

Litigation financing: A Comparative Analysis

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Abstract

In this paper, we analyze three different ways to finance litigation, namely (i) self-finance by plaintiffs, (ii) contingent fees arrangements and (iii) third-party financing. We show how they impact on the access to justice, and on the decision to settle or to go to courts, when claims can be meritorious or frivolous. Our results show that third-party financing does not always facilitate the access to justice for a plaintiff, nor the equilibrium settlement amount, and can even increase the number of frivolous claims as well as the total litigation costs.

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1 Introduction

In Europe, the right for an injured party of a tortious or contractual wrongdoing to receive compensation was granted a fundamental value. The European Court of Human Rights has indeed decided that a credit for damages deriving from a wrongdoing, *i.e.* a liability credit or liability claim, is a good for the purpose of application of Protocol 1 of the Euro-

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pean Convention of Human Rights (Tuil and Visscher [2010]).¹ However, in practice, the implementation of this fundamental right is far from being satisfactory. Several types of losses do not receive compensation because of the practical difficulties and the costs necessary to achieve it. The traditional way for an injured party to seek compensation is to bring a claim directly and individually in court, but legal fees still represent an economic barrier to pursuing a lawsuit. For instance, in Canada, the legal fees of a typical civil case for a three days trial in the Ontario Court is estimated at \$38,200 to the plaintiff (Puri [1998]). These costs can become even higher if we include service of process fees, fees relating to examination of discovery or expert testimony. In the U.S., pursuing a civil action in federal court costs an average of \$15,000, the Federal Judicial Center reported last year. Cases involving scientific evidence, like medical malpractice claims, often cost more than \$100,000.² Recently, experts have estimated that four-fifths of low-income people in the U.S. have no access to an attorney when they need one.³ Last, the 2007 report on the transparency of costs of civil judicial proceedings in the EU shows that high levels of litigation costs are also a concern for the European states.⁴

In such a context, there is a need to find alternative means to fund litigation. Among these means, contingent fees are contracts in which an attorney pays for the litigation costs of a plaintiff. The attorney obtains a percentage of the plaintiff's award if the lawsuit succeeds, but has no compensation if the lawsuit fails.⁵

Third party financing is another way to finance litigation: it is not the plaintiff nor the attorney but some external "for-profit" funders that pay for the plaintiff's litigation costs in exchange for an agreed share of any recovered proceeds. As under contingent fees, the funders get a percentage of the proceeds only if the claim is successful, either in litigation or in settlement, and get nothing if the claim fails.

It is worth noting that third-party financing is not a simple extension of contingent fees

¹ECourtHR 20 November 1995, *Pressos Compania Naverra vs Belgium*, RTD civ. 1996, 1019, JP Margenau for tortious matters, EcourtHR 9 November 1994, *Raffineries Grecques Stranis Stratis Andreabis vs Greece*, RTD civ. 1995, 652, F. Zenati, for damages claims deriving from breach of contracts.

²"Funders Put Money on Lawsuits to Get Payouts", *The New York Times*, 14 November 2010.

³"Addressing the Justice Gap", *New York Times*, 23 August 2011.

⁴The average cost for a civil case in Europe is between 5 000 and 10 000 euros. For more details, see the report on the transparency of costs of civil judicial proceedings in the EU: https://e-justice.europa.eu/content_costs_of_proceedings-37-en.do

⁵This is often referred to as the "no win, no fee" principle. Let us also add that we consider here that the "third party" is a for-profit one. We do not deal with other types of "third parties" as insurance or government. This is consistent with the expression of "third party financing" that is today dedicated to external funders.

arrangements to a larger class of funders. The first difference is that under contingent fees agreements, the attorney retained provides services (*i.e.* he invests his time and resources in prosecuting a case), rather than the funds necessary to procure such services. A second difference is that funders choose to finance litigation with the expectation of a positive return that they compare to alternative investments they could make on the financial market.

The proponents of third-party financing argue that it allows a better access to justice, since it deeply lowers the budgetary constraint of the plaintiffs thanks to the large financial means of the funders. The Jackson report on civil litigation costs⁶, which sought to increase access to justice, gave important public approval for third-party financing: “it may be the most effective means of promoting access to justice for a claim against, say, a multinational pharmaceutical company”. However, as underlined by the report of the Chamber Institute for Legal Reform (ILR [2009a], p.4), increasing the access to courts also “increases the likelihood that any potential defendant will be hauled into court on a meritless claim”. Indeed, critics attack third-party funding on a variety of grounds, including that it increases frivolous lawsuits, is unnecessary, creates conflicts of interest and imperils the relationship between attorneys and clients. The assertion that funding will spawn meritless litigation stems from the belief that funders base their investment decisions on considerations that go beyond the merits of a claim and instead focus on the present value of the expected return. Funders may also be able to tap other funders to finance litigation, securitize litigation costs and sell derivative interests in lawsuits to spread the risk of a frivolous lawsuit among numerous funders.

In this paper, we compare three different ways to finance litigation, namely self-finance, contingent fees and third-party financing. Our comparison aims to establish what are the impacts of each of these systems on (*i*) the number of plaintiffs accessing to courts, (*ii*) the equilibrium settlement amounts, (*iii*) the decision of the defendant to settle or to go to court, and (*iv*) the probability that an uninjured plaintiff decides to file a (frivolous) claim. We do not aim to explore all possible ways to finance litigation, nor to seek to determine which of these financing systems would be the most socially efficient. We only focus on how third-party financing (whose potential introduction in several countries raises a lot of debates) leads to different incentives for plaintiffs to file a claim, and for defendants to

⁶Lord Justice Jackson, Review of Civil Litigation Costs, April 2010, para 4.4.4.

settle or not, compared to self finance or contingent fees arrangements. This allows us to bring some parts of answers to the current debates about third-party financing: Is it a better way to finance litigation? Does it benefit more to frivolous claims than meritorious ones?

To address these issues, we propose here a model where claims can be either meritorious or frivolous. Following Katz [1990] and Miceli [1994], we define a “frivolous lawsuit” as a suit that has sufficiently low chance of prevailing at trial so that it would not be brought but is filed only in the hopes of obtaining a favorable settlement. In other words, a frivolous lawsuit is “that of an uninjured plaintiff obtaining a payment to which he is not entitled, at the expense of an uninformed defendant” (Katz [1990]). It occasions rent-seeking and may lead to waste resources.⁷ Let us also mention that our analysis does not address suits in which the prospect of judicial error or jury confusion at trial permits a plaintiff to obtain a settlement that is undeserved according to some external normative standards. Instead, as the previous literature we mention, we take a strictly positive view of the law and treat all suits expected to prevail at trial as genuine. In the same way, we do not consider suits that turn out *ex post* to have little basis in law, but that *ex ante* seemed plausible.

To explain how an uninjured plaintiff may be offered a positive amount in settlement, we propose a model of asymmetric information. More precisely, we assume that the defendant may face two types of plaintiff: a truly injured one and an uninjured one. The plaintiff and his attorney know whether the claim is frivolous or meritorious, so that the defendant is the only agent who cannot distinguish between a frivolous and a meritorious one. We show that under each litigation financing system, two types of equilibria appear, according to the defendant’s belief of the probability that the claim is meritorious. Our results highlight that the higher the rate of return on capital the funders require under third-party financing, (i) the lower the probability that a plaintiff accesses to court is, and (ii) the lower the equilibrium settlement amount offered by the defendant is. As a consequence, (iii) the higher the probability that the defendant decides to settle rather than to go to court is, and (iv) the higher the probability that an uninjured plaintiff opens a file with the hopes of obtaining a settlement is. This allows us to show that third-party financing may be more beneficial to frivolous claims than meritorious ones, and that it may even

⁷See Katz [1990] for examples of direct and indirect costs caused by frivolous lawsuits (resources used in filing and defending such meritless suits, costs of investigation to distinguish frivolous and genuine claims, additional trials).

lead to higher total litigation costs under some conditions.

The basic theoretical framework of our model is inspired by Katz [1990] and Miceli [1994]. Katz [1990] presents a model that explains frivolous suits as a result of defendant uncertainty regarding the merits of plaintiffs' claims. Miceli [1994] compares two types of litigation financing, namely hourly fees paid by the plaintiff and contingent fees arrangements, when claims can be either meritorious or frivolous. We extend this framework into two directions: first, we introduce a third type of litigation financing, *i.e.* third-party financing under which external funders finance the claim. Second, we introduce a cost constraint on the plaintiff: while Miceli [1994] assumes that a plaintiff can always afford to go to court, we rather consider that a plaintiff cannot finance the cost to go to court above some threshold. This allows us to show that each financing system has two kind of distinguished impacts: an impact on the probability to *access* to courts, and an impact on the probability that a *frivolous* claim arises, while Katz [1990] and Miceli [1994] focus only on the last consequence, without regarding the problem of access to justice for a credit-constrained plaintiff. It seems to us that both effects have to be taken into account to really assess the net impact of contingent fees arrangements and third party financing. Up to now, many papers in the law and economics literature have wondered how to finance litigation (Heyes et al. [2004], Kirstein and Rickman [2004]). Legal aid (Dnes and Rickman [1998], Rickman et al. [1999], Garoupa and Stephen [2004], George [2006]) and insurance (Faure and De Mot [2011], Hylton [2011]) have already been explored. Contingent fees have also been deeply studied (Dana and Spier [1993], Rubinfeld and Scotchmer [1993], Emons [2000], Emons and Garoupa [2006], Emons [2007], Fenn and Rickman [2010], Cotten and Santore [2012]). Third-party financing (as the funding of litigation by external investors) has drawn far less attention. Our paper thus contributes to the emerging economic literature on this topic. Chen and Abrams [2012] is the first empirical paper about third-party financing. Using two sources of variation - *de jure* status of third party litigation funding in different Australian states as well as variation in third party litigation funding from the largest litigation funding firm in Australia - they find evidence that litigation, court caseloads, and court expenditures increase with third party funding. Rubin [2010] shows how overall increasing third party financing of litigation is likely to be harmful, since it would increase external costs such as the costs imposed on defendants. In addition, the type of lawsuits that would likely result from increased third party investment would

probably move the legal system away from efficiency. Lyon [2010] looks at how potential negative consequences of third-party financing can be effectively addressed through enforcement of existing ethical and procedural guidelines or by adoption of new regulations. Considering that the interest rates funders charge reflect the funder's information about the strength of the plaintiff's case, Avraham and Wickelgren [2012] analyze a signaling model in which the plaintiff can introduce its funding contract as evidence. They show that there exists a separating equilibrium in which the funder's information is fully-revealed. Demougin and Maultzsch [2012] propose to study other agency problems that can be raised under third-party financing, especially between the funder and the attorney. They determine how a combination of contingency fees and third-party financing may be the best way to overcome agency problems and financial constraints of would-be plaintiffs who would like to pursue meritorious claims. Their paper deals with how to discipline attorneys while we rather focus on the consequences of third-party financing on the plaintiffs' behavior, and do not introduce agency relationship.

Instead of focusing on the conflict of interest between the three-player (the attorney, the litigant and the funder), we consider here the opportunity cost to raise funds. This original perspective has been little developed up to now, and we show why it matters as it directly impacts on access to justice for the plaintiffs and on their decision to settle or to go to court.

