Understanding the Asbestos Crisis

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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 most uses of asbestos ended in the early 1970's. Eighty firms have filed for bankruptcy due to asbestos liabilities and the total cost of asbestos compensation is estimated to be more than $200 billion.

This paper examines why asbestos claims have become a crisis. I argue that plaintiffs' lawyers concentrate thousands of claims in particularly favorable jurisdictions and judges respond to lengthy dockets by adopting procedural innovations that are intended to encourage 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 hypotheses that migration of claims to favorable jurisdictions and adoption of the three procedural innovations cause trial outcomes to become more pro-plaintiff and therefore encourage the filing of additional claims. Filing claims in favorable jurisdictions is shown to increase their expected value at trial by about $2 million and use of the procedural innovations increases their expected value by $900,000 to $2.3 million. I also present evidence that higher damage awards at trial raise the overall cost of asbestos litigation both by raising settlement levels and by attracting additional claims.

Understanding the Asbestos Crisis[1]

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

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. About 600,000 individuals have filed claims for damage resulting from asbestos exposure and, because individuals typically file claims against multiple defendants, as many as twenty million claims may have been filed. Insurers of asbestos defendants have paid out around $32 billion in compensation and high liability for asbestos claims has caused about 80 firms to file for bankruptcy—30 of them since the beginning of 2000.[3] Two recent studies estimate that between 52,000 and 128,000 jobs in the U.S. have been lost because of asbestos litigation.[4] But although asbestos stopped being used in the early 1970's and the number of new cases of asbestos-related cancers has been declining since the early 1990's, the asbestos litigation crisis is growing worse. The number of claims filed nearly tripled during the 1990's and, in 2000 alone, twelve large companies reported that 520,000 new asbestos claims were filed against them.[5] Claims are rising because plaintiffs' lawyers are filing more claims on behalf of plaintiffs with minimal injury from asbestos against defendants whose involvement with asbestos production is increasingly tangential. Despite this, damage awards are rising and multi-million dollar awards are becoming common—two trials that occurred in March 2003 resulted in damage awards of $47 million and $250 million—the highest in the history of asbestos litigation.[6] With an unlimited supply of plaintiffs and defendants and rising damage awards, asbestos has become the largest mass tort in U.S. legal

[1] I am grateful for comments from Donald Dewees, Michael Noel, Kathy Spier and participants at talks at the NBER Summer Institute in Law & Economics, Harvard, and the American Enterprise Institute. The NSF Economics Program provided support under grant number 0212444.
[2] Quoted in Castleman (1996, p. 358).
[3] See Carroll et al (2002) and White (2002).
[4] See Stiglitz et al (2002) and Carroll et al (2002). The lower figure is jobs lost in companies that have gone bankrupt and the higher figure is all jobs lost or not created due to asbestos liabilities.
[5] This figure is taken from 10-K filings with the S.E.C. 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 not reported.
[6] See "2 Large Verdicts in New Asbestos Cases," by Alex Berenson, *New York Times*, April 1, 2003. These trials are not included in the dataset of asbestos trials discussed below.

history. Two recent predictions of the eventual cost of asbestos liability came out at $200 and 275 billion—suggesting that asbestos may end up costing more than Superfund.[7]

This paper examines why the asbestos mass tort has grown so large. One important factor is that plaintiffs' lawyers choose where to file asbestos claims and they concentrate claims in a few states with particularly favorable legal rules and a few jurisdictions within these states that have particularly favorable judges. A second important factor is that, because lawyers file thousands of cases in a few courts, judges face judicial gridlock. They have responded by developing new legal procedures intended to reduce trial time and encourage mass settlements of large numbers of claims at once. These procedural innovations also change trial outcomes in a pro-plaintiff direction. But when trial outcomes are pro-plaintiff and large numbers of asbestos claims are settled on favorable terms, plaintiffs' lawyers find it extremely profitable to file additional claims in the same courts. This worsens the gridlock and pressures the judge to continue using the procedural innovations. And because of the nature of asbestos exposure, the numbers of potential plaintiffs and potential defendants are virtually unlimited. As a result, the asbestos mass tort keeps growing.

I present two types of evidence. First I use a new dataset of all asbestos trials from 1987 – 2003 to test the hypotheses that the expected return from trial of asbestos claims is higher when plaintiffs' lawyers file cases in a few favorable jurisdictions and when judges use three procedural innovations developed for asbestos trials—consolidation, bifurcation, and "bouquet" trials. Consolidated trials are trials of multiple asbestos claims simultaneously before a single jury. The jury makes separate decisions for each plaintiff against each defendant. Bifurcated trials are trials that are divided into phases. After phase one, the judge suspends the trial and directs the parties to engage in settlement bargaining. The trial resumes only if the negotiations fail. Bouquet trials refer to consolidated trials of a small group of plaintiffs selected from a large group of as many as 10,000 claims. After the bouquet trial, the judge directs the parties to settle all the cases in the large group, using the outcomes in the bouquet trial as a template. My results show that going to trial in three particularly favorable jurisdictions increases plaintiffs' expected return by $1.7 to $2.6 million compared to states with few asbestos trials and that use of the three procedural innovations increase their expected return by $900,000 to $2.3 million.

[7] The two studies of the cost of asbestos are Angelina and Biggs (2001) and Bhavatula et al (2001). The cost of the Superfund cleanup program (the Comprehensive Environmental Response, Compensation and Liability Act of 1980) has been estimated to be between $90 and $180 billion. See Probst et al (1995, pp. 18-20).

Because less than one percent of asbestos claims are tried in court, the main cost of asbestos liability is that of settlements rather than damage awards at trial. In the second part of the paper, I use data on the average cost of asbestos settlements by company to show that damage awards and settlement costs are positively related. The results show that both settlement levels and the number of claims filed against a company increase when companies pay higher damage awards at trial.

Section II of the paper gives some background concerning asbestos litigation and legal procedure. Section III examines how the three procedural innovations and plaintiffs' choice of jurisdiction 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 presents the data on the relationship between asbestos damage awards and settlement costs. Section VII concludes.

II. Asbestos Litigation: Some 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. Asbestosis is non-cancerous scarring of the lungs due to inhaled asbestos fibers, which causes loss of lung capacity. It varies in severity from not disabling at all to severely disabling. Asbestosis and mesothelioma are both uniquely associated with asbestos exposure. Pleural plaque is scarring or thickening of the pleural membrane and is non-disabling. An important factor in asbestos litigation is that most plaintiffs have little or no asbestos-related impairment. The proportion of plaintiffs who claim to have asbestos-related cancers declined from 20% during the 1980's to less than 10% by the mid-1990's (Carroll et al, 2002).

