Optimal pricing of court services*

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Abstract

Litigants are generally charged for using court services. The charges involved are usually set to achieve a combination of efficiency, equity and funding goals. This paper presents a simple model, based on regulated monopoly pricing, to address the question of how these charges should be set. We find that fixed fees generally form part of the optimal charging package, despite concerns about their regressive nature. Per-unit fees will also be used though they may be set below cost; in this case, a trade-off emerges and the fixed fee is used to achieve funding goals. Our model is a useful one for developing extensions from the nonlinear pricing literature.

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1 Introduction

Although a court's principal function is to adjudicate the outcomes of cases, the procedure for doing this can involve a variety of inputs. Both parties can apply to the court to acquire/enforce injunctions, force discovery of documents, seek an interim judgement, etc. Apart from aiding settlement, a complementary benefit of providing services in this way is the hope that more accurate decisions will be reached, perhaps as a result of more information being placed before the court or through the same judge gaining familiarity with the case as it proceeds. In England and Wales, to take a particular example, the structure given to cases by Lord Woolf's 1999 reforms have more clearly 'compartmentalised' cases (once proceedings are issued) in this way, and the aforementioned benefits received attention during the preceding debate (Woolf (1996)).

In most jurisdictions, litigants are charged for the range of services offered by the courts according to a pre-specified set of tariffs, determined by the court.¹ Policy makers typically claim a variety of objectives for these charges; in particular, raising revenue (to cover the cost of the services provided), en-

¹ Continuing with the example of England and Wales, see www.courtservice.gov.uk/fandl/ch_crt_fees2.htm. The costs in question can include fixed fees of £80 for allocating the case to a particular level of court; £50 upon commencement of proceedings with value £300–£400; £500 upon commencement of proceedings above £50,000; and per unit fees of £30 to summons a witness; £150 for a detailed assessment of the opponent's costs; etc.

couraging efficient use of the courts (by deterring ‘weak’ cases) and enhancing access to justice (by protecting low-income litigants from these costs). An interesting example is the UK Government’s policy in this area which aims at all of these: i.e. “recover[ing] the full cost of providing the civil courts”, ensuring that “court services are provided efficiently and effectively”, and aiming to be “fair” (LCD (1998), p. 1). Recently, the legal profession in England and Wales has debated such issues in advance of some proposed increases in the charges.²

With policy makers seeking to achieve such a variety of important objectives, court prices should be chosen within a framework that makes clear the trade-offs that may be encountered in attempting to achieve them. The role of courts and fees has received assorted attention in the literature. Authors have examined the decision-making machinery of the court (Kirstein and Schmidtchen (1997)), its propensity for error (Daughety and Reinganum (1995)), the incentives that court costs may create (Rubinfeld and Sappington (1987)) and the role of court fees in criminal cases (Garoupa and Gravelle (2002)). However, the setting of court prices has received limited attention. The current paper suggests one way to correct this situation by recognising a link between the court’s problem when setting fees and the literature on optimal price regulation (Laffont and Tirole (1993); Wilson (1993)). Essen-

²See LCD (1999), Law Society (2002).

tially, we think of the court as a monopolist, selling services to litigants at prices regulated to maximise a particular notion of social welfare.³ In this way, we seek to evaluate the policy options set out above. We show that lump-sum filing fees can form part of the court’s optimal (two-part) tariff, despite concerns in some quarters that they are regressive. We find a natural maximum to this fee in circumstances where court fixed costs are covered. We also indicate how the per unit price of services may then be set and indicate how this can be done in conjunction with the fixed fee.

The paper proceeds as follows. In the next section, we present the basic model before Section 3 derives and presents our main results. Section 4 discusses the paper and indicates how recent developments in non-linear pricing might provide further insights for the ways in which court services should be priced.

2 Model

A plaintiff (P) and defendant (D) are engaged in a civil action. The parties’ cases have strengths θ_P and θ_D respectively and although they are aware of

³Of course, in practice, courts may face a degree of ‘competition’ from several sources. These may include courts in other jurisdictions (in some international cases for instance), tribunals and alternative dispute resolution fora (such as arbitration and mediation services). Thus, our analogy between the court and a monopolist represents something of an approximation. Nonetheless, domestic courts are typically the pre-eminent forum for adjudicating legal disputes so this approximation is a useful starting point for the topic at hand.