The rest of the paper is organized as follows: in section 2, we describe the different ways to finance litigation, and we underline more precisely the benefits and costs of third-party financing. We also justify in this section why third-party financing leads to a higher opportunity cost to raise funds. In section 3, we compare the types of litigation financing when claims are meritorious. In section 4, we consider that claims can be either meritorious or frivolous. In section 5, we compare the financing systems to see which one benefits more to meritorious claims than frivolous ones. Section 6 concludes.

2 How to finance litigation?

2.1 To overcome cost barriers

Many victims do not have sufficient financial resources to meet the costs of a court case or legal representation. To deal with this problem, some countries provide with legal aid. The right to legal aid is enshrined by the European Convention on Human Rights (ECHR) (Article 6 (3)(c)) and guarantees the right to legal assistance where the defendant has insufficient means to pay for it. The Charter of Fundamental Rights of the European Union (Article 47) also stipulates that legal aid shall be made available to those who lack sufficient resources in so far as such aid is necessary to ensure effective access to justice. In the U.S., the Legal Services Corporation, created by Congress, gives out federal grants that provide the bulk of support for legal aid to the poor. It allocates the funding to State Legal Aid Services Offices across the United States. Over the decades, that budget has shrunk: it was \$404 million in 2011, about one-third less than it was 15 years ago, adjusted for inflation. The House Appropriations Committee has proposed reducing that to \$300 million for 2012.⁸

Then, in the U.S. as in Europe, legal aid is generally available only to the very poorest.⁹ Most of the plaintiffs have then to self finance their claims, or give up the idea to be represented by attorneys.

Many alternative financing systems have yet developed to help victims to file a claim. Among these systems, contingent fees arrangements foresee that the attorney gets a share of the proceeds if his client wins and nothing if his client loses. Contingent legal fees are widely used in the US. In around 87% of all torts and 53% of all contractual issues plaintiffs retain their attorney on a contingency basis (Kritzer [1990]).

In Europe, contingent fees were strictly forbidden during a long time. However, things begin to change. In 2007, Germany's constitutional court ruled that Germany's ban on contingency fees is unconstitutional.¹⁰ The UK government made a series of announce-

⁸Source: "Addressing the Justice Gap", New York Times, 23 August 2011.

⁹More than 50 million Americans are eligible to receive civil legal aid from LSC-funded programs (...) Most are at or below 125 percent of the federal poverty level threshold, an income of approximately \$25,000 a year for a family of four (*Source*: <http://legalaid.uslegal.com/>). In Europe, there are many differences among the Member states. As an example, in 2012, in France, legal aid is provided for people whose average net mensual income is below 929 euros.

¹⁰The court directed the German Parliament to amend its law accordingly, but it seems that the Parliament never made the amendment.

ments on 30 March 2011 about major reforms of funding and reform of the civil justice system.¹¹ One of these reforms is the introduction of contingent fees arrangements in civil litigation. In many other European countries as France, Belgium or the Netherlands, contingent fees arrangements are not allowed but under discussion (Faure et al. [2010]).¹²

Recently, a new way to finance litigation has emerged. “Third-party financing” or “litigation financing” corresponds to the funding of litigation by an external investor who has no pre-existing interest in the litigation, usually on the basis that (i) the funder will be paid out of the proceeds of any amounts recovered as a consequence of the litigation, often as a percentage of the recovery sum; and (ii) the funder is not entitled to payment should the claim fail.

Traditionally, third party involvement in litigation was prohibited in common law as well as in civil law countries. The most interesting change concerns Australia. In this country, which does not permit contingent fees, third party litigation funding has been tolerated since the 1990s in some contexts, such as the disposition by liquidators or trustees in bankruptcy of an insolvent’s causes of action. More recently, the scope of litigation funding has recently expanded with the emergence of funders who support general commercial litigation with no interest other than the potential for a commercial return on investment. In the U.S., the legal status of third-party financing is far from clear (Lyon [2010]). The common law doctrines of maintenance and champerty¹³ make the legality of third-party financing uncertain in many states. However, some state courts (as in Maine or Ohio) have begun to make third-party financing possible, by enacting legislation setting requirements for contracts between litigation financing companies and consumers. England and Wales have recently embraced third party litigation financing, and the industry has kept on growing, financing insolvency cases, commercial litigation and arbitration, group litigation as well as professional negligence cases (but not personal injury cases) (ILR [2009b]). While

¹¹These broadly follow the recommendations of the 2010 *Review of Civil Litigation Costs* by Lord Justice Jackson and the *Report Common Sense, Common Safety* by Lord Young of Graffham.

¹²Some European countries have started to allow for conditional fees that are agreements under which the attorney gets an upscale premium if the case is won and nothing if the case is lost. However, this premium is unrelated to the adjudicated amount as under contingent fees arrangements. (See Emons [2007] for a comparison between contingent and conditional fees). Success fees may also be allowed in some countries: they make the attorney fees partly (but not solely) dependant on the success of the claim. Last, third-party financing is sometimes allowed to finance arbitration, but still not to finance litigation.

¹³Following Shukaitis [1987], “maintenance” is defined as a situation where a person “without interest” in a suit assists a party in litigation. “Champerty” is maintenance plus an agreement to share in the proceeds of the suit.

third-party financing is flourishing in the U.K., the practice does not appear yet to have crossed the English Channel to the rest of Europe. In many European countries (as in France, Italy, Spain, Sweden, Austria or Belgium), law does not appear to prohibit third party financing¹⁴, but the practice is rare or even non-existent. The industry of third-party financing is yet currently developing in Germany, but is mainly oriented to the funding of cases outside Germany.¹⁵

In all of these countries, there are lively debates about the opportunity to introduce third-party financing (Garber [2010]). There is then a need to deeply understand the potential benefits and costs of this practice.

2.2 Third-party financing: the potential benefits

Through third-party financing, individuals or firms with no direct interest in a particular claim can buy at least a fraction of that claim. Then, third-party financing can be regarded as a market for buying and selling lawsuits, creating a market for the production of justice (Chen and Abrams [2012]). The main expectation is to allow credit-constrained plaintiffs to access to justice, and thus contributing to reduce litigation undersupply. Collecting data from the largest third party litigation funding firm in Australia, and other data from courts and administrative agencies, Chen and Abrams [2012] finds evidence that litigation increases with third party financing (as well as court caseloads and court expenditures). In addition, third-party financing could serve to remedy a longstanding imbalance of power that favors defendants. For instance, when an individual plaintiff files a claim against a corporate defendant, financial disparities often represent a barrier to victory for the plaintiff. Third-party financing contributes to place the litigant on a more stable financial

¹⁴For instance, in France, article 1597 of the French Civil Code prohibits judges, attorneys and other legal professions to acquire lawsuits, rights and credits of action which are of the jurisdiction of the tribunal where they exercise their profession. This article of the Civil Code, which provision has not changed since 1804, has been enacted officially for the purpose of preventing speculation. However, had this provision been enacted in fear of speculation over liability claims, the prohibition should not have only concerned some specific professions, but everyone striving for investing in liability claims. The real reason for this prohibition is the protection of the image of the justice in the society. Therefore, nothing prevents interpreting Article 1597 of the French Civil Code a contrario and admitting in principle the legality of the assignment of a liability claims. Case law has not had the chance to rule on the issue, but the most eminent authors seem to admit the legality of assignment of liability claims without trouble. However, it shall be acknowledged that, only after a complex analysis, one can conclude of the legality of their assignment.

¹⁵ The most representative litigation funding company is Allianz ProcessFinanz, that has funded cases including copyright, contract, labor and employment, trade, corporate, insolvency and commercial matters. In 2007, only 0,4% of cases used third-party financing in Germany as for Jackson LJ *Review of civil litigation costs: Preliminary Report* (2009, p. 564).

footing.

Let us also note that third-party financing is sometimes referred to as a “non-recourse loan” because the lender has no claim for repayment if the suit does not eventually succeed. But the most significant difference among plaintiffs’ lenders is not in the type of loan offered but in the size and scope of investment. “Loans to individuals with tort claims are typically measured in thousands or tens of thousands of dollars, offset by damages awards that tend to peak in the low hundred thousands (...) By contrast, commercial claim finance is a more rarefied world with fewer players in the market and significantly higher stakes. The litigant on both sides are typically corporate entities, and funding can reach up to \$ 15, 000, 000 on cases valued at \$ 100, 000, 000 or more” (Lyon [2010]). This illustrates how third-party financing may help to overcome the cost barrier between a credit-constrained plaintiff and a defendant with larger financial resources.

Some other benefits are expected. For instance, risk adverse individuals could decline to pursue positive expected value claims, and a transfer of a claim from a risk-averse to a risk-neutral party should yield an increase in total claims pursued. Some claim holders can also be unaware that they possess a meritorious legal claim, and third-party financing provides the funders with the incentives to locate and provide information to those unaware claim holders.

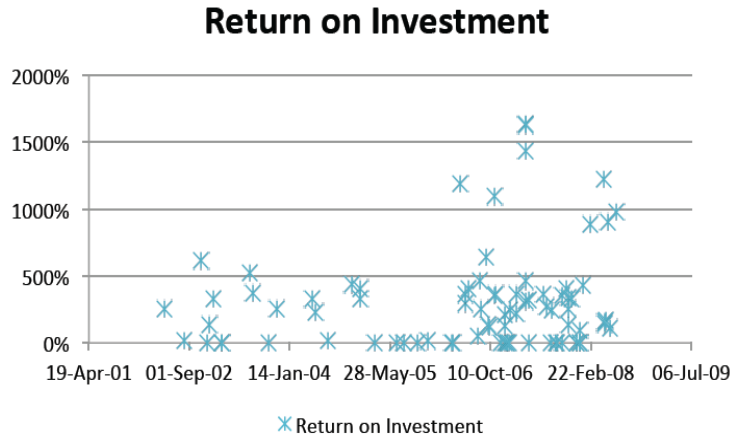
Let us also add that there is undoubtedly a market for litigation finance. Companies¹⁶ that have begun offering such services have enjoyed favorable results. Third party funders generally seek anywhere from 20% to 50% of the claimant’s recovery (ILR [2009b]), which can constitute a return on investment - and an effective interest rate on the loan - upward of 200%.¹⁷ The company Juridica, based in the U.K., invests in commercial cases and mainly in the U.S. It raised £74 million in its december 2007 initial public offering on the London Stock Exchange’s small companies market and another £33,2 million with a second offering in 2009 (ILR [2009a]). Its 2010 annual report mentions that the company received proceeds totalling approximately US\$ 6.6 million related to four investments that year. Another example comes from IMF that is the largest litigation funding firm in the

¹⁶Names in the industry are (among others) Allianz ProzesFinanz, Harbour Litigation Funding, IM Litigation Funding, Juridica Capital Management, Burford Capital Limited, Credit Suisse.

¹⁷Julia H. McLaughlin, Litigation Funding: Charting a Legal and Ethical Course, 31 *Vt. L. Rev.* 615, 620-21 (2007) (explaining that the financier’s share of any recovery can be more than 200% of the amount financed).

Australian market. It is listed on the Australian stock exchange, and holds a portfolio of litigation investments (as of early 2007) with a total value of A\$1 billion. The following figure shows the achieved rates of return on investments of this firm:

Figure 1: IMF Return on investments (Chen and Abrams [2012])



2.3 Third-party financing: the potential costs

In spite of these potential benefits, third-party financing also leads to serious concerns and difficulties.

