3 INFLUENCE OF CASE MERIT

Result 6. Under both fee allocation rules, defendant expenditure at trial exceeds plaintiff expenditure at trial for frivolous lawsuits (π=0.25) while plaintiff expenditure at trial exceeds defendant expenditure at trial for strong lawsuits (π=0.75). The expenditures at trial for the two parties are most similar for closely contested lawsuits (π=0.50).

Support. Figure 13 demonstrates that under both allocation rules, mean defendant expenditure at trial is higher than mean plaintiff expenditure at trial when π=0.25, while the opposite relationship is true when π=0.75. These differences in expenditure are most significant for π=0.75 (at the 5% level under the American Rule and at the 12% level under the English Rule). The difference between mean plaintiff and mean defendant expenditure reaches a minimum of 2 under the American rule and a minimum of 72 under the English rule, both at π=0.50.

Result 7. Under both fee allocation rules, frivolous lawsuits (π=0.25) are the most likely to not be filed, closely contested lawsuits (π =0.50) are the most likely to be resolved at trial, and strong lawsuits (π =0.75) are the most likely to produce a pretrial settlement.

Support. Figure 14 illustrates the frequency of the forms of resolution for various levels of π. Under the American rule, the frequency of no suit reaches a peak of 36% for π=0.25, the frequency of trial reaches a peak of 89% for π=0.50, and the frequency of settlement reaches a peak of 16% for π=0.75. Similarly, under the English rule, the frequency of no suit reaches a peak of 93% for π=0.25, the frequency of trial reaches a peak of 23% for π=0.50, and the frequency of settlement reaches a peak of 88% for π=0.75. The differences between the peak percentage and the other percentages for each form of resolution is statistically significant at the 1% level in all but two cases and at the 5% level in all but one case (percentage of trials under the American Rule between π=0.50 and π=0.75).

5.4 EFFECT OF UNCERTAIN MERIT

Result 8. Under both fee allocation rules, legal expenditure at trial is lower when the merit of the lawsuit is uncertain than when the merit is known.

Support. Figure 15 indicates that under the American rule, mean expenditure at trial drops from 44.9 to 36.5 with the addition of uncertain merit. Figure 16 indicates that under the English rule, mean expenditure at trial drops from 580.2 to 439.6 with the addition of uncertain merit.

Result 9. Under both fee allocation rules, the frequency of trial is higher when the merit of the lawsuit is uncertain than when the merit is known.

Support. Figure 15 illustrates that under the American rule, the frequency of trial increases from 80% to 85% with the addition of uncertain merit. Figure 16 illustrates that under the English rule, the frequency of trial increases more than two-fold from 12% to 26% with the addition of uncertain merit.

Result 10. The difference in expenditure per dispute between the American and English rules is greater when the merit of the lawsuit is uncertain than when the merit is known.

Support. Calculating expenditure per person per dispute as before (see Result 3), we discover that under the American rule, average expenditure per person per dispute decreases from 35.92 to 31.13 (44.31 to 39.94 including fixed costs) with the addition of uncertain merit. On the other hand, under the English rule, average expenditure per person per dispute increases from 75.53 to 113.86 (78.66 to 118.23 including fixed costs) with the addition of uncertain merit. Thus the difference in expenditure per dispute between the two rules increases with the addition of uncertainty.

5.5 PERFORMANCE OF MODEL PREDICTIONS

While the general parametric influence on legal expenditure and dispute resolution is of great interest, it is also important to explore why these factors have the influence that they do. In particular it is important to inquire about the reliability of game theoretic models in helping us understand the patterns of data. Where are they accurate and where do they tend to fail?

The first several results in this section (Result 11 through Result 17) tell us that the qualitative predictions of the Nash equilibrium and subgame perfect equilibrium models are almost always consistent with the observed experimental behavior and outcomes. These results suggest that traditional game theory contributes significantly to our understanding of the relative institutional response to changes in fee allocation rule, case merit, and lawyer productivity. On the other hand, the latter results of this section (Result 18 through Result 20) identify certain areas in which the specific quantitative predictions of the game theoretic models are inconsistent with the experimental observations.

Result 11. The direction of the difference in expenditure at trial under the two different allocation rules is as predicted by the Nash equilibrium model.

Support. Observation 1 indicates that the Nash equilibrium model predicts, for all experimental parameters, that legal expenditure at trial will be higher under the English rule than under the American rule. This prediction matches Result 1 presented above. In addition, Observation 1 specifically says that total expenditure at trial should always be at least twice as large under the English rule as under the American rule. Comparison between Figures 7 and 8 indicates that this is true for all combinations of α and π.

Result 12. The direction of the difference in frequency of trial under the two different allocation rules is as predicted by the subgame perfect equilibrium model.

Support. For the parameters used in the experimental sessions (A=240, C=10), Observation 12 says that the subgame perfect equilibrium model predicts that the frequency of trial will be lower under the English rule than under the American rule. This prediction matches Result 2 presented above.

Result 13. For almost all parameter combinations, the most frequently observed form of resolution is the form predicted by the subgame perfect equilibrium model.

Support. Figure 5 illustrates the form of resolution predicted by the subgame perfect equilibrium model under the American rule for the particular values used in the experimental sessions (A=240, C=10). This figure shows that trial is the predicted form of resolution under the American rule for all nine combinations of α and π used in the experiments. Comparing this prediction with the experimental results in Figure 7 reveals that trial is, in fact, the most frequently observed form of resolution under the American rule for all parameter combinations. For the English rule, the crosses in Figure 6 illustrate the forms of resolution predicted by the subgame perfect equilibrium model for the nine combinations of α and π used in the experiments. Comparing these predictions with the experimental results in Figure 8 reveals that the most frequently observed form of resolution matches the predicted form of resolution for seven of the nine combinations of α and π. Combining the results from both rules, the most frequently observed form of resolution matches the predicted form of resolution in 16 out of the 18 different parameter combinations (three levels of α, three levels of π, and two different allocation rules).

Result 14. Under both fee allocation rules, the effect of changes in the productivity of lawyers on legal expenditure at trial is as predicted by the Nash equilibrium model.

Support. Under both fee allocation rules, Observation 3 says that the Nash equilibrium model predicts that legal expenditure at trial will increase as the productivity of lawyers increases. This prediction matches Result 4 presented above. Moreover, Figures 3 and 4 demonstrate that the Nash model predicts that the increase in legal expenditure as a response to an increase in lawyer productivity will be more significant under the English rule than under the American rule. This prediction is also verified by Result 4 above.

Result 15. Under the English rule, the effect of changes in the productivity of lawyers on the frequency trial is as predicted by the subgame perfect equilibrium model.

Support. Observation 15 indicates that, under the English rule, the subgame perfect equilibrium model predicts that the frequency of trial will decrease as the productivity of lawyers increases. This prediction coincides with Result 5 presented above.

Result 16. Under the English rule, the effect of changes in case merit on legal expenditure at trial is as predicted by the Nash equilibrium model.

Support. According to Observations 7 and 8, the Nash equilibrium model predicts that (a) defendant expenditure at trial will exceed plaintiff expenditure at trial when π=0.25, (b) plaintiff expenditure at trial will exceed defendant expenditure at trial when π=0.75, and (c) the difference between plaintiff and defendant expenditure at trial should be smallest for π=0.50. All three of these predictions are verified by Result 6 above.

Result 17. Under both fee allocation rules, the effect of changes in case merit on the frequency of suit, settlement, and trial is as predicted by the subgame perfect equilibrium model.

Support. According to Observations 16 and 17, the subgame perfect equilibrium model predicts that, under both allocation rules, frivolous lawsuits (π=0.25) will be the most likely to not be filed, closely contested lawsuits (π=0.50) will be the most likely to be resolved at trial, and strong lawsuits (π=0.75) will be the most likely to produce a pretrial settlement. This prediction coincides with Result 7 presented above.

Result 18. Under the American rule, average legal expenditure at trial is slightly higher than predicted by the Nash equilibrium model. Under the English rule, average legal expenditure at trial is much higher than predicted by the Nash equilibrium model

Support. Figure 17 shows that for all values of α, the observed average expenditure at trial under both allocation rules is above the level of expenditure predicted by the Nash equilibrium model. This figure also illustrates that the difference between observed and predicted expenditure at trial is much more significant under the English rule than under the American rule (note the

different scales for the vertical axes in the figure). In addition, comparison of predicted expenditure levels in Figures 3 and 4 to observed expenditure levels in Figures 7 and 8 allow examination of differences for all nine combinations of α and π. Under the American rule, observed expenditure at trial ranges from 10% below prediction (α=0.50, π=0.75, defendant) to 220% above prediction (α=0.25, π=0.50, plaintiff). Under the English rule, observed expenditure at trial ranges from 85% above prediction (α=0.75, π=0.25, defendant) to 1415% above prediction (α=0.25, π=0.50, defendant). All differences between observed and predicted expenditure levels are statistically significant at the 1% level.

Result 19. Under the American rule, the frequency of trial is lower than predicted by the subgame perfect equilibrium model.

Support. Figure 18 illustrates that the subgame perfect equilibrium model predicts 100% of legal disputes will go to trial under the American rule for the particular parameter values used in the experimental sessions. This figure also shows, however, that only 80% of all experimental disputes are actually resolved at trial. Moreover, Figure 7 indicates that, for particular combinations of α and π, as few as 60% of disputes are resolved at trial under the American rule.

Result 20. Under the English rule, the frequency of no suit is higher than predicted by the subgame perfect equilibrium model while the frequency of settlement is lower than predicted.

Support. As illustrated in Figure 19, the subgame perfect equilibrium model predicts that, under the English rule, 21% of all disputes will result in no suit being filed, 67% will result in pretrial settlement, and 12% will proceed to trial (note that these percentages are determined by the observed relative frequency of the different combinations of α and π in the experimental sessions). Figure 19 also depicts the observed frequency of the different forms of resolution, and although the observed frequency of trial (12%) matches the prediction, the observed frequency of no suit (50%) is significantly greater than predicted while the observed frequency of settlement (38%) is significantly lower than predicted. Comparing predictions and observations for specific parameter values reveals that much of the overall discrepancy can be traced to two specific parameter combinations: α=0.75, π=0.25, and α=0.75, π=0.50. Figure 6 illustrates that settlement is the predicted form of resolution under both of these parameter combinations, however in both cases, Figure 8 reveals that the most frequently observed resolution is no suit being filed (90% and 67% of disputes), with settlement occurring much less frequently (0% and

37% of disputes). Note that both litigants prefer to avoid trial under these parameter combinations, however the subgame perfect equilibrium model predicts that the plaintiff will file suit with the knowledge (or belief) that the defendant will subsequently choose to settle rather than go to trial. In the actual experiments, however, many plaintiffs are choosing not to file suit, apparently because they fear that the defendants will "call their bluff" and proceed to trial.

6 EX-POST THEORIZING AND CONJECTURES

The analysis in this paper provides important insight into the impact of alternative legal fee allocation rules on the behavior of litigants and the resolution of legal disputes. Nonetheless, there remain relevant unanswered questions and significant avenues for further research in the field. In this section, we present rudimentary theories on several issues that are raised or unaddressed by our analysis and discuss potential research extensions that are outside the scope of the present paper.

As mentioned previously, a comprehensive investigation of different fee allocation rules requires examination of all four stages in the chronology of a legal dispute (Figure 1), recognizing that behavior in each preliminary stage will depend heavily upon expectations about the outcome of later stages. The present paper is intended to be a first step in such an investigation, and therefore focuses primarily on the different effects of the American and English rules on outcomes and decisions at trial, the final stage in the chronology. Other researchers may seek to extend our analysis to the previous stage of settlement bargaining, and in doing so may employ a more flexible settlement procedure than the strict forfeiture settlement mechanism used in our investigation. It is therefore sensible to discuss the anticipated effects of alternative settlement mechanisms on the results of this paper.

It is reasonable to expect that a more flexible settlement mechanism could produce additional settlements and fewer trials than were predicted and observed in the present analysis. Recall that the forfeiture settlement mechanism we employed was chosen with the expectation that the number of disputes resolved at trial would be significant enough for us to draw strong conclusions about trial expenditure decisions. In our experiments, more than 90% of the lawsuits filed under the American rule were resolved at trial, whereas fewer than 10% of all lawsuits proceed to trial in actual practice. Therefore, any settlement mechanism that is selected to more closely represent existing legal procedure should result in a greater number of lawsuits being settled out of court.

