Asbestos Litigation: Procedural Innovations and Forum-Shopping

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Abstract

This paper examines how forum-shopping and procedural innovations affect the outcomes of asbestos trials, using a new dataset of all asbestos trials from 1987 to 2003. When lawsuits are filed in six particularly favorable jurisdictions, plaintiffs' expected returns from trial are found to increase by $800,000 to nearly $4 million. The procedural innovations are bifurcated trials, bouquet trials, and consolidation of multiple plaintiffs' claims for trial. Bifurcated and bouquet trials are found to increase plaintiffs' expected returns from trial by $650,000 and $1.2 million, respectively. Small consolidations are found to increase plaintiffs' probabilities of winning and receiving punitive damages, but larger consolidations are associated with lower damage awards.

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I. INTRODUCTION

At least twenty-seven million people in the U.S. were exposed to asbestos, which causes a variety of diseases ranging from mild to fatal.[2] As of the end of 2002, 730,000 individuals had filed claims for damage from asbestos exposure and 8,400 firms had been sued.[3] Because individual plaintiffs typically file claims against more than one defendant, as many as ten million claims may have been filed. Although asbestos stopped being used in the U.S. in the early 1970's and the number of new cases of asbestos-related cancers has been declining since the early 1990's, asbestos litigation continues to increase. The number of claims filed nearly tripled during the 1990's[4] and, in 2000 alone, twelve large companies reported that 520,000 new asbestos claims were filed against them.[5] Damage awards have risen steadily (see below). Two recent studies predicted that the cost of asbestos litigation would eventually reach more than $200 billion—higher than the cost of the Superfund clean-up program.[6]

The paper uses a new dataset of all asbestos claims that were tried in court between 1987 and 2003 to investigate how forum-shopping and procedural innovations affect asbestos trial outcomes. Because plaintiffs' lawyers choose where to file lawsuits, they have an incentive to file in states that have particularly favorable legal rules and in jurisdictions within these states that have particularly favorable judges and juries. This phenomenon--known as forum-

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[2] For histories of asbestos use and asbestos litigation in the U.S., see Brodeur (1985), Bowker (2003), Castleman (1996) and White (2004).

[3] See Carroll et al (2004).

[4] See Carroll et al (2004).

[5] This figure is taken from 10-K filings with the S.E.C. of 12 large companies that report asbestos liabilities. In calculating the number of claims, information for 1999 or 2001 is substituted if figures for 2000 were not reported.

[6] See Angelina and Biggs (2001, pp. 32-38) and Bhagavatula, Moody, and Russ (2001) for estimates of the final cost of asbestos litigation. Probst et al (1995, pp. 18-20) estimates that the final cost of the Superfund cleanup program (the Comprehensive Environmental Response, Compensation and Liability Act of 1980) will be between $90 and $180 billion.

shopping—affects all litigation but is particularly important in the asbestos context.[7] Because forum-shopping results in thousands of asbestos claims being filed in a few courts, judges in these courts face long and crowded dockets. In response, judges have developed new legal procedures for resolving asbestos claims. The paper focuses on three procedural innovations: consolidation, bifurcation, and "bouquet" trials. Consolidated trials are simultaneous trials of multiple asbestos plaintiffs' claims before the same jury. The jury makes separate decisions for each plaintiff's claim against each defendant. Bifurcation refers to the practice of dividing trials into multiple phases. After the first phase, the judge suspends the trial and directs the parties to bargain a settlement. The trial resumes only if negotiations fail. Most bifurcated trials decide liability in phase one and damages in phase two, but asbestos trials usually reverse the order and decide damages in phase one. Finally, bouquet trials are consolidated trials of a small group of plaintiffs selected from a large group of hundreds or thousands of asbestos claims. After the bouquet trial, the judge directs the parties to settle all of the cases in the large group, using the outcomes in the bouquet trial as a template. (The term "bouquet trial" refers to the practice of including at least one of each plaintiff type in the small group.) All of the procedural innovations are intended to reduce trial time and to resolve multiple asbestos claims at once.[8]

The results show that when asbestos claims are filed in any of six particularly favorable jurisdictions, plaintiffs' expected return from going to trial increases by $800,000 to nearly $4 million and, when bifurcation and bouquet trials are used, plaintiffs' expected return from trial increases by $650,000 and $1.2 million, respectively. Small consolidations increase plaintiffs' probabilities of winning and receiving punitive damages, but large consolidations are associated with lower damage awards.

Section II of the paper gives background concerning asbestos litigation and legal procedure. 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 the regression results. Limitations of the analysis are also discussed. Section VI discusses how forum-shopping and the procedural innovations contribute to the overall rise in asbestos litigation costs and concludes.

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[7] The term forum-shopping as used here is entirely descriptive and does not have normative or welfare implications. See the conclusion for a brief discussion of normative implications.

[8] See Mullenix (1991) and Willgang (1987) for discussion of the history and development of the procedural innovations.

II. ASBESTOS LITIGATION: BACKGROUND

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. Other cancers associated with asbestos include esophageal cancer and cancers of the digestive system. Asbestosis is non-cancerous scarring of the lungs due to inhaled asbestos fibers, which causes loss of lung capacity. It varies in widely severity, from non-disabling to fatal. Asbestosis and mesothelioma are both uniquely associated with asbestos exposure. Pleural plaque refers to scarring or thickening of the pleural membrane; it is non-disabling.

The probability of asbestos exposure leading to development of a severe asbestos disease rises with the length and intensity of exposure. But asbestos diseases have long latency periods—frequently 30 years or more between exposure and disease manifestation. In part because of the long latency period, individuals who have been exposed to asbestos have only a low probability of ever developing a serious asbestos disease. Nonetheless, individuals have an incentive to file lawsuits as soon as they discover that they were exposed to asbestos. This is because, if they delay, statutes of limitations that begin to run when harm is discovered may prevent them from filing in the future.[9] And even if they can file later, defendants may have gone bankrupt in the meantime.[10] As a result, most asbestos plaintiffs have little or no asbestos-related impairment. The most widely-used measure of disabling asbestos disease—the proportion of asbestos plaintiffs who claim to have asbestos-related cancers--declined from 20% during the 1980's to less than 10% by the mid-1990's.[11]

Plaintiffs' lawyers recruit asbestos plaintiffs by advertising widely and by offering free chest X-rays to potential plaintiffs who sign retainer agreements with the lawyer's firm. Those whose X-rays show scarring of the lungs or the pleural membrane--which could be due to asbestos or a

[9] Miceli and Segerson (2002) provide a theoretical model of the race to file.
[10] When firms file for bankruptcy, they set up compensation trusts for asbestos victims, but compensation is often delayed for years and payments are much lower than in the tort system. See White (2002) for discussion.
[11] The number of asbestos-related cancer cases is used as a measure of disabling asbestos disease, since the Centers for Disease Control maintain a registry of all cancer cases. However this measure excludes cases of disabling asbestosis. See Carroll et al (2004).

number of other causes--are signed up as plaintiffs.[12] Plaintiffs' lawyers are paid on a contingency fee basis, keeping 33 to 40% of any settlement or damage award. The asbestos plaintiffs' bar is a concentrated industry, with a small number of law firms each representing thousands of plaintiffs.[13] Asbestos plaintiffs rarely are consulted on how their lawsuits are conducted. Plaintiffs' lawyers decide where to file claims, conduct settlement negotiations with defendants, and decide whether to settle or go to trial. They file claims against multiple defendants on behalf of each plaintiff. Plaintiffs' lawyers greatly favor settlements over trials, because trials are time-consuming and contingency fees do not compensate them for the value of the additional time they spend in trial preparation and at the trial itself. Plaintiffs' lawyers often choose a favorable jurisdiction and file thousands of asbestos claims there, combining a few plaintiffs who have mesothelioma with large numbers of plaintiffs who are unimpaired. The threat of taking the mesothelioma claims to trial is used to induce defendants to settle the entire group of claims.