The first concern is about the possible increase of meritless claims. Under contingent fees, the attorney fees depend on the success of the claim, so that attorneys have few incentives to spend their time on cases that are unlikely to be successful. Conversely, because third-party litigation financing increases the overall financing available for litigation and reduces the attorney’s own risk, the disincentives for bringing frivolous claims may be lowered. This danger may be all the more worrying as “funding companies are able to securitize their litigation loans or otherwise sell any derivative interest in them in the capital markets. In such circumstances, the financiers would have little incentives to investigate whether the claims they finance are frivolous, because the risk of loss would be spread among hundreds of thousands, if not millions, of funders” (ILR [2009b]).

Since the main interest of the funders is their expected return on investments, they may also be willing to finance claims with a low probability of success but a high potential

amount of recovery.¹⁸ Quoting a technical director of a hedge fund, the report of the *Chamber institute for Legal Reforms* (ILR [2009a], p. 3) states that “*In a typical case[,] a hedge fund, acting on behalf of already wealthy funders, will seek to accumulate yet more money (...) by gambling on the outcome of a legal action for damages. They have no interest in the justice or otherwise of the case -only in the chances of success - as they will demand a share of the damages awarded in return for putting up the stake money*”. Such a strategy may be particularly profitable if the defendant prefers to settle rather than to go to court to question the merits of the claim.

A second concern is that the development of third-party financing is also seen as creating a compensation culture driven by profit-seeking financial entities trafficking in legal claims (Veljanovski [2011]). Third-party financing is not insurance but investment: it draws the attention of funders because it is uncorrelated with other asset classes and perhaps mildly counter-cyclical, and offers high (but risky) awards. In the U.K., the value of the claims that are funded tends to be high. Some other funders have guidelines with others strict minimum thresholds. Only claims with a financial remedy are funded. Actions for specific performance and injunctive relief were not considered for the obvious reason that there was no financial outcome in which to share.

Last, a third concern is that the participation of a funder as a third party is likely to cause higher transaction costs than in a two-party scenario like a conventional attorney-client relationship. Transaction costs are here considered as the costs spent to organize the three-player contractual relationship.

The reasons why transaction costs should be higher are the following ones:

- In many countries where third-party financing is allowed, two contracts are signed: one between the plaintiff and her attorney and another contract between the plaintiff and the funder.¹⁹ This raises contracting costs compared to contingent fees where there is only one contract between the plaintiff and her attorney.
- Bargaining costs should also increase under third-party financing compared to other

¹⁸As Mick Smith of third party litigation funder Clunius Capital has observed: “the perception that you need strong merits is wrong - there’s a price for everything” (ILR [2009b], p.12).

¹⁹See for instance Demougin and Maultzsch [2012] (p.2-3) and Winter et al. [2008] (pp. 34-35) that describe the legal structure of third-party financing in Germany. Demougin and Maultzsch [2012] also mention that “it does not come as a surprise that some litigation financing contracts usually include an additional fee in favor of the attorney who has not only to communicate with his client but also with the financier” (p.6).

financing systems, since many aspects of the relationship with the financier have to be negotiated, such as the sharing of the control (and the right to decide) over the claim.²⁰

- Another factor of cost increase comes from the litigation risk assessment the funders have to make. While attorneys have obvious expertise in evaluating the meritoriousness and settlement value of litigation, other potential funders need to hire attorneys to conduct this inquiry for them. The risk assessment depends on quite a few uncertain variables: the facts, the current law, the jury pool, the presiding judge, the skills and incentive structure of the opposing counsel, risk aversion of the opposing party, and more generally his incentive to settle (Faure and De Mot [2011]). A detailed analysis of the merits of a claim would lead to high administrative costs.
- Last, during all the procedure, the decision-making is shared between the plaintiff and the funder, which is likely to create conflicts.²¹ The interests of the three parties (the plaintiff, the financier and the attorney) may diverge, and solving such conflicts is time-consuming and costly (Waye [2007]). Timothy Hart, Vice President, Accounting & Financial Consulting for Huron Consulting Group, has said that clients may have to relinquish some decision-making authority to the funder and that “the client’s interests may diverge from the funder in that other business reasons may suggest that they might settle a claim for less than the funder has targeted” (ILR [2009a]). Conflicts could also arise between the funders and the attorney, if a third-party financier directs or regulates the attorney’s professional judgment (ILR [2009a,b]).

All these reasons suggest that third-party financing is much more costly to organize than a traditional bilateral relationship. Investors will select claims that are “profitable” enough to overcome these costs. For this reason, they ask a higher “rate of return” when they finance a claim than the rate an attorney could require under contingent fees.

²⁰Among those aspects, the *Code of conduct for litigation funders*(2011) published by the association of Litigation Funders in England and Wales mentions that the agreement between a plaintiff and a financier shall state whether (and if so how) the funder may provide input to the Litigant’s decisions in relation to settlements and terminate the contractual agreement.

²¹In 2006, in *Campbells Cash and Carry Pty Ltd v. Fostif Pty Ltd*, a five-to-two majority of the Australian High Court held that a third-party funder may exercise significant control over the litigation, and that this control is not an abuse of process and does not offend public policy in states that have abolished maintenance and champerty as crimes and torts.

In the following sections, we modelize such a view. We first show how the financing systems impact on the equilibrium settlement amounts when all cases are known to be meritorious (section 3). Then, we assume that the claims can be either meritorious or frivolous (section 4).

3 Financing of Litigation when claims are meritorious

3.1 The theoretical framework

We consider a plaintiff who initiates a claim by filing a lawsuit at an initial cost f . This amount includes the cost of preparing and filing a complain and making the fact of the lawsuit known to the defendant. Once the suit has been brought, this initial cost is sunk and does not affect the decision to go to trial. A settlement period follows during which the plaintiff and defendant, through their attorneys, attempt to negotiate a settlement. The attorney costs of this period are R_p and R_d for the plaintiff and defendant, respectively. As in Miceli [1994], we assume that these costs are time costs that the attorney incurs whether or not a settlement is reached. If a settlement is not reached, the case is either dropped or goes to trial. If it goes to trial, the plaintiff and defendant incur additional attorney costs of C_p and C_d . At trial the plaintiff expects to receive a damage D if the lawsuit succeeds. Our theoretical framework involves the following important assumptions:

- The expected damage exceeds the plaintiff’s filing plus attorney costs, so that a claim is always worth being filed, even if it goes to court: $D - C_p - R_p - f > 0$. We make this assumption to focus on the impact of the different litigation financing systems for a claim that deserves to be filed. Then, we take for granted that the plaintiff deserves to be compensated for his injury.²²
- The plaintiff and the defendant incur no other costs apart the attorney fees, and there is no disagreement between the plaintiff and the defendant over the expected judgment at trial (the expected value D) or the costs of trial (C_p and C_d). Information

²²In other words, our concern is not to know whether it is socially efficient or not to file a claim. As discussed in the conclusion, we follow to some extent the U.S. Supreme Court’s observation about the “great benefits” of attorney advertising in *Bates* (*Bates v. State Bar Ariz.*, 433 U.S. 350, 376 (1977)) and make it applicable to our framework: “ Although [it] might increase the use of the judicial machinery, we cannot accept the notion that it is always better for a person to suffer a wrong silently than to redress it by legal action”.

about the costs and the expected damage is then symmetric.²³

- The market for attorneys is a competitive market: attorneys are identical in ability and their identity does not impact on the size of the damage at trial. Then, the plaintiff's attorney expects to earn zero profits, regardless of the fee arrangement. This assumption is made to isolate the impact of the fee arrangement on the disposition of a case.²⁴
- During the settlement period, the defendant makes a take-it-or-leave-it settlement offer. The assumption of a single offer from the defendant is a restrictive one, but we abstract from this issue because our main goal is not to provide a general solution to the bargaining problem, but to see what determines the decision to settle or to go to court.
- The plaintiff and the defendant support their own litigation costs.²⁵
- Last, to underline the problem of cost barriers to access to justice, we impose some cost constraints on the plaintiff to go to court. The cost to go to court for the plaintiff C_p is distributed among a probability density function z on $[C_p^{min}, C_p^{max}]$, with $0 < C_p^{min} < C_p^{max}$. Its value is determined before the plaintiff initiates the claim, and known by all. The variety of possible costs may reflect the variety of possible injuries the plaintiff may suffer from, and then the different types of claims he may hold (even if the claim is meritorious in each case). In other words, for a same expected damage D if the case goes to court, the cost to go to trial may be different according to the type of injury.

We assume that a plaintiff can self finance the initial cost to file a lawsuit f and the litigation costs during the settlement R_p . However, he can finance the cost to go to court C_p up to an amount \bar{C} (known by all) so that $C_p^{min} < \bar{C} < C_p^{max}$.

Then, when $C_p > \bar{C}$, the plaintiff cannot finance on his own the litigation, and then does not initiate the claim since he has no credibility to threat to go to court (unless he chooses one of the two other litigation financing). Under contingent fees

²³We deserve information asymmetries for the section 4. These asymmetries will bear on the nature of the claim (frivolous or meritorious) that is unknown to the defendant.

²⁴The assumption of a competitive market for attorneys has been subject to some debates: see Osiel [1990], Hadfield [2000], Crabdall and Winston [2011].

²⁵In other words, we do not consider the so-called British rule for the allocation of litigation costs, whereby the loser pays the legal costs of the other party.

arrangements, the attorney can finance the litigation costs R_p and the cost to go to court C_p until an amount \bar{C} (also known by all), with $C_p^{max} > \bar{C} > \bar{C}$. Last, under third-party financing, the funders may finance R_p and C_p with no cost constraint on C_p .

We make the simplifying assumption that the cost to go to court for the defendant (C_d) is constant so as to focus only on the barrier to access to justice for the plaintiff when the cost C_p is high.²⁶ Then, in our model, the claim can be that of a corporate defendant and an individual plaintiff.

The timing of the game is as follows:

1. An injury occurs to the plaintiff and the parties learn the cost $C_p \in [C_p^{min}; C_p^{max}]$ to go to court for this injury.
2. The plaintiff decides to file a claim at cost f or not.
3. The attorney costs R_p and R_d have to be paid.
4. The settlement period occurs.
5. If the settlement fails, the plaintiff can drop or decide to go to court, and then pays the attorney costs C_p . The defendant's attorney costs to go to trial are C_d (a constant).
6. The judgement is made and the plaintiff receives a damage D whenever the claim is meritorious.

In the following subsections, we examine the decision to settle or to go to trial under each type of litigation financing when claims are known (by all the parties) to be meritorious. (Possible frivolous claims will be introduced in section 4).

²⁶As many other contributions on third-party financing, we explore only funding of plaintiffs' expenses because the methods and mechanisms of plaintiff-side lending are somewhat different than those on the defense side, and the market is significantly more developed (Lyon [2010], Molot [2009]).

3.2 Equilibrium under self finance

Let us first consider the case where the plaintiff self finances his claim. We first determine the probability with which the plaintiff can access to justice (subsection 3.2.1) and then the equilibrium settlement amount (subsection 3.2.2).