Despite the prospect of increasing the settlement rate, use of an alternative mechanism is nevertheless unlikely to reverse any of the results comparing litigant behavior under the two different allocation rules. For example, trial expenditure should continue to be higher under the English rule than under the American rule (Result 1), since the settlement mechanism has no effect on incentives at trial (although it may influence the type of disputes that proceed to trial). Moreover, as long as this disparity in trial expenditure persists, there will be a greater incentive to settle and therefore a lower frequency of trial under the English rule than under the American rule (Result 2).

We also expect that expenditure per legal dispute would continue to be higher under the English rule than under the American rule (Result 3) for any reasonable settlement mechanism. Given that the observed expenditure per trial under the English rule was 13 times higher than under the American rule, adoption of an alternative settlement mechanism would reverse our result only if the new mechanism produced 13 trials under the American rule for every single trial under the English rule. No matter the settlement procedure, such a significant difference in trial rates is highly unlikely and inconsistent with empirical evidence [Hughes and Snyder 1991, 1995].

Another potential research extension is the enhancement of the game theoretic models to explain the discrepancies between predicted behavior and experimental observations. The models presented in this paper are remarkably effective in terms of predicting the qualitative behavioral impact of changes in fee allocation rule, case merit, and lawyer productivity. Nonetheless, there are experimental treatments in which the observed form of resolution and/or level of legal expenditure differs significantly from the model predictions.

First of all, it is possible that a model of litigant behavior containing an element of randomness or imperfect performance may explain some of the observed actions and outcomes that are inconsistent with the traditional game theoretic model. Introducing small errors in performance could account for cases in which observed litigant behavior does not differ substantially from the prediction. For example, although the observed form of resolution is most frequently the form predicted, we still observe dispute resolutions that are zero likelihood events according to the model. With the introduction of randomness or error, this zero likelihood problem is immediately averted as all possible outcomes become positive probability events.

In addition, the results of the uncertain merit experiments suggest that a model incorporating uncertain or asymmetric information may also have considerable explanatory power. As previously discussed, the addition of uncertain merit increases the frequency of trial, especially under the English rule. Information uncertainty therefore presents itself as a potential explanation for the occurrence of trials (with frequencies as high as 28%) under the English rule in treatments for which settlement or no suit is the predicted resolution. In particular, a litigant may be uncertain about the interpretation of the dispute process, about the assessment of the probability of prevailing at trial, or about the opposing parties beliefs about these same factors.

Lastly, anomalous litigant behavior may also be a result of non-neutral attitudes toward risk. In particular, consider the most dramatic inaccuracy of the current game theoretic model, which is the significant underestimation of legal expenditure at trial under the English rule. In these disputes, the equilibrium expected profit at trial is always negative for the defendant and is negative for the plaintiff in six of nine treatments. Since trial is a negative value gamble for both parties in such cases, prospect theory [Kahneman and Tversky 1979] predicts risk seeking behavior by the litigants, making them more inclined to take the greater gamble associated with larger trial expenditures. Such risk attitudes may therefore explain why observed expenditure at trial under the English rule is significantly higher than the current model predicts for risk neutral parties. In addition, it is possible that non-neutral risk attitudes may be the rationale for other observed behavior that is inconsistent with the game theoretic models as currently constructed.

7 CONCLUSIONS

The analysis of legal fee allocation rules presented in this paper suggests that a change from the American rule to the English rule could result in extreme changes in the legal process. The experimental results as well as the game theoretic model applied to the legal dispute environment under investigation indicate significant differences in the level of legal expenditures and the frequency of suit, settlement, and trial induced by the two rules.

In the experimental legal environment, subjects chose levels of expenditure at trial under the English rule which were on average almost 13 times larger than the levels of expenditure at trial chosen under the American rule. On the other hand, nearly 6 times fewer legal disputes were brought to trial under the English rule than under the American rule. Despite the lower frequency

of trial under the English rule, total expenditure per dispute was 78% higher under the English rule than under the American rule.

These results indicate that while a move to the English rule may reduce the number of lawsuits and trials in our legal system, it may nevertheless increase the total cost of the system as a result of dramatically increased expenditure at trial. The surprisingly high legal fees that must be paid by a losing party under the English rule also raises significant issues concerning proper access to justice. Parties with meritorious claims may be deterred from going to trial or even using the legal system at all when the potential costs are so high. It is a fundamental premise of our legal system that every citizen is entitled to her day in court, and relieving court congestion may not be justified if, as a consequence, potential litigants are afraid to exercise their legal rights.

In addition to the qualitative differences between the American rule and English rule, we were also able to identify the impact of several other factors on litigation expenditure and dispute resolution. The productivity of lawyers was shown to be positively related to legal expenditure at trial and negatively related to the frequency of trial. Case merit was also found to have significant effects, with frivolous lawsuits being the most likely to not be filed, closely contested lawsuits the most likely to be resolved at trial, and strong lawsuits the most likely to produce a pretrial settlement. In addition, defendants outspent plaintiffs on average when frivolous lawsuits were resolved at trial while plaintiffs outspent defendants on average when strong lawsuits were resolved at trial. Finally, the effect of uncertain merit was to decrease expenditure at trial, increase the frequency of trial, and increase the gap between the American rule and English rule in terms of expenditure per dispute.

The Nash equilibrium and subgame perfect equilibrium models provide accurate predictions regarding the qualitative differences between the American and English rules as well as the impact of changes in lawyer productivity and case merit. Nonetheless, the specific quantitative predictions were not always accurate, with the most dramatic discrepancy being a significant underestimation of the level of legal expenditure at trial under the English rule. Directions for future research include enhancements to the current models that may explain such discrepancies, perhaps incorporating errors in performance, uncertain or asymmetric information, or non-neutral attitudes toward risk.

Figure 1
Chronology of a Legal Dispute

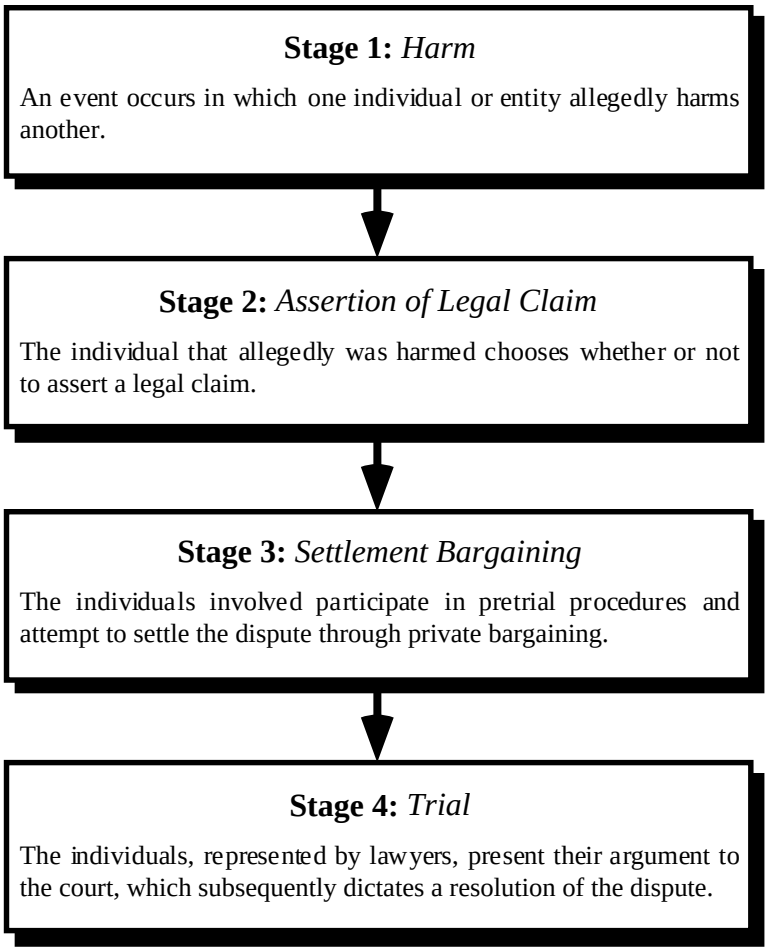


Figure 2
Structure of Experimental Legal Dispute

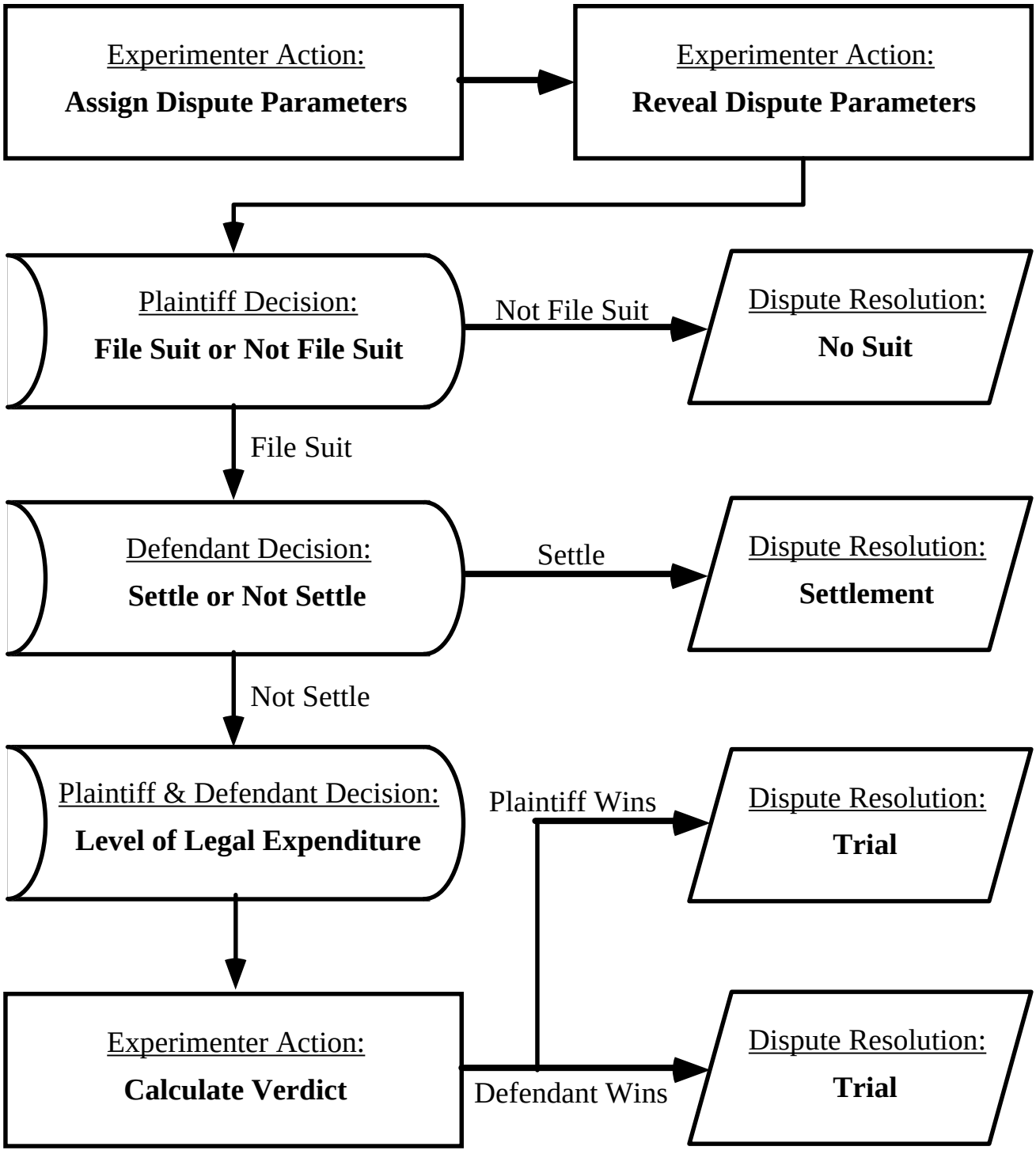


Figure 3

Predicted Expenditure At Trial Under American Rule (A=240, C=10)

