Auctioning Class Action Representation

Alon Klement*
Buchmann Faculty of Law, Tel-Aviv University, Israel

Zvika Neeman
Berglas School of Economics, Tel-Aviv University, Israel

Moran Ofir
Harry Radzyner Law School, The Interdisciplinary Center (IDC) Herzliya, Israel

Class actions feature severe agency problems, resulting from the divergence of interests between class members and the class attorney. This article proposes a novel mechanism for selecting the class attorney and aligning her interests with those of the represented class. The mechanism applies a combined percentage and hourly litigation fee structure, suggested by Polinsky, Mitchell A., and Daniel L. Rubinfeld. 2003. "Aligning the Interests of Lawyers and Clients," 5 *Am Law Econ Rev* 165, in which lawyers earn a percentage of the class' common fund, and bear the same percentage over their time investment. To maximize the expected payoff for the class, we supplement this fee structure with a preliminary two stages auction, in which the role of the lawyer is tendered using competitive bidding. We prove that the proposed auction approximates the highest possible net payoff for the class as the number of lawyers who compete for the right to represent the class increases. The percentage taken by the lawyer would be the lowest possible, and the winning lawyer would be the one who produces the highest expected net payoff for the class. We then extend the model to cases where the attorney files the class action is compensated for her pre-filing investment, and to settlements (JEL K41, K22)

1. Introduction

For over 50 years, class actions in the US have been initiated and litigated by self-driven entrepreneurial lawyers. Lawyers have taken the risks and costs of pursuing class action litigation, in the hope of obtaining a class-wide relief, out of which they would earn their fees. Those fees, usually calculated on a contingency percentage basis, have fueled the engines of American class actions (Coffee 2015; Miller 2018).

* Buchmann Faculty of Law, Tel-Aviv University, Israel. Email: klement@tauex.tau.ac.il.
For their helpful comments, we thank participants in workshops at Georgetown, George Washington, George Mason, USC and Tel-Aviv Universities, as well as the Israeli, the European and the American Law and Economics Associations' annual meetings in 2019.

The Journal of Law, Economics, and Organization, Vol. 38, No. 3
doi:10.1093/jleo/ewab014
Advance Access Publication August 14, 2021

However, the entrepreneurial class action procedure, which induces private lawyers to pursue public goals, has had its inherent costs. Since lawyers' incentives are not fully aligned with class members' interests, opportunities for rent-seeking have allegedly produced agency problems that were manifested both in inadequate litigation incentives and in potentially collusive settlements (Coffee 1987; Macey and Miller 1991).

A solution to agency problems in the context of individual litigation was suggested by Polinsky and Rubinfeld (2003).[1] To align the interests of the lawyer and the client, Polinsky and Rubinfeld (PR) have proposed that the lawyer would pay a third party an upfront premium, and in return the third party would compensate the lawyer for a certain fraction of her litigation time investment—the number of hours she spent on the case multiplied by her hourly fee. This fraction is set to equal the complement of the percentage earned by the lawyer from the litigation or settlement outcome. Thus, the percentage earned by the lawyer, and the percentage of the costs she has to bear are equalized. As PR shows, the lawyer's incentives are the same as if she were the sole owner of the lawsuit.

The PR incentive scheme provides a solution to the lawyer's moral hazard problem. Yet, it does not address two additional challenges which are critical for maximization of the client's expected payoff: how to select the optimal lawyer, and how to minimize her fee. In the context of class actions, these challenges become critical, as lawyers often initiate the litigation and there is no market to choose among them and determine their fee.

This article resolves both challenges, by supplementing the PR scheme with a preliminary auction. The auction mechanism selects the best lawyer for the class and pays her the minimum fee required to motivate her to litigate the class action.

The proposed auction is divided into two stages. In the first stage, risk-neutral after-the-event (ATE) litigation insurers bid the highest percentage of the lawyer's hourly fee they are willing to pay for every hour invested in the case.[2] In the second stage, lawyers bid the highest price they are willing to pay to represent the class, given the percentage set in the first stage auction. The lawyer's hourly fee is determined by the court when litigation concludes. The winning lawyer's bid is paid to the winning insurer, and the lawyer is compensated according to the PR scheme, where

1. A long list of papers cited Polinsky and Rubinfeld's (2003) paper. For example see: Klement and Neeman (2004); Huang (2004); Kirstein and Rickman (2004); Davis and Cramer (2009–2010); ; Burch (2012); . See also Cooter and Porat (2002).

2. After-the Event (ATE) insurance covers the legal costs and expenses involved in litigation. It is distinguished from before-the-event (BTE) insurance, which covers future legal costs, and whose terms are agreed before the event which give rise to the claim takes place. In ATE insurance the policy is taken out after a legal dispute arises, in order to cover the risk of having to pay the opponent's legal costs. ATE insurance can be purchased for nearly all areas of litigation. See Lewis (2011).

the percentage she earns from any judgment or settlement is the complement of the percentage bid by the winning insurer.

For example, suppose the winning insurer agrees to pay 70% of the lawyer's hourly fee and the winning lawyer bids $100 \times 0.7 = 70$. Then by the end of litigation the court determines the lawyer's hourly fee, the insurer pays the lawyer 70% of her total hourly investment (number of hours multiplied by the hourly fee), and the lawyer earns an additional 30% of the judgment or settlement.

As we prove, this two-stage auction approximately maximizes the class' net payoff. The percentage taken by the lawyer minimizes the lawyer's rent, and the winning lawyer is the one who produces an approximately maximum expected net payoff for the class, as the number of lawyers who compete for the right to represent the class increases.

The intuition for this result is the following: If the entire proceeds from the lawsuit were auctioned to the lawyer who was willing to pay most, then the winner would be the lawyer whose net expected payoff from the lawsuit was maximal. She would be the one who can produce the highest net litigation payoff. Under competitive bidding, her bid would equal the net value of the sole ownership of the litigation.

Now suppose that instead of auctioning the whole claim, we auction only some percentage of it. Since the PR fee structure guarantees that the total value of the claim would not be affected by the lawyer's percentage, the price offered for this percentage would equal the winning bid in the sole ownership auction, multiplied by that percentage. This implies that the same lawyer would win both auctions.

The winning lawyer earns a percentage of the lawsuit's net expected value (expected judgment or settlement minus litigation costs), but she pays an upfront premium to the insurer. As we show, the outcome of the two-stage auction is that the lawyer bears her full litigation costs—the insurance premium plus her share of the litigation costs equal the reservation value of the time she invests—leaving the class with a maximum net payoff.

