Are Star Lawyers Also Better Lawyers?

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Abstract

We study the performance of dominant law firms ("stars") in corporate litigation. We use directors' and officers' (D&O) insurance coverage as a benchmark for expected settlement amounts, to separate to what extent (a) stars reach more favorable settlements on any lawsuit or (b) stars pick lawsuits where a favorable settlement is ex ante more likely. Our findings indicate the latter, and that stars have an economically small impact on settlement amounts. This result is not explained by measurement error or over-insurance. The extent to which stars are associated with improvements in corporate governance also appears modest. Overall, our evidence suggests that star law firms are not more valuable to their clients than lesser-known firms.

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The legal profession has steep barriers to entry. Practicing lawyers are required to obtain a license and to pass the bar exam; most states mandate that they graduate from American Bar Association (ABA)-accredited law schools; and legal services firms must be owned and managed by U.S. licensed lawyers. Those restrictions are justified on the grounds that they promote competence and professionalism, protecting consumers from incompetent lawyers (Barton (2001)). But at the same time, barriers to entry can give rise to market concentration and oligopolistic rents. Consistent with this view, out of the leading 200 U.S. law firms in 2016, the top 10 captured 21% of total revenues;[1] and since 1970, the thirty largest law firms accounted for between 50% and 80% of yearly corporate litigation settlements (Figure 1).

The tradeoff between competence and competition in legal services hinges on whether dominant law firms ("stars" henceforth) provide a superior service. Leaving aside the broader issue of their impact on the quality of the justice system, the anti-competitive effects of barriers to entry can be justified if a star law firm improves the expected settlement for its clients. That, however, is not obvious. Stars are larger and have more resources and presumably better lawyers; but they are also busier, and to their eyes any one lawsuit might be less important. In contrast, a smaller firm might be more focused and work harder. Therefore, whether star law firms are also better law firms is an empirical question – one which we attempt to answer in this paper.

The main empirical challenge we face is determining whether (a) on any given lawsuit, a star has the ability to generate a more favorable settlement, over and above the average law firm ("treatment" effect), or (b) stars are better at picking lawsuits where any law firm can generate a favorable settlement ("selection" effect). The implications are very different: clients should be willing to pay for treatment (a), but not for selection (b). Separating those two effects is challenging, because most straightforward measures of law firm performance are positively associated with both. For instance, finding that star status correlates with more favorable settlements is uninformative, as it may be explained by treatment, selection, or a

[1] Data from the Am Law 100 and Am Law 200 rankings (*The American Lawyer*, May 2017 and June 2017).

combination of both. To isolate the treatment effect and assess the impact of stars on the lawsuit's outcome, one needs a "benchmark" assessing the expected settlement *regardless of the law firm on the lawsuit.*

That is precisely the intuition behind our empirical approach. To design our test, we rely on an institutional feature of the U.S. legal environment: the fact that companies routinely purchase directors' & officers' (D&O) insurance against corporate litigation. We use D&O insurance coverage as a natural benchmark for plaintiff law firm performance. The D&O insurance market is highly competitive and has modest information asymmetry, as corporations must disclose private information on litigation risk to their prospective insurers. Insurance coverage thus represents an unbiased estimate of the settlement expenses that a defendant company expects to face, irrespective of the law firm employed by the plaintiffs. In other words, insurance coverage gauges the selection effect. The difference between the actual settlement and the amount covered by D&O insurance, on the other hand, estimates the treatment effect associated with a given plaintiff law firm.

To take these ideas to the data, we assemble a database of lawsuits against companies listed in the U.S. and plaintiff law firms over the period 1970-2016. Our sample covers shareholder and derivative class actions, employee lawsuits, lawsuits related to products, services and operations, intellectual property, trade practices, environment, fraud, and antitrust; it combines a number of existing databases with hand-collected data. For each lawsuit in our sample, we obtain information on the defendant company, the plaintiff law firms, settlement amounts, and D&O insurance coverage. To the best of our knowledge, this is the most comprehensive dataset on corporate lawsuits to date.

Our main findings are as follows. Consistent with the notion that stars tend to associate with successful lawsuits, we find a strong positive relation between dollar settlement amounts and an indicator for the top-10 plaintiff law firms. However, when we separate "selection" and "treatment" by looking at the amount covered by D&O insurance and the residual settlement amount, we find that selection explains over 80% of the outperformance of star law firms. That suggests that the ability to generate a more favorable settlement accounts for less than one-fifth of the performance of stars relative to non-stars. Because plaintiff law firm fees are determined as a percentage of the settlement amount, a back-of-the-envelope calculation suggests that, relative to the D&O insurance coverage benchmark, on average star plaintiff law firms are overpaid by $1.35 million per lawsuit.

The baseline result of a small impact of star law firms on settlements net of the D&O insurance coverage is very robust. It holds under alternative proxies for law firm status and alternative treatments of the standard errors; it is robust to the inclusion of a large number of controls and fixed effects; it also holds when we restrict the attention to shareholder lawsuits (class actions and derivative actions), as well as over different time periods.

We address three potential alternative explanations for our findings. The first one is measurement error, related to the fact that when a lawsuit is dismissed the D&O coverage is not disclosed, but is rather set to zero just as the settlement amount. That attributes a more favorable outcome to the plaintiff law firm, because it implies that it performs in line with the D&O insurance benchmark whereas it actually underperforms it, as the unobserved insurance coverage is likely positive. As star plaintiff law firms are more likely to reach a settlement, the censoring associated with dismissed lawsuits can introduce a bias against them relative to non-stars. We address this difficulty by means of several approaches: list-wise deletion of the dismissed lawsuits, where we restrict our tests to settled cases, as well as three data imputation methods (mean imputation, Markov Chain-Monte Carlo Multiple Imputation (MCMC-MI), and the Random Forest algorithm), which estimate the censored D&O insurance coverage. The combined evidence from these approaches provides a range of estimates for the treatment effect. Under the approach most favorable to the law firms, selection still accounts for over 60% of the overall performance of stars; under the least favorable one, for all of it. This evidence indicates that censoring of D&O insurance coverage in dismissed lawsuits does not explain the modest performance of star law firms.

The second alternative explanation is excessive D&O insurance by the defendant companies (over-insurance). Inflated insurance coverage can induce a bias towards estimating a smaller treatment effect, which could explain our findings under the additional assumption that over-insured companies are more likely to face star plaintiff law firms. To address this possibility, we resort to a unique database containing all D&O insurance contracts and their pricing at a leading insurance company active in the primary D&O

insurance market. We combine these data with machine-learning techniques to obtain insurance coverage and premium estimates for all defendant companies in our data, and flag as over-insured those companies with high coverage and low premiums relative to three alternative benchmarks. The differences in treatment effect estimates between over-insured companies and the rest are statistically insignificant and economically minuscule, suggesting that over-insurance does not explain our baseline findings.

The third alternative explanation is that plaintiff utility is not just a function of the dollar settlement, but also of changes to the governance and policies of the defendant firm. To check for this possibility, we consider a range of governance indexes, covering corporate governance dimensions such as managerial compensation, entrenchment, and board structure. At least some lawsuits are associated with governance changes: Between filing and settlement year, nearly 20% defendant companies change CEO, and the average company experiences significant board turnover. However, such changes do not appear to concentrate among lawsuits with star plaintiff law firms, where we find at best only weak evidence of any governance improvements. Unreported tests also reveal little evidence of improvements along more general dimensions such as employee relations, diversity, community, human rights, and environmental performance. In sum, non-monetary lawsuit outcomes are unlikely to explain our findings, consistent with the notion that star plaintiff law firms have little impact on the defendant company's governance structure.

Our paper makes two main contributions. First, it contributes to the literature on competition and barriers to entry in regulated professions, in particular legal services. The traditional argument for those barriers is based on information asymmetry: law firm clients lack sufficient information to assess the merit of a lawsuit and the ability of their legal counsel, and incompetent lawyers can cause irremediable damage (Kleiner (2000), Barton (2001)). The key assumption behind this argument is that the inefficiencies that arise from restricting entry (documented e.g. by Winston, Crandall, and Maheshri (2009) and Winston and Karpilow (2016)) are compensated by the superior service provided by the best law firms. Our results indicate that even the most successful "stars" provide a service that is only marginally better than the average law firm. They support the view that the alleged benefits of restricted entry in legal services are in fact outweighed by its anti-competitive effects. Our contribution to this literature is also methodological.

To our knowledge, this is the first study to cast the problem of measuring law firm performance in terms of its selection and treatment components, whereas practitioner rankings tend to rely on crude measures such as total revenues. In contrast to those rankings, we use D&O insurance coverage to develop an intuitive benchmarking approach that could be easily implemented in professional practice.

Second, our paper contributes to the corporate governance literature on corporate litigation. The ability of shareholders (and more generally corporate stakeholders) to take managers to court serves as an ex ante disciplining mechanism against moral hazard and provides ex post compensation in case managers misbehave (Jensen and Meckling (1976), La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998)). Along with studies documenting the beneficial effects of corporate litigation (Ferris et al. (2007), Chung and Wynn (2008), Appel (2016)), this literature points to two inter-related problems. The first one is that exposure to potentially frivolous lawsuits can result in excessive managerial conservatism (Kinney (1994), Lin, Liu, and Manso (2017)). The second problem is that institutional features of the legal profession can induce lawyers to focus on profits rather than the merit of a lawsuit; an example is the widespread application of "no win, no pay" contingency fees (Brickman (1989), Horowitz (1995), Krishnan and Kritzer (1999)). Indeed, among legal scholars a prevailing concern is that a large fraction of corporate lawsuits are frivolous and that attorneys, rather than shareholders, are the main beneficiaries in shareholder litigation (Romano (1991), Rhode (2004)). These two problems suggest that the governance role of litigation may be undermined in practice, and that law firms make gains at the expense of the plaintiffs they represent. Our findings bring new elements corroborating this view, by showing that dominant law firms do not materially improve their clients' expected monetary benefit from litigation, nor do they have an impact on governance at the defendant firm. In addition, they suggest that regulatory efforts aimed to limit shareholders' ability to sue their company, such as the Private Securities Litigation Reform Act (PSLRA) of 1995, may be misdirected. If stars do not have a large impact on settlements but command larger fees, addressing law firms' incentives and/or their market power may be more beneficial for their clients.

The remainder of our paper is organized as follows. Section II provides the institutional background and discusses our empirical strategy. Section III describes our data and variables. Section IV presents the main results. Section V analyzes alternative interpretations. A brief conclusion follows.

II. Institutional background and testable hypotheses

A. The market for D&O insurance

D&O insurance is a central litigation risk management tool. Nearly all U.S. public corporations purchase such insurance policies (Baker and Griffith (2007)); our data, described below, indicate that they cover on average around 72% of settlement amounts, and in many cases the entire settlement. The features of the D&O insurance market indicate that (i) companies seek coverage for the full extent of their expected liability, and (ii) insurers provide such coverage at a fair premium. These elements suggest that D&O insurance coverage represents an unbiased estimate of the expected settlement amount.

The typical D&O insurance package protects individual managers from litigation (so-called “Side A”), reimburses the corporation for indemnification of officers and directors (“Side B”), and protects the corporation itself from the risk of litigation to which it may be a party (“Side C”).[2] The principal exclusions from D&O coverage are fraud, “insured v. insured” cases (aimed at avoiding collusive litigation), and prior claims. The prior claims exclusion removes from the coverage any claims noticed or pending prior to the commencement of the current policy, which ordinarily would be covered under a prior policy, creating an incentive for the insured to notify the insurer of any potential claims at the earliest possible date, because those claims are likely to be excluded under any subsequent policies.

[2] Side A coverage has no deductible, whereas side B and C can have deductibles. A higher deductible can reduce the insurance premium; but such savings are considered small, and involve the risk of the company bearing higher costs in the event of litigation. In addition, although the company may not receive any benefits from the insurer, the insurer may require (1) to be kept informed throughout the litigation, and (2) that the insured comply with the insurer’s rules, such as whom they may retain as counsel, when the insured may settle a claim, and general litigation strategy (Guggenheim and Henderson (2008)). The Tower Perrins (2008) survey reports that 66% of surveyed firms purchase D&O insurance with no deductibles at all. Among the ones with total assets between $2-$5 Bn as in our sample, the average deductible is about $860,000. In our data, the average settlement is $45 m for lawsuits with available insurance coverage information, and the average insurance coverage is $33 m, implying that deductibles are on average 1.9% of the settlement amount, or 2.6% of observed insurance coverage.

The exposure of any individual insurer to a given company's litigation risk is limited, as most policies have limits of $10 million or less (Baker and Griffith (2007)). Companies therefore purchase a "tower" of D&O policies in order to reach a desired amount of insurance, with the assistance of specialized D&O insurance brokers. The bottom layer of the tower, or "primary policy" responds first to a covered loss; the layers further up in the tower are purchased from so-called excess insurers.

Prior to underwriting D&O insurance coverage, the insurers obtain information about litigation risk from prospective insureds, collected through the application process and via independent research. Prospective insureds have an incentive to transparency in their application, because an applicant furnishing untrue information creates the basis for a subsequent rescission action. The insurer's research is based on public data, as well as on private information obtained from meetings with the applicant's senior management, typically covered by nondisclosure agreements. The information collected through these channels has broad scope, and ranges from the prospective insured's financials and corporate strategy, to incentives and governance, to the background and personality of the managers (Baker and Griffith (2007)). Indeed, Core (2000) finds evidence that D&O premiums reflect the quality of the insured company's governance. Moreover, policies are renewed on a frequent basis (in some cases yearly), so that the data on which they are based is timely. In sum, the insurers collect information that enables them to form an accurate assessment of the litigation risk of the prospective insured, reflected in the D&O insurance premium and coverage.

Although insurers have a degree of discretionality in insurance pricing, they are constrained by competition and transparency. In the market for primary insurance a few insurers such as ACE, AIG, and Chubb historically have had large market shares; but the excess insurance market is competitive and has low barriers to entry, and features of insurance contracts such as the prior claims exclusion, or the fact that the primary insurer's quote is disclosed to all prospective excess insurers, ensure that information is widely available and timely. In addition, "shopping" for less expensive coverage is common (Baker and Griffith (2007)). These features suggest that D&O insurance premiums will generally be fair, so that companies have no reason to under-insure their litigation risk.

The combination of (i) accurate risk assessment on part of insurers and (ii) the fact that companies likely do not under-insure suggests that the D&O insurance coverage provides an unbiased estimate of the litigation settlement amounts a given company expects to face.[3] This is consistent with a literature documenting the information content of D&O insurance (Boyer and Stern (2014), Chalmers, Dann, and Harford (2002), Core (2000)). As we discuss below, it also plays an important role in our empirical strategy.

B. Empirical strategy

The following simple model clarifies our identification challenge and empirical strategy. Suppose that lawsuits are indexed by a parameter $\omega \sim U(0{,}1)$. For $\omega > 1/2$, the lawsuit are always dismissed, yielding a settlement equal to 0; we can think of these as "hopeless" lawsuits where no amount of ability on part of the plaintiff law firm can make a difference. For cases where $\omega \leq 1/2$, the lawsuit may yield a positive settlement amount, and law firm ability can matter.[4]

Plaintiff law firms are characterized by two dimensions: (i) their ability to reach a favorable settlement (corresponding to the "treatment" effect), and (ii) their ability to pick a lawsuit that can generate a favorable settlement in the first place (corresponding to the "selection" effect). These two dimensions are independent, so that a law firm can be a good lawsuit winner but a bad picker, vice versa, both, or neither.