α \ π	0.25	0.50	0.75
0.25	PLAINTIFF: 15 DEFENDANT: 15 TOTAL 30	PLAINTIFF: 15 DEFENDANT: 15 TOTAL 30	PLAINTIFF: 15 DEFENDANT: 15 TOTAL 30
0.50	PLAINTIFF: 30 DEFENDANT: 30 TOTAL 60	PLAINTIFF: 30 DEFENDANT: 30 TOTAL 60	PLAINTIFF: 30 DEFENDANT: 30 TOTAL 60
0.75	PLAINTIFF: 45 DEFENDANT: 45 TOTAL 90	PLAINTIFF: 45 DEFENDANT: 45 TOTAL 90	PLAINTIFF: 45 DEFENDANT: 45 TOTAL 90

Figure 4

Predicted Expenditure At Trial Under English Rule (A=240, C=10)

α \ π	0.25	0.50	0.75
0.25	PLAINTIFF: 20 DEFENDANT: 60 TOTAL 80	PLAINTIFF: 40 DEFENDANT: 40 TOTAL 80	PLAINTIFF: 60 DEFENDANT: 20 TOTAL 80
0.50	PLAINTIFF: 60 DEFENDANT: 180 TOTAL 240	PLAINTIFF: 120 DEFENDANT: 120 TOTAL 240	PLAINTIFF: 180 DEFENDANT: 60 TOTAL 240
0.75	PLAINTIFF: 180 DEFENDANT: 540 TOTAL 720	PLAINTIFF: 360 DEFENDANT: 360 TOTAL 720	PLAINTIFF: 540 DEFENDANT: 180 TOTAL 720

Figure 5

Predicted Form of Resolution Under American Rule (A=240, C=10)

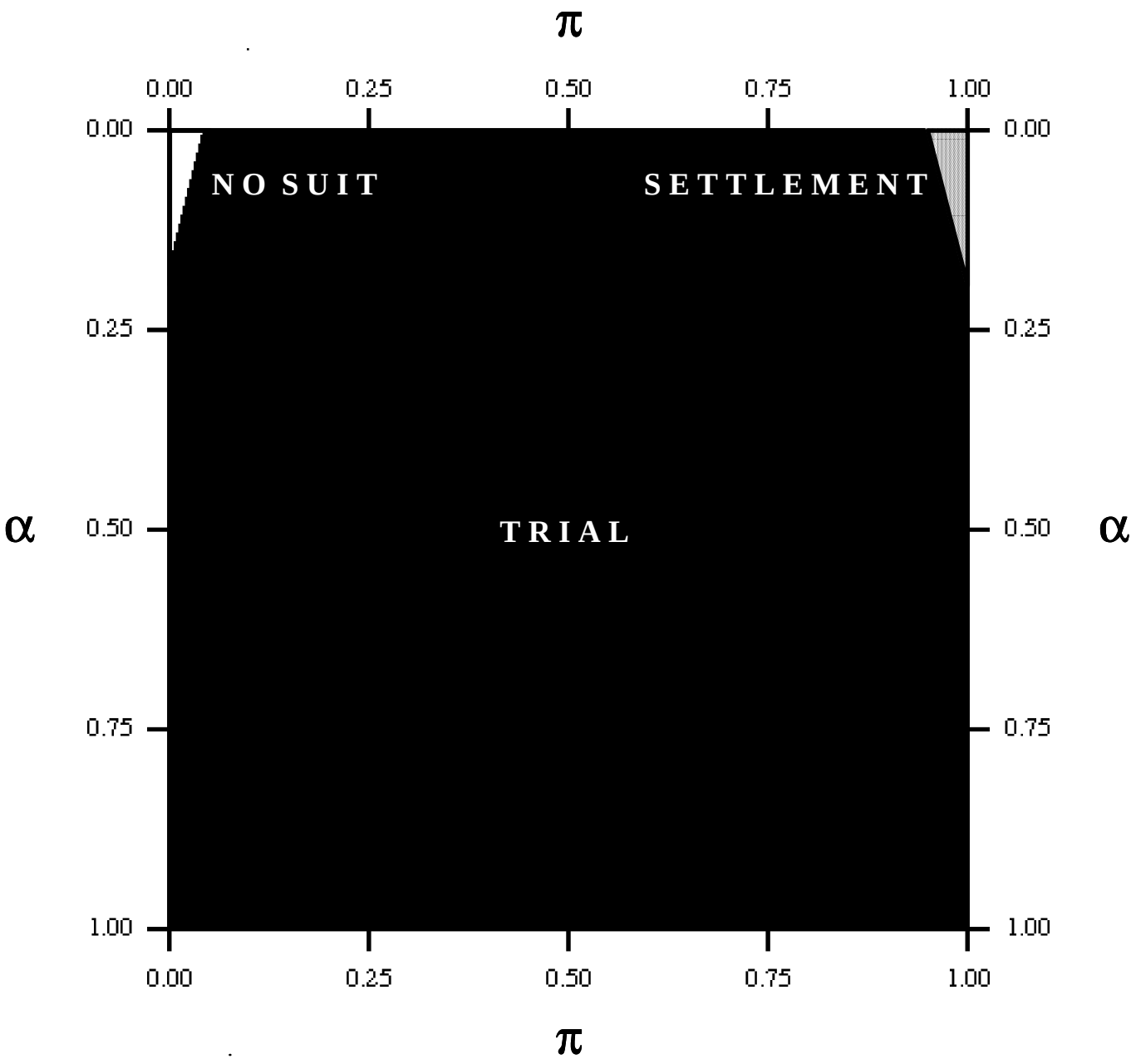


Figure 6

Predicted Form of Resolution Under English Rule (A=240, C=10)

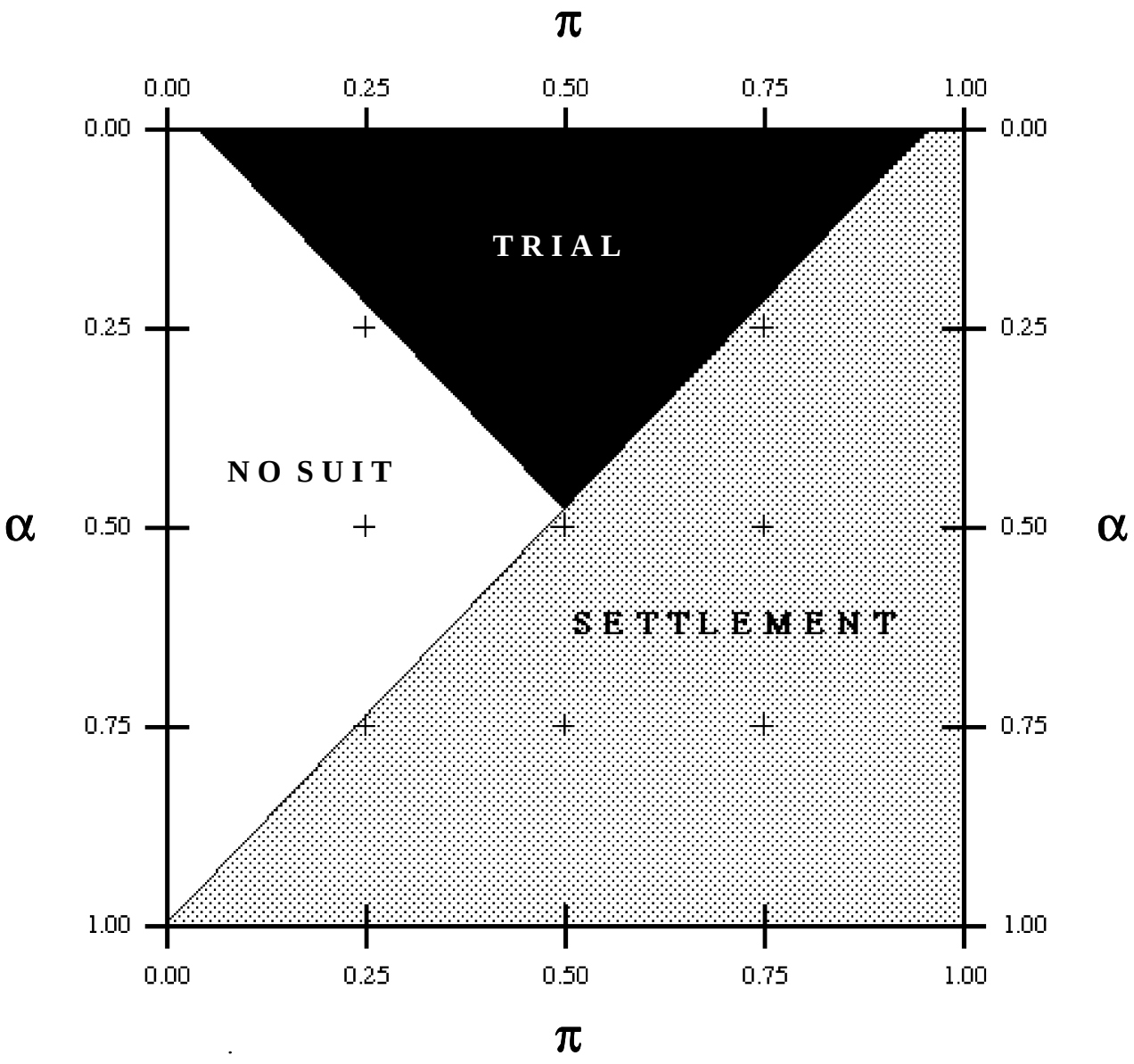


Figure 7
Experimental Results Under American Rule

α \ π	0.25	0.50	0.75
0.25	**MEAN EXPENDITURE** PLAINTIFF 27 DEFENDANT 37 **FORM OF RESOLUTION** NO SUIT 39% SETTLEMENT 0% TRIAL 61%	**MEAN EXPENDITURE** PLAINTIFF 48 DEFENDANT 38 **FORM OF RESOLUTION** NO SUIT 5% SETTLEMENT 0% TRIAL 95%	**MEAN EXPENDITURE** PLAINTIFF 32 DEFENDANT 23 **FORM OF RESOLUTION** NO SUIT 0% SETTLEMENT 10% TRIAL 90%
0.50	**MEAN EXPENDITURE** PLAINTIFF 44 DEFENDANT 60 **FORM OF RESOLUTION** NO SUIT 40% SETTLEMENT 0% TRIAL 60%	**MEAN EXPENDITURE** PLAINTIFF 51 DEFENDANT 72 **FORM OF RESOLUTION** NO SUIT 2% SETTLEMENT 2% TRIAL 96%	**MEAN EXPENDITURE** PLAINTIFF 35 DEFENDANT 27 **FORM OF RESOLUTION** NO SUIT 0% SETTLEMENT 21% TRIAL 79%
0.75	**MEAN EXPENDITURE** PLAINTIFF 54 DEFENDANT 44 **FORM OF RESOLUTION** NO SUIT 26% SETTLEMENT 4% TRIAL 70%	**MEAN EXPENDITURE** PLAINTIFF 62 DEFENDANT 55 **FORM OF RESOLUTION** NO SUIT 12% SETTLEMENT 14% TRIAL 74%	**MEAN EXPENDITURE** PLAINTIFF 55 DEFENDANT 49 **FORM OF RESOLUTION** NO SUIT 0% SETTLEMENT 18% TRIAL 82%

Figure 8
Experimental Results Under English Rule

α \ π	0.25	0.50	0.75
0.25	**MEAN EXPENDITURE** PLAINTIFF 295 DEFENDANT 510 **FORM OF RESOLUTION** NO SUIT 90% SETTLEMENT 0% TRIAL 10%	**MEAN EXPENDITURE** PLAINTIFF 378 DEFENDANT 606 **FORM OF RESOLUTION** NO SUIT 53% SETTLEMENT 13% TRIAL 34%	**MEAN EXPENDITURE** PLAINTIFF 377 DEFENDANT 123 **FORM OF RESOLUTION** NO SUIT 10% SETTLEMENT 83% TRIAL 7%
0.50	**MEAN EXPENDITURE** PLAINTIFF - DEFENDANT - **FORM OF RESOLUTION** NO SUIT 100% SETTLEMENT 0% TRIAL 0%	**MEAN EXPENDITURE** PLAINTIFF 635 DEFENDANT 557 **FORM OF RESOLUTION** NO SUIT 32% SETTLEMENT 40% TRIAL 28%	**MEAN EXPENDITURE** PLAINTIFF 1000 DEFENDANT 700 **FORM OF RESOLUTION** NO SUIT 4% SETTLEMENT 89% TRIAL 7%
0.75	**MEAN EXPENDITURE** PLAINTIFF 1000 DEFENDANT 1000 **FORM OF RESOLUTION** NO SUIT 90% SETTLEMENT 0% TRIAL 10%	**MEAN EXPENDITURE** PLAINTIFF 1000 DEFENDANT 1000 **FORM OF RESOLUTION** NO SUIT 60% SETTLEMENT 37% TRIAL 3%	**MEAN EXPENDITURE** PLAINTIFF - DEFENDANT - **FORM OF RESOLUTION** NO SUIT 4% SETTLEMENT 96% TRIAL 0%

