Dynamics of Collective Litigations

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Abstract

In collective litigations the outcome of the trial may depend on the number of litigants. In this paper, we study how collectives form and explore actions that the defendant can take to interfere in this process. We propose a dynamic model of litigation in which a defendant faces the arrival of plaintiffs over time and where the defendant is privately informed about the scope of the harm she has caused (e.g. how many consumers have been exposed to a defective product). We show that when all plaintiffs are strategic the defendant can completely avoid the formation of a collective. However, if some plaintiffs (exogenously) join the collective then strategic plaintiffs may also join. We compare the baseline, in which all settlements are public, to a setting where the privacy of settlements is endogenous. We show that use of private settlements can decrease expected payments for some plaintiffs but may increase payments to subsequent ones. Importantly, the defendant does not always gain from the availability of private settlements.

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1 Introduction

Settlement negotiations between a defendant and a plaintiff do not occur in the vacuum. Their outcomes are used by third parties (e.g. other plaintiffs) as an input when designing their own litigation strategies. Previous settlements may directly affect the outcomes that can be expected from a trial. Additionally, they may also allow other parties to learn about features of the environment.

As an example, consider an individual that is harmed after consuming a product. He, naturally, takes into account observed past behavior of the producer and other harmed consumers to decide whether to start a law suit, when to do it, and whether to do it alone or joining others. Likewise, whatever he chooses to do is likely to affect the information available as well as incentives of future harmed consumers. In this litigation setting, as in many others, it is natural to consider that the defendant is better informed than each individual plaintiff about the underlying environment. For instance, a firm has privilege knowledge about the safety measures taken during production, which determine the extend to which consumers are exposed to a possible harm. In such a case, the actions of the firm are used by interested parties to make inferences about its private information. This feature remains under-explored in the study of litigations in which more than one plaintiff may be involved.

A case that illustrates the main features of the litigation environment that we are studying is the Baxter dialysis crisis [Diermeier and Dickinson, 2012]. In the fall of 2001, more than 50 patients in seven countries died between few days of going through dialysis. Deaths did not occur all at once. It was rather a sequential process. As deaths occurred, health authorities (initially in Spain) discovered a connection between the cases: the same type of dialyzer (a filter used during a hemodialysis) was used in all diseased patients.

The manufacturer of the dialyzers (Baxter International) was the first one to find out the cause of the deaths: a fluid used to identify leaks remained in the dializers, evaporating during the treatment, and entering the patients' bloodstream. The manufacturer was better informed about the scope of the crisis. It had privilege knowledge about the number of patients that could have been exposed to the faulty dialyzers. In the aftermath of this crisis, the manufacturer settled with the families of all patients.

In this paper, we study the dynamics of settlement negotiations between a privately-informed defendant and several potential plaintiffs arriving over time. We focus on two main issues: how collectives form and the extend to which the defendant can affect this process. We present three main findings. First, the ability to settle with each individual plaintiff is a very effective tool for the defendant to avoid the formation of a collective. Second, if there is an exogenous chance of break down in negotiations with plaintiffs arriving late, then settlements with plaintiffs arriving early on can endogenously fail. In this setting, making an offer so low that the plaintiff is willing to reject it is the only way in which the defendant is able to credibly reveal her private information. Finally, we show that the availability of secret settlements may be harmful for the defendant.

We propose a model in which a defendant faces random arrival of plaintiffs over three periods. In each period, one plaintiff can arrive with some exogenous probability. The defendant is privately informed about the actual value of the probability of arrival, which the plaintiffs do not know. This probability can be interpreted as a safety characteristic of a product that determines, for example, the extend to which a population of consumers is exposed to a risk (e.g. a defective product).

The three periods in our model need not to be taken in a literal sense. The last period can be interpreted as a deadline prescribed by the court for plaintiffs' opt out choices. In that sense, the first period is meant to capture an initial phase in which there is no previous information that can influence plaintiff decisions, for instance because the defendant is a new firm in the market or because there is no precedent of an accident of the same kind. The second period intends to capture an intermediate stage in which information about the case may potentially exist but there is still room for the arrival of additional plaintiffs.

We assume that the outcome of a trial is affected by the number of litigants. This may be because trial costs can be divided among the litigants, because each additional litigant provides evidence that increases the chance of prevailing in the case, or because there are some administrative requirements about the minimal amount of plaintiffs being allowed to litigate collectively. In our model, plaintiffs' entry is endogenous, i.e., after arrival a plaintiff decides whether to file the case. If the case is filed, the defendant gets to make a settlement offer. We study two settings: one in which all settlements are publicly observed and one in which the defendant can settle secretly. Whenever an offer is rejected, the plaintiff can join a (potentially collective) lawsuit.

Plaintiffs can be of two types: strategic or behavioral. A plaintiff is *behavioral* if he strictly prefers to file the case and go to trial. A possible interpretation is that a fraction of plaintiffs are vengeful, benefit from the publicity given to the case, or otherwise derive utility from going to trial. Alternative, it can also be seen as a fraction of plaintiffs that over-estimate payments from going to court. A plaintiff is said to be *strategic* if his optimal choice depends on other plaintiffs' actions. On one hand, a strategic plaintiff arriving in the last period faces no uncertainty about payoff and bases his litigation strategy on the actions he has observed. On the other hand, in the first two periods a plaintiff's optimal choice depends on his beliefs about the probability of arrival of new litigants (as well as on the conjecture about the strategy of those that arrive).

There are two sources of externalities in our model. First, there is the payoff externality arising from the assumption that outcomes from trial depend on the number of litigants. Second, there also exist information externalities. When a plaintiff does not file the case or settles secretly other players do not observe the arrival. This affects beliefs and filing decisions of subsequent plaintiffs.

As a benchmark, we start our analysis in Section 3.1 assuming that the probability of arrival is commonly known. In this case, only behavioral plaintiffs go to trial. Strategic plaintiffs file the case whenever someone has already chosen to go to trial, or if the probability of arrival of a behavioral plaintiff is sufficiently high. If the case is filed, an strategic plaintiff always accepts the settlement offer. Equilibrium behavior of strategic plaintiffs resembles the equilibrium in divide-and-conquer strategies identified in the literature (Segal, 1999; Che and Spier, 2008). If the fraction of behavioral plaintiffs is low, the mere capability of the defendant of paying-off future plaintiffs is enough to prevent any filing from strategic plaintiffs.

In Section 3.2, we introduce asymmetric information and study the case in which all settlements are publicly observed. The equilibrium in divide-and-conquer strategies persists if there are not enough behavioral plaintiffs. However, if the fraction of behavioral plaintiff is above a certain threshold our predictions change. In the first two periods, negotiations with a strategic plaintiff look like a signaling game. In any separating equilibrium, the offer by a defendant facing high arrival rate is always accepted by an strategic plaintiff. On the other hand, in the showcase equilibrium, the offer by a defendant that faces low arrival rate is rejected with some positive probability. That is, the inability to settle with a fraction of plaintiffs gives rise to failed negotiations between a privately-informed defendant and strategic plaintiffs (who would have otherwise settled). The defendant facing low arrival trades-off the probability of an agreement for lower offers. Moreover, after observing a settlement, a plaintiff in the second period is relatively more incline to file the case than if offers were always accepted for both types of defendants.

In Section 3.3, we allow the defendant to hide the occurrence of a settlement (and the arrival of the plaintiff involved) from other players. We show that the availability of secret settlements does necessarily benefit the defendant. Privacy regimes are only meaningful in the first period. This is because plaintiff's choices in the last period do not depend on beliefs. In equilibrium, filing decision in the second period cannot depend on whether a settlement was observed in the first period. As a result, an strategic plaintiff's filing decision in the second period depends more closely on the prior belief than when all settlements are public. For a prior low (high) enough, an strategic plaintiff never (always) files in the second period. On the other hand, for intermediate priors filing decision in the second period depends on how often an strategic plaintiff rejects the offer in the first period. This gives raise to multiple equilibria, even when a unique outcome is selected in each negotiation.

As argued before, in the absence of behavioral plaintiffs our model has a unique equilibrium in which the defendant avoids the formation of a collective. This coincides with the equilibrium in divide-and-conquer strategies discussed by Che and Spier (2008) in an static context with complete information.[1] More broadly, this point has also been made in the literature in contracting with externalities (Segal, 1999 and 2003; Segal and Whinston, 2000). Besides considering the effects of exogenous breakdowns in the negotiations, we differ in that our focus is on a dynamic context with a privately-informed defendant.

This paper closely relates to the literature on litigation in dynamic environments. Some papers consider environments with symmetric information (Deffains and Langlais, 2011; Bernhardt and Lee, 2014) while others study private information on the side of the plaintiffs (Che, 1996; Daughety and Reinganum, 2011). For example, Daughety and Reinganum [2011] focus on privately-informed plaintiffs deciding on whether to file a case. The central trade-off for the plaintiffs is between acting early to motivate other plaintiffs to join and waiting to be more informed about the number of other plaintiffs. Private information on the defendant's side is a feature that, to the best of our knowledge, has not been explored.

[1] In addition to the static model with complete information, Che and Spier (2008) consider the following two extensions. First, they consider the case in which bilateral negotiations between the defendant and each plaintiff are sequential instead of simultaneous. Second, they allow for private information on the side of the plaintiffs. Divide-and-conquer strategies are used by the defendant in both extensions, although asymmetric information in the side of the plaintiff generates trials in equilibrium.

The effects of secret settlements have been studied in other environments. Daughety and Reinganum [2005] study a dynamic setting in which consumers choose whether to purchase a product taken into account their beliefs about the likelihood of being harmed by the product. The availability of secret settlements between the firm and harmed consumers results in a privately-informed firm, which gives prices a signaling role. This asymmetric information may reduce demand, making preferable for the firm to commit to only settling publicly. We complement this analysis by focusing on a way in which the secret settlements can influence the litigation itself.

Our paper belongs to the broader literature on collective action in a dynamic environment. A wide array of collective action models have been firstly studied by [Olson, 1965]. Recently, the interest in the dynamics of collective action is mostly related to collective investment with a particular focus on crowdfounding [Alaei et al., 2016]. Two papers are particularly related. Liu [2018] presents a dynamic setting with both, payoffs and information externalities. Investors choose whether and when to invest in a project. Each investor receives a private signal about the probability of success of the project. An investor can enter the project early baring the risk that the project does not receive enough support, but revealing her optimistic view of the prospects of the project. On the other hand, the investor can also wait to observe whether her peers support the project before committing herself. The main difference with our setting is that we consider a party (the defendant) that intervenes (through settlement offers) in the formation of the collective.

In Deb et al. [2019], buyers decide whether purchase a product in a crowdfunding campaign. Buyers face an opportunity cost of purchasing the product and waiting until the the campaign success. Thus, buyers only buy if the probability of success is high enough. The arrival rate of buyers is commonly known in their model. Similar to our setting, their model considers players (donors) that intervenes in the actions of buyers (through donations). However, while the objective of donors is to maximize the probability of success of the campaign, the objective of the defendant in our context is to minimize the probability of the collective litigation occurring.

Collective litigation

Before describing the model, we find it useful to describe the procedure of collective litigation. Our model focuses on two basic features of collective litigation cases: (1) a participation of a plaintiff generates positive externality on other potential plaintiffs; (2) the number of plaintiffs is uncertain, and as such can be used to analyze different types of collective litigation suits. We describe two basic types of collective litigation, namely *a joinder* and *a class action*.[2] Moreover, we focus on the US system.[3]

Joinder

[2]See Pace [2009] for an overview of different collective litigation forms in the US.

[3]See Mulheron [2004] for detailed comparison of class action regulation in common law countries. Collective litigation suits are less developed in civil law countries, Backhaus et al. [2012] provides examples of collective litigation regulation in countries of continental Europe and a description of general trends in regulation development.

Joinder is a flexible tool that allows multiple plaintiffs to voluntarily aggregate their lawsuits.[4] The requirements to form a joinder are vague and in practice require some relation between the claims of individual plaintiffs to form a joinder Effron [2011], Erichson [2000]. The main advantage of the joinder is that it generates economies of scale – the plaintiffs may pool resources and coordinate efforts when handling the claim Anderson and Trask [2012]. Under a joinder each party keeps the right to their own claim, that is, they are not bounded by decisions of other plaintiffs. Moreover, the courts do not need to hold a common trial for all members of a joinder Pace [2009].

Class action

The rest of the paper continues as follows: Section 2 introduces the model, Section 3 presents the analysis and main results. Finally, Section 4 concludes.