the this the court is not. We assume that $\{\theta_P, \theta_D\} \in [0, 1] \times [0, 1]$ and that, in general, the court's priors are independently distributed in the same way, with cumulative distributions $G(\theta_P) = G(\theta_D)$ and densities $g(\theta_P) = g(\theta_D)$.⁴

As well as 'access', the court sells homogeneous services and does not price discriminate between P and D. In common with the examples given in Footnote 1, it sets a filing fee F that only P pays, and a per unit price of f for its services. The plaintiff buys q_P of these and the defendant buys q_D . These demands are the result of P and D maximising payoff functions $U_P(\theta_P) = u_P(\theta_P) - F - fq_P$ and $U_D(\theta_D) = u_D(\theta_D) - fq_D$, with respect to q_P and q_D respectively, where u_i , $i = P, D$, are the gross benefits to each party from the action: notice that, for simplicity, we assume US cost rules (we return to this in Section 4). In Appendix A we provide a particular example of how the demands $q_i(\theta_P, \theta_D, f)$, $i = P, D$, can be determined as the Nash equilibrium of a litigation game (based on Hause (1989)). It seems reasonable, as in our example, that these demands will increase with own case strength and decrease with f . The effects of the opponent's strength may be harder to predict, as is the case with our example. Reduced form gross surplus functions will, in general, be $u_i(q_i, q_j, \theta_i, \theta_j, f)$ for $i \neq j = P, D$.

⁴The assumption of independence may not always be realistic because a strong plaintiff will often be faced by a weak defendant (or *vice versa*), so $G(\theta_P, \theta_D)$ may be more appropriate. For reasons of tractability, much of our ensuing analysis assumes that θ_D is observable so that $G(\theta_D)$ can be ignored.

Notice that we must have $u_P > 0$ for P to wish to pursue the action and we assume that $u_D < 0$ to ensure that D desires its avoidance.

Bearing the above in mind, and assuming that the court has no capacity constraint, a constant per unit cost of c and fixed cost of K , we choose to write its problem when setting prices as

$$\max_{F, f} \int_0^1 \int_{\theta_P^*(F, f)}^1 [u_P(\cdot) + u_D(\cdot) - F - f(q_P + q_D)] dG(\theta_P) dG(\theta_D) \quad (1)$$

subject to

$$F[1 - G(\theta_P^*(F, f))] + (f - c) \int_0^1 \int_{\theta_P^*(F, f)}^1 (q_P + q_D) dG(\theta_P) dG(\theta_D) \geq K \quad (2)$$

where (2) is the court's break-even constraint: i.e. following the policy discussion in the Introduction, full cost recovery is one of the objectives when setting prices. Further, we allow for the possibility that the court wishes to exclude plaintiffs with sufficiently weak cases, $\theta_P < \theta_P^*(\cdot)$.⁵

Before proceeding to consider the solution, it is worth pausing to reflect on several features of the problem set out in (1) and (2). The objective func-

⁵The model could accommodate a 'multiproduct' court, where injunctions, directions, interim judgements, etc., may each have different prices; see generally Armstrong (1996). Assume that there are $k = 1, \dots, K$ services. Then P's probability of winning at trial could be given by $\sum_k q_P^k / \sum_k (q_P^k + q_D^k)$. Expenditure on services would be $F + \sum_k f_k (q_P^k + q_D^k)$. Complexity would arise from the cross-elasticities that this would create. Further, we could add other objectives, like minimising the probability of Type I and Type II errors; see Rubinfeld and Sappington (1987).

tion (1) assumes that welfare is the sum of the litigants' payoffs. This is a common assumption in models of litigation (see, for example, Gravelle (1989, 1990, 1993)). However, those models also include additional terms that our problem ignores: in particular, the deterrence effect of litigation on *ex ante* care levels (and hence the volume of litigation) and the valuable precedential externality that flows from court decisions (see Cooter *et al.* (1982)). Effectively, our welfare function is a static one that ignores the wider benefits of civil courts as social institutions whose activity is central to the protection of property rights and contracts. Whilst it would be possible to build a welfare function with these features (see the aforementioned references), we feel that our approach is useful for showing how the problem of determining prices may be embedded within a welfare maximising framework.

Next consider the constraint (2). Though reflecting a 'real world' policy position (in England and Wales for example), this ignores the fact that many court services are subsidised, not least in order to encourage the positive externalities produced by legal precedent. One way for the model to handle this would be to require fees only to cover a fraction (α) of K , thereby incorporating αK on the righthand-side of (2). As before, we feel that our model is a useful starting point for modelling court pricing so we ignore this issue in what follows. Clearly, such complications warrant further study.