As the original producers of asbestos products have gone bankrupt, new types of firms have become asbestos defendants. Defendants include producers of products that contain or used to contain small amounts of asbestos (such as automobiles), retailers that sold asbestos-containing products (such as Sears), firms whose production facilities contained asbestos insulation (such as food processors and textile manufacturers), and firms that operate workplaces containing asbestos. Firms in nearly all SIC codes have been named as defendants.[14] Small as well as large firms are sued--although small firms generally do not have deep pockets, damages may be obtained from their insurers.

III. THEORETICAL DISCUSSION

Plaintiffs' lawyers have an incentive to file their claims in jurisdictions where plaintiffs' expected return is highest—a process known as forum-shopping. In making this decision, they compare expected returns in Federal versus state court and across different state court systems. Several factors cause expected returns to vary across states. First, state laws and states' rules of legal procedure differ in important ways that affect the value of asbestos claims. Mississippi and

[12] See Carroll et al (2004) for discussion.
[13] See Carroll et al (2004) for concentration ratios for the asbestos plaintiffs' bar.
[14] Carroll et al (2004).

West Virginia are favored locations for asbestos litigation because their liberal joinder rules allow asbestos claims from all over the country to be litigated there. Plaintiffs' lawyers can file a single claim that involves a state resident suing an out-of-state defendant and then join hundreds or thousands of out-of-state claims to the original case—in effect creating an informal class action. Mississippi is also a favored location because it does not require that judges approve the terms of settlements, which means that plaintiffs' lawyers' legal fees are not subject to judicial scrutiny.[15] Some states, including Mississippi, Texas and Illinois, are also favorable to plaintiffs because they do not (or did not) limit the size of punitive damage awards. Other states are favorable to plaintiffs because they use joint and several liability. Under this doctrine, when multiple defendants are found liable, each defendant is liable for up to the entire damage award. Plaintiffs benefit because their probability of collecting rises.[16]

Forum-shopping also involves plaintiffs' lawyers choosing among counties within particular states. County court systems within a state may differ because judges and/or juries in certain regions are particularly pro-plaintiff. Also plaintiffs' lawyers may develop long-term relationships with particular judges, such as by contributing to the judge's re-election campaign. Although juries decide most asbestos trials, judges have enormous influence on trial outcomes. Judges decide whether to allow defendants to conduct medical examinations of plaintiffs, when to schedule trials, whether to use the procedural innovations if trial occurs, and (in some states) whether to instruct juries to consider awarding punitive damages. They may aid plaintiffs by giving defendants little advance notice of the trial date and by allowing plaintiffs' lawyers to choose which particular plaintiffs' claims go to trial. Also, some judges strongly encourage the parties to negotiate mass settlements and may become personally involved in the negotiations.

The determination of where claims are filed and whether the procedural innovations are used at trial is a two-stage process. In the first stage, plaintiffs' lawyers choose where to file claims and, in the second stage, certain claims go to trial and judges decide whether to use the procedural innovations. Turn now to the questions of why judges adopt the procedural

[15] See Rothstein (2001).

[16] Favored locations for asbestos litigation have varied over time in response to changes in state and Federal laws or legal rules. See Carroll et al (2004) for data on state-by-state filings of asbestos claims since the early 1980's. See Glaberson (1999, p. A1) for discussion of recent changes in Texas law that discouraged tort claims. The changes included limits on punitive damages.

innovations and how they affect trial outcomes. To address these issues, I use an extended version of the well-known "optimism" model of litigation.[17]

The combined expected return to the plaintiff and the plaintiff's lawyer from trial of a single asbestos plaintiff's claim is $p_p (D_p + I_p) - wT^1 - R_p + e_p$. Here p_p and D_p are the plaintiff's lawyer's predictions of the plaintiff's probability of winning at trial and the damage award if the plaintiff wins, respectively. Both compensatory and punitive damages are included. 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 lottery of going to trial. It depends on the plaintiff's lawyer's degree of risk aversion, the variance of trial outcomes, and the degree of correlation of trial outcomes across claims when multiple claims are tried together. I_p is the indirect effect of the particular asbestos claim on the value of other asbestos claims that the same plaintiffs' law firm represents. I_p is large and positive if plaintiffs' lawyers represent large numbers of other plaintiffs whose claims would increase in value following a favorable trial outcome, and conversely. e_p is the error in the plaintiff's lawyer's predictions.

Defendants, unlike plaintiffs, are assumed to make their own litigation decisions. The defendant's expected cost of going to trial is $p_d (D_d + I_d) + C_d + R_d + e_d$, where the d subscripts denote the defendant. Most of the terms are analogous to those for the plaintiff. C_d is the defendant's legal cost of going to trial. R_d, the defendant's risk premium, increases as the case poses a bigger threat to the defendant firm's solvency and its 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 indirect effect I_d of a particular claim consists of its effect on the number and value of other claims filed against the same defendant. Settling low damage claims is likely to cause many new claims to be filed, because these claims are more profitable if they settle. But settling high damage claims has little effect on the number of future claims, since plaintiffs' lawyers find it profitable to represent these

[17] Most discussions of the model involve a single plaintiff and a single defendant, so that the discussion here extends the model to consider multiple plaintiffs. See Mnookin and Kornhauser (1979), Shavell (1982), and Cooter and Rubinfeld (1989) for discussion of the model.

claims even if they go to trial. Settling high damage claims also benefits defendants by avoiding the negative publicity of a trial in which an adverse outcome is likely. Thus I_d is negative for low damage claims and positive for high damage claims.

No settlement is possible if the plaintiff's expected return from going to trial exceeds the defendant's expected cost, or:

$$p_p (D_p + I_p) - wT^1 - R_p + e_p > p_d (D_d + I_d) + C_d + R_d + e_d \qquad (1)$$

and settlement is possible when the inequality in (1) is reversed. When (1) is reversed, the range of settlement equals the right hand side minus the left hand side of (1). The probability of settlement is assumed to increase as the settlement range gets larger.[18]

Now turn to the question of how the three procedural innovations affect the time required for trial of the plaintiff's claim, the probability of settlement, and the outcome of trial. Trial time is of interest because judges generally wish to minimize it and therefore the procedural innovations are more likely to be used if they cause it to fall. Settlement probability is of interest because judges wish to clear their dockets and settlements resolve claims without the necessity of holding trials. In addition, plaintiffs' lawyers gain when claims settle rather than go to trial, so that higher settlement probabilities encourage them to file additional claims in the same jurisdiction. Finally, trial outcomes are of interest because the next section examines the relationship between use of the procedures and trial outcomes empirically. I consider each of the three procedural innovations separately.

A. *Consolidation*

In consolidated trials, a single jury decides all plaintiffs' claims, but—unlike class actions--the jury makes separate decisions for each plaintiff's claim against each defendant.[19] Both state and Federal rules of legal procedure require that claims having consolidated trials have "common

[18] Spier (2002) points out that when multiple plaintiffs bargain with a single insolvent defendant, there are externalities across plaintiffs that affect their bargaining strategies. Although asbestos litigation often involves multiple plaintiffs, these externalities are internalized because all plaintiffs are represented by the same law firm. However similar externalities may exist on the defendants' side in the asbestos context, since most plaintiffs file claims against multiple defendants. The discussion below ignores this. See also Chang and Sigman (2000).

[19] In a class action, the jury makes a single decision for the entire class of claims. The U.S. Supreme Court did not allow class actions of asbestos lawsuits to be certified and state courts have followed its lead. See Cabraser (1998) for discussion.

issues of law or fact." In asbestos cases, these include evidence concerning the harmful effects of asbestos and the causal link between exposure to asbestos and development of particular diseases. Often plaintiffs whose claims are consolidated worked at the same workplace or had the same occupation, so that common issues also include whether plaintiffs were exposed to specific asbestos products, what the product producers knew about the dangers of asbestos, and whether plaintiffs were adequately warned of the dangers.

Suppose the time required for an *N*-plaintiff consolidated trial is T^N. Consolidation reduces the total time required for trials of *N* claims as long as $T^N < NT^1$. This condition holds because, in a consolidated trial, only one rather than *N* juries needs to be selected and common issues are presented once rather than *N* times.