3.2.1 Access to justice under self-finance

Because of the cost constraint, the plaintiff can credibly threat to go to trial only when $C_p \leq \bar{C}$. Since the plaintiff's cost to go to court is distributed according to the probability density function z , he can afford to go to court with a probability $x_S = \int_0^{\bar{C}} z(C_p) dC_p$. If he cannot credibly threat to go to court (with probability $(1 - x_S)$), the defendant is able to anticipate it and will make no offer during the settlement, so that the plaintiff prefers not to file his claim (that costs f).²⁷

3.2.2 Equilibrium settlement amount

To determine the settlement amount if the claim is filed (with probability $x_S \in (0, 1)$), the game is solved by reasoning backwards from its last stage, where the plaintiff must choose between accepting the defendant's offer S or going to trial.

When going to trial, the plaintiff gets an amount D of damages since his claim is meritorious. In the previous stage, *i.e.* in the settlement period, the defendant offers a settlement amount S_S equal to the lowest amount the plaintiff will accept rather than go to trial.²⁸ This amount is found by equating the marginal value of a trial for the plaintiff, $D - C_p - R_p - f$, with the value of a settlement, $S_S - R_p - f$. Thus,

$$S_S = D - C_p \tag{1}$$

where S_S is positive by since $D - C_p - R_p - f > 0$. Notice that neither the attorney's fee for the settlement period (R_p) nor the filing cost f affect S_S since they are sunk at the

²⁷Since the goal of this paper is to compare the litigation financing systems for credit-constrained plaintiffs, we implicitly consider that they cannot borrow money. In other words, $D - \bar{C}_p - R_p - f - r(C_p - \bar{C}_p) < 0$ where r is the interest rate. Avraham and Wickelgren [2012] and Grous [2006] also mention that borrowing money from traditional lenders is generally unavailable for plaintiffs that are likely to use third-party financing, and we focus here on those types of plaintiffs.

²⁸We assume that when the plaintiff is indifferent between going to court and settling, he chooses the settlement.

point the plaintiff must accept or reject the offer. In contrast, because the plaintiff avoids paying the trial fee (C_p) by settling, the defendant reduces his settlement offer by that amount. Given (1), the plaintiff's net return from the suit is $D - C_p$ which just equals her expected return from going to trial. This reflects the assumption that the defendant extracts all of the surplus from the settlement.

Lemma 1. *Under self-finance, some meritorious claims are not filed because of potential cost barriers. When the costs of litigation do not prevent the access to court, then parties prefer to settle than to go to court to save on additional attorney costs.*

3.3 Equilibrium under contingent fees arrangements

Under contingent fees arrangements, the attorney bears the litigation costs, and obtains a percentage of the plaintiff's award if the lawsuit succeeds.

3.3.1 Access to justice under contingent fees arrangements

The highest amount of cost the attorney can bear is $\bar{C} > \bar{C}$. Then, under contingent fees, the plaintiff can access to court with a probability $x_{CF} = \int_0^{\bar{C}} z(C_p) dC_p$. Since $\bar{C} > \bar{C}$, then $x_{CF} > x_S$. This can be interpreted very intuitively: the attorneys can support higher litigation costs than the plaintiff, so that there is a higher probability that the claim is financed under contingent fees arrangements than under self-finance.²⁹

3.3.2 Equilibrium settlement amount under contingent fees arrangements

We denote $\beta_s \in (0, 1)$ the percentage of the recovery the attorney gets when the claim is settled, and $\beta_t \in (0, 1)$ the share he gets when the case goes to trial.³⁰

The expected payoff of the plaintiff when going to trial is then $(1 - \beta_t)D$. By denoting S_{CF} his expected return when accepting a settlement, the condition for the equilibrium

²⁹As under self-finance, we rule out the possibility for the attorneys to borrow money at interest rate r . See section 6 for discussion.

³⁰The rate the attorney gets is not the same if the case is settled or goes to court. The American Bar Association (ABA) *Model Rules of Professional Conduct* adopted by the ABA House of Delegates in 1983 states that "a contingent fee agreement (...) shall state the method by which the fee is to be determined, including the percentage (...) that shall accrue to the attorney in the event of settlement, trial or appeal" (Rule 1.5). Emons [2000] (p.21) mentions that "in a typical tort case in the United States, the plaintiff's attorney (...) gets one third if the case is settled without trial, 40% if the plaintiffs wins a trial, and 50% if a judgement for the plaintiff is affirmed on appeal".

settlement amount becomes:

$$(1 - \beta_s)S_{CF} = (1 - \beta_t)D \quad (2)$$

At equilibrium, the condition for zero profit for the attorneys operating in a competitive market allows to determine the percentage of recovery they get. The net payoff of a attorney in case of settlement is $\beta_s S_{CF} - R_p$ so that $\beta_s = \frac{R_p}{S_{CF}}$. In the same way, an attorney gets $\beta_t D - R_p - C_p$ when going to trial, so that $\beta_t = \frac{C_p + R_p}{D}$.³¹ Then,

$$\begin{aligned} (2) \Leftrightarrow S_{CF} &= \beta_s \times S_{CF} + D - \beta_t D \\ &= R_p + D - C_p - R_p = D - C_p \end{aligned}$$

When comparing S_S and S_{CF} , it comes that $S_S = S_{CF}$: the equilibrium settlement amount does not change with the payment structure of the attorney.

Lemma 2. *Under contingent fees arrangements, the probability for an injured plaintiff to access to justice is higher than under self-finance (but is not equal to one), and the equilibrium settlement amount is the same than under self-finance litigation.*

3.4 Equilibrium under Third-Party Financing

Under third-party financing, some external funders finance the claim, and get back a share of the proceeds if the claim is settled or goes successfully to court. However, such a financing may be more costly, for two main reasons:

- The implication of a third party raises new costs (considered here as transaction costs): Coordinating three parties (the funder, the attorney and the plaintiff) is more costly than managing a bilateral relationship, as described in subsection 2.3. Two contracts need to be approved and signed, bargaining and administrative costs are likely to increase as well as costly potential conflicts. External investors only finance claims whose “profitability rates” are high enough to finance these costs (beyond the

³¹Note that in this case, β_t is hypothetical since no case goes to trial. However, it must be defined in theory so that S_{CF} can be derived. Moreover, the plaintiff is willing to enter into the agreement since his remaining gain $(1 - \beta_t)D$ allows him to pay for the cost f to file a claim: $(1 - \beta_t)D = D - C_p - R_p \geq f$. In the same way, at equilibrium, $(1 - \beta_s)S_{CF} \geq f$ so that the “participation constraint” of the plaintiff is fulfilled.

litigation costs). To illustrate this point, McLaughlin [2007] (p.621) states that “the litigation-funding industry carries heavy costs”, and many legislatures mention that the rate of return asked by the funders has to take into account those direct and indirect charges.³²

- The opportunity cost of the funders is likely to be higher than that of an attorney: funders may more easily diversify their investment and may require the same rate of return on capital they could earn in an alternative investment of equivalent risk.³³

Because of these two reasons, we assume that the funders require a minimal rate of return on capital $k \geq 0$ to finance a claim. Under this assumption, let us determine the access to justice and the settlement amount when the claim is financed by third parties.

3.4.1 Access to justice under third-party financing

We denote $\gamma_s \in (0, 1)$ (resp. $\gamma_t \in (0, 1)$) the share of the recovery required by the funders if the claim is settled (resp. if the case goes to trial).³⁴ The funders agree to finance a claim if:

$$\frac{\gamma_t D - R_p - C_p}{R_p + C_p} = k \quad (3)$$

(3) can be interpreted as the participation constraint of the funders, and can be rewritten as follows:

$$\gamma_t = \frac{(k + 1)(C_p + R_p)}{D} \quad (4)$$

However, for the plaintiff to agree to sign an agreement with the funders, his remaining share of the recovery has to be high enough to allow him to cover his cost to file a claim

³²For instance, in Nebraska (see Legislative Bill 1094) or the Maine Legislature (Public Law, chapter 394, H.P. 1186 - L.D. 1703, 123rd Legislature).

³³Without providing technical details that would be beyond the scope of this paper, the funders determine the rate of return they require by comparing the investment in litigation to other comparable investments with similar risk profiles to determine the “market” cost of capital. It is commonly equated using the CAPM (capital asset pricing market) formula.

³⁴In the U.K., these rates range between 20 % and 40 % of the award/settlement, and in some cases 50 % or higher. In Australia, rates are between 30 % and 60 % (Veljanovski [2011], p.22).

f , *i.e.* if:

$$(1 - \gamma_t)D - f \geq 0 \Leftrightarrow \gamma_t \leq \frac{D - f}{D}$$

$$\Leftrightarrow \gamma_t \leq 1 - \frac{f}{D} \quad (5)$$

Combining (4) and (5) leads to:

$$D - (k + 1)(R_p + C_p) - f \geq 0 \quad (6)$$

From (6), only meritorious claims that are profitable enough can be financed under third-party financing. When the expected damage by going to court is D , the funders will agree to finance the claim if C_p is not “too high”, *i.e.*:

$$D - (k + 1)(C_p + R_p) - f \geq 0 \Rightarrow C_p \leq \hat{C}(k) = \frac{D - f}{k + 1} - R_p \quad (7)$$

Then third-party financing allows to finance a claim with an expected compensation D if the cost to go to court is C_p such that $C_p \leq \hat{C}(k) = \frac{D - f}{k + 1} - R_p$. In other words, under third-party financing, the plaintiff is financed with a probability $x_T(k) = \int_0^{\hat{C}(k)} z(C_p) dC_p$ where $k \geq 0$ denotes the required rate of return on capital for the funders.

Since $\frac{\partial \hat{C}(k)}{\partial k} < 0$, then the higher the required rate of return on capital is, the lower the maximum cost $\hat{C}(k)$ the funders accept to finance is.³⁵

Since $\frac{\partial x_T(k)}{\partial k} \leq 0$, it also implies that the probability to access to justice under third-party financing decreases with k . It is then worth noticing that the funders have *a priori* no cost constraint but because third-party financing is more costly than the other financing systems, they select only the most profitable claims. This entails an endogenous cost constraint on the claims they finance.

Proof n°1 in the appendix shows that $\exists \hat{k}$, so that $\forall k \in (0, \hat{k})$, $x_T(k) \geq x_{CF}$ and $\forall k > \hat{k}$, $x_T(k) < x_{CF}$.

³⁵Let us also note that $\frac{\partial \hat{C}(k)}{\partial D} > 0$: the higher D is, the more willing the funders are to finance a high cost to go to court. However, we assume here that D depends on the type of injury (and is fixed and exogenous), and does not depend on the type of litigation financing. We deserve such an investigation for further works.

To sum up, the merit of a claim is not sufficient to be financed by third parties. Because third-party financing raises additional costs compared to the other types of funding (to organize the three-player relationship), claims have to be profitable enough for the funders not to make losses. Even if there is no cost barrier as under self finance or contingent fees arrangements, third-party financing implies a “profitability” barrier that restricts the number of claims that can be filed. Then, this litigation financing does not necessarily enlarge the number of cases that accesses to justice. Let us now determine whether third-party financing improves the settlement conditions.