The proposed auction should be compared to two alternative auction mechanisms that have been suggested or practiced in the past. One proposal was to auction the *total claims* of all class members (Macey and Miller 1991, 1993). According to this proposal, the winner would pay his bid and distribute it among class members, and then prosecute the class action against the defendant, in his name. Since the winning bidder becomes the owner of the claim, he would act as his own agent. As the sole owner of the claim, he would conduct the litigation and settlement just like any other litigant (including the defendant), thus unraveling the problem of misalignment between the class and its representatives.

Although this proposal was theoretically appealing, courts have never implemented it. First, and foremost, such an auction would violate the

prohibition on claim selling.[3] Second, it would require potential buyers to dedicate sufficient funds to compensate all class members, before the class action is certified, and hence before class members are defined and identified (Harel and Stein 2004). Finally, since the winner in the auction pays for the *expected* value of the class action, evaluated before discovery and litigation, that value would be the same irrespective of the actual liability of the defendant. As we show, our proposal realizes the same optimality outcomes as the full claim auction, without being subject to these problems.

An alternative auction mechanism for the class attorney position has been experimented with by courts.[4] In these auctions, lawyers were required to submit their requested percentage fee, which they could condition on the stage the litigation concludes. These auctions have been harshly criticized.[5] Most significantly, the concern was that this type of auction creates a "race to the bottom," driving both the quality of the winning bidder and his incentives to litigate the case properly, away from what the class would have required (Bebchuk 2002; Fisch 2002). Competitive bidding over the attorney percentage puts insufficient weight on qualitative dimensions of the choice of counsel, and it results in a too low percentage, which falls below the optimal level from the class' perspective. Thus, this type of auction not only fails to resolve the class attorney agency problem, but it might even aggravate it. As we prove, these problems are resolved by our proposed auction mechanism, combined with the PR fee structure.

As we show, the proposed mechanism can be accommodated into alternative financing and litigation regimes. It may be employed in securities class action litigation in the United States, which vests the lead plaintiff, who holds the largest financial interest in the relief sought, with the authority to select and retain class counsel.[6] Furthermore, we show how the

3. For a critical discussion of claim auctions see Moeller (2000). Thomas and Hansen (1993) are criticizing Miller and Macey (1991) proposal as unworkable in practice, and questionable under the current rules of professional responsibility; *See also* Third Circuit Task Force Report on Selection of (2001) [hereinafter Task Force Report] holding that the proposal is unworkable in practice, since it would violate rules of professional conduct prohibiting lawyers from having a financial interest and would require changes in the law that have not yet garnered support outside of some academic circles. The report and witness statements by numerous academics, lawyers and judges, can be found onhttps://www.ca3.uscourts.gov/sites/ca3/files/final%20report%20of%20third%20circuit%20task%20force.pdf

4. *See, e.g., In re* Oracle Sec. Litig., 136 F.R.D. 639, 641 (N.D. Cal. 1991) (first lead counsel auction). Since then, courts continued to employ the device in various securities class actions. For a comprehensive descriptive review of these cases. *See* Hooper and Leary (2001) and the Third Circuit Task Force Report, *supra* note 4.

5. One of the Task Force Report's main conclusions was that the traditional methods of selecting class counsel are preferable to auctions in most class action cases. See Task Force Report, *supra* note 7 at p. 18.

6. For further reading on the lead plaintiff provision under the Private Securities Litigation Reform Act (PSLRA) see: Simmons and Ryan (2003); Perino (2006); Nelson and Pritchard (2007); Choi (2007); Cox et al.(2008); Choi(2011); Choi and Prichard (2018).

optimal scheme may be combined with an independent payment to the filing attorney, and at the same time allow him to participate in the auction. Thus, the proposed scheme would not undermine the incentives of lawyers and class members to initiate claims and file class actions.

Notably, although the proposed scheme may be used in individual litigation, class actions hold specific features which render implementation of the scheme more attractive. In particular, attorneys' fees in class actions are determined by the court by the end of the litigation. As we show below, this resolves a potential divergence between the lawyer's hourly cost and the hourly fee she is paid, thus inducing her to invest optimally. Furthermore, whereas in individual litigation, market competition may often prove effective in addressing moral hazard and adverse selection problems, such competition is absent in class actions, where the court and not the client selects the lawyer and determines her remuneration. Choosing the representative lawyer through auction would not prove more costly compared to alternative selection procedures already used in class actions, and, as we show, it would provide better outcomes for the class.

Section 2 presents the formal model and derives the main results. Section 3 extends the model to settlements and to cases where the class representative or attorney holds some independent share of the litigation outcome. Section 4 concludes. Proofs of the Propositions are relegated to Appendix.

2. The Model

We present a simple model in which a class action is filed against a defendant.[7] After the class action is filed, the court must choose one out of n different lawyers to litigate the case. The marginal hourly cost of lawyer $i \in \{1, \ldots, n\}$, which is equal to her hourly fee, is w_i. Suppose that for each lawyer i, and for each number of hours spent on litigation h_i, the class prevails with a probability$p_i(h_i)$ which is increasing and concave in h_i and is such that $p_i(0) = 0$. The award for the class if it wins the case is a.[8] The lawyer's reservation payoffs are all assumed to be equal to zero.

In subsection 2.1, we characterize the first-best outcome for the class. We then show in subsection 2.2 how the PR scheme may be implemented to this model. Subsection 2.3 presents our main result, showing how the first-best outcome can be implemented if the lawyer is chosen by the court and then the lawyer decides the number of hours to invest in the litigation. Notably, the court may verify the number of hours worked h_i, yet it only

7. This is a simplification of class action procedure, in which the plaintiff files a motion to certify the lawsuit as a class action. See Federal Rules of Civil Procedure §23(c)(1).

8. Although we focus on litigation outcomes to simplify the main part of the analysis, the model can be extended to incorporate settlement negotiations, as we show in Appendix.

observes an unbiased signal about the marginal cost w_i (as opposed to observing w_i directly), and it does not observe the function $p_i(\cdot)$.

2.1 The Optimal Outcome for the Class

We solve for the optimal (first-best) outcome for the class.[9] For each attorney i the expected litigation payoff to the class as a function of the number of hours invested h_i,denoted $V_i(h_i)$, is given by:

$$V_i(h_i) = p_i(h_i)a - w_i h_i. \tag{1}$$

Maximization of this payoff with respect to h_i yields a (necessary and sufficient) first-order condition, which is solved by h_i^*:

$$p_i'(h_i^*) = \frac{w_i}{a}. \tag{2}$$

Hence, the class' maximal expected payoff if represented by lawyer i is:

$$V_i^* = p_i\left(h_i^*\right)a - w_i h_i^*. \tag{3}$$

Denote by i^* the lawyer who obtains the maximum expected payoff for the class, V^*,

$$V^* = max_i V_i^*. \tag{4}$$

To cover her litigation investment, this lawyer must be paid $w_{i^*}h_{i^*}$.

