EXPLAINING THE FLOOD OF
ASBESTOS LITIGATION:
CONSOLIDATION, BIFURCATION,
AND BOUQUET TRIALS

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ABSTRACT

The number of asbestos personal injury claims filed each year is in the hundreds of thousands and has been increasing rather than decreasing over time, even though asbestos stopped being used in the early 1970's. Eighty firms have filed for bankruptcy due to asbestos liabilities—including 30 filings since the beginning of 2000.

This paper examines why asbestos claims are increasing over time. Because large numbers of asbestos claims are filed in particular courts, judges in these courts have adopted procedural innovations intended to clear their dockets by encouraging mass settlements. These innovations cause trial outcomes to change in plaintiffs' favor. As a result, the innovations make the asbestos crisis worse by giving plaintiffs' lawyers an incentive to file large numbers of additional claims in the same courts. The paper uses a new dataset of asbestos trials to test the hypothesis that three important procedural innovations—consolidated trials, bifurcation, and bouquet trials--favor plaintiffs and therefore encourage the filing of additional claims. I find that bifurcation and bouquet trials nearly triple plaintiffs' expected return from trial, while consolidations of up to seven lawsuits raise plaintiffs' expected return from trial by one- third to one-half.

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Explaining the Flood of Asbestos Litigation: Consolidation, Bifurcation, and Bouquet Trials [1]

"The hazards of asbestos were described by the Roman historian Pliny..."[2]

I.   Introduction

One hundred million people in the U.S. were occupationally exposed to asbestos.   Asbestos exposure can cause a variety of diseases--ranging from pleural plaque to mesothelioma and other cancers—usually after a long latency period.[3] At least 600,000 individuals have filed claims for damage resulting from asbestos exposure and, because individuals typically file claims against multiple defendants, the total number of claims is much larger (Carroll et al, 2002). In the year 2000 alone, twelve large companies reported that 520,000 new asbestos claims were filed against them.[4] Insurers of asbestos defendants have paid out around $32 billion in compensation and heavy liability for asbestos claims has caused about 80 firms to file for bankruptcy—30 of them since the beginning of 2000.[5] But defendants' bankruptcies haven't ended the asbestos mass tort. Instead, plaintiffs' lawyers are filing ever more claims on behalf of plaintiffs whose injuries are less severe against defendants whose involvement with asbestos production is increasingly tangential. With an unlimited supply of both plaintiffs and defendants, asbestos has become the largest mass tort in U.S. legal history. Two recent predictions of its total cost came out at $200 and 275 billion—suggesting that asbestos may end up costing more than Superfund.[6]

Asbestos claims are concentrated in a few courts and the volume of claims in these courts makes it infeasible to hold individual trials for all claimants. Fearing judicial gridlock, judges have responded by developing new legal procedures intended to resolve large numbers of cases

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[2] Quoted in Castleman (1996, p. 358).
[3] American Academy of Actuaries (2001).
[4] This figure is taken from 10-K filings of 12 large companies that report asbestos liabilities. Data for number of claims filed in 1999 or 2001 is substituted if figures for 2000 are unavailable.
[5] See Carroll et al (2002) and White (2002).
[6] The two studies are Angelina and Biggs (2001) and Bhavatula et al (2001).

at minimal cost in court time.[7] One important procedural innovation is consolidated trials, which are trials of multiple asbestos claims simultaneously before a single jury. The jury makes separate decisions for each plaintiff against each defendant.[8] Another innovation is bifurcation, which divides the trial into two or more phases. In bifurcated trials, the jury decides liability in phase one and damages in phase two; while in reverse bifurcated trials, the order is reversed. After phase one, the trial is suspended and the judge directs the parties to negotiate a settlement—with the judge sometimes becoming intimately involved in the negotiations. The judge may threaten that, if the parties do not settle, s/he will direct the jury to consider punitive damages.[9] A third innovation is the "bouquet" trial. Here, a small group of cases is selected for trial from a larger group that may include thousands of cases. At the end of the bouquet trial, the judge directs the parties to settle the large group of cases based on the template of the small group outcomes. If negotiations break down, the judge may threaten to use the same jury to decide additional cases in the large group.

A couple of examples are useful. A reverse bifurcated bouquet trial of 12 plaintiffs' asbestos claims in Mississippi in 1998 resulted in phase one compensatory damage awards that totaled $48 million. When the judge threatened to send the issue of punitive damages to the same jury, the defendants settled the 12 cases, reportedly for the full amount of the damage awards. The judge then scheduled an additional 63 cases for trial before the same jury. Defendants lodged an emergency appeal with the Mississippi Supreme Court seeking to disqualify the judge for bias, but their appeal was denied. Defendants then settled all of the remaining 1,738 claims in the large group on extremely favorable terms for plaintiffs. In a bifurcated trial in West Virginia in 2002 that involved 4,000 plaintiffs from 35 states suing a single defendant, liability and a punitive damages multiplier were decided during phase one. After phase one, the judge instructed the parties to negotiate a settlement of all 4,000 claims. Although settlement negotiations are still on-going, they are likely to succeed because the jury's

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[7] Current centers for asbestos litigation include Kanawha County, West Virginia, and Jefferson County, Mississippi, but these have varied over time. See below. Mullenix (1991) and Saks and Blanck (1992) discuss the development of these innovations.

[8] Consolidations differ from class actions, where a judge certifies a class that combines all claims of a particular type into a single case and the jury makes a single decision for all. In consolidations, multiple claims that involve common issues are joined and may be tried together, but separate decisions are made for each. The U.S. Supreme Court did not allow class actions of asbestos lawsuits and state courts have followed its lead. See Cabraser (1998).

[9] See Willgang (1987) for discussion of how judges in asbestos trials often act as mediator and/or schedule settlement conferences in their chambers.

decision that the defendant must pay punitive damages of three times any compensatory damage award makes proceeding to the damages phase extremely risky for the defendant.[10]

My hypothesis in this paper is that judges' attempts to save trial time by encouraging mass settlements of asbestos claims have made the asbestos crisis worse by encouraging plaintiffs' lawyers to flood the courts with additional claims. The mechanism works in the following way. Because of the large numbers of claims filed in particular courts, judges in these courts adopt procedural innovations that are intended to reduce trial time and encourage large numbers of cases to settle. These procedural innovations also change trial outcomes in a pro-plaintiff direction. But when large numbers of asbestos claims are settled on favorable terms for plaintiffs, then plaintiffs' lawyers find it profitable to file additional claims in the same courts. This worsens the gridlock and pressures the judge to continue using the innovations. Because of the nature of asbestos exposure, the numbers of potential plaintiffs and potential defendants are virtually unlimited and, as a result, the asbestos mass tort keeps growing.[11]

In this paper, I use a new dataset of asbestos trials from 1987 – 2002 to test the hypothesis that the three procedural innovations caused asbestos trial outcomes to become more pro-plaintiff. The results show that bifurcated trials and bouquet trials cause plaintiffs' expected return from trial to nearly triple, while consolidations of up to seven cases raise plaintiffs' expected return from trial to increase by one-third to one-half.

Section II of the paper gives some background concerning asbestos litigation. Section III examines how the three procedural innovations are predicted to affect trial times, settlement probabilities, and trial outcomes. Sections IV and V present the data and empirical evidence on trial outcomes. Section VI concludes.