3.4.2 The equilibrium settlement amount under third-party financing

Let us determine $\gamma_s \in (0,1)$ the share of the recovery asked by the funders in case of settlement. To reach a rate of return on capital k , the funders ask for γ_s so that:

$$\frac{\gamma_s S_T - R_p}{R_p} = k \Leftrightarrow \gamma_s S_T = (k + 1)R_p \quad (8)$$

The plaintiff accepts the settlement if he gets at least as much as he can get by going to trial:

$$(1 - \gamma_s)S_T = (1 - \gamma_t)D$$

$$\Leftrightarrow S_T = \gamma_s S_T + (1 - \gamma_t)D$$

$$\text{From (4) and (8)} \quad S_T = (k + 1)R_p + (D - (k + 1)(C_p + R_p))$$

$$\Leftrightarrow S_T = S_T(k) = D - (k + 1)C_p \quad (9)$$

Then, when $k = 0$, then $S_T(0) = S_{CF} = S_S$.

Yet, whenever $k > 0$, then $S_T(k) \leq S_S = S_{CF}$. This comes from the fact that by accepting to settle, the funders avoid to invest $C_p(k + 1)$ at the following period: they save both on the plaintiff’s cost to go to court (C_p) as well as on the transaction and opportunity cost they would support by going to court (kC_p).

By ranking the settlement amounts, we get:

$$S_T(k) \leq S_S = S_{CF} \quad (10)$$

Lemma 3. $\forall k \in (0, \hat{k})$, *third-party financing leads to a lower settlement amount than under contingent fees, but to a higher probability that the claim can be brought to court ($x_T(k) \geq x_{CF}$). However, $\forall k > \hat{k}$, third-party financing is less efficient than contingent fees: it still leads to a lower equilibrium settlement amount ($S_T(k) < S_{CF}$) and to a lower probability that the claim is financed ($x_T(k) < x_{CF}$).*

Given lemmas 1, 2 and 3, we can establish the following proposition:

Proposition 1. *There is no litigation financing system that allows to finance all types of meritorious claims a plaintiff may hold. The access to justice is constrained by a cost barrier under self-finance and contingent fees, and by a “profitability” barrier under third-party financing.*

4 Financing of Litigation when claims can be meritorious or frivolous

Let us now consider a situation where the defendant cannot observe whether the claim of the plaintiff is meritorious or frivolous. Then, the plaintiff can be truly injured or not. For instance, an individual may be involved in an accident but sustained no injuries. Another example is a products liability case in which injury is undisputed, but the plaintiff is not entitled to damages if he was contributorily negligent in using the product (Katz [1990]). We assume that the judges do not make any mistake: they allow for damages only for meritorious claims, and are able to detect frivolous claims that get no damage. There is then no value to pursue a claim to trial for an uninjured plaintiff. However, it may be profitable for him to file suit in hopes of obtaining a settlement. As defined in the introduction, we consider a frivolous claim as that of an uninjured plaintiff obtaining payment to which he is not entitled to, during the settlement period. They are not suits for which the plaintiffs wrongly believe that they are entitled to a recovery. As explained by Katz [1990] (p.4), “in order to explain how frivolous suits can persist, it is necessary

to explain why defendants might be willing to offer positive amounts in settlement to a frivolous suitor”.

The timing of the game becomes as follows:

1. A plaintiff can randomly be injured or not in an accident, and the cost C_p to go to court for such an injury ($C_p \in [C_p^{min}; C_p^{max}]$) is revealed.³⁶
2. The plaintiff chooses whether to file a claim at cost f or not.
3. The attorney’s costs R_p and R_d are paid.
4. The settlement period occurs.
5. If the settlement fails, parties can drop or pay C_p and C_d to go to trial.
6. The judgment is made and the information is revealed: only meritorious claims get the damage D .

We focus in this section on the number of frivolous suits filed and the consequences on settlement under each type of litigation financing $i \in \{S; CF; T\}$. The assumptions are the same as in the previous section, except that the defendant does not know whether the case is meritorious or frivolous.³⁷ Yet, the attorney of the plaintiff can observe (and communicate to funders) the merit of the claim. The attorneys accept to finance a case only if they can expect at least zero profits, and the funders finance the claim if they expect a rate of return on capital $k \geq 0$. Moreover, whether frivolous or not, the plaintiff has the same cost constraint to finance C_p as that described in the previous section.

We denote $x_i \in (0, 1)$ the probability with which a plaintiff can afford to go to court under financing system $i \in \{S; CF; T\}$, *i.e.* the probability that the cost $C_p \in [C_p^{min}; C_p^{max}]$ is such that it can be financed under financing system i . Because of the cost constraint

³⁶We assume that there is only one possible injury during the accident that occurs, so that an uninjured plaintiff can try to misrepresent as a victim of this injury, but not as a victim of a different injury, whose cost would be different than the value of C_p .

³⁷We assume that the attorney of the defendant has no access to all the information about the plaintiff so that he cannot determine with certainty the merit of the claim. As in Katz [1990] (p.8), we also abstract from the fact that in an actual lawsuit the defendant may wish to spend resources to investigate the claim’s validity, for example by paying for a medical examination or by engaging in civil discovery. Instead, we consider that complete information is likely to be prohibitively costly, so that the defendant can only estimate a probability that the claim is meritorious, and this probability is that remaining after optimal investigation.

of the plaintiff, this fraction is relative to the financing system as shown in the previous section. The defendant observes C_p and knows whether the claim can be credibly financed or not (*i.e.* the defendant knows the budget constraint of the plaintiff and the cost C_p to go to court for him). What he cannot observe is only an individual plaintiff's type (*i.e.* whether the plaintiff is truly injured or not). As a consequence, whether the plaintiff is truly injured or not, he can credibly threaten to go to court with a probability x_i .³⁸

We introduce some other notations:

- $\alpha \in (0, 1)$ is the initial probability that an accident occurs, *i.e.* that a plaintiff is truly injured. This probability is exogenous, known by the defendant, and does not change as regards to the financing system.
- $\theta_i \in (0, 1)$ is the probability with which an uninjured plaintiff files suit under financing system i . The uninjured plaintiff decides to file a claim if the cost to go to court can be financed (so that $\theta_i \leq x_i$) and if he anticipates that the defendant will prefer to settle rather than to bring the case to court. Then, θ_i represents the strategy of the uninjured plaintiff who has to choose between opening a file or not.
- $\psi_i \in (0, 1)$ is the probability that the defendant settles under financing system i . This variable describes the strategy of the defendant.

Then, the equilibrium we use is a sequential equilibrium where θ_i^* and ψ_i^* represent the best responses of the uninjured plaintiff and of the defendant. From the previous notations, we can deduce:

- *The probability that a plaintiff opens a claim:* If a plaintiff is truly injured (with probability α), he opens a claim as soon as he finds the means to do it (with probability x_i). If he is uninjured (with probability $(1 - \alpha)$), he files a claim as soon as he can credibly do so (still with a probability x_i), and if he expects (with probability θ_i) a positive return from the decision of the defendant to settle, since he will get no compensation by going to trial. Then, the probability that a plaintiff files a claim is $x_i\alpha + (1 - \alpha)x_i\theta_i = x_i(\alpha + (1 - \alpha)\theta_i)$.

³⁸Let us precise that x_i is not the probability to be financed under financing system i , but the probability that the cost C_p the plaintiff has to spend belongs to the range of costs that can be financed under financing system i . Whether the claim of the uninjured plaintiff is financed or not depends on whether it is profitable or not as described in what follows.

- *The conditional probability that a plaintiff who files suit is truly injured under financing system i:* We denote this probability α_i^* where $\alpha_i^* = \frac{\alpha x_i}{\alpha x_i + (1-\alpha)x_i \theta_i} = \frac{\alpha}{\alpha + \theta_i(1-\alpha)}$ according to the Bayes' rule. Then,

$$\alpha_i^* \geq \alpha \tag{11}$$

4.1 Equilibrium under self finance

4.1.1 The strategy of the defendant

When a claim is filed, the defendant does not know whether the claim is frivolous or not not, and he has three strategies:

1. He can either offer the lowest amount an injured plaintiff will accept not to go to court, *i.e.* S_S as defined in subsection 3.2. Whether the plaintiff is truly injured or not, he will accept the offer. The total cost of this strategy for the defendant is $S_S + R_d = D - C_p + R_d$.
2. The defendant can propose $S_S = \epsilon$ (with ϵ being a low positive value, $\epsilon \approx 0$) so that only an uninjured plaintiff accepts.³⁹ However, a truly injured plaintiff will refuse and will prefer to go to court. The total expected cost of this strategy is $(1 - \alpha^*)\epsilon + \alpha^*(D + C_d) + R_d$, since there is a probability $(1 - \alpha^*)$ that the plaintiff is uninjured and accepts the settlement offer, and a probability α^* that the claim is meritorious, so that the defendant spends costs C_d to go to court and pays the damage D .
3. Last, the defendant can make no offer during the settlement period ($S_S = 0$). In this case, if the plaintiff is uninjured, he drops off the case, and he goes to court only if he is truly injured. The total cost of this strategy for the defendant is $\alpha_S^*(D + C_d) + R_d$.

The defendant will choose the lowest cost strategy. Making an offer $S_S = \epsilon$ (the second strategy) is always more costly than making no offer (the third strategy), since in both cases, the defendant has to finance the cost to go to court if the claim is meritorious and pays in addition ϵ if the plaintiff is uninjured ($S_S = \epsilon$). The defendant has then to choose

³⁹If he does not accept, he will get zero since he will not go to court, knowing that he will get nothing since his claim is frivolous.

between the first and the third strategy, *i.e.* offering $S_S = D - C_p$ or making no offer ($S_S = 0$) and going to court with an expected cost of $\alpha_S^*(D + C_d) + R_d$.

Then, the defendant has better settle when the total expected cost under settlement is lower than the expected total cost when going to court, *i.e.* when:

$$D - C_p + R_d \leq \alpha_S^*(D + C_d) + R_d$$

$$\frac{D - C_p}{D + C_d} \leq \alpha_S^*$$

The threshold value of α_S^* allowing to separate the two strategies of the defendant is given by $\bar{\alpha}_S^* = \frac{D - C_p}{D + C_d}$. When $\alpha_S^* \geq \bar{\alpha}_S^*$, then it is cheaper for the defendant to settle rather than to go to court. This can be interpreted as follows: the probability that a plaintiff (that has filed a claim) is truly injured is so high that it will be too costly for the defendant to go to trial. Symmetrically, the defendant goes to trial when $\alpha_S^* \leq \bar{\alpha}_S^*$: the probability that a plaintiff (that has filed a claim) is truly injured is low enough so that it is cheaper to go to court rather than to settle.

The behavior of the defendant then depends on $\alpha_S^* = \frac{\alpha}{\alpha + \theta_S(1 - \alpha)}$, which means that it depends on θ_S , *i.e.* the uninjured plaintiff's behavior (to file a suit or not). Let us now detail this strategy.

4.1.2 The strategy of the uninjured plaintiff

The decision of the uninjured plaintiff to open a file or not depends on his own anticipation of the defendant's behavior (to settle or not), since he gains only in case of settlement. To solve this sequential equilibria, we need to distinguish two cases: $\alpha \geq \bar{\alpha}_S^*$ and $\alpha < \bar{\alpha}_S^*$.