2.2 An Optimal Incentive Scheme for a Single Lawyer

Suppose now that the lawyer is chosen by a court, which cannot observe the lawyer's ability. Thus, the court does not observe the function $p_i(\cdot)$.Furthermore, the court may verify the number of hours worked h_i, but can only observe an unbiased signal w_i^e about the marginal cost with expectation equal to w_i.

If the lawyer is awarded a percentage $\theta < 1$ of the outcome, according to the ordinary contingent fee, and she controls the litigation, then her investment would be lower than optimal. The lawyer's expected payoff as a function of the number of hours worked, denoted $U_i(h_i)$, is

$$U_i(h_i) = \theta p_i(h_i)a - w_i h_i, \tag{5}$$

and her (necessary and sufficient) first-order condition for maximization of this payoff, solved by h_i^θ, is

9. Class members' payoff is not equivalent to social welfare. Some lawsuits may have no deterrent value, and may not justify their costs. See, for example, Shavell (1982). Nevertheless, our focus here is on the class attorney's agency problem, and hence we use the expected payoff to the class as the normative criterion.

$$p_i'(h_i^\theta) = \frac{w_i}{\theta a}. \tag{6}$$

Since $\theta < 1$ and $p_i(h_i)$ is concave, this implies that from the class' perspective, the lawyer's investment would be lower than optimal, $h_i^\theta < h_i^*$.

We now show how an incentive scheme similar to the one suggested by PR eliminates the conflict of interest between the lawyer and the represented class. It is a two-tiered incentive scheme in which the number of hours invested in the case is decided by the lawyer, who earns a percentage $\theta < 1$ of the litigation or settlement outcome. In addition, the lawyer makes an upfront nonrefundable fixed payment, f, to a risk-neutral litigation insurer, before the litigation. In return, the insurer agrees to pay the lawyer $(1-\theta)w_i^e$ for each hour she spent on the case, where w_i^e would be deterimed by the court when it decides the case. Since the court's signal is unbiased, the expected hourly payment for the insurer equals $(1-\theta)w_i$.

It should be noted that while in individual litigation the client and the lawyer agree on the lawyer's hourly fee in advance, before litigation begins, in class actions the lawyer's compensation is determined by the court, only when the case is decided for the class or settled, and it is paid out of the "common fund" created for the class by the judgment or settlement (Lynk 1994; Alexander 1998). Although some scholars have suggested that courts should determine the fee in advance (Lynn et al. 2015), setting the fee only when litigation concludes is advantageous where the court cannot observe the lawyer's exact hourly cost but only an unbiased signal of it. As pointed out by Wickelgren (2004) a divergence between that lawyer's hourly fee and her hourly cost could result in either higher or lower investment in the case, and might undermine the optimality of the scheme suggested by PR. However, if the fee is determined only after the lawyer has made all litigation investments, and since the expected fee equals the lawyer's hourly cost, $E[w_i^e] = w_i$, this misalignment is corrected.

Under the proposed scheme, the lawyer has full discretion to decide how many hours to invest. Her expected payoff is therefore equal to:

$$U_i(h_i) = \theta p_i(h_i)a - w_i h_i + (1-\theta)w_i h_i - f = \theta V_i(h_i) - f. \tag{7}$$

The (necessary and sufficient) first-order condition for maximization is the same as equation (2). Therefore, the lawyer's investment, h_i^θ, which maximizes her expected payoff, equals the class' optimal choice, h_i^*, and it is independent of the percentage θ.

This leads to the following result:

Proposition 1. **(Polinsky and Rubinfeld 2003).** If the lawyer is paid a percentage θ of the award, and she is paid by the insurer an expected amount of $(1-\theta)w_i$ for each hour she invests in the case, then her litigation decisions are optimal for the class, irrespective of θ.

The expected payoff to the class under this scheme is

$$(1-\theta)p_i(h_i^*)a = (1-\theta)\left(V_i^* + w_i h_i^*\right). \tag{8}$$

Notably, this expected payoff is lower than the maximum payoff defined by equation (3), unless the lawyer's share of the expected class outcome equals her investment: $\theta p_i(h_i^*)a = w_i h_i^*$.

2.3 Selecting the Optimal Lawyer by an Auction and Minimizing Her Rent

The incentive scheme proposed in the previous subsection aligns the interests of the lawyer and the class. However, in order to induce the lawyer to agree to represent the class under this scheme, her expected payoff, $\theta V_i^* - f$, needs to be nonnegative, which imposes a lower bound on the value of θ. Specifically, it is required that:

$$\theta \geq \frac{f}{V_i^*} \geq \frac{(1-\theta)w_i h_i^*}{V_i^*} \tag{9}$$

or that

$$\theta \geq \frac{w_i h_i^*}{V_i^* + w_i h_i^*} = \frac{w_i h_i^*}{p_i(h_i^*)a}. \tag{10}$$

Denote the value of θ that attains this lower bound by θ_i^*. When this value of θ is used in the scheme, the expected payoff to the class in equation (8) is equal to

$$\left(1 - \frac{w_i h_i^*}{V_i^* + w_i h_i^*}\right)p_i(h_i^*)a = V_i^*, \tag{11}$$

which is equal to the expected payoff to the class under the first-best outcome in equation (3).

It follows that in order to maximize the class' expected payoff, the court must choose the lawyer who would maximize the class' net expected payoff, and award her the minimal percentage $\theta_i^* = \frac{w_i h_i^*}{V_i^* + w_i h_i^*}$. Remember that for each lawyer i, the court can observe an unbiased estimate of w_i, w_i^e, and the number of hours invested by the lawyer, h_i, but does not know the function$p_i(\cdot)$. Hence, a court that relies on the PR incentive scheme, as it is applied in the previous section, can neither select the optimal lawyer, nor can it determine the value of h_i^*, or minimize the lawyer's expected net payoff $\theta V_i^* - f \geq 0$. We now present an auction scheme that achieves an approximately optimal solution to these problems.

We embed the auction within a Bayesian game as follows. Suppose that the type of lawyer i is given by a pair $\langle p_i(\cdot), w_i \rangle$ that consists of a probability function and hourly fee. The prior distribution of $\langle p_i(\cdot), w_i \rangle$ induces a prior distribution of the values V_i^*. To facilitate our analysis, we assume that the V_i^*'s are independently and identically distributed on the intervals

$[0, -V]$. The cumulative distribution function of each V_i^* is given by a differentiable function F.