Figure 9

Expenditure at Trial Under Alternative Allocation Rules

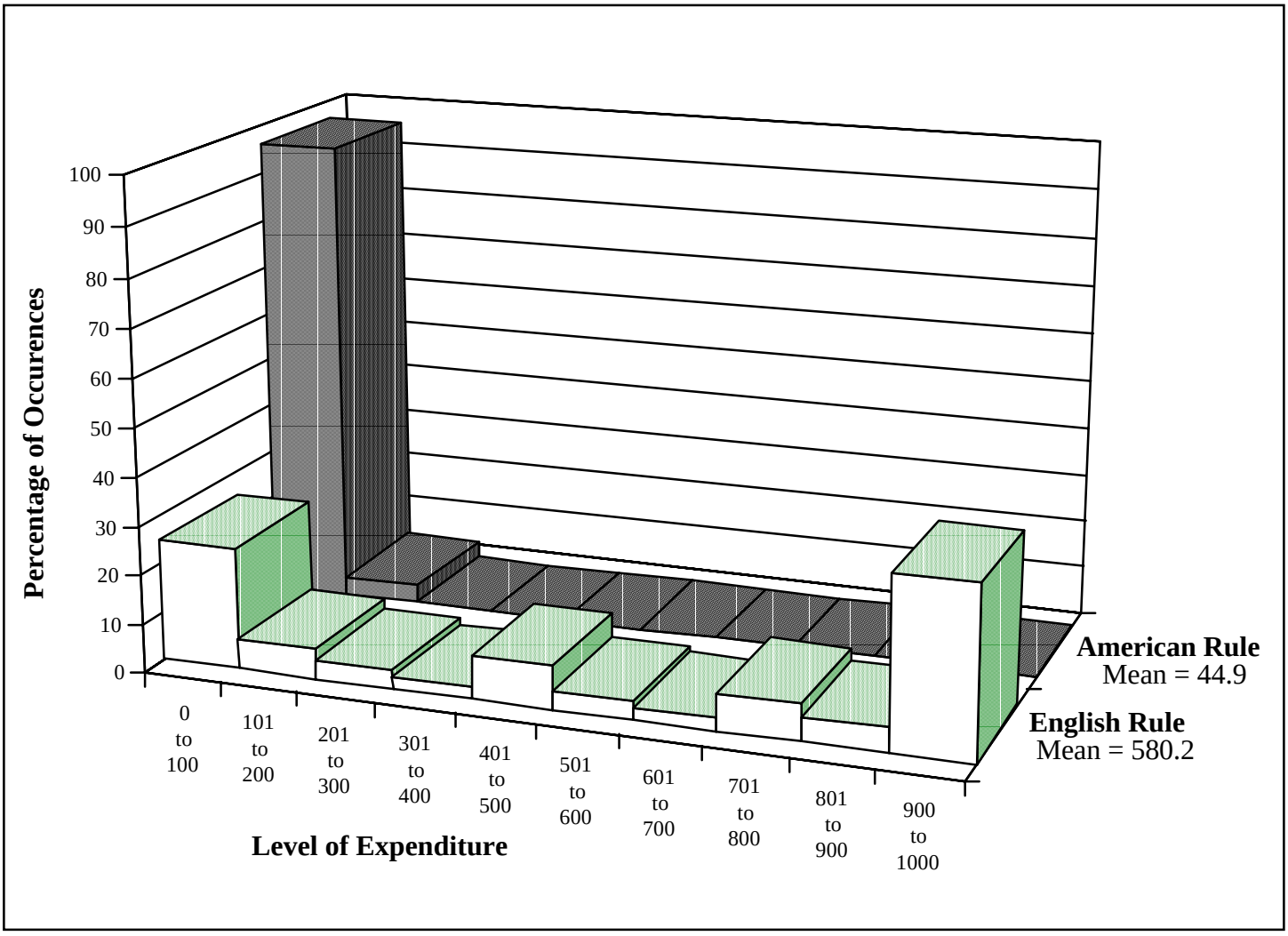


Figure 10
Form of Resolution Under Alternative Allocation Rules

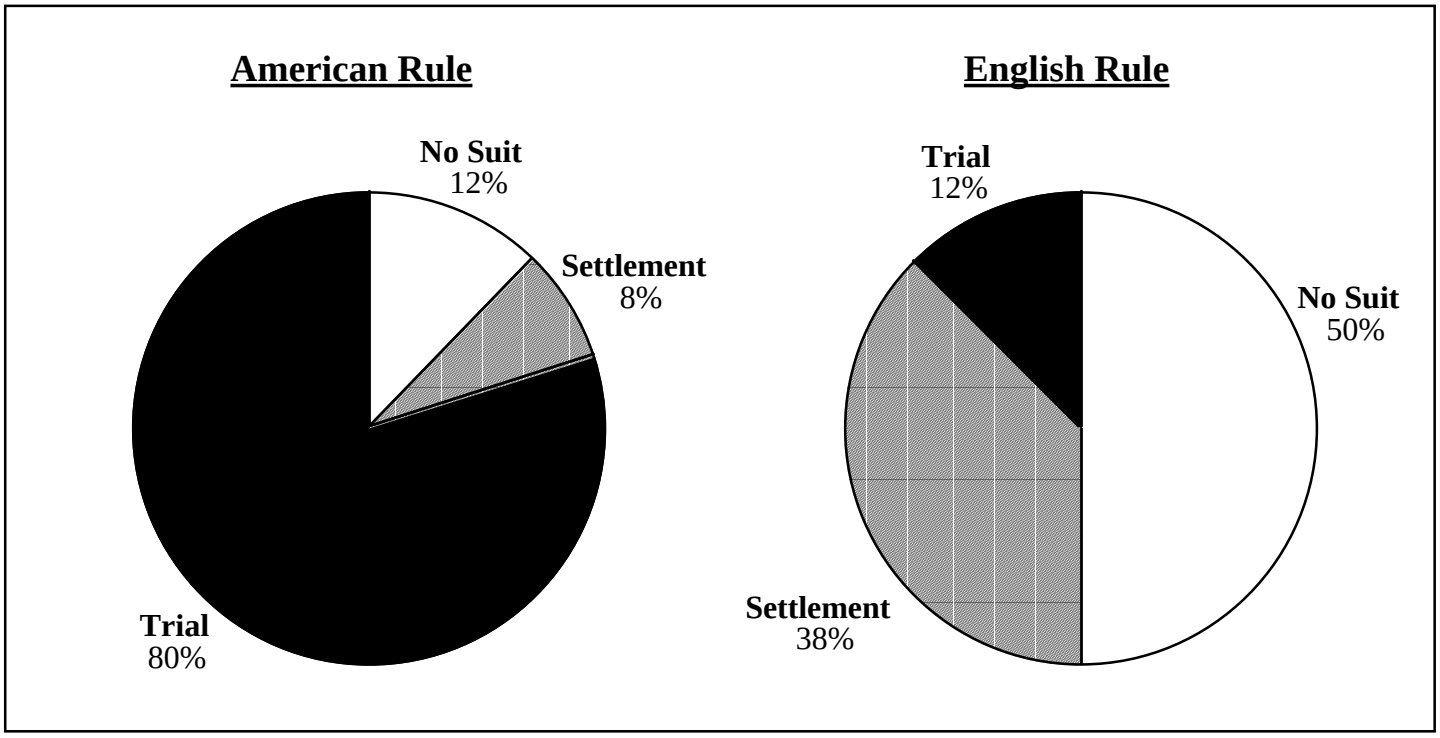


Figure 11

Expenditure at Trial as a Function of Lawyer Productivity

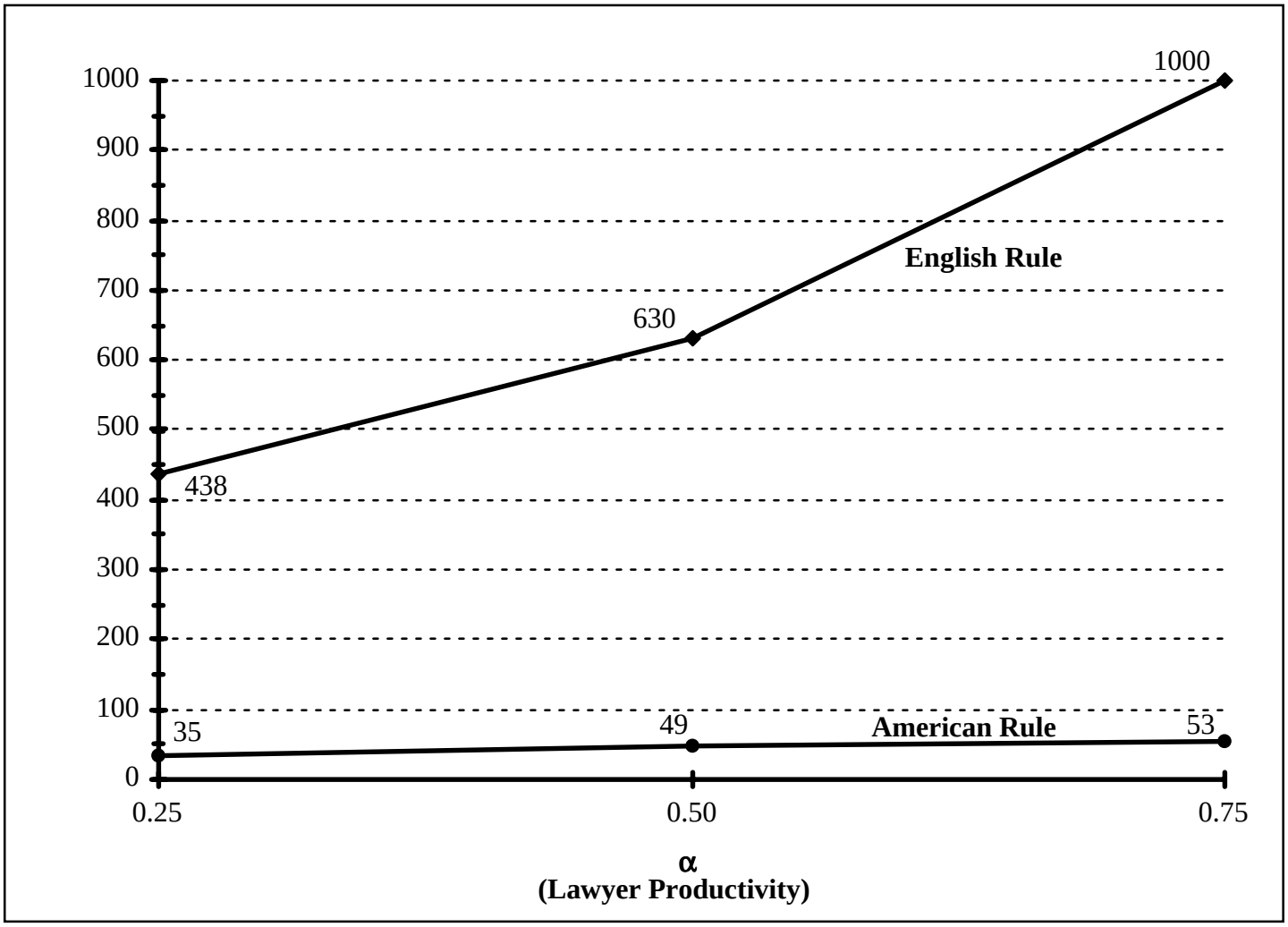


Figure 12