- When $\alpha \geq \bar{\alpha}_S^*$, the probability that a plaintiff is truly injured (α) is higher than the threshold above which the settlement strategy is less costly for the defendant ($\bar{\alpha}_S^*$). From (11), $\alpha_S^* \geq \alpha$ so that $\alpha_S^* \geq \bar{\alpha}_S^*$: the defendant always prefers to settle.

Since the uninjured plaintiff anticipates this decision, he always files a claim, $\theta_S^* = 1$. Then, the probability that a case filed is settled becomes $\alpha_S^* = \frac{\alpha}{\alpha + \theta_S(1 - \alpha)} = \alpha$. The equilibrium is a pure strategy equilibrium: the plaintiff always files a suit ($\theta_S^* = 1$), and the defendant always settles ($\psi_S^* = 1$).

This can be interpreted as follows: the probability that a plaintiff is truly injured is so high that the defendant prefers to settle rather than to go to trial. However, at

equilibrium, if the plaintiff is uninjured (which happens with a low probability), he earns a rent.

- Let us now consider the case where $\alpha < \bar{\alpha}_S^*$. Since from (11), $\alpha_S^* \geq \alpha$, this does not allow to compare $\bar{\alpha}_S^*$ and α_S^* , and then to learn the defendant's strategy to settle or to go to court. Let us examine the two possible strategies of the defendant and show that no pure strategies equilibrium exists.
 - First, if the defendant decides to settle, then the plaintiff (whether truly injured or not) files a suit, so that $\theta_S^* = 1$ and $\alpha_S^* = \alpha_S$. Then, $\alpha_S = \alpha_S^* \leq \bar{\alpha}_S^*$: it would have been cheaper for the defendant to go to court rather than to settle.
 - Let us now examine what happens if the defendant always decides to go to court. Then, $\theta_S^* = 0$ and $\alpha_S^* = 1$ since only a truly injured plaintiff files a suit. In this situation, we go back to the results found in section 3: it is cheaper for the defendant to settle when the claim that is filed is meritorious.

Then, the only equilibrium is a mixed strategy equilibrium where the defendant decides to settle with some probability, and an uninjured plaintiff files a suit with some other probability. To characterize this equilibrium, we find θ_S^* and ψ_S^* so that the defendant is indifferent between settling and going to trial, and an uninjured plaintiff is indifferent between filing or not filing.

Under self finance, a plaintiff is indifferent between filing or not if:

$$\psi_S^* S_S - R_p - f = 0 \Leftrightarrow \psi_S^* = \frac{R_p + f}{S_S} = \frac{R_p + f}{D - C_p}$$

where ψ_S^* represents the probability that the defendant chooses to settle at equilibrium.

The defendant is indifferent between settling and going to court if $\alpha_S^* = \bar{\alpha}_S^*$:

$$\begin{aligned} \frac{\alpha}{\alpha + \theta_S^*(1 - \alpha)} &= \frac{D - C_p}{D + C_d} \\ \Leftrightarrow \theta_S^* &= \frac{\alpha(C_p + C_d)}{(1 - \alpha)(D - C_p)} \end{aligned}$$

where θ_S^* represents the probability that an uninjured plaintiff files a claim under self-finance at equilibrium.

This mixed strategy equilibrium can be interpreted as follows: the probability that a

plaintiff is uninjured is so high that the defendant gets some incentives to go to court (with probability ψ_S^*), so as to drive the profit of the uninjured plaintiff to zero.

This equilibrium is unique and stable under an adjustment process: if an uninjured plaintiff files a claim too frequently, the defendant will refuse to settle, which is likely to diminish the incentives of an uninjured plaintiff to bring suit. If an uninjured plaintiff files a claim with a low probability, the defendant chooses to settle, which increases the incentives of the uninjured plaintiff to bring suit.

Lemma 4. *Under self-finance:*

When $\alpha \geq \bar{\alpha}_S^* = \frac{D-C_p}{D+C_d}$, a pure strategy equilibrium exists: $\psi_S^* = \theta_S^* = 1$.

When $\alpha < \bar{\alpha}_S^*$, there is no pure strategy equilibrium but a mixed strategy equilibrium defined as follows:

$$\psi_S^* = \frac{R_p + f}{D - C_p}; \theta_S^* = \frac{\alpha(C_p + C_d)}{(1 - \alpha)(D - C_p)}$$

4.2 Equilibrium under contingent fees arrangements

4.2.1 The financing of frivolous claims

The attorney observes whether the case is meritorious or not. If the case is meritorious, the attorney asks a share β_s of the gains in case of settlement and β_t in case of trial, as defined in section 3.2. However, if the case is frivolous, the expected profit of the attorney will be $\psi_{CF}\beta_s^F S_{CF} - R_p$, where ψ_{CF} is the probability that the defendant will settle under a contingent fee agreement, and β_s^F is the share of the settlement amount the attorney requires.⁴⁰ The zero-profit condition under perfect competition implies that:

$$\beta_s^F = \frac{R_p}{\psi_{CF} S_{CF}} \quad (12)$$

The rate as defined by (12) is applied for frivolous claims.⁴¹ We assume that the

⁴⁰Let us note that $\psi_{CF} > 0$ is a necessary condition for the attorney to accept the case. Moreover, contrary to Miceli [1994], we assume that the attorney fees (in case of settlement) are different when the claim is meritorious or not, which explains why our results are slightly different than his. This assumption seems consistent with the idea of free entry and competition among attorneys: plaintiffs may “shop around” for the best rate which reduces opportunities for profit that could emerge if a attorney imposed the rate for frivolous claims to meritorious ones. Also note that, since the plaintiff knows whether he is truly injured or not, attorneys cannot try to misrepresent the merits of a case to the client and negotiates a higher percentage rate.

⁴¹ β_s^F is here larger than the rate asked when all the claims are meritorious. This can be explained by

rates defined between the attorney and the plaintiff are not observable to outsiders, else the plaintiff's type could be found by observing the rate asked by the attorney under settlement.

4.2.2 The equilibrium strategies

As in the previous case, the defendant has two strategies: he can choose to settle for S_{CF} so that the plaintiff always accepts (whatever his type), or he can make no offer during the settlement period and go to court only if the plaintiff is truly injured (so that the expected cost of this strategy is $\alpha_{CF}^*(D + C_d)$). As previously, any offer between 0 and S_{CF} will be rejected by the truly injured plaintiff and accepted by the uninjured plaintiff. As long as the truly injured plaintiff does not accept it, there is no reason to offer the frivolous one anything at all. Then, the defendant is indifferent between settling and going to court if:

$$\begin{aligned} \alpha_{CF}^*(D + C_d) + R_d &= S_{CF} + R_d \\ \Leftrightarrow \alpha_{CF}^{\bar{*}} &= \frac{S_{CF}}{D + C_d} = \frac{D - C_p}{D + C_d} \end{aligned}$$

When $\alpha_{CF}^* \geq \alpha_{CF}^{\bar{*}}$, then the defendant prefers settling rather than going to court. When $\alpha_{CF}^* < \alpha_{CF}^{\bar{*}}$, the defendant makes no offer and goes to trial, because the probability that the plaintiff is truly injured is too low and it would be too costly to always settle rather than to go to court to see whether the plaintiff is truly injured.

Then, as under self finance, two types of equilibria arise according to the value of α :

- When $\alpha \geq \alpha_{CF}^{\bar{*}}$, then the defendant chooses to settle with any plaintiff that files a suit. The plaintiff files a claim, whatever his type. A pure strategy equilibrium exists, defined as follows: $\theta_{CF}^* = \psi_{CF}^* = 1$.
- When $\alpha < \alpha_{CF}^{\bar{*}}$, the only equilibrium is a mixed strategy equilibrium.

The uninjured plaintiff is indifferent between filing or not filing if

the fact that a frivolous case is more risky because the plaintiff gets some compensation only if the case is settled but not if it goes to court.

$$\begin{aligned}\psi_{CF}(1 - \beta_s^F)S_{CF} - f = 0 &\Leftrightarrow \psi_{CF}S_{CF} - R_p = f \text{ from (12)} \\ &\Leftrightarrow \psi_{CF}^* = \frac{f + R_p}{D - C_p}\end{aligned}$$

where ψ_{CF}^* represents the probability that the defendant chooses to settle at equilibrium under contingent fees arrangements.

The defendant is indifferent between settling and going to trial if:

$$\begin{aligned}\alpha_{CF}^* = \bar{\alpha}_{CF}^* &\Leftrightarrow \frac{\alpha}{\alpha + (1 - \alpha)\theta_{CF}} = \frac{D - C_p}{D + C_d} \\ &\Leftrightarrow \theta_{CF}^* = \left(\frac{\alpha}{1 - \alpha}\right)\left[\frac{(C_p + C_d)}{(D - C_p)}\right]\end{aligned}\tag{13}$$

where θ_{CF}^* represents the probability that an uninjured plaintiff opens a claim at equilibrium, under contingent fees arrangements.

Let us note that $\theta_S^* = \theta_{CF}^*$, $\psi_S^* = \psi_{CF}^*$, and $\bar{\alpha}_{CF}^* = \bar{\alpha}_S^*$. The probabilities with which an uninjured plaintiff files a claim and that the claim is settled are the same under contingent fees and self-finance. However, since $x_S \leq x_{CF}$, these probabilities are applied on a larger scale.

Lemma 5. *Under contingent fees arrangements:*

When $\alpha \geq \bar{\alpha}_{CF}^* = \frac{D - C_p}{D + C_d}$, a pure strategy equilibrium exists, $\theta_{CF}^* = \psi_{CF}^* = 1$.

When $\alpha < \bar{\alpha}_{CF}^*$, there is only a mixed strategy equilibrium such that:

$$\psi_{CF}^* = \frac{f + R_p}{D - C_p}; \theta_{CF}^* = \left(\frac{\alpha}{1 - \alpha}\right)\left[\frac{(C_p + C_d)}{(D - C_p)}\right]$$

4.3 Equilibrium under Third-Party Financing

4.3.1 The financing of frivolous claims

The funders observe whether the plaintiff is truly injured or not. As described in subsection 3.4, the shares of the recovery asked by the funders are γ_s and γ_t for meritorious claims.

When a claim is frivolous, the plaintiff may ask to be financed with the hopes to obtaining some settlement. In this case, he gives up a share $\gamma_s^F \in (0, 1)$ to the funders.⁴²

$$\frac{\gamma_s^F \psi_T S_T - R_p}{R_p} = k \quad (14)$$

$$\Rightarrow \gamma_s^F = \frac{(k+1)R_p}{\psi_T S_T} \quad (15)$$

Let us note that $\gamma_s^F \geq \gamma_s$: the funders ask for a higher share of the gains when the claim is frivolous (in comparison to a meritorious claim), because the outcome is more risky. Let us now determine whether an uninjured plaintiff opens a file or not.

4.3.2 The equilibrium strategies

The defendant has to choose between settling for S_T so that the plaintiff accepts (whatever his type), or making no offer so that he goes to court only if the plaintiff is truly injured. The defendant is indifferent if:

$$\alpha_T^* (D + C_d) = S_T \quad (16)$$

$$\bar{\alpha}_T^* = \frac{D - (k+1)C_p}{D + C_d} \quad (17)$$

Then, symmetrically to the previous cases, whenever $\alpha \geq \bar{\alpha}_T^*$, a pure strategy equilibrium exists, so that $\theta_T^* = \psi_T^* = 1$. In other words, the probability that a plaintiff is truly injured is so high that the defendant always prefers to settle than to go to court. The plaintiff (whether truly injured or not) files a claim, but the probability that he is truly injured remains high enough for the settlement strategy to be the most appropriate strategy for the defendant.