The law firm's ability to pick a lawsuit is modeled as follows. Each firm observes a signal about the lawsuit's category, equal to the realization of ω plus a noise component $\xi \sim U\left(-\frac{1}{2} + \tilde{\delta}, \frac{1}{2} - \tilde{\delta}\right)$, where $\tilde{\delta} \in \{0, \delta\}$, with $0 < \delta \leq \frac{1}{2}$. Intuitively, firms with $\delta > 0$ observe a more precise signal, endowing them with

[3] On the other hand, companies may over-insure. We discuss this possibility below, and find that it is unlikely to account for our findings.
[4] The 1/2 threshold need not reflect the features of the corporate litigation market. It helps simplify the notation; but the argument also applies with a general threshold.

better lawsuit-picking ability. If a law firm observes a signal with value less than 1/2, it picks the lawsuit.[5] That means that the law firm makes "correct" picks with probability: [6]

$$\Pr\left(\omega + \xi \le \frac{1}{2} \ \&\ \omega \le \frac{1}{2}\right) = \frac{3-4\tilde{\delta}}{8\left(1-2\tilde{\delta}\right)} \tag{1}$$

In addition to lawsuit-picking ability, the law firm can have the ability to reach a favorable settlement. This ability is modeled by a factor $\tilde{k}$ that scales up the settlement. Suppose that, if a non-zero settlement can be reached in the first place (i.e. if $\omega \le 1/2$), then as a baseline the settlement amount is $R > 0$. However, if the law firm has high ability, the final settlement is increased to Rk, with $k > 1$.

To relate this model to our test, consider the expected settlement amount conditional on $\tilde{\delta}$ and $\tilde{k}$:

$$E\left(Settlement \middle| \tilde{\delta}, \tilde{k}\right) = \Delta\left(\tilde{\delta}\right) R \tilde{k} \tag{2}$$

where $\Delta\left(\tilde{\delta}\right) \equiv \frac{3-4\tilde{\delta}}{8\left(1-2\tilde{\delta}\right)}$. Introducing indexes for law firm f and lawsuit i and a multiplicative error term $e^{\varepsilon_{if}}$ and taking logs, we have:

$$\ln Settlement_{if} = \ln R + \ln \Delta\left(\tilde{\delta}_f\right) + \ln \tilde{k}_f + \varepsilon_{if} \tag{3}$$

Thus, if we compare settlements between a star law firm (S) and a non-star (NS), we have:

$$\underbrace{\ln \Delta\left(\tilde{\delta}_S\right) - \ln \Delta\left(\tilde{\delta}_{NS}\right)}_{\text{Selection effect}} + \underbrace{\ln \tilde{k}_S - \ln \tilde{k}_{NS}}_{\text{Treatment effect}} \tag{4}$$

In other words: *If the stars reach more favorable settlements on average, i.e. the above expression is positive, that can be because they pick their lawsuits better ($\tilde{\delta}_S > \tilde{\delta}_{NS}$, selection effect), because they are*

[5] Throughout, we assume that the fees and expense reimbursements collected by plaintiff law firms in the event of a positive settlement amount are sufficient to cover their expected costs. Alternatively, we can think of the $\omega > 1/2$ lawsuits as cases in which the law firm only covers its costs, and of the $\omega \le 1/2$ as cases in which the law firm can make abnormal profits.

[6] The value is obtained as follows:

$$\Pr\left(\omega + \xi \le \frac{1}{2} \,\&\, \omega \le \frac{1}{2}\right)$$
$$= \int_{-\infty}^{\frac{1}{2}} \Pr\left(\xi \le \frac{1}{2} - \tilde{\omega} \middle| \omega = \tilde{\omega}\right) dF_{\omega}(\tilde{\omega}) = \int_{-\infty}^{\frac{1}{2}} \Pr\left(\xi \le \frac{1}{2} - \tilde{\omega} \middle| \omega = \tilde{\omega}\right) f_{\omega}(\tilde{\omega}) d\tilde{\omega}$$
$$= \int_{0}^{\frac{1}{2}} \Pr\left(\xi \le \frac{1}{2} - \tilde{\omega} \middle| \omega = \tilde{\omega}\right) d\tilde{\omega}$$

Because $\xi \sim U\left(-\frac{1}{2} + \tilde{\delta}, \frac{1}{2} - \tilde{\delta}\right)$ we then have $\int_0^{\frac{1}{2}} \frac{1-\tilde{\delta}-\tilde{\omega}}{1-2\tilde{\delta}} d\tilde{\omega} = \left(1 - 2\tilde{\delta}\right)^{-1} \left[\left(1 - \tilde{\delta}\right)\tilde{\omega} - \frac{\tilde{\omega}^2}{2}\right]_0^{\frac{1}{2}} = \frac{3-4\tilde{\delta}}{8\left(1-2\tilde{\delta}\right)}$.

better at reaching a more favorable settlement ($\tilde{k}_S < \tilde{k}_{NS}$, treatment effect), or both. This clarifies the empirical challenge of separating the treatment and selection effects in the data.

Looking at the D&O insurance coverage helps address this challenge. Assume that the insurance company observes ω perfectly, i.e. it always knows in what category a given lawsuit belongs, and sets the coverage accordingly. This makes sense in light of the features of the D&O insurance market discussed above. Because the insurance is purchased before the lawsuit takes place, and thus before the identity of the plaintiff law firm is known, the coverage is determined under the expectation of a law firm of "average" ability. That means that the coverage for a $\omega \leq 1/2$ lawsuit will be $R\bar{k}$, where $\bar{k} \equiv 1 + \mu(k-1)$ and μ denotes the fraction of "high ability" law firms in the population (i.e. the ones with $k > 1$). For a lawsuit where $\omega > 1/2$, the coverage will just be 0 (as the settlement is normalized to 0).

In the data, we observe lawsuits covered by D&O insurance. A given law firm will take up a lawsuit with coverage $R\bar{k}$ with probability $\Pr\left(\omega + \xi \leq \frac{1}{2} \;\&\; \omega \leq \frac{1}{2}\right) = \Delta(\tilde{\delta})$, which we computed above. The coverage for lawsuits taken up law firm f is thus:

$$Coverage_{if} = \Delta(\tilde{\delta}_f) R\bar{k} e^{\eta_{if}} \quad (5)$$

where the notation is the same as above and we introduced a multiplicative error term $e^{\eta_{if}}$. Taking logs:

$$\ln Coverage_{if} = \ln R + \ln \Delta(\tilde{\delta}_f) + \ln \bar{k} + \eta_{if} \quad (6)$$

and in expectation, the difference in coverage between star and non-star firm lawsuits is:

$$\ln \Delta(\tilde{\delta}_S) - \ln \Delta(\tilde{\delta}_{NS}) \quad (7)$$

That corresponds to the selection effect, and we exploit it in our identification strategy.[7] Combining equations (3) and (7) we have that:

$$\ln Settlement_{if} - \ln Coverage_{if} = \ln \tilde{k}_S - \ln \tilde{k}_{NS} + \nu_{if} \quad (8)$$

[7] Equation (7) also makes it clear that the assumption of independence between $\tilde{\delta}$ and $\tilde{k}$ is not restrictive, but just simplifies the notation. To obtain equation (7), all that is required is that the insurance company cannot condition on the value of $\tilde{k}$ when deciding the coverage level $R\bar{k}$. If $\tilde{\delta}$ and $\tilde{k}$ are not independent, $\Delta(\tilde{\delta})$ is replaced by $\ln\left[\Pr\left(\omega + \xi \leq \frac{1}{2} \;\&\; \omega \leq \frac{1}{2} \middle| \tilde{k}\right)\right]$, and all expressions are adjusted accordingly, without changing any of the conclusions. Equation (7), in particular, still captures the selection effect.

where $\nu_{if} \equiv \varepsilon_{if} + \eta_{if}$. In other words: Subtracting the log-insurance coverage from the log-settlement amount removes the selection effect $\ln \Delta(\tilde{\delta}_S) - \ln \Delta(\tilde{\delta}_{NS})$, isolating the treatment effect.

III. Data and main variables of interest

A. Sample composition

To maximize coverage and the representativeness of our sample, we merge information from the major providers of data on corporate lawsuits in the U.S., incorporating manual screens and hand-collected additional information. Our main sources are Audit Analytics Litigation (AA), ISS Securities Class Action Services (ISS), the Federal Court Cases Integrated Data Base (FCC), the Master Significant Cases & Actions Database (MSCAd), and the Stanford Securities Class Action Clearinghouse (SCAC). Our dataset combines these sources, to assemble what is, to the best of our knowledge, the most comprehensive collection of corporate lawsuits against U.S. publicly listed firms settled over the period 1970-2016 (the earliest coverage for any of those sources is 1970).

The MSCAd database contains 14,364 individual corporate lawsuits with complete available data for our test; AA 8,409; FCC 7,299; ISS 5,705; and SCAC 2,818. There is some overlap among them, so we merge lawsuits in the different databases by defendant company, court, docket number, filing date, and settlement date. Defendant company names and docket numbers are sometimes reported using different spelling or numbering conventions, and we screen them to remove duplicates. The resulting dataset contains 27,428 individual lawsuits. Out of them, 79% are brought before federal courts, 20% before state courts, and the remaining 1% comprise a small number of lawsuits brought before foreign courts, regulators, or alternative dispute resolutions. Figure 2.A describes the number of corporate lawsuits over time; the data coverage is sparse until 1991, but after that date we observe an increase in litigations, reaching a peak in the 2006-10 period with nearly 9,000 lawsuits against U.S. public companies.

In comparison to the previous literature, the set of lawsuits we analyze is broader. The majority of studies using individual lawsuit data restrict the focus to shareholder class actions (e.g. DuCharme, Malatesta, and Sefcik (2004), Fahlenbrach, Low, and Stulz (2010)) or derivative actions (e.g. Appel (2016), Lin, Liu, and Manso (2017)). Because we want to assess the performance of law firms in general, we aim to obtain the largest possible coverage; however, as we show in robustness checks our main results hold when we restrict the sample to the largest lawsuit category, that of shareholder lawsuits.

That category includes both shareholder class actions and derivative actions, lawsuits related to shareholder risks, financial practices, management and fiduciary risks, corporate capital, finance, and investment risks, and is associated with Nature Of Suit (NOS) codes 160 and 850 in the AA and FCC databases. The number of shareholder lawsuits has also been increasing over time, and their average settlement amounts since the 2000s are in line with those of other corporate lawsuits (Figure 2). Although more frequent, shareholder lawsuits exhibit only the fourth largest average settlements, after lawsuits associated with environment risk, products, and trade practices (Figure 3). We define lawsuit categories in greater detail in Appendix A.

When we break down our sample by industry, we find that out of the 10 Fama-French industries, lawsuits are most frequent among "Finance, business services, and others" and "Business equipment". The largest average settlement amounts are found among "Finance, business services, and others", "Telecommunications", and "Oil, gas, and coal" (Figure 3).

Multiple plaintiff and defendant law firms can be involved in a given lawsuit. In corporate litigation, all but the very largest law firms tend to specialize as either plaintiff or defendant; because of the nature of our empirical approach, we focus on plaintiff law firms. Law firms are partnerships, and they are typically named after their most senior partners. Their names may change over time, reflecting e.g. a promotion to "name partner" or the departure of one or more name partners from the firm. We standardize firm names, to account for alternative spellings, abbreviations, and typos, and to track firms across the different sources and over time. The lawsuits in our dataset involve 11,612 individual plaintiff law firms; the average lawsuit is associated with 2 law firms, and the average law firm participates in 6 lawsuits.[8]

Throughout the analysis, we require that the outcome of a given lawsuit is known, i.e. that the lawsuit has been either settled or dismissed by the end of our sample period. We drop any lawsuits that are still pending or have unknown outcome as of the end of 2016. The vast majority of corporate lawsuits (over 98%) do not actually go to trial, but are either settled or dismissed prior to that.[9] Settlement occurs in 57% of the lawsuits in our data (15,716 cases; Table 1). For settled cases, the average settlement is around $27 million (Table 1; all dollar figures are expressed in constant 2010 U.S. dollars); however, settlements become larger in the more recent years, peaking at about $50 million in the period 2001-2005 (Figure 2). These figures are consistent with earlier studies focusing on narrower datasets (e.g. Baker and Griffith (2007)).

Conditional on observing the settlement amount, the case description can also report the amount of the settlement covered by D&O insurance. Insurance coverage is not universally disclosed; in our data, out of 15,716 settled lawsuits, 1,340 reveal it. Typically the lawsuits with insurance disclosure involve larger settlements; for those suits, the average settlement amount is around $45 million. For our purposes, that means: (i) our baseline tests focus on the portion of the data that is economically more relevant, and (ii) those tests are based on a set of lawsuits where plaintiff law firms seemingly generate larger amounts of money for their clients. As we verify in section IV.A, however, insurance coverage disclosure does not appear to affect the relationship between star law firm status and settlements. On average, insurance coverage is nearly $33 million, or 72% of the settlement; but there is important variation in this variable: in 46% of lawsuits with available information, the insurance coverage the entire settlement amount, whereas in 7% of cases the coverage is zero.

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[8] The distribution of the number of lawsuits is skewed. The 95th percentile is 15 lawsuits, the 99th is 91, and the law firm with the maximum number of lawsuits in our data is Milberg LLP (formerly known as Milberg Weiss LLP and Milberg Weiss Bershad & Schulman LLP) with 1,478.

[9] A mere 522 lawsuits go to trial, or 1.9% of the lawsuits in our data. Among those, the most common type is shareholder lawsuits (407 cases), and the most common industry of the defendant firm is business equipment (108 cases).

B. Star law firms

To identify "star" law firms, we rank law firms on the basis of the settlement amounts that they generate over time. Cumulative settlement amounts are a natural measure of law firm status, as they are observed by their clients and determine the firms' revenues. In turn, revenues drive many popular law firm rankings, such as the Am Law 100 mentioned in the introduction, which are widely available to industry practitioners and prospective clients. Fees are more closely related to revenues, but they are also more sparsely populated in our data sources; and as we confirm in robustness checks, the information contained in the settlement is largely equivalent.

Figure 1, already referred in the introduction, plots the distribution of settlement amounts over four periods: pre-2000, 2001-05, 2006-10, and 2011-16.[10] Two patterns emerge. First, the shape of the distribution is quite stable over time. Second, whereas a large number of firms has small market shares, a core of firms captures the lion-share of settlements.

These stylized facts motivate our choice of variables proxying for law firm status. Our main proxy is the $Star$ indicator, equal to 1 for the top 10 law firms in a given year based on cumulative settlement amounts. This variable is constructed as follows. For a given law firm i in year t, we compute the cumulative settlement amount S_{it} generated by the firm over the 5 years up to and including t. We then rank law firms in year $t + 1$ sorting them by S_{it}, such that the firm with the largest cumulative settlement has the top rank. The one-year lag between cumulative settlement amounts and law firm ranks ensures that the information about past performance (settlement) is available to e.g. prospective clients in year $t + 1$, and that there is no overlap between the dependent variables in most of our tests (related to settlements in individual lawsuits) and the law firm's rank.[11]

[10] Whenever $N > 1$ plaintiff firms are involved in one lawsuit, we assign $1/N$ times the settlement amount to each of them. In 27% of the lawsuits in our data, we are able to observe the lead plaintiff or defendant law firm, which often receives the lion-share of the fees (this information is only available in Audit Analytics). In unreported tests, we construct an alternative version of our law firm status proxies, by attributing the entire fees to the lead law firm in those cases; the results based on the alternative measure are very similar in terms of statistical and economic significance.