Suppose that the court runs the following two auctions sequentially: First, it runs an auction among different possible risk-neutral litigation insurers to determine the value of θ, and then it runs an auction among lawyers to determine the identity of the lawyer who would be chosen to represent the class, and the terms of her employment. The two auctions can also be run simultaneously, but not in the reverse order.[10] When litigation concludes the court determines also the lawyer's hourly fee.

Specifically, in the first auction, litigation insurers compete for the right to fund $1 - \theta$ of the lawyer's litigation costs by bidding their proposed value of θ, with the lowest bidder winning the auction, subject to the following terms. The winner is paid an amount θb_i by the lawyer who would win the second auction, where b_i is the winning bid in the second auction to be subsequently determined. In return, the insurer reimburses the lawyer who wins the second auction an amount of $(1 - \theta)w_i^e$ per hour she invests on the litigation, which is determined when litigation concludes. Because the estimate w_i^e is unbiased, the winning lawyer is paid an expected amount of $(1 - \theta)w_i$ per hour worked on the case.

Denote the expected value of the winning bid in the second auction by $E[b^*]$. The expected rent to the winning litigation insurer is therefore given by $\theta E[b^*] - (1 - \theta)E[w_i^{e*}h_i^*]$ where w_i^{e*} and h_i^* denote the expected hourly fee and hours worked by the winning bidder, respectively (below, we explain the reason that the winning bidder would indeed work h_i^* hours). The litigation insurer need not know at the time of the first auction the realized values of w_i^{e*} and h_i^*. We do assume, however, that these values are equal to the means of the litigation funder's beliefs about these values, and that the mean of the litigation funders' beliefs about the winning lawyer's hourly fee coincides with the court's expected estimate of this fee.[11]

The fact that this expected rent is increasing in θ implies that competition among litigation insurers would drive the value of the winning bid, denoted θ^*, down so that the expected rent to litigation insurers is equal to zero:

$$\theta^* E[b^*] - (1 - \theta^*)E[w_i^{e*}h_i^*] = 0. \tag{12}$$

Moreover, if the deviations of the litigation insurer's estimate of the court's determined winning lawyer's fee w_i^{e*} from its mean w_i^* is stochastically independent of the deviations of the estimated number of hours worked by this lawyer $h_i^*$from its mean $E[h_i^*]$, which is a reasonable

10. This is because knowledge of the winning lawyer's bid b_i would affect the value of the winning θ, which would feed back into the determination of b_i.

11. That is, we assume that litigation funders are "Bayesian rational," in the sense that they can formulate beliefs with respect to the distribution of any variable they do not know. We further assume that these beliefs are not entirely ad-hoc, but are anchored by the variables' true values through their mean values.

enough assumption since the litigation insurer determines the value of w_i^{e*} before the winning lawyer is even selected, then the covariance between these two variables is zero. In this case $E[w_i^{e*}h_i^*] = E[w_i^{e*}]E[h_i^*] = w_i^*E[h_i^*]$.

After the first auction ends and the value of θ^* becomes known, the court runs a second auction. In this second auction, the different lawyers bid for the right to represent the class. Lawyers each submit a bid $b_i \geq 0$. The highest bidder wins the right to represent the class. The winning lawyer pays under the following terms: the lawyer pays $\theta^* b_i$ to the chosen litigation insurer. The lawyer would be paid $\theta^* a$ upon winning the case, and would be reimbursed at the estimated rate $(1-\theta)w_i^e$ per hour for number of hours she works, h_i, where w_i^e denotes the court's subsequent unbiased estimate of the winning lawyer's hourly cost.

The expected payoff of the lawyer who wins the auction and works h_i hours is therefore given by

$$p_i(h_i)\theta^* a - \mathrm{w}_i h_i + (1-\theta^*)w_i h_i - \theta^* b_i = \theta^*(p_i(h_i)a - w_i h_i - b_i) \qquad (13)$$

Notice that this expression is proportional to the first-best payoff to the class, up to a constant, so the winning lawyer would work h_i^* hours, regardless of the value of θ^*. It follows that the winning lawyer's expected payoff from winning the auction is

$$\theta^*\left(p_i\left(h_i^*\right)a - w_i h_i^* - b_i\right) = \theta^*\left(V_i^* - b_i\right). \qquad (14)$$

That is, the lawyer who wins the auction pays its bid b_i, and gains the expected benefit V_i^*, both multiplied by θ^*. Lawyers who do not win the auction obtain a payoff of zero. If θ^* is equal to one, then the auction is a first-price auction. If $\theta^* < 1$ then the auction is not strictly speaking a first-price auction, but it can nevertheless be analyzed in the same way.

Recall that the V_i^*'s are continuous random variables that are independently and identically distributed on the interval $[0, -V]$. The following Proposition characterizes equilibrium behavior in the lawyers' auction.

Proposition 2.

(a) The lawyer with the highest value of $\mathrm{V_i^*}$ wins the auction with a bid that is equal to $\mathrm{b_i}\left(\mathrm{V_i^*}\right) = \mathrm{E}\left[\mathrm{max_{j\neq i}V_j^*}|\mathrm{max_{j\neq i}V_j^*} \leq \mathrm{V_i^*}\right]$.
(b) The class' expected payoff approaches $V_{i^*}^*$ as the number of lawyers increases.

That is, in the unique equilibrium of the second auction, each lawyer would bid the expected value of the highest valuation of the other lawyers conditional on this value being smaller than the lawyer's own value V_i^*, or

$$b_i\left(V_i^*\right) = E\left[max_{j\neq i}V_j^* | max_{j\neq i}V_j^* \leq V_i^*\right]. \qquad (15)$$

If lawyers bid their valuations V_i^*, and the percentage θ^* were equal to the winning bidder's θ_i^*, then the auction would have generated an

expected payoff to the class that is equal to the expected payoff that is generated by the best lawyer under the first-best outcome. However, the fact that lawyers bid $b_i(V_i^*)$, which is smaller than V_i^*, and therefore the litigation insurers set θ^* at a higher value compared to the winning bidder's θ_i^* in order to break even implies that the expected payoff to the class is lower.

The winning lawyer under this scheme earns a positive rent through two channels: (1) because $b_i(V_i^*) < V_i^*$ lawyers' bids are lower than what representation is worth for them, and (2) as a result of the first observation, the value of θ^* is set larger than the value θ_i^* that is required to induce the winning lawyer to participate in the auction.