2 Model

In case of the commonly studied individual ligation, the outcome of the trial depends mostly on the merit of the case. However, the outcome of a collective litigation depends also on the number of litigants. There may exist an administrative requirements for the number of plaintiffs that need to be present to file a collective litigation suit,[5] additional plaintiffs may provide new evidence necessary to succeed with the case, larger number of plaintiffs may also limit defendant's ability to prevent certification of collective litigation on procedural bases.[6]

We propose a simple dynamic model of collective litigation. We model the collective litigation as a four-period sequential game between *a defendant* and three potential *plaintiffs*. In period $t = 0$ there is an accident with a random scope (i). The accident has a high scope ($i = H$) with a commonly-known probability μ and a low scope ($i = L$) with probability $1 - \mu$. We suppose that the plaintiff does not observe the scope of the harm, but the defendant does. Therefore, through the paper we refer to the scope of the harm as the characteristic of the defendant. That is, we call a defendant who is liable for an accident with a high (low) scope simply as a high-type (low-type) defendant. In each following period ($t = 1, 2, 3$), with probability λ_i one plaintiff suffers a harm. λ_H is assumed to be larger than λ_L, that is, an accident of high scope is more likely to result in a harm. After arrival the plaintiff decides whether to file the case or not. Filing the case results in a cost f for the plaintiff.[7]

After the case is filed, the plaintiff is approached by the defendant, who makes a take-it-or-leave-it settlement offer (S_t). The offer consists of two variables: the monetary transfer ($s_t \in \mathbb{R}$)

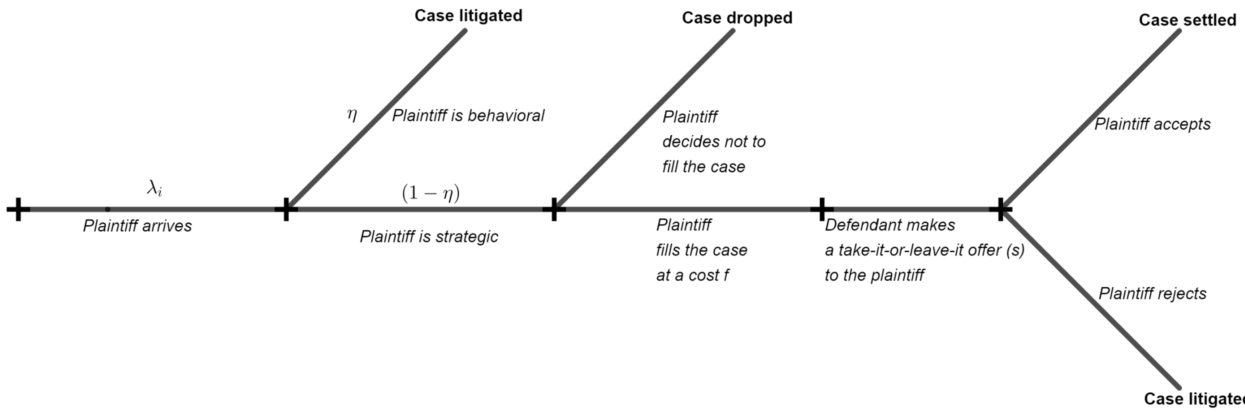
[4] In principal a joinder can be initiated by the court, this possibility is not relevant for our paper, hence, we focus on permissive joinders.

[5] For example, in Poland 10 plaintiffs are required to file a collective suit, in Germany this number is set to 40.

[6] Anderson and Trask [2012] provides a description of tactics of attacking representative plaintiffs to prevent certification of class action.

[7] This cost can be interpreted not only as an administrative cost, but also as an opportunity cost. If the plaintiff decides to file a collective litigation case, he at least temporarily gives up the opportunity to litigate the case individually.

Figure 1: Sequence of events in periods 1-3



and the secrecy regime ($\zeta_t \in \{0,1\}$, where $\zeta_t = 0$ denotes a secret settlement). After receiving the offer, the plaintiff makes a decision (a_t) on whether to accept it ($a_t = 1$) and settle the case, or to reject it ($a_t = 0$) and litigate the case.

Moreover, we assume that with probability η the plaintiff is *behavioral*. A behavioral plaintiff can be seen as either vengeful or pro-social. He always files the case and rejects any settlement.[8] In contrast, with probability $1-\eta$ the plaintiff is *strategic* and takes the decisions in order to maximize his expected payoff.

The sequence of events within each period t, for $t = 1, 2, 3$, is presented on Figure 1.

The outcome of the litigation depends on the amount of participants that litigate. We focus on the simplest situation, in which there is a minimal amount of litigants required for the collective litigation to be successful. The closest collective litigation form to this scenario is a class action, when some amount of representative plaintiffs must be gathered to file the case.[9] When the litigation is successful, the defendant is forced to transfer the compensation $w > f$ to each of the participants. Otherwise, the collective litigation fails and no transfers are realized.[10] We focus on the most interesting scenario, in which the minimal amount of participants is set to 2.[11] We assume that $\lambda_H w > f > \lambda_L w$, that is, if the scope of accident is known to be low

[8] Although the model requires some exogenous probability of settlement failure, the qualitative results do not depend on the particular assumption made. It can be simply assumed that there is some exogenous probability η that the settlement negotiation fails, for example, because the defendant failed to identify the plaintiff.

[9] In the model we allow for the plaintiffs to settle the case even after a minimal amount of the representative plaintiffs has been already reached, which corresponds to an opt-in rule. In the United States an opt-out rule is used instead, that is, once the class action case is filed subsequent plaintiffs are automatically participating in the litigation. However, in terms of payoffs, the choice of participation rule is irrelevant in our model.

[10] The model is easily extendable for the case in which the payoff from the litigation is described by a strictly increasing sequence w_k. However, whether the negotiation at some period t with history h_t result in a separating or a pooling equilibrium depends on the particular choice of the sequence.

[11] If $k = 1$ the model is a simple sequence of ultimatum games. If $k = 3$ only the decision of the first period

the second period plaintiff would never start a collective litigation, but he may consider it if the scope of the harm is high. Overall, the payoff of the defendant is given by $-\big(\sum_t a_t s_t + \mathbb{1}_{k>1} kw\big)$ and the payoff of the period t plaintiff is given by $a_t s_t + (1-a_t)\mathbb{1}_{k>1} w$, where $\mathbb{1}_{k>1}$ is the indicator function taking value of 1 if there is more than 1 litigant at the end of the game, and 0 otherwise.

Unlike the defendant, the plaintiff does not observe the scope of an accident. Instead, he forms a belief about the probability of each state of the world using the Bayes' rule. We denote the probability that the plaintiff arriving in period t and observing some history h_t assigns to the scope of the harm being high by μ_{t,h_t}. We assume that h_t is a pair of two variables: the number of previous litigants (k_t) and the of public settlements by period t (n_t). In other words, we suppose that a plaintiff does not observe the terms of previous settlements, but only a number of publicly settled cases. The plaintiff also updates his beliefs after receiving an offer from the defendant. We denote by $\mu_{t,h_t}(S_t)$ the probability that the t-th period plaintiff gives to the scope of the harm being high after observing a history h_t and an offer S_t.

The solution concept used through the analysis is Perfect Bayesian Equilibrium (PBE) satisfying the D1 criterion [Banks and Sobel, 1987]. That is, we look for a strategy profile for all the strategic plaintiffs and the defendant of each type and the beliefs of the plaintiffs, such that the players are sequentially rational and their beliefs follow the Bayes' rule whenever possible. Moreover, we require that when the plaintiffs observe some action of the defendant that has a 0 probability on the equilibrium path, that is, they cannot use the Bayes rule, they believe that it comes from a defendant type who is "more likely" to profit on this action compared to her equilibrium payoff. In practice, the D1 criterion selects the separating equilibrium with the smallest probability of litigation.

3 Analysis

Before analyzing the fully-fledged model we consider two simpler scenarios. Firstly, we study the game under symmetric information. Secondly, we consider a situation when the information is asymmetric, but all the settlements are public. Only then we move to the most complex case, when secret settlements are allowed.

3.1 Symmetric information model

We start the analysis by considering a symmetric information scenario, in which both the plaintiffs and the defendant observe the scope of the harm and hence the probability of arrival (λ) of future plaintiffs.

Clearly, independently of the period analyzed, a strategic plaintiff always files the case if there already is at least one other litigant. He realizes that the case will be certainly successful if he joins the litigation, and the costs of filing the case will be covered. After the case is filed, the negotiation between the plaintiff and the defendant is a simple ultimatum bargaining

plaintiff is relevant, hence there is no incentive to manipulate the information for the defendant.

game. The defendant proposes a settlement transfer equal to w, which is always accepted in the equilibrium.[12] Since the scope of the harm is known, the selected secrecy regime is irrelevant.

If a strategic plaintiff does not observe any past litigants, he files the case only if the proportion of behavioral plaintiffs is sufficiently high. He realizes that if he litigates any future strategic plaintiff will necessarily settle the case; hence the collective litigation can be successful only if at least one behavioral plaintiff arrives. We denote this probability by ρ_t. Naturally $\rho_3 = 0$, and $\rho_t = \lambda\eta + (1 - \lambda\eta)\rho_{t+1}$ for $t < 3$. Once the case is filed, the negotiation is a simple ultimatum bargaining game. The defendant proposes a settlement offer which exactly covers the expected payoff of the plaintiff, that is, $\rho_t w$, and the case is settled in the equilibrium.

The equilibrium of the symmetric information model is summarized in Proposition 1.

Proposition 1. *If $k_t > 0$ a strategic plaintiff files the case independently of the period. After a case is filed, the defendant makes an offer $s_{t,k=1} = w$, which is always accepted by the strategic plaintiff.*
If $k_t = 0$ a strategic plaintiff files the case if and only if $\rho_t \geq \frac{f}{w}$.

Proposition 1 shows that when the information is symmetric the litigation is completely driven by the behavioral plaintiffs. Importantly, it implies that if all the plaintiffs are strategic (that is $\eta = 0$) no case is ever filed independently of how high are λ and w. Each plaintiff realizes that even if he files the case and decides to litigate, future plaintiffs will free-ride on his decision by settling the case. Hence, it is always optimal to drop the case. Moreover, if η is low the probability of successful collective litigation is small. Hence, a strategic plaintiff never files the case unless there are previous litigants. The cut-off values for η are provided in Corollary 1.

Corollary 1. *If $\eta < \frac{1-\sqrt{1-\frac{f}{w}}}{\lambda}$, then no strategic plaintiff files the case unless $k_t > 0$.*
If $\eta \in [\frac{1-\sqrt{1-\frac{f}{w}}}{\lambda}, \frac{f}{w\lambda})$, then a first-period strategic plaintiff always files the case, but a second-period strategic plaintiff files the case only if $k_2 = 1$.
If $\eta > \frac{f}{w\lambda}$ then a strategic plaintiff in periods 1 and 2 always files the case.

It is worth observing that in standard individual litigation models the settlement can be seen as a positive outcome. It allows the plaintiff to be compensated for the harm by the defendant without incurring litigation costs for both parties and the state. However, in the context of collective litigation this assertion is not necessarily correct. Indeed, if all the plaintiffs were represented by a single lawyer who negotiates settlement terms on their behalf (as it may happen in class action), it could be socially beneficial to settle the case. But, in our model, the defendant settles the case with each plaintiff separately and is capable of preventing collective litigation. In fact, the mere capability of the defendant of paying-off future plaintiffs is enough to prevent any case from being filed.[13]

[12]To be precise, if $k_3 = 2$ there are two possible outcomes of the sub-game in the final period. One in which the final plaintiff settles the case, and one in which he litigates the case. Since they result in the same payoffs for all the players, we ignore the latter possibility.

[13]This problem is discussed more in details in Che and Spier [2008].

3.2 Asymmetric information with public settlements

Before we introduce the possibility of manipulating the information, we study a simpler case in which the information is asymmetric, but all the settlements are public. We focus on the scenario in which $\eta \geq \frac{f}{\lambda_H w}$, that is, we assume that there exist beliefs sufficiently high for a strategic plaintiff to file the case even if no previous litigants are observed. We denote the difference between arrival rates by $\Delta\lambda \equiv \lambda_H - \lambda_L$. In order to ensure uniqueness of the equilibrium, we begin the analysis by assuming that $\lambda_H + \lambda_L \leq \frac{4}{3}$. We relax this assumption in Section 4.1.

However, if no past litigants are observed in early periods, the results from the symmetric information model no longer hold. Consider a strategic plaintiff who arrives in period 1 or 2. He realizes that even if he decides to litigate, a strategic plaintiff in the future will always settle the case. Therefore, the litigation can be successful only if a behavioral plaintiff arrives. Similarly to subsection 3.1 we denote the probability of arrival of at least one behavioral plaintiff in the future periods conditional on the state of the world i, by ρ_t^i, where $\rho_3^i = 0$, and $\rho_t^i = \lambda_i\eta + (1 - \lambda_i\eta)\rho_{t+1}^i$ for $t < 3$. The difference between these probabilities in each state of the world is denoted by $\Delta\rho_t \equiv \rho_t^H - \rho_t^L$. Since the probability of arrival of a new behavioral plaintiff is higher when the scope of the accident is large than when the scope is low, the case is filed only when he assigns sufficiently large probability to the scope of the harm being high.