Form of Resolution as a Function of Lawyer Productivity

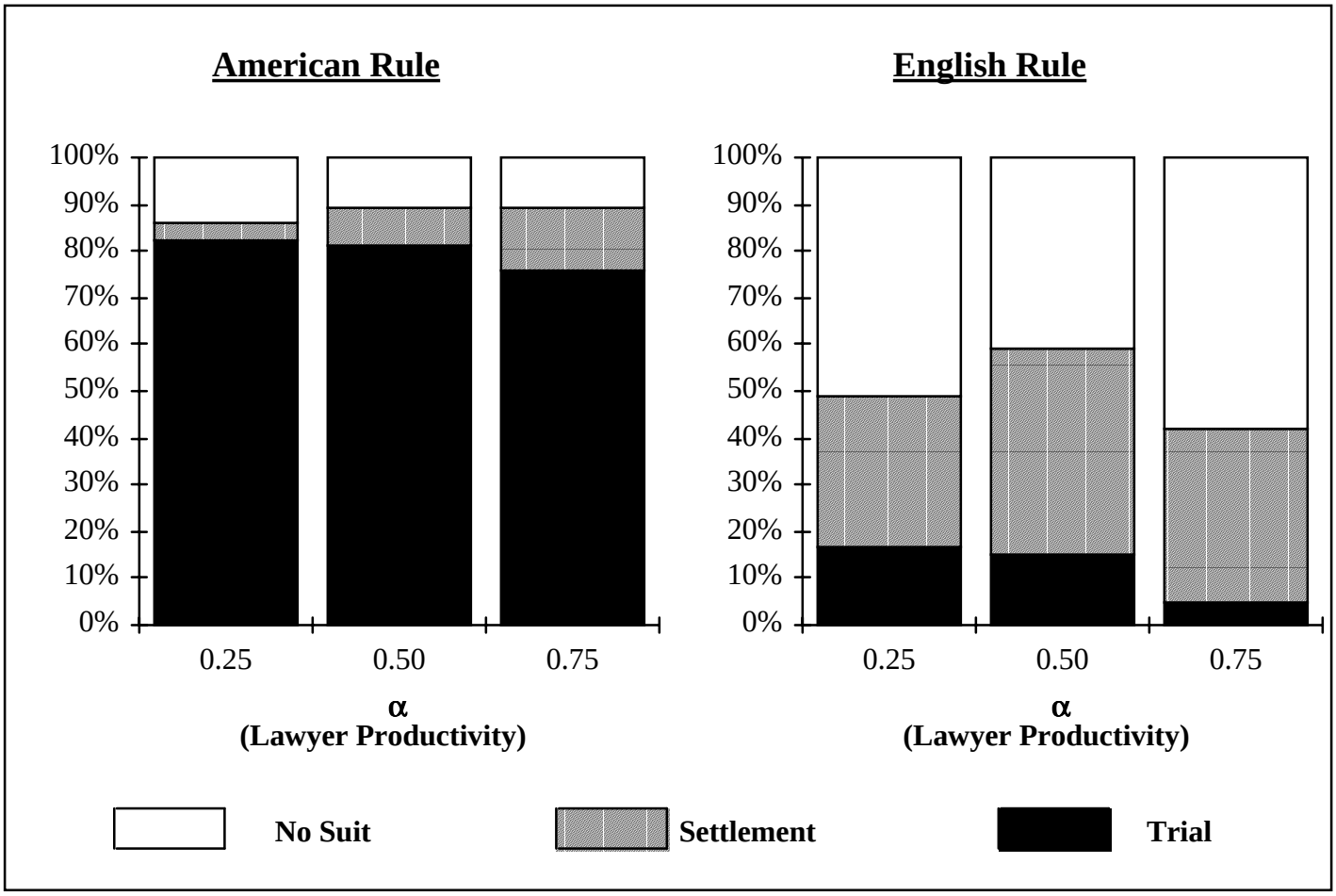


Figure 13
Expenditure at Trial as a Function of Case Merit

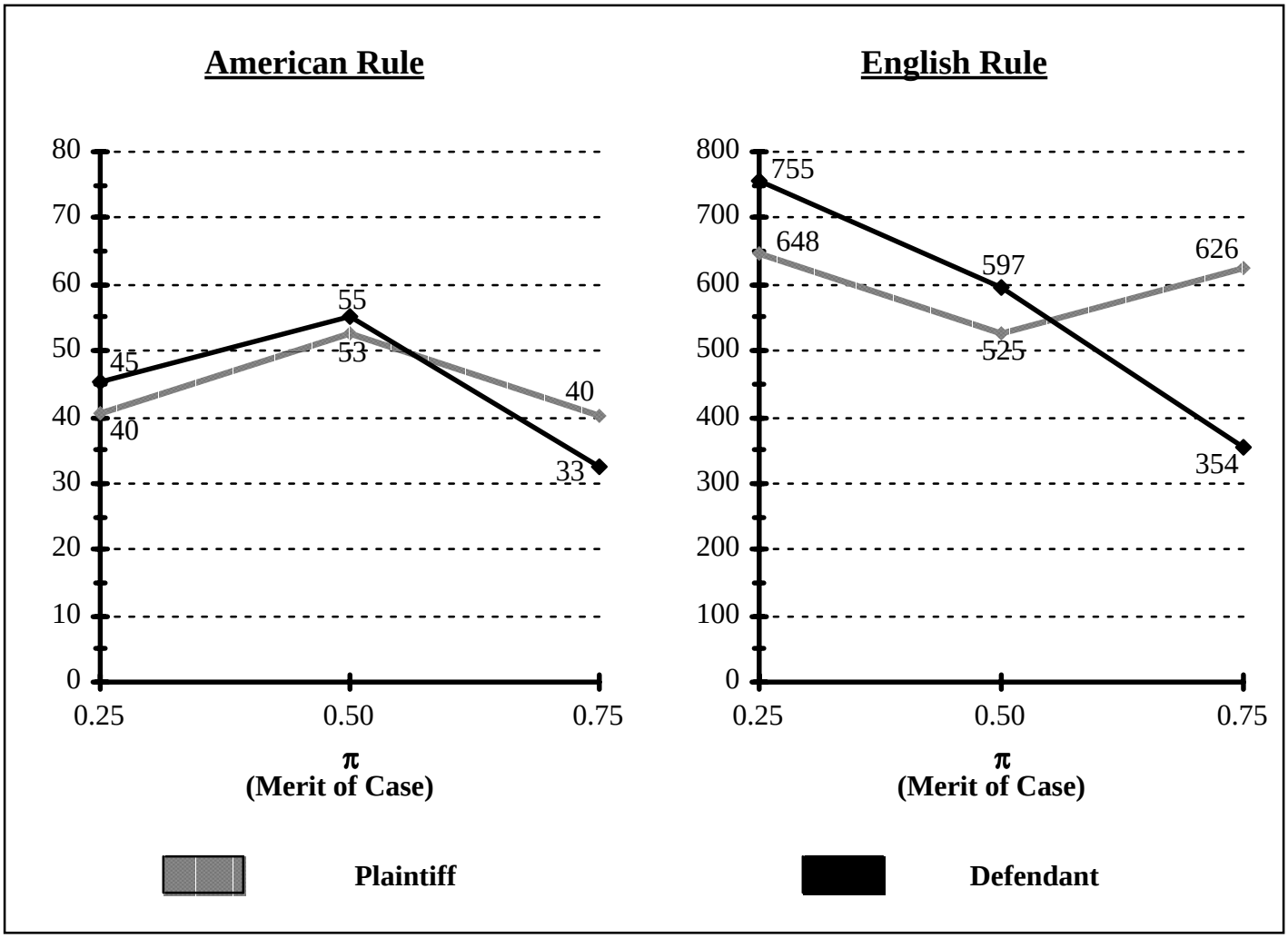


Figure 14
Form of Resolution as a Function of Case Merit

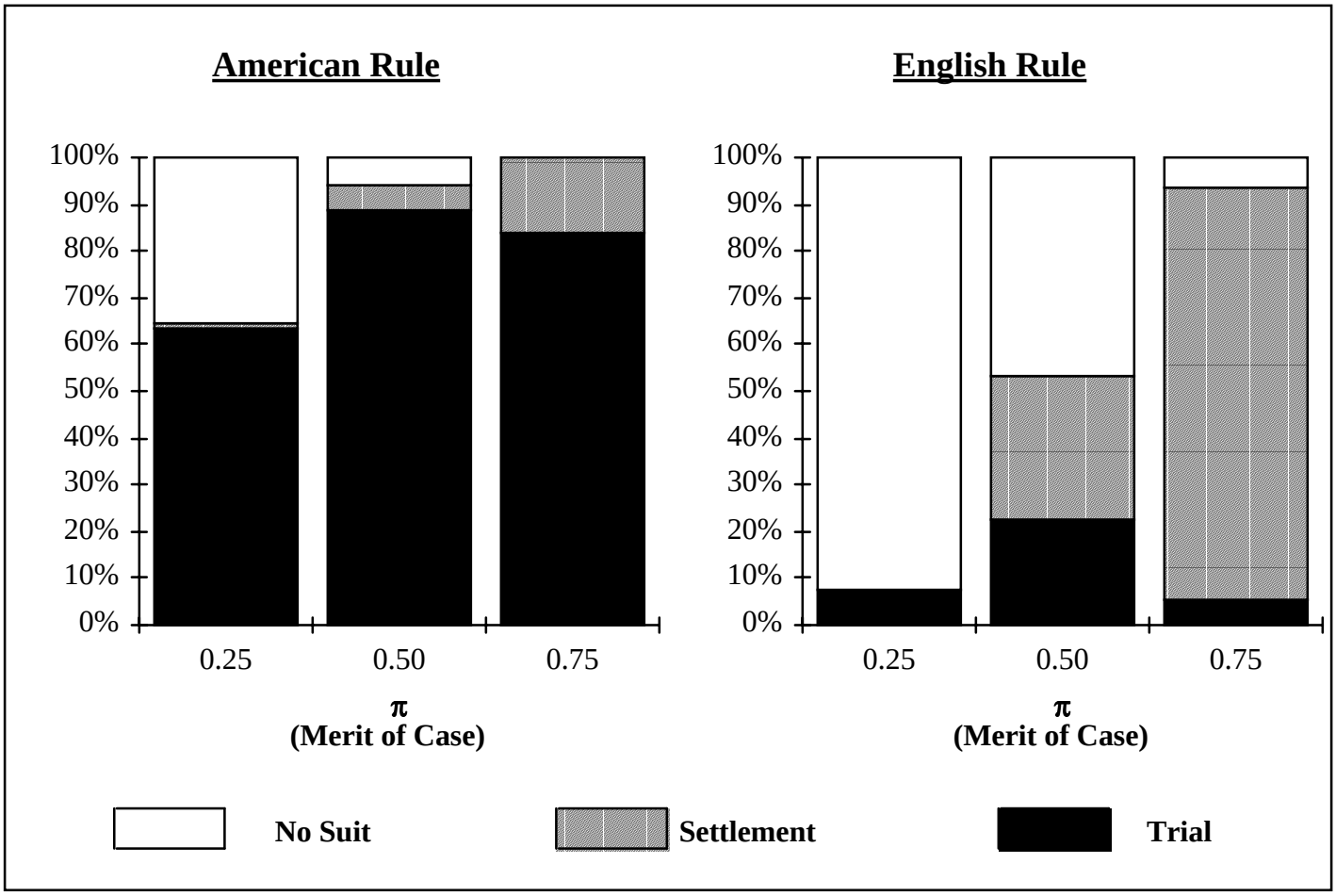
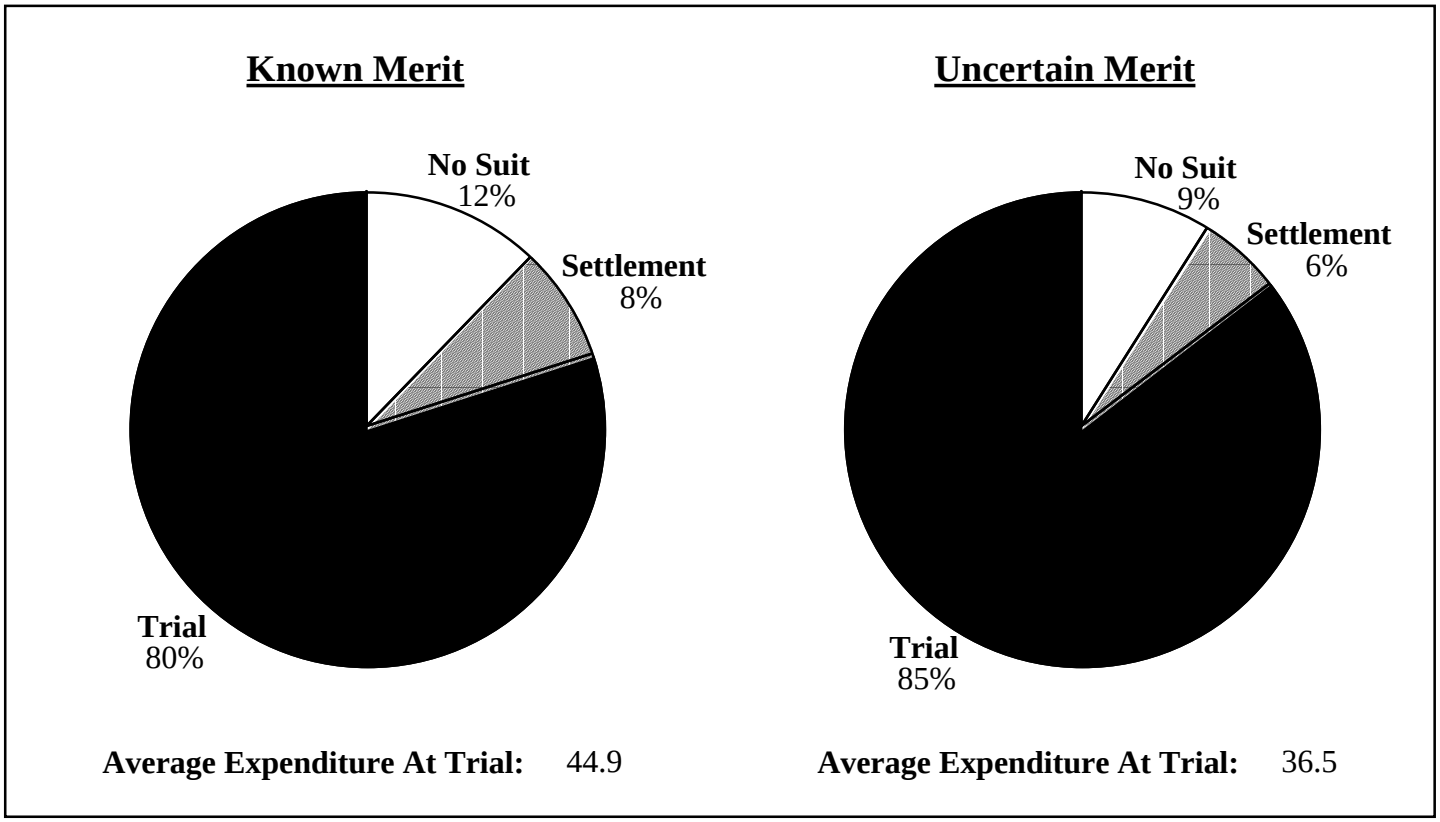