Importantly, however, the litigation insurer need not know the value of h_i^* in order for this scheme to be successfully implemented as required by the PR scheme described in the previous subsection, in which there was no competition among lawyers. It is only required that litigation insurers have unbiased beliefs over the realization of the winning bidder's effort h_i^*, and that these beliefs be stochastically independent of the unbiased court estimate of the lawyer's hourly cost, w_i^e.

Finally, as implied by Proposition 2, as the number of lawyers who participate in the auction increases, the intensified competition among them implies that $b_i(V_i^*)$ converges to V_i^*, and the variance associated with the winning bid decreases, so that θ^* converges to the winning bidder's θ_i^*. Thus, the expected payoff to the class converges to the first-best payoff under the best lawyer.

3. Extensions

3.1 Settlement

Our model has abstracted from the possibility of settlement. As we next show, our results carry through if we allow for the possibility of pre-trial settlement, where class-action lawyers hold private information regarding their probability of winning the case for the class, $p_i(h_i)$.

For simplicity, suppose that the defendant incurs no litigation costs. Suppose that n lawyers compete in the auction for the right to represent the class as described above in Section 2.3 of the article. It is commonly known that if the case is litigated by lawyer $i \in \{1, \ldots, n\}$ who works h_i hours then the liability of the defendant equals $p_i(h_i)a = V_i^* + w_i h_i$. The defendant does not observe $p_i(h_i)$ and w_i and therefore, from its perspective, both are viewed as random variables. Furthermore, we assume that the defendant does not learn the winning lawyer's, i^*, bid, and therefore it does not know $V_{i^*}^*$.

The defendant makes a take-it-or-leave-it settlement offer s to the winning lawyer i^*. If the lawyer accepts the defendant's offer, then the defendant pays s to the class. A proportion $\theta^* s$ is paid to the lawyer, and the class retains the rest, $(1 - \theta^*)s$. If the case settles, the lawyer exerts no effort, and so does not need to be compensated for any hours worked. If the

lawyer rejects the defendant's settlement offer s, then the case proceeds to trial where the lawyer i^* exerts effort $h^*_{i^*}$ as described in Section 2.3 of the article, and wins the case for the class with probability $p_{i^*}(h^*_{i^*})$.

The winning lawyer i^* accepts the defendant's settlement offer s if and only if his payoff from litigating the case, which by the analysis described in Section 2.3 is equal to $\theta^* V^*_{i^*}$, is such that $\theta^* s \geq \theta^* V^*_{i^*}$ or $s \geq V^*_{i^*}$. If the lawyer refuses the defendant's settlement offer, then the case proceeds to trial, and the defendant's expected liability is $p_{i^*}(h^*_{i^*})a = V^*_{i^*} + w_{i^*}h^*_{i^*}$.

Importantly, because the winning lawyer's payoff is proportional to that of the class both in litigation and in settlement, the lawyer would accept or reject the defendant's settlement offer if and only if the class would reject it, which implies that settlements involve no loss of revenue for the class.

The defendant understands that, given a settlement offer s, if $\max_{i\in\{1,\ldots,n\}} V^*_i > s$, then, if the case proceeds to trial, it would face the best lawyer from the group of n lawyers. But if $\max_{i\in\{1,\ldots,n\}} V^*_i \leq s$, then, if the case proceeds to trial, it would face a randomly chosen lawyer from the group of n lawyers. In the former case, the defendant's liability would be $p_{i^*}(h^*_{i^*})a = [\max_{i\in\{1,\ldots,n\}} V^*_i] + w_{i^*}h^*_{i^*}$. In the latter case, the defendant's expected liability would be $E_{j\in\{1,\ldots,n\}}[p_j(h^*_j)a]$ because, in this case, the winning lawyer is randomly selected from the group of lawyers.

Denote the distribution of the defendant's liability by $G_s(\cdot)$. Because a lower settlement offer s implies that the best lawyer from the group of n lawyers is more likely to be selected, if $s > s'$ then the distribution $G_{s'}$ first-order-stochastically-dominates the distribution G_s (namely, $G_{s'}(x) \leq G_s(x)$ for every $x \geq 0$). This implies that for every x, the value of $G_s(x)$ is increasing in s. Given an anticipated settlement offer s, the defendant chooses the settlement offer s^* so as to minimize its expected liability,

$$(1 - G_s(s^*))E\Big[p_{i^*}(h^*_i) \max_{i\in\{1,\ldots,n\}} V^*_i > s\Big]a + G_s(s^*)s^*.$$

Suppose that for every value of s, this minimization problem has a solution, and that this solution is continuous in s. There exists an equilibrium in which the lawyers' expectations s about the value of the defendant's settlement offer s^* are correct, and so $s = s^*$. To verify this, denote the solution to the defendant's problem as a function of the anticipated settlement s by $s^*(s)$. Thus, $s^*(0) > 0$ is the settlement offer of a defendant who faces the best lawyer from the group of n lawyers, and $s^*(\infty) < \infty$ is the settlement offer of a defendant who faces a randomly chosen lawyer. The function $s^*(s)$ is continuous and monotone nonincreasing. By the Intermediate Value Theorem, there exists an anticipated settlement s such that $s^*(s) - s = 0$ or such that $s^*(s) = s$.

The analysis presented in Section 2.3 from which we derived the lawyers' bid functions applies as before. However, in the second auction, instead of bidding for the expected benefit V^*_i, lawyers would take the

possibility of settlement into account. They would bid as if their value from winning the auction was $\max\{s^*, V_i^*\}$ minus their bid, both multiplied by θ^*, because they anticipate the settlement offer s^*, and would accept it only if $V_i^* \leq s^*$. If $V_i^* > s^*$, then the winning lawyer i^* will refuse the settlement offer and proceed to trial, where he would win the expected amount V_i^* for the class.

The rest of the analysis proceeds exactly as in Section 2.3 subject to the qualification that lawyers bid higher. The winning bid would thus be higher, and the possibility of settlement implies that the likelihood that the case would be litigated in court would be smaller. This implies that the winning litigation insurer would need to reimburse the winning lawyer with a smaller probability. Both of these effects increase the Left-Hand-Side of equation (12). This implies that litigation insurers would set the value of θ^* in equation (12) lower, and the expected payment to the class would be correspondingly higher.

3.2 Compensating the Filing Lawyer for Her Investment

The proposed mechanism might seem to undermine the incentives of lawyers to file class actions. There are two types of fixed costs that were left out in the model, which might raise such a concern. First, the lawyer might need to invest some fixed costs for conducting the litigation, which is not included in her variable hourly fee. It is easily verified that if the lawyer is paid the same percentage over these costs, nothing in our analysis changes. Hence, these costs would not affect the lawyer's participation constraint and her incentives to file and litigate.