The probability of victims' asbestos disease becoming more serious depends on the length and intensity of their exposure, but because asbestos diseases involve very long latency periods, 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.[8] Thus asbestos litigation is characterized by claimants with little or no impairment racing to file early.[9]

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 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 a small number of firms each representing thousands of plaintiffs (Carroll et al, 2002). Law firms recruit plaintiffs by advertising widely. They also offer free X-rays to screen for asbestos fibers in the lungs to potential plaintiffs who sign retainer agreements with the firm. Large numbers of textile workers have filed asbestos claims over the past few years based on lung X-rays. Textile factories have ventilation systems to filter textile fibers out of the air and building codes in the past required that these systems be lined with asbestos insulation. Because X-rays can detect low levels of asbestos fibers in the lungs and because screeners tend to find asbestos fibers more often than they are actually present, few of these claimants have any disability (Carroll et al, 2002).

Plaintiffs' lawyers are paid on a contingency fee basis, keeping 33 to 40% of any settlement or damage award. Because plaintiffs are unsophisticated, plaintiffs' lawyers determine the litigation strategy. Plaintiffs' lawyers greatly favor settlements over trials, because trials are time-consuming and contingency fees do not compensate lawyers for their time costs at trial. A common strategy in asbestos litigation is for plaintiffs' lawyers to file several thousand asbestos claims in the same court, combining a few plaintiffs who have mesothelioma or other cancers and a large mass of plaintiffs who are unimpaired. Each plaintiff sues 20 to 50 defendant firms. Lawyers use the threat of taking the cancer claims to trial to induce defendants to settle the entire mass of claims, including those of unimpaired plaintiffs.

An important aspect of asbestos litigation is plaintiffs' lawyers' right to choose where to litigate their claims. Most asbestos claims are filed in state courts and plaintiffs' lawyers

[8] 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.
[9] Miceli and Segerson (2002) provide a model showing the conditions under which there is a race to file lawsuits.

concentrate claims in states that have favorable legal rules and in jurisdictions within those states that have favorable judges and juries. Mississippi is a favored location because its liberal joinder rules allow asbestos claims from all over the country to be litigated there. Plaintiffs' lawyers file a single case that involves a Mississippi resident suing an out-of-state defendant and then join thousands of out-of-state claims to the original case. Mississippi and several other states are also favored because they have no limits on the size of punitive damage awards. Not surprisingly, Mississippi is reported to have 20% of all asbestos claims (Parloff, 2002). Other favored locations for asbestos litigation are West Virginia, Madison Co., Illinois, and Houston, Texas.

Judges also have enormous influence over asbestos litigation. Judges decide when to schedule a particular trial, whether to use the procedural innovations, whether to admit particular types of evidence at trial, and (in some states) whether to instruct the jury to consider awarding punitive as well as compensatory damages. Some judges also encourage the parties to negotiate mass settlements and may become personally involved in the negotiations.[10]

III. Theoretical Discussion

I start with an extended version of the standard trial versus settlement model (Wittman, 1985). The combined expected return to the plaintiff and the plaintiff's lawyer from trial of a single asbestos claim is $p_p D_p + e_p - wT^1 - R_p + X_p$. 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. 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 lottery of going to 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 is the external effect of the particular claim on other asbestos claims that the same law firm represents. For example, X_p is positive if plaintiffs' lawyers expect an unusually favorable trial outcome and if they represent large numbers of other claims whose value would increase following the trial.

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

Defendants, unlike plaintiffs, are assumed to be informed and to make their own litigation decisions. The defendant's expected cost of going to trial is $p_d D_d + e_d + C_d + R_d + X_d$, where the d subscripts denote the defendant and most of the terms are analogous to those for the plaintiff. C_d is the defendant's legal cost of going to trial. The defendant's risk premium, R_d, is assumed to increase 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 external effect X_d of a particular claim involves how it affects the number of claims that plaintiffs' lawyers file against the defendant in the future. 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 claims filed in the future, since representing these claims is profitable even if they go to trial. Thus X_d is zero for high damage claims and negative for low damage claims.

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.[11]

Decisions are made at two points in time. First, plaintiffs' lawyers choose where to file claims. Later, judges choose whether to use the procedural innovations. I consider first how each of the three procedural innovations affects trial time, the probability of settlement, and the outcome of trial. Then I consider lawyers' choice of jurisdiction.

Consolidation. In consolidated trials, a single jury is used to decide all claims, but it makes separate decisions for each plaintiff's claim against each defendant.[12] Both state and Federal rules of legal procedure require that consolidated cases have "common issues of law or fact." In

[11] This simple model assumes that a single plaintiff bargains with a single defendant. 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. Although asbestos litigation often involves multiple plaintiffs bargaining with a single defendant, these externalities are less important because plaintiffs are usually represented by the same plaintiffs' law firm. Chang and Sigman (2000) model joint and several liability.

[12] 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 the entire class. 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).

asbestos cases, these include evidence concerning the harmful effects of asbestos and the causal link between exposure to asbestos and development of particular diseases. Sometimes plaintiffs whose cases are consolidated worked at the same workplace or had the same occupation, so that common issues may also include whether they 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 from asbestos exposure.

Consolidating N cases reduces the total time required for trial, because only one jury must be selected and common issues are presented once rather than N times. Consolidating N cases for trial also raises the probability of settlement by making trial outcomes more positively correlated, so that going to trial becomes more risky. Trial outcomes in consolidated trials are more positively correlated because a single jury decides all cases rather than different juries deciding each case. Also, evidence concerning all N plaintiffs is presented before the jury makes any decisions, so that the jury in a consolidated trial decides all N cases based on the same information. Because the risk of going to trial is higher when cases are consolidated, the risk premiums R_d and R_p both rise. This makes the settlement range in eq. (1) larger and makes settlement more likely. These factors suggest that judges with crowded dockets have an incentive to consolidate their asbestos trials. I present evidence below showing that consolidation in fact increases the degree of correlation of asbestos trial outcomes.[13]

Now consider how consolidation affects trial outcomes. Consolidation changes the information set available to the jury, because the jury hears evidence about all of the plaintiffs before it makes decisions for any one plaintiff. This means that juries in consolidated trials have more information than juries in independent trials. While additional information in theory can have any effect on outcomes, in practice it seems likely to benefit plaintiffs. As an example, some asbestos defendants appear callous because they failed to label their products as dangerous and this makes juries more sympathetic to plaintiffs. Since consolidated trials have more defendants, there is a higher probability that at least one defendant will appear callous. Also plaintiffs in consolidated trials have a mixture of low and high-severity diseases and juries often (mistakenly) infer that less severe diseases will inevitably become more severe over time. This

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

makes juries more sympathetic to plaintiffs with low severity diseases and is likely to increase their damage awards.