Now consider how consolidating claims for trial affects the probability of settlement. Consolidating claims makes trial outcomes more positively correlated, because all claims are decided by a single jury rather than each claim being decided by a different jury. Also, evidence concerning all *N* plaintiffs is presented before the jury makes any decisions, so that the jury decides all *N* claims based on the same information. The increase in the degree of positive correlation causes the risk premiums R_d and R_p to rise when trials are consolidated. As a result, the settlement range in eq. (1) becomes larger and settlement becomes more likely. I present empirical evidence below showing that consolidation makes asbestos trial outcomes more positively correlated.[20]

Now consider how consolidation affects trial outcomes. Because the jury in a consolidated trial hears evidence concerning all of the plaintiffs before it makes decisions for any one plaintiff, this means that juries in consolidated trials base their decisions on more information than juries in individual trials. But additional information may either benefit or harm plaintiffs. As an example of how additional information may benefit plaintiffs, some asbestos defendants appear callous because they failed to label their products as dangerous and callous defendants tend to make jurors more sympathetic to plaintiffs. In consolidated trials, there is a higher probability that at least one defendant will appear callous and this benefits all plaintiffs. But

[20] Suppose trial risk for a single plaintiff trial is measured by the standard deviation of the distribution of outcomes divided by the mean of the outcome distribution. Then a consolidated trial of *N* claims has risk of $(s\sqrt{1+(N-1)r})/m\sqrt{N}$, where s is the standard deviation of the outcomes, m is the mean outcome, and r is the correlation coefficient. This expression is increasing in r.

consolidated trials also have more plaintiffs. These trials therefore have a higher probability that at least one plaintiff will be unappealing to jurors and this harms all plaintiffs.

B. Bifurcation

In bifurcated trials, the jury decides either damages or liability in phase one of the trial. Then the trial is suspended while the parties engage in settlement bargaining. If no settlement is agreed on, the trial resumes and the same jury decides the remaining issue in phase two.[21] In straight bifurcation, liability is decided in phase one and damages in phase two, while in reverse bifurcation, the order is reversed. Reverse bifurcation was developed specifically for asbestos trials.[22]

How does bifurcation affect trial time? When N plaintiffs' claims are consolidated for trial, bifurcating the trial saves time as long as $s_b{}^N T_2{}^N > 0$, where $s_b{}^N$ denotes the probability of settlement after phase one for an N-plaintiff consolidated trial and $T_2{}^N$ is the time required for phase two of an N-plaintiff consolidated trial. This expression must be positive as long as $s_b{}^N$ is greater than zero. In addition, $s_b{}^N T_2{}^N$ becomes more positive as N increases, because both the probability of settlement and the time required for phase two of the trial rise when more claims are consolidated. These considerations suggest that judges are more likely to use bifurcation as the number of claims consolidated for trial rises.

Suppose we compare the probability of settlement before the trial begins versus after phase one of a bifurcated trial. If reverse bifurcation is used, then after phase one, $D_p = D_d$ in expression (1). If straight bifurcation is used, then after phase one, $p_p = p_d$ in expression (1). Either way, the first phase of trial reduces the extent of disagreement between the two sides and therefore increases the probability of settlement. This suggests that if settlement has not occurred by the time a trial begins, judges will find it attractive to use bifurcation, because part of the trial time can still be saved if the parties settle after phase one. Since judges use reverse bifurcation more frequently than straight bifurcation in asbestos trials, the analysis also suggests

[21] Punitive damages may be decided in a separate phase three. See Landes (1993) for a model of bifurcated trials.
[22] Punitive damages may be part of either phase or may be decided in a separate phase three.

that deciding damages resolves more uncertainty than deciding liability. I test this hypothesis below.

Finally consider how bifurcation affects the outcomes of asbestos trials. Studies of other types of litigation suggest that juries' decisions concerning damages often reflect a mixture of evidence concerning both damage and liability.[23] Bifurcation therefore affects trial outcomes by eliminating some of the evidence that juries would normally consider in making their decisions. In asbestos trials, the evidence concerning damage often favors plaintiffs (because plaintiffs have asbestos-related diseases), while the evidence concerning liability often favors defendants (because plaintiffs cannot show that they were exposed to particular defendants' asbestos products). Suppose for example that a plaintiff has damages of $500,000 and the probability of the defendant being found liable is .5. If a jury had both types of evidence, then it might find the defendant liable, but award damages of only $250,000 because the evidence concerning causation is weak. However in a reverse bifurcated trial, the jury would decide damages in phase one without hearing the evidence concerning liability and, in the example, the damage award would therefore be $500,000. 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 after phase one. This suggests that reverse bifurcated trials will tend to have higher damage awards than non-bifurcated trials.

C. "Bouquet" trials

In a bouquet trial, a small group of Q claims is selected to be tried together from a larger group of N consolidated claims. Following the bouquet trial, the judge directs the parties to negotiate a settlement of the remaining $N-Q$ claims. The judge may threaten that, if bargaining breaks down, s/he will use the same jury to decide additional claims in the large group and will also direct the jury to consider awarding punitive damages. The alternative to a bouquet trial is a consolidated trial of all N claims. Assume that bouquet trials are not bifurcated.

The expected time for a consolidated trial of N claims is T^N, while the expected time to resolve the same N claims using a bouquet trial of Q claims is $T^Q + (1 - s_q{}^N)T^{N-Q}$. Here $s_q{}^N$ is the probability that the large group settles after the bouquet trial and T^Q and T^{N-Q} are the

[23] See Wittman (1986) and White (1989).

times required for trials of Q and N - Q claims, respectively. Suppose $T^N = T^{N-Q}$, i.e., the time required for trial of the large group is the same regardless of whether a bouquet trial has occurred. Then the time savings from a bouquet trial is $s_q{}^N T^N - T^Q$. This expression increases as N rises, because T^N and $s_q{}^N$ are both positively related to N, but T^Q is not. Thus judges' incentive to use bouquet trials increases as consolidations become larger. Bouquet trials in effect allow a form of consolidation to occur even when the number of cases is so large that a true consolidated trial would be impractical.

Now consider how the probability of settlement differs when the parties negotiate over settling N - Q claims following a bouquet trial versus over settling N claims without a bouquet trial. Because judges generally use the same jury for additional cases in the large group if the parties do not settle following the bouquet trial, the bouquet trial reduces uncertainty concerning the outcomes of the large group. It therefore causes p_p and p_d to approach each other and D_p and D_d to approach each other. The bouquet trial also raises the risk of trial of the large group, since the judge is likely to instruct the jury to follow the template established in the bouquet trial and this raises the degree of correlation of the outcomes. Both effects make settlement more likely.

Finally, consider how bouquet trials affect damage awards. An important point is that judges have an incentive to encourage juries to award high damages in bouquet trials, because high damages in the bouquet trial increase the probability that the large group will settle by threatening defendants' solvency. A recent example is a Mississippi bouquet trial of 12 plaintiffs who were selected from a large group of 1,738 claims. The 12 plaintiffs were awarded damages of $4 million each. After the bouquet trial, the judge directed the parties to settle the large group and threatened that, otherwise, he would continue using the same jury to decide additional claims and would instruct the jury to consider punitive damages. The defendants filed an emergency appeal to the Mississippi Supreme Court on the grounds that the judge was biased against them, but their appeal was rejected. Faced with the possibility that damage awards could be as high as ($4,000,000)(1,738) = $7 billion, defendants settled the large group on very favorable terms for plaintiffs.[24] Even paying a small fraction of this amount could exhaust the insurance coverage

[24] See Parloff (2002) for an account of the trial.

and threaten the solvency of many defendants, so that they were willing to pay highly to settle.[25] In contrast, if damage awards in bouquet trials are low, then defendants prefer to avoid settling because settlements encourage plaintiffs' lawyers to file additional claims, i.e., I_d is low or negative. Thus judges prefer for juries to award high damages in bouquet trials, because high damage awards encourage mass settlements.[26]

D. The relationship between procedural innovations and forum-shopping.

As discussed above, plaintiffs' lawyers choose at stage one where to file their claims and then judges decide whether to use the procedural innovations at stage two when (and if) claims go to trial. However plaintiffs' lawyers can predict in advance whether judges in particular jurisdictions are likely to use the procedural innovations if trial occurs and they use these predictions in choosing among jurisdictions. This suggests that, rather than the procedural innovations and forum-shopping having separate effects on trial outcomes, their effects may be combined and therefore difficult to separate econometrically. I test below for whether the procedural innovations affect trial outcomes differently depending on whether they are heavily versus lightly used.[27]

IV. ASBESTOS TRIAL DATA AND SUMMARY STATISTICS

The dataset includes information on nearly all asbestos claims that were tried to a verdict in the U.S. between mid-1987 and March 2003. Each individual plaintiff constitutes a separate observation, regardless of whether the plaintiff's claim had an individual or a consolidated trial. Claims are included in the dataset as long as a decision was reached on either liability or damages. Plaintiff-specific variables include the plaintiff's alleged disease, whether the plaintiff

[25] George Priest makes a similar argument that class actions harm defendants by threatening their solvency and thereby forcing them to settle dubious claims rather than face the risk of trial. See Priest (1997, p. 521).