Second, since participation in the auction is not conditioned on filing the initial complaint, a lawyer who files a class action might not be compensated for her pre-filing investment if she does not win the auction for representation. This might create disincentive to make such initial investments. This, indeed, is a valid concern, which is common to all post-filing selection procedures, including the one implemented in securities litigation according to the Private Securities Litigation Reform Act (PSLRA).[12] In every one of them, the desirability of optimal representation stands in potential conflict with the optimal incentives to file.

This problem may be addressed by awarding the filing attorney a percentage of the case's outcome, irrespective of whether she wins the auction

12. Private Securities Litigation Reform Act of 1995, 15 U.S.C.A§ 78u-4. The lead plaintiff provision under the PSLRA addresses the appointment and the required qualifications of the lead plaintiff in securities class actions. The provision establishes a rebuttable presumption that the most adequate class member seeking appointment to represent the class is the one who has the largest financial interest in the relief sought by the class. The provision vests the lead plaintiff with authority to select and retain class counsel. According to section (a)(3)(B) the court shall consider any motion made by a class member and appoint as lead plaintiff the member of the purported class that is most capable of adequately representing the interests of the class. According to section (a)(3)(B)(v) the court vests the lead plaintiff with the authority to select and retain class counsel.

to represent the class or not.[13] In fact, if the proposed mechanism is accommodated to compensate for the filing investment, it would provide better filing incentives compared to the current contingency fee regime. Whereas under contingency fee, lawsuits whose net expected value for the filing attorney are negative would not be filed, under the proposed scheme the same lawsuits would earn the filing attorney a positive payoff if they generate a positive expected value under the attorney who would win the right to represent the class.

At the same time, since by Proposition 2, the winning bid in the auction approximates the maximum expected net value for the class, V_i^*, it allows the court to evaluate the true merits of the case and may assist it in discouraging frivolous filings (based on their expected value at the time of filing). If such filings produce negligible bids, the court may decide to dismiss the case.

As we now show, allowing a lawyer who holds an independent share in the litigation outcome to participate in the auction, does not affect its outcome, and the optimality result is preserved.[14] This is important because otherwise, filing lawyers would not be allowed to participate in the auction, thus significantly reducing the incentives to file. Furthermore, if the proposed incentive scheme is applied to the representative plaintiff instead of the representative lawyer, in a manner similar to the one applied by the PSLRA, then it is necessary to verify that optimal outcomes would obtain irrespective of the plaintiff's share of the class.

Suppose a lawyer i holds a share μ_i of the class net reward. Then, her total share of the litigation gross payoff is $\theta + \mu_i(1-\theta)$. In this case, if lawyer i is required to pay $\theta + \mu_i(1-\theta)$ times his bid conditional on winning the auction, and the per hour reimbursement to lawyer i is set at $\big(1-\theta-\mu_i(1-\theta)\big)w_i$, then lawyer i would exert an effort that is equal to the first-best effort h_i^*. This would change this lawyer's expected bid in the auction and so also the expected payoff to litigation insurers from a bid of θ. However, competition among litigation insurers should still drive their bids for θ so that their expected payoff is equal to zero.

Lawyer i's payoff from representing the class, under this proposed incentive scheme, would be $\big(\theta + \mu_i(1-\theta)\big)p_i(h_i)a - \theta w_i h_i - f$. Her payoff if another lawyer, j, represents the class would be $\big(\mu_i(1-\theta)\big)p_j(h_j)a$. As we prove, bidding an amount that is equal to the expected value of the

13. We assume that after the class action is filed, no additional filings are allowed prior to the auction. This is a simplification of class action practice, in which competing filings are submitted. The problem of choosing which of these filing attorneys should be awarded a percentage of the class action returns does not depend on the auction mechanism, and may be resolved in the same manner that courts currently select the representative lawyer—namely by accounting for the timing of the filing and its quality. See Rothstein (2010).

14. Bulow et al. (1999) famously showed that in common value auctions, a small ownership stake of one of the bidders ("toehold") can have a large negative effect on the outcome of the auction. We have modeled the auction for the right to represent the class as a private value auction, so the difficulties that arise in their context do not arise here.

second-highest valuation conditional on winning is still an equilibrium of the first-price auction.

Proposition 3. The bid functions $b_i(V_i) = E\left[max_{j\neq i}V_j |\ max_{j\neq i}V_j \leq V_i\right]$ form an equilibrium of the first-price auction. In this equilibrium, the lawyer with the highest value of V_i^* wins the auction, pays $(\theta + \mu_i(1-\theta))$ times his bid, and his per hour reimbursement is set at$(1-\theta)(1-\mu_i)w_i$.

Intuitively, the bidding function which maximizes a lawyer's payoff in the auction under the equilibrium suggested in Proposition 2, would also maximize her payoff if she holds a percentage of the class payoff, given that all other lawyers maintain their bidding strategies. Making a higher bid would result in that lawyer representing the class even where another lawyer would better represent it. Since this strategy was dominated by the optimal bidding function when the lawyer had no percentage of the class payoff, it would prove even worse now, as she would also lose from not being optimally represented. Making a lower bid would be dominated by the previously optimal bid function, for similar reasons.

4. Conclusion

This article shows how auctioning the role of class attorney, structured in the particular manner suggested, can realize optimal outcomes for represented class members, and overcome agency problems and conflicts of interests. It allows courts to facilitate competition among lawyers and guarantee maximum payoff to class members. Moreover, since the proposed auction gives courts a strong indication about the value of the case, they may use it to estimate the expected value of submitted class actions, as well as verify the adequacy of proposed class action settlements.

The proposed mechanism can be accommodated into alternative financing and litigation regimes. It may be employed in securities class action litigation in the United States, which vests the lead plaintiff, who holds the largest financial interest in the relief sought, with the authority to select and retain class counsel. It can also be implemented in other class action regimes, most significantly in Australia, which depend on litigation funders to facilitate class action litigation.[15] As long as the controlling agent, be it the attorney, the lead plaintiff, or the funder, is selected using the auction procedure, and compensated according to the proposed fee structure, optimal outcomes for the class would follow.

References

Alexander, Janet C. 1998. "Contingent Fees and Class Actions," 47 *DePaul L Rev* 347.

15. See: Barker (2012); Kalajdzic et al. (2013); Morabito (2017); Waye and Morabito (2018); Grave et al. (2012); Clark (2007); Morabito (2012). For the involvement of litigation funders in class action litigation in the United States. See Avraham and Sebok (2019); Hensler (2014); Burch (2012); Issacharoff (2014).