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. Straight bifurcation involves deciding liability in phase one, while reverse bifurcation—more commonly used in asbestos trials--involves deciding damages in phase one.[14]

Bifurcation saves the time required for phase two of the trial if settlement occurs after phase one. The time savings are $s_b T_2^N$, where s_b is the probability of settlement after phase one and T_2^N is the time required for phase two of a consolidated trial involving *N* plaintiffs. I argued above that settlement is more likely to occur when more cases are consolidated for trial, so that s_b increases as N rises. In addition, T_2^N increases as *N* rises, since each phase of trial takes longer 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 following phase one of a bifurcated trial versus before the trial begins. Resolving damages increases the probability of settlement by reducing the two sides' disagreement over damages, so that D_p and D_d approach each other, and resolving liability has the same effect on the two sides' disagreement over liability, so that p_p and p_d approach each other. This suggests that if settlement has not occurred by the time the trial begins, judges will find it attractive to use bifurcation, because part of the time required for a full trial can still be saved if the parties settle after phase one.

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 (Wittman, 1986, and White, 1992). Bifurcation therefore affects trial outcomes by eliminating some of the evidence that juries would otherwise consider in making their damage 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

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

exposed to particular defendants' asbestos products). If the jury had both types of evidence, then it might decide that a plaintiff's damage is, say, $500,000, but award only $250,000 because of doubt over whether the defendant should be liable. However in a bifurcated trial, the jury might decide only damages in phase one, so that in the example it does not hear evidence concerning liability and therefore awards 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 bifurcated trials will 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 *N* cases. Following the trial, the judge directs the parties to negotiate a settlement of the remaining $N - S$ cases and may threaten to use the same jury to decide additional cases and decide punitive damages if no settlement is agreed on. The alternative to a bouquet trial is a consolidated trial of all *N* cases. I assume that bouquet trials are not bifurcated.

The expected time for a consolidated trial of *N* cases is T^N, while the expected time to resolve the same *N* cases using a bouquet trial of *S* cases is $T^S + (1 - s_B)T^{N-S}$. Here s_B is the probability that the large group settles after the bouquet trial and T^N, T^S and T^{N-S} are the times required for trials of *N*, *S* and *N-S* cases, respectively. Suppose $T^N = T^{N-S}$, i.e., the time required for a consolidated trial is the same regardless of whether a bouquet trial has occurred. Then the time savings from a bouquet trial is $s_B T^N - T^S$. This expression increases as *N* rises, because T^N is positively related to *N*, but T^S is not. This suggests that judges' incentive to use bouquet trials increases as consolidations become larger. Bouquet trials in effect allow consolidation 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 versus settling *N* cases without a bouquet trial. Because judges often use the same jury for additional cases in the large group if the parties do not settle following the bouquet trial, the bouquet trial causes p_p and p_d to approach each other and D_p and D_d to approach each other. The bouquet trial also signals that the outcomes of the large group will be highly correlated with the outcomes of the small group, thus raising the risk of trial. Both effects make settlement more likely.

Finally, consider how bouquet trials affect damage awards. An important point is that high damage awards in bouquet trials make it very likely that the parties will settle the remaining $N - S$ claims. This is because if they do not settle and the jury awards the same high damages to all plaintiffs in the large group, defendants' solvency could be threatened. Because judges want the large group to settle, they therefore have an incentive to encourage juries to award high damages in bouquet trials.[15] 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 cases and to decide punitive damages. The defendants appealed to the Mississippi Supreme Court on the grounds that the judge was biased in plaintiffs' favor, but their appeal was unsuccessful. Faced with the possibility that damage awards could be as high as ($4,000,000)(1,738) = $7 billion, the defendants settled the large group on very favorable terms for plaintiffs (Parloff, 2002). Even paying a small fraction of this amount could exhaust the insurance coverage and threaten the solvency of many defendants, so that they were willing to pay highly to settle.[16] 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., X_d is low or negative. Thus judges have an interest in bouquet trials leading to high damage awards, because high damage awards are more likely to lead to mass settlements.

Plaintiffs' lawyers' choice where to file asbestos claims. Finally, consider plaintiffs' lawyers choice of state and choice of jurisdiction within the state. In choosing a jurisdiction, plaintiffs' lawyers take account of the fact that some states have favorable legal rules, that win rates and damage awards are higher in certain jurisdictions, and that judges' probabilities of using the procedural innovations vary across jurisdictions. Plaintiffs' lawyers also take account of the effect of concentrating their cases in particular jurisdictions. One jurisdiction may be best for mesothelioma claims, while another may be best for unimpaired plaintiffs' claims. But plaintiffs' lawyers may nonetheless file both types of cases in the same jurisdiction, because

[15] In the standard trial versus settlement model given in eq. (1) above, higher predicted damage awards increase the likelihood of trial rather than settlement. However higher damage awards in the bouquet trial context are likely to have the opposite effect, because they threaten defendant firms' solvency and therefore raise defendants' risk premium, R_d.

[16] Priest (1997) makes a similar argument that class actions hurt defendants by threatening their solvency and therefore forcing them to settle dubious claims rather than face the risk of trial.

doing so lengthens the dockets of judges in the jurisdiction and increases the probability that judges will use the procedural innovations.

IV. Data and summary statistics

The dataset includes nearly all asbestos trials that occurred between mid-1987 to March 2003—about 5,800 trials in total.[17] Trials are included as long as a decision was reached on either liability or damages. Regardless of whether trials were consolidated or not, each plaintiff is a separate observation. Because information concerning very large consolidated trials is often missing, those with more than 200 plaintiffs are excluded from the calculations.

Plaintiff-specific variables include the plaintiff's alleged disease, whether the plaintiff died before trial, whether the plaintiff smoked, the number of defendants that each plaintiff sues, and the outcome of the trial. Trial-specific variables include the date of the trial, whether the trial was in state or Federal court, the jurisdiction in which the trial occurred (for trials in state court), the number of claims consolidated, and whether the trial was bifurcated or was a bouquet trial.

Summary statistics are given in Table 1. About 27% of all trials occur in Pennsylvania, because large numbers of workers were exposed to asbestos at Philadelphia-area naval shipyards. Texas and California each have more than 10% of trials. The jurisdictions that are reported to be very pro-plaintiff, including Mississippi, West Virginia and Madison Co., Illinois, have relatively few trials. (No specific jurisdictions are broken out in West Virginia or Mississippi, because few trials occurred in these states.) About 14% of asbestos trials occur in Federal court.