[11] The ranking we obtain agrees with other popular industry rankings. Out of the top 100 law firms in 2016 according to our ranking, over half have a national rank in the U.S. News & World Report "Best Law Firms" ranking, and over

For robustness, we also consider three alternative measures of law firm status. The first, $Star\ (fees)$, is a top-10 firm indicator based on cumulative past fees rather than settlements. Cumulative fees are computed analogously to S_{it}; where fees are not disclosed in the case descriptions, we impute the value of 1/3 of the settlement, about the median fraction of the settlement amount destined to fees. The second one, $Star\ (count)$ is a top-10 firm indicator based on the cumulative number of lawsuits that a given law firm has worked on, over a 5-year period. The third and final one is a continuous measure, called $Rank$, and defined as:

$$Rank_{it+1} = \frac{S_{it} - \min_j\{S_{jt}\}}{\max_j\{S_{jt}\} - \min_j\{S_{jt}\}} \tag{9}$$

where $\min_j\{S_{jt}\}$ and $\max_j\{S_{jt}\}$ are the minimum and maximum cumulative settlement across all law firms j other than firm i. This measure reflects the concentration of the distribution of market shares among law firms, assigning a higher value to firms with larger cumulative settlements.[12]

C. Other variables of interest

In most of our tests we use control variables derived from the CRSP/Compustat Merged database. We match CRSP/Compustat to defendant companies in our lawsuit data, mainly by manually screening company names; both the AA and SCAC databases contain tickers, and the AA database also contains the SEC's Central Index Key (CIK), so we use this linking information where available.

The main set of control variables used throughout the paper are derived from Kim and Skinner (2012), and include: Size (natural logarithm of the defendant company's total assets), yearly sales growth rate, stock return (monthly average over a one-year period), stock return skewness, stock return volatility, and share turnover (ratio of the number of shares traded to the number of shares outstanding). These variables are

90% of those are in the first tier for "Corporate Law", "Litigation – Securities", "Litigation – Intellectual Property", "Mass Tort Litigation – Class Action / Plaintiffs", or "Criminal Law – White Collar". Over 30% of them, moreover, feature in the Am Law Top 100 Law Firms list.

[12] In untabulated tests, we construct measures analogous to $Rank$ but based on fees and the number of past lawsuits. The results are very similar in terms of statistical and economic significance.

defined on a yearly frequency, and expressed in their values as of the end of the year prior to a given lawsuit's filing date.

In robustness checks, we supplement these variables with additional controls retrieved from CRSP/Compustat, the IBES analyst forecast database, BoardEx, and the Thomson Reuters 13F Institutional Holdings database. We list the additional controls in section IV.B, and describe them in detail in Appendix A.

Finally, in the tests on changes to corporate governance described in section V.C, we take into consideration several measures related to governance quality. The first is the Bebchuk, Cohen, and Ferrell (2009) E-Index (retrieved from professor Bebchuk's website). We also analyze CEO changes and CEO compensation package data from the Compustat ExecuComp database. Finally, we look at board composition measures from BoardEx. The variables and their sources are described in detail in Appendix A.

IV. The performance of star plaintiff law firms

A. Baseline evidence

This section reports our baseline finding: relative to the benchmark of D&O insurance coverage, the performance of star law firms is modest. Our baseline regression is:

$$y_{if} = \alpha + \beta Star_f + \gamma' x_{if} + \varepsilon_{if} \tag{10}$$

where $Star$ denotes the "star" indicator, equal to 1 if plaintiff law firm f is a top-10 law firm, and x is a vector of control variables used by Kim and Skinner (2012), including filing year and defendant company fixed effects. The dependent variable y_{if} is $Settlement_{if}$, the natural logarithm of the amount of the settlement (expressed in millions of 2010 dollars) on lawsuit i with plaintiff law firm f, or $Coverage_{if}$, the log-D&O insurance coverage amount, or the difference $Settlement_{if} - Coverage_{if}$.[13]

[13] One observation in equation (10) corresponds to one lawsuit and one plaintiff law firm. Many lawsuits involve multiple plaintiff law firms; the median lawsuit has 2, the maximum is 67. Unreported tests reveal nearly identical results if we restrict the sample to lawsuits involving at most 10 or at most 5 plaintiff law firms.

The estimates are reported in Table 2. They show that star law firms are associated with much larger settlements: When the $Star$ indicator equals 1, the settlement amount is 18% (column (6)) to 60% (columns (3)-(4)) larger.[14] The question is how much of that is attributable to treatment – star law firms being able to reach a larger settlement on any given case – and how much to selection – star law firms being skilled at picking those lawsuits where any law firm would be able to reach a large settlement. To answer that question, in columns (1) and (5) we replace the dependent variable by $Settlement - Coverage$, the difference between log-settlement and log-insurance coverage which, as we argued, removes the selection effect. Our results suggest a much smaller treatment effect of star law firms: the estimate that is more favorable to star law firms attributes a 10% larger settlement amount to them; the more conservative one, a 3% larger settlement.

A back-of-the-envelope calculation based on columns (5) and (6) reveals the economic magnitude of the implied performance misattribution. The average settlement amount is about $27.08 million (Table 1); the estimates of column (6) imply that star law firms are associated with 18% larger settlements, i.e. an extra $4.87 million. At the average fee of about 1/3 of the settlement amount, that means that a law firm with star status earns $1.62 million more per lawsuit than a regular one. The estimates of column (5), however, imply that it should earn only about 1/6 of that, or $270,000; i.e. plaintiffs overpay stars by $1.35 million.

This calculation is based on average fees; but we can expect that star law firms will charge higher fees. In a separate set of tests, reported in Table 3, we estimate a regression analogous to (10), replacing the dependent variable by log-fees or log-fees plus expense reimbursements. The estimates indicate that indeed star law firms do indeed charge 3.3% higher fees relative to the average law firm, implying an excess payment to stars of $1.41 million per lawsuit.[15]

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[14] Because insurance coverage data is not always available, we estimate specifications (3) and (4), respectively, restricting the sample to lawsuit-plaintiff law firm observations where insurance coverage is available and where it is not. The coefficients on the $Star$ indicator are very similar, suggesting that the availability of insurance coverage data does not affect the relationship between law firm status and settlement amounts.

[15] The regression specification also includes log-settlement amount among the control variables. Fees information is only available for a subset of the sample, explaining the smaller number of observations in the specifications in Table

B. Robustness

We now present a number of robustness checks on the baseline test discussed in the previous section; the results of these tests are summarized in Table 4. First, we consider alternative proxies for law firm status. We look at $Star\ (fees)$ and $Star\ (count)$, alternative top-10 firm indicators based on fees and number of past lawsuits, respectively, rather than settlement amounts, as well as at the continuous measure $Rank$, all defined above. We re-estimate the baseline regression (10), replacing $Star$ by those alternative proxies. The results are reported in panel A. Under all alternative proxies, the results are similar to our baseline, in terms of statistical significance and economic magnitude. In all cases, star law firms ($Star\ (fees)$ or $Star\ (count)$ indicator equal to 1, or a higher value of the $Rank$ variable) are associated with higher settlement amounts, but (much) smaller settlements net of insurance coverage. Our baseline results, therefore, do not depend on the specific proxy for law firm status we used in the previous section.

The second set of robustness checks revolves around the treatment of the standard errors. First, we focus on the potential serial correlation in settlement amounts generated by a given law firm. Because we determine star law firm status based on past settlements, there could be a mechanical correlation between $Settlement$ (and $Settlement - Coverage$) on the left-hand side of equation (10) and $Star$ on the right-hand side. To address this issue, we run regressions in the spirit of Fama and MacBeth (1973): We draw inference from the average coefficients from year-by-year cross-sectional regressions corresponding to equation (10). As each cross-sectional regression is estimated on one year of data only, serial correlation in settlement amounts is not a concern.[16] The results are reported in panel B (columns (1)-(2)): the average coefficient estimates are somewhat larger, but still close to our baseline, suggesting that the results of Table

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3. The calculation of the economic effects in this section is based on the average settlement size of $27 million (Table 1). Conditional on the availability of insurance coverage data, the average settlement is actually larger ($45 million); we use the unconditional average to reach a conservative estimate.

[16] The concern for a mechanical serial correlation is attenuated due to the fact that we obtain nearly identical results with $Star\ (count)$, which is based on the number of past lawsuits rather than settlement amounts. Due to the relatively small number of observations per settlement year prior to 1992, we constrain the sample to the settlement years from 1992 on in the Fama-MacBeth estimation. Moreover, although serial cross-correlation between settlement amounts and the $Star$ indicator is not a problem with the Fama-MacBeth approach, serial correlation in the $Star$ indicator itself and the other right-hand side variables can still be an issue. To adjust for that, the standard errors apply the Newey-West correction, based on a 5-year lag window.

2 are not affected by serial correlation. As an additional test, we re-estimate our baseline equation (10) with two- and three-way clustered standard errors (panel B, columns (3)-(6)), clustering by defendant firm and filing year, and by defendant firm, law firm, and filing year. The statistical significance of the resulting estimates is comparable to the baseline regressions of Table 2.

The third set of checks is about potential omitted variables. First, we include a large number of additional control variables in the baseline regression; second, we include additional fixed effects. In panel C, columns (1)-(2) include additional controls for a number of firm characteristics (book-to-market, dividend payout ratio, ROA, debt-to-total assets ratio, interest coverage ratio, R&D-to-sales ratio, advertising-to-sales ratio, staff-to-sales ratio, and discretionary accruals ratio). In columns (3)-(4), we add controls associated with transparency and stock liquidity (analyst forecast dispersion, forecast errors, and coverage, bid-ask spread, Amihud (2002) illiquidity ratio, and idiosyncratic volatility). In columns (5)-(6), we add controls associated with the quality of corporate governance (Bebchuk, Cohen, and Ferrel's (2009) E-index, board size, log-CEO salary, bonus, and equity pay) and with ownership structure (institutional ownership level, equity stake controlled by the top 10 largest institutional shareholders, ownership of institutional block-holders, number of institutional investors, number of institutional block-holders, and institutional ownership HHI). All additional control variables are defined in detail in Appendix A. The introduction of additional control variables does not affect the baseline finding of a small treatment effect for star law firms, relative to the benchmark of D&O insurance coverage. In panel D, columns (1)-(4), we repeat the baseline regression including court fixed effects, lawsuit type fixed effects, law firms fixed effects, as well as all three additional fixed effects. Court and lawsuit type fixed effects do not much affect the coefficient on $Star$ in comparison to the baseline; when we introduce law firm fixed effects, however, the coefficient becomes statistically insignificant and economically much smaller. In sum, this set of checks confirms that the treatment effect of star law firms appears small.

In a fourth check, we ask if shareholder lawsuits, which represent a large component of the lawsuits in our sample, differ from other lawsuits in a meaningful way. We distinguish between shareholder class actions and derivative actions, and introduce interaction terms between $Star$ and indicators for either kind of lawsuit. The estimates, reported in panel D, columns (5)-(6), indicate an effect of star law firms in class actions somewhat larger than the baseline, but still economically small. The effect for derivative actions is smaller than in Table 2, and statistically insignificant.

The two final robustness checks are reported in panel E. In the first check, we collapse lawsuits that have the same court, docket, and filing date but different settlement dates (columns (1)-(2)), as well as lawsuits with the same court, filing, and settlement date but different dockets (columns (3)-(4)). The first case corresponds to related lawsuits affecting different defendants (e.g. the company and its directors); the second one to lawsuits filed by different plaintiffs, and then unified by the court. The results are, statistically and economically, very close to the baseline. In the second check, we trace the effect of star plaintiff law firms over different time periods: pre-2000, 2001-2005, 2006-2010, and 2011-2016. The estimates indicate a small and insignificant impact of star law firms on settlement amounts (net of the insurance benchmark or otherwise) in the years prior to 2006. The $Settlement - Coverage$ effects become larger in 2006-10 and 2011-16, but are still small relative to the larger settlements associated with star law firms.

Taken together, the checks discussed in this section support our baseline results. They suggest that the finding of a small impact of star law firms is robust to alternative proxies for law firm status, treatment of the standard errors, potential omitted variables, different types of lawsuits, aggregation of related lawsuits, and over time. This is consistent with the view that star law firms have a relatively small treatment effect on settlement amounts.

V. Alternative explanations

We discuss four potential alternative explanations for our findings. The first one is measurement error, due to the fact that when a lawsuit is dismissed the D&O insurance coverage is set to zero like the settlement amount, or to the fact that multiple settlements can exhaust a defendant company's insurance coverage. The second one is over-insurance: it is possible that defendant firms purchase excessive D&O insurance coverage, biasing our results towards finding a smaller treatment effect. The third one is that insurance coverage might reflect the "treatment" effect of the plaintiff law firm that the defendant company expects to face. The fourth one is that plaintiffs do no seek redress in the form of a dollar settlement, but rather in terms of changes to the defendant firm's governance; by focusing on settlement amounts, therefore, we may underestimate the actual impact of star law firms. Below we address all these alternative explanations, and we find that they are unlikely to explain our findings.

A. Measurement error

Our data include 11,711 lawsuits in which the settlement is equal to zero, as the case was dismissed. Because of the zero settlement, the amount covered by the insurance is also set to zero. But in fact, most likely in those cases the actual insurance purchased by the defendant company is not zero but, rather, a positive amount. For the average law firm in our data, the censoring implied by dismissed cases results in a more favorable estimate of the treatment effect. The reason is that we attribute a performance ($Settlement - Coverage$) equal to zero, whereas the actual performance should be negative, as a zero settlement is associated with a (most likely) non-zero insurance coverage.

To assess the impact of this potential bias on our estimates, we perform five additional tests, corresponding to alternative approaches to dealing with the censored data. Approach I is list-wise deletion: we estimate the baseline regression (10) restricting the sample to the set of observations with a positive settlement amount. The estimates are reported in Table 5, column (5), and show a small, statistically insignificant, and actually *negative* coefficient estimate on $Star$.

Approach II also restricts the sample to settled lawsuit, but applies inverse-probability weighting (IPW; Seaman and White (2011)). Intuitively, this approach estimates equation (10) assigning greater importance to lawsuits that, although settled, were most likely to be dismissed based on their characteristics. The IPW approach requires two steps: (i) estimate the probability P that a given lawsuit is dismissed, and (ii) estimate equation (10) on the settled lawsuits observations with weighted least squares (WLS), where the weights are proportional to $1/P$. In the first step, we estimate a probit regression where the dependent variable is an indicator equal to 1 for settled cases, and 0 otherwise, and the explanatory variables are the $Star$ indicator and the Kim and Skinner (2012) controls. We also estimate a linear probability model with analogous specification, including filing year and defendant company fixed effects. The estimates are reported in Table 5, columns (3) and (4). They indicate that star law firms are strongly associated with settled cases. Having a star plaintiff law firm is associated with a 4.8 percentage points higher probability of settlement (column (4)); relative to the unconditional probability of 57%, this represents an 8% increase, which is economically non-trivial. In the second step, we use WLS with weights inversely proportional to the probability that a lawsuit is settled. The estimates are reported in Table 5, column (6). We find again a small, statistically insignificant, and negative coefficient on $Star$. The performance of star law firms, therefore, seems to owe more to the fact that they tend to reach a settlement at all, rather than a higher settlement than other law firms.