[26] This differs from the standard argument in the trial versus settlement model, given in eq. (1), that when damage awards are predicted to be higher, the probability of trial rises rather than falls. In the bouquet trial context, higher predicted damage awards are likely to have the opposite effect, since they threaten defendant firms' solvency and encourage the filing of additional claims—effects that are omitted in the standard model.

[27] Another implication of the theoretical discussion is that plaintiffs' lawyers have an incentive to concentrate their asbestos claims in one or a few jurisdictions, because doing so congests judges' dockets and therefore increases the probability that they will use the procedural innovations. Because large plaintiffs' law firms control thousands of asbestos claims, a single firm may be able to file enough claims in a particular jurisdiction to affect judges' behavior—particularly if the court has only a few judges. But even if a single plaintiffs' law firm cannot congest a judge's docket by itself, other plaintiffs' law firms will be attracted to jurisdictions where many asbestos claims have already been filed, since additional claims are more likely to cause congestion.

died before trial, whether the plaintiff smoked, the number of defendants, and the outcome of the trial. Trial-specific variables include the trial date, whether the trial was in state or Federal court, the state in which the trial occurred (for trials in state court), the county in which the trial occurred (for certain counties that are centers of asbestos litigation), the number of claims that were consolidated for trial, and whether the trial was bifurcated or was a bouquet trial. There are approximately 5,200 observations. [28]

Summary statistics for the full dataset are given in Table 1. The state with the largest share of asbestos trials is Pennsylvania with 27%. This is because large numbers of workers were exposed to asbestos at Philadelphia-area naval shipyards. Texas and California have the next-largest shares with 12% and 11%, respectively. At the other extreme, very few trials occurred in Madison Co., Illinois (a well-known center for tort litigation), or in Mississippi or West Virginia—even though these jurisdictions attract many asbestos claims. This is presumably because nearly all claims that were filed in these jurisdictions settled. About 14% of asbestos claims were tried in Federal court.

The distribution of alleged diseases is 18% mesothelioma, 13% lung and other cancers, 47% asbestosis, and 14% pleural plaque. The remaining 8% of plaintiffs have missing disease data—generally in larger consolidated trials. About 11% 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 who claimed to have lung cancer are identified as smokers. Because virtually all plaintiffs are male, there is no sex variable. Plaintiffs' average age at the time of trial was 65, but 14% of plaintiffs died before their trials occurred.

Turning to the procedural variables, one-quarter of plaintiffs have individual trials, another quarter have small consolidated trials of two to five plaintiffs and the remaining half have large consolidated trials of six or more plaintiffs. About 19% of plaintiffs have bifurcated trials (including both straight and reverse bifurcations) and 4% have bouquet trials. While small

[28] The data are taken from *Mealey's Asbestos Litigation Reporter*, an online newsletter. *Mealey's* does not report claims that settled before or during trial, so they are excluded. Large consolidated trials involving 200 or more plaintiffs are omitted from the dataset because *Mealey's* does not give information concerning outcomes for individual plaintiffs. To check on the comprehensiveness of *Mealey's* trial coverage, I compared coverage by a different asbestos litigation reporter, *Andrew's*, to that for *Mealey's* for trials that occurred during a five month period in 1990. During the period, *Andrew's* reported seven trials that were not covered by *Mealey's*, out of a total of 316 trials covered during the period. If we assume that the two reporters together covered all trials, this suggests that the *Mealey's* dataset is about 97% complete.

consolidations are negatively correlated with bifurcation and bouquet trials (-.16 and -.11, respectively), large consolidations are positively correlated with both (.21 and .20, respectively). The latter result is consistent with the theoretical discussion.

Half of all trials involved only a single defendant, 27% involved two or three defendants, and 23% involved four or more. Defendants are counted only if they had not settled with the plaintiff by the time the jury reached a verdict. Most plaintiffs in fact sued more defendants than are represented in the data, but the additional defendants settled before the verdict.

Trial outcome figures are given at the bottom of table 1. The probability that plaintiffs win at trial is 64%. Plaintiffs are coded as winning if any defendant was found liable. The average compensatory damage award, conditional on damages being awarded, is $1.3 million (all dollar figures are in 2003 dollars).[29] Conditional on winning compensatory damages, plaintiffs' probability of being awarded punitive damages is nearly 20%, 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 awarded, is $1.8 million. Plaintiffs' expected return from going to trial, including both types of damages and allowing for the probability that plaintiffs lose, is $1.06 million.

Table 2 gives time trends. Column (1) shows that the number of asbestos claims tried to a verdict fell steadily from 1990 to 2003. But column (2) shows that the real value of damage awards increased sharply starting in the early 1990's, from $514,000 in 1992-3 to $4 million in 2002-03. These conditions made it more profitable for plaintiffs' lawyers to file additional asbestos claims and, not surprisingly, the number of filings rose steadily over the period, as shown in column (3).[30]

Table 3 shows that use of the procedural innovations varies widely across jurisdictions. The proportion of trials that were bifurcated varies from zero in Madison County, Illinois, to 47% in Manhattan (New York County), New York. In Mississippi, the proportion of claims that had bouquet trials was 79%, but many jurisdictions had no bouquet trials at all. The proportion of claims that had small consolidated trials of two to five plaintiffs varied from 7% in Houston (Harris County), Texas, to 51% in Maryland outside of Baltimore County. Another difference

[29] Defendants do not necessarily pay the damage awards listed here, since damages may be reduced 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.

[30] The data in column (3) are from Carroll et al (2004).

among jurisdictions is the propensity to award punitive damages. Punitive damages were almost never awarded in Pennsylvania, while they were awarded to 52% of claimants in Madison County, Illinois. The propensity of courts to award punitive damages also varies within particular states, since 1.6% of plaintiffs in Baltimore, Maryland, received them, compared to 28% of plaintiffs in the rest of Maryland. I test below for whether the procedures affect trial outcomes differently depending on whether they are heavily used.

Now turn to the question of whether consolidating claims for trial makes trial outcomes more risky by increasing the degree of correlation of the outcomes. To address this, I first compute the correlation coefficient of the outcomes of all two-plaintiff trials. Then as a comparison, I randomly pair up all plaintiffs that had single-plaintiff trials and compute the correlation coefficient of the outcomes for the random pairs. The correlation coefficient for the actual pairs of plaintiffs is predicted to be higher than the correlation coefficient for the random pairs. However, a problem with the randomization procedure is that individual plaintiffs could never have been paired with plaintiffs whose trials occurred in other jurisdictions. Therefore I repeated the calculations with a correction for jurisdiction by first estimating probit (tobit) regressions explaining the outcome variable as a function of jurisdiction dummies. Using the regression results, I predicted the outcome variable if all claims were filed in the same jurisdiction and then used the predicted values to compute the correlation coefficient for the random pairs. Both the uncorrected and the corrected versions of the results for the random pairs are given. I followed the same procedure for each of the outcome variables and for three-plaintiff and five-plaintiff consolidated trials.[31]

Results are shown in table 4. For the actual two-plaintiff consolidations, the correlation coefficients for whether plaintiffs win and for expected total damages are .74 and .92, respectively. The correlation coefficients for larger consolidated trials are similarly high. However the correlation coefficients for the random pairs and larger random groups are all close to zero, regardless of whether the random groups are corrected for the jurisdiction in which the trial occurred or not. I also repeated the procedure for two-plaintiff consolidations, but restricted the sample to claims tried in Pennsylvania (the state with the largest number of tried claims).