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[10] The first case is Cosey v. E.D. Bullard Co., Civ. No. 95-0069 (Miss. Cir. Ct. Jefferson County 1995), discussed in Schwartz and Lorber (2000, p. 255) and Parloff (2002). The West Virginia case was characterized by the judge as a consolidated trial but not a bouquet trial. The trial originally involved 8,000 claims and 250 defendants, but half of the plaintiffs and all of the defendants except Union Carbide settled by the start of the trial. See Jonathan D. Glater, "Many Concerns Settle 8,000 Asbestos Suits," *New York Times*, Sept. 25, 2002, and "West Virginia Jury Finds Union Carbide Product Defective, Premises Unsafe," *Mealey's Litigation Reporter: Asbestos*, vol. 17:19, Nov. 1, 2002.

[11] See Carroll et al (2002) for figures showing that claims against five major defendants rose sharply during the 1990's.

II.   Asbestos Litigation: Some Background.   An important factor in asbestos litigation is that most claimants have little or no asbestos-related impairment at the time they file claims. The main asbestos diseases are mesothelioma, lung and other cancers, asbestosis, and pleural plaque. Mesothelioma is cancer of the pleural membrane around the lungs and organs and is generally fatal within a short period after diagnosis. Asbestos claims involving lung cancer are problematic because many asbestos plaintiffs were smokers. Smoking and asbestos exposure can each cause lung cancer alone and, if both are present, the probability of lung cancer rises sharply. Asbestosis is non-cancerous scarring of the lungs due to inhaled asbestos fibers, which causes loss of lung capacity. It varies widely in severity from non-disabling to severely disabling. Along with mesothelioma, asbestosis is uniquely associated with asbestos exposure. Pleural plaque is scarring or thickening of the pleural membrane and is generally non-disabling. During the 1980's, about 20% of asbestos claims involved some type of cancer, but this figure had fallen to about 10% by the mid-1990's.[12]

    The probability of victims' asbestos disease becoming more serious depends on the length and intensity of their exposure, but because asbestos diseases involve a long latency period, most victims' disease will not progress further. Nonetheless, plaintiffs have an incentive to file lawsuits as soon as they discover their asbestos exposure even if they are unimpaired, because if they delay, statutes of limitations that begin to run when harm is discovered may prevent them from filing in the future. And even if they can file later, defendants may have gone bankrupt in the meantime.[13] Thus asbestos litigation is characterized by claimants with little or no impairment racing to file early.[14]

    As the original asbestos product producers have gone bankrupt, plaintiffs' law firms' attention has shifted to a new set of defendants, including firms whose products contained asbestos (such as automobile and auto parts manufacturers), firms that sold asbestos-containing products (such as Sears), and firms whose production processes use asbestos insulation (such as food processors

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[12] See Carroll et al (2002). Note that the disease distribution of asbestos claimants differs from the disease distribution of asbestos trials --see below.

[13] When firms file for bankruptcy, they set up compensation trusts for asbestos victims, but the levels of compensation are much lower than in the tort system. See White (2002) for discussion.

[14] Courts in some states put non-impaired claimants on an "inactive docket" that prevents them from suing immediately, but allows them to sue in the future if they develop a serious asbestos disease. But they still face the risk that defendants' funds will run out before they can sue. See Behrens (2002) for discussion. Miceli and Segerson (2002) provide a model showing the conditions under which there is a race to file lawsuits.

and textile producers). At least 6,000 separate firms covering nearly all SIC codes have been named as defendants in asbestos lawsuits (Carroll et al, 2002).

   The asbestos plaintiffs' bar is a concentrated industry, with more half of all asbestos claims handled by only ten plaintiffs' law firms. Each of these firms represents thousands of plaintiffs.[15] Law firms recruit plaintiffs by advertising widely. They also offer factory workers free lung X-rays to screen for asbestos fibers in return for workers signing retainer agreements with the firm. Large numbers of textile workers have filed asbestos claims over the past few years based on X-ray screening. These workers were exposed to asbestos because textile factories have ventilation systems to filter textile fibers out of the air which were lined with asbestos insulation. Because X-rays can detect low levels of asbestos fibers and because screeners tended to find asbestos fibers more often than they are actually present, few of these workers have any disability (see Carroll et al, 2002).

   Plaintiffs' lawyers are formally retained on a contingency fee basis, keeping 33 to 40% of the settlement or damage award.[16] For plaintiffs' law firms to make a profit representing asbestos claimants, they must be able to obtain judgments or settlements on behalf of minimally injured plaintiffs, since a large majority of asbestos claims are of this type. Because trials are time-consuming and contingency fees do not compensate plaintiffs' lawyers for their time spent at trial, they greatly favor settlements over trials. Plaintiffs' lawyers' power goes well beyond the formal agreements that they sign with plaintiffs. Because plaintiffs are unsophisticated, plaintiffs' lawyers rather than plaintiffs determine the litigation strategy.   Also, plaintiffs' law firms may negotiate mass settlements with particular defendants that specify only a total dollar payment, so that the lawyer decides how to divide the settlement among plaintiffs.

   Plaintiffs' law firms have a great deal of influence over the litigation process. Most asbestos claims are filed in state courts and law firms concentrate claims in the most pro-plaintiff jurisdictions. Also, plaintiffs' law firms take advantage of state joinder rules to join or consolidate groups of claims whose size and composition favor plaintiffs. For example, Mississippi is a favored location for asbestos litigation because its liberal joinder rules allow asbestos claims to be litigated there even if neither the plaintiff nor the defendant is located in

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[15] The law firm of Baron & Budd handles 12,000 asbestos claimants. See Parloff (2002) and Carroll et al (2002).

[16] Contingency fees in asbestos litigation have been in the range of 33-40% since the early 1980's and did not fall over time as asbestos litigation became more routine. This is probably because of the high concentration of claims among a small number of plaintiffs' law firms.   See Carroll et al (2002) for data.

Mississippi. The only requirement is that the claim must be joined to another claim that involves a Mississippi resident suing an out-of-state defendant. This allows large blocks of claims from all over the country to be consolidated in Mississippi. Mississippi is also favorable for plaintiffs because it has no limits on the size of punitive damage awards.[17]

Judges also have enormous influence over asbestos litigation and plaintiffs' lawyers have an incentive to choose jurisdictions where judges and juries are pro-plaintiff. Judges decide when to schedule a particular trial, whether to use the three procedural innovations, whether to admit particular types of evidence in court, and (in some states) whether to instruct the jury to consider punitive damages as well as compensatory damages.   Some judges allow plaintiffs' lawyers to decide which claims to include in consolidated or bouquet trials and allow lawyers to delay announcing plaintiffs' names until shortly before the trial begins. This benefits plaintiffs because defense lawyers may not have time to verify plaintiffs' work histories or disease claims before the trial begins. Some judges also encourage the parties to negotiate mass settlements and may become personally involved in the negotiations. Plaintiffs' lawyers also favor courts located in inaccessible places, because defendants' lawyers must travel to these places for trials, while plaintiffs' lawyers are more likely to live nearby. (See Bell, 2002.)

In asbestos trials, strict liability is applied if the jury determines that the plaintiff was exposed to asbestos and not adequately warned of its dangers. Generally plaintiffs are in a strong position on warnings, because producers knew or should have known of the dangers of asbestos exposure long before they began to put warnings on their products. However plaintiffs often have little evidence showing that they were exposed to particular defendants' asbestos products.

III.   Theoretical Discussion

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[17] Texas law was similarly favorable to plaintiffs, but was changed in 1995 to restrict joinder and limit punitive damages. See "Texas Forum Non Conveniens Law Constitutional, State Supreme Court Rules," *Mealey's Litigation Review: Asbestos,* vol. 14:12, July 16, 1999, and Rothstein (2001).