3 Results

3.1 Filing fee (F)

Consider the first-order condition for F . Letting $\lambda \geq 0$ be the Lagrange multiplier on (2)⁶, we have

$$\begin{aligned} \frac{\partial \mathcal{L}}{\partial F} = & - \int_0^1 \int_{\theta_P^*}^1 dG(\theta_P) dG(\theta_D) - \int_0^1 [u_D^* - f q_D^*] g(\theta_P^*) \frac{\partial \theta_P^*}{\partial F} dG(\theta_D) \\ & + (1 + \lambda) \left\{ -F g(\theta_P^*) \frac{\partial \theta_P^*}{\partial F} + [1 - G(\theta_P^*)] \right\} \\ & - (1 + \lambda)(f - c) \int_0^1 (q_P^* + q_D^*) \frac{\partial \theta_P^*}{\partial F} g(\theta_P^*) dG(\theta_D) \end{aligned} \quad (3)$$

where $u_D^* = u_D(\theta_P^*, \cdot) < 0$ and $q_i^* = q_i(\theta_P^*, \cdot)$, $i = P, D$. Although it is possible to derive results with (3), the intuition is clearer if we make the simplifying assumption that D's case strength is observable (so that there is no need to integrate over θ_D). Employing this assumption and setting (3) equal to zero at the (interior) optimum, (3) becomes

$$\frac{F + \frac{u_D^* - f q_D^*}{1 + \lambda} + (f - c)(q_P^* + q_D^*)}{F} = \frac{\lambda}{1 + \lambda} \frac{1}{E_F} \quad (4)$$

⁶We return to the sign of λ later.

where (following Laffont and Tirole (1993), pp. 148–149) E_F is the (negative of) the *elasticity of participation with respect to F* .⁷ Equation (4) is a Ramsey-type formula once one appreciates that a change in F will alter participation and, in turn, will alter both P and D’s demands.⁸ As a result, this generates a revenue of $f - c$ per unit demand, which is part of the marginal ‘cost’ of the change in participation. Further, of course, a change in P’s participation level will impose a negative external effect on D since he will now have to defend the case. This effect of changing F is captured by the middle expression in the numerator in (4).

Clearly, the choice of F will depend on the sign of E_F .⁹ First consider $E_F > 0$, i.e. a higher value of F reduces plaintiff participation. In this case, in common with other Ramsey rules, (4) exhibits a negative relationship between the elasticity of participation and the value of F : when $E_F > 0$, the filing fee is lowered as drop-out becomes more sensitive to it. An additional implication of (4) is that a fixed fee will generally be optimal as the equation will generally be solved by $F > 0$. This is interesting because fixed filing fees

⁷This is expressed as

$$E_F = -\frac{\partial[1 - G(\theta_P^*)]}{\partial F} \frac{F}{1 - G(\theta_P^*)} = g(\theta_P^*) \frac{\partial \theta_P^*}{\partial F} \left[\frac{F}{1 - G(\theta_P^*)} \right]$$

⁸Note that the lefthand-side of (4) is an implicit function of F to the extent that (as we shall see) this affects θ_P^* . (F will not affect the marginal conditions that determine the q_i ’s.) In principle, this may slightly complicate the effects below—they may often be ignored because the indirect effects through θ_P^* will often be sufficiently small.

⁹Appendix B shows how the sign of E_F is determined.

have often been regarded as a regressive means of raising funds (see Civil Justice Council (2000)). Further, given $u_D^* - fq_D^* < 0$, it is clear that a higher filing fee (F) is required to achieve a given value of the righthand-side in (4) so that when $f < c$ a trade-off emerges between the two.

Now suppose that $E_F < 0$, so that participation *rises* with F . This can happen because changing P's participation may lower D's use of court services ($\partial q_D / \partial \theta_P \gtrless 0$) and, thus, raise P's gross surplus. The value of F may now be positive or negative (subsidies to plaintiffs) depending on whether $f \gtrless c$ and the size of $u_D^* - fq_D^* < 0$.