When $\alpha < \bar{\alpha}_T^*$, *i.e.* when the probability that a plaintiff is truly injured is low, there is only a mixed strategy equilibrium. The best strategy is for the defendant to go to trial with some probability ψ_T and for the uninjured plaintiff to file a claim with some

⁴²If the case goes to court, the plaintiff drops off the case, so that there is no need to define a share of the recovery for the funders in this situation.

probability θ_T . This equilibrium implies that the uninjured plaintiff is indifferent between filing or not filing, *i.e.*:

$$\begin{aligned}\psi_T(1 - \gamma_s^F)S_T - f = 0 &\Leftrightarrow \psi_T(S_T - \frac{(k+1)R_p}{\psi_T}) = f \\ &\Leftrightarrow \psi_T^* = \frac{f + (k+1)R_p}{D - (k+1)C_p}\end{aligned}$$

The defendant is indifferent between settling and going to trial if $\alpha^* = \bar{\alpha}_T^*$. This implies:

$$\begin{aligned}\frac{\alpha}{\alpha + (1 - \alpha)\theta_T} &= \frac{D - (k+1)C_p}{D + C_d} \\ \Leftrightarrow \alpha(D + C_d) &= [D - (k+1)C_p]\alpha + (1 - \alpha)[D - (k+1)C_p]\theta_T\end{aligned}$$

$$\theta_T^* = \left(\frac{\alpha}{1 - \alpha}\right)\left[\frac{(k+1)C_p + C_d}{D - (k+1)C_p}\right] \quad (18)$$

Lemma 6. *Under third-party financing:*

When $\alpha \geq \bar{\alpha}_T^*$, a pure strategy equilibrium exists, so that $\theta_T^* = \psi_T^* = 1$.

When $\alpha < \bar{\alpha}_T^*$, we observe a mixed strategy equilibrium, defined as follows:

$$\begin{aligned}\psi_T^* &= \frac{f + (k+1)R_p}{D - (k+1)C_p} \\ \theta_T^* &= \left(\frac{\alpha}{1 - \alpha}\right)\left(\frac{(k+1)C_p + C_d}{D - (k+1)C_p}\right)\end{aligned}$$

4.4 Comparison of equilibria

We compare here the thresholds separating pure and mixed strategies ($\bar{\alpha}_i^*$), the probabilities that the case filed and settled (ψ_i^*), and the probabilities that an uninjured plaintiff files a claim under each type of litigation financing (θ_i^*). This comparison allows to show that third-party financing leads to the highest probability of settlement (even when these cases are frivolous), and to the highest probability that an uninjured plaintiff files a claim.

4.4.1 Comparison of the thresholds $\bar{\alpha}_i^*$

Let us compare the different threshold $\bar{\alpha}_i^*$ separating pure and mixed strategies.

$$\begin{aligned}\bar{\alpha}_S^* &= \alpha_{CF}^* = \frac{D - C_p}{D + C_d} \\ \bar{\alpha}_T^* &= \frac{D - (k + 1)(C_p)}{D + C_d}\end{aligned}$$

Then, it comes that $\bar{\alpha}_S^* = \alpha_{CF}^* \geq \bar{\alpha}_T^*$. Third-party financing leads to a lower threshold: the proportion of pure strategies equilibria where all claims (whether meritorious or frivolous) settle is then higher.

4.4.2 Comparison of the probabilities that a case is settled

Let us now compare the fraction ψ^* of cases filed that settle under mixed strategies. These probabilities are:

$$\begin{aligned}\psi_S^* &= \frac{R_p + f}{D - C_p} = \psi_{CF}^* \\ \psi_T^* &= \frac{R_p(k + 1) + f}{D - (k + 1)C_p}\end{aligned}$$

Then, when $k = 0$, $\psi_T^* = \psi_S^* = \psi_{CF}^*$; and when $k > 0$, $\psi_T^*(k) > \psi_S^* = \psi_{CF}^*$: third-party financing leads to a higher probability that a defendant chooses to settle compared to self finance or contingent fees arrangements.⁴³ Since the equilibrium settlement amount is lower under third-party financing than under alternative financing systems, this creates higher incentives for the defendant to decide to settle rather than to go to court.

⁴³We note that $\frac{\partial \psi_T^*}{\partial k} = \frac{R_p(D - (k + 1)C_p) + (f + R_p(k + 1))C_p}{(D - (k + 1)C_p)^2} \geq 0$, and $\psi_T^*(0) = \psi_S^* = \psi_{CF}^*$. This result seems consistent with the empirical evidence about third-party financing provided by Chen and Abrams [2012]: he finds a marked decrease in the average number of appearances each party made before the court in jurisdictions, and interprets it to indicate a corresponding increase in out-of-court resolution between the parties, *i.e.* settlement.

4.4.3 Comparison of the probability that an uninjured plaintiff files a suit

We compare here the probabilities that an uninjured plaintiff files suit in mixed strategies.

$$\begin{aligned}\theta_S^* &= \theta_{CF}^* = \frac{\alpha(C_p + C_d)}{(1 - \alpha)(D - C_p)} \\ \theta_T^* &= \left(\frac{\alpha}{1 - \alpha}\right) \left(\frac{((k + 1)C_p + C_d)}{D - (k + 1)C_p}\right)\end{aligned}$$

Then, when $k = 0$, then $\theta_T^*(0) = \theta_S^* = \theta_{CF}^*$, while when $k > 0$, $\theta_T^*(k) > \theta_S^* = \theta_{CF}^*$.⁴⁴ Third-party financing leads to a higher probability that an uninjured plaintiff files a claim: since the probability that the defendant decides to settle is higher, this creates higher incentives for an uninjured plaintiff to file a claim, with the hopes of obtaining gains through settlement.

Proposition 2.

When $k > 0$, the probability that an uninjured plaintiff files a claim is higher under third-party financing than under contingent fees or self-finance.

This proposition seems consistent with the empirical results of Chen and Abrams [2012]: Of the 123 claims fully or partially funded and closed by IMF (the largest Australian company funding litigations), 83 were settled out of court, 25 were withdrawn or “dropped” and five lost and 10 won at trial. As underlined by Veljanovski [2011], this indicates a relatively high “drop rate” of over 20 %.

5 Further comparisons

In this section, we extend our comparisons between the financing systems to wonder (i) which system benefits more to meritorious claims than to frivolous ones, and (ii) what are the total litigation costs under each financing system.

5.1 Who benefits from each financing system?

From subsection 3.4.1, third-party financing increases the access to court for a truly injured plaintiff when $k \in (0, \hat{k})$. However, from proposition 2, third-party financing also raises

⁴⁴This comes from $\theta_T^*(0) = 0$ and $\frac{\partial \theta_T^*}{\partial k} = \frac{\alpha}{(1 - \alpha)} \times \frac{C_p(D - (k + 1)C_p) + ((k + 1)C_p + C_d)C_p}{(D - (k + 1)C_p)^2} \geq 0$.

the probability that an uninjured plaintiff opens a file and gets a compensation under settlement. In this subsection, we try to evaluate the net effect of third party financing compared to the other litigation financing systems, as regards to the probabilities that meritorious and frivolous claims have to be compensated.

5.1.1 Probabilities to be compensated under pure strategies

Let us denote Δ_i , with $i \in \{S; CF; T\}$, the difference between the probability that a truly injured plaintiff gets a compensation (αx_i) and the probability that an uninjured plaintiff opens a file and benefits from settlement under financing system i (*i.e.* $(1 - \alpha)x_i$ under pure strategies). Then, this difference between these probabilities under financing system i is:

$$\Delta_i = \alpha x_i - (1 - \alpha)x_i = x_i(2\alpha - 1)$$

- $\forall i \in \{S; CF; T\}$, $\Delta_i \geq 0 \Leftrightarrow \alpha \geq \frac{1}{2}$: each financing system benefits more to the truly injured plaintiff than to an uninjured one if there is on average more truly injured plaintiffs than uninjured ones.
- When $\alpha \geq \frac{1}{2}$:
 - From subsection 3.4.1, $\forall k \in (0, \hat{k})$, $x_T(k) \geq x_{CF}$, then $\Delta_T \geq \Delta_{CF} > \Delta_S$.
 - $\forall k > \hat{k}$, $x_T(k) \leq x_{CF}$, then $\Delta_{CF} > \Delta_T$ and $\Delta_{CF} > \Delta_S$.

Consequently, under pure strategies, third-party financing is the system that benefits the most to meritorious claims when the rate of return on capital required by the funders is not *too* high, *i.e.* $k \leq \hat{k}$.

5.1.2 Probabilities to be compensated under mixed strategies

Under mixed strategies, the difference Δ_i between the probability that a truly injured plaintiff gets some compensation and the probability that an uninjured plaintiff benefits from settlement is:

$$\forall i \in \{S; CF; T\}, \Delta_i = \alpha x_i - (1 - \alpha)x_i \theta_i^* \psi_i^* = x_i[\alpha - (1 - \alpha)\theta_i^* \psi_i^*]$$

- $\forall i \in \{S; CF; T\}, \Delta_i \geq 0 \Leftrightarrow \alpha \geq \frac{\theta_i^* \psi_i^*}{1 + \theta_i^* \psi_i^*}$: each financing system i benefits more to a truly injured plaintiff than to an uninjured one if $\alpha \geq \frac{\theta_i^* \psi_i^*}{1 + \theta_i^* \psi_i^*}$.
- Δ_i is increasing in x_i (the probability that a claim can be financed under financing system i), is decreasing in θ_i^* (the probability that an uninjured plaintiff opens a file under financing system i) and in ψ_i^* (the probability that the defendant prefers to settle rather than to go to court).
- Proof n°2 in the appendix shows that $\exists \tilde{k}$ (with $\tilde{k} \leq \hat{k}$) so that:

$$\forall k \in (0, \tilde{k}), \max_{i \in \{S; CF; T\}} \Delta_i = \Delta_T(k)$$

$$\forall k > \tilde{k}, \max_{i \in \{S; CF; T\}} \Delta_i = \Delta_{CF}$$

Under mixed strategies, the rate of return required by the funders has to be lower than under pure strategies for third-party financing to be the financing system that benefits the most to meritorious claims. This can be explained as follows: when the rate of return on capital the funders require increases, the settlement amount decreases (lemma 3), and then the defendant becomes more willing to settle (proposition 2). This raises the incentives of the uninjured plaintiff to file a claim. Then, for third-party financing to outperform the other litigation financing mechanisms, the rate of return on capital (k) has to be relatively “low”, and all the lower than the probability that a plaintiff is truly injured is high (*i.e.* strategies are mixed and not pure).

Proposition 3. *Third-party financing benefits more to meritorious claims than frivolous ones if the rate of return on capital required by the funders is low, i.e. $k < \tilde{k}$.*

5.2 Comparison of total litigation costs

In this subsection, we focus on the overall litigation costs under each financing system. These costs depend on the number of suits filed, and on the settlement rate.

