Are Sequential Trials Really Better than Unitary Trials?

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Abstract

In a dispute involving multifarious points of disagreement, courts have the discretion to adjudicate issues separately in multiple, sequential proceedings or all-at-once in a single unitary proceeding. In this paper, we identify an overlooked effect: sequential trials give a structural advantage to defendants. This bias in favor of defendants could potentially be quite large. Further, we contrast the effects of sequential and unitary trials on parties' decisions to litigate and parties' expenditures in litigation, using a rent-seeking model. Contrary to the prior literature on this topic, we find that neither procedural regime is outright superior to the other and that the optimal choice of procedural regime is contingent on factors particular to each case. We identify which conditions cause one procedural regime to be more efficient than the other, and suggest policies to take advantage of these differences.

Keywords: rent-seeking, litigation expenditures, sequential litigation

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1 Introduction

The resolution of legal disputes often involves the adjudication of multiple distinct issues. The issues may be independent claims arising out of the same set of facts, or they may be contingent upon one another. In the latter alternative, where multiple issues arise from a single cause of action, the law has developed two ways of managing the case: (1) "unitary litigation,"[1] and (2) "sequential litigation."[2]

In unitary litigation, the multifarious distinct issues in a dispute are bundled together in a single proceeding. The ruling in a unitary trial decides all the issues at once. By contrast, in sequential litigation, the issues in a case are divided out and litigated in separate stages. The court renders a judgment on the litigated issues at the conclusion of each stage, proceeding to the next stage only if the plaintiff has prevailed, until all the issues in the case are decided. The sequential nature of the process puts an end to the trial when the plaintiff loses in the initial stage of the proceeding.

Unitary and sequential proceedings differ in some obvious ways. Most significantly, sequential litigation accomplishes some procedural economy, avoiding the litigation of issues that are rendered mute or irrelevant by the results of the first stage of litigation. The key contribution of this paper is to show that the choice of procedural regime endogenously affects the level of spending at trial. The change in expected litigation costs in turn affects the parties' choices whether to litigate. Our results suggest that overall spending changes in less than obvious ways, as the form of trial changes from unitary to sequential.

The paper is structured as follows. In Section 1 we provide the legal background and discuss the existing literature. In Section 2, we provide an overview of the model. In Section 3, we analyze parties' expenditures and participation constraints in unitary proceedings. In Section 4, we analyze parties' expenditures and participation constraints in sequential proceedings. In Section 5, we unveil an overlooked effect of sequential litigation, identifying a pro-defendant advantage compared to unitary litigation. Further, we compare rent seeking expenditures and

[1] The literature also uses the term "issue consolidation." See, e.g., Gensler (2000).

[2] The literature also uses the term "issue bifurcation." See, e.g., Landes (1998); Gensler (2000).

participation constraints in unitary and sequential trials, contrasting our results to those of earlier researches. Section 6 concludes with remarks on how the foregoing results affect policy, along with ideas for future extensions.

1.1 Teminology and Legal Background

Modern legal systems adopt a variety of mechanisms for organizing litigation into sequential proceedings, tackling issues of preemptive relevance first, and addressing issues that have conditional relevance at a latter stage. Although the separation of issues into sequential stages of litigation is often observed, the terminology used to refer to these procedural techniques varies across jurisdictions. Hence, a brief explanation of the terminology is warranted at this point. Sequential litigation is sometimes referred to as "bifurcation." However, the term is often used ambiguously to refer to both severance (or "severance of claims") and sequential litigation. To be rigorous, "severance" refers to the separation of independent *causes of action* (e.g., counterclaims, crossclaims, third party claims), whereas "sequential litigation" refers to the separation of *issues* that underlie a single cause of action.[3] The strict definition of "bifurcation" is the latter, however lawyers, judges, and lawmakers are not always consistent in the use of this terminology.[4] This is the first reason why we will avoid the term "bifurcation."[5] Another reason to prefer the term "sequential" over "bifurcated" is that the latter term implies a two-stage division. While we use a two-stage model in this paper, our results are easily extendable

[3] *Compare* BLACK'S LAW DICTIONARY 1498 (9th ed. 2011) ("Severance (Civil procedure): The separation, by the court, of the claims of multiple parties either to permit separate actions on each claim or to allow certain interlocutory orders to become final.") *with* BLACK'S LAW DICTIONARY 1644 (9th ed. 2011) ("Bifurcated trial: A trial that is divided into two stages, such as for guilt and punishment or for liability and damages.").

[4] For example, Oregon Administrative Rules 340-11-0540 uses the term "bifurcation" when it means severance ("Each and every violation is a separate and distinct violation, and in cases of continuing violations, each day's continuance is a separate and distinct violation. Proceedings for the assessment of multiple civil penalties for multiple violations may, however, be consolidated into a single proceeding or bifurcated into separate proceedings, at the department's discretion.").

[5] It may bear observing that the distinction between an independent cause of action and a constituent issue may sometimes be unclear. The lack of analytical clarity as to the threshold at which an element of a claim becomes an independently actionable claim may be one reason for the ambiguous use of the terminology.

to "trifurcation" and "polyfurcation." Avoiding the implication that our results are wed to a two-stage division also weighs in favor of the term "sequential."

Different jurisdictions allow varying degrees of flexibility in allowing courts to separate or join issues. For example, in U.S. federal courts, Rule 42(b) of the Federal Rules of Civil Procedure allows,

> The court, in furtherance of convenience or to avoid prejudice, or when separate trials will be conducive to expedition and economy, may order a separate trial of any claim, cross-claim, counterclaim, or third-party claim, or of any separate issue or of any number of claims, cross-claims, counterclaims, third-party claims, or issues, always preserving inviolate the right of trial by jury as declared by the Seventh Amendment to the Constitution or as given by a statute of the United States.

Interestingly, between the years 1939 and 1966, the separation of issues was allowed only when "in furtherance of convenience or to avoid prejudice." It was not until the 1966 Amendment of Fed. R. Civ. P. 42 that courts were authorized to separate issues into sequential litigation when it proved "conducive to expedition and economy."[6] This might have resulted in increased use of sequential litigation, if not for the Advisory Committee Notes accompanying the 1966 Amendment, which advised, "While the separation of issues for trial is not to be routinely ordered, it is important that it be encouraged where experienced has demonstrated its worth." Courts have since interpreted this to indicate a rebuttable presumption against sequential litigation.[7]

Likewise, in the United Kingdom, Rule 3.1(2) of the Civil Procedure Rules states,

> Except where these Rules provide otherwise, the court may –
> . . .
> (e) direct that part of any proceedings (such as a counterclaim) be dealt with as separate proceedings;
> . . .
> (i) direct a separate trial of any issue;

[6] Charles Alan Wright, Arthur R. Miller, et al., 9A Fed. Prac. & Proc. Civ. §2388 (3d. ed.).
[7] *See, e.g.,* Gensler (2000)

(j) decide the order in which issues are to be tried.[8]

In Canada, procedural rules are determined independently by each jurisdiction. Most jurisdictions allow sequential litigation.[9] In practice however Canadian courts exercise a strong presumption (stronger than U.S federal courts) against sequential litigation, although recent cases suggest that Canadian courts may be softening their position.[10]

U.S. state courts vary widely in how they treat unitary and sequential litigation. While most state rules of civil procedure have something similar to Fed. R. Civ. P. 42,[11] there is considerable variation as to which issues are presumptively separable or inseparable,[12] where there exists an obligation to separate or a prohibition against separation,[13] whose discretion it is to initiate the separation (assuming it is not obligatory), and whether the sequence of issues to be adjudicated is pre-

[8]The possibility of separating proceedings applies to both civil and criminal cases, although the policy rationales for doing so differ between two areas.

[9]For example, *see* Ontario's RULES OF CIVIL PROCEDURE, RRO 1990, Reg 194, Rule 6.1.01 ("With the consent of the parties, the court may order a separate hearing on one or more issues in a proceeding, including separate hearings on the issues of liability and damages.").

[10]*See, e.g.,* Wang v. Byford-Harvey 2012 ONSC 3030 (Ont. C.A.); Elcano Acceptance Ltd. v. Richmond, Richmond, Stambler & Mills, [1986] O.J. No. 576 (Ont. C.A.); Kovach v. Kovach (2009), 95 O.R. (3d) 34 (Div. Ct.).