Because asbestos plaintiffs are unsophisticated and plaintiffs' lawyers represent thousands of cases, plaintiffs' lawyers (rather than plaintiffs) decide on litigation strategy. Plaintiffs' lawyers are assumed to maximize the combined expected return to themselves and plaintiffs, minus the opportunity cost of their time. The combined expected return from going to trial in a particular asbestos lawsuit is $p_p D_p + e_p - wT^1 - R_p + X_p$. Here p_p is the plaintiff's lawyer's prediction of the plaintiff's probability of winning at trial and D_p is the predicted damage award if the plaintiff wins. Both compensatory and punitive damages are included. e_p is the error in the plaintiff's lawyer's predictions. T^1 is the time required for a single-plaintiff trial and w is the opportunity cost of the plaintiff's lawyer's time per unit. R_p is the risk premium that plaintiffs' lawyers are willing to give up to obtain the certainty of settlement rather than face the uncertainty of trial. It depends on the plaintiff's lawyer's degree of risk aversion, the variance of the trial outcome, and the degree of correlation of outcomes across claims. X_p measures the external effect of the particular case on other cases that the same law firm represents. X_p is positive when plaintiffs' lawyers expect the trial outcome to be unusually favorable and when they represent large numbers of other plaintiffs whose claims would be more valuable following the trial.

The defendant's expected cost of going to trial is $p_d D_d + e_d + C_d + R_d + X_d$. Here the d subscripts denote the defendant and most of the terms are analogous to those for the plaintiff. Defendants, unlike plaintiffs, are assumed to be informed and to make their own litigation decisions. C_d is the defendant's legal cost of going to trial. The risk premium R_d is the amount that the defendant is willing to pay to obtain the certainty of settlement. R_d increases as the case poses a bigger threat to the defendant's solvency and ability to avoid bankruptcy. Although bankruptcy limits firms' liability for damages and therefore reduces risk, managers suffer heavy losses if bankruptcy occurs. For defendants, the external effect X_d of the particular case is on the number of future cases filed against them. Settling low damage claims is likely to cause many new claims to be filed, because representing low damage claims is more profitable if they settle. In contrast, settling high damage claims has little effect on the number of future filings,

since representing high damage claims is profitable even if they go to trial. Thus X_d is zero for high damage claims and negative for low damage claims.[18]

A necessary condition for settlement to occur is:

$$p_p D_p + e_p - wT^1 - R_p + X_p \; < \; p_d D_d + e_d + C_d + R_d + X_d \qquad (1)$$

The probability of settlement is assumed to increase as the settlement range, which equals the right hand side minus the left hand side of (1), gets larger.

Now turn to the procedural innovations used in asbestos litigation. Since judges' goal is to save court time by encouraging settlements, we examine how each of the three innovations affect the amount of time spent in trial and the probability of settlement. Also, because our data is for asbestos trials rather than settlements, we examine the effect of the procedural innovations on trial outcomes.

Consolidation. In both state and Federal court, lawsuits that are consolidated must have "common issues of law or fact." Issues that are common across asbestos claims include evidence concerning the harmful effects of asbestos and the causal relationship between exposure to asbestos and development of particular diseases. In addition, consolidations often involve plaintiffs who worked at the same workplace. For these groups, common issues of fact also include evidence concerning the specific asbestos products that the claimants were exposed to, what the defendants knew about the dangers of asbestos and when they knew it (the "state-of-the-art" defense), and whether the defendants provided adequate warning of danger from contact with asbestos products.

Consider first the effect of consolidation on the amount of time required for trial. Suppose the judge could either hold independent trials of N asbestos lawsuits or a single consolidated trial of all N cases. The amount of time required for a consolidated trial of N cases is T^N. A consolidated trial saves court time if $T^N < NT^1$. Why do consolidated cases save court time? One factor is that only a single jury rather than N separate juries must be impaneled.

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[18] This simple model assumes that a single plaintiff bargains with a single defendant. Although the empirical work concerns multiple asbestos claims that may be consolidated for trial, plaintiffs are nearly always represented by a single plaintiffs' law firm. See Spier (2002) for a model in which multiple plaintiffs bargain with a single insolvent defendant, so that there are externalities among the plaintiffs that affect their bargaining strategies. I ignore these effects here. See Wittman (1985) for discussion of the standard model of trial versus settlement.

Second, common issues are presented only once rather than multiple times. Thus judges have an incentive to consolidate multiple asbestos cases for trial in order to save court time.

Now consider how consolidation affects the probability of settlement. Consolidation is likely to make trial outcomes more highly correlated than if the same cases had independent trials. First, the same judge and jury make decisions that apply to all of the plaintiffs and therefore the same decision-making process is applied to all N cases. If the trials were instead independent, then there would be a different jury for each plaintiff, there might be a different judge, and even the same judge might make different decisions across trials. Second, in consolidated trials the evidence for all of the plaintiffs is presented to the jury before it makes any decisions. This means that the evidence is more homogeneous in consolidated trials than in independent trials. These factors tend to increase the degree of positive correlation of outcomes in a consolidated trial.

Suppose two cases have the same observable characteristics but each has an error term. A standard measure of trial risk for both cases is the ratio of the standard deviation of the combined outcomes to the mean of the combined outcomes:

$$(1/2\boldsymbol{m})\sqrt{2\boldsymbol{s}^2(1+\boldsymbol{r})}$$

Here $\boldsymbol{s}^2$ is the combined variance of the outcomes, $\boldsymbol{m}$ is the combined mean outcome, and $\boldsymbol{r}$ is the correlation coefficient. If the two cases have independent trials and the correlation coefficient is zero, then the risk of trial is $(\sqrt{2}/2)(\boldsymbol{s}/\boldsymbol{m}) = .707(\boldsymbol{s}/\boldsymbol{m})$. If the two cases are consolidated for trial but the correlation coefficient remains zero, then the risk of trial is unchanged. Now suppose the cases are consolidated for trial and this raises the correlation of the outcomes, so that $\boldsymbol{r}$ increases from 0 to .5. Then risk rises to $.866(\boldsymbol{s}/\boldsymbol{m})$.[19] Thus if consolidation increases the degree of positive correlation of the outcomes, both risk premiums R_d and R_p are predicted to rise and therefore settlement is more likely to occur. I show below that the average correlation coefficient of the outcomes is higher when cases have consolidated trials than when cases that had independent trials are randomly assigned to groups of the same size.

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[19] This is the standard insurance result that risk per case falls when an insurer writes more policies that are uncorrelated. If n cases are consolidated rather than 2 and the outcomes are independent, then the risk measure increases by a factor of $\sqrt{n}/n$ rather than $\sqrt{2}/2$.

Consolidation also affects the probability of settlement via its effect on legal costs. Consolidation raises defendants' legal costs because individual plaintiffs sue many different defendants and each defendant must be represented at the trial even if it is sued by only one plaintiff. Thus defendants' lawyers have to attend longer trials than they would if the claims were tried independently and this raises the probability of settlement. In contrast, consolidation has relatively little effect on plaintiffs' legal costs, since the same lawyers represent all of the plaintiffs.

Overall these factors suggest that case consolidation reduces trial time and raises the likelihood of settlement. Thus judges with many asbestos cases on their dockets have an incentive to use it.