Our subsequent approaches rely on data augmentation and imputation methods to form an estimate of the actual insurance coverage in dismissed lawsuits, and use it in our test. Approach III is based on mean imputation. We regress the log-insurance coverage on indicators for lawsuit category, defendant firm Fama-French industry, and lawsuit settlement year, and use the coefficient estimates to obtain imputed values for firms in a given lawsuit category, industry, and year. We then obtain an updated $Settlement - Coverage$ variable, which replaces the imputed insurance coverage values where the lawsuits were dismissed, and re-estimate equation (10). The estimates are reported in Table 5, column 7. The coefficient on $Star$ is now positive, and the magnitude (0.021) small but closer to the baseline estimate of 0.031 from Table 2 (although still statistically indistinguishable from zero).

Approach IV is the Markov Chain-Monte Carlo (MCMC) data augmentation method combined with multiple imputation (Rubin (1987)) MCMC data augmentation proceeds in two steps: (i) an imputation step (I-step), where given a vector of parameter estimates $\hat{\beta}$ a set of observations for the censored $Coverage$ data are obtained, as a random draw from the distribution of $Coverage$ given $\hat{\beta}$; and (ii) a prediction step (P-step), where a revised estimate of the vector of parameters is formed, as a random draw from the distribution of $\hat{\beta}$ given the observed data and the $Coverage$ draw from the I-step. The initial set of estimates $\hat{\beta}$ are obtained via the expectation-maximization algorithm; the I-step and P-step are then iterated, generating a Markov Chain that for a sufficiently large number of iterations converges to its stationary distribution, from which a set of imputed values of $Coverage$ is drawn. Those values are then plugged into $Settlement - Coverage$, and the baseline test (10) is estimated. To account for the uncertainty in the imputed values, the MCMC process is repeated over 100 rounds; the resulting estimates are averaged to obtain one estimate for the coefficient on $Star$, and the associated standard errors are obtained through the Rubin (1996) formulas.[17] The estimates are reported in Table 5, column (8). The estimated coefficient on $Star$ is larger than the baseline estimate of Table 3 at 0.046, although again statistically insignificant.

Approach V uses the Random Forest algorithm (Brieman (2001), Mullainathan and Spiess (2017)). Random Forest is a machine-learning algorithm that based on a large number of random decision trees generates a prediction of the censored values of D&O insurance coverage for dismissed lawsuits using the available data used as a "training set".[18] We impute the Random Forest prediction for those censored values, re-run equation (10), and report the estimates in Table 5, column (9). In this case, the estimated coefficient on $Star$ equal to 0.077, larger than the baseline estimate of Table 3 and statistically significant (t = 2.53).

Summing up, the five approaches discussed in this section provide a range of values for the coefficient on $Star$ between -0.012 and 0.077, bracketing our baseline estimate of 0.031. Under the most favorable estimate, the "treatment effect" from the $Settlement - Coverage$ regression accounts for only 39% of the overall performance of star law firms; under the least favorable one, the treatment effect is statistically indistinguishable from zero, and actually negative. Combined, this evidence suggests that our baseline result of a small treatment effect associated with star plaintiff law firms is not explained by the unobserved insurance coverage data for dismissed lawsuits.

A separate instance of measurement error is if multiple settlements exhaust a defendant company's insurance coverage, underestimating the "selection effect" and overestimating the "treatment effect". Over 40% of the settlement in our data are associated with firms that face no other settlement in the same calendar year, and 90% with firms facing at most 4 other settlements. In addition, the institutional features of the

[17] We provide details on this approach in Appendix B.
[18] We provide details on this approach in Appendix C.

corporate insurance market discussed in Section II.A indicate that insurance coverage should be close to the expected total settlement for a given firm in a given year. That suggests that this type of error is unlikely to play a major role in our data. Consistent with this view, in additional tests omitted for brevity we find that our baseline effect is unrelated to the number of settlements a given company has to meet in a given year, nor to their size compared to previous settlements.

B. Over-insurance

A second potential explanation for our baseline finding is over-insurance. It is possible that defendant companies purchase D&O insurance in excess of the expected settlement amount that they face from corporate lawsuits. Under this hypothesis, the log-difference $Settlement - Coverage$ tends to underestimate the treatment effect. That should not be a problem if over-insurance is distributed at random across defendant companies, independent of the $Star$ indicator. Under the additional assumption that companies that over-insure tend to face star plaintiff law firms, however, it could introduce a bias against stars in our test.

Over-insurance requires inefficient behavior on part of D&O insurers, defendant companies, or both. First, a company may receive an excessively low D&O insurance premium quote from its prospective insurers, and take advantage of it to purchase a higher coverage; in turn this requires that insurers systematically underestimate the company's litigation risk. Second, the company may face an accurate insurance premium, but decide to purchase a higher amount of insurance coverage; this could be due for instance by an agency issue such as excessive managerial conservatism in the face of potential litigation (Manso (2011)). In sum, over-insurance should be associated with relatively low premiums and relatively high coverage.

Before discussing our test, we point out that some of the features of the D&O insurance market discussed in section II.A suggest that systematic over-insurance is unlikely. Inefficient pricing (cheap premiums) are not expected because the D&O insurance market is competitive, as there are low entry barriers for insurers, and transparent, as prospective insured are expected to share both public and private information with their insurers, and the quote of the primary insurer is made available to the excess insurers. That indicates that D&O insurance premium will tend to reflect the litigation risk of the prospective insured in an accurate manner, leaving few if any "arbitrage opportunities" for the insureds. Moreover, although there is evidence suggesting that managers act more conservatively when faced with litigation risk, they appear to do so mainly through other leverages than D&O insurance coverage, such as their innovation policies (e.g. Lin, Liu, and Manso (2017)). If anything, practitioners tend to debate the possibility that the insureds increase deductibles, reducing the effective coverage to lower the overall insurance cost; but even that appears to be associated with modest gains at best (Guggenheim and Henderson (2008)).

One challenge in taking to the data the over-insurance hypothesis is that D&O insurance premiums and overall coverage are not publicly disclosed. We address this difficulty combining a unique dataset with machine-learning techniques to produce premium and coverage estimates for the defendant companies in our main data. We build this part of our analysis on the universe of D&O insurance quotes by a leading insurance company active in the primary segment of the D&O insurance market, over the years 2005-2016, covering 130 companies. We use this database as a "training set" for the Random Forest algorithm, described above and in greater detail in Appendix C, to obtain an estimate of the primary D&O insurance premium for defendant companies, based on characteristics observable up to the end of the year prior to the lawsuit settlement or dismissal.

Based on the above discussion, we flag over-insured companies as follows. We regress insurance premiums and coverage on indicators for size (total assets) quintile, settlement year, and interaction terms, and obtain residuals. We consider a company over-insured if its premium residual is negative and its coverage residual positive. In additional checks, we repeat this procedure augmenting the premium and coverage regressions to include industry indicators or industry and previous litigation intensity indicators, and their interactions with settlement year indicators.[19] We then estimate the baseline regression (10)

[19] In the mean imputation approach test described in section V.B, we estimate insurance coverage for the settlement amount on an individual *lawsuit*. Here we benchmark the insurance coverage for an entire *company*, potentially facing multiple lawsuits. For that reason, we do not condition on lawsuit type, but rather on company size (total assets) to define the benchmark used in this test.

separately for over-insured defendant companies and the other companies in our dataset, and compare the coefficients on $Star$.

The results are reported in Table 7. Across all the specifications, over-insured companies do not exhibit especially small $Star$ coefficients. In fact, in two out of three cases the coefficient is nearly identical to the baseline value of 0.030 from Table 2 (specifications (1) and (3)); and in the remaining specification (5), it is actually *larger* at 0.052. Moreover, in all cases the differences between the over-insured companies and the rest are economically very small, and indistinguishable from zero at conventional level of statistical significance. This evidence indicates that over-insurance does not explain the baseline effects documented in Table 2.

C. Does insurance coverage reflect the expected plaintiff law firm besides expected settlement?

So far we have assumed that the insurance coverage reflects the expected settlement amount *conditional on facing an "average" law firm*. An alternative is that when the defendant company expects a very large settlement it also expects to face a star plaintiff law firm, and therefore purchases a larger insurance policy. Under this hypothesis, the insurance coverage may capture part of the "treatment effect", and we may underestimate the impact of star law firms on the larger lawsuits.

Another way to see this is as follows. Suppose that lawsuits can be "large" or "small", and that on either kind of lawsuit, a star law firm can increase the settlement by an amount e^A, where $A > 0$ is a positive amount. Suppose further that when the defendant company expects to face a star law firm (i.e. in a large lawsuit), it raises its insurance coverage by an amount e^B. Now let w_{LS} the fraction of observations of large (L) lawsuits with star law firms (S) in the data, w_{LNS} the fraction of observations of large lawsuits with non-star law firms (NS), w_{SS} the fraction of observations of small lawsuits with star law firms, and w_{SNS} the fraction of observations of small lawsuits with non-star law firms.

The baseline regression (10) where the dependent variable is $\ln Settlement - \ln Coverage$ returns then an estimate of:

$$w_{LS} \underbrace{(A - B)}_{\text{Large, Star}} - w_{LNS} \underbrace{(-B)}_{\text{Large, Non-Star}} + w_{SS} \times \underbrace{A}_{\text{Small, Star}} - w_{SNS} \times \underbrace{0}_{\text{Small, Non-Star}} \tag{11}$$

If defendant companies tend to obtain higher insurance when they expect a larger settlement because they are likely to face a star law firm, we should expect $w_{LS} > w_{LNS}$. The above expression clarifies that this leads to underestimating the treatment effect of star plaintiff law firms A.

One solution to this difficulty is to stratify the sample so that $w_{LS} \approx w_{LNS}$. In other words, we compare lawsuits with star law firms to lawsuits with similarly-sized settlements, but without star law firms. To that end, we employ a matched-sample approach. For each lawsuit with a star law firm, we include in the regression sample n lawsuits with non-star law firms having similar settlement size, with $n = 10$, 5, 3, or 1. This ensures that $w_{LS} \approx w_{LNS}$ and $w_{SS} \approx w_{SNS}$, thus removing the bias if it exists.

The results are reported in Table 8. In no specification do we detect a larger effect associated with star law firms in comparison to the baseline test of Table 2. In fact, the coefficient on $Star$ is always small, insignificantly different from zero or at best weakly significant, and actually negative in all specifications. These results indicate that the results of Table 2 are not an artifact of insurance coverage absorbing part of the treatment effect of star law firms.

D. Changes in governance around the lawsuit

So far we have assumed that all that the plaintiff cares about is the dollar settlement amount. However, it is possible that the payoff plaintiffs seek is not exclusively monetary; they may in fact derive a benefit from material changes in management and/or governance practices. As a result, the defendant company might be able to avoid having to pay a large settlement on condition of implementing changes to its governance structure; and conceivably this might be a more favorable outcome for the plaintiff, as it brings about gains over the longer term. As argued by Romano (1991), this would be a salutary Coasian outcome, where the defendant company, rather than the court, is able to redress the problems that give rise to the lawsuit in the first place. According to this line of reasoning, an alternative explanation for our findings is that the beneficial impact of star law firms manifests itself, rather than in higher settlement amounts, in changes in governance at the defendant company.

Indeed, changes along several corporate governance dimensions do take place around the average lawsuit in our data. In the tests in this section, we consider changes in board composition, CEO identity, CEO compensation, and in the Bebchuk et al. (2009) E-index. As reported in Table 7, panel A, over the course of the average lawsuit we observe the departure (addition) of 1.1 (1.6) board members, and a net reduction in board size of 0.5 members. Similar changes are found when we restrict the sample to shareholder lawsuits. Relative to the average pre-lawsuit board size of about 7 members, these changes appear economically meaningful, and potentially value-improving based on Yermack's (1996) evidence that smaller boards are associated with higher stock market valuation. In a similar spirit, we also observe a CEO change in nearly 20% of lawsuits (overall as well as shareholder lawsuits). The picture is more ambiguous when we look at changes in CEO compensation, at those companies where the CEO does not change during the course of the lawsuit. In those cases, CEO bonuses and equity compensation (restricted stocks plus stock options) are reduced by about 20% and 30% respectively, but the CEO's salary increases by 13% (similar effects obtain when restricting the sample to shareholder lawsuits). Overall, we observe an increase in the E-index, signaling greater managerial entrenchment; but the statistical significance of the change is only marginal, and disappears when we restrict the sample to shareholder lawsuits. In sum, we observe potential improvements in governance associated with managerial turnover (CEO and board membership changes), but more ambiguous results when looking at CEO compensation and managerial entrenchment, closer to the spirit of the findings of Romano (1991), who finds little impact of litigation on those dimensions.

The interesting question is if any governance improvements are more likely when the plaintiff law firm is a star. We run a set of tests for this possibility, looking at corporate governance changes following the lawsuit. We estimate:

$$\Delta G_{if} = \alpha + \beta Star_f + \gamma' x_{if} + \varepsilon_{if} \tag{12}$$

The dependent variable ΔG denotes the annualized percentage change in a given corporate governance quality proxy over the period from the end of the year before lawsuit i is filed to the end of the year when it is settled (or dismissed), and x includes the Kim and Skinner (2012) controls, as well as defendant company and filing year fixed effects.

The results are reported in Table 7, panels B (all lawsuits) and C (shareholder lawsuits). Overall, we find very little evidence that star plaintiff law firms are associated with governance improvements. The coefficient on $Star$ is, across all specifications, small and mostly indistinguishable from zero at conventional levels of statistical significance. The only significant effects we detect are a positive association between $Star$ and the likelihood of a CEO change, which is 3 percentage points higher in shareholder lawsuits, and between $Star$ and the change in CEO salary, which 1.5-2.4% lower. There is no evidence of a significant relation between star plaintiff law firms and the size of the board (although the number of board departures and additions both decrease), nor with components of CEO compensation other than salary.

Overall, the evidence reported in this section provides little support for the view that the small treatment effect of star plaintiff law firms on settlement amounts can be compensated by changes in classic corporate governance measures. In unreported tests we considered a range of indexes of corporate social responsibility from the MSCI-KLD database, related to employee relations, diversity, community, human rights, and environmental performance. We find little evidence of any association between those indexes and $Star$, suggesting that even broadening the scope of governance changes is unlikely to reveal a material treatment effect of stars.

VI. Discussion

The results of Table 2 indicate that about 80% of the settlement generated by a star law firm is explained by selection. That implies that stars are not especially better than the average law firm at reaching a favorable settlement for their clients. Combined with the finding that they tend to charge higher fees (Table 3), this evidence suggests that plaintiffs could be better off hiring lesser-known law firms. Why, then, does that not happen?

The answer to that question has two parts. First, modest as it may be, there still exists a treatment effect associated with star law firms. Our baseline estimates imply that they outperform non-stars, net of the D&O insurance benchmark, by a statistically significant 3%. That translates into an over $800,000 higher settlement amount, relative to the average settlement of $27 million. Economically, this may be non-negligible, and it may be sufficient to induce a preference for stars.