[11]*See, e.g.*, TEXAS RULE OF CIVIL PROCEDURE 174; CALIFORNIA CODE OF CIVIL PROCEDURE §1048; N.Y.C.P.A. §§96, 96a, 97; MINNESOTA STATUTES Rule 42.03(1); SOUTH CAROLINA RULES OF CIVIL PROCEDURE Rule 42; VA CODE §8.01-374.1; WEST VIRGINIA RULES OF CIVIL PROCEDURE Rule 42.

[12]*Compare* Fontenot v. Patterson Ins., 997 So.2d 529, 537 (La., 2012) ("[B]ifurcated trials should be avoided when possible.") *with* Galarza v. Crown Container Co., 934 N.Y.S.2d 465 (NY App., 2011) ("Courts are encouraged to bifurcate issues of liability and damages in personal injury trials. A unified trial should only be conducted where the nature of the plaintiff's injuries has an 'important bearing' on the issues of liability.") (citations omitted); *See also* Roberts v. Roberts, 9 Pa. D. & C. 4th 133, 136 (Pa. Ct. of Common Pleas, 1991) ("However, trial courts may not establish a pro forma policy to grant or deny bifurcation requests. Trial courts are required to carefully explore and analyze the advantages and disadvantages of bifurcation on a case-by-case basis and must spell out and state the reasons for granting or denying bifurcation requests.").

[13]*Compare* Havel v. Villa St. Joseph, 963 N.E.2d 1270, 1276 (2012) (holding that the court was required to grant sequential litigation if either party moved to bifurcate the proceedings) and Sowell v. State 590 N.E.2d 1123, 1124 (Ct. of Appeals of IN, 1992) ("Sowell correctly argues that when the State seeks to elevate a misdemeanor charge to a felony based on prior convictions, and also seeks an habitual offender enhancement, as is the case here, the trial *must be* conducted in three separate phases.") (emphasis added), *with* New Jersey Supreme Court directive 103 N.J.L.J. Index 249 ("Bifurcation will be permitted only with the approval of the Assignment Judge, which will not be granted except in the most unusual and extenuating circumstances.").

scribed. For example, a defendant in New Jersey has the right to a sequential trial *upon request*, when punitive damages are at issue. The New Jersey law assigns the first stage to determining compensatory damages and the second stage to determining punitive damages.[14] Texas, California, Georgia, Kansas, Missouri, Montana, Nevada, Ohio, Tennessee, Utah, and Wyoming have similar procedures.[15] New York law encourages judges to separate liability and damages issues into separate, sequential proceedings in any action for personal injury. The New York law presumptively assigns the determination of liability to the first stage and determination of damages to the second stage, "unless the court orders otherwise."[16]

The division between liability and damages, or between compensatory damages and punitive damages in tort law finds an analogue in the criminal law, where conviction and sentencing are frequently treated sequentially.[17] Further, it should be recognized that novel issue divisions also arise in practice and are permitted under most civil procedure rules.[18] The option to divide issues into sequential pro-

[14]N.J. Stat. §2A:15-5.13 (2012).

[15]Transp. Ins. Co. v. Moriel, 879 S.W.2d 10, 30 (Tex. 1994) ("We therefore conclude that a trial court, if presented with a timely motion, should bifurcate the determination of the amount of punitive damages from the remaining issues. . . . At least thirteen states now require bifurcation of trials in which punitive damages are sought. Ten of these, California, Georgia, Kansas, Missouri, Montana, Nevada, Ohio, Tennessee, Utah, and Wyoming, generally follow the procedure outlined above, in which the *amount* of punitive damages is bifurcated from the remaining issues. The other states require bifurcation of the entire punitive damages claim, including liability and amount. We believe the former approach is preferable, ...").

[16]22 NYCRR 202.19, 202.35, 202.42.

[17]For example, see State v. LaRock, 1196 W.Va. 294, 314 (S. Ct. App. W. Va. 1996) ("[N]either the language of W.Va.Code, 62-3-15, logic, nor common sense compels us to hold a trial judge has no discretion to bifurcate trial in a first degree murder case. . . . While our reading of W.Va.Code, 62-3-15, is that unitary trials are permitted, there is nothing in the statutory language that forbids bifurcation. It may well be true that unitary trials are adequate and appropriate in most cases, but it equally is clear that there are instances in which unitary trials perpetuate rather than limit the prejudice to the parties and the harm to the adversarial process. Accordingly, we hold that a trial court has discretionary authority to bifurcate a trial and sentencing in any case where the jury is required to make a finding as to mercy.").

[18]*E.g.* Averbach v. Rival Mfg. Co., 879 F.2d 1196 (3d Circ. 1989) ("Over Averbach's objection, the district court agreed to Rival's proposal to try the case by means of a bifurcated trial, with the first phase directed only to the question of whether the interrogatory responses were fraudulent, and the second phase to the issues of causation and damages. We note that this division is not along the common line of bifurcation between liability and damages. Nonetheless, Fed. R. Civ. P. 42(b) expressly authorizes a separate trial of any separate issue under certain circumstances, subject to Seventh Amendment considerations.").

ceedings also exists in arbitration.[19] However, most codified arbitration rules do not comment on bifurcation, while some even discourage it.[20]

It will suffice to observe for the moment then that a large variety of mechanisms exist for separating issues into individuated, sequential proceedings. The division tends to front-load dispositive issues, and to disentangle orthogonal issues (e.g., the *existence of* liability from *how much* liability).[21]

1.2 Literature Review

It should be of no surprise that the consequences of unitary and sequential litigation have been obvious and tempting candidates for economic analysis, and there exists a substantial body of prior literature on the topic. The economic literature on litigation generally begins with Landes (1971), who examined the choice to litigate or plead in criminal trials, Gould (1973), who evaluated the impact of risk aversion on the parties' incentives to settle in a civil dispute, and Posner (1973), who considered a number of procedural rules, in both the civil and criminal context, and their impact on the decision to litigate or settle.[22]

With respect to the choice of unitary versus sequential litigation specifically,

[19] See, e.g., INTERNATIONAL ARBITRATION RULES of the American Arbitration Assoc., Art. 16(3) ("The tribunal may in its discretion . . . bifurcate proceedings."); COMMERCIAL DISPUTE RESOLUTION PROCEDURES of the American Arbitration Assoc., R-30 ("The arbitrator, exercising his or her discretion, shall conduct the proceedings with a view to expediting the resolution of the dispute and may direct the order of proof, bifurcate proceedings and direct the parties to focus their presentations on issue the decision of which could dispose of all or part of the case."); CPR Rules for Non-Administered Arbitration (2007) ("Matters to be considered in the initial pre-hearing conference may include, *inter alia*, the following: (a) Procedural matters (such as setting specific time limits for, and manner of, any required discovery; the desirability of bifurcation or other separation of the issues in the arbitration; the desirability and practicability of consolidating the arbitration with any other proceeding; . . . .")

[20] 1 CA CODE OF REGULATIONS §1252(a) ("Presumption Against Bifurcation. Except in extraordinary circumstances, the arbitrator(s) shall not bifurcate the arbitration.").

[21] See 75 Am. Jur. 2d Trial §83 (2012) ("[T]he trial court should be alert to the danger that evidence relevant to both issues may be offered at only half of the trial; this hazard necessitates the determination that the issues are totally independent prior to bifurcation. . . . In tort actions, first resolving the liability issue may have the effect of eliminating the need for a second trial on damages in the event no liability is found; as a result, bifurcation is an attractive device in many tort proceedings.").

[22] For additional examples in the literature, see also Braeutigam, Owen & Panzar (1984); Hause (1989); Katz (1988); Kobayashi & Lott (1996); Hirshleifer & Osborne (2001).