5.2.1 Litigation costs under pure strategies

Under pure-strategies equilibria, the defendant always settles and the uninjured plaintiff always decides to file a suit, whatever the financing system. Total litigation costs (L) are therefore $f + R_p + R_d$ under each financing system, and are spent when the plaintiff can afford to go to court, so that $\forall i \in \{S; CF; T\}$:

$$L_i = x_i(R_p + R_d + f)$$

Since $\forall k \in (0, \hat{k})$, $x_T(k) \geq x_{CF}$, then third-party financing leads to the highest litigation costs, mainly because they enlarge the access to court, and then leads to an increase in total litigation costs.

5.2.2 Litigation costs under mixed strategies

In this situation, we denote P_i^s ($i \in \{S; CF\}$) the probability that a suit is filed and that the settlement period occurs, so that $P_i^s = x_i(\alpha + (1 - \alpha)\theta_i)$. The probability that a claim is brought to court is $P_i^t = x_i\alpha(1 - \psi_i^*)$, since only a truly injured plaintiff goes to trial if the defendant refuses to settle. Then, $\forall i \in \{S; CF\}$, total litigation costs are:

$$\begin{aligned} L_i &= P_i^s(R_p + R_d + f) + P_i^t(C_p + C_d) \\ &= x_i[(\alpha + (1 - \alpha)\theta_i^*)(R_p + R_d + f) + \alpha(1 - \psi_i^*)(C_p + C_d)] \end{aligned}$$

Since $x_{CF} > x_S$, $\theta_{CF}^* = \theta_S^*$ and $\psi_S^* = \psi_{CF}^*$, then $L_{CF} > L_S$: litigation costs are higher under contingent fees arrangements than self-finance, mainly because of the larger access of plaintiffs to justice.

Under third-party financing, the total litigation costs are:

$$\begin{aligned} L_T(k) &= P_T^s(R_p + R_d + f) + P_T^t(C_p + C_d) \\ &= x_T(k)[(\alpha + (1 - \alpha)\theta_T^*(k))(R_p + R_d + f) + (\alpha(1 - \psi_T^*(k)))(C_p + C_d)] \end{aligned}$$

When k increases:

- $x_T(k)$ decreases: the probability that an uninjured plaintiff can be financed under third-party financing decreases, which reduces the total litigation costs.
- $\theta_T^*(k)$ increases: an uninjured plaintiff is more likely to open a file, which increases the total litigation costs.

- Last, $\psi_T^*(k)$ increases: the defendant is more willing to settle, which allows to avoid the costs to go to court, and then reduces the total litigation costs.

Let us however note that when $k \rightarrow 0$, $L_T(k) \rightarrow (\alpha + (1 - \alpha)\theta_{CF}^*)(R_p + R_d + f) + \alpha(1 - \psi_{CF}^*)(C_p + C_d)$ since $\theta_T^*(0) = \theta_{CF}^*$ and $\psi_T^*(0) = \psi_{CF}^*$. Then, when $k \rightarrow 0$, $L_T(k) > L_{CF}$.

Proposition 4. *When the rate of return on capital required by the funders is very low ($k \rightarrow 0$), third-party financing increases the access to justice ($x_T(k) \rightarrow 1$) and outperforms the other financing systems, but also increases the total litigation costs.*

6 Conclusion

In many countries, legislators wonder whether the introduction of third-party financing will help to overcome the cost barrier to access to justice. Even if external funders have larger means than attorneys, the cost to organize a three-player relationship is higher than a traditional bilateral relationship. Since legislation allows funders to consider both direct and indirect charges when defining the share of the recovery they ask in case of success, they only select claims whose “profitability rate” is large enough to cover all types of costs they support. Then, our model shows that third-party financing: (i) does not allow to finance all types of meritorious claims, (ii) gives uninjured plaintiffs higher incentives to open a file (compared to the other financing systems), so that this financing may benefit more to uninjured plaintiffs than uninjured ones, and (iii) may lead to higher total litigation costs. This does not mean that third-party financing should be banned. Our model simply shows that by solving a problem (the cost barrier to access to justice), third-party financing is likely to create other difficulties, as the increase of frivolous claims or litigation costs. Our results also show that third-party financing is worthwhile when funders do not require a too high rate of return on capital. However, when their requirement for profitability is high, the difficulties raised by third-party financing are likely to be higher than the benefits it entails, such as a larger access to justice. This may explain why some legislators are reluctant to introduce such a practice.

Our analysis is a first step towards a better understanding of third-party financing, but could be deepened in several ways. For instance, we consider litigation costs mainly as attorney costs. However, in practice, additional external costs may appear (Rubin

[2010]). For instance, defendants may support additional opportunity costs of time and efforts. These include time spent in searching files for documents in response to document requests, time spent in preparation for depositions and testimony, and time spent in testimony itself. One could also argue that the attention of the managers will be diverted from profit making endeavors to the lawsuit. Reputational costs are also under silence in our model. Our conclusion about the increase in the incentives of an uninjured plaintiff to file a claim could be softened if we introduce potential reputational costs of supporting frivolous litigation for third-party funders. The risk for the funders is to be associated with nuisance suits, and its involvement in a particular case could undercut the plaintiff's bargaining power to the extent that it suggests the claim is without merit. However, such an analysis also calls for strong assumptions, in particular as regards to the structure of information between players in a repeated setting.

Let us also add that we do not discuss in our model the question of the optimal number of litigation. We take for granted that a plaintiff deserves to be compensated, and that this compensation is higher than the total amount of costs required to get it ($\forall C_p \in [C_p^{min}; C_p^{max}]$, $D - R_p - C_p - f > 0$). As a consequence, we do not discuss whether the increase in the probability to access to justice under third-party financing is socially efficient or not. It is sometimes argued that the additional lawsuits that would occur as a result of third party financing would have more social costs than social benefits (Rubin [2010]). This point deserves further research.⁴⁵

Another extension could be to consider that the amount of money the parties have at disposal to finance their claims may influence the size of the damage, or the probability to win the case. This should call for a model where both parties (*i.e.* the plaintiff and the defendant) could benefit from contingency fees or third-party funders. Then, not only could the litigation costs of the plaintiffs vary, but also that of the defendant (C_d). However, this analysis is beyond the scope of this paper, where our primary concerns are the access to justice for truly injured plaintiffs and the number of frivolous claims that are settled in each type of litigation financing system.

To focus on the current debates about litigation financing in Europe, we focus on self-finance, contingent fees and third-party financing. However, insurances are also developing

⁴⁵A complete analysis of this question would require a complex model taking also into account the social benefit of the change in behavior brought about through the threat of easier access to court thanks to third party financing.

to finance litigation (“before the event insurance” or “after the event insurance” (Faure and De Mot [2011])). We could also assume that plaintiffs or attorneys could borrow money to finance litigation. It would be useful to include such systems in further researches. Last, our model does not also deal with the problem of product liability system, when it is the result of a series of legal changes brought about through litigation (especially in *common law* countries). Attorneys acting through their associations may coordinate information, choose and sequence lawsuits in such a way as to create precedents favorable to expansion of law. While some attorneys have contributed to changing the legal rules, some others have been rather “free-riders” by benefiting from these changes without contributing. Third-party funders are likely to be involved in many cases as a method of diversification. This means that they will be able to internalize more of the effects of legal changes than could individual law firms, and so will contribute more to financing litigation leading to policy changes. The danger is that third-party financing could lead to increase the number of inefficient precedents (Rubin [2010]). We intend to take into account these additional effects in further researches.

Appendix

Proof n°1:

We show here that $\exists \hat{k}$, so that $\forall k \in (0, \hat{k})$, $x_T(k) \geq x_{CF}$ and $\forall k > \hat{k}$, $x_T(k) < x_{CF}$.

$$\begin{aligned}
x_T(k) \leq x_{CF} &\Leftrightarrow \hat{C}(k) \leq \bar{C} \\
&\Leftrightarrow \frac{(D-f)}{(k+1)} - R_p \leq \bar{C} \\
&\Leftrightarrow \frac{D-f}{\bar{C} + R_p} \leq k+1 \\
&\Leftrightarrow \frac{D-f-\bar{C}-R_p}{\bar{C} + R_p} \leq k
\end{aligned}$$

We denote $\hat{k} = \frac{D-f-\bar{C}-R_p}{\bar{C}+R_p}$. Since $\hat{C}(k)$ is a continuous and decreasing function in k , then $\forall k \in (0, \hat{k})$, $x_T(k) \geq x_{CF}$ and $\forall k > \hat{k}$, $x_T(k) < x_{CF}$.⁴⁶

⁴⁶It is straightforward to show that $\hat{k} > 0$ since $\bar{C} \in [C_p^{min}, C_p^{max}]$ and $\forall C_p \in [C_p^{min}, C_p^{max}]$, $D - C_p - R_p - f > 0$.

Proof n°2 (proposition 3):

We show here that $\exists \tilde{k}$ so that under mixed strategies $\forall k \leq \tilde{k}$, $\Delta_T(k) \geq \Delta_{CF}$.

$$\Delta_T(k) = x_T(k)[\alpha - (1 - \alpha)\theta_T^*(k)\psi_T^*(k)]$$

We denote $V(k) = \alpha - (1 - \alpha)\theta_T^*(k)\psi_T^*(k)$ so that $\Delta_T(k) = x_T(k)V(k)$.

Then, $V'(k) = -(1 - \alpha)[\frac{\partial\theta_T^*(k)}{k}\psi_T^*(k) + \theta_T^*(k)\frac{\partial\psi_T^*(k)}{k}]$.

Since $\frac{\partial\theta_T^*(k)}{k} \geq 0$ and $\frac{\partial\psi_T^*(k)}{k} \geq 0$ (see footnotes 40 and 41), then $V'(k) \leq 0$.

We can write that $\Delta'_T(k) = x'_T(k)V(k) + x_T(k)V'(k) \leq 0$, so that $\Delta_T(k)$ is decreasing in k .

Moreover, $\Delta_T(0) = \alpha - (1 - \alpha)\theta_{CF}^*\psi_{CF}^*$ which implies that $\Delta_T(0) > \Delta_{CF}$.

Since $\Delta_T(k) \rightarrow 0$ when $k \rightarrow +\infty$, and Δ_T is a continuous and decreasing function on $[0, +\infty[$, then there is $\tilde{k} > 0$ so that $\forall k \in (0, \tilde{k})$, $\Delta_T(k) \geq \Delta_{CF}$ and $\forall k > \tilde{k}$, $\Delta_T(k) < \Delta_{CF}$.

In addition, remember that:

$$\Delta_S = x_S[\alpha - (1 - \alpha)\theta_S^*\psi_S^*]$$

$$\Delta_{CF} = x_{CF}[\alpha - (1 - \alpha)\theta_{CF}^*\psi_{CF}^*]$$

Since $\theta_S^* = \theta_{CF}^*$, $\psi_S^* = \psi_{CF}^*$ and $x_S \leq x_{CF}$, then $\Delta_{CF} \geq \Delta_S$. As a consequence,

$\forall k \in (0, \tilde{k})$, $\max_{i \in \{S; CF; T\}} \Delta_i = \Delta_T(k)$

$\forall k > \tilde{k}$, $\max_{i \in \{S; CF; T\}} \Delta_i = \Delta_{CF}$

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