[31] The set of state and county dummies is the same as in the regressions discussed below. For the three- and five-plaintiff groups, the reported correlation coefficients are the average of all the off-diagonal elements in the correlation matrix. All of the calculations for the random assignments are repeated three times and the reported results average over the three repetitions.

The results, shown at the bottom of table 4, are similar: the correlation coefficients for the actual pairs are very high, but those for the random pairs are close to zero. These results support the hypothesis that consolidating cases for trial increases the degree of correlation of the outcomes and therefore makes going to trial more risky. In fact they suggest that the increase in risk due to consolidation is extremely large.

V. REGRESSION RESULTS AND ROBUSTNESS CHECKS

A. Regression results

I estimate probit models to explain whether plaintiffs won at trial and whether plaintiffs received punitive damages and tobit models to explain the amounts of compensatory and punitive damages. Table 5 gives the results of the probit regression explaining whether plaintiffs won at trial and the tobit regression explaining compensatory damage awards. The sample for the probit model is all trials of plaintiffs' claims for which the jury decided liability. Plaintiffs are treated as winning at trial if at least one defendant was found liable for compensatory damages. The sample for the tobit model is all trials of plaintiffs' claims for which the jury decided compensatory damages--damages are truncated from below if the plaintiff lost. Table 6 gives the results of the probit regression explaining whether punitive damages were awarded and the tobit regression explaining punitive damage awards. The sample for both of these models is all trials of claims in which the plaintiff was awarded compensatory damages. In the probit model, plaintiffs are treated as receiving punitive damages if at least one defendant was found liable for these damages. In the tobit model, damages are truncated from below if plaintiffs did not receive punitive damages.[32]

In all four models, the most important right hand side variables are the dummy variables for jurisdiction and for the procedural innovations. The jurisdiction dummies include both state dummies and selected county dummies. Whenever a county dummy is used, another dummy is

[32] Probit regressions are used when the dependent variable is either zero or one. Tobit regressions are used when the dependent variable is continuous, but cannot take values below a fixed cutoff—here damages cannot be negative. See Greene (2003). The sample for the probit model excludes trials of claims where the jury decided only damages (i.e., reverse bifurcated trials that ended after phase one); while the sample for the tobit model excludes trials of claims in which the jury decided only liability (i.e., straight bifurcated trials that ended after phase one). The sample for the probit model is smaller because more trials are reverse bifurcated than straight bifurcated.

included that covers the rest of the state.[33] The excluded jurisdiction is Pennsylvania. Although Pennsylvania has the most asbestos trials of any state over the sample period, the proportions of asbestos claims filed there and asbestos trials occurring there have fallen over time, suggesting that it is a relatively unfavorable venue for plaintiffs.[34] The procedural dummies include whether a bouquet trial was used, whether the trial was reverse or straight bifurcated (the excluded category is non-bifurcated trials), whether the trial consolidated 2-5 plaintiffs and whether the trial consolidated more than 5 plaintiffs (the excluded category is single-plaintiff trials). All regressions also include dummy variables for disease (the excluded category is pleural plaque), other plaintiff characteristics, and year dummy variables (1987-88 is excluded).

The probit results in tables 5 and 6 are given as marginal effects that measure the change in the probability of the plaintiff winning or receiving punitive damages when a right-hand side variable shifts from zero to one in value. The tobit results in the two tables are given both as coefficients and as marginal effects measured in 2003 dollars. Robust standard errors clustered by trial are given in parentheses and asterisks indicate statistical significance at the 95% level.

Turn first to the procedural innovations. Table 5 shows that plaintiffs' probability of winning at trial increases by 15 percentage points when they have small consolidated trials rather than individual trials and their probability of winning rises by 27 percentage points when they have bifurcated trials. Both effects are statistically significant. Large consolidated trials and bouquet trials, however, are not significantly related to whether plaintiffs win. Compensatory damage awards are significantly higher when plaintiffs have bifurcated trials or bouquet trials—awards rise by $588,000 and $806,000 in these situations, respectively. However small consolidated trials are not significantly related to the amount of compensatory damages and large consolidated trials are negatively and significantly related to compensatory damages. Turning to punitive damages, plaintiffs' probability of being awarded punitive damages increases by 6 percentage points when they have small consolidated trials and the relationship is statistically significant.

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[33] The county dummies are Madison Co., IL; Manhattan (New York Co.), NY; Baltimore City/County, MD; Houston (Harris Co.), TX; Dallas Co., TX; and San Francisco, CA. These jurisdictions are all centers for asbestos litigation. Other states that are centers for asbestos litigation, including Mississippi and West Virginia, are not sub-divided because few trials occurred in these states. Thirty other states that had few or no asbestos trials over the entire sample period are combined into a single dummy variable. Results for some of the jurisdiction dummies and the year dummies are omitted.

[34] The proportion of asbestos trials held in Pennsylvania dropped from 33% in 1987-1995 to 13% in 1996-2003 and the percent of asbestos claims filed in Pennsylvania declined from 17% in 1970-87 to 3% in 1993-97. See Carroll et al (2004) for data.

But the most important procedural innovation affecting punitive damage models is the bouquet trial, which is associated with a huge increase--85 percentage points--in plaintiffs' probability of winning punitive damages and with an increase of $1.5 million in punitive damage awards. These effects are both statistically significant. Neither large consolidations nor bifurcated trials are significant in the models explaining punitive damages.

The results suggest that different procedural innovations affect different aspects of plaintiffs' return from trial. Bifurcated trials are associated with larger compensatory damages and bouquet trials with higher punitive damages. Small consolidations are associated with higher probabilities of plaintiffs' winning and receiving punitive damages, while large consolidated trials are associated with lower compensatory damage awards. The mixed results for consolidations are consistent with the theoretical model, which led to ambiguous predictions.

Now turn to the jurisdiction effects. Plaintiffs in West Virginia, Houston, the rest of Texas, and New Jersey are 30, 26, 20 and 16 percentage points more likely to win at trial, respectively, than those in Pennsylvania. Also plaintiffs in Mississippi are 29 percentage points more likely to win at trial, although the relationship is only marginally significant (p = .085). Compensatory damage awards are $4.0 million and $1.9 million higher in Mississippi and in Manhattan, respectively, than in Pennsylvania and they are $500,000 to $1 million higher in West Virginia, Houston, Dallas, and the rest of Texas. All of these effects are statistically significant. Turning to punitive damages, the jurisdiction effects are huge. Plaintiffs in Madison Co., Illinois, are 91 percentage points more likely to receive punitive damages than those in Pennsylvania, while those in West Virginia, Houston, Dallas, and the rest of Texas are 58, 71, 66, and 67 percentage points more likely to receive punitive damages, respectively. Jurisdictions that award punitive damages more frequently also tend to make higher punitive damage awards. Plaintiffs receive $2.4 million more Madison County than in Pennsylvania and they receive between $1.2 and $1.7 million more in West Virginia, Houston, Dallas, and the rest of Texas than in Pennsylvania. In contrast, plaintiffs in Baltimore City/County are 10 percentage points less likely to receive punitive damages than those in Pennsylvania and their punitive damage awards are more than $1 million smaller. All of these results are statistically significant. A surprising result is that plaintiffs in Mississippi do not receive higher punitive damages than plaintiffs in Pennsylvania. Overall, these results suggest that forum-shopping greatly affects plaintiffs' expected return from trial.

Turn now to the results for the disease and smoking variables. The smoking variable is entered both by itself and interacted with the dummy for lung cancer. Plaintiffs who have mesothelioma are 23 percentage points more likely to win than those who have pleural plaque and they receive $1.5 million more in compensatory damages. They are also 11 percentage points more likely to be awarded punitive damages conditional on winning at trial and their punitive damage awards are $554,000 higher. All of these effects are statistically significant. A surprising result is that plaintiffs who are smokers are 10 percentage points more likely to win at trial. This is probably because smokers on average are sicker than non-smokers and this makes them more likely to elicit jurors' sympathy. The interaction of smoking and lung cancer has negative coefficients in all four regressions—suggesting that juries sometimes attribute plaintiffs' lung cancer to smoking rather than asbestos exposure. None of the other disease variables is statistically significant.