When the case is filed the defendant would like to achieve a settlement with a high probability at a low offer. Naturally, the offers a strategic plaintiff is willing to accept depend on his belief about the state of the world. In particular, if the plaintiff believes that the scope of the harm is low, he is willing to accept relatively small offers. As a result, the defendant always has an incentive to pretend that scope of the harm is low. However, in the equilibrium, a plaintiff can recognize the scope of the harm based on the offer made by the defendant. Since when the scope of the harm is low the defendant does not expect many future litigants to arrive, her expected cost of failing in achieving a settlement is small compared to the defendant of a high type. Hence, she is more willing to risk a rejection of her offer. To be precise, in the equilibrium the defendant of each type makes an offer exactly compensating the expected payoff of the plaintiff in the realized state of the world. The plaintiff always accepts the offer coming from the high-type defendant, but he rejects the offer coming from the low-type defendant with some positive probability.

Although the negotiation fails endogenously only when the scope of the harm is low, the high type defendant is more likely to face an arrival of a plaintiff. Hence, overall, observing the negotiation failure is always more probable when the scope of the harm is high. Moreover, the prediction that the negotiation with a high type defendant never endogenously fails should be taken with a grain of salt, as it is a product of two strong assumptions in the model. First, we assume that there are only two scopes of the harm. We conjecture that if there are more scopes of the harm possible, then the probability of the negotiation failing is decreasing in the scope, but reaches zero only for the highest scope of the harm possible. Second, we assume that all the costs of the litigation are sunk at moment of filing the case, hence, dropping the case is never optimal for the plaintiff at the negotiation stage. We conjecture that if it was not the case only semi-separating equilibria, in which the defendant of a high type mixes in between making an offer which is always accepted by the plaintiff and an offer that is rejected with a positive probability, can be sustained.[14]

The outcome of the litigation strongly depends on the plaintiff's prior μ. A strategic plaintiff can anticipate the outcome of the negotiation, he realizes that he will be always compensated for his expected payoff under litigation. Hence, if a strategic plaintiff does not hold a strong belief that the scope of the harm is high, he will decide to drop the case, unless there are previous litigants. In order to simplify the exposition we describe the decision of the strategic plaintiff in terms of the likelihood ratio l_{t,h_t}:

$$l_{t,h_t} \equiv \frac{\mu_{t,h_t}}{1-\mu_{t,h_t}}. \tag{1}$$

To be precise, a strategic plaintiff arriving in period $t < 3$ and observing some history $h_t = (0, n_t)$ files the case only if the likelihood ratio of his beliefs is above a threshold $\check{l}_t$:

$$\check{l}_t \equiv \frac{\frac{f}{w} - \rho_t^L}{\rho_t^H - \frac{f}{w}}. \tag{2}$$

The numerator of (2) represents the expected payoff of the plaintiff if the scope of the harm is low, and the denominator the expected payoff of the plaintiff if the scope of the harm is high. Note that, $\check{l}_1$ can be negative for some parametrizations of the model, but $\check{l}_2$ is always positive. That is, it can be that the first period plaintiff files the case independently of his beliefs, but the second period plaintiff always decides to do so only if he assigns a sufficiently high probability to the scope of the harm being high.

Since the plaintiff arriving in the first period can face only one history, that is, his own arrival, it is easy to see that he will always decide to file the case if and only if the likelihood ratio of the prior ($l \equiv \frac{\mu}{1-\mu}$) is above a threshold $\hat{l}$:

$$\hat{l} \equiv \frac{\lambda_L}{\lambda_H}\check{l}_1. \tag{3}$$

However, the second-period strategic plaintiff's decision may depend on the history. Naturally, if the prior value is sufficiently low, the second-period strategic plaintiff will always decide to drop the case unless $k_2 = 1$. To be precise, if a second-period strategic plaintiff finds it unlikely that the scope of the harm is high even after observing an arrival in period 1, he never starts a litigation. In other words, if l is below a threshold $\underline{l}$ the second-period strategic plaintiff never files the case, unless $k = 1$, for:

$$\underline{l} \equiv \frac{\lambda_L^2}{\lambda_H^2}\check{l}_2. \tag{4}$$

[14] The reasoning is based on Nalebuff [1987] who studies screening pre-trial negotiation when the plaintiff needs to be credible to file a case when the negotiation fails. Nalebuff finds that in order to retain the credibility of going to the court the plaintiff may need to increase his settlement offer so that the expected liability value conditional on negotiation failing covers the cost of trial. We conjecture that the same reasoning can be applied to signaling negotiation. Then, in order for the plaintiff to be credible to reject some small offer, it must be made by the high type defendant with some positive probability.

Analogously, if the prior is sufficiently high, the second-period plaintiff always files the case. To be precise, the prior must be high enough for the plaintiff to believe that the case is worth litigation, even if he observes only his own arrival. In other words, if the likelihood ratio of the prior is above a threshold $\bar{l}$, the second period plaintiff always files the case, for:

$$\bar{l} \equiv \frac{\lambda_L(1-\lambda_L)}{\lambda_H(1-\lambda_H)}\check{l}_2. \tag{5}$$

Note that $\bar{l} > \hat{l}$, that is, if the second-period plaintiff always files the case, then a first-period plaintiff also always files the case. However the relation between $\underline{l}$ and $\hat{l}$ depends on the particulars of the model. If λ_L is sufficiently close to λ_H, then $\underline{l} > \hat{l}$. That is, there exists a range of priors for which the first-period plaintiff always files the case, but a second period-plaintiff never does. It happens whenever information about the scope is less relevant than the amount of periods during which a behavioral plaintiff may arrive. Whenever λ_H and λ_L are far apart $\underline{l} < \hat{l}$. Naturally, in this situation the second-period plaintiff may observe $h_2 = (0,0)$ even when a plaintiff in the first period arrived, but decided not file the case. Hence, the beliefs of the second-plaintiff observing a history $h_2 = (0,0)$ are higher if $l < \underline{l}$, than if $l \geq \underline{l}$. However, they are never high enough for the strategic plaintiff in the second period to start a litigation.

The prior influences not only the decision of a strategic plaintiff to file the case, but also the probability of the settlement negotiation failing. In particular, the probability of rejecting the low offer in the first period depends on the prior level. It happens because in any PBE satisfying the D1 criterion, the probability of rejection of a low offer is just high enough to ensure that the defendant of a high type prefers certain settlement at the high offer to risking litigation and making a low offer. When the prior is low, the threat of litigation is more efficient in the first period, since without a past litigant a second-period plaintiff does not file the case. Hence, the probability of rejection of the low offer is smaller. To be precise, we denote by $\underline{p}_{1,0}$ the probability of rejecting the low offer in the first period, which makes the defendant of the high type indifferent between making the high and low-offer when the second-period strategic plaintiff never starts the litigation:

$$\underline{p}_{1,0} \equiv \frac{\Delta\rho_1}{\Delta\rho_1 + 2\lambda_H - \lambda_H^2\eta(1+\eta)}. \tag{6}$$

Analogous probability, when the second-period strategic plaintiff always files the case after observing a previous arrival is denoted by $\bar{p}_{1,0}$:

$$\bar{p}_{1,0} \equiv \frac{\Delta\rho_1}{\Delta\rho_1 + 2\lambda_H(1-\lambda_H\eta)}. \tag{7}$$

The equilibrium is described in details in Proposition 2.

Proposition 2. *If $\lambda_H + \lambda_L \leq \frac{4}{3}$, in any PBE equilibrium satisfying the D1 criterion, when only public settlements are available and $k_t > 0$, a strategic plaintiff files the case independently of the period. After the case is filed, the defendant makes an offer $s_{t,k=1} = w$, which is always accepted by the strategic plaintiff.*
If $k_t = 0$:

(i) a strategic plaintiff arriving in period 3 never files the case,

(ii) a strategic plaintiff arriving in period $t = 1, 2$ files the case if and only if $l_{t,h_t} \geq \check{l}_t$. After the case is filed the defendant makes an offer $s^i_{t,0} = \rho^i_t w$. The offer $s^H_{t,0}$ is always accepted by the strategic plaintiff, but the offer $s^L_{t,0}$ is rejected with probability $p_{t,0}$, where $p_{2,0} = \frac{\Delta\rho_2}{\Delta\rho_2 + \lambda_H}$; $p_{1,0} = \underline{p}_{1,0}$, if $l \geq \bar{l}$, and $p_{1,0} = \bar{p}_{1,0}$ otherwise.

3.3 Asymmetric information with endogenous secrecy regime

In this subsection we allow for the secrecy regime to be endogenously determined. That is, while making an offer the defendant chooses not only a transfer size (s_t) but also decides whether the potential settlement will be public (ζ_t).

Allowing for private settlements does not influence the decision of the plaintiff in the final period, since he does not face any uncertainty about the payoff. Hence, a strategic plaintiff in period 3 files the case if and only if at least one previous litigant is observed, and always settles it at w. Since the decision of the plaintiff in the final period is independent from the scope of the harm, but depends only on the number of litigants, the choice of secrecy regime in period 2 is irrelevant. From the perspective of the defendant it is irrelevant if the settlement is private or public, it is only relevant that it is reached.

However, the decision on the privacy regime in the initial period plays an important role. Te strategic plaintiff in period 2 starts the litigation only if he assigns sufficiently high probability to the scope of the harm being high. Hence, the defendant profits when the scope of the harm appears to be low.

Naturally, the choice of the privacy regime matters only for some range of prior beliefs. If the prior is very low ($l < \underline{l}$), the second-period strategic plaintiff never start the litigation. Analogously, if the prior is sufficiently high ($l \geq \bar{l}$), the second-period plaintiff always files the case. However, in-between these extremes there is a potential for influencing the decision of the second-period plaintiff through the secrecy regime.

Yet, in the equilibrium, any attempt to change the behavior of the second-period plaintiff must fail. In other words, if the secrecy regime is endogenous, the decision of the second period plaintiff must be independent from observing a previous settlement (that is, it must independent from the realization of n_2). To illustrate why this must be the case, suppose that the strategic plaintiff in the second period starts the litigation if and only if he observes a previous arrival. Naturally, the high-type defendant would then always settle the case privately, in order to limit future litigation. On the contrary, the low-type defendant would always make a public settlement offer. Since she faces a low probability of any subsequent plaintiff arriving, the possibility of the case being filed in the second period is not very costly for her. Therefore, she would prefer to signal her type to the first-period plaintiff and ensure a certain settlement through choosing a public settlement. However, if only the low-type defendant settles the case publicly in the first period, the second-period plaintiff would never file the case after observing $n_2 = 1$.

Since a second-period plaintiff never conditions his decision on observing a settlement in a previous period, his behavior depends on the prior belief even more than in the model with only public settlements available. If he holds a prior high enough, he will always file the case in the second period. We refer to this type of an equilibrium as a *high litigation equilibrium*. On the contrary, if the prior is low, the second-period strategic plaintiff never starts the litigation. We refer to this type of an equilibrium as a *low litigation equilibrium*. The prior threshold above which the second-period plaintiff always files the case depends on the first-period negotiation process itself. In particular, it is influenced by the probability with which the first-period strategic plaintiff rejects the low offer. The higher is this probability the less likely it is that the defendant manages to achieve a settlement when the scope of the harm is low. Hence, the second-period plaintiff holds a stronger belief that lack of litigants results from a successful settlement with a high-type defendant and is more willing to start the litigation. To be precise, if the probability of rejecting the low offer during the first-period negotiation is p, then the second-period strategic plaintiff always files the case if and only if $l \geq \tilde{l}(p)$, and never starts the litigation otherwise, for

$$\tilde{l}(p) \equiv \check{l}_2 \frac{\lambda_L\big(1-\lambda_L\eta - p\lambda_L(1-\eta)\big)}{\lambda_H\big(1-\lambda_H\eta\big)}. \tag{8}$$

The equilibrium is described in details in Proposition 3.

Proposition 3.

(a) If $l \leq \tilde{l}(\underline{p}_{1,0})$ there exists a PBE satisfying the D1 criterion called a low litigation equilibrium, in which:

(i) If $k_t > 0$ any strategic plaintiff always files the case. After the case is filed the defendant makes an offer with a monetary transfer $s_{t,k=1} = w$, which is always accepted by the plaintiff.

(ii) A strategic plaintiff arriving in the first period files the case if and only if $l \geq \check{l}_1$. After the case is filled, the defendant makes an offer with a transfer $s^i_{1,0} = \rho^i_1 w$. The offer $s^H_{1,0}$ is always accepted by the strategic plaintiff, and the offer $s^L_{1,0}$ is rejected with probability $\underline{p}_{1,0}$.

(iii) If $k_t = 0$, a strategic plaintiffs arriving in the second or third periods never files the case.