The distribution of diseases is mesothelioma--18%, lung and other cancers--13%, asbestosis--47%, and pleural plaque--14%. The remaining 8% of plaintiffs have missing disease data—generally in large 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 lung cancer plaintiffs are identified as smokers. Because virtually all plaintiffs are male, no sex variable is used. Plaintiffs' average age was about 65 and 14% of plaintiffs died before their trials.

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[17] Data are taken from two asbestos litigation reporters, *Andrew's* (trials before April 1990) and *Mealey's* (trials starting in April 1990). Both reporters claim to cover all asbestos trials. To check on the comprehensiveness of their trial coverage, I compared trials reported in *Andrew's* versus *Mealey's* for a five month period in late 1990. During the period, *Andrew's* reported 316 trials, including seven that were not reported in *Mealey's*. Assuming that the two reporters together cover all trials, this suggests that the dataset is about 97% complete. However of the seven omitted trials, five were defense verdicts, suggesting that the plaintiff win rate may be slightly overstated.

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 consolidated trials involving six or more plaintiffs. About 19% of plaintiffs have bifurcated trials and 4% have bouquet trials. Bifurcation and small consolidations are negatively correlated (-.16), while bifurcation and large consolidations are positively correlated (.21).

Half of all trials involve a single defendant, 27% involve two or three defendants, and 23% involve four or more. Most plaintiffs originally sued many more than four defendants, but defendants are only counted if they did not settle by the time the jury decided the case.

The outcome variables are given at the bottom of table 1. Plaintiffs win 64% of asbestos trials—a high figure compared to most types of litigation.[18] The average compensatory damage award, conditional on damages being awarded, is $812,000 (all dollar figures are in 1987 dollars).[19] Conditional on winning, plaintiffs' probability of being awarded punitive as well as compensatory damages is 17%, 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 positive punitive damages, is $1.4 million. The expected return from going to trial, including both types of damage, is $648,000.

Table 2 gives time trends. The number of trials has fallen since the early 1990's, while at the same time the number of asbestos claims was growing rapidly (Carroll et al, 2002). Expected real damage awards also increased starting in the late 1990's.

Table 3 shows that use of the procedural innovations varies widely across states and across courts within particular states. For example, the proportion of trials that are bifurcated varies from zero in Madison County, IL, to 47% in Manhattan (New York County), NY. In Mississippi state courts, 79% of all trials were bouquet trials, but most jurisdictions had no bouquet trials at all. The proportion of plaintiffs who had small consolidated trials of two to five plaintiffs varied from 7% in Houston, TX, to 44% in Philadelphia. Another difference among jurisdictions is the propensity to award punitive damages. No plaintiffs were awarded punitive damages in Philadelphia or the rest of Pennsylvania, while 87% of plaintiffs who won compensatory

[18] 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. Some states apply joint and several liability to damage awards, meaning that each defendant who is found liable is responsible for up to the entire damage award. In the rest, the jury divides the damage award among the defendants.

[19] Defendants do not necessarily pay the damage awards listed here, since they 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.

damages also received punitive damages in Madison Co., IL. The propensity of courts to award punitive damages does not depend exclusively on state legal rules, since 3% of Baltimore plaintiffs who won their cases received punitive damages, compared to 45% of plaintiffs in other state courts in Maryland.

Now turn to whether consolidating claims makes trial outcomes more risky by increasing the correlation of the outcomes. 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 consolidated trials of two 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 states and are unlikely to be paired with plaintiffs who have different diseases. Therefore I first estimate probit (tobit) regressions explaining whether plaintiffs win (the damage award) as a function of dummy variables for all states that had more than a few trials, disease variables, and smoking variables. Using the regression results I predicted the outcome variables for each plaintiff and then used the predicted values to compute the correlation coefficient for the random pairs. The analogous procedure is followed for three-plaintiff consolidated trials, etc.

Results are shown in table 4. The correlation coefficient for compensatory damages in two-plaintiff consolidations is .78 for actual pairs compared to .36 for random pairs. For punitive damages, the figures are .98 versus .01 and, for expected total damage, they are .90 versus .39. The results for consolidations of more than two plaintiffs are similar. These results support the hypothesis that consolidating cases for trial increases the correlation of the outcomes and therefore makes going to trial more risky.

V. Empirical Results

I use probit models to explain whether plaintiffs won and whether they received punitive damages conditional on winning and tobit models to explain compensatory damages and punitive damages conditional on winning. The right hand side variables are dummy variables measuring trial location and use of the procedural innovations and plaintiff-specific variables representing disease, smoking behavior, and number of defendants.

A potential problem is whether the coefficients of the procedural innovation and trial location variables could be biased upward because they are related to unobserved plaintiff characteristics. For example, suppose certain plaintiffs elicit jurors' sympathy and therefore receive higher damage awards. If lawyers tend to file sympathetic plaintiffs' cases in particular courts or judges tend to consolidate cases involving sympathetic plaintiffs, then the coefficients of these variables could be biased upward because they capture the effect on trial outcomes of plaintiffs being sympathetic. But in practice this seems unlikely. Judges decide whether to use the procedural innovations before the start of trial, when they know little about individual plaintiffs. Endogeneity is more likely to be an issue for the trial location variables, since lawyers know plaintiffs' unobserved characteristics and may choose different jurisdictions for trial depending on plaintiffs' types. But the high concentration of asbestos claims in a few jurisdictions suggests that certain trial locations are the most profitable regardless of plaintiffs' types. Also, I argued that plaintiffs' lawyers have an incentive to concentrate claims in particular jurisdictions in order to clog judges' dockets and induce them to use the procedural innovations. This means that lawyers may prefer to file all of their claims in the same jurisdiction even if particular plaintiffs' claims have higher value elsewhere, because the return for all claims is higher if they are concentrated in a particular jurisdiction. I discuss this issue further below.