Now consider how consolidation affects trial outcomes. As discussed above, consolidation changes the information set available to the jury, because juries hear evidence about all of the plaintiffs whose claims are consolidated before they make their decisions for any one plaintiff. One possibility is that juries award more to plaintiffs who are not disabled when they have consolidated trials with other plaintiffs whose disease is more severe, because the jury infers that less severe diseases will inevitably become more severe over time. Also defendants in asbestos trials often appear callous because they failed to label their products as dangerous and this often makes juries more sympathetic to plaintiffs. In consolidated trials, there are more defendants and therefore a higher probability that at least one defendant will appear callous, which benefits all of the plaintiffs. Finally, suppose plaintiffs in a consolidated trial consist of both smokers and non-smokers. Defendants are likely to argue that smokers' disease was caused by smoking rather than asbestos (the "smoking defense"). But in a consolidated trial, the jury can observe that non-smoking plaintiffs have the same disease even though they never smoked, and therefore may infer that asbestos rather than smoking caused the smokers' disease. This could lead the jury to award higher damages to smokers in consolidated trials. These examples suggest that outcomes are likely to be more favorable to plaintiffs in consolidated trials than independent trials.[20]

Bifurcation.[21] Judges can choose among straight bifurcation, reverse bifurcation, or no bifurcation. In straight (reverse) bifurcation, the jury decides liability (damages) in the first phase of the trial. Then the trial is suspended while settlement bargaining takes place. If the

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[20] However additional information in theory could cause outcomes to change in either direction. See Selwin and Picus (1987) for a description of an asbestos trial that illustrates the smoker scenario.

[21] See Landes (1993) for a model of bifurcated trials.

parties do not settle, then the same jury decides damages (liability) in the second phase of the trial. Punitive damages may be decided as part of either phase or may be put off to a separate phase three. In litigation generally, straight bifurcation is more common than reverse bifurcation, because defendants win about half of all cases and straight bifurcation saves the court time required for the damages phase of the trial when plaintiffs win. However in asbestos trials, reverse bifurcation is more common. Judges may use reverse bifurcation because defendants' probability of winning is lower in asbestos cases than in litigation generally, so that the gain from resolving liability is smaller. Also damages are more uncertain than liability, so that deciding damages reduces uncertainty by more than deciding liability and therefore has a bigger impact on the probability of settlement. (See below for data.) In the discussion below, I consider only the comparison of reverse bifurcation versus no bifurcation.

Suppose a consolidated trial of N cases may use reverse bifurcation. Phases one and two of a reverse bifurcated trial are assumed to take T_1^N and T_2^N days of trial time, respectively. Assume that total trial time for both phases of a reverse bifurcated trial is greater than that for a non-bifurcated trial of N cases, or $T_1^N + T_2^N > T^N$. Expected trial time for a reverse bifurcated trial is $T_1^N + (1 - s_{rb})T_2^N$, where s_{rb} is the probability of settlement following phase one. Judges choose reverse bifurcation over no bifurcation if expected trial time is lower when the trial is reverse bifurcated, or:

$$T_1^N + (1 - s_{rb})T_2^N \leq T^N \qquad (3)$$

I argued above that the probability of settlement is higher when more cases are consolidated, so that s_{rb} increases as N rises. In addition, T^N increases faster than T_1^N as N rises, so that the magnitude of the difference between the left and right hand sides of (3) increases as N rises. These considerations suggest that judges are more likely to use reverse bifurcation as more cases are consolidated for trial.

Suppose we compare the probability of settlement following phase one of a reverse bifurcated trial versus before the trial begins. Resolving damages increases the probability of settlement by resolving the two sides' disagreement over D, which is likely to be their main source of disagreement. Although the remaining legal costs of trial are lower after phase one of the trial and this reduces the probability of settlement, the former effect is likely to more than

outweigh the latter. This suggests that if settlement has not occurred by the time the trial begins, judges will find it attractive to use reverse bifurcation, because part of the time required for a full trial can still be saved if the parties settle after the first phase.

Now consider the effects of reverse bifurcation on the outcome of trial. Studies of other types of litigation suggest that juries' decisions concerning damages often reflect a mixture of evidence concerning both damage and liability (see Wittman, 1986, and White, 1992). Thus reverse bifurcation may affect trial outcomes by eliminating part of the evidence that juries would otherwise consider in making their damage decisions. In asbestos trials, the evidence concerning damage is often strongly in the plaintiff's favor (because the plaintiff has a disease that is only caused by asbestos), while the evidence concerning liability is often weak (because the plaintiff cannot show that s/he was exposed to particular asbestos products). If the jury had both types of evidence, then it might decide that the plaintiff's damages amount to, say, $500,000, but because jury members disagree on whether to find the defendant liable, the jury might award damages of only $250,000. However in a reverse bifurcated trial, the jury does not hear evidence concerning liability during phase one, so that in the example it would award damages of $500,000 rather than $250,000. Although juries might compensate for higher damage awards by finding defendants not liable more frequently in phase two, this will not be observed if the parties settle following phase one. This suggests that trials that use reverse bifurcation are likely to have higher damage awards than non-bifurcated trials.

"Bouquet" trials. In a bouquet trial, a small group of S cases is selected to be tried together from a large group of size N. Following the trial, the judge directs the parties to negotiate a mass settlement of the remaining $N - S$ cases, based on the outcomes in the bouquet trial. The alternative to a bouquet trial is a single consolidated trial. For simplicity, I assume that the bouquet trial is not bifurcated, although reverse bifurcation and bouquet trials may be combined.

Do bouquet trials save trial time? Suppose the probability of settlement following a bouquet trial of S cases is s_b, the time required for the bouquet trial is T^S, and the time required to try the remaining N - S cases is T^{N-S}. The cost in trial time of a consolidated trial is T^N and the expected cost in trial time of a bouquet trial is $T^S + (1 - s_b)T^{N-S}$, where s_b is the probability of settling the large group of N-S cases after the bouquet trial. Bouquet trials save trial time over consolidated trials if:

$$T^{S} + (1 - s_b)T^{N-S} \leq T^{N}. \qquad (4)$$

Bouquet trials become more attractive as N increases, because consolidated trials are subject to diseconomies of scale as the number of cases increases.[22] As N increases, T^{S} remains the same, but T^{N-S} and T^{N} both increase, so that condition (4) is satisfied at lower levels of s_b. This suggests that judges' incentive to use bouquet trials increases as the number of asbestos cases on their dockets rises. In effect, using a bouquet trial allows the judge to get the time savings from a consolidated trial, even when the number of cases is so large that a consolidated trial would be impractical.

Now consider how the probability of settlement differs when the parties negotiate over settling N - S cases following a bouquet trial of S cases versus when they negotiate over settling N cases without a bouquet trial. Because judges often continue to use the same jury for additional cases in the large group if the parties do not settle the small group, the bouquet trial reduces the differences between p_p versus p_d and between D_p versus D_d for cases in the large group and it also signals that the outcomes of the large group will be highly correlated with the outcomes of the small group. Both effects make settlement more likely.

Finally, consider how bouquet trials affect damage awards. Because judges have considerable control over the size of damage awards and are assumed to want the parties to settle, consider whether high versus low damage awards in the bouquet trial are more likely to lead to a mass settlement of the large group. In the standard trial versus settlement model given in eq. (1) above, higher predicted damage awards increase the likelihood of trial rather than settlement occurring. However higher damage awards in the bouquet trial context are likely to have the opposite effect, because they threaten the defendant firms' solvency and therefore raise defendants' risk premium, R_d. For example in the Mississippi bouquet trial discussed above, damage awards in the small group were $4,000,000 per plaintiff and the large group contained 1738 plaintiffs. Thus if the large group were tried before the same judge and jury, a possible outcome was that total damages as high as ($4,000,000)(1,738) = $7 billion could be awarded. Even paying a small fraction of this figure could exhaust the insurance coverage and threaten the

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[22] As N gets large, jury members tend to forget the evidence and few jurors are willing to serve.

solvency of many defendants and they therefore were willing to pay high amounts to settle.[23] On the other side, if damage awards in bouquet trials are low, then defendants prefer to avoid settling because of concern that settling will encourage plaintiffs' lawyers to file additional claims, i.e., X_d is low or negative. Thus judges gain when bouquet trials result in high damage awards, because the parties are more likely to agree to a mass settlement following the trial.