(b) If $l \geq \tilde{l}(\bar{p}_{1,0})$ there exists a PBE satisfying the D1 criterion called a high litigation equilibrium, in which:

(i) If $k_t > 0$ any strategic plaintiff always files the case. After the case is filed the defendant makes an offer with a monetary transfer $s_{t,k=1} = w$, which is always accepted by the plaintiff.

(ii) If $k_t = 0$ a strategic plaintiffs arriving in the first or second period always files the case. After the case is filled, the defendant makes an offer with a transfer $s^i_{t,0} = \rho^i_t w$. The offer $s^H_{t,0}$ is always accepted by the strategic plaintiff, and the offer $s^L_{t,0}$ is rejected with probability $p_{t,0}$, where $p_{1,0} = \bar{p}_{1,0}$, and $p_{2,0} = \frac{\Delta\rho_2}{\Delta\rho_2 + \lambda^H}$.

(iii) If $k_3 = 0$ a strategic plaintiff in the third period never files the case.

No other PBE satisfying the D1 criterion, in which the decision of a strategic plaintiff on whether to file the case is binary, exists.

The exact choice of secrecy regime cannot be pinned down in the equilibrium. To be precise, any pair of probabilities of making a public settlement offer by each type of the defendant in period 1 can be sustained as an element of some PBE satisfying the D1 criterion, as long as the decision of the second-period plaintiff is unaffected by the choice of the secrecy regime in the first period. In particular, a decision to always settle the case secretly can always be supported as an element of the equilibrium. It implies that introducing the possibility of settling the case privately is equivalent in terms of payoffs to allowing only secret settlements. This result is summarized in Corollary 2.

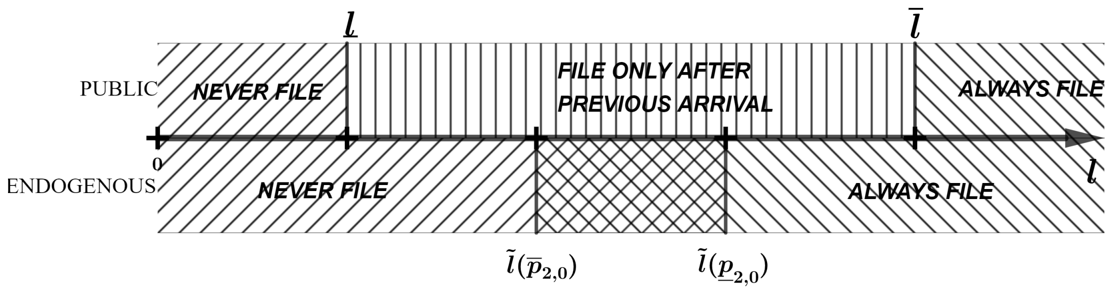
Corollary 2. *Any PBE satisfying the D1 criterion of the game with endogenous secrecy regime is payoff-equivalent to some PBE satisfying the D1 criterion of the game in which only secret settlements are available.*

Importantly, Corollary 2, does not state that only secret settlements have to be used on the equilibrium path. For example, there always exists an equilibrium in which the defendant of at least one type always settles the case publicly. Yet, if secret settlements are available observing history of past settlements never changes the decisions of the plaintiffs, and they behave as if all the settlements had been secret.

Note that $\tilde{l}(\bar{p}_{2,0}) < \tilde{l}(\underline{p}_{2,0})$, and there is a region of prior values for which the low- and high-litigation equilibra coexist. Naturally, on this region there also exist equilibria in which the second period strategic plaintiff starts the litigation with any probability. To simplify the analysis, we focus only on the equilibria in which the decision to file the case is binary. That is we study only the equilibria that are the most preferred (low-litigation) and the least preferred (high-litigation) by the defendant. The multiplicity can be seen as an example of "self-fulfilling prophecy". Suppose that the agents during the first-period negotiation conjecture that a second-period plaintiff always files the case. Then the probability of rejecting a low offer must be high, in order to prevent the high-type defendant from making it. Hence, it becomes unlikely that the low-type defendant ensures a settlement in period 1, and the second-period plaintiff assigns larger probability to the scope of the harm being high whenever he observes no previous litigants (that is, $k_2 = 0$). As a result, he always files the case and the conjecture of the agents in the first period is correct. On the contrary, if the agents during the first-period negotiation believe that a second-period strategic plaintiff never starts the litigation, the probability of rejecting the low offer can be small. As a result the second-period plaintiff finds it likely that observing no litigants follows from the low-type defendant settling the case in the previous period. Hence, he indeed does not file the case.

Figure 2 presents the comparison of a second-period strategic plaintiff's decision in two versions of the model. The upper part of the figure represents the decision of a second-period strategic plaintiff when all the settlements are public, and the lower part of the figure represent

Figure 2: Comparison of the decisions of the stratigic plaintiff in period 2 if $k_2 = 0$.



this decision when the secret settlements are available. Naturally, if $l \leq \max\{\hat{l}, \underline{l}\}$, (that is, the second-period strategic plaintiff never starts litigation even when all the settlements are public), or if $l \geq \bar{l}$ (that is, the second period plaintiff always files the case even when all the settlements are private), the equilibrium path and the payoffs of the players remain unchanged. However, in-between these extremes the outcome of the game changes. To be precise, in when all settlements are public a second-period strategic plaintiff conditions his decisions on the realization of n_2, whereas if private settlements are available he always takes the same decision. In particular, when $l < \tilde{l}(\bar{p}_{2,0})$ he never starts the litigation, and when $l > \tilde{l}(\underline{p}_{2,0})$ she always starts the litigation. For values of $l \in [\tilde{l}(\bar{p}_{2,0}), \tilde{l}(\underline{p}_{2,0})]$ both behaviors can be supported as a part of equilibrium path.The effect of availability of secret settlements on the payoffs of the player strongly differ between the low- and high-litigation equilibria. We begin by analyzing the first case.

In the low-litigation equilibrium, the defendant gains on introducing the possibility of settling the case. There is a direct effect of a strategic plaintiff in the second period never starting the litigation. Due to it, the defendant never has to pay the compensation to him or litigate against him. Moreover, there is also an indirect effect of the change in the behavior of a second-period plaintiff on the negotiation process in the first period. In particular, a first-period plaintiff accepts a low offer with a higher probability. Hence, the defendant gains also on limiting the probability of the litigation in the first period.

A plaintiff in the first period remains unaffected by introducing the possibility of settling the case secretly. However, a second-period plaintiff looses on it. Firstly, both a strategic and a behavioral plaintiff are less likely to face a previous litigant. Secondly, a strategic plaintiff has now less information to evaluate the scope of the harm. Thus, it happens more often that he drops the case even though the scope of the harm is high. Also a plaintiff in the final period of the game looses on introducing the possibility of settling the case secretly. Since the negotiation in the first period fails less often, and a second-period strategic plaintiff never even files the case, a plaintiff in the final period is less likely to face previous litigants and obtain a compensation from the defendant.

On the contrary, in the high-litigation equilibrium, the defendant would be better-off if he could commit to always settling the case publicly. Then, a second-period strategic plaintiff could always distinguish a history in which there was a previous arrival from a history in which no arrival happened, and he will file the case only in the first scenario. However, if the privacy regime is endogenous when the defendant faces a strategic plaintiff in the first period, it is tempting for her to settle the case privately. Hence, a plaintiff in the second period cannot distinguish between the histories with sufficient precision and he always files the case.

Similarly to the low-litigation equilibrium in a high-litigation equilibrium a first-period plaintiff is not affected by endogenizing the secrecy regime but a second-period strategic plaintiff is loosing when secret settlements are allowed. He receives less information through observing the history, and more often files the case in the low state of the world. Interestingly, both a strategic and the behavioral plaintiff in the final period of the game are better-off when a secret settlements are allowed. Since a second-period plaintiff is more likely to file the case conditional on the scope of the harm being low, the negotiation in the second period fail more often and a plaintiff in the final period is more likely to face a previous litigant. As a result, secret settlements may be overall beneficial for the plaintiffs. It happens whenever λ_L is sufficiently close to $\frac{f}{w}$ or l is sufficiently close $\bar{l}$. That is, the expected individual cost of unnecessarily filing the case by the plaintiff in the second period is trumped by the positive externality that additional litigation generates for potential plaintiff in the third period.

4 Extensions

4.1 Pooling equilibria

The results presented in Section 3.2 rely on an assumption that $\lambda_H + \lambda_L < \frac{4}{3}$. This assumption ensures that the high type defendant is always willing pay more for achieving the settlement, than the low type defendant. In general this does not need to be true, as a result, for some parameters of the model separating equilibria of the negotiation may not exist.

First, we study the case of only public settlement being present. If $\lambda_H + \lambda_L > \frac{4}{3}$ and the fraction of behavioral plaintiffs is sufficiently high, the first period settlement negotiation changes. In this situation it is likely for the high type defendant to face a collective litigation even when the case is settled in the first period, since it is very probably that she will face two behavioral defendants in later periods. On the contrary, the low type defendant can still with high likelihood prevent collective litigation by settling the case in the first period. Hence, avoiding litigation in the first period is more valuable for the low type than for the high type defendant. However, the plaintiff still has a higher expected payoff when litigating against the low type defendant than when litigating against the high type defendant. As a result, it is impossible to build a separating equilibrium in the first period negotiation. However, multiple pooling equilibria satisfying the D1 criterion exist. Moreover, in any equilibrium satisfying the D1 criterion the negotiation in the first period ends with a settlement. This result is summarized in Proposition 4.

Proposition 4. *If all the settlements are public $\lambda_H + \lambda_L \geq \frac{4}{3}$ then there exists $\bar{\eta} \in (0,1)$ such that:*

(i) for all $\eta < \bar{\eta}$ Proposition 2 applies;

(ii) for all $\eta > \bar{\eta}$ in any PBE satisfying the D1 criterion during the first period negotiation with a strategic plaintiff the case is settled at some pooling offer $s_1 \in \Big[\big(\mu_{1,h_1}\rho_1^H + (1-\mu_{1,h_1})\rho_1^L\big)w, \rho_1^H w\Big]$, the case is filed by the first period strategic plaintiff if and olny if $s_1 \geq f$;

(iii) Proposition 2 applies for periods two and three.

Similar result can be delivered for the case when the settlements are secret. In any pooling equilibrium, both the high- and the low-type defendant always offer an identical transfer s, and can mix between between proposing secret and public settlement with identical probability, as long as the decision of the second period plaintiff is unaffected by the realization of n_1. This result is presented in proposition 5.

Proposition 5. *If the secrecy regime is endogenous $\lambda_H + \lambda_L \geq \frac{4}{3}$ then there exists $\bar{\eta} \in (0, 1)$ such that:*

(i) for all $\eta < \bar{\eta}$ Proposition 3 applies;

(ii) for all $\eta > \bar{\eta}$ there exists PBE satisfying the D1 criterion in which during the first period negotiation with a strategic plaintiff the case is settled at some pooling transfer $s_1 \in \Big[\big(\mu_{1,h_1}\rho_1^H + (1-\mu_{1,h_1})\rho_1^L\big)w, \rho_1^H w\Big]$, the case is settled publicly with some probability independent of the defendant's type, the case is filed by the first period strategic plaintiff if and olny if $s_1 \geq f$;

(iii) Proposition 2 applies for periods two and three.

The equilibria described in Proposition 5 are not necessarily unique, however the nature of the multiplicity is not very interesting. First, for mid values of η and μ, it can happen that there exist high-litigation separating equlibria and low-litigation pooling equilibria. Second, for mid values of μ an equilibrium, in which the second period plaintiff starts the litigation if and only if he observes a previously settled case. However, in this situation the case is always settled secretly in the first period. Hence, the multiplicity is only due to out-of-equilibrium behavior. As a result corollary 2 still holds.

4.2 Payoffs strictly increasing in number of litigants

4.3 Lawyer filing a case on plaintiffs behalf

5 Conclusion

We study the dynamics of settlement negotiations between a privately-informed defendant and several potential plaintiffs arriving over time. We propose a model in which a defendant faces random arrival of plaintiffs over three periods. In each period, one plaintiff can arrive with some exogenous probability known to the defendant but not the plaintiffs. The outcome of the litigation depends on the amount of plaintiffs litigation, in particular, we assume that there is a minimal amount of plaintiffs required for the litigation to be successful. We suppose that there are two types of plaintiffs. A behavioral plaintiff always litigates, and a strategic plaintiff decides on whether to file the case, and then negotiates settlement with a defendant.

We show that if the fraction of behavioral plaintiffs is low, the mere capability of the defendant of paying-off future plaintiffs is enough to prevent any filing from strategic plaintiffs. However, if the fraction of behavioral plaintiffs is sufficiently high, the strategic plaintiffs will file the case. Moreover, pre-trial negotiations with strategic plaintiffs may fail, and the collective litigation can succeed. Additionally, we study the effects of private settlements in this context. We show that introducing a possibility of settling the case privately, is equivalent in terms of payoffs to only secret settlements being present. When the case can be settled privately, some plaintiffs receive less information and it becomes more difficult for them to learn about the scope of the harm. In particular, the plaintiffs do not change their decision on whether to file a case based on the history of past settlements. Importantly, the defendant gains on availability of private settlements when the plaintiffs hold a low prior about the arrival rate, but looses on it in the opposing scenario.