The last set of variables is the number of defendants. When there are 2 or 3 defendants at trial rather than one, plaintiffs receive an additional $350,000 in compensatory damages. But having four or more defendants rather than one is associated with a 7.5 percentage point reduction in the probability that plaintiffs receive punitive damages and a $400,000 reduction in the average punitive damage award, where the latter result is nearly significant at the 5% level ($p = .058$). The negative results for four or more defendants may reflect the fact that particular defendants must be found liable for punitive damages and, with a large number of defendants, jurors may have difficulty deciding which one should be held liable.

Taking the results in tables 5 and 6 together, the models explaining liability fit better than the models explaining damage levels. For compensatory damages, the pseudo-R^2 value is .134 for whether damages are awarded, compared to only .014 for the level of damages. For punitive damages, the values are .43 versus .042, respectively. These results suggest a reason why judges in asbestos trials tend to use reverse bifurcation more often than straight bifurcation: since damages are more difficult to predict than liability, a reverse bifurcated trial has a better chance of causing the parties to settle after stage one than a straight bifurcated trial.[35]

Table 7 reports the results of a tobit regression that explains plaintiffs' total return from trial. The dependent variable is the sum of compensatory plus punitive damages, or total damages.

[35] In an experimental study of mock jurors' decisions on compensatory and punitive damages, Sunstein et al (2002) also found that juries' decisions concerning whether to award damages were much more predictable than their decisions concerning the dollar amounts of damages.

Damages are truncated from below if plaintiffs lost at trial.[36] The bifurcated trial and bouquet trial dummies are both highly significant, but the small consolidated trial dummy is insignificant and the large consolidated trial dummy is negative and significant. On average, plaintiffs that had bifurcated trials received $650,000 more and those that had bouquet trials received $1.2 million more. But plaintiffs who had large consolidated trials received $395,000 less than plaintiffs who had individual trials. Plaintiffs in Mississippi received $3.8 million more than plaintiffs in Pennsylvania, but the relationship is only significant at the 10% level ($p = .10$). Plaintiffs in West Virginia, Houston, Dallas, the rest of Texas, and Manhattan received between $800,000 and $1.7 million more than plaintiffs in Pennsylvania. All of these effects are significant at the 5% level. Surprisingly, while the coefficient of the Madison County, Illinois, dummy is positive and large, it is insignificant. Plaintiffs in Madison County receive significantly higher punitive damages, but their overall return from trial is not significantly greater than that of plaintiffs in Pennsylvania.

B. Caveats and robustness checks

The results in the previous section suggest that both forum-shopping and procedural innovations have large and statistically significant effects on plaintiffs' expected returns from trial. In this section I discuss two limitations of the analysis. The first is the possibility that selection bias causes the coefficients of the jurisdiction dummies to be biased upward in the regressions, which would mean that the estimated returns to forum-shopping are greater than the true returns. In order for selection bias to be important, there must be an unobserved (to the econometrician) plaintiff or trial characteristic that is correlated with the residual—the unexplained portion of the outcome variables. As an example, suppose the unobserved characteristic is whether individual plaintiffs are attractive to juries. Also suppose there are only two jurisdictions—Texas and Pennsylvania. Assume that plaintiffs' lawyers can observe plaintiffs' types and they file attractive plaintiffs' claims in Texas and unattractive plaintiffs' claims in Pennsylvania. In this case, plaintiff attractiveness, which is part of the error term, would be correlated with the Texas dummy. As a result, the coefficients of the Texas dummy variable in regressions like those reported in tables 5-7 would be biased upward, because they capture both the effect of having a trial in Texas

[36] The sample for the regression explaining total damages includes all claims in which juries decided either liability or compensatory damages. However straight bifurcated trials were excluded if there was a decision on liability but no decision on damages. In a few reverse bifurcated trials, plaintiffs were awarded damages in phase one but no defendants were found liable in phase two. In these trials, damages were set equal to zero.

rather than Pennsylvania and the effect of the plaintiff being attractive rather than unattractive. The resulting bias would cause the results to overstate the difference between expected trial returns in Texas versus Pennsylvania.

Is this type of selection bias likely? One way to test for selection bias is to assume that plaintiffs' observable and unobservable characteristics are positively correlated. As an example, plaintiffs who are attractive to juries might also tend to have more severe diseases. Then a finding that trial location isn't positively and significantly related to plaintiffs' observable characteristics would imply that trial location isn't positively and significantly related to plaintiffs' unobservable characteristics. To implement this test, I first constructed a summary measure of plaintiffs' observable characteristics by running a regression of total damages on all of the plaintiff-specific variables. I then used the estimated model to predict each plaintiff's expected return at trial. Suppose plaintiffs' predicted expected trial return based on their observable characteristics is denoted $\hat{D}$. Then I ran separate probit regressions explaining whether the trial occurred in particular jurisdictions as a function of $\hat{D}$, plus dummies for the procedural innovations and year. A finding that the coefficients of $\hat{D}$ in these regressions are not positive and statistically significant would suggest that selection bias is not a problem. The coefficients of $\hat{D}$ in regressions explaining whether trials occurred in Pennsylvania, Houston, Dallas, the rest of Texas, New Jersey, Mississippi, and San Francisco were all either negative or positive but insignificant. Only the regression explaining whether trial occurred in Manhattan resulted in a positive and significant coefficient for $\hat{D}$. Overall these results suggest that the coefficients of the jurisdiction variables are not biased upward.[37]

The second econometric issue is whether the effects of the procedural variables can be separated from those of trial location. The alternative hypothesis is that the procedural innovations mainly affect trial outcomes in jurisdictions where they are heavily used, which would imply that they are part of the return to forum-shopping. The highest correlation between a jurisdiction and a procedural innovation is between Mississippi and bouquet trials (see table 3). I therefore tested for whether bouquet trials have a larger effect on plaintiffs' return from trial in Mississippi than

[37] Tests for selection bias for trial in Mississippi and West Virginia could not be estimated because of high correlations between the procedural dummies and the year dummies. I also ran the same test for the procedural innovations. The coefficients of $\hat{D}$ in regressions explaining whether the procedural innovations were used were always either negative or positive but insignificant. This suggests that selection bias does not affect the coefficients of the procedural innovations.

elsewhere. To do so, I reran the model in table 7 that explains total damages, but omitted the Mississippi observations. In this regression, the coefficient of the bouquet trial dummy measures the effect of bouquet trials on total damages in all jurisdictions besides Mississippi, while the coefficient in the regression reported in table 7 measures the same effect in all jurisdictions. Omitting the Mississippi observations caused the coefficient of the bouquet trial dummy to drop by by 15 percent (from 1,900,000 to 1,620,000), but it remained large and highly statistically significant (p = .003 and .001, respectively). Thus while bouquet trials have a larger effect on trial outcomes in Mississippi than in other jurisdictions, they have a very large and statistically significant effect on total damages in other jurisdictions as well. Similarly, bifurcation is most heavily used in Manhattan, so I tested for whether it has a larger effect in Manhattan than in other jurisdictions by following the same procedure. The results showed that omitting the Manhattan observations from the regression in table 7 caused the coefficient of the bifurcated trial dummy to fall by 21 percent, from 1,030,000 to 814,000, but it remained large and highly statistically significant. Finally, small consolidations are frequently used in Pennsylvania, Baltimore and Manhattan. Similar tests found that small consolidations have a similar effect on total damages and the effect remains statistically significant when the observations from these jurisdictions are omitted from the regression. Overall, these results suggest that the procedural innovations have statistically significant and economically important effects on trial outcomes regardless of where they are used, although their effect appears to be slightly larger in the jurisdictions where they are most heavily used.