These results suggest that judges have an incentive to use the three procedural innovations because they save trial time and increase the probability of settlements. But the innovations are also predicted to improve trial outcomes for plaintiffs.

IV. Data and summary statistics

The dataset consists of all asbestos trials reported in *Andrew's Asbestos Litigation Reporter* or *Mealey's Litigation Reporter: Asbestos* from mid-1987 to mid-2002.[24] Trials are included in the dataset as long as the judge or jury reached a decision on either liability or damages. Regardless of whether trials were individual or consolidated, each plaintiff is a separate observation. There are about 5,500 observations.

Variables that are plaintiff-specific include the plaintiff's alleged disease, whether the plaintiff died before trial, whether the plaintiff smoked, the number of defendants that each plaintiff sues, a dummy variable that equals one if the plaintiff's claim was consolidated for trial with one or more additional plaintiffs whose disease was more severe, and the outcome of the trial. Variables that are trial-specific include the date of the trial, the state in which the trial occurred, whether the trial was in state or Federal court, the number of claims consolidated, whether the trial was bifurcated or reverse bifurcated, and whether it was a bouquet trial.

Summary statistics are given in Table 1. More than one-quarter of all trials occur in Pennsylvania, because large numbers of workers were exposed to asbestos at Philadelphia-area naval shipyards. Other states with large numbers of trials include New York, Texas, California, and West Virginia. Surprisingly, Mississippi has only one-half of one percent of trials, although

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[23] If high damages are awarded, then even if defendants are confident that they would be overturned on appeal, defendants cannot appeal without posting a bond equal to the amount of the damage award, which they often cannot do without violating loan covenants. Priest (1997) has argued that large class actions hurt defendants by threatening their solvency and therefore forcing them to settle rather than go to trial.

[24] Pre-1990 data are taken from *Andrew's* and more recent data from *Mealey's*.

it is reported to have 20% of asbestos lawsuits (see Parloff, 2002). About one-tenth of asbestos trials occur in Federal court, with the rest in state courts.

Diseases are divided into four levels of increasing severity: pleural plaque (13% of trials), asbestosis (42%), lung and other cancers (12%), and mesothelioma (16%). The remaining 16% of plaintiffs have missing disease data—most of them were in large consolidated trials.[25] About 10% of individual plaintiffs are identified as smokers. Smoking is identified only when the defendant used smoking as a legal defense at trial and this occurs mainly in lung cancer cases: about 42% of plaintiffs with lung cancer are identified as smokers, compared to only 7% of other plaintiffs. Because virtually all plaintiffs are male, no sex variable is used. The average age of plaintiffs who were alive at the time of trial was 63. About 13% of plaintiffs died before their trials.

Turning to the procedural variables, about 24% of plaintiffs had single-plaintiff trials, while the remainder had consolidated trials of two or more plaintiffs. 34% of consolidated trials involved 2 through 7 plaintiffs, with the distribution fairly uniform over this range. The remaining 42% of trials involved 8 or more plaintiffs, of which the largest consolidation in the dataset involved 328 claims. About 16% of plaintiffs had bifurcated or reverse bifurcated trials (most were reverse bifurcated) and 0.6% had bouquet trials.[26] One-third of plaintiffs in consolidated trials were combined with at least one plaintiff who had a higher-level disease. As discussed in the theoretical section, plaintiffs who have consolidated trials are also more likely to have bifurcated trials: the overall correlation between bifurcated trials and consolidated trials is .19 and the correlation between bifurcated trials and consolidated trials of eight or more plaintiffs is .35. But the correlation between bouquet trials and bifurcated trials is small.

Half of all claims involve a single defendant, 14% involve two defendants, 12% involve three defendants, and about 23% involve four or more. Most plaintiffs originally sue many more

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[25] Note that 28% of all asbestos trials involve plaintiffs who claim to have some type of cancer, compared to only 11% of all asbestos claims. See Carroll et al (2002), p. 64, for data on asbestos claims.

[26] The bifurcated trial variable equals one if the *Reporter* identified the trial as bifurcated or reverse bifurcated. The bouquet trial variable equals one if the *Reporter* article or another news article identified the trial as such (not necessarily using this term). The number of bouquet trials in the dataset is small because they are rarely appealed and therefore are rarely mentioned in *Reporter* articles. The coefficients of the bouquet trial variable could be biased upward if the only bouquet trials that are identified are those with high damage awards. An early bouquet trial that occurred in Texas in 1990 (the *Cimino* trial) is excluded because it was quite different from later bouquet trials.

defendants, but defendants are only counted if they did not settle by the time the jury decided on a verdict.[27]

The outcome variables are given at the bottom of table 1. Plaintiffs win 69% of asbestos trials—a high figure compared to most types of litigation.[28] The average compensatory damage award, conditional on damages being positive, is $804,000 (all dollar figures are in 1987 dollars).[29] Conditional on the defendant being found liable, plaintiffs' probability of being awarded punitive damages is 35%, which is much higher than the figure of 6% reported by Eisenberg et al (1997) for general litigation. The average punitive damage award, conditional on punitive damages being positive, is $1.12 million. The expected return from going to trial, including both types of damage, is $636,000.

In the theoretical section, I discussed how reverse bifurcation reduces expected trial time, because resolving damages increases the probability of settlement by more than resolving liability. Table 2 gives the risk of damage versus the risk of liability, as measured for both by the ratio of the standard deviation to the mean. The risk of liability for compensatory damages is .66, which is much lower than the risk of compensatory damages themselves of 2.8. Similarly, the risk of liability for punitive damages is 1.75, while the risk of punitive damages themselves is 6.7. Table 2 also shows that the correlation of liability for compensatory versus punitive damages is .41, while the correlation of the two types of damages is only .17. (The latter figure is for all trials; damages are set equal to zero if no damages were awarded.)

Now turn to whether consolidating claims for trial makes trials more risky by increasing the degree of correlation of the outcomes. To answer this question for two-plaintiff trials, I first compute the correlation coefficient of the outcomes of all two-plaintiff trials. Then as a comparison, I randomly assign all single-plaintiff trials in pairs and compute the correlation coefficient of the outcomes for the random pairs. The correlation coefficient for the actual

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[27] Typically, plaintiffs sue all producers of asbestos-containing products that they were exposed to during their working lives, except those that have gone bankrupt. They rarely sue their employers, because the workers' compensation system limits employers' liability. See Brodeur (1985) for discussion of plaintiffs' lawyers' early attempts to sue employers under workers' compensation.

[28] Plaintiffs are coded as winning if any of the defendants was found liable. The damage award is the total for all defendants who are found liable. States vary in whether they apply joint and several liability to damage awards (meaning that all defendants who are found liable are responsible for up to the entire damage award) or whether the jury divides the damage award among the defendants. See Chang and Sigman (2000) for discussion of joint and several liability.

[29] Note that defendants do not necessarily pay the damage awards listed here, since it may be reduced ("remitted") by the trial judge and/or reduced or reversed on appeal. Also defendants may file for bankruptcy following the award. On the other hand, pre-judgment interest is added to damage awards and it is often high in asbestos cases.

consolidated trials is predicted to be higher than the correlation coefficient for the random pairs. However, a problem with the randomization procedure is that plaintiffs who had single-plaintiff trials could never have been paired with plaintiffs whose trials occurred in other states. Therefore before assigning the single-plaintiff trials in pairs, I first estimate probit (tobit) regressions explaining whether plaintiffs win (the damage award) as a function of a set of dummy variables for states that either had large numbers of trials or are particularly pro-plaintiff or pro-defendant. From the regression results I compute predicted values for the outcome variable and then use the predicted values to compute the correlation coefficient for the random pairs. The analogous procedure is followed for three-plaintiff consolidated trials, etc.[30]

Results are shown in table 3 separately for each of the outcome variables. The first entry in the table shows that the actual correlation coefficient of liability in two-plaintiff consolidations is .71, compared to only .37 in single-plaintiff trials that were randomly paired. For compensatory damages, the figures are .76 versus .31 and, for expected total damages, they are .90 versus .35. These results support the hypothesis that consolidating cases for trial causes the outcomes to become more highly correlated. Consolidation therefore increases the probability of settlement by making trials more risky. The results for larger consolidations show that the correlation coefficient for expected total damages increases from .90 to .97 as the number of consolidated claims rises from two to seven. But the correlation coefficient falls to .60 for consolidations of eight plaintiffs or more.