Second, the selection effect – the ability of stars to pick lawsuits that have a greater chance of settling – can be valuable per se to prospective plaintiffs, as they typically lack the ability to assess the merit of their case. The estimates of Table 5, columns (3)-(4), indicate that stars have a 5-8% higher probability of reaching a settlement. This is economically non-trivial, and combined with the treatment effect, it may justify the success of stars.[20]

These considerations suggest that, despite the small treatment effect of stars indicated by our findings, great caution should be exercised before drawing general welfare implications. A small competitive advantage is nonetheless an advantage, and the market share and higher fees commanded by star law firms may well be rational in equilibrium.

An alternative is that plaintiffs could indeed improve their welfare by turning to non-stars, but are unable to do so. The combination of two frictions can lead to this result. The first one comprises the regulatory barriers to entry into the legal profession mentioned in the introduction, which limit the supply of potential competitors. The second friction is related to information asymmetry between law firms and their clients, as well as institutional features of the market for legal services in the U.S. Not only are plaintiffs often unable to assess the merit of their case against a defendant company without the assistance of legal counsel, but it is not uncommon for law firms to actively pursue prospective clients.[21] As a result

[20] An additional possibility could be that star law firms help their clients reach a settlements in a shorter time. When we regress the time log-time between filing of the lawsuit and settlement (or dismissal) on the $Star$ indicator, however, we find small, insignificant, and actually positive coefficients on the indicator, suggesting that star law firms are not associated with quicker lawsuits.

[21] A characteristic illustration of that is the shareholder alerts often placed online by law firms specializing in shareholder class actions. For instance, in August 2018 Bronstein, Gewirtz & Grossman, LLC announced that it is "investigating potential claims on behalf of purchasers of Atlantia S.p.A.", seeking facts related to its investigation on whether Atlantia's officers and/or directors violated federal securities laws, as well as investors who "purchased

of those frictions, law firm clients are unlikely to search for alternative, less expensive legal counsel, which can sustain the dominant position of stars. Determining whether the competitive advantage or limits to competition explanation for the small treatment effect of star law firms that we document is beyond the scope of our analysis, and left for future research.

Conclusion

We study the performance of dominant law firms ("stars") in corporate litigation, on a large sample of corporate lawsuits in the U.S. over the period 1970-2016. We exploit directors and officers (D&O) insurance coverage as a benchmark for expected settlement amounts, to separate to what extent (a) stars reach more favorable settlements on any lawsuit ("treatment effect") or (b) stars pick lawsuits where a favorable settlement is ex ante more likely ("selection effect"). Our findings indicate that selection explains over 80% of observed settlement amounts, and that star firms have an economically small treatment effect. This result is not explained by measurement error or over-insurance; and stars also do not appear to be associated with significant improvements in governance at the defendant companies. Overall, our evidence suggests that star law firms are not especially more valuable to their clients than lesser-known firms.

Atlantia shares", presumably as prospective clients. In the same alert, Bronstein, Gewirtz & Grossman, LLC mention that their primary expertise is "the aggressive pursuit of litigation claims on behalf of our clients." The alert is available at: https://www.bgandg.com/atasy.

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Table 1 Descriptive statistics

The table reports descriptive statistics for the main variables used in the analysis. The summary statistics for Settlement ($MM), Settlement | Insurance coverage ($MM), Insurance coverage ($MM), Fees ($MM), and Case settled (Y/N) are based on collapsed data where one observation corresponds to one lawsuit. The other variables are based on data where one observation is one lawsuit and one law firm. The variable Settlement | Insurance coverage ($MM) is identical to Settlement ($MM), except in that the sample is restricted to observations where D&O insurance coverage data are available. All dollar quantities are expressed in 2010 dollars. All the variables are defined in detail in Appendix A. The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases.

Variable	Mean	St. dev.	Min	P25	Median	P75	Max	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Star	0.048	0.213	0.000	0.000	0.000	0.000	1.000	71,260
Star (fees)	0.050	0.218	0.000	0.000	0.000	0.000	1.000	71,260
Star (count)	0.106	0.308	0.000	0.000	0.000	0.000	1.000	71,260
Rank	0.052	0.139	0.000	0.000	0.002	0.033	1.000	71,260
Size	7.542	2.738	2.234	5.404	7.309	9.473	14.337	58,136
Sales growth	0.214	0.675	-0.945	-0.004	0.060	0.242	5.038	57,915
Return	0.038	0.626	-1.915	-0.245	0.016	0.307	2.278	58,485
Ret. skewness	0.196	0.701	-1.485	-0.264	0.153	0.625	2.105	57,690
Ret. volatility	0.154	0.106	0.034	0.080	0.123	0.194	0.577	57,690
Share turnover	3.157	3.211	0.175	1.152	2.132	3.959	18.984	56,519
Settlement ($MM)	27.266	110.035	0.000	0.000	1.753	9.115	963.167	14,470
Settlement | Ins. cvg. ($MM)	45.987	162.491	0.000	0.687	3.738	13.114	963.167	1,309
Ins. coverage ($MM)	33.216	146.039	0.000	0.013	2.577	9.527	963.167	1,309
Fees ($MM)	3.714	8.862	0.000	0.348	0.928	2.789	62.934	5,218
Case settled (Y/N)	0.578	0.494	0.000	0.000	1.000	1.000	1.000	25,034

Table 2 Baseline estimates

The table shows the estimates of:

$$y_{ist} = \alpha_i + \alpha_t + \beta Star_{fst} + \gamma' x_{ist} + \varepsilon_{ist}$$

The unit of analysis is one lawsuit s against defendant firm i, settled in year t, where law firm f acts as a plaintiff law firm. In column (1) the dependent variable is $Settlement - Coverage$, the difference between log-settlement amounts and log-insurance coverage on lawsuit s involving defendant firm i, taking place in calendar year t. In column (2), the dependent variable is the log-insurance coverage $Coverage$; in columns (3) and (4) it is the log-settlement $Settlement$, with the sample restricted to observations with available insurance coverage data in column (3), and unrestricted in column (4). $Star_{fst}$ is an indicator variable equal to 1 if plaintiff law firm f in lawsuit t ranks among the top 10 firms by settlement amounts obtained in year t. x is the vector of control variables used by Kim and Skinner (2012), listed in the table; α_i and α_t denote defendant firm and filing year fixed effects. All the variables are defined in detail in Appendix A. The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Dep. variable:	$Settlement - Coverage$	$Coverage$	$Settlement$	$Settlement$	$Settlement - Coverage$	$Settlement$
	(1)	(2)	(3)	(4)	(5)	(6)
Star	0.102***	0.510***	0.612***	0.630***	0.031***	0.184***
	(6.70)	(11.91)	(11.42)	(13.45)	(3.71)	(6.91)
Size					0.040*	0.175**
					(1.80)	(2.22)
Sales growth					0.022	0.145**
					(1.41)	(2.09)
Return					-0.005	-0.098
					(-0.19)	(-1.06)
Ret. skewness					0.007	-0.009
					(0.55)	(-0.23)
Ret. volatility					-0.285	-0.702
					(-1.51)	(-1.16)
Share turnover					0.008*	0.016
					(1.65)	(1.05)
Intercept	0.077***	0.323***	0.400***	1.072***		
	(11.50)	(18.27)	(18.56)	(45.28)		
Require available ins. coverage data	Y	Y	Y		Y	Y
Filing year f.e.					Y	Y
Defendant firm f.e.					Y	Y
R^2	0.003	0.012	0.012	0.007	0.582	0.72
N	33,759	33,759	33,759	71,260	26,426	26,426

Table 3 Fees for star plaintiff law firms

The table shows the estimates of:

$$Fees_{ist} = \alpha_i + \alpha_t + \beta Star_{fst} + \gamma' x_{ist} + \varepsilon_{ist}$$

In column (1) the dependent variable is $Fees$, the natural logarithm of the fees charged by the plaintiff law firm (expressed in millions of 2010 dollars); in column (2), it is the log-fees plus expense reimbursements. $Star_{fst}$ is an indicator variable equal to 1 if plaintiff law firm f in lawsuit t ranks among the top 10 firms by settlement amounts obtained in year t. x is the vector of control variables used by Kim and Skinner (2012), augmented to include the log-settlement amount $Settlement$; α_i and α_t denote defendant firm and filing year fixed effects. All the variables are defined in detail in Appendix A. The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)
Star	0.032***	0.033***
	(2.68)	(2.79)
Controls	Y	Y
Filing year f.e.	Y	Y
Defendant firm f.e.	Y	Y
R^2	0.911	0.911
N	12,114	12,114

Table 4 Robustness

The table reports robustness checks on the baseline results of Table 2. In all panels except D, the odd-numbered columns report correspond to column (5) of Table 2, with $Settlement - Coverage$ as the dependent variable, and the even-numbered columns correspond to column (6), with $Settlement$ as the dependent variable. Panel A considers alternative proxies for law firm status: $Star\ (fees)$, a top-10 law firm indicator based on fees (columns (1)-(2)), $Star\ (count)$, a top-10 law firm indicator based on the number of past lawsuits (columns (3)-(4)), and the continuous $Rank$ measure based on settlement amounts (columns (5)-(6)). Panel B considers alternative treatments of the standard errors, running Fama-MacBeth regressions (columns (1)-(2)), or using two- and three-way clustered standard errors (columns (3)-(6)). Panel C considers augmented specifications with additional control variables. Columns (1)-(4) of panel D report specifications corresponding to column (5) of Table 2, with $Settlement - Coverage$ as the dependent variable, augmented to include additional fixed effects. Columns (5)-(6) correspond to the same columns of Table 2, focusing on the performance of star law firms in shareholder lawsuits (class actions and derivative actions). Panel E reports specifications where lawsuits with identical defendant firm, court, docket, and filing date, but different settlement date are collapsed (columns (1)-(2)), where lawsuits with identical defendant firm, court, filing date, settlement, but different dockets are collapsed (columns (3)-(4)), as well as a breakdown of the effects associated with star law firms by time period (columns (5)-(6)). The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
A. Alternative law firm status proxies						
Star (fees)	0.027***	0.169***				
	(3.42)	(6.63)				
Star (count)			0.021***	0.142***		
			(2.82)	(6.34)		
Rank					0.051***	0.358***
					(3.31)	(7.40)
Controls	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y	Y	Y
R^2	0.582	0.720	0.582	0.720	0.582	0.721
N	26,426	26,426	26,426	26,426	26,426	26,426
B. Fama-MacBeth and alternative standard error clusters						
	Fama-MacBeth		Alternative standard error clusters			
Star	0.045**	0.233**	0.031***	0.184***	0.031***	0.184***
	(2.56)	(2.46)	(3.02)	(4.60)	(4.22)	(4.19)
Controls	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.			Y	Y	Y	Y
St. error	Newey-West 5 lags		Cluster by firm and year		Cluster by firm, law firm, and year	
(Avg.) R^2	0.331	0.372	0.582	0.72	0.582	0.720
N	26,229	26,229	26,426	26,426	26,426	26,426

Table 4 Robustness – continued

	(1)	(2)	(3)	(4)	(5)	(6)
C. Additional control variables						
Star	0.030**	0.192***	0.017**	0.169***	0.015*	0.150***
	(2.49)	(5.14)	(2.13)	(4.27)	(1.83)	(3.68)
Baseline controls	Y	Y	Y	Y	Y	Y
Additional firm controls	Y	Y	Y	Y	Y	Y
Transparency controls			Y	Y	Y	Y
Governance controls					Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y	Y	Y
R^2	0.537	0.677	0.569	0.695	0.574	0.719
N	15,178	15,178	12,108	12,108	10,433	10,433
D. Additional fixed effects; Shareholder lawsuits						
Star	0.027***	0.025***	0.009	0.010	-0.020	-0.062
	(3.49)	(3.31)	(0.57)	(0.69)	(-1.20)	(-1.04)
Star × Class action					0.051**	0.223***
					(2.43)	(3.37)
Star × Derivative action					0.020	0.396**
					(0.38)	(2.43)
Class action					0.067***	0.432***
					(3.20)	(8.35)
Derivative action					0.032	0.065
					(0.78)	(0.92)
Controls	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y	Y	Y
Court f.e.	Y			Y		
Lawsuit category f.e.		Y		Y		
Law firm f.e.			Y	Y		
R^2	0.596	0.585	0.674	0.686	0.584	0.733
N	26,302	26,410	22,931	22,826	26,426	26,426

Table 4 Robustness – continued

	(1)	(2)	(3)	(4)	(5)	(6)
E. Collapsed data; effects by time period						
Star	0.031***	0.193***	0.030***	0.182***		
	(3.65)	(6.89)	(3.60)	(6.83)		
Star: 1970-2000					0.003	-0.044
					(0.26)	(-1.63)
Star: 2001-2005					0.008	0.060
					(0.63)	(1.61)
Star: 2006-2010					0.051**	0.330***
					(2.36)	(5.23)
Star: 2011-2016					0.074*	0.420***
					(1.96)	(4.25)
Controls	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y	Y	Y
R^2	0.583	0.717	0.582	0.721	0.582	0.721
N	24,649	24,649	26,324	26,324	26,426	26,426

Table 5 Measurement error

The table reports a number of checks against the possibility that measurement error explains the baseline findings of Table 2, owing to the fact that D&O insurance coverage cannot be observed when a lawsuit is dismissed. Columns (1)-(2) report the estimates of Table 2 (columns (5)-(6)) for ease of comparison. Columns (3) and (4) report the estimates of a model relating the relationship between the star law firm indicator and the probability that the case is settled (as opposed to dismissed), using a probit model (column (3), where marginal effects are reported) or a linear probability model (column (4)). The remaining columns report alternative approaches to dealing with the censored D&O insurance coverage data for dismissed lawsuits. Column (5) is based on list-wise deletion, i.e. the sample is restricted to observations with available data (settled cases). Column (6) is also based on list-wise deletion, but applies Inverse Probability Weighting (IPW) to assign more importance to observations that, although corresponding to settled lawsuits, are ex ante more likely dismissed. Column (7) applies mean imputation to estimate imputed values for the censored D&O insurance coverage observations, and based on those imputed values estimates a regression corresponding to column (1). Column (8) also uses imputed values, obtained with the Markov Chain-Monte Carlo Multiple Imputation (MCMC-MI) method. Column (9) also uses imputed values, obtained with the Random Forest (RF) method. The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company (except in column (8), where they are based on the Rubin (1996)) formulas). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	Baseline (as in Table 2)		**Probability of settlement**		$\boldsymbol{Settlement - Coverage}$				
	$\boldsymbol{Settlement - Coverage}$	$\boldsymbol{Settlement}$			**List-wise deletion**	**IPW**	**Mean imputation**	**MCMC-MI**	**RF**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Star	0.031***	0.184***	0.077***	0.048***	-0.012	-0.010	0.021	0.046	0.077**
	(3.71)	(6.91)	(7.81)	(7.26)	(-1.13)	(-1.20)	(0.95)	(1.00)	(2.53)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y		Y	Y	Y	Y	Y	Y
R^2	0.582	0.720		0.743	0.865	0.878	0.645		0.735
N	26,426	26,426	26,426	26,426	4,926	4.922	26,426	26,426	26,426