Landes (1993) argued that sequential trials lowered the expected cost of litigation relative to unitary trials, because a subset of issues could be rendered moot and the litigation costs of adjudicating them could be avoided, if the plaintiff lost on a dispositive issue at an earlier stage in the dispute. However, by lowering expected litigation costs, sequential litigation might also decrease plaintiffs' disincentive to sue, thereby increasing the total number of lawsuits. This could reduce the bargaining space created by litigation costs and lessen parties' margin to settle out of court. Chen, Chien & Chu (1997) extended Landes' model, to account for sequential litigation involving asymmetric information. The authors also explored the effects of unitary and sequential proceedings on parties' non-cooperative bargaining strategies in finding a settlement. Their result strengthened the case for sequential litigation, albeit with results that differed from Landes (1993). Indeed, while Landes (1993) hypothesized that sequential litigation could increase litigation rates by reducing the expected cost of litigation, Chen, Chien & Chu (1997) showed that the stepwise information revealing effect of sequential litigation could foster settlements between the litigants. They argue that the information produced in the first stage of a sequential dispute may *increase* the likelihood of settlement. Landes (1998) brings these results together, and represents the current mainstream view. The subsequent literature has largely accepted that sequential litigation tends, on balance, to be preferable to unitary litigation. For example, Gensler (2000) encourages courts (especially federal courts) to favor sequential proceedings, opposing the judicial preference for issue-consolidation and unification of proceedings. Most recently, De Mot (2012) considered the effects of sequential trials in conjunction with the English rule.[23]

In the analysis of litigation generally, outside of the literature on unitary and sequential litigation, economists have tended to model litigation as a rent-seeking problem. Notable studies of litigation that utilize rent-seeking models include Tullock (1975); Farmer & Pecorino (1999); Hirshleifer & Osborne (2001); Parisi (2002); Baye, Kovenock & de Vries (2005); Luppi & Parisi (2012).[24] The

[23] Coate, Kleit & Bustamante (1995) provide an interesting empirical analysis of sequential litigation decisions in the context of antitrust cases. Empirical evidence supports the idea that firms may be willing to settle with FTC regardless of the case merit.

[24] For a comprehensive survey of the applications of rent-seeking models to litigation and the

use of rent-seeking framework to model parties' incentives in litigation furnishes a tractable method of endogenizing parties' litigation decisions, and of comparing litigation rates and expenditures under the two procedural forms.

In this paper, we bring these two lines of literature together, comparing parties' expenditures in unitary and sequential litigation. We move into our analysis starting from the intuitive premise that the choice of procedural form affects not only the order of issues litigated, but also the litigation efforts of the parties in each proceeding. We then consider the extent to which the change in expected litigation costs could in turn affect the parties' choices to participate in litigation. We find that introducing endogenous litigation effort and participation choice into the model significantly changes the results of the prior literature on sequential litigation.

2 Structure of the Model

In this section, we model the incentive effects of procedural form, extending Tullock's rent-seeking model (see Tullock (1967, 1980)). The elements of the model are the investments of each litigant, the value of the case, and the relative strength of the case as between plaintiff and defendant.[25] We use this framework to compare litigation efforts in equilibrium in unitary and sequential proceedings. When multiple issues arise in a unitary proceeding, the plaintiff and the defendant choose their effort levels for all the issues in the dispute at once. Contrastingly, when the issues are divided into sequential proceedings, parties choose their effort level for the first stage. If the plaintiff wins at the first stage, the parties proceed to litigation on the next issue, choosing their litigation efforts for the second stage of the trial. If the plaintiff wins at every subsequent stage, the defendant pays the plaintiff the default judgment, which we denote V. The outcome of the case, either in a unitary or sequential trial, depends on the court's adjudication of all issues. The plaintiff needs to win all issues in order to receive V.

design of trials and fee-shifting arrangements, see Congleton, Hillman & Konrad (2008, Chapter 3.2).

[25] See, among others, Tullock (1975); Farmer & Pecorino (1999); Hirshleifer & Osborne (2001); Parisi (2002); Baye, Kovenock & de Vries (2005); Luppi & Parisi (2012).

2.1 Assumptions

Before proceeding further, we will need to articulate what simplifying assumptions characterize our model.

First, we assume that sequential proceedings consist of two stages. Of course, courts are generally empowered to divide issues more finely, separating issues out into indefinitely many proceedings to decide the overall dispute. However, our results using a two-stage sequential model are easily generalized to cover such cases; and using the two-stage model will be both more perspicuous and parsimonious.

Second, we assume that the issues in both stages of a sequential proceeding are dispositive. Certainly, courts have discretion to separate a non-dispositive issue for separate adjudication (and frequently do so in preliminary hearings of various sorts), however it will be difficult to generalize over such cases, which will anyway have attenuated effects and less significance than the dispositive that our analysis covers.

Third, we assume that there are two parties to the dispute, whom we label "plaintiff," and "defendant." This need not be the case, and it sometimes arises in complex litigation that multiple parties are simultaneously plaintiffs and defendants in a multitude of counterclaims and crossclaims. These complications are tangential to our investigation.

Fourth, we assume that each stage of sequential litigation hinges on a single issue. In fact, each stage will likely involve the adjudication of a small bundle of issues (as contrasted with a unitary proceeding, which bundles *all* issues in the dispute). We will refer to each mini-bundle as being a single issue for the purposes of our model.

Fifth, we assume no fixed costs of litigation. Each party is assumed to be responsible for its own legal costs, regardless of the outcome (i.e., the American rule).

Finally, we assume that both parties have perfect knowledge about the merits of the case, although the court does not.

2.2 Terms

Under either procedural form, both parties invest effort on both issues (although in some cases the investment may be zero). Let us refer to the issue in the first stage of a sequential proceeding as "issue 1," and the issue in the second stage as "issue 2." We retain these labels when referring to issues in unitary litigation, although of course the numbering will no longer signify temporal order in that context (since all issues are decided in a single proceeding).

Let x_{1j} and x_{2j} denote the expenditures of the plaintiff for issue 1 and issue 2, respectively, and let $j \in \{U, S\}$ signify the procedural form, where U denotes unitary litigation and S denotes sequential litigation. Similarly, let y_{1j} and y_{2j} refer to the expenditures of the defendant on issue 1 and issue 2 respectively, where again $j \in \{U, S\}$.

Let F_1 and F_2 represent the merits of the dispute (i.e., the strength of the plaintiff's claims) on issue 1 and issue 2 respectively. Let $0 \leq F_1 \leq 1$ and $0 \leq F_2 \leq 1$, where we interpret $F_i = 0$ to mean that the plaintiffs position is entirely without merit with respect to issue i, and $F_i = 1$ to mean that the defendant's position is entirely without merit with respect to i.

If courts knew the values of F_1 and F_2, then they would always rule for plaintiffs when $F_i > 0.5$, and for defendants when $F_i \leq 0.5$. However, because courts do not know the values of F_1 or F_2, parties' litigation efforts will influence the decision of the court. Of course, the resolution of a case can hinge upon issues of fact or issues of law, and the type of issue being disputed will affect the effectiveness and manner of parties' litigation efforts. However, regardless whether litigation hinges upon issues of fact or law, litigants can increase their probability of winning the case by undertaking greater litigation efforts.[26] The larger a litigant's investment in litigation, the greater the probability that the court (or jury) will be persuaded by that party's legal argument (and/or evidence), and the larger the probability that he will win the case.

[26] When litigation involves issues of fact, the parties efforts will materialize as investments in discovery (e.g., the number of witnesses or pieces of evidence to support the litigants' claims). When litigation involves issues of law, the parties' efforts will take the form of investments in legal expertise (e.g., number of briefs, motions, and legal opinions in support of the litigants' claims).

For each issue, a litigant's success will depend not only on the relative strength of the party's claim, but also on the investment in effort on each side, as well as the productivity of their efforts. We use Tullock (1980)'s explicit functional form to denote the parties respective probabilities of success. As with probabilistic rent-seeking models, the probability of winning the case for one party, say for the plaintiff, equals the ratio of the plaintiff's effort over the sum of total effort spent by both parties, weighted by the respective merits of the case.

Let a and b be the productivity of the parties' efforts. These parameters weigh the relative importance of effort versus case merit in determining the outcome for issue 1 and issue 2 respectively. The productivity parameters will always be equal for both parties, but may differ between legal issues. This formulation of the problem captures the intuition that increased efforts may be more effective with some issues than with others. For example, investments in legal research may yield greater returns when dealing with a complex legal issue than in assisting a technical fact finding.

2.3 The Probability Functions

Finally, we give the probability functions of the plaintiff on issue 1 and issue 2. p_1 and p_2 below represent the probability of plaintiff success on each issue, respectively.

$$p_1(x_{1j}, y_{1j}) = \frac{x_{1j}^a F_1}{x_{1j}^a F_1 + y_{1j}^a (1 - F_1)} \tag{2.1}$$

$$p_2(x_{2j}, y_{2j}) = \frac{x_{2j}^b F_2}{x_{2j}^b F_2 + y_{2j}^b (1 - F_2)} \tag{2.2}$$

$1 - p_1$ is the probability that the defendant wins on issue 1; $1 - p_2$ is the probability that the defendant wins on issue 2; and $1 - p_1 p_2$ is the probability that the case will be decided in favor of the defendant. Plaintiff obtains a judicial award V in his favor, only if he prevails on both issues (e.g. fault and damages), while it

is enough for the defendant to prevail on one or the other issues to avoid liability.