Table 4 gives information on how trial outcomes have varied over time. The number of trials was higher in the earlier years of the sample than in the later years. The probability of plaintiffs winning has remained fairly constant over time, but real damage awards--compensatory and punitive--have risen sharply.

V. Empirical Results

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[30] For consolidations of three or more, the reported correlation coefficient is the average value of the off-diagonal terms in the correlation matrix. The state dummy variables used in the regressions are the same as those reported in tables 5 and 6 below, plus Illinois and Maryland. Adding disease and smoking variables to the regressions used to correct for state did not change the results in table 3.

The left hand column of table 5 gives the results of a probit regression explaining whether plaintiffs won.[31] The figures are marginal effects, with robust standard errors clustered by trial in parentheses. Asterisks indicate statistical significance at the 95% level.

Turn first to the effects of the procedural innovations. When two or three plaintiffs' claims are consolidated for trial, plaintiffs' probability of winning rises by 15 percentage points compared to single-plaintiff trials and, when four or five plaintiffs' claims are consolidated, plaintiffs' probability of winning rises by 11 percentage points. Both effects are highly significant. These results suggest that small consolidations give plaintiffs an important advantage in litigation. Larger consolidations have a positive effect on plaintiffs' probability of winning, but they are not statistically significant. When trials are bifurcated or reverse bifurcated, plaintiffs' probability of winning rises by 29 percentage points and, in a bouquet trial, plaintiffs' probability of winning rises by 21 percentage points. Both effects are statistically significant. Thus bifurcated and bouquet trials give plaintiffs a substantial advantage.

The regression includes dummy variables for seven states that either have many asbestos trials or are particularly pro-plaintiff or pro-defendant (the excluded group consists of all other states). The results show that three states are particularly pro-plaintiff: plaintiffs' probability of winning is 28, 16 and 14 percentage points higher in West Virginia, Mississippi, and Texas than in the excluded states, respectively. Not surprisingly, all three states have attracted substantial numbers of asbestos filings. In contrast, plaintiffs are 6 percentage points less likely to win in Pennsylvania than in the excluded states.[32] These results suggest that plaintiffs' lawyers get high returns from concentrating their filings of asbestos claims in pro-plaintiff states. Cases tried in Federal court are not significantly more likely to lead to verdicts favoring plaintiffs than those tried in state courts.

Now turn to the disease and smoking variables. The excluded disease category is pleural plaque and the excluded smoking category is non-smoker. Because of the close relationship between lung cancer and smoking, these variables are entered separately and also interacted. Plaintiffs who have mesothelioma are 13 percentage points more likely to win than those who have pleural disease, while plaintiffs who have lung cancer and also smoke are 20 percentage

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[31] Note that the disease variables are both severity measures and indicators of liability, since certain diseases are uniquely associated with asbestos exposure.

[32] The percent of asbestos filings in Texas, Mississippi and West Virginia rose from 7% in 1970-87 to 38% in 1994-97; while the percent of filings in Pennsylvania declined from 17% to 3% during the same period. See Carroll et al (2002), p. 32. Adding additional state dummies to the probit model did not change the results.

points less likely to win. Both effects are statistically significant. Presumably the negative effect of lung cancer and smoking together reflects juries' difficulty in deciding whether asbestos exposure or smoking caused the disease. However smoking by itself increases plaintiffs' probability of winning by 13 percentage points and the effect is statistically significant. The positive effect of smoking probably occurs because smokers on average are sicker than non-smokers.[33] A surprising result is that having a consolidated trial with a plaintiff whose disease is in a higher category reduces rather than increases plaintiffs' probability of winning, by 6 percentage points. This suggests that consolidation with other plaintiffs who have a more severe disease does not benefit plaintiffs who have a less severe disease. However consolidation with other plaintiffs who have the same disease but are more disabled may still benefit plaintiffs. However the data do not allow us to test this latter effect.

The last set of variables examines whether having multiple defendants at trial affects plaintiffs' probability of winning. When there are two defendants rather than one, plaintiffs' probability of winning rises by 7 percentage points, but when there are four or more defendants, plaintiffs' probability of winning falls by 6 percentage points. Both effects are statistically significant. Thus multiple defendants have a mixed effect on trial outcomes.

The second and third columns of table 5 give the results of a Tobit regression explaining compensatory damages. The sample is all cases in which damages were decided, so that damages are truncated at zero when the plaintiff lost. Coefficients and robust standard errors clustered by trial are given in column two and marginal effects are given in column three. Figures are in thousands of 1987 dollars.

The results show that consolidated trials have mixed effects on damage levels. Plaintiffs in consolidated trials of up to five claims received between $90,000 and $137,000 more, while plaintiffs in larger consolidations of eight or more claims received $173,000 less. Only the latter effect is statistically significant. However bifurcated trials and bouquet trials both have large positive effects on damage levels: the marginal effects are $628,000 and $2,410,000, respectively, and both are statistically significant. The large positive effects of bifurcated and bouquet trials on damages may reflect judges favoring plaintiffs in their conduct of these trials in order to increase the likelihood that settlement negotiations will succeed.

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[33] When the regression was re-run with an interaction term between smoking and the number of cases consolidated, the interaction term was not significant.

The state dummy variables show that the same states that are particularly pro-plaintiff on liability are also pro-plaintiff on damages. Plaintiffs in Mississippi, West Virginia and Texas received $1.6 million, $467,000, and $394,000 more in compensatory damages than plaintiffs in the excluded states, respectively. Plaintiffs also received $751,000 more in New York and $187,000 less in Pennsylvania than in the excluded states. These results again suggest that plaintiffs' lawyers gain substantially from choosing to litigate in favorable jurisdictions. Plaintiffs also received significantly higher damage awards if they have mesothelioma or other types of cancer, rather than pleural plaque, and if they are smokers. As in the regression explaining whether plaintiffs win, this is probably because smokers are sicker than other plaintiffs.

Having two defendants at trial rather than one raises the damage award by $219,000 and the effect is significant at the 5% level. However damage awards are not significantly different when there are three or more defendants rather than one. These results suggest that juries tend to award higher damages when the costs are shared among a small number of defendants.

Table 6, column 1, reports a probit model explaining whether plaintiffs receive punitive damages. The sample consists all trials in which at least one defendant was found liable for compensatory damages. Turning to the procedural innovations, the largest effect is that of bifurcated trials, which are associated with an increase of 54 percentage points in plaintiffs' probability of winning punitive damages. Plaintiffs are also 6 to 18 percentage points more likely to receive punitive damages when trials are consolidated, although the results are only borderline significant (the 2-3 case consolidation variable has a p value of .085 and the 6-7 case consolidation variables has a p value of .073). Thus when juries award punitive damages to any plaintiff in a consolidated trial, they are more likely to award punitive damages to the other plaintiffs in the consolidated trial as well. However, plaintiffs in bouquet trials are 28 percentage points less likely to receive punitive damages. This is probably because bouquet trials usually settle before the punitive damage phase of the trial.