Several extensions are left for future research. First, it is relevant to verify the robustness of the model when there are more than 3 periods and the litigation payoff is strictly increasing in the amount of litigants. From our early results we conjecture that in this setting the late periods of the game the negotiations are more likely to fail. However, in the early periods of the game only pooling equilibria exist and the settlement can always be reached. On one hand, it suggests that the collective litigation is strongly driven by the behavior of the late plaintiffs. On the other hand, it implies that the effect of secret settlements is especially relevant in the early period, since the observed history influence both the decision on whether to file the case and the outcome of the negotiation. Second, in our analysis we ignore the role of attorneys. In fact, our model suggests that the attorneys may play much more relevant role in collective litigation than in individual litigation. In particular, apart from providing their services and expertise, they may limit the ability of the defendant to exploit the plaintiffs through sequential settlements by joining the cases and handling the negotiation on behalf of multiple litigants.

A Proofs

Proof of **Proposition 1**.

In the final period there is no uncertainty, and the negotiation, whenever the plaintiff files the case, is a simple ultimatum bargaining game. That is, if $k = 0$ an offer $s_3 = 0$ is made and accepted by a strategic plaintiff. If $k > 0$ an offer $s_3 = w$ is made an accepted by a strategic plaintiff. Since $0 < f < w$, the case is filed if and only if $k > 0$.
Using backwards induction, if $k_2 = 0$, the plaintiff in the second period expects a payoff of $\lambda\eta w$ from litigation. Hence, if the case is filed, in the equilibrium the defendant makes an offer $\lambda\eta w$ and a strategic plaintiff accepts it. What follows is that the strategic plaintiff files the case if and only if $\eta \geq \frac{f}{\lambda w}$, that is $\rho_2 \geq \frac{f}{w}$.
Analogs reasoning applies in period 1. ∎

Proof of **Proposition 2**
Proposition 2 is proved by backward induction in lemmas 1 – 4.

Lemma 1. *In period 3 a strategic plaintiff files the case if and only if $k_3 > 0$. If he files the case, it is always settled for w.*

Since the game in the final period is a simple ultimatum bargaining game the proof is omitted.

Lemma 2. *In period 2, if $k_2 = 1$ a strategic plaintiff always files the case and settles it for w.*

Lemma 2 is the direct consequence of a fact that if there are two participants of the litigation the litigation is necessarily successful and yields a known payoff of w to the plaintiff.

Lemma 3. *In period 2, if $k_2 = 0$ in any PBE satisfying D1 criterion:*

(i) the defendant of type i makes an offer $s^i_{2,0} = \lambda_i \eta w$,

(ii) the plaintiff's beliefs satisfy $\mu(s^L_{2,0}) = 0$, and $\mu(s) = 1$ for any $s \in (s^L_{2,0}, s^H_{2,0}]$.

(iii) the plaintiff accepts any offer $s \geq s^H_{2,0}$, rejects any offer $s \in (-\infty, s^H_{2,0}) - \{s^L_{2,0}\}$, and rejects an offer $s^L_{2,0}$ with probability $p_{2,0} = \frac{\Delta\rho_2}{\Delta\rho_2 + \lambda_H}$.

Lemma 3 is proved in claims 1-3

Claim 1. *The described equilibrium is a PBE satisfying the D1 criterion.*

Proof. Simple inspection shows that the equilibrium is indeed a PBE: the plaintiff's beliefs are consistent, and the plaintiff is best responding to his beliefs. Given the response of the plaintiff, there is no profitable deviation for the defendant.
In order to show that the equilibrium satisfies the D1 criterion it is enough to prove that the high type is not deleted for any strategy $s \in (s^L_{2,0}, s^H_{2,0})$. That is, a plaintiff can assign a positive probability for the scope of harm being high if an offer $s \in (s^L_{2,0}, s^H_{2,0})$ is observed.

Take any such an offer s, then the high type is weakly better off making it if it is rejected with probability at most $p^H(s) \equiv \frac{p_{2,0}(w\lambda_H(1+\eta)-s^L_{2,0})-(s-s^L_{2,0})}{w(1+\lambda_H)(1+\eta)-s}$. The low type is strictly better off making this offer if it is rejected with probability at most $p^L(s) \equiv \frac{p_{2,0}(w\lambda_L(1+\eta)-s^L_{2,0})-(s-s^L_{2,0})}{w(1+\lambda_L)(1+\eta)-s}$. Since $p^H(s) \geq p^L(S)$ the equilibrium satisfies the D1 criterion. ■

Claim 2. *There is no PBE satisfying the D1 criterion in which the high-type defendant makes an offer $s < s^H_{2,0}$ with positive probability.*

Proof. Take some PBE in which some offer $s < s^H_{2,0}$ is made with a positive probability by the high-type defendant. Then, it must be the case that this offer is accepted with some positive probability $1 - p(s)$. Since it is always the best-response of the plaintiff to accept any offer $s > s^H_{2,0}$, otherwise the high-type defendant would have a profitable deviation of offering $s^H_{2,0} + \varepsilon$ and ensuring settlement. Since $p(s) < 1$ it must be the case that the plaintiff assigns a positive probability to s being made by the low-type defendant. Hence, in the equilibrium, the offer s has to indeed be made with a positive probability also by the low-type defendant.
Observe that there can exist only one such an offer. Suppose there are more, and denote any two of them by s_1 and s_2. Then it must be the case that both the high type and the low type must be indifferent in between making the offers, that is:

$$(1 - p(s_1,))s_{1,0} + p(s_1)w(1 + \eta)\lambda_i = (1 - p(s_2))s_2 + p(s_2)w(1 + \eta)\lambda_i \quad \text{for } i = H, L, \tag{9}$$

which yields a contradiction.
Take some offer $s' = s^L_{2,0} + \varepsilon$ which is not made on the equilibrium path. Then the high-type defendant is better off making the offer s' than under her equilibrium payoff if and only if it is rejected with probability at most $p^H(s') \equiv \frac{(1-p(s))s+p(s)(\lambda_H(1+\eta)w)-s'}{\lambda_H(1+\eta)w-s'}$. The low type is better off making the offer s' than under her equilibrium payoff if and only if it is rejected with probability at most $p^L(s') \equiv \frac{(1-p(s))s+p(s)(\lambda_L(1+\eta)w)-s'}{\lambda_L(1+\eta)w-s'}$. Since $p^L(s') < p^H(s')$, if the equilibrium satisfies the D1 criterion, then $\mu_{2,h_2}(s') = 0$. But then the offer s' is accepted by the plaintiff with probability 1 and the defendant has a profitable deviation. ■

Claim 3. *The described equilibrium is the unique PBE satisfying D1 criterion.*

Proof. A consequence of Claim 2 is that the high type always makes an offer $s^H_{2,0}$ in any PBE satisfying D1. Moreover, since the unique best response of a plaintiff is to always accept any offer $s > s^H_{2,0}$, the offer $s^H_{2,0}$ must also always be accepted on the equilibrium path. Otherwise the defendant of a high type would have a profitable deviation of making an offer $s^H_{2,0} + \varepsilon$.
Observe that the low type cannot make any offer $s \in (s^L_{2,0}, s^H_{2,0})$ on the equilibrium path. Otherwise, the equilibrium beliefs of the plaintiff would be $\mu_{2,h_2}(s) = 0$ and it would be always accepted. Hence the high-type defendant would have a profitable deviation of making an offer s. Any offer $s > s^H_{2,0}$ cannot be an element of the equilibrium path, since the defendant would have a profitable deviation of making an $s - \varepsilon > s^H_{2,0}$. An equilibrium in which the low-type defendant makes an offer $s^H_{2,0}$ cannot satisfy the D1 criterion. The proof follows exactly the proof of Claim 2 and is omitted.
Take some separating equilibrium in which the high-type defendant makes an offer $s^H_{2,0}$ and the low type makes an offer $s^L_{2,0}$. Observe that there cannot exist an equilibrium in which the

offer $s^L_{2,0}$ is rejected with probability smaller than $p_{2,0}$, since the high-type defendant would have a profitable deviation of making the offer $s^L_{2,0}$. Hence, take some equilibrium in which the offer $s^L_{2,0}$ is rejected with some probability $p > p_{2,0}$, and consider some offer $s = s^L_{2,0} + \varepsilon$. The defendant of the low type is better off making an offer s than under her equilibrium payoff if it is rejected with probability at most $p^L(s) \equiv \frac{p\lambda_L(1+\eta)w+(1-p)s^L_{2,0}-s}{\lambda_L(1+\eta)w-s}$. The defendant of the high type is better off making an offer s than under her equilibrium payoff it is rejected with probability at most $p^H(s) \equiv \frac{s^H_{2,0}-s}{\lambda_H(1+\eta)w-s} = \frac{p_{2,0}\lambda_L(1+\eta)w+(1-p_{2,0})s^L_{2,0}-s}{\lambda_H(1+\eta)w-s}$. Hence, $\lim_{s\to s^L_{2,0}} p^H(s) = p_{2,0}$ and $\lim_{s\to s^L_{2,0}} p^L(s) = p$. Thus, there exists s small enough such that $p^L(s) < p^H(s)$. Therefore $\mu_{2,h_2}(s) = 0$ and the offer s is always accepted by the plaintiff. Hence, the defendant has a profitable deviation of making the offer s.
Note that the proof applies also for any equilibrium in which the low-type defendant makes an offer $s < s^L_{2,0}$. ∎

Lemma 4. *In period 1 in any equilibrium satisfying the D1 criterion:*

(i) the defendant of type i makes an offer $s^i_{1,0} = \rho^i_1 w$,

(ii) the plaintiff's beliefs satisfy $\mu(s^L_{1,0}) = 0$, and $\mu(s) = 1$ for any $s \in (s^L_{2,0}, s^H_{2,0}]$,

(iii) the plaintiff accepts any offer $s \geq s^H$, rejects any offer $s \in (-\infty, s^H_{2,0}) - \{s^L_{2,0}\}$, and rejects an offer $s^L_{2,0}$ with probability $p_{1,0} = \frac{\Delta\rho_1}{\Delta\rho_1+2\lambda_H(1-\lambda_H\eta)}$, if $\mu < \underline{l}$, and $p_{1,0} = \frac{\Delta\rho_1}{\Delta\rho_1+2\lambda_H-\lambda_H^2\eta(1+\eta)}$ otherwise.

We establish the existence of the equilibrium in claims 4 and 5. Observe that in the described equilibrium the defendant of each type makes an offer exactly compensating the expected payoff of a first-period plaintiff conditional on the realized state of the world, and the high type is exactly indifferent between making an offer $s^H_{1,0}$ and $s^L_{1,0}$. Hence, the proof that the described equilibrium is the unique equilibrium satisfying the D1 criterion exactly follows claims 2 and 3. Therefore, it is omitted.

Claim 4. *The continuation value of the game for the defendant of type i, given that there is $k \in \{0,1\}$ plaintiffs litigating by the end of period 1 and a plaintiff in period 1 filed the case is given by $-\kappa^i_k(\mu)$ such that:*

$$\kappa^i_k(\mu) \equiv \begin{cases} \left[2(1+\eta) - \lambda_i\eta^2\right]\lambda_i w & \text{if } k = 1 \\ \lambda_i^2\eta(1+\eta)w & \text{if } k = 0 \text{ and } \frac{\mu}{1-\mu} \leq \underline{l} \\ \lambda_i^2\eta w\left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta+\lambda_H}\mathbb{1}_{\lambda_i=\lambda_L}\right] & \text{if } k = 0 \text{ and } \frac{\mu}{1-\mu} > \underline{l} \end{cases} \tag{10}$$

Proof. Following lemmas 1 and 2, observe that if $k_1 = 1$ then a strategic plaintiff files the case in periods 2 and 3 at settles it at w and a behavioral plaintiff always litigates the case. Hence, the continuation value of the game for the defendant is given by: $-\left[2(1+\eta) - \lambda_i\eta^2\right]\lambda_i w$.
If $k = 0$ there are two cases. Either the plaintiff in the second period files the case, or he does not. If he does not file the case the litigation is driven fully by the behavioral plaintiff. Hence, the continuation value of the game is given by: $-\lambda_i^2\eta(1+\eta)w$.