In the following two sections we characterize the equilibrium expenditures of litigants in unitary trials (when issues are argued and adjudicated in a single proceeding) and in sequential trials (when issues are argued and adjudicated in sequential stages).

3 Expenditures in a Unitary Trial

When litigating multiple issues in a unitary proceeding, parties must allocate their litigation investments over the multiple issues of the case to maximize (minimize) their expected returns (liability).

Specifically, the plaintiff chooses x_{1U} and x_{2U} to maximize

$$p_1(x_{1U}, y_{1U})p_2(x_{2U}, y_{2U})V - x_{1U} - x_{2U} \tag{3.1}$$

subject to the participation constraint:

$$p_1(x_{1U}, y_{1U})p_2(x_{2U}, y_{2U})V - x_{1U} - x_{2U} \geq 0 \tag{3.2}$$

Similarly, the defendant chooses y_{1U} and y_{2U} to minimize

$$p_1(x_{1U}, y_{1U})p_2(x_{2U}, y_{2U})V + y_{1U} + y_{2U} \tag{3.3}$$

subject to the participation constraint[27]:

$$p_1(x_{1U}, y_{1U})p_2(x_{2U}, y_{2U})V + y_{1U} + y_{2U} \leq V \tag{3.4}$$

Proposition 3.1. *In a unitary trial, parties allocate symmetric levels of effort,*

[27] In a standard rent-seeking game, participation constraints are irrelevant, since the nature of the contest is such that each player can always guarantee himself a payoff of zero by exerting zero effort. Hence, equilibrium payoffs are always strictly positive. Payoffs are zero when the plaintiff exerts zero effort and $-V$ when the defendant exerts zero effort. In the context of litigation, a participation constraint acquires relevance, inasmuch as zero effort amounts to a lack of participation in litigation.

notwithstanding asymmetries in the merits of their positions. Effort levels differ across issues 1 and 2. The interior Nash equilibria level of efforts are respectively:

$$x^*_{1U} = y^*_{1U} = aF_1F_2(1 - F_1)V \tag{3.5}$$

$$x^*_{2U} = y^*_{2U} = bF_1F_2(1 - F_2)V \tag{3.6}$$

Proof. See Appendix □

At an interior solution, parties will devote equal resources to the issues involved in the case, regardless of the merits of their claims in the respective issues.[28] The intuition of this result is that, once the parties decide to participate in litigation, they face symmetric litigation stakes, given the zero-sum nature of any damage award. Equations 3.5 and 3.6 tell us that for both parties, legal expenditures increase as a and b increase, and as the value of the case V increases.

Interestingly, expenditures on issue 1 increase as the strength of plaintiff's position with respect to issue 2 increases. Symmetrically, expenditures on issue 2 increase as the strength of plaintiff's position with respect to issue 1 increases. Also, ceteris paribus, litigants will spend more when the relative strengths of their claims are closer to one another.

We must also consider that the expected expenditures in litigation will affect the parties' willingness to engage in litigation in the first place. The symmetry observed in Proposition 3.1 with respect to litigation efforts does not apply to the parties' participation decisions. Unlike the symmetry of litigation stakes, parties facing asymmetric merits will make different decisions with respect to participation in litigation. Substituting 3.5 and 3.6 in 3.2 and 3.4, we can see that both parties are more likely to litigate when the productivity parameters are lower. Correspondingly, one party is more likely to litigate, when his claim is relatively stronger than the

[28] The result of symmetric spending in rent-seeking games with bias was first discussed in Tullock (1980), and it has, since then, become a standard result in the literature on rent seeking in (one-stage) litigation under the American rule (and under the Nash-Cournot protocol). See, for example, Farmer & Pecorino (1999); Hirshleifer & Osborne (2001); Parisi (2002).

other.[29]

4 Expenditures in a Sequential Trial

When resolving issues in sequential litigation, the court adjudicates each issue at the conclusion of each stage of litigation. At each stage, parties choose whether to continue litigating, and how much effort to expend. The dispute continues to the next stage as long as the plaintiff continues winning. If the defendant wins at any stage, he wins the dispute in toto. If the plaintiff wins every stage, then he wins the dispute in toto.

In the following analysis, we frame the problem as a sequential game and proceed by backward induction.

4.1 The Second Stage

The parties enter the second stage of litigation only if the plaintiff has been successful in the first stage. In the second stage,[30] the plaintiff must choose x_{2S} to maximize

$$p_2(x_{2S}, y_{2S})V - x_{2S} \tag{4.1}$$

subject to his participation constraint:

$$p_2(x_{2S}, y_{2S})V - x_{2S} \geq 0 \tag{4.2}$$

Likewise, the defendant must choose y_{2S} to minimize

$$p_2(x_{2S}, y_{2S})V + y_{2S} \tag{4.3}$$

[29] See conditions 7.5 and 7.6 in the Appendix for analytical details.

[30] According to 2.2, the probability of plaintiff's success in stage 2 is equal to $p_2(x_{2S}, y_{2S}) = \frac{x_{2S}^b F_2}{x_{2S}^b F_2 + y_{2S}^b (1-F_2)}$.

subject to his participation constraint:

$$p_2(x_{2S}, y_{2S})V + y_{2S} \leq V \tag{4.4}$$

Proposition 4.1. *In the second stage of sequential litigation, both plaintiff and defendant invest an equal amount in litigation, notwithstanding the relative merits of their positions. The interior Nash equilibria are:*

$$x^*_{2S} = y^*_{2S} = bF_2(1 - F_2)V \tag{4.5}$$

Proof. See Appendix □

Spending at the second stage of the trial increases with both the productivity parameter, b, and the value of the case, V. We also observe that parties invest the same amount on litigation as each other, regardless of the relative merits of their positions. The merits of the case, however, do affect the parties' expenditure levels. For any given b and V, the parties spend the most when the case is a close contest ($F_2 = \frac{1}{2}$).

Also in this case, the symmetry observed in Proposition 4.1 with respect to litigation efforts does not extend to participation probabilities. With respect to the choice of whether to participate in litigation, both parties are more likely to pursue litigation when the productivity parameter is lower. The litigant with higher relative strength of his position is more likely to participate in litigation. [31]

4.2 The First Stage

We now analyze the legal expenditures of the parties in the first stage, given the optimal choice of legal expenditures in the second stage in 4.5.[32] The characterization of legal expenditures in equilibrium in the first stage requires that we to distinguish between three alternative scenarios, which arise in anticipation of how parties will behave in the second stage.

[31] See conditions 7.9 and 7.10 in the Appendix for analytical details.

[32] In the interest of accessibility, the objective functions and the participation constraints of the parties will be discussed in the Appendix.

The first scenario consists of cases where the plaintiff would choose not to litigate in the second stage. In this case, his participation constraint in the first stage is not satisfied (i.e., it would not be rational for a plaintiff to initiate a litigation that he does not intend to continue in the second stage of litigation), and the defendant will escape liability without engaging in litigation. The second scenario consists of cases where the plaintiff's participation constraint is satisfied, but now instead the participation constraint of the defendant is not satisfied. In such cases, the defendant will settle, paying V, and avoiding the litigation costs. In the third scenario, the participation constraints are satisfied for both parties. In the context of these three scenarios,[33] we now characterize the expenditures of parties in the first stage in the following propositions.

Proposition 4.2. *When it is not optimal for the plaintiff to pursue his claim in the second stage, the optimal legal expenditures of both plaintiff and defendant are zero (for both stages of litigation).*

Proof. See Appendix □

In this case, both parties will invest zero resources in the first stage. Any positive expenditures in litigation in the first stage would yield negative returns, given that the plaintiff will not litigate in the second stage even if he wins in the first stage, and he will therefore have zero probability of winning the dispute. The first stage and second stage expenditures are therefore zero for both parties.