Table 5 gives the results of a probit regression explaining whether defendants were found liable for damage (whether plaintiffs won) and a tobit regression explaining compensatory damage awards (in logs). The sample for the probit model is all trials in which liability was decided and the sample for the tobit model is all trials in which compensatory damages were decided (damages equal zero if the plaintiff lost). Table 6 gives results of a probit model explaining whether punitive damages were awarded and a tobit model explaining the punitive damage awards (in logs). The samples for both of the models in table 6 are all cases in which the plaintiff won on the issue of liability. All models include year dummy variables and dummy variables for all states that had more than a few trials.[20] The probit results are given as marginal effects measured in percentage points. The tobit results are given both as coefficients and

[20] The excluded states are VT, NH, RI ID, NB, SD, MT, WY, NV, KS, AR, NM, AZ, OR, AK, TN, IN, ME, NC, and MN. Dummy variables are included for the following jurisdictions: Madison Co., IL; New York Co., NY; Baltimore City/County, MD; Philadelphia, PA; Houston (Harris Co.), TX; Dallas Co., TX; and San Francisco, CA. An additional dummy variable is also included for all other jurisdictions within each of these states.

marginal effects measured in 1987 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. The bifurcated trial dummy is entered by itself and also interacted with the small and large consolidated trial dummies. The results show that plaintiffs are more likely to win and receive higher compensatory damages when the procedural innovations are used. Plaintiffs in small consolidated trials are 12 percentage points more likely to win and they receive $614,000 more in compensatory damages than plaintiffs that have individual trials. If small consolidated trials are also bifurcated, then plaintiffs receive an additional $2 million in damages. Plaintiffs in large consolidated trials that are bifurcated are 30 percentage points more likely to win and receive $2.26 million more in compensatory damages, compared to plaintiffs who have individual, non-bifurcated trials. Having a bouquet trial has no effect on whether plaintiffs win, but it is associated with an additional $961,000 in compensatory damages. All of these effects are statistically significant and they suggest that the procedural innovations give plaintiffs an important advantage in litigation. However none of the procedural innovations are associated with an increase in plaintiffs' probability of receiving punitive damages. But plaintiffs in small consolidated trials that are bifurcated receive an additional $3.9 million in punitive damages compared to plaintiffs who have non-bifurcated, individual trials.

Trial outcomes also differ significantly across locations. Plaintiffs in West Virginia and Mississippi are 21 percentage points more likely to win than those in the excluded states (although only the West Virginia coefficient is statistically significant). Plaintiffs in Philadelphia and those whose claims are filed in Federal court are both 18 percentage points less likely to win than plaintiffs in the excluded states. Compensatory damage awards are between $1.6 and 2.5 million higher in Mississippi, West Virginia and Houston than in the excluded states, while they are $600,000 lower in Philadelphia than in the excluded states. Plaintiffs in Madison Co. are 85 percentage points more likely to receive punitive damages than plaintiffs in the excluded states, while those in Mississippi, West Virginia and Houston are 30 to 37 percentage points more likely to receive punitive damages. In contrast, plaintiffs in Pennsylvania are 13 percentage points *less* likely to receive punitive damages, compared to the excluded states. Jurisdictions that award punitive damages more frequently also tend to make higher punitive damage awards. Plaintiffs receive between $1.8 and 3.9 million more in Madison Co., Houston, West Virginia and Mississippi than in the excluded states, while those in Manhattan, Baltimore and all jurisdictions

in Pennsylvania receive between $2.5 and $3.2 million less. These results suggest that plaintiffs' lawyers get high returns from concentrating their filings of asbestos claims in locations that are particularly pro-plaintiff.

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 21 percentage points more likely to win than those who have pleural disease and they receive $2.4 million more in compensatory damages and $600,000 more in punitive damages. An interesting result is that plaintiffs who smoke are 11 percentage points more likely to win at trial and they receive an additional $681,000 in compensatory damages. This is probably because smokers tend to be sicker than non-smokers. However if plaintiffs have lung cancer and also smoke, then they are about equally likely to win as plaintiffs who have pleural disease and do not smoke Presumably the negative effect of lung cancer and smoking together reflects juries' difficulty in deciding whether asbestos exposure or smoking caused plaintiffs' lung cancer.

The last set of variables examines whether having multiple defendants at trial affects plaintiffs' probability of winning. When there are two or three defendants rather than one, plaintiffs' probability of winning is not significantly different, but they receive $402,000 more in compensatory damages. When there are four or more defendants, plaintiffs' probability of receiving punitive damages falls by 6 percentage points and the amount of punitive damages falls by $916,000. These results are all statistically significant. The latter result may reflect the fact that juries must assign liability for punitive damages to particular defendants, and they may have difficulty distinguishing among defendants' behavior. Thus additional defendants at trial have a mixed effect on trial outcomes.

Taking the results in tables 5 and 6 together, the models explaining liability for damages fit better than the models explaining damage levels. For compensatory damages, the R^2 value is .15 for whether damages are awarded, compared to only .05 for the level of damages. For punitive damages, the values are .32 versus .15. 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 that resolves damages in phase one has a

better chance of causing the parties to settle than a straight bifurcated trial that resolves liability in phase one.[21]

Table 7 gives the results of a tobit regression explaining plaintiffs' expected return from trial including both types of damage (in logs). The sample omits trials in which liability was not decided and damages are set equal to zero in trials where positive damages were awarded in phase one, but the defendant was found not liable in phase two. (Damages also equal zero in trials that plaintiffs lost.) Plaintiffs in small consolidated trials that were not bifurcated receive $738,000 more than plaintiffs in individual non-bifurcated trials, while plaintiffs in small consolidated trials that were bifurcated receive $2,346,000 more. Plaintiffs in large consolidated trials that were not bifurcated receive $353,000 less than plaintiffs in individual non-bifurcated trials, while plaintiffs in large consolidated trials that were bifurcated receive $2,329,000 more. Thus bifurcation combined with consolidation increases plaintiffs' expected return at trial by a factor of five. Plaintiffs in bouquet trials receive $909,000 more than plaintiffs in individual trials. All of these effects are highly significant. Plaintiffs in the three most pro-plaintiff jurisdictions of Mississippi, West Virginia and Houston, Texas, receive $2.6 million, $1.7 million, and $2.1 million more than plaintiffs in the excluded states, respectively. Thus it is not surprising that all three of these jurisdictions have become centers for asbestos litigation. But, surprisingly, plaintiffs in Madison County do not receive significantly more than plaintiffs in the excluded states. Plaintiffs in Philadelphia receive $712,000 less than those in the excluded states.

Now consider again whether the coefficients of the procedural innovation dummies are biased upward because they capture the effect of unobservable plaintiff characteristics. Suppose we assume that plaintiffs' observable and unobservable characteristics are positively correlated—for example, whether plaintiffs elicit sympathy from jurors is likely to be correlated with the severity of their disease. Then a finding that use of the procedural variables isn't positively and significantly related to observable plaintiff characteristics would imply that use of the procedural variables isn't significantly related to plaintiffs' unobservable characteristics. To test for whether use of the procedural variables is related to observable plaintiff characteristics, I first constructed a summary measure of the observables by running a regression of expected return at

[21] Sunstein et al (2002) ran experiments in which mock juries hear legal cases and decide on both compensatory and punitive damages. Similar to the results here, they found that juries' decisions concerning whether to award damages were fairly predictable, but their decisions concerning the dollar amounts of damages were not.

trial on all of the plaintiff-specific variables and then used the estimated model to predict each plaintiff's expected return. Suppose the vector of predicted expected returns is denoted $\hat{D}$. Then I ran probit models explaining each of the procedural innovations as a function of $\hat{D}$, plus trial location dummies and year dummies. In models explaining bifurcation, large consolidations, and the interaction of the two, the coefficients of $\hat{D}$ turned out to be negative and statistically significant; while in the models explaining bouquet trials, small consolidations, and the interaction of bifurcation and small consolidations, the coefficients of $\hat{D}$ were positive but not statistically significant. These results suggest that the coefficients of the procedural variables in the models explaining trial outcomes are not biased upward.[22]

Overall, the results support the hypotheses that use of the procedural innovations increases plaintiffs' expected return from trial and that lawyers can greatly increase the expected value of their cases by filing them in favorable states and jurisdictions.