The same states that are pro-plaintiff on compensatory damages are also much more likely to award punitive damages: plaintiffs in Mississippi, Texas, and West Virginia are 36 to 51 percentage points more likely to receive punitive damages than plaintiffs in the excluded states. In contrast, plaintiffs in Pennsylvania are 42 percentage points *less* likely to be awarded punitive damages than plaintiffs in the excluded states. Plaintiffs with severe diseases are also much

more likely to receive punitive damages. Those with mesothelioma, lung cancer (for non-smokers), and other cancer are 17, 26, and 28 percentage points more likely to receive punitive damages and all of these effects are significant. However plaintiffs are 20 percentage points less likely to receive punitive damages if they have lung cancer and also smoked. Finally, plaintiffs are significantly less likely to receive punitive damages when there are more than four defendants at trial. This may reflect the fact that juries must impose the punitive damage award on a particular defendant and they may it difficult to pick out a particular defendant when they all engaged in similar behavior.

The second and third columns of table 6 give the results of a Tobit model explaining the level of punitive damages. The sample is all plaintiffs who received compensatory damages; punitive damages are truncated at zero if none were awarded. The results show that plaintiffs in consolidated trials do not receive significantly different punitive damage awards than plaintiffs in independent trials. Plaintiffs in bifurcated and bouquet trials receive less in punitive damages, but the effects are not statistically significant. Thus none of the procedural innovations have significant effects on the size of punitive damage awards. The fact that bifurcated and bouquet trials tend to have lower punitive damages may reflect the fact that these trials are more likely to settle before they reach the punitive damages stage, i.e., judges are generally successful in their efforts to obtain mass settlements before the trials are completed.

Punitive damages are significantly higher in the same three pro-plaintiff states: awards were $397,000 to $570,000 higher in Texas, West Virginia and Mississippi than in the omitted states. Also, plaintiffs in Pennsylvania receive significantly lower punitive damages than plaintiffs in the omitted states. None of the disease or smoking variables are statistically significant in explaining the size of punitive damage awards.

Taking the results in tables 5 and 6 together, the models explaining whether damages are awarded consistently fit better than the models explaining the level of damages. For compensatory damages, the R^2 value is .19 for whether damages are awarded, compared to only .01 for the level of damages. For punitive damages, the values are .50 versus .03. These results are in accord with Sunstein et al's (2002) experiments in which mock juries hear legal cases and decide on both types of damages. They found that for both types of damages, juries make fairly predictable decisions concerning whether or not to award damages, but erratic and unpredictable decisions concerning the dollar amounts of damages.

Finally, table 7 combines the results from tables 5 and 6 to compute the effect of the procedural variables and other selected variables on plaintiffs' expected return from trial.[34] The main result of the paper is that procedural innovations have very large effects on trial outcomes. In particular, plaintiffs in bifurcated and bouquet trials on average receive $1.2 million more than plaintiffs in non-bifurcated and non-bouquet trials, which nearly triples their expected return from trial. Those in bifurcated trials receive higher awards of both compensatory and punitive damages, while those in bouquet trials receive higher compensatory damages but lower punitive damages. Plaintiffs in consolidated trials of up to seven plaintiffs receive between $200,000 and $305,000 more than plaintiffs in independent trials, but plaintiffs in large consolidated trials of eight or more plaintiffs receive slightly less. The fact that large consolidations appear to have a different effect on trial outcomes than small consolidations may be due to the fact that large consolidations often have missing disease information. Plaintiffs in the three most pro-plaintiff states of Mississippi, West Virginia and Texas receive $2.1 million, $1.3 million, and $1 million more than plaintiffs in the excluded states, respectively. Thus it is not surprising that all three of these states have become centers for asbestos litigation.

VI. Conclusion

Judges in courts with many asbestos claims encourage plaintiffs and defendants to agree to mass settlements and I argue that this has made the asbestos crisis worse. The mechanism works in the following way. Because of the large numbers of claims filed in particular courts, judges in these courts adopt procedural innovations that are intended to reduce trial time and encourage large numbers of cases to settle. But judges' leverage to encourage mass settlements of asbestos claims is higher when trial outcomes favor plaintiffs rather than defendants and, as a result, judges tend to adopt procedural innovations that are pro-plaintiff. But when large numbers of asbestos claims are settled on favorable terms for plaintiffs, then plaintiffs' lawyers find it extremely profitable to file additional claims in the same courts. Because of the nature of asbestos exposure, the class of potential plaintiffs and defendants is virtually unlimited and, as a result, the asbestos mass tort keeps growing.

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[34] The increase in expected damage is $(dp)D + (dD)p$, where p and D are the mean values of the probability of damages and the damage level and dp and dD are the marginal effects taken from table 5. The same procedure is applied separately to compensatory and punitive damages.

In the paper, I use a new dataset of asbestos trials from 1987-2002 to test the hypothesis that procedural innovations commonly used in asbestos trials favor plaintiffs. I find that in bifurcated or bouquet trials, plaintiffs' expected gain from trial increases by $1.2 million, or by nearly 200%, compared to their expected gain in non-bifurcated and non-bouquet trials. Also in consolidated trials of up to seven plaintiffs, plaintiffs receive between $200,000 and $305,000 more, an increase in their expected return of 31 to 48 percent. These figures include both compensatory and punitive damages. Thus the procedural innovations substantially increase plaintiffs' lawyers' incentives to file additional asbestos claims. Finally in the three most pro-plaintiff states of Mississippi, West Virginia and Texas, the expected return from trial increases by one to two million dollars compared to the other states. Thus it is not surprising that all three of these states have become centers for asbestos litigation.

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	Mean	Std. Dev.
State in which trial occurred		
Pennsylvania	.272	.445
Texas	.141	.348
New York	.130	.336
California	.102	.302
West Virginia	.081	.272
New Jersey	.056	.231
Mississippi	.006	.078
If Federal court	.10	.302
Number of cases consolidated for trial		
1 (individual trials)	.235	.424
2-3	.113	.317
4-5	.129	.335
6-7	.101	.302
8 or more (max = 328)	.422	.493
If bifurcated trial	.163	.370
If bouquet trial	.006	.075
Disease		
Mesothelioma	.159	.365
Lung cancer	.105	.307
Other cancer	.017	.128
Asbestosis	.416	.493
Pleural plaque	.131	.338
Disease missing	.164	.370
Number of disease levels (if consolidated trial)	1.99	.977
If higher disease at trial (if consolidated trial)	.329	.470
Demographic variables		
Years of exposure	23.3	12.6
Age at trial (if alive)	63	10.0
If died before trial	.131	.337
If plaintiff smokes	.104	.305
Number of defendants at trial		
1	.510	.500
2	.142	.349
3	.120	.325
4 or more	.228	.420
Outcome variables		
If defendant found liable	.693	.461
Compensatory damages (if positive)	$804,000	$1,740,000
If punitive damages (if def. found liable)	.353	.480
Punitive damages (if positive)	$1,120,000	$2,530,000
Expected total damages	$636,000	$1,780,000

Table 2:
Relative Risk of Liability versus Damages

	Compensatory Damages	Punitive Damages
Risk of defendant being found liable for:	.66	1.75
Risk of damages:	2.8	6.7
Risk of damages (if compensatory damages > 0)	2.2	2.3
Risk of expected total damages:	2.8	
Correlation of the probabilities of winning compensatory versus punitive damages	.405	
Correlation of compensatory and punitive damages	.166	

Note: The figures in the first four lines are the standard deviation divided by the mean. Unless otherwise noted, figures are based on all trials.