VII. CONCLUSION

This paper examines the effect of forum-shopping by plaintiffs' lawyers and use of three procedural innovations on the outcomes of asbestos trials. I use a new dataset of asbestos lawsuits that went to trial between 1987 and 2003 to show that going to trial in pro-plaintiff jurisdictions such as West Virginia, various parts of Texas, or Manhattan, New York, is associated with increases in plaintiffs' expected trial return of $800,000 to $1.7 million, compared to having a trial in Pennsylvania—a relatively unfavorable jurisdiction for plaintiffs. Having a trial in Mississippi is associated with an even larger increase in expected damages of

nearly $4.0 million. Having a bifurcated trial or a bouquet trial is shown to increase plaintiffs' expected trial returns by $650,000 and $1.2 million, respectively. However, having a consolidated trial has a mixed effect: small consolidations of 2 to 5 plaintiffs' claims are associated with higher probabilities of plaintiffs winning and receiving punitive damages, but large consolidations of more than 5 plaintiffs are associated with lower expected trial returns.

Damage awards constitute less than 10% of the total cost of asbestos litigation--most of the cost of litigation is due to settlements.[38] But when forum-shopping and procedural innovations result in higher damage awards, they are also likely to raise settlement costs and increase the probability of settlement. These changes in turn have an important feedback effect, since higher damage awards and higher settlement probabilities make it more profitable for plaintiffs' lawyers to search out new asbestos plaintiffs and file additional claims. And because so many people were exposed to asbestos and so many firms produced or used asbestos products, the asbestos mass tort has continued to grow without running out of plaintiffs and defendants. Thus forum-shopping and procedural innovations have contributed to the growth of the asbestos mass tort both directly by raising damage awards and indirectly by raising settlement levels and the number of claims filed.

Finally, it should be noted that the theory and evidence presented here are entirely positive (descriptive) and, therefore, no welfare conclusions can be drawn from the analysis. Thus if asbestos damage awards and settlements have increased due to forum-shopping and use of the procedural innovations, the result could be either an increase or a decrease in economic efficiency. But it is possible to draw some welfare inferences from the history of asbestos litigation. Economic theory tells us that the efficient level of liability by producers of dangerous products is the level that gives producers economically efficient incentives to make their products safer. Prior to the 1970's, asbestos producers rarely were held liable for the harm that asbestos exposure caused to their own workers or to others who came into contact with asbestos products. This level of liability was clearly too low, since asbestos was widely used despite being very harmful. But in the early 1970's, asbestos producers began to be found liable for damages and their response was to quickly eliminate nearly all asbestos from products sold in the U.S. Because asbestos is so dangerous, this increase in liability clearly improved efficiency. But this suggests that as of 1987,

[38] Using the trial dataset, there were approximately 5200 trials between 1987 and 2003 and the expected trial return was $1.057 million, so that total damage awards were $5.5 billion. This equals 8 percent of the total costs of asbestos litigation as of 2003, which was $70 billion (see Carroll et al, 2004). Note that the damage award figure omits awards prior to 1987 and awards in very large consolidated trials. However it is overstated to the extent that damage awards are reduced and/or are never collected by plaintiffs.

the starting date for the asbestos trial data analyzed here, liability was already high enough to provide efficient deterrence and, therefore, increases beyond that level were economically inefficient.[39]

[39] See White (2004) for a history of asbestos litigation and data on levels of asbestos use.

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Table 1: Summary Statistics

	Mean	Std. Dev.
Jurisdiction (state/county) in which trial occurred		
Pennsylvania	.272	.445
Houston, Texas	.038	.190
Dallas, Texas	.026	.159
Rest of Texas	.056	.230
New Jersey	.057	.233
Mississippi	.0065	.080
West Virginia	.024	.154
Manhattan, New York	.033	.178
Madison Co., Illinois	.0055	.074
Baltimore, Maryland	.036	.186
San Francisco, California	.043	.203
If Federal court	.140	.347
Disease		
Mesothelioma	.176	.381
Lung cancer	.113	.316
Other cancer	.017	.128
Asbestosis	.469	.499
Pleural plaque	.142	.350
Disease missing	.079	.270
Demographic variables		
Age at trial (if alive)	64.8	48.8
If plaintiff alive at trial	.855	.351
If plaintiff smokes	.111	.315
Procedural innovations		
If individual trial	.249	.432
If 2-5 plaintiffs consolidated for trial	.263	.440
If more than 5 plaintiffs consolidated for trial	.487	.500
If bifurcated trial	.185	.389
If bouquet trial	.038	.191
Number of defendants at trial		
1	.499	.500
2-3	.275	.447
4 or more	.225	.418
Outcome variables		
If defendant found liable	.640	.480
Compensatory damages (if positive)	$1,312,000	$2,969,000
If punitive damages (if defendant found liable)	.199	.399
Punitive damages (if positive)	$1,826,000	$4,046,000
Expected total damages	$1,057,000	$3,013,000

Notes: Consolidations of more than 200 plaintiffs are omitted. Dollar figures are in 2003 dollars. The calculations reported in this table use the full sample of 5,226 tried claims, except for the outcome variables. They are based on the samples used for the regressions reported in tables 5-6, except that the mean compensatory and punitive damage figures are based on positive values only (the uncensored observations in the regressions).

Table 2:
Asbestos Litigation--Time Trends

	Number of asbestos claims tried to a verdict (1)	Expected damage awards (2)	Number of claims filed against five large defendants (3)
mid-1987-1989	376	$920,000	
1990-1991	1,675	699,000	81,000
1992-1993	958	514,000	101,000
1994-1995	840	991,000	133,000
1996-1997	681	869,000	141,000
1998-1999	293	2,081,000	222,000
2000-2001	319	2,894,000	
2002-March 2003	84	4,019,000	

Notes: Dollar figures are in 2003 dollars. Data in column (3) are taken from Carroll et al, *supra* note 3.

Table 3:
Variation in Use of the Procedural Innovations across Jurisdictions

	Bifurcated trials	Bouquet trials	Small consolidations (2 to 5 claims)	Large consolidations (more than 6 claims)	If punitive damages awarded
Pennsylvania	.108	0	.40	.48	.002
Mississippi	0	.79	.21	.79	.29
Houston TX	.005	0	.07	.91	.33
Madison Co. IL	0	0	.14	.55	.52
San Francisco CA	.14	0	.20	.37	.077
Baltimore MD	.04	0	.44	.53	.016
Rest of MD	.14	.09	.51	.31	.28
Manhattan NY	.47	0	.44	.47	.007
Federal courts	.28	.22	.18	.53	.25

Notes: The punitive damage column gives the number of punitive damage awards as a fraction of the number of claims tried.

Table 4:
Correlation Coefficients of Outcomes in Consolidated Trials versus Random Groups of Single-Plaintiff Trials

Number of claims per trial	Actual versus random	If compen-satory damages awarded	Compen-satory damages	If punitive damages awarded (conditional on liability)	Punitive damages (conditional on liability)	Expected total damages
2	Actual	**.74**	**.80**	**.88**	**.98**	**.92**
	Random	**.05**	**.01**	**-.02**	**-.01**	**0**
	Random (corrected for jurisdiction)	**.02**	**.04**	**.01**	**.02**	**.04**
3	Actual	**.70**	**.60**	**.95**	**.996**	**.84**
	Random	**0**	**.01**	**0**	**0**	**.01**
	Random (corrected for jurisdiction)	**-.02**	**.01**	**0**	**.01**	**.01**
5	Actual	**.59**	**.85**	**.94**	**.99**	**.92**
	Random	**.01**	**0**	**0**	**0**	**.01**
	Random (corrected for jurisdiction)	**0**	**0**	**.03**	**-.01**	**0**
2 (PA claims only)	Actual	**.64**	**.92**	**N.A.**	**N.A.**	**.92**
	Random	**.01**	**-.10**	**-.02**	**-.01**	**-.00**

Note: For the three- and five-plaintiff groups, the reported correlation coefficients are the average of all the off-diagonal elements in the correlation matrix. All of the calculations determining correlation coefficients for random groups of plaintiffs are repeated three times and the reported figures are averages over the three repetitions. In the bottom two rows, the samples are restricted to claims tried in Pennsylvania, but otherwise the procedure is the same.