Proposition 4.3. *When it is not optimal for the defendant to litigate in the second stage, the optimal legal expenditures of both plaintiff and defendant are positive in the first stage. The efforts of both parties will be equal, regardless of the relative strengths of their positions. The Nash equilibrium expenditures are:*

$$x_{1S}^{*} = y_{1S}^{*} = aF_1(1 - F_1)V \tag{4.6}$$

[33] If the participation constraints of both parties are violated, the mixed strategy equilibrium studied by Dari Mattiacci & Parisi (2005) would apply. The study of of such mixed equilibria would not be very informative in the present context. For this reason, we assume that at least the participation constraint is satisfied for one party and we concentrate the analysis to the three scenarios examined in Propositions 4.2, 4.3 and 4.4.

Proof. See Appendix □

In this case, the outcome of the dispute will hinge upon the adjudication of first stage, because the defendant will not defend at the second stage. If the first stage of litigation is decided in favor of the plaintiff, the defendant will simply pay V without proceeding to the second stage. Both the plaintiff and the defendant will expend effort on litigation in the first stage of the dispute, and their expenditures will increase as the productivity parameter, a, and value of the case, V increase.

Also, for any given a and V, the parties incur the highest costs when the case is a close contest ($F_1 = \frac{1}{2}$). Due to the effects of litigation expenditures on participation constraints, the plaintiff is more likely to litigate when litigants face a lower productivity parameter a and he has a claim with greater merits on the first issue F_1. The defendant also litigates more often when the productivity parameter, a, is lower, but the defendant is less likely to litigate when F_1 is higher. [34]

Proposition 4.4. *When it is optimal for both parties to litigate in the second stage, the optimal legal expenditures for the plaintiff and defendant will be positive in the first stage. Here, the expenditures will differ as between the two parties, contingent on the relative strength of their positions with respect to issue 1 and the productivity parameter. The Nash equilibrium expenditures are:*

$$y_{1S}^* = mx_{1S}^* \tag{4.7}$$

where

$$m = \frac{1 + b(1 - F_2)}{1 - b(1 - F_2)} \tag{4.8}$$

Proof. See Appendix □

We see that the choice of unitary versus sequential litigation clearly affects legal expenditures. The parties' litigation efforts on the first issue of a unitary trial identified in 3.5 and 3.6 differ from parties' expenditures in the first stage of a sequential trial identified in 4.7 and 4.8. Excluding the limiting cases $b = 0$ and

[34] See conditions 7.16 and 7.17 in the Appendix for analytical details.

$F_2 = 1$, it is obvious that $m > 1$, and the expenditures of the defendant in a sequential trial would be larger than those of the plaintiff. The reason is that the defendant has more to lose in the second stage than the plaintiff has to win: the expected judgment plus litigation costs for the defendant, and the expected judgment minus litigation costs for the plaintiff. For any given values a, b, V, and F_2, parties will have higher expenditures when the plaintiff has a stronger claim, $F_1 > \frac{1}{2}$, with the highest level reached at $\bar{F}_1$.[35] Sequential litigation has an interesting effect on the parties' litigation efforts in stage 1 of the trial. Given the dispositive and preclusive effects of a judgment in stage 1 on the continuation of the case in stage 2, parties will front-load their litigation investments in the first stage, such that greater efforts for both parties will be observed when the plaintiffs bring a meritorious case ($F_1 > \frac{1}{2}$) worthy of being litigated by the defendant.

In the following section, we will build on these results to explore more systematically the differences between the litigation incentives created by the two procedural forms and to contrast our findings with those of the prior literature on this topic.

5 Unitary Versus Sequential Litigation: Structural Advantages and Comparison of Effects

Sequential litigation has a basic advantage over unitary litigation: the second stage spending in sequential litigation can at times be avoided. Intuitive as this advantage may be, in Section 4 we have shown that the benefits of sequential litigation may be offset by the incentive effects created by sequential litigation. The use of a rent-seeking model allows us to formulate a more explicit comparison of the two procedural regimes, showing how the choice of unitary or sequential litigation affects parties' returns, even when the outcomes and merits of the issues are independent of one another. In Section 5.1, we identify an overlooked effect of sequential litigation: a pro-defendant bias. In Section 5.2 we compare the ways in which uni-

[35] Note that $\frac{\partial x^*_{1S}}{\partial F_1} = 0$ and $\frac{\partial y^*_{1S}}{\partial F_1} = 0$ when $F_1 = \bar{F}_1 = \frac{m^a}{m^a+1}$. This value of F_1 is higher than $\frac{1}{2}$, since $m > 1$. Hence, the highest effort is reached when $F_1 > \frac{1}{2}$.

tary and sequential trials affects the parties' legal expenditures. In Section 5.3 we compare our two procedural regimes with respect to the decision to enter litigation.

5.1 The Hidden Bias of Sequential Litigation

The previous literature on unitary versus sequential litigation, by treating litigation expenditures as exogenous, overlooked the effects of sequential litigation on the defendants' incentives. Under sequential litigation, defendants have the opportunity to front-load investments in the first stage of litigation. Given the preclusive effects of stage 1 litigation on subsequent stages of the trial, we can identify a previously overlooked effect.

Proposition 5.1. *Sequential litigation gives defendants a structural advantage over plaintiffs.*

Proof. See Appendix □

Sequential trials give an advantage to defendants, which could potentially be quite large. The intuition for this advantage can be drawn from the results discussed in Section 4. The stakes at stage 2 are higher for the defendant than for the plaintiff. It is enough for the defendant to prevail on one of the two issues, when instead it is necessary for the plaintiff to win on both issues. As a result, the defendant is willing to spend more in stage 1 of the trial, given the preclusive effect that a victory in stage 1 would have on subsequent litigation.

5.2 Comparing Legal Expenditures in a Unitary Versus Sequential Litigation

The choice of procedural regime affects the parties' litigation efforts. Comparing the parties' litigation decisions under two procedural regimes, we can observe the following differences.

Proposition 5.2. *In sequential litigation, expenditures on the second issue will always be greater than in a unitary proceeding.*

Proof. See Appendix □

Corollary 5.3. *In sequential litigation, the expected expenditures on the second issue will always be smaller than in a unitary trial.*

Proof. See Appendix □

Proposition 5.2 states that litigation costs in the second stage are larger when the parties choose sequential rather than unitary litigation.[36] This is a fairly intuitive result, given that a sequential trial allows each party to defer the expenditures on the second issue until the first issue is decided. Once the first issue is settled, if the decision of the second issue is still relevant, the marginal return from expenditures on that issue will be larger compared to a unitary trial. In a unitary trial, each party discounts the return from his or her litigation investment by the probability of the plaintiff's (still unknown) success on the first issue, whereas in a sequential trial, the plaintiff will have already won the first issue by the time the second issue is litigated.

The contrast between Proposition 5.2 and Corollary 5.3 is somewhat surprising. Notwithstanding the increase in expenditures in the second stage, under sequential litigation, *expected* expenditures actually decrease. This result is driven by the fact that the different participation constraints lower litigation rates when sequential procedures are followed.[37] The effect of reduced litigation outweighs the effect of increased expenditures identified in Proposition 5.2, yielding lower expected expenditures.[38] The result identified in Corollary 5.3 is consistent with the result established by Landes (1993) for the case of exogenous litigation expenditures.

[36] Proposition 5.2 holds true when the plaintiff's and defendant's participation constraints are satisfied.

[37] The participation constraints of the plaintiff and defendant are identified in 7.25 and 7.26 in the Appendix.

[38] The plaintiff's probability of success in a sequential trial is lower, because the defendant spends more in stage one than the plaintiff. This implies that, although the second stage expenditures of both parties increase with probability $\frac{1}{F_1}$ (if that stage is reached), the parties will incur these expenditures less often. The probability the plaintiff prevails in the first stage of a sequential trial is $\frac{F_1}{F_1+m^a(1-F_1)}$, while it is F_1 in a unitary trial.

As discussed in Proposition 5.4 however, the effect of sequential litigation on the expenditures on the first issue is more ambiguous, and possibly inconsistent with Landes (1993).