If the plaintiff in the second period files the case, then, following Lemma 3, conditional on the arrival of the plaintiff, in the second period the defendant makes an offer exactly compensating the expected payoff of the plaintiff conditional on the scope of the harm. Moreover, the offer made by the low type defendant is rejected with positive probability $p_{2,0}$. Hence, the continuation value of the game is given by: $-\lambda_i^2\eta w\left[2+\frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta+\lambda_H}\mathbb{1}_{\lambda_i=\lambda_L}\right]$.
To finish the proof recall that a strategic plaintiff in the second period files the case conditional on $k_2=0$ if and only if $l_{2,h_2}\geq \check{l}_2$. The beliefs of the plaintiff in period 2 if $h_2=(0,1)$ are given by $l_{2,h_2}=l\frac{\lambda_H^2}{\lambda_L^2}$. Hence $l_{2,h_2=(0,1)}\geq\check{l}_2$ if and only if $l\geq\underline{l}$. ■

Claim 5. *The described equilibrium is a PBE satisfying D1 criterion.*

Proof. We start by analyzing the case when $\mu<\frac{\frac{f}{w}-\rho_2^L}{\Delta\rho_2}$. We firstly show that the proposed strategy profile can be indeed sustained as a PBE.
Set the following interim belief profile $\mu_{1,h_1}(s)=\mathbb{1}_{s\neq s^L_{1,0}}$.

A strategic plaintiff accepts an offer $s^i_{1,0}$ from type i if

$$s^i_{1,0}\geq\left[\lambda_i\eta+(1-\lambda_i)\lambda_i\eta\right]w=(2-\lambda_i)\,\lambda_i\eta w$$

Thus, the unique best response for the plaintiff is to reject the offer whenever $s_{1,0}\in(s^L_{1,0},s^H_{1,0})$. Also note that for $s_{1,0}\in\{s^L_{1,0},s^H_{1,0}\}$ the plaintiff is indifferent between accepting or rejecting the offer. Hence, the plaintiff has no profitable deviation.

Note that $p_{1,0}$ is such that the high-type defendant is indifferent between offering $s^L_{1,0}$ or $s^H_{1,0}$:

$$p_{1,0}\left[\left[2(1+\eta)-\lambda_H\eta^2\right]\lambda_H w\right]+(1-p_{1,0})\left[s^L_{1,0}+\lambda_H^2\eta(1+\eta)w\right]=s^H_{1,0}+\lambda_H^2\eta(1+\eta)w$$

$$\iff p_{1,0}\left[2(1+\eta)\lambda_H w-\lambda_H^2\eta^2w-s^L_{1,0}-\lambda_H^2\eta(1+\eta)w\right]=s^H_{1,0}-s^L_{1,0}$$

Using $s^i_{1,0}=(2-\lambda_i)\lambda_i\eta w$ we get

$$p_{1,0}\left[2(1+\eta)\lambda_H w-\lambda_H^2\eta^2w-(2-\lambda_L)\lambda_L\eta w-\lambda_H^2\eta(1+\eta)w\right]=(2-\lambda_H-\lambda_L)\Delta\lambda\eta w$$

$$\iff p_{1,0}=\frac{(2-\lambda_H-\lambda_L)\Delta\lambda\eta}{2\lambda_H\left(1-\eta^2\lambda_H\right)+(2-\lambda_H-\lambda_L)\Delta\lambda\eta}\in(0,1)$$

Any other offer is either rejected or higher than the equilibrium offer. Hence, she does not have a profitable deviation.

Finally, we show that the low-type defendant does not have a profitable deviation either.

We have that in the proposed equilibrium the payoff for the low-type defendant equals to:

$$-p_{1,0}\left[\left[2(1+\eta)-\lambda_L\eta^2\right]\lambda_L w\right]-(1-p_{1,0})\left[(2-\lambda_L)\lambda_L\eta w+\lambda_L^2\eta(1+\eta)w\right]$$

$$=-2p_{1,0}w\lambda_L(1-\lambda_L\eta^2)-w\lambda_L\eta(2+\lambda_L\eta)$$

.

A deviation to any $s_{1,0} \in (s_{1,0}^L, s_{1,0}^H)$ delivers expected payoffs equal to $-\left[2(1+\eta) - \lambda_L \eta^2\right] \lambda_L w$. Note that

$$-2p_{1,0} w \lambda_L (1 - \lambda_L \eta^2) - w \lambda_L \eta (2 + \lambda_L \eta) > -\left[2(1+\eta) - \lambda_L \eta^2\right] \lambda_L w$$

$$\iff p_{1,0} < \frac{1 - \lambda_L \eta^2}{1 - \lambda_L \eta^2} = 1$$

which always holds.

Let $g(\lambda_i)$ be the expected gain for type λ_i from offering $s_{1,0}^H$ instead of $s_{1,0}^L$, taking $(s_{1,0}^L, s_{1,0}^H, p_{1,0})$ as given:

$$g(\lambda_i) = -s_{1,0}^H - \lambda_i^2 \eta (1+\eta) w + p_{1,0} \left[2(1+\eta) - \lambda_i \eta^2\right] \lambda_i w + (1 - p_{1,0}) \left[s_{1,0}^L + \lambda_i^2 \eta (1+\eta) w\right]$$

We already argued that $g(\lambda_H) = 0$, hence $g(\lambda_L) = g(\lambda_L) - g(\lambda_H)$. As a result

$$\begin{aligned} g(\lambda_L) &= -s_{1,0}^H - \lambda_L^2 \eta (1+\eta) w + p_{1,0} \left[2(1+\eta) - \lambda_L \eta^2\right] \lambda_L w + (1 - p_{1,0}) \left[s_{1,0}^L + \lambda_L^2 \eta (1+\eta) w\right] \quad (11) \\ &\quad + s_{1,0}^H + \lambda_H^2 \eta (1+\eta) w - p_{1,0} \left[2(1+\eta) - \lambda_H \eta^2\right] \lambda_H w - (1 - p_{1,0}) \left[s_{1,0}^L + \lambda_H^2 \eta (1+\eta) w\right] \quad (12) \\ &= w p_{1,0} \Delta\lambda \left[\eta(\lambda_H + \lambda_L)(2\eta + 1) - 2(1+\eta)\right] \end{aligned}$$

Therefore, $g(\lambda_L) \leq 0$ if and only if:

$$(\lambda_L + \lambda_H)/2 \leq (1+\eta)/(2\eta^2 + \eta) \tag{13}$$

, which is implied by $\lambda_H + \lambda_L < \frac{4}{3}$ for any choice of η.

Then, we show that if $\mu \geq \frac{\frac{f}{w} - \rho_2^L}{\Delta\rho_2}$ the described strategy profile is an element of a PBE.

Set the belief profile to $\mu_1(s) = \mathbb{1}_{s \neq s_{1,0}^L}$. The plaintiff is indifferent between accepting or rejecting equilibrium offers. For any offer $s_{1,0} \in (s_{1,0}^L, s_{1,0}^H)$ the plaintiff strictly prefers to reject. Hence, there is no profitable deviation for the plaintiff.

We choose $p_{1,0}$ such that the high-type defendant is indifferent between offering $s_{1,0}^H$ and $s_{1,0}^L$:

$$p_{1,0} \left[2(1+\eta) - \lambda_H \eta^2\right] \lambda_H w + (1 - p_{1,0}) \left[s_{1,0}^L + 2\lambda_H^2 \eta w\right] = s_1^H + 2\lambda_H^2 \eta w$$

$$\iff p_{1,0} \left[\left[2 + (2 - \lambda_H)\eta - \lambda_H \eta (1+\eta)\right] \lambda_H w - s_{1,0}^L\right] = s_1^H - s_{1,0}^L.$$

Using $s_{1,0}^i = (2 - \lambda_i) \lambda_i \eta w$ we get

$$p_{1,0} = \frac{s_1^H - s_{1,0}^L}{\left[2 - \lambda_H \eta (1+\eta)\right] \lambda_H w + s_{1,0}^H - s_{1,0}^L} = \frac{(2 - \lambda_H - \lambda_L) \Delta\lambda \eta}{\lambda_H \left[2 - \eta \lambda_H (1+\eta)\right] + (2 - \lambda_H - \lambda_L) \Delta\lambda \eta}.$$

Finally, we check that the low-type defendant has no incentive to deviate. As in the previous part of the proof let $g(\lambda_i)$ be the expected gain for type λ_i of offering $s_{1,0}^H$ instead of $s_{1,0}^L$, taking

$(s^L_{1,0}, s^H_{1,0}, p_{1,0})$ as given.

$$g(\lambda_i) = -s^H_{1,0} - \lambda_i^2 \eta w \left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta + \lambda_H} I[\lambda_i = \lambda_L]\right]$$
$$+ p_{1,0}\left[2(1+\eta) - \lambda_i \eta^2\right]\lambda_i w + (1-p_{1,0})\left[s^L_{1,0} + \lambda_i^2 \eta w \left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta + \lambda_H} I[\lambda_i = \lambda_L]\right]\right].$$

Since $g(\lambda_H) = 0$, we can write $g(\lambda_L) = g(\lambda_L) - g(\lambda_H)$ to get the following expression:

$$\begin{aligned} g(\lambda_L) = &-s^H_{1,0} - \lambda_L^2 \eta w \left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta + \lambda_H}\right] \\ &+ p_{1,0}\left[2(1+\eta) - \lambda_L \eta^2\right]\lambda_L w + (1-p_{1,0})\left[s^L_{1,0} + \lambda_L^2 \eta w \left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta + \lambda_H}\right]\right] \\ &+ s^H_{1,0} + 2\lambda_H^2 \eta w - p_{1,0}\left[2(1+\eta) - \lambda_H \eta^2\right]\lambda_H w - (1-p_{1,0})\left[s^L_{1,0} + 2\lambda_H^2 \eta w\right] \\ = &\; p_{1,0} w \Delta\lambda \left[-2(1+\eta) - \lambda_L^2 \eta \frac{1-\eta}{\Delta\lambda\eta + \lambda_H} + (\lambda_H + \lambda_L)(2\eta + \eta^2)\right]. \end{aligned}$$

Therefore, $g(\lambda_L) \le 0$ if and only if

$$\frac{\lambda_H + \lambda_L}{2} \le \frac{1+\eta}{2\eta + \eta^2} + \frac{\lambda_L^2(1-\eta)}{2(2+\eta)(\Delta\lambda\eta + \lambda_H)}, \tag{14}$$

which is implied by $\lambda_H + \lambda_L \ge \frac{4}{3}$ for any choice of η.

To finish the proof, we show that the proposed equilibrium satisfies the D1 criterion. To prove it, it is enough to show that the high-type defendant is not eliminated for any strategy $s \in (s^L_{1,0}, s^H_{2,0})$ under the D1 criterion.

Take any such an offer. Then the defendant of type i is better-off making the offer s rather than under her equilibrium payoff if and only if the offer s is rejected at most with probability $p^i(s) \equiv p_{1,0} - \frac{s - s^L_{1,0}}{\kappa^i_1 - \kappa^i_0 - s_L}$.

Recall that the low type never has profitable deviation of proposing $s^H_{1,0}$, and the high type never has a profitable deviation of proposing $s^L_{2,0}$. Hence, it is always the case that $\kappa^H_1 - \kappa^H_0 > \kappa^L_1 - \kappa^L_0$. Hence $p^H(s) > p^L(s)$ and the defendant of the high type is not eliminated for strategies $s \in (s^L_{1,0}, s^H_{2,0})$. ■

Proof of Proposition 3 Proposition 3 is proved in lemmas 5 – 7. The proof includes only the analysis of the negotiation in period 1 and the decision on filing the case in period 2, as other subgames follow exactly the proof of Proposition 2.

Lemma 5. *In any equilibrium satisfying the D1-criterion during the negotiation in the first period:*

(i) the defendant makes an offer including a transfer $s^i_{1,0} = \rho^i_1 w$.

(ii) A pair of probabilities (q^H, q^L) *with which the i-type defendant makes a public settlement offer can be supported as a part of some equilibrium if and only if the decision of the second period plaintiff is independent from observing a public settlement.*

(ii) The plaintiff always accepts the offer with a transfer $s^H_{1,0}$*, and rejects the offer with a transfer* $s^L_{1,0}$ *with some positive probability.*

Lemma 5 is proved in claims 6 – 10.

Claim 6. *In any PBE satisfying the D1 criterion during the first-period negotiation the defendant of a high type makes an offer* $s^H_{1,0}$.

Proof. Firstly, observe that a strategic plaintiff always accepts any offer including a transfer $s > s^H_{1,0}$ independently of the secrecy regime proposed. Hence, no offer $s > s^H_{1,0}$ can be made in the equilibrium.

Take some candidate equilibrium in which the high type makes the offer $S = (s, \zeta)$ where $s < s^H_{1,0}$. Then it must be the case that this offer is not rejected with probability 1, but only with some probability p. Hence, the low type must make an offer S with positive probability. Following the proof of Claim 2, recall that, for a given ζ, there exists at most one such an offer.