Table 3:
Correlation Coefficients of Outcomes in
Consolidated Trials versus Random Groups of Single-Plaintiff Trials

Number of cases per trial	Actual versus random	If compensatory damages awarded	Compensatory damages	If punitive damages awarded	Punitive damages	Expected total damages
2	Actual	.71	.76	.87	.98	.90
	Random	.37	.31	.29	.33	.35
3	Actual	.68	.60	.93	.996	.92
	Random	.28	.34	.29	.30	.38
4 or 5	Actual	.65	.96	.86	.96	.88
	Random	.31	.40	.20	.23	.34
6 or 7	Actual	.65	.98	.91	.63	.97
	Random	.30	.43	.17	.43	.43
8 or more	Actual	.68	.52	.89	.87	.60
	Random	.35	.335	.18	.25	.25

Notes: The correlation coefficient equals the average value of the off-diagonal terms in the correlation matrix. For trials of 4 or 5 plaintiffs, only the values for the first four plaintiffs are used in the calculations when there are five claims. The same procedure is followed for consolidations of 6-7 and 8 or more. Expected total damages = max[Compensatory Damages,0] + max[Punitive Damages,0].

Table 4:
Variation in Number of Trials and Damage Awards over Time

(Dollar figures in thousands of 1987 dollars.)

	Proportion of Trials	Prob. of Plaintiff Winning	Compensatory damages (if positive)	Prob. of Punitive Damages (if def. liable)	Punitive damages (if positive)
1987-88	.021	.68	$543	.30	$496
1989	.105	.88	725	.71	622
1990	.149	.69	412	.25	552
1991	.213	.82	608	.59	732
1992	.074	.70	461	.16	1,323
1993	.100	.47	548	.35	342
1994	.087	.55	690	.14	2,319
1995	.061	.56	922	.14	1,103
1996	.041	.63	1,056	.24	1,132
1997	.037	.65	857	.33	2,001
1998	.031	.66	1,275	.28	3,077
1999	.020	.73	1,504	.15	1,772
2000	.025	.65	1,414	.25	1,875
2001-02 (part)	.036	.62	3,500	.27	2,717

Table 5:
Results Explaining Whether Plaintiffs Win and Compensatory Damages

	If Plaintiffs Win	Compensatory Damages ($000)	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-3 case consolidation	.155 (.022)*	140 (109)	90
4-5 case consolidation	.114 (.026)*	213 (154)	137
6-7 case consolidation	.036 (.039)	21.9 (191)	14
>= 8 case consolidation	.054 (.036)	-269 (140)*	-173
Bifurcated trial	.290 (.022)*	977 (141)*	628
Bouquet trial	.213 (.038)*	3,750 (1610)*	2,410
State			
Mississippi	.160 (.057)*	2,550 (1,460)	1,640
West Virginia	.278 (.021)*	726 (209)*	467
Texas	.140 (.033)*	614 (165)*	394
Pennsylvania	-.058 (.034)	-292 (120)*	-187
New York	.086 (.043)	1,170 (262)*	751
California	.024 (.042)	21.5 (151)	14
New Jersey	.100 (.036)*	-246 (129)*	-158
If Federal court	-.014 (.049)	-98.5 (161)	-63
Disease and smoking			
Mesothelioma	.130 (.032)*	1,190 (159)*	763
Lung cancer (smoker)	-.196 (.077)*	-307 (210)	-197
Lung cancer (non-smoker)	-.039 (.049)	71.2 (182)	45
Other cancer	-.093 (.070)	583 (310)	374
Asbestosis	-.062 (.033)*	-102 (95.5)	-65
Disease missing	-.014 (.070)	-730 (270)*	-468
If plaintiff dead	-.018 (.025)	-49.2 (121)	-32
If plaintiff smokes	.130 (.028)*	203 (103)*	130
Higher disease level at trial	-.064 (.034)*	-171 (121)	
Number of defendants			
2	.069 (.027)*	340 (105)*	219
3	-.026 (.040)	177 (164)	114
4 or more	-.058 (.033)*	19.6 (147)	13
Constant		-116 (243)	
Year variables	Included	Included	
Pseudo R^2	.1920	.0147	
Number of obs.	5008	4692	
Number of censored observations		1678	

Note: the pseudo R^2 value for the tobit regression is calculated without clustering the error terms.

Table 6
Results Explaining Whether Plaintiffs Receive Punitive Damages and Amount

	If Plaintiffs Win Punitive Damages	Punitive Damages ($000)	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-3 case consolidation	.109 (.065)	234 (570)	42
4-5 case consolidation	.062 (.075)	-533 (569)	-95
6-7 case consolidation	.181 (.105)	189 (716)	34
>=8 case consolidation	.084 (.082)	-876 (639)	-157
Bifurcated trial	.542 (.111)*	-1,560 (1,450)	-279
Bouquet trial	-.277 (.108)	-2,910 (2,890)	-523
State			
Mississippi	.510 (.209)*	3,170 (1,850)	570
West Virginia	.498 (.122)*	2,210 (952)*	397
Texas	.362 (.073)*	2,650 (558)*	477
Pennsylvania	-.424 (.041)*	-5,760 (1,120)*	-1,036
New York	-.067 (.094)	-172 (982)	-31
California	.072 (.079)	-1,220 (693)	-219
New Jersey	.045 (.114)	-1,950 (874)*	-350
If Federal court	-.265 (.061)*	-1,190 (735)	-350
Disease and smoking			
Mesothelioma	.172 (.089)*	634 (593)	114
Lung cancer (smoker)	-.201 (.064)*	-624 (956)	-112
Lung cancer (non-smoker)	.256 (.087)*	679 (713)	122
Other cancer	.282 (.134)*	1,640 (1,190)	293
Asbestosis	.095 (.065)	347 (482)	62
Disease missing	.614 (.087)*	1,390 (1,240)	250
If plaintiff dead	-.005 (.043)	-96.5 (447)	-17
If plaintiff smokes	.011 (.083)	-369 (601)	-66
Higher disease level at trial	-.031 (.066)	-949 (501)	
Number of defendants			
2	-.035 (.054)	-28.6 (456)	-5.1
3	-.002 (.081)	-245 (600)	-44
4 or more	-.226 (.078)*	-1,210 (736)	-217
Constant		-2,530 (1,380)	
Year variables	Included	Included	
R^2 **or pseudo** R^2	.512	.0296	
Number of observations	3471	2597	
Number of censored observations		2130	

Note: the pseudo R^2 value for the tobit regression is calculated without clustering the error terms.

Table 7
Predicted Changes in the Expected Return from Trial
(000$)

	Compensatory Damages	Punitive Damages	Total Damages	Change in Expected Return:
Procedural innovations				
2-3 case consolidation	$142	$63	$305	48%
4-5 case consolidation	$154	$46	$200	31%
6-7 case consolidation	$28	$256	$284	45%
>=8 case consolidation	-$92	$51	-$41	-6.5%
Bifurcated trial	$585	$617	$1,200	188%
Bouquet trial	$1,780	-$574	$1,210	189%
State				
Mississippi	$1,220	$907	$2,130	334%
West Virginia	$467	$823	$1,290	203%
Texas	$325	$672	$1,020	160%
Pennsylvania	-$160	-$974	-$1,130	-178%
New York	$564	-$102	$463	73%
If Federal court	-$51	-$439	-$503	-79%
Disease and smoking				
Mesothelioma	$596	$334	$988	155%
Lung cancer (smoker)	-$237	-$317	-$543	-85%
Lung cancer (non-smoker)	$11	$431	$476	75%
Other cancer	$211	$534	$792	125%
Disease missing	-$332	$921	$589	93%
If plaintiff smokes	$157	-$7.7	$146	23%