Proposition 5.4. *On the first issue, expenditures in sequential litigation may be either smaller or larger than in a unitary trial, depending on the merit of the plaintiff's case,* F_1. *For stronger cases,* $F_1 > F_1^*$, *sequential litigation will induce higher litigation expenditures for both parties. Correspondingly, for weaker cases,* $F_1 < F_1^{**}$, *sequential litigation will induce lower litigation costs for both parties. For close cases,* $F_1^{**} < F_1 < F_1^*$, *the effect of sequential litigation will be mixed, with the plaintiff spending less and the defendant spending more, as compared to unitary litigation.*

Proof. See Appendix □

Sequential litigation creates two effects on the litigation incentives for the first issue. First, it provides incentives for the defendant to front-load litigation expenditures: if successful on the first issue, the defendant avoids litigation on the second issue and thus avoids liability. The increase in litigation expenditures for the defendant may trigger an increase or a decrease of expenditures for the plaintiff, depending on the strength of the case. This, in turn, may affect the defendant's incentives. This complex interaction may lead to the three different situations identified in Proposition 5.4: (i) both plaintiff and defendant spending more; (ii) both plaintiff and defendant spending less; and (iii) the plaintiff spending less and the defendant spending more (note that the reverse cannot occur).[39]

The main result revealed by our analysis is that the overall effect of sequential litigation procedures on the parties' expenditures depends on the merit of the plaintiff's case, F_1. When the plaintiff has a strong case, the return from investments in the first stage are higher, and sequential litigation induces plaintiffs to front-load their litigation expenditures. Conversely, when the strength of the plaintiff's case is low, the return from the investment in the first stage will be lower, and sequential

[39] When stage 2 is not litigated, expenditures on the first issue in a sequential trial are always larger than in a unitary trial.

litigation will induce the plaintiff to choose a lower level of effort, as compared to unitary proceedings.

To help us more clearly conceptualize these countervailing effects, it should be observed that the parties' litigation choices are characterized by strategic complementaries. In the right tail of the merit distribution, we observe that a strong case for the plaintiff ($F_1 > F_1^*$) leads to greater efforts by the plaintiff and, in turn, to increased defensive efforts by the defendant. Symmetrically, in the left tail of the distribution, a weak case ($F_1 < F_1^{**}$) leads to lower effort by the plaintiff, and in turn to lower defensive efforts by the defendant. In the intermediate range of the distribution, $F_1^{**} < F_1 < F_1^*$, we observe that sequential litigation has mixed effects on the plaintiff's and defendant's expenditures.

Proposition 5.5. *Total litigation expenditures and the settlement range in a sequential trial may be larger or smaller than in a unitary trial. Additionally, the plaintiff's incentive to litigate does not necessarily increase, but can actually decrease, in sequential litigation as compared to a unitary litigation.*

Proof. See Appendix □

When litigation choices are endogenously determined, sequential trials do not always lower the expected total cost of litigation. This runs contrary to Landes (1993), in which the plaintiff's first stage expenditures are always lower and the defendant's first stage expenditures always higher in a sequential trial. Landes' result is due to the fact that, by treating litigation expenditures as exogenous, the effect of a change in one party's expenditures on the other party's expenditures are not taken into account.[40] In our rent-seeking model with endogenous litigation, Landes' results hold for the case when parties have constant returns to litigation efforts ($a = b = 1$) and when the merits of the case are symmetrical ($F_1 = F_2 = \frac{1}{2}$). By introducing non-linear returns to efforts ($a, b \neq 1$) and/or an asymmetry in the merit of the case ($F_1, F_2 \neq \frac{1}{2}$), the advantage of sequential litigation will hinge upon the trade-offs between the savings in litigation costs (i.e., when the second stage of the trial is avoided) and the change in litigation costs in the first stage of the trial.

[40] For direct and indirect effects in a one-stage trial, see Katz (1988).

Under plausible conditions, the parties' front-loading of efforts to the first stage of sequential litigation more than offsets the savings in litigation costs in second stage of the trial.[41] In this case, the parties will be more likely to settle out of court, enlarging the range of mutually acceptable settlements. This is due to the fact that, when a trial becomes more costly for the plaintiff, he will be willing to accept a lower settlement amount, ceteris paribus. The complementary effect holds for the defendant, such that higher litigation costs increase the maximum settlement amount he is willing to offer. Hence, the settlement range may get larger, reducing in the number of trials. We also observe that it follows trivially, when the second stage is not litigated, that sequential litigation always leads to a reduction in total expenditures.

When suing becomes cheaper, more cases will be filed.[42] Landes (1993) showed that sequential procedures, by reducing expected trial costs, increase the plaintiffs incentive to litigate and the number of lawsuits. Proposition 5.5, however, shows that in the presence of endogenous litigation, the expected litigation costs may actually increase in some cases. This, in turn, may reduce the plaintiff's incentive to sue relative to a unitary proceeding. That is, the plaintiff's incentive to litigate in a sequential trial may be larger *or* smaller than in a unitary trial, depending on three factors: (i) the positive difference in expected judgment between a unitary and sequential trial (due to lower win rates on the first issue in a sequential trial), (ii) the difference in litigation costs on the first issue and (iii) the savings on the second issue in a sequential trial.[43]

[41] The condition for Landes (1993) result is specified in the Appendix as condition 7.35 and depends on the size of the productivity parameters a and b and the case merits F_1 and F_2.

[42] The present model could be extended to consider the effect of a settlement opportunities on the parties' litigation choices. As discussed above, the two litigation regimes affect parties' litigation efforts and the overall cost of litigation. Greater costs of litigation imply greater incentives to settle out-of-court. In our analysis, we have resisted the temptation to include endogenous settlement opportunities, since their inclusion would confound the results, with no added benefits. From a policy point of view, it is obvious that choosing a litigation structure with higher dissipation is a less-than-optimal way to discourage litigation, given that the same results could more effectively and predictably be achieved with a litigation tax. For litigation models that incorporates settlement opportunities, see Nalebuff (1987); Cornell (1990); Bebchuk & Chang (1996); Grundfest & Huang (2006)

[43] See Appendix for the analytical condition on the plaintiff's litigation incentive.

5.3 Participation Constraints in Unitary Versus Sequential Litigation

In addition to its effects on the litigants' litigation decisions, the choice of legal procedure also affects also the parties' decision to enter litigation. When litigation efforts are endogenously affected by the procedural regimes, the parties' filing decisions in a unitary trial differ from those chosen in a sequential trial.

Proposition 5.6. *In disputes where rational litigants would choose to litigate both stages of a sequential trial, it is possible that they would choose not litigate if those same issues were bundled in a unitary trial.*

Proof. See Appendix □

Proposition 5.6 yields some interesting and practically relevant results. In disputes where both the plaintiff and defendant would participate in both stages of sequential litigation, in at least some instances, unifying the proceedings in a single trial would alter incentives such that litigation would not occur. Where reducing litigation rates is desirable, unitary litigation could yield some benefits.

Despite the differences discussed in this section, the incentives of unitary and sequential litigation will be coextensive at least some of the time. For example, the plaintiff will never litigate in a unitary proceeding if he would not litigate both those same issues individually in the stages of a sequential trial. This can be explained by the fact that if the rational plaintiff does not find it prudent to file for litigation when issues are unbundled, he should not find desirable to litigate under in a unitary proceeding either.

6 Conclusion

In this paper we have examined the optimal use of sequential litigation procedures as a policy instrument. Our analysis suggests that, contrary to the received view, there is no simple answer as to which of the two procedures is best capable of mitigating rent dissipation through litigation.

Landes (1993) was the first to formally analyze differences between unitary and sequential trials. He compared unitary and sequential litigation under the American rule, and focused on situations with exogenous litigation expenditures. Landes (1993) argued that sequential litigation lowers the expected cost of litigation for both parties compared to a unitary trial, increasing the plaintiffs incentive to sue and reducing the parties' willingness to settle out of court. In this paper we used a rent-seeking to show that the choice of unitary versus sequential litigation procedures endogenously affects the parties' incentives to litigate as well as the magnitude of their litigation expenditures. Under our model, the effects of the procedural choice varied greatly depending on the particular characteristics of the case.

Our conclusions with respect to the effect of trial structure on total litigation costs again depart from the conventional wisdom. Contrary to Landes (1993), we observe that the consolidation of issues may sometimes lead to a reduction in litigation rates. This is due to the fact that when the parties' incentive to enter litigation is endogenously determined, sequential litigation may increase the expected cost of litigation compared to a unitary trial. Moreover, contrary to Landes (1993), we also show that sequential litigation can increase the first stage expenditures of both parties, leading to inefficiently high trial expenditures.