Avraham, Ronen, and Anthony J. Sebok. 2019. "An Empirical Investigation of Third Party Consumer Litigation Funding," 104 *Cornell L Rev* 1133.
Baker, Lynn A., Perino, Michael and Silver, Charles M., 2015. "Is the Price Right? An Empirical Study of Fee-Setting in Securities Class Actions," 115 *Colum L Rev* 1371.
Barker, George R. 2012. "Third-Party Litigation Funding in Australia and Europe," 8 *J L Econ Policy* 451.
Bebchuk, Lucian A. 2002. "The Questionable Casefor Using Auctions," 80 *Wash U L Q* 889.
Bulow, J., M. Huang, and P. Klemperer. 1999. "Toeholds and Takeovers," 107 *J Political Econ* 427–54.
Burch, Elizabeth C. 2012. "Financiers asMonitors in Aggregate Litigation," 87 *N Y U L Rev* 1275.
Choi, Stephen J. 2011. "Motions for Lead Plaintiff in Securities Class Actions," 40 *J Legal Studies* 205.
Choi, Stephen J., Jill E. Fisch, and Adam C. Prichard. 2007. "Do Institutions Matter? The Impact of the Lead Plaintiff Provision of the Private Securities Litigation Reform Act," 83 *Wash Univ Law Q* 869.
Choi, Stephen J., and Adam C. Prichard. 2018. "Lead Plaintiffs and Their Lawyers: Mission Accomplished, or More to Be Done?," in *Research Handbook on Representative Shareholder Litigation*, Edward Elgar Publishing 271-286.
Clark, Stuart S. 2007. "Thinking Logically, Suing Globally: The International Frontiers of Mass Tort Litigation in Australia," 74 *Def Couns J* 139.
Coffee, John C. 1987. "The Regulation of Entrepreneurial Litigation: Balancing Fairness and Efficiency in the Large Class Action," 54 *U Chi L Rev* 877.
——— 2015. *Entrepreneurial Litigation: Its Rise, Fall, and Future*. Harvard University Press.
Cooter, Robert, and Ariel Porat. 2002. "Anti-Insurance," 31 *J Legal Stud* 203.
Cox, James D., Randall S. Thomas, and Lynn Bai. 2008. "There Are Plaintiffs and . . . There Are Plaintiffs: An Empirical Analysis of Securities Class Action Settlements," 61 *Vanderbilt L Rev* 355.
David, H. A., and H. N. Nagaraja (2004) "ORDER STATISTICS," 3rd Edition, Wiley Interscience.
Davis, Joshua P., and Eric L. Cramer. 2009. "Of Vulnerable Monopolists: Question Innovation in the Standard for Class Certification in Antitrust Cases," 41 *Rutgers LJ* 355.
Fisch, Jill E. 2002. "Lawyers on the Auction Block: Evaluating the Selection of Class Counsel by Auction," 102 *Colum L Rev* 650.
Grave, Damian, Ken Adams, and Jason Betts. 2012. *Class Actions in Australia*. 2d ed. Thomson Reuters (Professional) Australia.
Harel, Alon, and Alex Stein. 2004. "Auctioning for Loyalty: Selection and Monitoring of Class Actions," 22 *Yale L Policy Rev* 69.
Hensler, Deborah R. 2014. "Third-Party Financing of Class Action Litigation in the United States: Will the Sky Fall," 63 *DePaul L Rev* 499.
Hooper, Laural L., and Marie Leary. 2001. "Federal Judicial Center, Auctioning the Role of Class Counsel in Class Action Cases: A Descriptive Study." Available Online Only at: https://www.fjc.gov/content/auctioning-role-class-counsel-class-action-cases-descriptive-study-0
Huang, Peter H. 2004. "Lawsuit Abandonment Options in Possibly Frivolous Litigation Games," 23 *Rev Litig* 47.
Issacharoff, Samuel. 2014. "Litigation Funding and the Problem of Agency Cost in Representative Actions," 63 *DePaul L Rev* 561.
Krishna, V. 2010. "Auction Theory," 2nd Edition, Academic Press.
Kalajdzic, Jasminka, Peter Cashman, Alana Longmoore. 2013. "Justice for Profit: A Comparative Analysis of Australian, Canadian and U.S. Third Party Litigation Funding," 61 *Am J Comp L* 93.

Kirstein, Roland, and Neil., Rickman 2004. ""Third Party Contingency" Contracts in Settlement and Litigation," *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft, Vol. 160, No. 4,* 555–75.

Klement, Alon, and Zvika., Neeman 2004. "Incentive Structures for Class Action Lawyers," 20 *J Law Econ Organ* 102–24.

Lebrun, Bernard. 2006. Uniqueness of the equilibrium in first-price auctions, 55 GAMES AND ECONOMIC BEHAVIOR, 131–151.

Lewis, Richard. 2011. "Litigation Costs and before-the-Event Insurance: The Key to Access to Justice?," 74 *Modern L Rev* 272–86

Lynk. 1994. "The Courts and the Plaintiffs' Bar: Awarding the Attorney's Fee in Class-Action Litigation, 23 *J Legal Stud* 187–89.

Macey, Jonathan R., and Geoffrey P. Miller. 1991. The Plaintiffs' Attorney's Role in Class Action and Derivative Litigation: Economic Analysis and Recommendations for Reform, 58 U. CHI. L. REV. 1.

Macey, Jonathan R., and Geoffrey P. Miller. 1991. "The Plaintiffs' Attorney's Role in Class Action and Derivative Litigation: Economic Analysis and Recommendations for Reform," 58 *U Chi L Rev* 1.

———. 1993. "Auctioning Class Action and Derivative Suits: A Rejoinder," 87 *Nw U L Rev* 458.

Miller, Arthur R. 2018. "The American Class Action: From Birth to Maturity," 19 *Theoretical Inq L* 1.

Moeller, Sally. 2000. "Class Auctions: Market Models for Attorney's Fees in Class Action Litigation," 113 *Harv L Rev* 1827.

Morabito, Vince. 2012. "Clashing Classes Down Under - Evaluating Australia's Competing Class Actions through Empirical and Comparative Perspectives," 27 *Conn J Int L* 245.

——— 2017. *An Empirical Study of Australia's Class Action Regimes, fifth report*.

Nelson, Johnson, and Adam C. Pritchard. 2007. "Do the Merits Matter More? The Impact of the Private Securities Litigation Reform Act," 23 *J Law Econ Organ* 627.

Perino, Michael. 2006. "Institutional Activism through Litigation: An Empirical Analysis of Public Pension Fund Participation in Securities Class Action," 9 *J Emp Legal Stud* 368.