VI. The Relationship between Asbestos Trials and Settlements

Less than one percent of asbestos claims are tried in court, while the rest are settled without going to trial.[23] This means that whether using the procedural innovations and filing cases in favorable jurisdictions raises asbestos litigation costs depends on the relationship between trial outcomes and settlement costs. In this section, I present evidence suggesting that pro-plaintiff trial outcomes raise settlement levels and attract additional claims, both of which raise companies' asbestos litigation costs.

Since settlements are normally secret, there is little publicly-available evidence about them. But mass settlements are occasionally reported and publicly traded companies are required to report asbestos litigation if it could have a material impact on the company's financial situation--although they often fail to do so. Using information from newspapers, asbestos newsletters and filings with the Securities and Exchange Commission, I constructed data on the average settlement

[22] These models were estimated using OLS. The coefficients (standard errors) of $\hat{D}$ are -.030 (.002), .00091 (.0011), .0026 (.0031), -.051 (.0034), .0021 (.00146) and -.017 (.0023) in the models explaining bifurcation, bouquet trials, small consolidations, large consolidations, bifurcation*small consolidations, and bifurcation*large consolidations, respectively.

[23] This figure is the ratio of 5,800 asbestos trials to 600,000 asbestos plaintiffs (Carroll et al, 2002). Note that the trial rate for an individual plaintiff suing an individual defendant is much lower, because plaintiffs settle with most defendants before trial (but a trial occurs unless all defendants have settled).

cost per claim and the number of claims pending by company by year.[24] For each company-year, I then used the dataset of asbestos trials to calculate the average damage award against the company during the previous three years and the number of trials in which the company was a defendant during the previous three years. Damage awards equal zero if the company won at trial and each plaintiff is counted as a separate trial. Thirty-three companies are represented, with an average of three years of data per company. The sample over-represents companies with large asbestos liabilities, since these companies are most likely to report their asbestos litigation costs.

The average settlement cost per claim resolved is $3,520 in 1987 dollars, the average damage award is $1.47 million in 1987 dollars, and the average punitive damage award is $691,000 (column (5) of table 8). Based on the model discussed in section III, settlement levels seem very low compared to damage awards. This is mainly because settlements are much more likely than trials to involve claimants who are unimpaired. The average company was a defendant in 89 trials over the previous three years, but about 10% of companies had no trials at all.

Table 8, columns (1) and (2), report the results of regressions explaining the average settlement level as a function of damages awards at trial. Damages are entered first as total damages and then broken down into compensatory and punitive damages. Robust standard errors clustered by company are given in parentheses. Total damages are significant at the 10% level ($p = .100$). Breaking down damages into their two components, all of the effect of damages on settlements comes from the punitive damage term, which is positive and just short of statistical significance at the 10% level ($p = .108$). If punitive damage awards against a company doubled from the average level of $691,000, then the company's average settlement level is predicted to increase by $449, or 13%. It is not surprising that punitive damages have a higher marginal effect on settlements than compensatory damages, since being liable for punitive damages sends a particularly strong signal that the defendant is vulnerable to asbestos claims. The number of trials in the past three years is entered both as a dummy variable for zero trials and an additional variable for number of trials. Companies that are defendants in more trials are predicted to pay higher settlements, because trial outcomes are public information and they signal to plaintiffs' lawyers that the company is a target of litigation. The zero trial dummy is intended to capture the advantage of not sending this signal

[24] The average settlement cost figure is actually total asbestos litigation costs divided by the number of claims resolved that year. This figure is higher than the average cost of settlements, since it includes the cost of paying damage awards. But this distortion is likely to be small since the number of damage awards is small compared to the number of settlements. The number of pending claims against the company is used rather than the number of new claims filed, because the latter is rarely reported.

(Daughety and Reinganum, 1999). Although the zero trials variable is not statistically significant in either regression, the large negative coefficients suggest that having zero trials gives companies a big advantage in settlement bargaining. For companies that do have trials, each additional trial raises the average settlement level by about $11 and the relationship is strongly statistically significant.

Columns (3) and (4) report the results of regressions explaining the number of asbestos claims pending against the company. Again higher total damages are significantly related to the number of claims pending at the 10% level (p = .065) and punitive damages are significant at the 1% level. If the average punitive damage award against a company doubled, then the model predicts that the number of claims against it will increase by 9,500.

Overall, these results suggest that when companies pay higher damage awards and are defendants more frequently at trial, their average settlement costs increase and they attract additional claims—both of which raise their asbestos litigation costs.

VII. Conclusion

This paper argues that asbestos litigation has grown to become a crisis because filing asbestos claims is extremely profitable. Plaintiffs' lawyers concentrate large numbers of claims in particularly pro-plaintiff jurisdictions and judges respond to lengthy dockets by adopting procedural innovations that are intended to clear their dockets by encourage mass settlements. These procedural innovations not only encourage settlements, but also make trial outcomes more pro-plaintiff. As a result, representing asbestos claims is very profitable for plaintiffs' lawyers. 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.

The paper presents two types of evidence to support these claims. First I use a new dataset of asbestos trials from 1987-2003 to show that use of the procedural innovations increases plaintiffs' expected return from trial and therefore increases plaintiffs' lawyers' incentives to file additional asbestos claims. Having either a small or large consolidated trial that is also bifurcated is associated with an increase of $2.3 million in plaintiffs' expected return from trial, compared to having an individual trial that is non-bifurcated. Bouquet trials are associated with an increase of $900,000 in plaintiffs' expected return compared to non-bouquet trials. In

addition, by filing claims in pro-plaintiff jurisdictions such as Mississippi, West Virginia, and Houston, Texas, plaintiffs' lawyers can increase the expected return from trial by $1.7 to $2.6 million, compared to filing in states with little asbestos litigation. Not surprisingly, Mississippi, West Virginia and Texas have become centers for asbestos litigation—the percent of all asbestos claims filed in these three states rose from 7% in 1970-87 to 38% in 1994-97. In contrast, plaintiffs in Philadelphia received $800,000 less than plaintiffs in the excluded states and the percent of asbestos claims filed in Pennsylvania declined from 17% to 3% during the same period (Carroll et al, 2002, p. 32).