The principal result of this paper is the identification of characteristics that render one procedure preferable to its alternative. These results furnish an economic framework for understanding some of the procedural rules that give courts discretion on whether to join or separate issues. Separating issues in sequential litigation creates two effects. First, it incentivizes the defendant to front-load his litigation efforts. If the defendant prevails in the first stage, he can avoid both liability and the litigation costs associated with contesting the second issue. Second, the defendant's front-loading will affect the plaintiff's expenditures in the first stage. Our analysis finds that, in view of the incentive effects of sequential litigation, the choice of procedural form is not neutral to the parties' payoffs. When litigation efforts are endogenously determined, sequential litigation gives a structural advantage to defendants. Given the fact that the defendant only needs to prevail on one of the two issues, under sequential litigation the defendant will front-load effort in

stage 1 of the trial, taking advantage of the preclusive effect of a victory in stage 1 on subsequent litigation. Under unitary litigation, the defendant would need to invest simultaneously on the defense of both issues, investing in the litigation of issue 2, without the benefit of knowing the outcome of litigation on issue 1.

We also observe that contrary to the wisdom in the existing literature, the effect of procedural form on total spending is not clear-cut. The overall effect will depend on the strength of the plaintiff's case. The stronger the plaintiff's position, the higher the returns on his investment in effort. Sequential litigation will therefore increase the litigation expenditures for both parties in such a case. However, the opposite effect obtains when the plaintiff has a weak case. Finally, in close cases, it will be indeterminate which procedural form is more efficient.

Our results run counter to the presumptions of procedurally "cautious" courts like *Fontenot v. Patterson*, which held, "[B]ifurcated trials should be avoided when possible,"[44] as well as "progressive" courts like *Glarza v. Crown Container Co.*, which held, "A unified trial should only be conducted where the nature of the plaintiff's injuries has an 'important bearing' on the issues of liability."[45] Rather, our analysis suggests that courts should exercise discretion in each case, without rebuttable presumptions in one direction or another. In a divorce case, a Pennsylvania court held in *Roberts v. Roberts* something similar to this, declaring,

> [T]rial courts may not establish a pro forma policy to grant or deny bifurcation requests. Trial courts are required to carefully explore and analyze the advantages and disadvantages of bifurcation on a case-by-case basis . . . .[46]

We argue that from an economic point of view, the *Roberts* decision had the right idea. Moreover, our model gives courts a more concrete way of "analyz[ing] the advantages and disadvantages of bifurcation on a case-by-case basis."

Of course, it is unlikely that courts will expressly look at the strength of the plaintiff's case in deciding whether to litigate issues sequentially. Indeed, the ex ante apparent strength of a party's case is rarely remarked upon at all in court opinions. Nevertheless, courts routinely anticipate the strength of parties' arguments and

[44] 997 So.2d 529, 537 (La., 2012).
[45] 934 N.Y.S.2d 465 (NY app., 2011).
[46] 9 Pa. D. & C. 4th 133, 136 (Pa. Ct. of Common Pleas, 1991).

evidence when ruling on matters prior to trial. Incorporating the economic considerations we discuss in this paper would be entirely consistent with those practices.

On a broader note, general results suggest that the effects of procedural form are more complex than the traditional analyses indicate. Future extensions of our results should consider the extent to which in some range of situations one procedural regime might be mutually preferable to both litigants. From a policy perspective this would help determine the extent to which the procedural choice between unitary and sequential litigation should be left as a mere default, changeable by consent of the parties, taking into account their private information on the merits of their respective claims and the returns to litigation effort. This would in turn allow courts to infer information about these private values from the revealed preferences of the litigants. Further analysis is desirable for promoting a more efficient design of trials, and we hope that our insights might provide an analytical building block for courts in exercising their discretion to separate and join issues to minimize the dissipation of resources through litigation.

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7 Appendix

Proof. of Proposition 3.1

The first order conditions of the plaintiff are:

$$\frac{x_{2U}^b F_2}{x_{2U}^b F_2 + y_{2U}^b (1-F_2)} V[\frac{a x_{1U}^{a-1} F_1}{x_{1U}^a F_1 + y_{1U}^a (1-F_1)} - \frac{a x_{1U}^{2a-1} F_1^2}{[x_{1U}^a F_1 + y_{1U}^a (1-F_1)]^2}] = 1 \tag{7.1}$$

$$\frac{x_{1U}^a F_1}{x_{1U}^a F_1 + y_{1U}^a (1-F_1)} V[\frac{b x_{2U}^{b-1} F_2}{x_{2U}^b F_2 + y_{2U}^b (1-F_2)} - \frac{b x_{2U}^{2b-1} F_2^2}{[x_{2U}^b F_2 + y_{2U}^b (1-F_2)]^2}] = 1 \tag{7.2}$$

The first order conditions of the defendant are:

$$\frac{x_{2U}^b F_2}{x_{2U}^b F_2 + y_{2U}^b (1-F_2)} V[\frac{a F_1 (1-F_1) x_{1U}^a y_{1U}^{a-1}}{[x_{1U}^a F_1 + y_{1U}^a (1-F_1)]^2}] = 1 \tag{7.3}$$

$$\frac{x_{1U}^a F_1}{x_{1U}^a F_1 + y_{1U}^a (1-F_1)} V[\frac{b F_2 (1-F_2) x_{2U}^b y_{2U}^{b-1}}{[x_{2U}^b F_2 + y_{2U}^b (1-F_2)]^2}] = 1 \tag{7.4}$$

Solving the system of equations 7.1, 7.2, 7.3 and 7.4 yields the equilibrium values 3.5 and 3.6. Substituting the equilibrium values 3.5 and 3.6 in 3.2 and 3.4, the participation constraint of the plaintiff and defendant become respectively:

$$a(1-F_1) + b(1-F_2) \leq 1 \tag{7.5}$$

$$a(1-F_1) + b(1-F_2) \leq \frac{1}{F_1 F_2} - 1 \tag{7.6}$$

□

Proof. of Proposition 4.1

The first order condition of the plaintiff implies

$$V[\frac{bx_{2S}^{b-1}F_2}{x_{2S}^b F_2 + y_{2S}^b(1-F_2)} - \frac{bx_{2S}^{2b-1}F_2^2}{[x_{2S}^b F_2 + y_{2S}^b(1-F_2)]^2}] = 1 \tag{7.7}$$

The first order condition of the defendant implies

$$V[\frac{bF_2(1-F_2)x_{2S}^b y_{2S}^{b-1}}{[x_{2S}^b F_2 + y_{2S}^b(1-F_2)]^2}] = 1 \tag{7.8}$$

Solving the system of first order conditions 7.7 and 7.8 yields $x_{2S}^* = y_{2S}^*$ in 4.5.

Substituting the equilibrium values 4.5 in 4.2, the plaintiff's participation constraint takes the following form:

$$b(1-F_2) \leq 1 \tag{7.9}$$

Substituting the equilibrium values in 4.5 in 4.4, the defendant's participation constraint takes the following form:

$$bF_2 \leq 1 \tag{7.10}$$

□

Proof. of Proposition 4.2

The participation constraint of the plaintiff in 7.9 is violated. By backward induction, the plaintiff will invest zero at first stage, since any positive legal expenditure at stage 1 will not increase the probability to win the trial. Given the optimal plaintiff's choice, the defendant will set equal to zero his legal expenditures, to minimize his objective function. □

Proof. of Proposition 4.3

The participation constraint of the plaintiff in 7.9 is not violated, while the participation constraint of the defendant in 7.10 is violated. The plaintiff chooses

x_{1S} to maximize this objective function:

$$p_1(x_{1S}, y_{1S})V - x_{1S} \tag{7.11}$$

The defendant chooses y_{1S} to minimize this objective function:

$$p_1(x_{1S}, y_{1S})V + y_{1S} \tag{7.12}$$

where

$$p_1(x_{1S}, y_{1S}) = \frac{x_{1S}^a F_1}{x_{1S}^a F_1 + y_{1S}^a (1 - F_1)} \tag{7.13}$$

The first order condition of the plaintiff is:

$$[\frac{a x_{1S}^{a-1} F_1}{x_{1S}^a F_1 + y_{1S}^a (1 - F_1)} - \frac{a x_{1S}^{2a-1} F_1^2}{(x_{1S}^a F_1 + y_{1S}^a (1 - F_1))^2}]V = 1 \tag{7.14}$$

The first order condition of the defendant is:

$$\frac{a x_{1S}^a y_{1S}^{a-1} F_1 (1 - F_1)}{(x_{1S}^a F_1 + y_{1S}^a (1 - F_1))^2} V = 1 \tag{7.15}$$

The solution of FOCs 7.14 and 7.15 determines 4.6.