3.2 Per-unit fee (f)

We now turn to the setting of f . The general first-order condition (with θ_D unobservable) is given by

$$\begin{aligned}
\frac{\partial \mathcal{L}}{\partial f} = & \int_0^1 \int_{\theta_P^*}^1 \left(\frac{\partial u_P}{\partial q_D} \frac{\partial q_D}{\partial f} + \frac{\partial u_D}{\partial q_P} \frac{\partial q_P}{\partial f} - q_P - q_D \right) dG(\theta_P) dG(\theta_D) \\
& - \int_0^1 [u_D^* - fq_D^*] g(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} dG(\theta_D) \\
& + (1 + \lambda) \left\{ -Fg(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} + \int_0^1 \int_{\theta_P^*}^1 (q_P + q_D) dG(\theta_P) dG(\theta_D) \right. \\
& + (f - c) \left[\int_0^1 \int_{\theta_P^*}^1 \left(\frac{\partial q_P}{\partial f} + \frac{\partial q_D}{\partial f} \right) dG(\theta_P) dG(\theta_D) \right. \\
& \left. \left. - \int_0^1 (q_P^* + q_D^*) g(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} dG(\theta_D) \right] \right\} \tag{5}
\end{aligned}$$

It is useful to define the following expressions:

$$A_{ij} \equiv \int_0^1 \int_{\theta_P^*}^1 \frac{\partial u_i}{\partial q_j} \frac{\partial q_j}{\partial f} dG(\theta_P) dG(\theta_D) > 0, \quad i \neq j = P, D \quad (6)$$

$$Q_i \equiv \int_0^1 \int_{\theta_P^*}^1 q_i dG(\theta_P) dG(\theta_D) > 0, \quad i = P, D \quad (7)$$

$$Q'_i \equiv \int_0^1 \int_{\theta_P^*}^1 \frac{\partial q_i}{\partial f} dG(\theta_P) dG(\theta_D) < 0, \quad i = P, D \quad (8)$$

Expressions (7) and (8) are, respectively, the expected demand for court services from litigant i and the derivative of this with respect to f . Expression (6) can be thought of as the ‘adversarial’ demand for services, brought about by the effect of litigant i on litigant j .

Once again, further progress is aided by assuming that the strength of D’s case is observable to the court. Using this, plus (4) and (6)–(8), we can rewrite (5). Assuming an interior solution for f , we now have:

$$\begin{aligned} A_{PD} + A_{DP} + \lambda(Q_P + Q_D) + (f - c)(1 + \lambda)(Q'_P + Q'_D) &= g(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} \frac{\lambda F}{E_F} \\ \Rightarrow \frac{f - c}{f} &= \frac{\lambda}{1 + \lambda} \frac{\left[g(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} \frac{F}{E_F} - (Q_P + Q_D) \right]}{Q'_P + Q'_D} - \frac{A_{PD} + A_{DP}}{(1 + \lambda)(Q'_P + Q'_D)} \quad (9) \end{aligned}$$

Now define the (positive) price elasticity of *total* demand (e_f) and the (neg-

ative of the) elasticity of participation with respect to per unit fees (E_f).¹⁰

Then (9) becomes

$$\frac{f - c}{f} = \frac{\lambda}{1 + \lambda} \left[\left(\frac{1 - G(\theta_P^*)}{Q'_P + Q'_D} \right) \frac{E_f F}{E_F} + \frac{1}{e_f} \left(1 - \frac{A_{PD} + A_{DP}}{\lambda(Q_P + Q_D)} \right) \right] \quad (10)$$

To interpret (10), notice that the lefthand-side is a Lerner index for the mark-up of f over marginal cost. This varies inversely (as is usual) with the price elasticity of demand, provided that the adversarial demands are sufficiently small relative to the own demands (i.e. $(A_{PD} + A_{DP})/(Q_P + Q_D) < \lambda$): to the extent that the adversarial effects are second-order ones, this seems feasible. The first term on the righthand-side captures the extent to which using f or F is a better means of raising revenue. Assuming $\lambda > 0$ (so revenue ‘matters’), the court will set $f \gtrless c$ according to E_f/E_F . Suppose that both of these are positive, so that increases in both fees lead to lower participation.