Since most asbestos claims are settled rather than tried in court, I also examine the relationship between companies' settlements costs and the outcomes of trials in which they were defendants during the previous three years. The results suggest that when higher damages are awarded against companies at trial and when companies are defendants in more trials, they pay more to settle claims out of court. Also when damage awards are higher, the company attracts additional claims.

How will the asbestos crisis end? Since state courts created the crisis, state-level legal reform is unlikely to resolve it. If the most favorable states adopted reforms, then the litigation would simply shift to the next-most-favorable states and, if other states adopted reforms, there would be no effect at all. Thus some Federal-level solution is needed. Currently, Congress is considering legislation that would transfer all asbestos litigation to a trust. The trust would be funded with payments from asbestos defendants and insurers and would pay claimants according to a fixed schedule that depends mainly on their disease. Whether the trust would end the stream of firms going bankrupt due to asbestos liabilities depends on whether and how generously it decides to compensate claimants who have asbestos exposure, but little or no disability. If the trust provides generous compensation to this group of claimants, then it will end up contributing to the asbestos problem rather than the asbestos solution.

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Table 1: Summary Statistics

	Mean	Std. Dev.
State/court in which trial occurred		
Pennsylvania	.272	.445
New York	.042	.201
West Virginia	.024	.154
Texas	.120	.325
New Jersey	.057	.233
Mississippi	.006	.080
California	.108	.311
Philadelphia, Pennsylvania	.201	.401
Manhattan, New York	.033	.178
Houston, Texas	.038	.190
Madison Co., Illinois	.0055	.074
Baltimore, Maryland	.036	.186
San Francisco, California	.043	.203
If Federal court	.140	.347
Number of cases consolidated for trial		
1 (individual trials)	.249	.432
2-5	.263	.440
6 or more	.485	.500
If bifurcated trial	.185	.389
If bouquet trial	.038	.191
Disease		
Mesothelioma	.176	.381
Lung cancer	.112	.316
Other cancer	.017	.128
Asbestosis	.467	.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
Number of defendants at trial		
1	.499	.500
2-3	.275	.447
4 or more	.225	.418
Outcome variables		
If defendant found liable	.641	.480
Compensatory damages (if positive)	$812,000	$1,830,000
If punitive damages (if def. found liable)	.172	.378
Punitive damages (if positive)	$1,370,000	$2,850,000
Expected total damages	$648,000	$1,910,000

Notes: Consolidations of more than 200 plaintiffs are omitted. Dollar figures in 1987 dollars.

Table 2:
Time Trends

	Number of trials per year	Expected damages	Number of claims filed per year against five large defendants
1987-89	150	$632,000	
1990-91	837	446,000	81,000
1992-93	480	339,000	101,000
1994-95	420	613,000	133,000
1996-97	343	565,000	141,000
1998-99	148	1,310,000	222,000
2000-03	101	1,990,000	

Notes: Dollar figures are in 1987 dollars. Calculations of the number of trials exclude consolidated trials involving more than 200 plaintiffs. Data on number of claims filed are taken from Carroll et al (2002, p.39).

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

	Bifurcated trials	Bouquet trials	Small consolidations (2 to 5 plaintiffs)	Large consolidations (more than 6 plaintiffs)	If punitive damages awarded
Philadelphia PA	.12	0	.44	.46	0
Mississippi	0	.79	.21	.79	.36
Houston TX	.005	0	.07	.91	.42
Madison Co. IL	0	0	.14	.55	.88
San Francisco CA	.14	0	.15	.20	.15
Baltimore MD	.04	0	.44	.53	.03
Other MD	.14	.09	.50	.30	.45
Manhattan NY	.47	0	.44	.47	.007
Federal courts	.28	.22	.18	.53	.25

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

Number of cases per trial	Actual versus random	If compen-satory damages awarded	Compen-satory damages	If punitive damages awarded	Punitive damages	Expected total damages
2	Actual	.74	.78	.88	.98	.90
	Random	.14	.36	.20	.01	.39
3	Actual	.70	.60	.95	.994	.84
	Random	.13	.31	.13	.11	.31
5	Actual	.58	.85	.85	.99	.92
	Random	.08	.11	.41	.14	.39
6-7	Actual	.64	.98	.90	.63	.97
	Random	.18	.47	.17	.20	.49

Table 5:
Results Explaining Whether Plaintiffs Win and Compensatory Damages

	If Plaintiffs Win	Compensatory Damages (in logs)	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-5 case consolidation	12.0 (3.1)*	1.39 (.387)*	$614,000
>= 6 case consolidation	-1.0 (4.1)	-.972 (.393)*	-425,000
2-5 case*Bifurcation	19.3 (12.1)	4.56 (1.08)*	2,000,000
>=6 case* Bifurcation	30.0 (6.7)*	6.17 (.984)*	2,700,000
Bifurcated trial	4.10 (9.7)	-.034 (.800)	-15,000
Bouquet trial	-1.6 (24.1)	2.19 (.892)*	961,000
State/Jurisdiction			
Mississippi	20.6 (15.0)	5.81 (1.61)*	2,540,000
West Virginia	20.8 (7.6)*	3.67 (.846)*	1,610,000
Houston, Texas	13.8 (9.5)	4.38 (.722)*	1,920,000
Manhattan, New York	-5.0 (9.2)	1.26 (.751)	548,000
Baltimore, Maryland	-16.0 (10.3)	-.800 (.768)	-351,000
Philadelphia, Pennsylvania	-18.5 (7.5)*	-1.40 (.459)*	-614,000
Pennsylvania--Other	-30.6 (7.7)*	-4.10 (543)*	-1,800,000
Madison Co., Illinois	-21.4 (20.9)	-1.11 (1.59)	-489,000
San Francisco, California	-12.6 (9.3)	-.383 (.667)	-168,000
New Jersey	-2.0 (8.9)	-2.08 (.723)*	-912,000
If Federal court	-18.5 (9.2)*	-1.18 (.550)*	-518,000
Disease and smoking			
Mesothelioma	21.2 (3.2)*	5.50 (.501)*	2,390,000
Lung cancer (smoker)	-11.6 (7.7)	-.730 (.876)	-345,000
Lung cancer (non-smoker)	.38 (4.8)	.474 (.625)	149,000
Other cancer	1.4 (7.6)	1.59 (.959)	542,000
Asbestosis	1.9 (3.1)	.888 (.378)*	310,000
If plaintiff alive at trial	2.6 (4.0)	.312 (.373)	103,000
If plaintiff smokes	11.3 (4.0)*	1.59 (.472)*	681,000
Number of defendants			
2-3	4.3 (3.1)	.989 (.301)*	402,000
4 or more	1.5 (4.0)	.298 (.328)	157,000
Constant		7.16 (1.04)	
Year variables	Included	Included	
Additional state variables	Included	Included	
Pseudo R^2	.147	.053	
Number of obs.	4708	5057	
Number of censored observations		1838	

Notes: Probit results are marginal effects measured in percentage points. Tobit results are given both as coefficients and marginal effects in thousands of 1987 dollars.