Then take some offer $S' = (s', \zeta)$, which is not made on the equilibrium path, with $s' = s^L_{1,0} + \varepsilon$ and ζ that is used in the offer S. Recall from Claim 4 the values of the continuation game for the defendant κ^i_k. Observe that if the second-period plaintiff files the case after observing history $h_2 = (0, \zeta)$, then $\kappa^i_0 = \lambda^2_i \eta w \left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta + \lambda_H} \mathbb{1}_{\lambda_i = \lambda_L}\right]$, and otherwise $\kappa^i_0 = \lambda^2_i \eta(1+\eta)w$. Moreover κ^i_1 remains unchanged.

Hence, the i-type defendant is better-off making an offer S' if it is rejected with probability at most $p^i(S') \equiv \frac{p(\kappa^i_1 - \kappa^i_0 - s) - s' + s)}{\kappa^i_1 - \kappa^i_0 - s'}$. Recall form the proof of Claim 5 that $\kappa^H_1 - \kappa^H_0 > \kappa^L_1 - \kappa^L_0$. Hence, $p^H(S') < p^L(S')$, and if the equilibrium satisfies the D1 criterion $\mu_{1,h_1}(S') = 0$. Therefore, the offer S' is always accepted by the plaintiff, and the defendant has a profitable deviation of making the offer S'. ■

Claim 7. *In any PBE satisfying the D1 criterion during the first-period negotiation the defendant of a low type makes an offer* $s^L_{1,0}$.

Proof. Claim 6 implies that there does not exist an equilibrium in which the low-type defendant makes an offer with a transfer $s > s^L_{1,0}$. If $s \in (s^L_{1,0}, s^H_{1,0})$ in a candidate equilibrium, then the offer made by the low type is always accepted and the high type has a profitable deviation of making an offer s. If $s \geq s^H_{1,0}$ then the proof of Claim 6 applies, and there exists some offer S' with a transfer $s' = s^L_{1,0} + \varepsilon$, which is always accepted by the plaintiff. Thus, the defendant has a profitable deviation of making the offer S'.

Suppose there exists an equilibrium, in which some offer $s < s^L_{1,0}$ is made by the defendant of the low type. Then, it is always rejected by the plaintiff. Consider some offer S' with a transfer $s' = s^L_{1,0} + \varepsilon$. Then the plaintiff of the low type is better-off making this offer than under her equilibrium payoff if it is accepted with any positive probability. The plaintiff of the high type is better-off making the offer S' only if it is accepted with a probability higher than some threshold. Hence, if the equilibrium satisfies the D1 criterion, $\mu_{1,h_1}(S') = 0$, and the offer S' is always accepted. Therefore the defendant has a profitable deviation of making an offer S'. ■

Claim 8. *There does not exist a PBE satisfying the D1 criterion, in which the second-period plaintiff files the case upon observing $h_2 = (0,0)$ but not upon observing $h_2 = (0,1)$.*

Proof. Take any such candidate equilibrium. Then, it must that the high-type defendant settles the case secretly with some positive probability. Hence, the high-type defendant has a profitable deviation of proposing a public settlement with probability 1. ■

Claim 9. *There does not exist a PBE satisfying the D1 criterion, in which the case is settled publicly with some positive probability and the second-period plaintiff files the case upon observing $h_2 = (0,1)$, but not upon observing $h_2 = (0,0)$.*

Proof. Take any such an equilibrium. Then, it must be that the high type proposes a public settlement with some positive probability. Hence, she has a profitable deviation of proposing a secret settlement with probability 1. ■

Claim 10. *There does not exist a PBE satisfying the D1 criterion, in which the second-period plaintiff files the case upon observing $h_2 = (0,1)$, but not $h_2 = (0,0)$.*

Proof. Claim 9 proves the case when the case is settled publicly with some positive probability. Suppose there exists an equilibrium in which the case is always settled secretly in the first period, and the second-period strategic plaintiff files the case if he observes $h_2 = (0,1)$, but not $h_2 = (0,0)$.
Observe that in any such an equilibrium, the low offer during the first-period negotiation must be rejected with some probability $p \geq \underline{p}_{1,0} = \frac{\Delta\rho_1}{\Delta\rho_1 + 2\lambda_H(1-\lambda_H\eta) - \lambda_H\eta(1-\eta)}$.
Denote by $-\kappa^i_0(\zeta)$ the value of the continuation game for the defendant of type i, if the case in period 1 is settled at a privacy regime ζ. Following the proof of Claim 4 $\kappa^i_0(0) = \lambda^2_i\eta(1+\eta)w$, and $\kappa^i_0(1) = \lambda^2_i\eta w\left[2 + \frac{\Delta\lambda(1-\eta)}{\Delta\lambda\eta+\lambda_H}\mathbb{1}_{\lambda_i=\lambda_L}\right]$.

Consider an offer $S' = (s' = s^L_{1,0} + \varepsilon, \zeta = 1)$. Then, the high-type defendant is better-off making the offer S' than under her equilibrium pay-off if it is rejected with probability at most $p^H \equiv \frac{s^H_{1,0} - s' - (\kappa^H_0(1) - \kappa^H_0(1))}{\kappa^H_1 - \kappa^H_0(1) - s'}$. And the low-type defendant is better-off making the offer S' than under her equilibrium if it is rejected with probability at most $p^L \equiv \frac{p(\kappa^L_1 - \kappa^L_0(0) - s^L_{1,0}) - (\kappa^L_0(1) + s' - \kappa^L_0(0) - s^L_{2,0})}{\kappa^1_L - \kappa^1_0(1) - s'}$.

We claim that for ε small enough it must be the case that $p^H < p^L$ and $p^L > 0$. Observe that p^L is increasing in p, hence take the smallest possible $p = \underline{p}_{1,0}$. Knowing that if $p = \underline{p}_{1,0}$, the defendant of a high type is indifferent between making an offer $S = (s^H_{1,0}, 0)$ and $S = (s^L_{1,0}, 0)$, we can restate the expression for p^i where $i = H, L$ in the following way:

$$\underline{p}_{1,0}\kappa^i_1 + (1-\underline{p}_{1,0})(\kappa^i_0(0) + s^L_{1,0}) = p^i\kappa^i_1 + (1-p^i)(s' + \kappa^i_0(0)) + (1-p^i)(\kappa^i_0(1) - \kappa^i_0(0)). \quad (15)$$

Hence, if $\kappa^H_0(1) - \kappa^H_0(0) > \kappa^L_0(1) - \kappa^L_0(0)$, there exists an offer s' sufficiently close to $s^L_{1,0}$ for which indeed p^L is strictly smaller than p^H. Substituting for κ^i_k's and simplifying we obtain:

$$\lambda^2_H > \lambda^2_L + \lambda^2_L p_{2,0}. \quad (16)$$

Substituting for $p_{2,0}$ by $\frac{\Delta\lambda\eta}{\Delta\lambda\eta+\lambda_H}$ and simplifying we obtain:

$$(\lambda_H + \lambda_L)(\eta\Delta\lambda_+\lambda_H) > \lambda^2_L\eta, \quad (17)$$

which must be always satisfied, since $\lambda_H > \lambda_L\eta$ and $\lambda_H + \lambda_L > \lambda_L$.

Thus, if the out-of-equilibrium beliefs follow the D1 criterion, there exists an offer $S' = (s' > s^L_{2,0}, \zeta = 1)$ such that $\mu(S') = 0$. This offer is always accepted by the plaintiff and (by the fact that $p^L > 0$) the defendant of a low type has a profitable deviation of making the offer S'. ∎

Lemma 6. *If the probability of rejection of the offer $s^L_{1,0}$ during the first-period negotiation is given by p, then in any PBE equilibrium satisfying the D1 criterion in which the decision on filing the case is taken in pure strategies, the second-period strategic plaintiff files the case upon observing $k_2 = 0$ if and only if $l \geq \tilde{l}(p) \equiv \breve{l}_2 \frac{\lambda_L(1-\eta\lambda_L - p\lambda_L(1-\eta))}{\lambda_H(1-\eta\lambda_H)}$. Otherwise, there exists an equilibrium in which the second-period plaintiff always files the case.*

Proof. Following Lemma 5 it must be that a decision of a second-period plaintiff is independent from the realization of n_2.
Denote by q^i the probability with which the defendant of type i proposes a public settlement in period 1. Then, if an equilibrium in which the second-period plaintiff never starts the litigation exists, there must exist a pair $(q^H, q^L) \in [0,1]^2$ satisfying the following two conditions:

$$\breve{l}_2 \leq l \frac{\lambda_H\Big(\lambda_H(1-\eta)(1-q^H) + 1 - \lambda_H\Big)}{\lambda_L\Big((1-\eta)(1-p)(1-q^L) + 1 - \lambda_L\Big)}, \quad (18)$$

$$\breve{l}_2 \leq l \frac{\lambda_H\lambda_H(1-\eta)q^H}{\lambda_L\lambda_L(1-\eta)(1-p)q^L}. \quad (19)$$

Condition (18) ensures that a second-period strategic plaintiff does not file the case if he observes $h_2 = (0,0)$, condition (19) ensures that a second-period strategic plaintiff does not file the case if he observes $h_2 = (0,1)$.
Rearranging the conditions we obtain:

$$q^L \geq \frac{1}{1-p}\Big(\frac{l}{\breve{l}_2}\frac{\lambda^2_H}{\lambda^2_L}q^H - \frac{l\lambda_H}{\breve{l}_2\lambda_L}\frac{(1-\eta\lambda_H)}{\lambda_L(1-\eta)} + \frac{1 - \big((1-\eta)p + \eta\big)\lambda_L}{\lambda_L(1-\eta)}\Big), \quad (20)$$

$$q^L \leq \frac{1}{1-p}\frac{l}{\check{l}_2}\frac{\lambda_H^2}{\lambda_L^2}q^H. \tag{21}$$

From (20) and (21) we get that the set of $(q^H, q^L) \in [0,1]^2$ satisfying (18) and (19) is non-empty if and only if:

$$\frac{1-\big((1-\eta)p+\eta\big)\lambda_L}{\lambda_L(1-\eta)} \leq \frac{l\lambda_H}{\check{l}_2\lambda_L}\frac{(1-\eta\lambda_H)}{\lambda_L(1-\eta)}. \tag{22}$$

Solving (22) for l the following condition is obtained:

$$l \leq \check{l}_2\frac{\lambda_L\big(1-\lambda_L\eta-p\lambda_L(1-\eta)\big)}{\lambda_H(1-\lambda_H\eta)} = \tilde{l}(p). \tag{23}$$

Hence the equilibrium, in which a second-period strategic plaintiff never starts the litigation exists if and only if $l \leq \tilde{l}(p)$.
The proof that the equilibrium in which a second-period plaintiff always files the case exists if and only if $l > \tilde{l}(p)$ follows exactly the same steps, and requires only reversing the direction of inequalities. ■

Lemma 7. *If $l \leq \tilde{l}(\underline{p}_{1,0})$ then there exists a PBE satisfying the D1-criterion, in which the second-period strategic plaintiff never starts the litigation, and the probability of rejecting the offer $s_{1,0}^L$ during the first period negotiation is given by $\underline{p}_{1,0}$.*
If $l \geq \tilde{l}(\bar{p}_{1,0})$ then there exists a PBE satisfying the D1-criterion, in which the second-period plaintiff always files the case, and the probability of rejecting the offer $s_{1,0}^L$ during the first period negotiation is given by $\bar{p}_{1,0}$.
No other PBE satisfying the D1 criterion, in which the decision on filing the case is taken in pure strategies exists.

Proof. Observe that $\bar{p}_{1,0}$ is probability of rejecting the low offer during the first-period negotiation which makes the high-type defendant exactly indifferent between making the offer $s_{1,0}^L$ and $s_{1,0}^H$, conditional on the second-period plaintiff always filing the case.
The proof that if a second-period plaintiff always files the case, then in any PBE satisfying the D1-criterion during the first-period negotiation the low offer is rejected with probability $\bar{p}_{1,0}$ follows the proof of Proposition 2. Hence, the existence condition is a corollary of Lemma 6.
Analogous reasoning applies for the equilibrium in which a second-period strategic plaintiff never starts the litigation. ■

noindent **Proof of Proposition 4** Proposition 4 is proved in lemmas 8 – **??**.