Table 6 Over-insurance

The table reports a number of checks against the possibility that the baseline findings of Table 2 are explained by some defendant company over-insuring against corporate litigation. Over-insurance is identified as follows. For each defendant company in our data, we estimate the yearly D&O insurance coverage and per dollar insurance price applying the Random Forest algorithm to the leading insurance company database as described in the text and in greater detail in Appendix C. In columns (1)-(2), insurance coverage (price) is then regressed on indicators for size (total assets) quintiles, settlement year, and interactions, obtaining regression residuals. A company is considered over-insured when the coverage residuals are positive and the price residuals are negative. Columns (3)-(4) repeat the procedure, augmenting the insurance coverage and price regressions to include Fama-French 10 industry indicators and their interactions with settlement year indicators; columns (5)-(6) repeat it again, augmenting the insurance coverage and price regressions to include an indicator for above-median number of previous lawsuits and its interactions with settlement year indicators. The row labeled "Difference F test (p-value)" reports the F test statistic for the difference between the coefficient on $Star$ in the over-insured and rest samples, as well as the associated p-value. The sample is the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Over-insurance based on:	**Size**		**Size and industry**		**Size, prev. lawsuits, and industry**	
	Over-insured	*Rest*	*Over-insured*	*Rest*	*Over-insured*	*Rest*
	(1)	(2)	(3)	(4)	(5)	(6)
Star	0.031**	0.027***	0.033***	0.027***	0.052**	0.024***
	(2.39)	(3.23)	(2.58)	(3.23)	(2.31)	(3.24)
Difference F test (p-value)	0.092 (0.761)		0.172 (0.678)		1.381 (0.240)	
Controls	Y	Y	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y	Y	Y
R^2	0.709	0.628	0.719	0.632	0.701	0.598
N	6,188	20,006	5,935	20,249	2,129	24,196

Table 7 Potential relationship between insurance coverage and star plaintiff law firms
The table reports the estimates of:

$$\ln Settlement_{ist} - \ln Coverage_{ist} = \alpha_i + \alpha_t + \beta Star_{fst} + \gamma' x_{ist} + \varepsilon_{ist}$$

The unit of analysis is one lawsuit s against defendant firm i, settled in year t, where law firm f acts as a plaintiff law firm. The dependent variable is $Settlement - Coverage$, the difference between log-settlement amounts and log-insurance coverage on lawsuit s involving defendant firm i, taking place in calendar year t. $Star_{fst}$ is an indicator variable equal to 1 if plaintiff law firm f in lawsuit t ranks among the top 10 firms by settlement amounts obtained in year t. x is the vector of control variables used by Kim and Skinner (2012); α_i and α_t denote defendant firm and filing year fixed effects. All the variables are defined in detail in Appendix A. The regression is estimated on a matched sample, constructed as follows. For each lawsuit with a star law firm, n matching lawsuits with the closest settlement amount are included in the sample, with $n = 10$ (column (1)), 5 (column (2)), 3 (column (3)), and 1 (column (1)). The lawsuits in each sample are retrieved from the set of all lawsuits against U.S. public firms filed in the period 1970-2016, contained in the union of the Audit Analytics, ISS, Federal Court Cases, Master Significant Cases & Actions, and Stanford Securities Class Action Clearinghouse databases. The t-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	10 matches	**5 matches**	**3 matches**	**1 match**
	(1)	(2)	(3)	(4)
Star	-0.015	-0.020	-0.013	-0.019*
	(-0.69)	(-1.23)	(-0.84)	(-1.70)
Controls	Y	Y	Y	Y
Filing year f.e.	Y	Y	Y	Y
Defendant firm f.e.	Y	Y	Y	Y
R^2	0.890	0.890	0.892	0.902
N	16,945	10,237	7,279	4,314

Table 8 Changes in governance around corporate lawsuits

The table reports a number of checks against the possibility that star law firms have an impact on the quality of corporate governance, beyond their impact on settlement amounts. Panel A computes average changes around all lawsuits (first row) and shareholder lawsuits (second row) in a number of dimensions of governance: The Bebchuck, Cohen, and Ferrel (2009) E-index (column (1)), changes in board composition (columns (2)-(4)), CEO changes (column (5)), and change in CEO compensation (columns (6)-(8)). Each cell reports the average (or average % change), with the corresponding t-statistic in parenthesis (based on standard errors clustered around defendant company). Panel B reports the estimates of specifications analogous to Table 2, where the dependent variable is one of the governance dimensions analyzed in panel A (all specifications include controls and defendant company and filing year fixed effects). Panel C reports similar regressions, restricting the sample to shareholder lawsuits. In all specifications the *t*-statistics, reported in parentheses, are based on standard errors clustered around defendant company. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	% change in	**Board…**			**CEO**	**% change in CEO…**		
	E-index	**Departures**	**Additions**	**Size**	**change (Y/N)**	**Salary**	**Bonus**	**Equity pay**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Average across all lawsuits and shareholder lawsuits								
Average	0.010*	1.101***	1.557***	-0.482***	0.171***	0.133***	-0.207***	-0.273***
	(1.85)	(64.09)	(76.88)	(-43.80)	(55.37)	(38.17)	(-28.43)	(-50.70)
Shareholder lawsuits	0.021	0.997***	1.475***	-0.494***	0.184***	0.130***	-0.198***	-0.322***
	(0.82)	(15.38)	(18.44)	(-11.65)	(14.13)	(10.30)	(-5.47)	(-12.91)
B. Regression estimates: All lawsuits								
Star	0.008	-0.048*	-0.048	0.009	0.024	-0.024**	0.040	0.001
	(1.12)	(-1.74)	(-1.39)	(0.64)	(1.58)	(-2.53)	(1.34)	(0.07)
R^2	0.891	0.742	0.751	0.815	0.446	0.473	0.652	0.687
N	2,881	10,306	10,476	10,304	14,823	10,147	9,367	9,882
C. Regression estimates: Shareholder lawsuits								
Star	0.003	-0.032	-0.045	0.020	0.032**	-0.015*	0.014	0.000
	(0.77)	(-1.20)	(-1.31)	(1.38)	(2.43)	(-1.91)	(0.68)	(0.03)
R^2	0.981	0.780	0.782	0.853	0.647	0.652	0.809	0.834
N	1,658	7,185	7,263	7,185	7,964	5,400	4,830	5,168

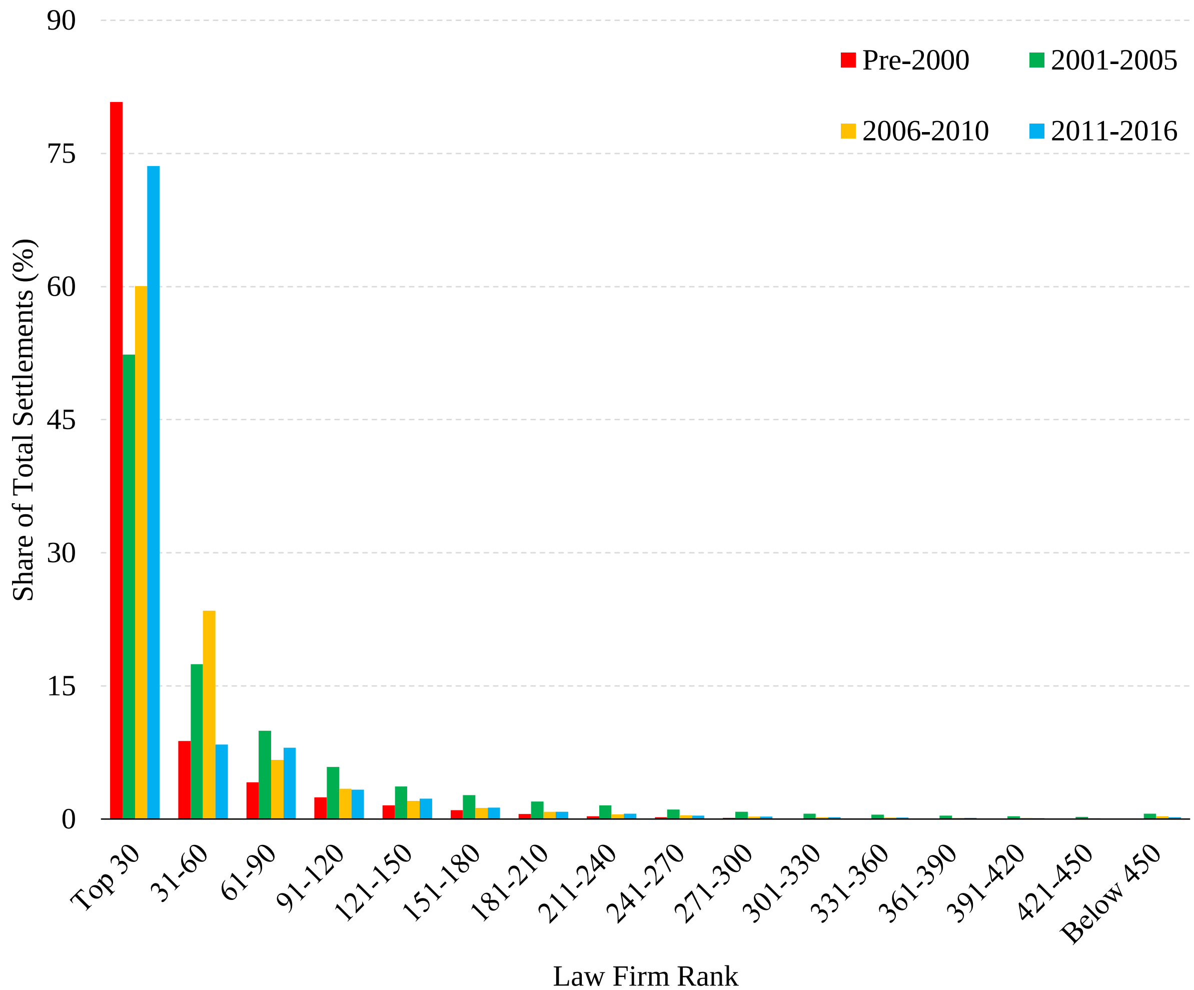

Figure 1 Market concentration among plaintiff corporate law firms
The figure reports the market share of plaintiff corporate law firms over four periods: up to and including 2000, 2001-2005, 2006-2010, 2011-2016. Law firms are ranked based on the total settlement amounts they generate over a given year, with the firms with the largest total settlements taking rank 1. They are then aggregated into 30-firm brackets, and their aggregate settlement amounts over a given period are plotted in the graph. The sample combines law plaintiff law firms in corporate lawsuits in the AA, ISS, FCC, MSCAd, and SCAC databases over the period 1970-2016.

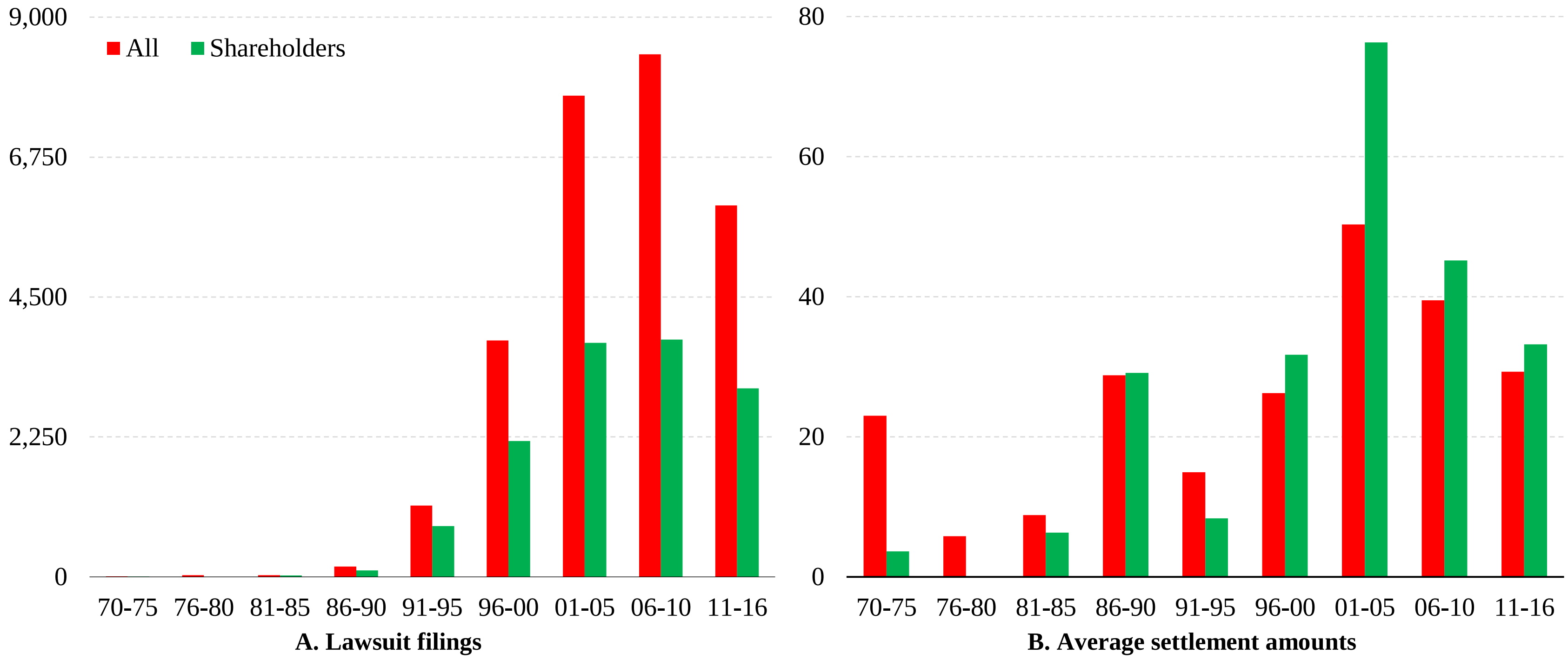

Figure 2 Lawsuit filings and average settlement amounts, 1970-2016

In panel A, the figure plots the number of general corporate lawsuits (red bars) and shareholder lawsuits (green bars) filed in each 5-year period since 1970. In panel B, it plots the average settlement amount (in 2010 $MM) associated with general corporate lawsuits (red bars) and shareholder lawsuits (green bars) in the same periods. The sample combines law plaintiff law firms in corporate lawsuits in the AA, ISS, FCC, MSCAd, and SCAC databases over the period 1970-2016.