Table 5:
Results Explaining Whether Plaintiffs Win and Compensatory Damages

	If Plaintiffs Win	Compensatory Damage Awards	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-5 case consolidation	0.15 (0.03)*	28,400 (193,000)	$18,100
>5 case consolidation	0.029 (0.04)	-546,000 (234,000)*	-348,000
Bifurcated trial	0.27 (.05)*	924,00 (306,000)*	588,000
Bouquet trial	-0.021 (0.25)	1,270,000 (602,000)*	806,000
Jurisdiction			
Mississippi	0.29 (0.08)	6,380,000 (3,730,000)*	4,060,000
West Virginia	0.30 (0.04)*	1,240,000 (340,000)*	785,000
Houston, Texas	0.26 (0.05)*	1,370,000 (353,000)*	874,000
Dallas, Texas	0.13 (0.09)	837,000 (390,000)*	533,000
Rest of Texas	0.20 (0.05)*	1,430,000 (515,000)*	913,000
Manhattan, New York	0.12 (0.06)	2,920,000 (698,000)*	1,860,000
Madison Co., Illinois	-0.024 (0.19)	397,000 (986,000)	253,000
San Francisco, California	0.07 (0.06)	288,000 (311,000)	183,000
Baltimore, Maryland	0.01 (0.08)	941,000(540,000)	599,000
New Jersey	0.16 (0.05)*	-445000 (253,000)	-283,000
If Federal court	0.02 (0.05)	361,000 (301,000)	230,000
Disease and smoking			
Mesothelioma	0.23 (0.03)*	2,330,000 (274,000)*	1,480,000
Lung cancer (smoker)	-0.13 (0.08)	-472,000 (363,000)	-301,000
Lung cancer (non-smoker)	0.03 (0.05)	398,000 (298,000)	254,000
Other cancer	-0.01 (0.08)	936,000 (502,000)	596,000
Asbestosis	0.03 (0.04)	160,000 (142,000)	102,000
If plaintiff alive at trial	0.03 (0.03)	158,000 (209,000)	100,000
If plaintiff smokes	0.10 (0.04)*	230,000 (170,000)	146,000
Number of defendants			
2-3	0.04 (0.03)	559,922 (181,086)*	356,000
4 or more	0.03 (0.05)	350,921 (269,950)	223,000
Constant		-593,59 (463,096)	
Year variables	Included	Included	
Additional jurisdiction variables	Included	Included	
Pseudo R^2	.134	.014	
Number of observations	4695	5045	
Number of censored obs.		1835	

Notes: Dollar values are in thousands of 2003 dollars. Probit results are marginal effects measured in percentage points. Robust standard errors are clustered by trial are given. Asterisks indicate significance at the 5% level. The pseudo-R^2 value for the tobit regression is taken from an estimation in which the standard errors are not clustered.

Table 6:
Results Explaining Whether Plaintiffs Receive Punitive Damages and Amount

	If Plaintiffs Receive Punitive Damages	Punitive Damage Awards	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-5 case consolidation	0.062 (0.031)*	$355,000 (681,000)	$68,300
>5 case consolidation	0.031 (0.033)	-424,000 (781,000)	81,600
Bifurcated trial	-0.034 (0.034)	-1,766,000 (1,068,000)	-340,000
Bouquet trial	0.85 (0.10)*	7,854,000 (1,823,000)*	1,510,000
Jurisdiction			
Mississippi	-0.035 (0.13)	514,000 (3,800,000)	98,900
West Virginia	0.58 (0.16)*	6,290,000 (1,680,000)*	1,210,000
Houston, Texas	0.71 (0.11)*	8,600,000 (1,890,000)*	1,650,000
Dallas, Texas	0.66 (0.12)*	7,140,000 (1,670,000)*	1,370,000
Rest of Texas	0.67 (0.078)*	7,970,000 (1,530,000)*	1,530,000
Manhattan, New York	-0.081 (0.02)	-5,970,000 (3,670,000)	-1,150,000
Madison Co., Illinois	0.91 (0.019)*	12,700,000 (2,770,000)*	2,440,000
San Francisco, California	0.21 (0.09)*	1,800,000 (1,150,000)	347,000
Baltimore, Maryland	-0.098 (0.014)*	-6,340,000 (2,330,000)*	-1,220,000
New Jersey	0.21 (0.11)*	2,100,000 (1,440,000)	404,000
If Federal court	0.12 (0.052)*	1,890,000 (1,060,000)	364,000
Disease and smoking			
Mesothelioma	0.11 (0.047)*	2,880,000 (944,000)*	554,000
Lung cancer (smoker)	-0.0026 (0.041)	-395,000 (1,170,000)	76,100
Lung cancer (non-smoker)	0.053 (0.042)	1,750,000 (901,000)*	338,000
Other cancer	0.12 (0.10)	3,550,000 (1,550,000)*	684,000
Asbestosis	0.045 (0.029)	1,269,000 (728,000)	244,000
If plaintiff alive at trial	0.0027 (0.020)	194,000 (635,000)	37,000
If plaintiff smokes	-0.031 (0.025)	-1,390,000 (755,000)	-268,000
Number of defendants			
2-3	-.009 (0.022)	-312,000 (585,000)	-60,000
4 or more	-0.075 (0.029)*	-2,00,00 (1,100,000)	-404,000
Constant		-6,890,000 (2,440,000)*	
Year variables	Included	Included	
Additional jurisdiction variables	Included	Included	
R^2 **or pseudo** R^2	.42	.042	
Number of observations	3130	3278	
Number of censored obs.		2647	

Notes: Dollar values are in thousands of 2003 dollars. Probit results are marginal effects measured in percentage points. Robust standard errors are clustered by trial are given. Asterisks indicate significance at the 5% level. The pseudo-R^2 value for the tobit regression is taken from a regression in which the standard errors are not clustered.

Table 7:
Results Explaining Total Damages

	Total Damage Awards	
	Tobit	
	(coefficients)	(marginal effects)
Procedural innovations		
2-5 case consolidation	71,100 (265,000)	$44,800
>5 case consolidation	-627,000 (292,000)*	-395,000
Bifurcated trial	1,030,000 (346,000)*	651,000
Bouquet trial	1,900,000 (639,000)*	1,200,000
Jurisdiction		
Mississippi	6,040,000 (3,680,000)	3,810,000
West Virginia	1,660,000 (495,000)*	1,040,000
Houston, Texas	2,150,000 (516,000)*	1,360,000
Dallas, Texas	1,320,000 (526,000)*	831,000
Rest of Texas	2,490,000 (758,000)*	1,570,000
Manhattan, New York	2,660,000 (732,000)*	1,680,000
Madison Co., Illinois	2,320,682 (1417454)	1,420,000
San Francisco, California	196,000 (377,000)	124,000
Baltimore, Maryland	635,000 (623,000)	401,000
New Jersey	-348,000 (334,000)	-219,000
If Federal court	391,000 (376,000)	247,000
Disease and smoking		
Mesothelioma	2,870,166 (351,000)*	1,810,000
Lung cancer (smoker)	-635,000 (470,000)	-401,000
Lung cancer (non-smoker)	537,000 (385,000)	339,000
Other cancer	1,360,000 (762,000)	857,000
Asbestosis	181,000 (186,000)	114,000
If plaintiff alive	212,000 (265,000)	134,000
If plaintiff smokes	103,000 (217,000)	65,000
Number of defendants		
2-3	641,000 (253,000)*	404,000
4 or more	341,000 (328,000)	215,000
Constant	-972,000 (717,000)	
Year variables	Included	
Additional juris. variables	Included	
Pseudo R^2	.012	
Number of observations	5056	
Number of censored obs.	1866	

Notes: The dependent variable is compensatory plus punitive damages. Damages are censored from below if the plaintiff lost at trial. For a few claims, damages were awarded in phase one of the trial, but all defendants were later found not liable. These plaintiffs are treated as having lost at trial. Results are given both as coefficients and marginal effects. Asterisks indicate statistical significance at the 5% level. Dollar values are in 2003 dollars.