The participation constraint of plaintiff and defendant yields respectively:

$$a(1 - F_1) \leq 1 \tag{7.16}$$

$$aF_1 \leq 1 \tag{7.17}$$

□

Proof. of Proposition 4.4

The participation constraint of the plaintiff in 7.9 and the participation constraint of the defendant in 7.10 are not violated. The plaintiff chooses x_{1S} to maxi-

mize this objective function:

$$p_1(x_{1S}, y_{1S})(F_2V - bF_2(1-F_2)V) - x_{1S} \tag{7.18}$$

The defendant chooses y_{1S} to minimize this objective function:

$$p_1(x_{1S}, y_{1S})(F_2V + bF_2(1-F_2)V) + y_{1S} \tag{7.19}$$

where

$$p_1(x_{1S}, y_{1S}) = \frac{x_{1S}^a F_1}{x_{1S}^a F_1 + y_{1S}^a(1-F_1)} \tag{7.20}$$

The first order condition of the plaintiff is:

$$[\frac{ax_{1S}^{a-1}F_1}{x_{1S}^a F_1 + y_{1S}^a(1-F_1)} - \frac{ax_{1S}^{2a-1}F_1^2}{(x_{1S}^a F_1 + y_{1S}^a(1-F_1))^2}](F_2V - bF_2(1-F_2)V) = 1 \tag{7.21}$$

The first order condition of the defendant is:

$$\frac{ax_{1S}^a y_{1S}^{a-1}F_1(1-F_1)}{(x_{1S}^a F_1 + y_{1S}^a(1-F_1))^2}(F_2V + bF_2(1-F_2)V) = 1 \tag{7.22}$$

The solution of FOCs 7.21 and 7.22 determines 4.7 and 4.8 The Nash equilibrium of the legal expenditures take the following form:

$$x_{1S}^* = \frac{aF_1F_2(1-F_1)(1+b(1-F_2))m^{a-1}V}{(F_1 + m^a(1-F_1))^2} \tag{7.23}$$

$$y_{1S}^* = \frac{aF_1F_2(1-F_1)(1+b(1-F_2))m^{a}V}{(F_1 + m^a(1-F_1))^2} \tag{7.24}$$

The participation constraint for the plaintiff requires that

$$a(1-F_1)\frac{(1+b(1-F_2))m^{a-1}}{F_1 + m^a(1-F_1)} + b(1-F_2) \leq 1 \tag{7.25}$$

The participation constraint for the defendant requires that

$$a(1-F_1)\frac{(1+b(1-F_2))m^a}{F_1+m^a(1-F_1)}+b(1-F_2)\leq\frac{1}{F_1F_2}(F_1+m^a(1-F_1))-1 \tag{7.26}$$

□

Proof. of Proposition 5.1 The participation constraint of the plaintiff in 7.9 and 7.25, and the participation constraint of the defendant in 7.10 and 7.26 are satisfied. In a unitary trial, at equilibrium, the probability to win for the plaintiff is F_1F_2, while the probability for the defendant is $1-F_1F_2$. In a sequential trial, at equilibrium, the probability to win for the plaintiff is $\frac{F_1}{F_1+m^a(1-F_1)}F_2$, while the probability to win for the defendant is $1-\frac{F_1}{F_1+m^a(1-F_1)}F_2$. For any F_1, F_2, a and b, $\frac{F_1}{F_1+m^a(1-F_1)}<F_1$, as required for the Proposition to hold. □

Proof. of Proposition 5.2

It follows straightly from the comparison of equilibrium litigation efforts 3.6 and 4.5. □

Proof. of Corollary 5.3

It follows straightly from Proposition 5.2, noting that the plaintiff's probability of success on issue 1 in a sequential trial is equal to $\frac{F_1}{F_1+m^a(1-F_1)}$. □

Proof. of Proposition 5.4

Both parties spend more in the first stage when $x_{1S}^*>x_{1U}^*$ and $y_{1S}^*>y_{1U}^*$. From inspection of 3.5, 3.6, 4.7 and 4.8, this occurs when $x_{1S}^*>x_{1U}^*$, since $x_{1U}^*=y_{1U}^*$ and $y_{1S}^*>x_{1S}^*$. From 3.5 and 7.23, this requires

$$\frac{(1+b(1-F_2))m^{a-1}}{(F_1+m^a(1-F_1))^2}>1 \tag{7.27}$$

or

$$F_1>F_1^* \tag{7.28}$$

where

$$F_1^* = \frac{m^a - \sqrt{(1 + b(1 - F_2))m^{a-1}}}{m^a - 1} \tag{7.29}$$

Both parties spend less in the first stage when $x_{1S}^* < x_{1U}^*$ and $y_{1S}^* < y_{1U}^*$. From inspection of 3.5, 3.6, 4.7 and 4.8, this occurs when $y_{1S}^* < y_{1U}^*$. From 3.6 and 7.24, this requires

$$\frac{(1 + b(1 - F_2))m^a}{(F_1 + m^a(1 - F_1))^2} < 1 \tag{7.30}$$

or

$$F_1 < F_1^{**} \tag{7.31}$$

where

$$F_1^{**} = \frac{m^a - \sqrt{(1 + b(1 - F_2))m^a}}{m^a - 1} \tag{7.32}$$

The plaintiff spends less and the defendant more in the first stage when $x_{1S}^* < x_{1U}^*$ and $y_{1S}^* > y_{1U}^*$. From inspection of 3.5, 3.6, 4.7 and 4.8, this occurs when $x_{1S}^* < x_{1U}^* < y_{1S}^*$. From 3.6 and 7.24, this requires

$$\frac{(1 + b(1 - F_2))m^a}{(F_1 + m^a(1 - F_1))^2} < 1 < \frac{(1 + b(1 - F_2))m^{a-1}}{(F_1 + m^a(1 - F_1))^2} \tag{7.33}$$

or

$$F_1^{**} < F_1 < F_1^* \tag{7.34}$$

where F_1^* and F_1^{**} are defined respectively according to 7.29 and 7.31. □

Proof. of Proposition 5.5

Assume the participation constraints of each party are satisfied in a sequential trial. Plaintiff wins litigation on issue 1 with probability $\frac{F_1}{F_1 + m^a(1-F_1)}$. Total rent-seeking expenditures in a unitary trial are larger than expected total rent-seeking

expenditure in a sequential trial when: $x^*_{1U} + x^*_{2U} + y^*_{1U} + y^*_{2U} > x^*_{1S} + y^*_{1S} + \frac{F_1}{F_1+m^a(1-F_1)}[x^*_{2S} + y^*_{2S}]$. Substituting 3.5, 3.6, 4.7, 4.8, 7.23, 7.24 and noting that $(1+m)(1+b(1-F_2)) = 2m$, provides the following condition:

$$[1 - \frac{1}{(F_1 + m^a(1-F_1)}]b(1-F_2) > [\frac{m^a}{(F_1 + m^a(1-F_1))^2} - 1]a(1-F_1) \tag{7.35}$$

The expected value for the plaintiff is larger under a unitary trial than under a sequential trial if:

$$F_1F_2V - aF_1F_2(1-F_1)V - bF_1F_2(1-F_2)V > \frac{F_1}{F_1 + m^a(1-F_1)}(F_2V - bF_2(1-F_2)V) - \frac{aF_1F_2(1-F_1)(1+b(1-F_2))m^{a-1}V}{(F_1 + m^a(1-F_1))^2}.$$

After algebraic manipulation, the above condition can be expressed as follows:

$$F_1F_2 - \frac{F_1F_2}{F_1 + m^a(1-F_1)} > (1 - \frac{(1+b(1-F_2))m^{a-1}}{(F_1 + m^a(1-F_1))^2})aF_1F_2(1-F_1) + (F_1 - \frac{F_1}{F_1 + m^a(1-F_1)})bF_2(1-F_2).$$

□

Proof. of Proposition 5.6

It follows straightly from the comparison of participation constraints 7.5 and 7.25 for the plaintiff, and 7.6 and 7.26 for the defendant. □