If participation is more sensitive to f than F (i.e. $E_f > E_F$) then the court should set a relatively low per-unit fee (note that $Q'_P + Q'_D < 0$). In

¹⁰These are given by

$$e_f \equiv -\frac{(Q'_P + Q'_D)f}{Q_P + Q_D}$$

$$E_f \equiv -\frac{\partial[1 - G(\theta_P^*)]}{\partial f} \left(\frac{f}{1 - G(\theta_P^*)} \right) = g(\theta_P^*) \frac{\partial \theta_P^*}{\partial f} \left(\frac{f}{1 - G(\theta_P^*)} \right)$$

Notice that, like E_F , $E_f \gtrless 0$: see Appendix B.

other words, when the court has to raise revenue, it cannot afford to cut too many would-be cases out of the court system and, therefore, chooses a combination of f and F that encourages P to bring a case. In principle, it is possible that this effect may lead to $f < c$, i.e. less than full cost recovery on itemised court services. In this case, (4) tells us that the setting of F will also be affected. In particular, F will have to rise (for $E_F > 0$) to help achieve the overall objective of full cost recovery.

Finally, we address the question of whether $\lambda > 0$ (so that (2) binds), or $\lambda = 0$. Notice from (10) that $f = c$ when $\lambda = 0$ and that, given this, $F = -(u_D^* - fq_D^*) > 0$ from (4). Thus, necessary conditions for the revenue constraint not to bind are that it is optimal to set per unit charges at marginal cost and the ‘entry fee’ equal to the disutility imposed on D from being brought into the litigation. Effectively, once individual services are paid for ($f = c$), the other cost to cover is (some fraction) of the externality imposed on D when bringing the case. The natural maximum one would choose for this is the total cost experienced by D (i.e. $u_D^* - fq_D^*$) and it is this that P is forced to internalise. These conditions are not, however, sufficient since (2) tells us that $\lambda = 0$ also requires $-(u_D^* - fq_D^*) \geq K/[(1 - G(\theta_P^*)]$, i.e. the representative D’s costs are sufficiently higher than the court’s fixed cost of running the case—an empirical matter.

4 Discussion and extensions

We have shown that optimal pricing of court services will generally involve lump-sum filing fees and per unit charges. This is so despite concerns about the effects of such costs on access to justice. We have also shown, however, that a trade-off can exist between the filing fee and the per-unit fees so that subsidy may take place on, say, itemised court services without jeopardising full cost recovery.

These are important insights for an area where, understandably, debate may sometimes lose sight of the need for rational assessment of the policy options. We believe the framework put forward above is a useful starting point for considering issues of access to justice, efficiency and funding of court services when setting court fees. Of course, a useful framework should also point the way to analysis that can further illuminate matters. Thus, we end the paper by suggesting several extensions that would provide a research agenda for further work.

4.1 UK cost rules

In Britain (and parts of Europe) the winner's legal costs are paid by the losing party. In the US, both parties pay their own costs regardless of outcome. Assuming (as in Appendix A) that the parties agree on the probabilities of

win/loss at trial, these would not change the *aggregate* net surplus function in (1) as this simply nets off the total costs of the case from the total gross payoffs (see Reinganum and Wilde (1986)). Of course *individual* payoffs would differ (as demonstrated in Appendix A), so the Nash service demands would differ too. From Hause (1989), the UK demands would be higher because the UK rule triggers an ‘arms race’ where costs escalate as the parties attempt to offload them on the opponent. Thus, the model can accommodate these changes. It would be an interesting exercise to compare the court charges under each rule: it seems likely that numerical simulation would be required here.

4.2 Low income groups

Our model would generate an ‘efficient’ cut-off θ_P^* in the sense that weak cases would be deterred. However, the access to justice debate surrounding fees typically refers to people with *strong* cases being unable to bring their cases because of the cost being too high.

One might explore this issue more fully if the individual maximisations described in Appendix A were carried out subject to an income (m) constraint: e.g. $F + fq_P \leq m$, generating Marshallian demands $q_P(\cdot, m)$. Then, if m were distributed (independent of θ_P) some low income cases would be

included above θ_P^* with the result that they would not be brought, despite being efficient.

4.3 Further models of nonlinear pricing

Recent literature on nonlinear pricing suggests that our model may place too many constraints on the available prices. For example, we do not allow prices to differ across litigants (i.e. no ‘quantity discounting’). This may be optimal in some settings, though see Armstrong and Vickers (2001) and Rochet and Chon (1998) for analyses examining this claim. Further, we could think of the court as a multiproduct monopolist and examine the range of prices it should charge for its services (see Armstrong (1996)). Alternatively, Rochet and Stole (2002) allow for randomness in the buyer-seller matching process and this seems to capture the important fact that litigants rarely plan *ex ante* to meet each other in court. Each of these papers suggests that the optimal price set for a regulated monopolist’s output (e.g. a court’s services) will be a delicate balance of access, efficiency and funding issues as well as the information available and the nature of the ‘matching process’ taking place prior to litigation. Developing the model we have presented along these lines may provide valuable insights into the principles that should govern these prices.