Figure 15

Known Merit vs. Uncertain Merit Under the American Rule

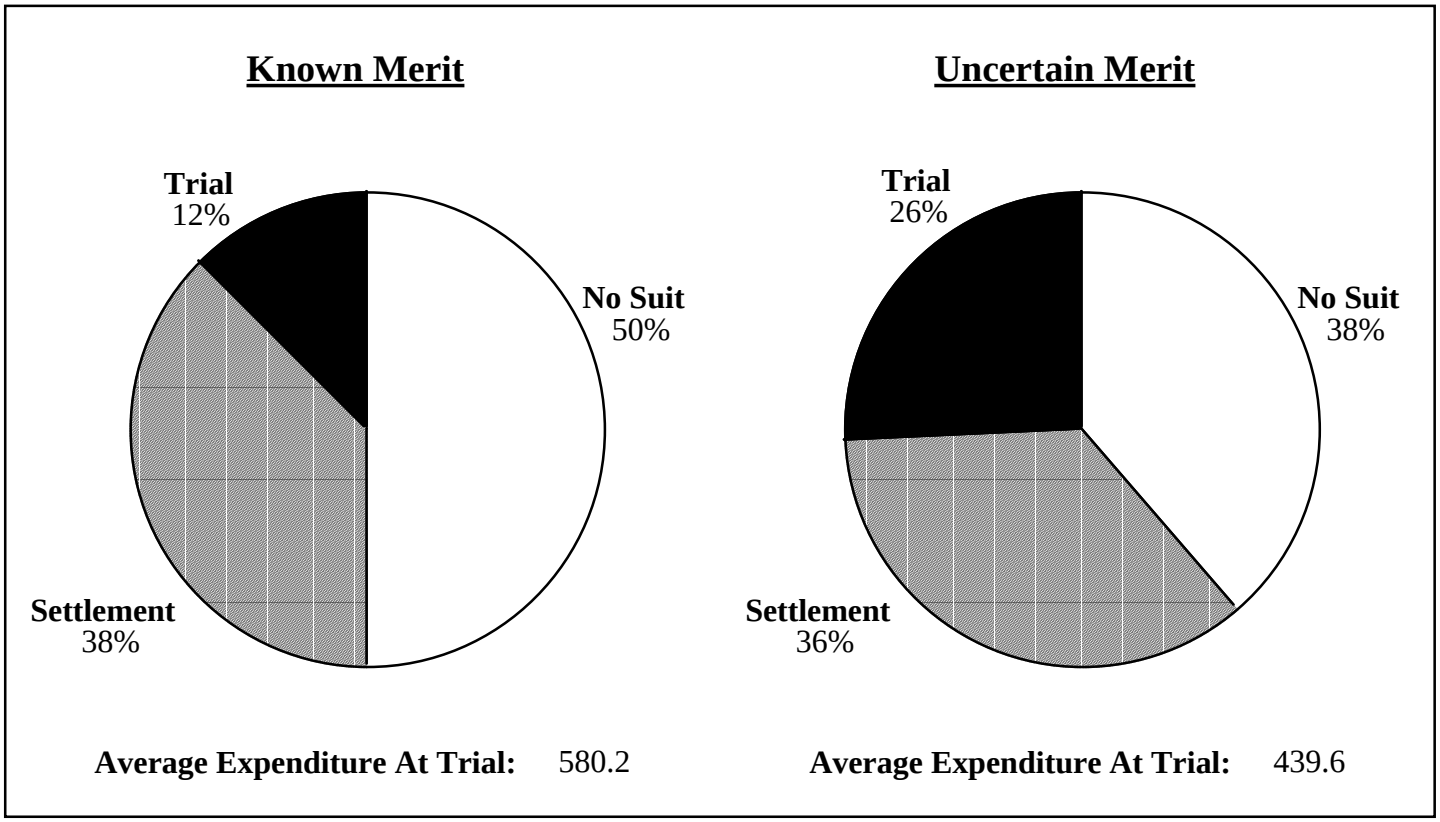


Average Expenditure At Trial: 44.9

Average Expenditure At Trial: 36.5

Figure 16

Known Merit vs. Uncertain Merit Under the English Rule



Average Expenditure At Trial: 580.2

Average Expenditure At Trial: 439.6

Figure 17
Predicted vs. Observed Expenditure at Trial

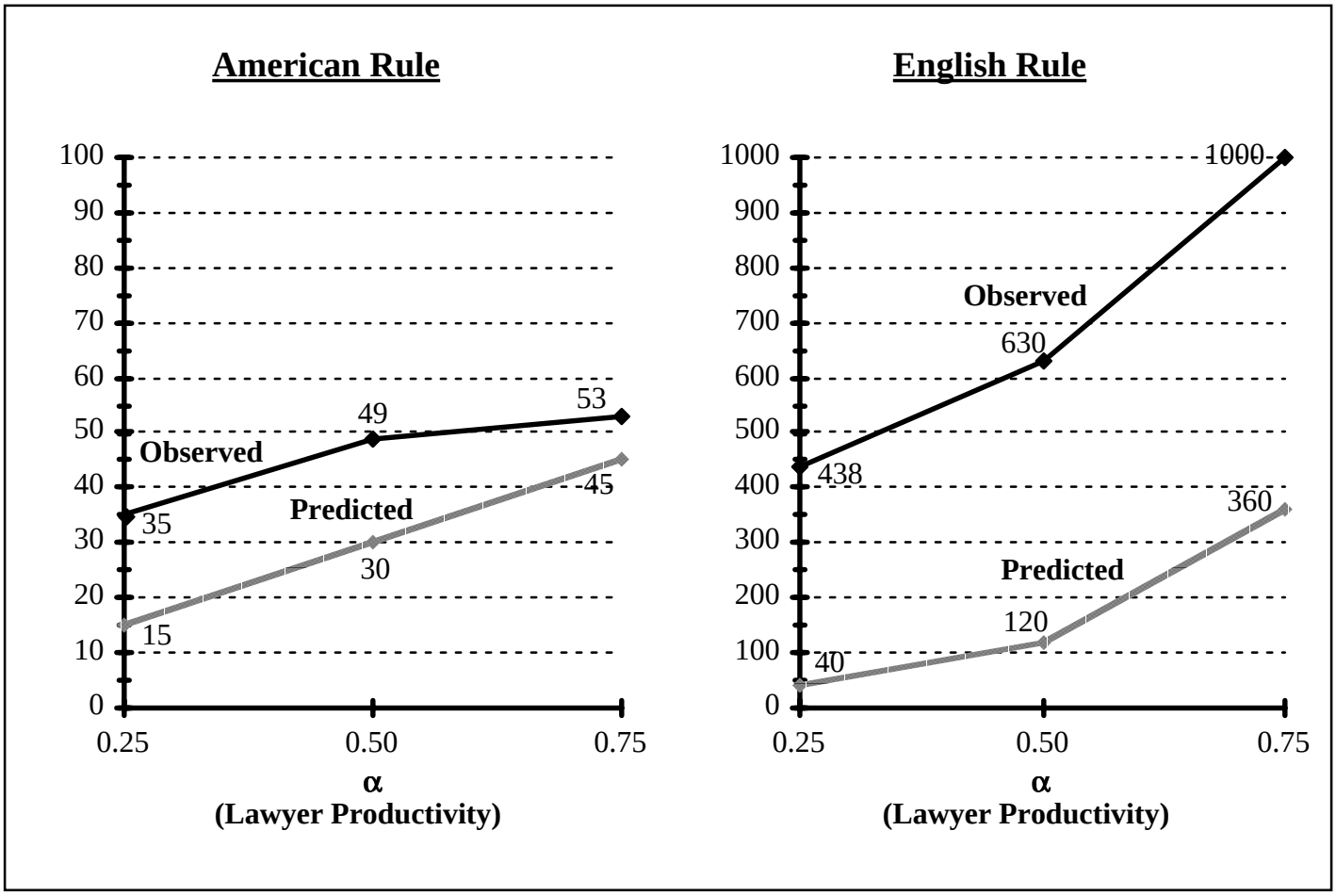


Figure 18

Predicted vs. Observed Form of Resolution Under the American Rule

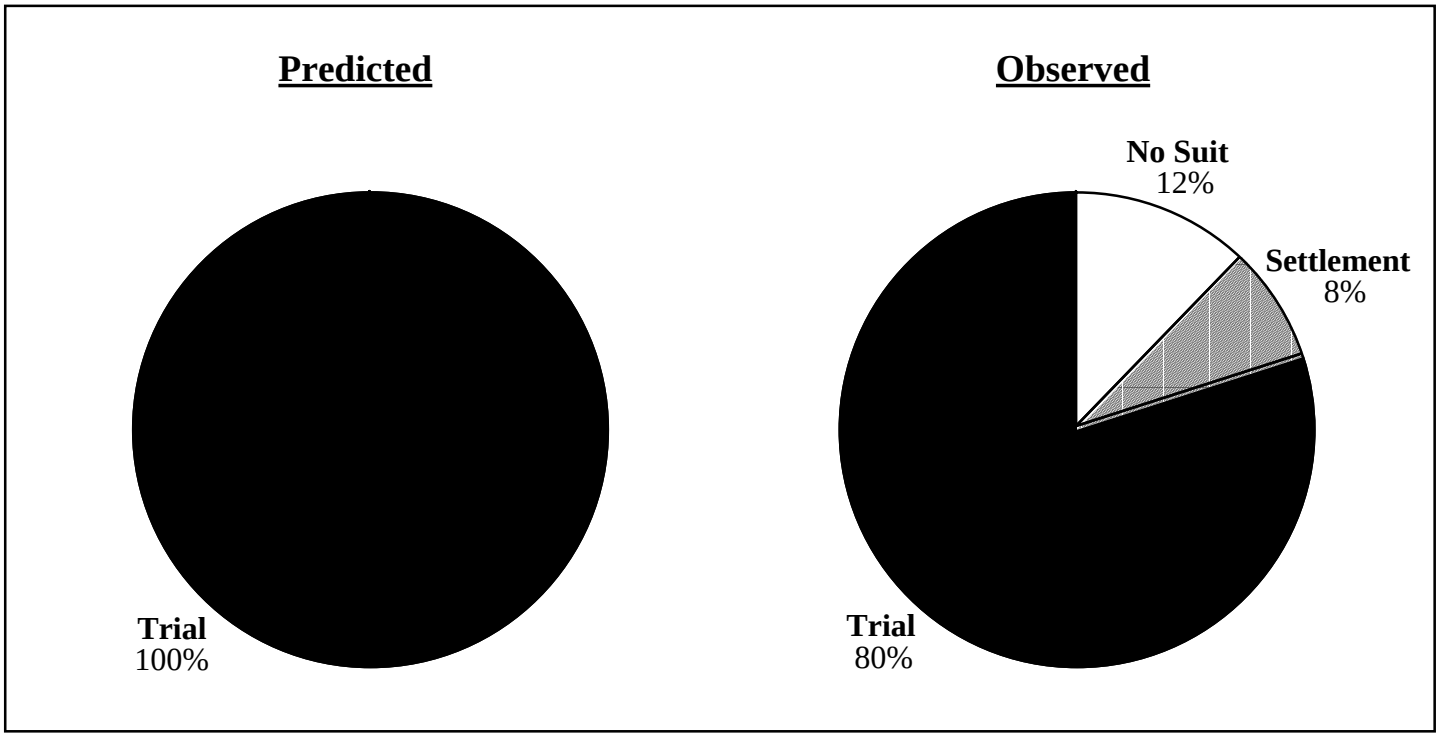
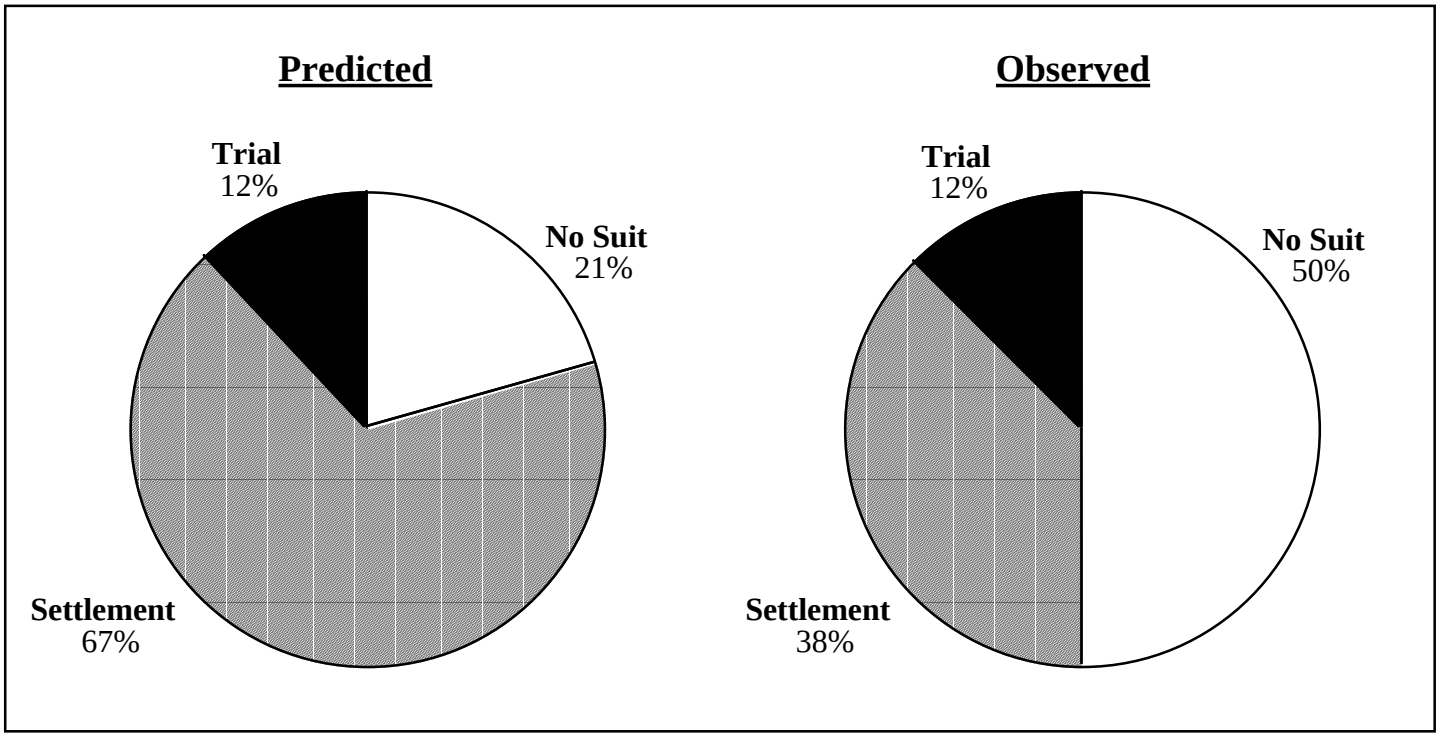


Figure 19

Predicted vs. Observed Form of Resolution Under the English Rule



APPENDIX: EXPERIMENT INSTRUCTIONS

This is an experiment in market decision making. If you follow the instructions carefully and make good decisions, you may earn money which will be paid to you in cash.

The currency used in this experiment is francs. Each franc is worth ____ dollars to you.

The experiment will consist of several periods. At the beginning of each period, every participant in the experiment will be randomly paired with another participant. In each period, you are equally likely to be paired with any other participant and the identity of the person you are paired with will never be revealed to you.

One member of each pair will randomly be designated as *Person A*, and the other member will be designated as *Person B*. In addition, each pair will randomly be assigned a *State*. The three possible states are "X", "Y", and "Z", and they each occur with equal probability. You will not know which State your pair has been assigned until the end of the period.

After each pair has been assigned a State, Person A and Person B will each receive a *Signal*. The Signal Person A receives is known as *Signal A* and the Signal Person B receives is known as *Signal B*. The three possible Signals are "X", "Y", and "Z". The probability of receiving each Signal will depend on which State the pair has been assigned. The following chart identifies the probability of receiving each Signal, "X", "Y", or "Z", as a function of the State, "X", "Y", or "Z", which has been assigned to the pair:

STATE	**SIGNAL**		
	X	**Y**	**Z**
X	60%	20%	20%
Y	20%	60%	20%
Z	20%	20%	60%

In other words, each person has a 60% chance of receiving the Signal which matches the State the pair has been assigned, and a 20% chance of receiving each of the other two signals. For every pair, Person A and Person B will each be assigned a Signal according to the above probabilities. Thus, Person A and Person B could receive the same Signal or they could receive different Signals.

At the start of each period, the first thing you will see on the computer screen will be an identification of which Person you are and which Signal you have received. For example, if you are Person A and you have received Signal X, the computer screen will read: "You are Person A in group, your Signal is X."

Each participant will receive a *Capital Payment* of 400 francs at the beginning of each period. During the rest of the period, participants will make decisions that affect their *Period Payoff* . Each participant's final *Period Profit or Loss* will be the 400 franc Capital Payment plus or minus this Period Payoff.

Each period will consist of two stages:

Stage 1

At the beginning of Stage 1, Person A in each group will be asked: "Do you want to continue (Y/N)?". Person A can answer this question by pressing either "Y" or "N" on his or her keyboard.

If Person A chooses "N", the period ends for that pair. Both Person A and Person B will receive a Period Payoff of 0 francs. Therefore, they each will have a Period Profit of 400 francs (the Capital Payment of 400 francs plus the Period Payoff of 0 francs).

If Person A chooses "Y", he or she will pay a *Fee* of 10 francs for choosing to continue, and Person B is then asked the same question, "Do you want to continue (Y/N)?".

If Person B then chooses "N", Person B gives Person A a *Transfer* of 240 francs and the period ends for that pair. Thus, Person A will receive a Period Payoff of 230 francs (the Transfer of 240 francs minus the Fee of 10 francs) and Person B will receive a Period Payoff of -240 francs. The Period Profits for this pair will be 630 francs and 160 francs respectively.