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

	If Plaintiffs Win Punitive Damages	Punitive Damages (in logs)	
	Probit	Tobit	
	(marginal effects)	(coefficients)	(marginal effects)
Procedural innovations			
2-5 case consolidation	3.2 (2.4)	2.04 (1.31)	$2,460,000
>=6 case consolidation	1.2 (2.9)	.295 (1.45)	34,900
2-5 case*Bifurcation	33.0 (30.0)	25.9 (7.85)*	3,120,000
>=6 case* Bifurcation			
Bifurcated trial	-3.8 (4.4)	-14.3 (6.06)*	-1,720,000
Bouquet trial	-1.3 (9.1)	-.923 (4.86)	-111,000
State/Jurisdiction			
Mississippi	34.2 (33.5)	15.8 (5.22)*	1,900,000
West Virginia	30.8 (18.5)*	14.5 (2.35)*	1,760,000
Houston, Texas	37.0 (16.0)*	17.8 (2.38)*	2,150,000
Manhattan, New York	-7.9 (1.3)*	-23.0 (5.97)*	-2,770,000
Baltimore, Maryland	-8.6 (1.4)*	-26.4 (5.59)*	-3,180,000
Pennsylvania	-12.8 (2.1)*	-20.9 (3.28)*	-2,520,000
Madison Co., Illinois	85.2 (8.3)*	32.0 (4.23)*	3,860,000
San Francisco, California	2.8 (4.8)	1.81 (2.41)	217,000
New Jersey	-.91 (4.1)	-.805 (2.70)	-96,400
If Federal court	-3.1 (2.4)	-3.50 (2.06)	-422,000
Disease and smoking			
Mesothelioma	6.3 (3.9)	5.21 (2.00)*	627,000
Lung cancer (smoker)	-1.3 (3.4)	-.962 (3.30)	-116,000
Lung cancer (non-smoker)	4.5 (4.1)	3.56 (2.47)	428,000
Other cancer	9.8 (8.8)	7.57 (3.81)*	916,000
Asbestosis	2.4 (2.7)	2.51 (1.70)	301,000
If plaintiff alive at trial	-1.6 (2.0)	-2.24 (1.36)	-265,000
If plaintiff smokes	-1.6 (2.5)	-1.60 (1.62)	-193,000
Number of defendants			
2-3	-1.6 (2.0)	-1.89 (1.13)	-227,000
4 or more	-6.5 (2.6)*	-7.62 (1.42)*	-916,000
Constant		-8.50 (3.63)	
Year variables	Included	Included	
Additional state variables	Included	Included	
R^2 **or pseudo** R^2	.320	.150	
Number of observations	2701	2780	
Number of censored observations		2294	

Notes: Probit results are marginal effects measured in percentage points. Tobit results are given both as coefficients and marginal effects in thousands of 1987 dollars.

Table 7:
Results Explaining Total Damages

	Total Damages (in logs)	
	Tobit	
	(coefficients)	(marginal effects)
Procedural innovations		
2-5 case consolidation	1.70 (.393)*	$738,000
>=6 case consolidation	-.810 (.400)*	-353,000
2-5 case*Bifurcation	4.60 (1.10)*	2,010,000
>=6 case* Bifurcation	7.07 (1.01)*	3,084,000
Bifurcated trial	-.919 (.824)	-402,000
Bouquet trial	2.08 (.908)*	909,000
State/Jurisdiction		
Mississippi	5.91 (1.64)*	2,580,000
West Virginia	3.95 (.863)*	1,730,000
Houston, Texas	4.79 (.735)*	2,090,000
Manhattan, New York	.683 (.763)	297,000
Baltimore, Maryland	-1.05 (.783)*	-459,000
Philadelphia, Pennsylvania	-1.63 (.467)*	-712,000
Madison Co., Illinois	-.251 (.678)	-507,000
San Francisco, California	-.256 (.679)	-114,000
New Jersey	-1.70 (.737)*	-743,000
If Federal court	-1.14 (.560)*	-498,000
Disease and smoking		
Mesothelioma	5.44 (.509)*	2,390,000
Lung cancer (smoker)	-.791 (.893)	-345,000
Lung cancer (non-smoker)	.336 (.637)	149,000
Other cancer	1.24 (.978)	542,000
Asbestosis	.705 (.384)	310,000
If plaintiff alive	.235 (.380)	103,000
If plaintiff smokes	1.56 (.481)*	681,000
Number of defendants		
2-3	.928 (.307)*	402,000
4 or more	.358 (.333)	157,000
Constant	7.23 (1.06)	
Year variables	Included	
Additional state variables	Included	
pseudo R^2	.054	
Number of observations	5071	
Number of censored observations	1857	

Notes: The sample excludes trials in which no decision concerning liability was made. Also in some trials, damages were decided in phase one, but the defendant was found not liable in phase two. These trials are treated as having zero damages. Results are given both as coefficients and marginal effects in thousands of 1987 dollars.

Table 8:
The Relationship Between Damage Awards and Settlement Levels

	Average Settlement (1)	Average Settlement (2)	Number of Pending Claims (3)	Number of Pending Claims (4)	Mean values
Total damages ($)	.000226 + (.000133)		.00613 + (.00318)		$1,470,000 (2,850,000)
Compensatory damages ($)		-.000219 (.000355)		-.00129 (.00236)	$775,000 (1,770,000)
Punitive damages ($)		.000650 (.000392)		.0137* (.00359)	$691,000 (1,740,000)
If zero trials	-464 (685)	-661 (740)	-8,130 (20,700)	-9,510 (20,700)	.098 (.298)
Number of trials	11.5* (2.55)	10.6* (2.37)	11.5 (23.2)	-1.84 (23.5)	89 (192)
Constant	2290 (517)	2,480 (740)	72,100 (10,400)	73,500 (10,200)	
Average settlement					$3,540 (3,520)
Number of pending claims					82,500 (69,500)
R^2	.38	.39	.17	.13	
N	94	94	125	125	

Note: Regressions use ordinary least squares. Dollar figures are in 1987 dollars. + signs indicate statistical significance at the 10% level.