Polinsky, Mitchell A., and Daniel L. Rubinfeld. 2003. "Aligning the Interests of Lawyers and Clients," 5 *Am Law Econ Rev* 165.

Rothstein, Barbara Jacobs. 2010. Managing Class Action Litigation: A Pocket Guide for Judges. *Federal Judicial Center*.

Simmons, Laura E., and Ellen M. Ryan. 2003. *Post-Reform Act Securities Lawsuits: Settlements Reported Through December*. Cornerstone Research, available at http://securities.stanford.edu/

Shavell, Steven. 1982. "Shte Social versus the Private Incentive to Bring Suit in a Costly Legal System," 11 *J Legal Stud* 333.

Third Circuit Task Force Report on Selection of Class Counsel 2001. "Third Circuit Task Force Report on Selection of Class Counsel," 74 *Temp L Rev* 689.

Thomas, Randall S., and Robert G. Hansen. 1993. "Auctioning Class Action and Derivative Lawsuits: A Critical Analysis," 87 *Nw U L Rev* 423.

Waye, Vicki, and Vince Morabito. 2018. "When Pragmatism Leads to Unintended Consequences: A Critique of Australia's Unique Closed Class Regime," 19 *Theoretical Inquiries L* 303.

Wickelgren, Abraham L. 2004. "Comment on "Aligning the Interests of Lawyers and Clients"," 6 *Am L Econ Rev* 433.

Appendix A: Proofs

Proof of Proposition 2. The proof is adapted from Krishna (2010). Suppose that all the bidders $j \neq i$ bid according to the bid function

$$b_j(V_j^*) = E\left[\max_{k\neq j}\{V_k^*\} \middle| \max_{k\neq j}\{V_k^*\} \leq V_j^*\right]$$

We show that it is the best response for bidder i to also bid according to the same bid function. This bid function is increasing and continuous so the bidder with the highest value submits the highest bid and wins the auction.

Bidder i cannot benefit from bidding higher than $b_i(\overline{V})$. The expected payoff to bidder i with value V_i^* if he bids $b_i \leq b_i(\overline{V})$ is

$$\Pi(b_i, V_i^*) = G(z)\Big(V_i^* - b_i(z)\Big)$$

where $z = b_i^{-1}(b_i)$ and $G(\cdot)$ denotes the cumulative distribution function of $\max_{k\neq i}\{V_k^*\}$. Denote the density function of $\max_{k\neq i}\{V_k^*\}$ by $g(\cdot)$. Observe that:

$$\begin{aligned}\Pi(b_i, V_i^*) &= G(z)\Big(V_i^* - b_i(z)\Big)\\ &= G(z)V_i^* - G(z)E[\max_{k\neq i}\{V_k^*\} | \max_{k\neq i}\{V_k^*\} \leq z]\\ &= G(z)V_i^* - \int_0^z yg(y)dy\\ &= G(z)(V_i^* - z) + \int_0^z G(y)dy\end{aligned}$$

where the last inequality follows from integration by parts.

It, therefore, follows that:

$$\begin{aligned}\Pi(b_i(V_i^*), V_i^*) - \Pi(b_i(z), V_i^*) &= G(z)(z - V_i^*) + \int_{V_i^*}^z G(y)dy\\ &\geq 0\end{aligned}$$

regardless of whether $z \geq V_i^*$ or $z \leq V_i^*$.

Uniqueness of the equilibrium follows from the results of Lebrun (2006).

The cumulative distribution function $G \equiv F^n$ where F is the cumulative distribution function of each bidder's value. Therefore, $G(V_i^*) = F^n(V_i^*) \searrow 0$ for every value $V_i^* < \overline{V}$. It follows that the value of the highest value bidder $V_{i^*}^* = \max_{k\in\{1,\ldots,n\}}\{V_k^*\}$ converges with the number of bidders n to $\overline{V}$. The bid of the highest value bidder is given by

$$b_{i^*}(V^*_{i^*}) = E[\max_{k\in\{1,\ldots,n-1\}}\{V^*_k\} | \max_{k\in\{1,\ldots,n-1\}}\{V^*_k\} \leq V^*_{i^*}].$$

A standard result in the theory of order statistics (see, e.g., David and Nagaraja 2004) implies that this expectation converges to $V^*_{i^*}$ with n. ■

Proof of Proposition 3. A lawyer who has no share of the claim and bids b_i in the auction wins $\theta(V_i - b_i)$ if he wins the auction and *zero* otherwise. A lawyer who has a share μ_i of the claim and bids b_i in the auction wins $(\theta + \mu_i(1-\theta))(V_i - b_i)$ if he wins the auction and $\mu_i(1-\theta)V_j$ where V_j is the value of the winning bidder if he loses. If all lawyers bid according to the bid functions $b_i(V_i) = E[\max V_j | \max V_j \leq V_i]$, then lawyer i wins the auction if and only if V_i is larger than all the other V_j's.

A bid which is higher than $b_i(V_i) = E[\max V_j | \max V_j \leq V_i]$ increases the probability of winning. If $\mu_i = 0$, then the standard arguments mentioned in the proof of Proposition 2 imply that bidding higher would generate a lower expected payoff to the lawyer.

If $\mu_i > 0$, then increasing the bid implies that lawyer i would also win the auction when $V_i < \max V_j$. But in this case, the benefit from winning over losing the auction is lower than in the case where $\mu_i = 0$, which implies that the lawyer cannot benefit from increasing its bid.

Similarly, a bid that is lower than $b_i(V_i) = E[\max V_j | \max V_j \leq V_i]$ decreases the probability of winning. If $\mu_i = 0$, then standard arguments imply that bidding lower would generate a lower expected payoff to the lawyer.

If $\mu_i > 0$, then decreasing the bid implies that lawyer i would fail to win the auction when $V_i > \max V_j$. But in this case, the benefit from winning over losing the auction is larger than in the case where $\mu_i = 0$, which implies that the lawyer cannot benefit from decreasing its bid. ■

Proof of Proposition 4. Let $S \geq 0$ and suppose that all the bidders $j \neq i$ bid according to the bid function $b_j(V^*_j, S) = E[\max_{k\neq j}\{V^*_k, S\} | \max_{k\neq j}\{V^*_k, S\} \leq V^*_j]$ and bidders for whom $V^*_j < S$ do not participate in the auction.

Inspection of the proof of Proposition 2 reveals that the argument proceeds as in the proof of Proposition 2, except the distribution function $G(\cdot)$ needs to be modified so as to denote the cumulative distribution function of $\max_{k\neq i}\{V^*_k, S\}$.