If Person B chooses "Y", he or she will also pay a fee of 10 francs for choosing to continue, and the period proceeds to Stage 2.

Stage 2

During Stage 2, Person A and Person B will make *Investment* decisions which will affect the likelihood of two possible outcomes: *Outcome A* and *Outcome B.*

Under Outcome A, Person B will give Person A a Transfer of 240 francs. Under Outcome B, no transfer takes place.

At the beginning of stage 2, each person is asked "Please enter your level of investment followed by the [F1] key to send." At this point each person will enter the amount of francs he or she wants to invest to affect the likelihood of Outcome A and Outcome B. The amount Person A invests is known as *Investment A* and the amount Person B invests is known as *Investment B.* Each person may enter any amount between 0 and 1000 (Note: You may invest more than your Capital Payment of 400 francs and you may also invest as little as 0 francs). After the amount is entered, you must press the F1 key to tell the computer you are ready.

The exact manner in which Investment A and Investment B affect the likelihood of Outcome A and Outcome B will be discussed in the final section of the instructions.

Calculating Profits and/or Losses

After stage 1 and stage 2 have been completed, and outcomes are calculated for each pair, every participant will be notified of the final results for his or her pair. For example, if you are Person B and you received Signal Z, at the end of the period your computer screen might read:

Period Ended. State: X, Outcome: A

	You: B	Other: A
Signal:	Z	X
Invest:	60	30
Payoff:	-310	200

In the above case, the State was X, Person A received Signal X, and Person B received Signal Z. Both Person A and Person B chose to continue in Stage 1, Person B chose to invest 60 in Stage 2, and Person A chose to invest 30 in Stage 2. Since the outcome was Outcome A, Person B's Period Payoff is -310 (the Transfer of 240, the Investment of 60, and the Fee for continuing of 10) and Person A's payoff is 200 (the Transfer of 240 minus the Investment of 30 and the Fee of 10).

Period payoffs can be summarized by the following table:

Stage 1 Decisions		Outcome	Period Payoffs	
Person A	Person B		Person A	Person B
N	-	-	0	0
Y	N	-	230	-240
Y	Y	A	230 - Investment A	-250 - Investment B
Y	Y	B	-10 - Investment A	-10 - Investment B

At the end of each period, participants should fill out all of the columns of information on the Profit / Loss Record sheet and calculate their Period Profit or Loss by adding their Period Payoff to their Capital Payment of 400 francs.

Determining the Outcome of Stage 2 for Each Pair

The outcome of Stage 2 for each pair will be determined by a single draw from a computerized urn. The exact make-up of the urn will be determined by the investment decisions of the two individuals.

The urn is filled with 1000 balls. The first 500 balls will be divided proportionately between Person A and Person B based on the amount of francs each person has chosen to invest. In other words:

$$\text{Number of Balls assigned to Person A} = \frac{\text{Investment A}}{\text{Investment A + Investment B}} \times 500$$

$$\text{Number of Balls assigned to Person B} = \frac{\text{Investment B}}{\text{Investment A + Investment B}} \times 500$$

To better understand this, here are a few examples:

Investment A	Investment B	Balls Assigned to Person A	Balls Assigned to Person B
75	75	250	250
20	30	200	300
120	30	400	100
0	5	0	500
0	0	250	250

The assignment of the remaining 500 balls will be determined by the state, "X", "Y", or "Z". The following chart summarizes the assignment of these 500 balls:

STATE	NUMBER OF BALLS ASSIGNED TO PERSON A	NUMBER OF BALLS ASSIGNED TO PERSON B
X	125	375
Y	250	250
Z	375	125

After all 1000 balls have been assigned, a single ball is drawn from the urn. If the ball belongs to Person A, then Outcome A occurs and Person B transfers 240 francs to Person A. If the ball belongs to Person B, then Outcome B occurs and no transfer takes place.