Lemma 8. *If $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently small, Proposition 2 applies.*

Proof. To verify the lemma it is enough to recall the condition for existence of equilibrium described in Proposition 2: (13) and (14), and note that the RHS of both conditions continuously increases in η on $(0,1)$, and it goes to infinity as η goes to 0. ■

Lemma 9. *If $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently large then only pooling PBE of the first period negotiation in which the defendant makes a single offer $s_{1,0}$ independently of the type exist.*

Lemma 10 is proved in claims **??** and **??**

Claim 11. *If $\lambda_H + \lambda_L > \frac{4}{3}$ there does not exist a PBE in which some offer is made by the low type defendant but not by the high type defendant during the first period negotiation.*

Proof. First, observe that if $\lambda_H + \lambda_L > \frac{4}{3}$ then (13) and (14) are violated for $\eta = 1$, hence, there exists a continuum of values of η for which they violated.
Second, observe that if (13) is violated an $l < \underline{l}$ ((14) is violated an $l \geq \underline{l}$ then:

$$\kappa_1^H(\mu) - \kappa_0^H(\mu) < \kappa_1^L(\mu) - \kappa_0^L(\mu). \tag{24}$$

Denote the smallest offer made only by the low type defendant by s^*. Note that s^* needs to be rejected with some positive probability $p(s^*) > 0$, as otherwise the high-type defendant would also make it. Hence, $s^* \leq s_{1,0}^L$. However, s^* needs to be accepted with some positive probability, as otherwise the low type defendant would have a profitable deviation of making an offer $s_{1,0}^H$, which needs to be accepted in any PBE. This result follows from the fact that $s_{1,0}^H < \kappa_1^H(\mu) - \kappa_2^H(\mu)$, and hence, $\kappa_0^L(\mu) + s_{1,0}^H < \kappa_1^L(\mu)$. Thus, $s^* = s_{1,0}^L$.

Denote the smallest offer made by the high type defendant by s'. If $s' = s_{1,0}^H$, then the fact that the equilibrium does not exist follows directly from the proof of Claim 5. Moreover, $s' > s_{1,0}^L$. $s' \neq s_{1,0}^L$ by assumption, and any offer $s < s_{1,0}^L$ is always rejected by the plaintiff, hence the high type defendant would prefer to make an offer $s_{1,0}^H$ which is always accepted by the plaintiff.

In order for the high type defendant not to have a profitable deviation of making an offer s^* the probabilities of rejecting an offer s' and rejecting an offer s^* need to satisfy:

$$p(s^*)\kappa_1^H(\mu) + (1 - p(s^*))(\kappa_0^H(\mu) + s^*) \geq p(s')\kappa_1^H(\mu) + (1 - p(s'))(\kappa_0^H(\mu) + s'). \tag{25}$$

Analogously, in order for the low type not to have a profitable deviation of always making an s' the probabilities of rejecting an offer s' and rejecting an offer s^* need to satisfy:

$$p(s^*)\kappa_1^L(\mu) + (1 - p(s^*))(\kappa_0^L(\mu) + s^*) \leq p(s')\kappa_1^L(\mu) + (1 - p(s'))(\kappa_0^L(\mu) + s^*). \tag{26}$$

■

Condition (25) reduces to: $(p(s^*) - p(s'))(\kappa_1^H(\mu) - \kappa_0^H(\mu)) \geq (1 - p(s'))s' - (1 - p(s^*))s^*$, and condition (26) reduces to: $(p(s^*) - p(s'))(\kappa_1^L(\mu) - \kappa_0^L(\mu)) \leq (1 - p(s'))s' - (1 - p(s^*))s^*$. Hence they can simultaneously hold only if $\kappa_1^L(\mu) - \kappa_0^L(\mu) \geq \kappa_1^H(\mu) - \kappa_0^H(\mu)$, which yields a contradiction.

Claim 12. *If $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently large, there does not exist a PBE in which some offer is made by the high type defendant but not by the low type defendant during the first period negotiation.*

Proof. Denote by s^* the largest offer that is made by the high type defendant but not by the low type defendant. In any PBE there is no offer made on the equilibrium path larger than $s_{1,0}^H$, hence, $s^* \leq s_{1,0}^H$. Moreover $s^* \geq s_{1,0}^H$, since otherwise the offer s^* would be always rejected on the equilibrium path, and the high type defendant would have a profitable deviation of making an offer $s_{1,0}^H$, which is necessarily accepted. Hence, $s^* = s_{1,0}^H$.
Denote by s' the largest offer that is made by the low type defend, and note that $s' \geq s_{1,0}^L$. If $s' < s_{1,0}^L$ it would be necessarily rejected an the low type defendant would have a profitable deviation of making an offer $s_{1,0}^H$. In order for the high type defendant not to have a profitable deviation of making an offer s' the probability of rejection of the offer s' needs to satisfy:

$$p(s') \geq \frac{s^* - s' - \kappa_H^0(\mu)}{\kappa_H^1(\mu) - s' - \kappa_H^0(\mu)}. \tag{27}$$

Analogously, in order for the low type defendant not to have a profitable deviation of always making an offer s^* the probability of rejection of the offer s' needs to satisfy:

$$p(s') \leq \frac{s^* - s' - \kappa_L^0(\mu)}{\kappa_:^1(\mu) - s' - \kappa_L^0(\mu)}. \tag{28}$$

Condition (27) and (28) can simultaneously hold only if $\kappa_1^L(\mu) - \kappa_0^L(\mu) \geq \kappa_1^H(\mu) - \kappa_0^H(\mu)$, which as shown in the proof of Claim **??** does not hold. ∎

Claim 13. *If $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently high there does not exist a PBE in which both the high and low type defendant make multiple offers with positive probability.*

Proof. For such a PBE to exist it would need to be that there exist at least two offers s, s' and corresponding probabilities of rejection of each $p(s)$, $p(s')$ such that both the low and the high type defendant are indifferent in between making those offers. However, this can only happen if $\kappa_H^1(\mu) - \kappa_H^0(\mu) = \kappa_L^1(\mu) - \kappa_L^0(\mu)$, which was shown in the proof of Claim **??** not to hold. ∎

Lemma 10. *No PBE in which an offer $s_{1,0}$ is rejected with positive probability satisfies the D1 criterion.*

Proof. Observe that an offer $s_{1,0}$ is rejected with a positive probability only if $s_{1,0} \leq \mu_{1,h_1} s_{1,0}^H + (1 - \mu_{1,h_1}) s_{1,0}^L$. Moreover, in no PBE $s_{1,0}$ is rejected with certainty, as then the defendant would have a profitable deviation of ensuring the settlement through making an offer $s_{1,0}^H$. Hence $s_{1,0} = \mu_{1,h_1} s_{1,0}^H + (1 - \mu_{1,h_1}) s_{1,0}^L$.

To show that any PBE in which $s_{1,0} = \mu_{1,h_1} s_{1,0}^H + (1 - \mu_{1,h_1}) s_{1,0}^L$ an $p(s_{1,0}) > 0$ fails the D1 criterion, it is enough to show that for an offer $s' = s_{1,0} + \varepsilon$ for ε sufficiently small the high type defendant is eliminated under the D1 criterion. Hence, $\mu(s') = 0$ and s' is always accepted on the equilibrium path. As a result, there is profitable deviation for the low type defendant of making and offer s'.

To prove this result, first, observe that the low type defendant is better-off making an offer s' rather than $s_{1,0}$ if and only if it is rejected with probability $p \leq p^L$, for $p^L L \equiv \frac{p(s_1)(\kappa_1^L(\mu) - \kappa(\mu)_0^L - s_{1,0}) - \varepsilon}{\kappa_1^L(\mu) - \kappa_O^L(\mu) - s'}$.

Second, observe that the high type defendant is better of making an offer s' rather than $s_{1,0}$ if and only if it is rejected with some probability $p \leq p^H$, for $p^H \equiv \frac{p(s_1)(\kappa_1^H(\mu)-\kappa(\mu)_0^H - s_{1,0})-\varepsilon}{\kappa_H^L(\mu)-\kappa_O^H(\mu)-s'}$. Both p^H and p^L are smaller than 1 for ε sufficiently small. Moreover, as $\kappa_1^L(\mu) - \kappa_0^L(\mu) > \kappa_1^H(\mu) - \kappa_0^H(\mu)$, $p^H < p^L$, hence the high type defendant is eliminated for strategy s' under the D1 criterion. ■

Lemma 11. *If $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently large there always exist pooling PBE satisfying the D1 criterion with any $s_{1,0} \in [\mu_{1,h_1} s_{1,0}^H + (1 - \mu_{1,h_1}) s_{1,0}^L, s_{1,0}^H]$, and $p(s_{1,0}) = 0$.*

Proof. First, we show that such PBE exist. Take offer $s_{1,0}$ and set the beliefs of the first period plaintiff at $\mu_{1,h_1}(s_{1,0}) = \mu_{1,H_1}$, $\mu_{1,h_1}(s) = 1$ for all $s \in (\mu s_{1,0}^L, s_{1,0})$, and set any beliefs for other offers

Then, it is always the strategy of the plaintiff to reject any offer $s < s_{1,0}$, and accept an offer $s_{1,0}$ is his best response. Given this strategy, it is a best response of the defendant independently of their type to always make an offer $s = s_{1,0}$. Hence, the belief $\mu_{1,h_1}(s_{1,0}) = \mu_{1,h_1}$ follows the Bayes' rule, and no other event is observed on the equilibrium path.

To verify that these equilibria satisfy the D1 criterion, it is enough to show that the high type defendant is not eliminated for offers $s \in (s_{1,0}^L, s_{1,0})$, and the the plaintiff can hold a belief $\mu(s) = 1$ in an equilibrium satisfying the D1 criterion. Take any $s \in (s_{1,0}^L, s_{1,0})$. The high type defendant is better-off making an offer s than under her equilibrium payoff if the probability of rejection of an offer s satisfies $p(s) \leq p^H \equiv \frac{s_{1_0} - s}{\kappa_1^H(\mu) - \kappa_0^H(\mu) - s}$, and the low type defendant is better-off making an offer s than under her equilibrium payoff if the probability of rejection of an offer s satisfies $p(s) \leq p^L \equiv \frac{s_{1_0} - s}{\kappa_1^L(\mu) - \kappa_0^L(\mu) - s}$. Since $\kappa_1^L(\mu) - \kappa_0^L(\mu) >$
$kappa_1^H(\mu) - \kappa_0^H(\mu)$ if $\lambda_H + \lambda_L > \frac{4}{3}$ and η sufficiently large. Then $p^L < p^H$ and the high type defendant is not eliminated for strategy s under the D1 criterion. ■

Lemma 12. *No other PBE satisfying the D1 criterion exists.*

Proof. The only two candidate equilibria types are a pooling equilibrium with $s > s_{1,0}^H$, and a pooling equilibrium with $s < \mu_{1,h_1} s_{1,0}^H + (1 - \mu_{1,h_1}) s_{1,0}^L$. However, in both candidate equilibria types the defendant would have a profitable deviation of making an offer $s_{1,0}^H + \varepsilon$, which is always accepted by the plaintiff. ■

Proof of Proposition 5 We prove only the existence of a pooling equilibrium in the first period negotiation when η is sufficiently large. The remaining elements of the follow directly from the proofs of Propositions 3 and 4. Proposition 5 is proved in lemmas 13 and 14.

Lemma 13. *If $\eta >$ sufficiently large then there exists an equilibrium in which:*

(i) the second period plaintiff's filing decision is independent from realization of n_2 ,

(ii) the first period negotiation is always secretly settled at a transfer $s_1 \in [\mu_{1,h_1} s_1^H + (1 - \mu_{1,h_1}) s_1^L$.

Proof. Since on the equilibrium path $n_2 = 0$, $\mu_{2,h_2=(0,1)}$ is an out-of-equilibrium belief and it can be set to $\mu_{2,h_2=(0,0)}$. Hence, the decision of the second period plaintiff is independent of n_2 and (i) holds.
Assume during the first period negotiation $\mu_{1,h_1}(s_1,\zeta) = \mu_{1,h_1}$ independently of ζ, and $\mu_{1,h_1}(s,\zeta) = 1$ for all $s \leq s_1$ independently of ζ. And pick any beliefs for other S. Then it is the best response of the plaintiff to accept an offer s_1 and reject any offer $s < s_1$. Hence, it is the best response of the defendant to make an offer s_1. ■

Lemma 14. *Equilibrium described in (13) satisfies the D1 criterion.*

Proof. To show that the equilibrium does satisfy the D1 criterion, it is enough to show that the high type is not eliminated for making any offer $S = (s,\zeta)$ for $s < s_1$ under the D1 criterion.
First, observe that since the decision of the filing decision of the second period plaintiff is independent from n_2 if the choice of ζ is irrelevant. Second take any $s < s_1$ Then, the defendant of type i is better-off making an offer s if it is rejected with probability at most p^i:

$$p^i = \frac{s_1 - s}{\kappa_1^i(\mu) - \kappa_0^i(\mu) - s}. \tag{29}$$

The high type is eliminated from making an offer s only if $p^L > p_H$, which is true only if $\kappa_1^H(\mu) - \kappa_0^H(\mu) > \kappa_1^L(\mu) - \kappa_0^H(\mu) >$. However for that to be the case either (**??**) or (14) needs to hold. But for η sufficiently large and $\lambda_H + \lambda_L > \frac{4}{3}$ both (13) and (14) are not satisfied. Hence, the high type is not eliminated from making an offer S under the D1 criterion. ■

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