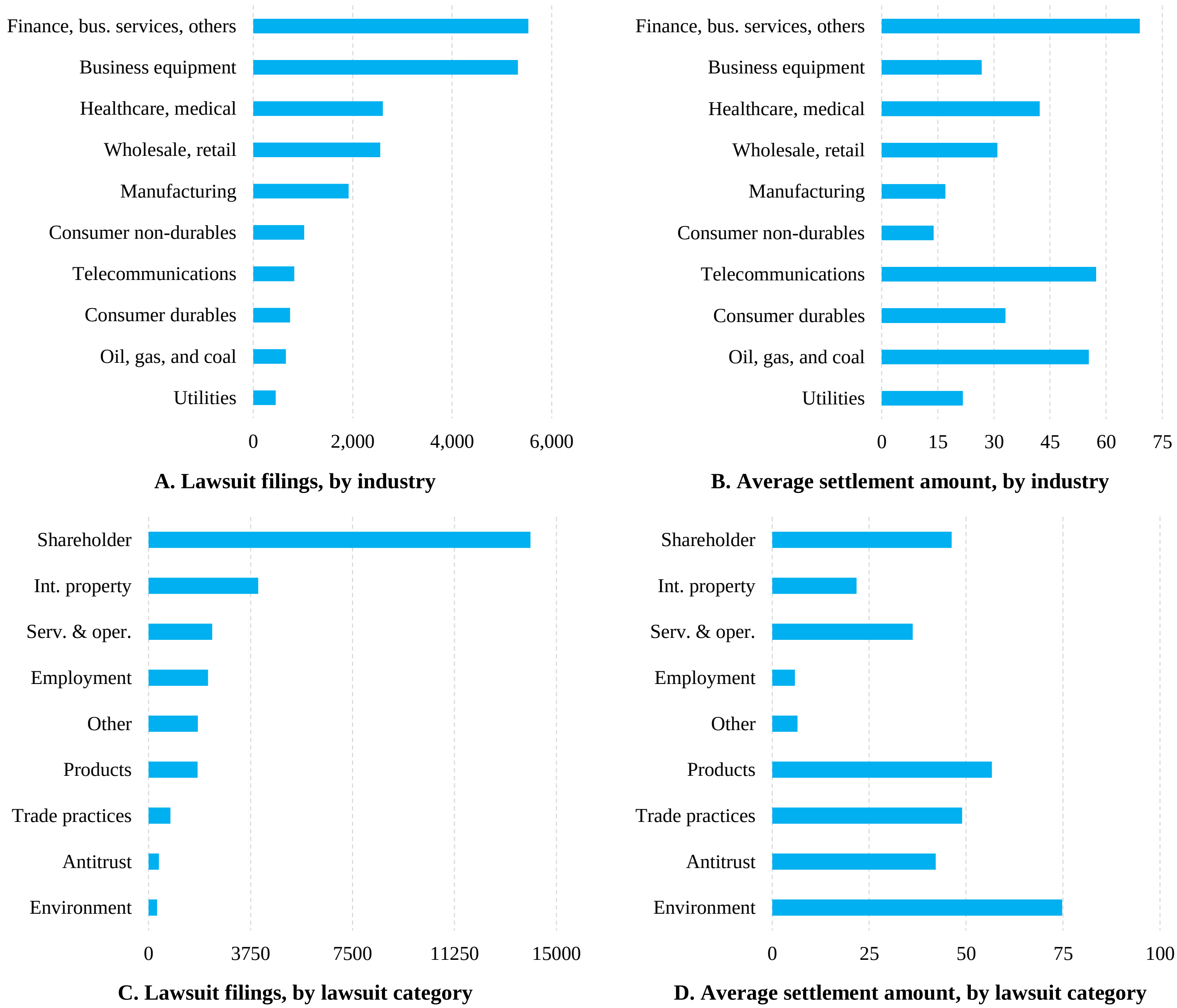

Figure 3 Lawsuit sample composition by industry and lawsuit category
The figure describes the composition of the lawsuit sample by Fama-French industry (panels A and B) and lawsuit category (panels C and D). Panels A and C report the number of lawsuits filed in each industry and lawsuit category respectively, and panels B and D the corresponding average settlement amounts (in 2010 $MM). The sample combines law plaintiff law firms in corporate lawsuits in the AA, ISS, FCC, MSCAd, and SCAC databases over the period 1970-2016.

Appendix A Variables description and dataset construction

A.1 Variables description

The following table reports the description of all the variables used in the analysis. The data on lawsuits and law firms combines information from the Master Significant Cases & Actions Database (MSCAd), ISS Securities Class Action Services (ISS), Audit Analytics Litigation (AA), and Federal Court Cases: Integrated Data Base (FCC). All accounting data come from Compustat and stock trading information from CRSP. ; those variables are expressed in their value as of the end of the fiscal year prior to the lawsuit filing date (the relevant Compustat and CRSP data items are listed in parentheses.). All dollar values are expressed in 2010 constant prices.

Variable name	Description	Source
Main outcome variables		
Settlement	Natural logarithm of the lawsuit settlement amount. The lawsuit settlement amount is equal to the maximum of the available values of the MSCAd *settlement_amount* variable, the settlement amount stated in the SCAC case description, the ISS *total amount*, the AA *settlement*, or the FCC *amtrec*. The settlement amount is expressed in millions of 2010 U.S. dollars.	MSCAd, SCAC, ISS, AA, FCC
Coverage	Natural logarithm of the portion of the settlement amount covered by the defendant's D&O insurer, or insurance coverage. The insurance coverage is equal to the maximum of the available values of the MSCAd *exposure_insured* variable, the insurance amount stated in the SCAC case description, or the ISS *insurance amount*. The coverage amount is expressed in millions of 2010 U.S. dollars.	MSCAd, SCAC, ISS
Fees; fees plus expense reimbursements	Natural logarithm of the amount spent by the plaintiff in prosecuting the case, for lawyers, law firms, legal representation, and other related expenses (legal fees). The legal fees are equal to the maximum of the available values for the MSCAd *plaintiff_legal_fees_expenses* variable, the fees stated in the SCAC case description, or the ISS *plaintiff legal fees description*. The ISS *plaintiff legal fees description* comes in the form of a text paragraph, from which we extract the fee amount using regular expressions and then manually checking whether the information is correct. The legal fees are in expressed in millions of 2010 U.S. dollars. From the case description in ISS and SCAC we are also able to separate out the component of the fees related to expense reimbursements, so that we can create a separate variable corresponding to fees only.	MSCAd, SCAC, ISS
Case settled	Indicator variable equal to 1 if the MSCAd *case_status* is "award" or "settled", the SCAC case status is "settled", or if the ISS *case status* is "settled", or the FCC *disp* is 13 ("settled") or the FCC *trclact* is 3 ("granted") or if the lawsuit settlement amount (defined below) is greater than zero. It is equal to 0 if the MSCAd *case_status* is "dismissed", the SCAC case status is "dismissed", or the ISS *case status* is "dismissed", or the FCC *disp* is 2 ("dismissal – want of prosecution") or 3 ("dismissal – lack of jurisdiction") or ("dismissal – voluntarily") or ("dismissal – other") or the FCC *trclact* is 2 ("denied").	MSCAd, SCAC, ISS, FCC

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Variable name	Description	Source
Law firm status proxies		
Star	Indicator variable for the top 10 law firms based on 5-year cumulative settlement amounts. For a given law firm i in year t, the cumulative settlement amount S_{it} generated by the firm over the 5 years up to and including t is computed. Law firms in year $t+1$ are then ranked, sorting them by S_{it}, such that the firm with the largest cumulative settlement has the top rank.	MSCAd, ISS, AA, SCAC
Star (fees)	Indicator variable for the top 10 law firms based on 5-year cumulative fees. The construction is analogous to the Star indicator, where the settlement amounts are replaced by legal fees. Legal fees are not always available; when the fees are missing, they are replaced by 1/3 of the settlement amount.	MSCAd, SCAC, ISS
Star (count)	Indicator variable for the top 10 law firms based on the 5-year cumulative number of lawsuits in which they are involved. The construction is analogous to the Star and Star (fees) indicators, replacing settlement amounts or fees by the number of lawsuits involving the law firm in a given year.	MSCAd, SCAC, ISS, AA,
Rank	Continuous measure of law firm status. It is based on the 5-year cumulative settlement amounts S_{it} associated with law firm i in year t. In year $t+1$, Rank is then defined as: $$Rank_{it+1} = \frac{S_{it} - \min_j\{S_{jt}\}}{\max_j\{S_{jt}\} - \min_j\{S_{jt}\}}$$ where $\min_j\{S_{jt}\}$ and $\max_j\{S_{jt}\}$ are the minimum and maximum cumulative settlement across all law firms j other than firm i.	MSCAd, SCAC, ISS, AA
Kim and Skinner (2012) control variables		
Size	Natural logarithm of total assets (*at*). Total assets are expressed in millions of 2010 U.S. dollars.	Compustat
Sales growth	Following Kim and Skinner (2012), it is defined as sales (*sale*) minus previous year sales divided by the beginning of the year total assets (*at*).	Compustat
Return	Following Kim and Skinner (2012), it is defined as the monthly market-adjusted stock return (*ret* - *sprtrn*) cumulated over a 12-month period. The cumulation period ends with the fiscal year-end.	CRSP
Return skewness	Following Kim and Skinner (2012), it is defined as the skewness of the defendant company's monthly stock returns (*ret*) over as 12-month period	CRSP
Return volatility	Following Kim and Skinner (2012), it is defined as the standard deviation of the defendant company's monthly returns (*ret*) over a 12-month period.	CRSP
Share turnover	Following Kim and Skinner (2012), it is defined as the total trading volume (*vol*) over the 12-month period ending with the fiscal year-end, divided by shares outstanding (*shrout*) at the beginning of the year.	CRSP

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Variable name	Description	Source
Other defendant company characteristics and control variables		
Book-to-Market	Book-to-market equity ratio, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Dividend payout	Dividend payout ratio (cash dividends divided by income before amortization and depreciation, if income before amortization and depreciation is positive), as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
ROA	Return on total assets, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Debt-to-Assets	Ratio of total liabilities to total assets, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Interest coverage	Interest coverage ratio (EBIT divided by interest expenses), as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
R&D-to-Sales	Ratio of R&D expenses to sales, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Advertising-to-Sales	Ratio of advertising expenses to sales, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Labor-to-sales	Ratio of labor expenses to sales, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Accruals	Ratio of discretionary accruals to total assets, as of the end of the year prior to lawsuit filing date.	WRDS Fin. Ratios Suite
Analyst dispersion	Standard deviation of analyst EPS forecast, divided by the absolute value of the median forecast.	IBES
Analyst error	Absolute value of the difference between median analyst EPS forecast and actual EPS, divided by the absolute value of the median forecast.	IBES
Analyst coverage	Natural logarithm of 1 plus the number of analysts covering the defendant company.	IBES
Bid-ask spread	On a given day, the bid-ask spread is defined as the absolute value of the difference between the bid and ask prices, divided by the closing price. Daily bid-ask spreads are then averaged over a given year. The bid-ask spread variable used in the tests is the yearly average, as of the end of the year prior to the lawsuit filing date.	CRSP
Amihud (2002) illiquidity	On a given day, the Amihud (2002) is defined as the ratio of the absolute value of the change in the stock price divided by the dollar trading volume. The dollar trading volume is defined as the product between the number of shares traded (*vol*) and the average of the current and lagged stock prices. The Amihud ratio is then averaged over a given year. The variable used in the tests is the yearly average, as of the end of the year prior to the lawsuit filing date.	CRSP
Idiosyncratic risk	1 minus the R-squared from a regression of daily excess stock returns (*ret* minus the risk-free rate of return) on the market (*mktrf*), size (*smb*), and value (*hml*) factors.	CRSP; Fama-French factors

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Variable name	Description	Source
E-index	Bebchuk, Cohen, and Ferrel (2009) entrenchment index.	Prof. L. Bebchuck's website
Board size	Number of members of the board of directors of the defendant company, as of the end of the year prior to the lawsuit filing date.	BoardEx
CEO Salary	Natural logarithm of the salary (*salary*) of the defendant company's CEO.	ExecuComp
CEO Bonus	Natural logarithm of the bonus (*bonus*) of the defendant company's CEO.	ExecuComp
CEO equity pay	Natural logarithm of the equity-based pay (option awards *option_awards_blk_value* plus restricted stocks grants *rstkgrnt*) of the defendant company's CEO.	ExecuComp
Inst. ownership	Fraction of the defendant company's shares held by 13F institutional investors.	TFN 13F
Top 10 inst. own.	Fraction of the defendant company's shares held by its 10 largest institutional investors.	TFN 13F
Block ownership	Fraction of the defendant company's shares held by blockholders.	TFN 13F
Num. inst. own.	Number of 13F institutional investors holding the defendant company's shares.	TFN 13F
Num. block. own.	Number of block holders holding the defendant company's shares.	TFN 13F
Inst. own. HHI	HHI concentration index of the firm's institutional shareholders.	TFN 13F
Class action	Indicator variable equal to 1 if the MSCAd *class_collective_action* variable is "class action" or "collective action", or if the observations come from ISS or SCAC, or the AA *class action* is 1, or if the FCC *classact* is 1; and equal to 0 otherwise.	MSCAd, ISS, AA, FCC
Derivative action	Indicator variable equal to 1 if the MSCAd *derivative_action_flag* is equal to 1 or if the AA *derivative* indicator is equal to 1, and 0 otherwise.	MSCAd, AA

A.2 Lawsuit types

Below we report a list of the types of lawsuits included in our data.

Shareholder - MSCAd *case_category* is Shareholder Risks, Financial Practices, Management & Fiduciary Risks, Corporate Capital Risks or Finance & Investment, or AA NOS or FCC NOS is 160 Stockholders Suits or 850 Securities/Commodities/Exchange, or if the data source is SCAC or ISS (those sources focus on shareholder lawsuits).

Employment - MSCAd *case_category* is Employment or Workplace, or AA NOS or FCC NOS is 330 Federal Employers Liability, 442 Employment, 445 - Americans With Disabilities, 710 Fair Labor Standard Act, 720 Labor/Management Relations, 740 Railway Labor Act, 751 - Family and Medical Leave Act, 790 Other Labor Litigation, and 791 Employee Retirement Income Security Act.

Products - MSCAd *case_category* is Products, or AA NOS or FCC NOS is 195 - Contract Product Liability, 245 Tort Product Liability, 315 - Airplane Product Liability, 355 - Motor Vehicle Product Liability, 365 Personal Injury Product Liability, 368 - Asbestos Personal Injury Product Liability, 380 - Other Personal Property Damage, or 385 Property Damage Product Liability.

Intellectual Property - MSCAd *case_category* is Intellectual property, or AA NOS or FCC NOS is 820 Copyrights, 830 Patent, or 840 Trademark.

Service & Operations - MSCAd *case_category* is Service & Operations, Business Practices Risks, Professional Practices, Transport & Shipping, or AA NOS or FCC NOS is 110 – Insurance, 120 – Marine, 140 - Negotiable Instrument, 151 – Medicare, 310 – Airplane, 340 – Marine, 350 - Motor Vehicle, 380 - Other Personal Property Damage, 362 - Personal Injury Medical Malpractice, 430 - Banks and Banking, 480 - Consumer Credit, 870 – Taxes, 891 - Agricultural Acts,

Trade Practice Risks - MSCAd *case_category* is Trade Practice Risks, or AA NOS or FCC NOS is 450 – Commerce, 470 - Racketeer Influenced and Corrupt Organizations.

Environment - MSCAd *case_category* is Environment or AA NOS or FCC NOS is 893 Environmental Matters.

Antitrust - MSCAd *case_type* is Anti-trust *AA NOS or FCC NOS is 410 Antitrust.*

Other Contracts and Fraud for residual categories.

A.3 Dataset construction

Lawsuit characteristics and law firm names are retrieved from the union of the Master Significant Cases & Actions Database (MSCAd), ISS Securities Class Action Services (ISS), Audit Analytics Litigation (AA), Federal Court Cases: Integrated Data Base (FCC), and the Stanford Security Class Action Clearinghouse (SCAC). The table below presents the composition of the final sample.

Table A1 Data sources

The table presents the data sources used in the construction of our dataset. The column labeled "Observations" reports the number of lawsuits associated with a given source or common to multiple sources. The data sources are Master Significant Cases & Actions Database (MSCAd), ISS Securities Class Action Services (ISS), Audit Analytics Litigation (AA), Federal Court Cases: Integrated Data Base (FCC), and the Stanford Security Class Action Clearinghouse (SCAC). Multiple sources indicate that the lawsuit observations are in each of the indicated datasets.