To help you better understand how the 1000 balls are assigned, you have been provided three sheets labeled "Probability of Outcome A as a Function of Investment A and Investment B." Each sheet is also labelled either "STATE X", "STATE Y", or "STATE Z." These sheets each contain a chart which indicates the probability of Outcome A (or percentage of balls assigned to Person A) for combinations of Investment A and Investment B.

After examining the charts on these three sheets, please note the following observations:

(1) For a given amount of investment by Person B, the more Person A invests, the more likely Outcome A is and the less likely Outcome B is. Similiarly, for a given amount of investment by Person A, the more Person B invests, the more likely Outcome B is and the less likely Outcome A is.

(2) For any given combination of Investment A and Investment B, Outcome A is most likely in State Z and least likely in State X.

(3) In state X, no matter how much Person A invests, there is always at least a 37.5% chance of Outcome B. No matter how much Person B invests, there is always at least a 12.5% chance of Outcome A.
Similarly, in state Y, there is always at least a 25% chance of Outcome B and there is always at least a 25% chance of Outcome A.
In state Z, there is always at least a 12.5% chance of Outcome B and there is always at least a 37.5% chance of Outcome A.

Probability of Outcome A as a Function of Investment A and Investment B

S T A T E X

I N V E S T M E N T B

INVESTMENT A	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
0	38	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
10	63	38	29	25	23	21	20	19	18	18	17	17	16	16	16	16	15	15	15	15	15	15	15	15	15	14
20	63	46	38	33	29	27	25	24	23	22	21	20	20	19	19	18	18	18	18	17	17	17	17	17	16	16
30	63	50	43	38	34	31	29	28	26	25	24	23	23	22	21	21	20	20	20	19	19	19	19	18	18	18
40	63	53	46	41	38	35	33	31	29	28	27	26	25	24	24	23	23	22	22	21	21	21	20	20	20	19
50	63	54	48	44	40	38	35	33	32	30	29	28	27	26	26	25	24	24	23	23	23	22	22	21	21	21
60	63	55	50	46	43	40	38	36	34	33	31	30	29	28	28	27	26	26	25	25	24	24	23	23	23	22
70	63	56	51	48	44	42	39	38	36	34	33	32	31	30	29	28	28	27	27	26	25	25	25	24	24	23
80	63	57	53	49	46	43	41	39	38	36	35	34	33	32	31	30	29	29	28	27	27	26	26	25	25	25
90	63	58	53	50	47	45	43	41	39	38	36	35	34	33	32	31	31	30	29	29	28	28	27	27	26	26
100	63	58	54	51	48	46	44	42	40	39	38	36	35	34	33	33	32	31	30	30	29	29	28	28	27	27
110	63	58	55	52	49	47	45	43	41	40	39	38	36	35	35	34	33	32	31	31	30	30	29	29	28	28
120	63	59	55	53	50	48	46	44	43	41	40	39	38	37	36	35	34	33	33	32	31	31	30	30	29	29
130	63	59	56	53	51	49	47	45	43	42	41	40	39	38	37	36	35	34	33	33	32	32	31	31	30	30
140	63	59	56	54	51	49	48	46	44	43	42	41	39	38	38	37	36	35	34	34	33	33	32	31	31	30
150	63	59	57	54	52	50	48	47	45	44	43	41	40	39	38	38	37	36	35	35	34	33	33	32	32	31
160	63	60	57	55	53	51	49	47	46	45	43	42	41	40	39	38	38	37	36	35	35	34	34	33	33	32
170	63	60	57	55	53	51	49	48	47	45	44	43	42	41	40	39	38	38	37	36	35	35	34	34	33	33
180	63	60	58	55	53	52	50	49	47	46	45	44	43	42	41	40	39	38	38	37	36	36	35	34	34	33
190	63	60	58	56	54	52	51	49	48	46	45	44	43	42	41	40	40	39	38	38	37	36	36	35	35	34
200	63	60	58	56	54	53	51	50	48	47	46	45	44	43	42	41	40	40	39	38	38	37	36	36	35	35
210	63	60	58	56	55	53	51	50	49	48	46	45	44	43	43	42	41	40	39	39	38	38	37	36	36	35
220	63	60	58	57	55	53	52	50	49	48	47	46	45	44	43	42	41	41	40	39	39	38	38	37	36	36
230	63	60	59	57	55	54	52	51	50	48	47	46	45	44	44	43	42	41	41	40	39	39	38	38	37	36
240	63	61	59	57	55	54	53	51	50	49	48	47	46	45	44	43	43	42	41	40	40	39	39	38	38	37
250	63	61	59	57	56	54	53	52	50	49	48	47	46	45	45	44	43	42	42	41	40	40	39	39	38	38

Prob(A) > 60

40 <= Prob(A) <= 60

Prob(A) < 40

Probability of Outcome A as a Function of Investment A and Investment B

S T A T E Y

I N V E S T M E N T B

INVESTMENT A	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
0	50	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
10	75	50	42	38	35	33	32	31	31	30	30	29	29	29	28	28	28	28	28	28	27	27	27	27	27	27
20	75	58	50	45	42	39	38	36	35	34	33	33	32	32	31	31	31	30	30	30	30	29	29	29	29	29
30	75	63	55	50	46	44	42	40	39	38	37	36	35	34	34	33	33	33	32	32	32	31	31	31	31	30
40	75	65	58	54	50	47	45	43	42	40	39	38	38	37	36	36	35	35	34	34	33	33	33	32	32	32
50	75	67	61	56	53	50	48	46	44	43	42	41	40	39	38	38	37	36	36	35	35	35	34	34	34	33
60	75	68	63	58	55	52	50	48	46	45	44	43	42	41	40	39	39	38	38	37	37	36	36	35	35	35
70	75	69	64	60	57	54	52	50	48	47	46	44	43	43	42	41	40	40	39	38	38	38	37	37	36	36
80	75	69	65	61	58	56	54	52	50	49	47	46	45	44	43	42	42	41	40	40	39	39	38	38	38	37
90	75	70	66	63	60	57	55	53	51	50	49	48	46	45	45	44	43	42	42	41	41	40	40	39	39	38
100	75	70	67	63	61	58	56	54	53	51	50	49	48	47	46	45	44	44	43	42	42	41	41	40	40	39
110	75	71	67	64	62	59	57	56	54	53	51	50	49	48	47	46	45	45	44	43	43	42	42	41	41	40
120	75	71	68	65	63	60	58	57	55	54	52	51	50	49	48	47	46	46	45	44	44	43	43	42	42	41
130	75	71	68	66	63	61	59	58	56	55	53	52	51	50	49	48	47	47	46	45	45	44	44	43	43	42
140	75	72	69	66	64	62	60	58	57	55	54	53	52	51	50	49	48	48	47	46	46	45	44	44	43	43
150	75	72	69	67	64	63	61	59	58	56	55	54	53	52	51	50	49	48	48	47	46	46	45	45	44	44
160	75	72	69	67	65	63	61	60	58	57	56	55	54	53	52	51	50	49	49	48	47	47	46	46	45	45
170	75	72	70	68	65	64	62	60	59	58	56	55	54	53	52	52	51	50	49	49	48	47	47	46	46	45
180	75	72	70	68	66	64	63	61	60	58	57	56	55	54	53	52	51	51	50	49	49	48	48	47	46	46
190	75	73	70	68	66	65	63	62	60	59	58	57	56	55	54	53	52	51	51	50	49	49	48	48	47	47
200	75	73	70	68	67	65	63	62	61	59	58	57	56	55	54	54	53	52	51	51	50	49	49	48	48	47
210	75	73	71	69	67	65	64	63	61	60	59	58	57	56	55	54	53	53	52	51	51	50	49	49	48	48
220	75	73	71	69	67	66	64	63	62	60	59	58	57	56	56	55	54	53	53	52	51	51	50	49	49	48
230	75	73	71	69	68	66	65	63	62	61	60	59	58	57	56	55	54	54	53	52	52	51	51	50	49	49
240	75	73	71	69	68	66	65	64	63	61	60	59	58	57	57	56	55	54	54	53	52	52	51	51	50	49
250	75	73	71	70	68	67	65	64	63	62	61	60	59	58	57	56	55	55	54	53	53	52	52	51	51	50

Prob(A) > 60

40 <= Prob(A) <= 60

Prob(A) < 40

Probability of Outcome A as a Function of Investment A and Investment B

S T A T E Z

I N V E S T M E N T B

INVESTMENT A	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
0	63	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
10	88	63	54	50	48	46	45	44	43	43	42	42	41	41	41	41	40	40	40	40	40	40	40	40	40	39
20	88	71	63	58	54	52	50	49	48	47	46	45	45	44	44	43	43	43	43	42	42	42	42	42	41	41
30	88	75	68	63	59	56	54	53	51	50	49	48	48	47	46	46	45	45	45	44	44	44	44	43	43	43
40	88	78	71	66	63	60	58	56	54	53	52	51	50	49	49	48	48	47	47	46	46	46	45	45	45	44
50	88	79	73	69	65	63	60	58	57	55	54	53	52	51	51	50	49	49	48	48	48	47	47	46	46	46
60	88	80	75	71	68	65	63	61	59	58	56	55	54	53	53	52	51	51	50	50	49	49	48	48	48	47
70	88	81	76	73	69	67	64	63	61	59	58	57	56	55	54	53	53	52	52	51	50	50	50	49	49	48
80	88	82	78	74	71	68	66	64	63	61	60	59	58	57	56	55	54	54	53	52	52	51	51	50	50	50
90	88	83	78	75	72	70	68	66	64	63	61	60	59	58	57	56	56	55	54	54	53	53	52	52	51	51
100	88	83	79	76	73	71	69	67	65	64	63	61	60	59	58	58	57	56	55	55	54	54	53	53	52	52
110	88	83	80	77	74	72	70	68	66	65	64	63	61	60	60	59	58	57	56	56	55	55	54	54	53	53
120	88	84	80	78	75	73	71	69	68	66	65	64	63	62	61	60	59	58	58	57	56	56	55	55	54	54
130	88	84	81	78	76	74	72	70	68	67	66	65	64	63	62	61	60	59	58	58	57	57	56	56	55	55
140	88	84	81	79	76	74	73	71	69	68	67	66	64	63	63	62	61	60	59	59	58	58	57	56	56	55
150	88	84	82	79	77	75	73	72	70	69	68	66	65	64	63	63	62	61	60	60	59	58	58	57	57	56
160	88	85	82	80	78	76	74	72	71	70	68	67	66	65	64	63	63	62	61	60	60	59	59	58	58	57
170	88	85	82	80	78	76	74	73	72	70	69	68	67	66	65	64	63	63	62	61	60	60	59	59	58	58
180	88	85	83	80	78	77	75	74	72	71	70	69	68	67	66	65	64	63	63	62	61	61	60	59	59	58
190	88	85	83	81	79	77	76	74	73	71	70	69	68	67	66	65	65	64	63	63	62	61	61	60	60	59
200	88	85	83	81	79	78	76	75	73	72	71	70	69	68	67	66	65	65	64	63	63	62	61	61	60	60
210	88	85	83	81	80	78	76	75	74	73	71	70	69	68	68	67	66	65	64	64	63	63	62	61	61	60
220	88	85	83	82	80	78	77	75	74	73	72	71	70	69	68	67	66	66	65	64	64	63	63	62	61	61
230	88	85	84	82	80	79	77	76	75	73	72	71	70	69	69	68	67	66	66	65	64	64	63	63	62	61
240	88	86	84	82	80	79	78	76	75	74	73	72	71	70	69	68	68	67	66	65	65	64	64	63	63	62
250	88	86	84	82	81	79	78	77	75	74	73	72	71	70	70	69	68	67	67	66	65	65	64	64	63	63

Prob(A) > 60

40 <= Prob(A) <= 60

Prob(A) < 40

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