Source	Nr. Lawsuits	Source	Nr. Lawsuits
MSCAd	9,981	ISS & SCAC & Federal	113
ISS	3,867	MSCAd & ISS & SCAC	102
AA	3,454	ISS & SCAC	101
AA & Federal	3,325	SCAC & AA & Federal	98
MSCAd & Federal	2,061	MSCAd & ISS & SCAC & Federal	71
SCAC	1,404	ISS & AA	60
MSCAd & ISS	516	ISS & SCAC & AA & Federal	57
MSCAd & AA & Federal	401	MSCAd & ISS & AA	45
MSCAd & AA	291	MSCAd & SCAC & Federal	36
MSCAd & SCAC & AA & Federal	270	MSCAd & ISS & SCAC & AA	32
ISS & Federal	208	MSCAd & SCAC & AA	27
MSCAd & ISS & Federal	208	SCAC & AA	24
MSCAd & SCAC	208	ISS & SCAC & AA	17
ISS & AA & Federal	193	All sources	115
SCAC & Federal	143		

Appendix B Imputation of insurance coverage data with MCMC-MI data augmentation

This appendix illustrates the Markov Chain-Monte Carlo with multiple imputation (MCMC-MI) data augmentation algorithm used to impute insurance coverage values in the tests discussed in section V.A. The random forest algorithm, which is used is that section as well as in section V.B, is presented separately in Appendix C.

To recap, the problem we face is that when lawsuits are dismissed, both the settlement amount and the insurance coverage are set to zero. Most likely, however, the insurance coverage is not zero, i.e. the censoring due to a given lawsuit's dismissal masks a negative law firm performance. We thus seek to obtain imputed values for the insurance coverage in the dismissed cases, using the available information. To illustrate the approach, let $Coverage_{obs}$ and $Coverage_{cen}$ denote the observed and censored insurance coverage observations, and let x denote the vector of regressors used throughout the analysis ($Star$ indicator and Kim and Skinner (2012) control variables, plus the fixed effects).

The intuition behind the MCMC-MI approach is to draw repeated samples from the probability distribution of the censored values; it then imputes the average of those draws. To do so, it proceeds by iterating two steps. The first "imputation" step (I-step) takes a vector of parameter estimates $\hat{\beta}^{(0)}$ as given, as an input to estimate the parameters of the distribution of $\widehat{Coverage}_{cen}$. A vector $\widehat{Coverage}_{cen}^{(0)}$ is then obtained, as a random draw from the conditional distribution $\Pr\left(Coverage_{cen}|x, \hat{\beta}^{(0)}\right)$. The vast majority of applications, including this paper, obtains that distribution assuming joint normality of $Coverage$ and the variables in x; Monte Carlo evidence shows that this yields consistent estimates even when the underlying variables are not jointly normal (Schaefer (1997)). The second "prediction" step (P-step) obtains a revised estimate of the vector of parameters $\hat{\beta}^{(1)}$, as a random draw from the conditional distribution $\Pr\left(\beta \left| Coverage_{obs}, \widehat{Coverage}_{cen}^{(0)}, x\right.\right)$.

The I-step and the P-steps are iterated, generating a Markov chain. Under mild conditions, for a sufficiently large number of iterations the Markov chain converges to a stationary distribution, from which the vector of imputed values $\widehat{Coverage}_{cen}$ is drawn. In our application, we "burn-in" the first 500 iterations of the Markov chain and use the next 10,000 iterations to reach convergence. This concludes the MCMC part of the approach.

The above procedure is then repeated m times, yielding m multiple imputations for $\widehat{Coverage}_{mis}$. In our tests, we set $m = 100$. By the law of iterated expectations, for a given parameter ϑ of interest such as the coefficient on the $Star$ law firm indicator in our tests:

$$\Pr(\vartheta|Coverage_{obs}) = \int \Pr(\vartheta|Coverage_{obs}, Coverage_{cen}) \Pr(Coverage_{cen}|Coverage_{obs}) dCoverage_{cen}$$

so that it is possible to make inference on ϑ by averaging its realizations across the m imputations. We follow Rubin (1996), who provides the following formula for the standard error on $\hat{\vartheta}$:

$$V_B + V_W + V_B/m$$

where V_B is the "between" variance, i.e. the variance of the realizations of $\hat{\vartheta}$ across the m imputations, V_W is the "within" variance, i.e. the average square of the standard errors of $\hat{\vartheta}$ in each of the m imputations, and V_B/m is a correction factor. The efficiency of the MCMC-MI approach relative to the benchmark with no missing data is given by:

$$\left(1 + \frac{\lambda}{m}\right)^{-1}$$

where λ denotes the fraction of dismissed cases in the sample. In our data, $\lambda = 53\%$, implying a relative efficiency of 99% with 100 imputations.

Appendix C Predicting price per insurance with the Random Forest machine-learning algorithm

We use the Random Forest machine-learning algorithm in two tests; in both cases, we employ this approach to obtain estimated values for observations for which the true value of a given variable cannot be directly observed.

First, we use it to impute censored values of lawsuit-level insurance coverage in the check against measurement error discussed in section V.A. In this case, the Random Forest algorithm takes as input all the available insurance data in our main dataset. Second, we use the algorithm to obtain predicted values of defendant company-level insurance coverage and insurance premium from the database from the leading insurance company in the check against over-insurance described in section V.B. In this case, we run the Random Forest algorithm on data supplied by the insurer, a leading player in the primary D&O insurance market. The data cover D&O insurance information for 130 companies (including 30 defendant companies facing corporate lawsuits) over the period 2005-2016. For those companies, the insurer provides information on primary-level D&O insurance coverage and premium (computed as a price per unit of coverage, i.e. as the ratio of the dollar insurance premium to insurance coverage).

Intuitively, the Random Forest algorithm obtains imputed values as an average of multiple decision trees (prediction models widely used in the machine learning literature). In the two applications of the Random Forest algorithm, we make use of the following variables. The top-10 star law firm indicator and the number of cases settled or dismissed in a given court for a given law firm over the previous five years are exclusively used in the application of section V.A (lawsuit-level imputation of insurance coverage). In the application of section V.B (firm-level imputation of insurance coverage and insurance premium) the latter variable is replaced by the number of cases settled or dismissed in a given court, averaged over the past five years. Both applications use the following variables: Number of lawsuits (Number of filed lawsuits against the defendant company over the past five years), Total settlement (Total dollar settlement amount against the defendant company over the past five years), Share of stars (Total settlement amount settled against star plaintiff law firms over the past five years divided by Total settlement over the same period), Average rank (Average of an indicator variable for a star law firm on a case over the past five years), Rank standard deviation (Standard deviation of an indicator variable for a star law firm on a case over the past five years), Cases in industry (Number of cases settled or dismissed in the Fama-French-10 industry of the defendant firm over the past five years), Total assets, Sales growth, Return, Return skewness, Return volatility, Share turnover, Book-to-Market, Dividend payout, ROA, Debt-to-Assets, Interest coverage, Cash-to-Total liabilities, Gross profits-to-Total assets, Cyclically-adjusted P/E ratio, R&D-to-Sales, Advertising-to-Sales, Labor-to-Sales, Accruals, Analyst dispersion, Analyst error, Analyst coverage, Board size, Departures from the board of directors, the ratio of incoming directors to board size, the ratio of departing directors to board size and a time trend (years since 1970). We set missing values for these variables to zeros, and include indicator variables equal to one for a given observation and a given variable no information is available from CRSP-Compustat, Execucomp, I/B/E/S, or BoardEx.

In our implementation, we follow the three-step procedure described in Brieman (2001): (1) Tune the model parameters to select optimal parameter values, to obtain the highest prediction accuracy; (2) Estimate the model with the selected optimal parameters using the observed data; (3) Form predictions for those cases when the data is not observed. We now provide a detailed explanation of those steps.

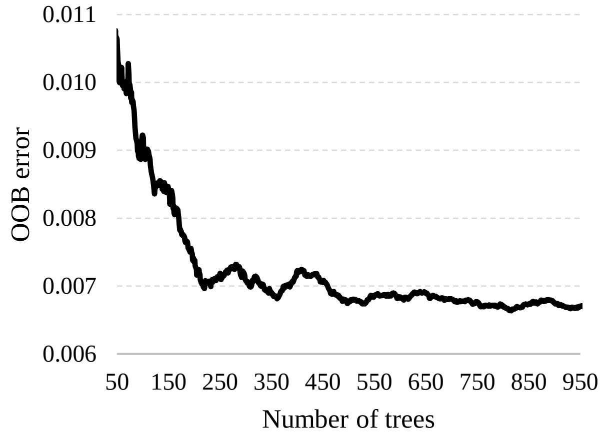
In the first step of the Random Forest approach, we obtain the optimal values of two parameters: (i) the number of trees, and (ii) the maximum number of variables each tree uses to make a prediction. Combined, these two parameters supply the best prediction. The criterion we use to assess the optimality of the prediction and model performance is the out-of-bag (OOB) error (Acharya et al. (2018), Brieman (2001), Mullainathan and Spiess (2017)). The OOB error is defined as 1 minus the model prediction accuracy on bootstrap subsamples. Each subsample is constructed as follows. The data are split into two parts, one for model training and the other to make a prediction. The OOB is computed on the prediction subsample.

First, to determine the optimal number of trees the model is fitted to the data under every number of trees between 1 and 1,000. Figure C.1 presents the OOB plot for lawsuit-level insurance coverage (panel A), company-level insurance coverage (panel B), and price per unit of insurance coverage (panel C). In all three cases, the estimates with a number of trees below 50 produce large errors and are omitted from the graphs. Also in all three cases, the OOB error stabilizes after 500 trees; we thus select 500 as the optimal number of trees.

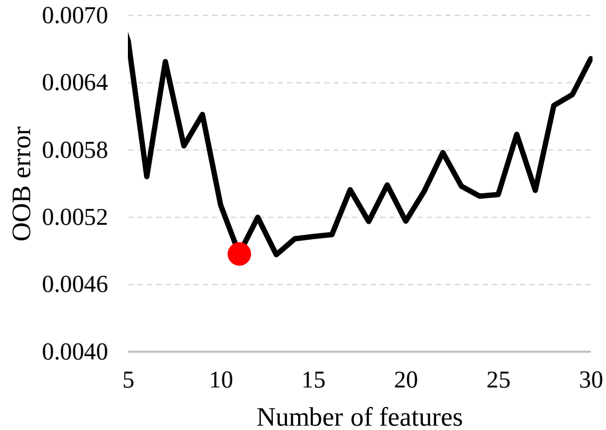
Second, we select the maximum number of variables that will be used to build each tree. Setting the number of trees to 500, we fit the Random Forest regressor for each number of variables from 1 to 35, where 35 is the number of all the variables we use in this section. Figure C.1 plot the OOB errors for lawsuit-level insurance coverage (panel D), company-level insurance coverage (panel E), and price per unit of insurance coverage (panel F) under different number of variables (estimates based on fewer than 5 variables produce very noisy estimates, omitted from the graphs). The red dots in the graphs highlight the number of variables minimizing the OOB: 11 for lawsuit-level insurance coverage, 24 for company-level insurance coverage, and 12 for price per unit of insurance coverage.

In the second step of the Random Forest implementation, we fit the model setting the number of trees and the maximum number of variables used in each tree to their optimal (OOB error-minimizing) values. We set the number of trees to 500 and the number of variables to 11 for the case level insurance, to 17 for the company level insurance coverage, and to 12 for the price per unit of insurance coverage.

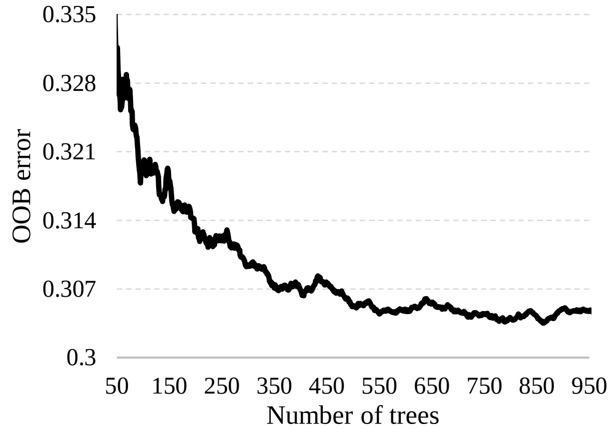
In the third step, we make a prediction for the missing data using the fitted Random Forest from the previous step. Looking at the most important features of the predictions, we find that the model fits the data well. The correlation between the actual and predicted values is 99% for lawsuit-level insurance coverage, 93% for company-level insurance coverage, and 97% for insurance premia.



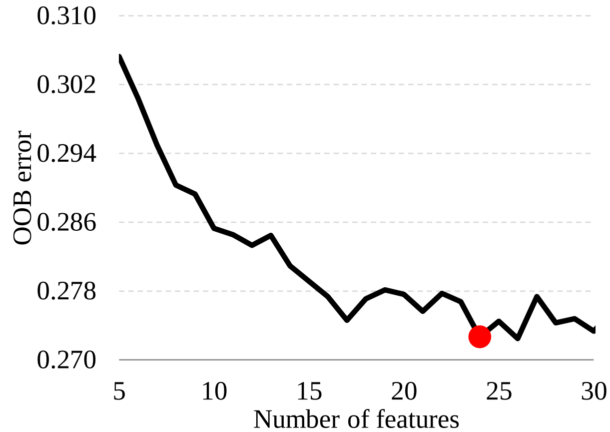
A. OOB vs number of trees,
lawsuit-level insurance coverage



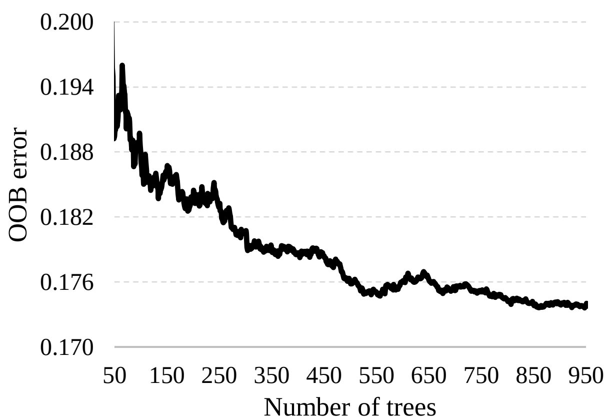
D. OOB vs number of features,
lawsuit-level insurance coverage



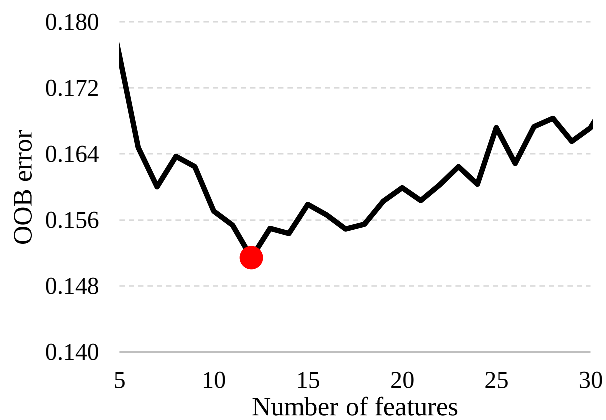
B. OOB vs number of trees,
company-level insurance coverage



E. OOB vs number of features,
company-level insurance coverage



C. OOB vs number of trees,
company-level price per unit ins. coverage



F. OOB vs number of features,
company-level price per unit ins. coverage

Figure C.1 Random Forest parameters tuning

The figures illustrate the parameters tuning for the Random Forest algorithms. Panels A, B, and C illustrate the choice of the number of trees for lawsuit-level coverage, company-level coverage, and company-level price per unit coverage respectively; panels D, E, and F the choice of the number of features.