4.4 The welfare framework

We close by returning to the discussion of our welfare framework in Section 2. We note that our utilitarian set-up can be amended to reflect more closely welfare functions in the literature, not least by incorporating *ex ante* care levels and the value of legal precedent. This latter point also highlights the static nature of the way we have set up the problem. In addition, our modelling of full-cost recovery, while reflecting elements of current policy debate, does not capture the subsidies that may be needed to ensure that sufficient precedential externalities are produced by use of the legal system. In practice, fees that do not allow for such precedent may have several effects. To begin, they could prevent legitimate attempts to protect contracts and property rights in future. Second, they may encourage the use of increased legislation in order to substitute for a reduced level of case law. Third, they may prevent the challenging of inefficient legislation, thereby potentially impeding the efficient protection of property rights that legal systems typically aim to achieve (see Coase (1960), Cooter *et al.* (1982)). In each situation, the evolution of the legal institutions involved will be affected by the choice of legal fees.¹¹

¹¹Indeed, the level of fees may influence the evolution of legal institutions in another way. It is possible to imagine a domestic court system pricing itself out of the adjudication market in the face of cheaper competition from various arbitration services and/or overseas courts (especially in the case of commercial work).

Whilst acknowledging these omissions from our model, and their possible implications, we have argued that our approach is a helpful one for beginning to analyse the determination of court pricing. Certainly, policy makers express varying objectives for these fees and it is important to develop frameworks for evaluating these and the trade-offs they may generate. Of course, issues such as those listed above go to the heart of the wider social role played by the courts and should form part of any research agenda flowing from this paper.

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Appendix

A An example of demands

To confirm that an established model of litigation produces the demands for services we have assumed, imagine that P's net payoff from bringing the case is

$$U_P(\theta_P) = \frac{q_P}{q_P + q_D} \theta_P x - F - f q_P$$

where x is the commonly observed level of damages at stake and we have assumed US cost rules.¹² Thus, a stronger P (higher θ_P) expects to receive more from the case. Also, the sense in which use of the court helps improve the decision is captured: if $q_P = 0$ then P cannot win regardless of the strength of his case (θ_P).

¹²Under UK rules, P's equivalent payoff would be

$$U_P^{UK} = \frac{q_P}{q_P + q_D} \theta_P x - \left(1 - \frac{q_P}{q_P + q_D} \theta_P\right) (F + f q_P + f q_D).$$

Now consider D. Once the case is brought, he must defend it. Failure to do so would result in the court awarding a default judgement to P. Thus, if D does nothing ($q_D = 0$) he can expect to pay out $\theta_P x$ (since $q_P/(q_P + q_D) = 1$ when $q_D = 0$). Thus, his net payoff from using the legal system is

$$U_D(\theta_D) = \theta_P x - \frac{q_P}{q_P + q_D} \theta_D x - f q_P$$

If the two parties play a Nash game in court services it is straightforward to show that the pure strategy equilibrium is given by

$$q_P^N = \Theta_P^2 \frac{\theta_D x}{f}, \quad q_D^N = \Theta_D^2 \frac{\theta_P x}{f}$$

where $\Theta_i \equiv \theta_i/(\theta_P + \theta_D)$, $i = P, D$. More generally, the Nash demands on court services are $q_i(\theta_P, \theta_D, f)$, $i = P, D$. Both parties' demands rise with the damages at stake and fall with the per unit price of court services. Also, some rearrangement yields

$$\frac{\partial q_i^N}{\partial \theta_i} = \frac{2x}{f} \Theta_i^2 \Theta_j > 0, \quad i = P, D$$

and

$$\frac{\partial q_i^N}{\partial \theta_j} = \frac{x}{f} \Theta_i^2 (1 - 2\Theta_j) \gtrless 0, \quad i, j = P, D, i \neq j$$

Thus, demands rise in own strength but litigant i 's demand will only rise in litigant j 's strength if i 's strength is sufficiently great: i.e. $\Theta_j < \frac{1}{2}$. The former of these is important: it is analogous the Laffont and Tirole (1993)'s assumption that 'higher θ ' consumers value the product more in their standard model of optimal regulated prices; in our model, this is true because the productivity of court services is higher.

B The elasticities

It is clear from Footnote 7 that $\text{sign } E_F = \text{sign } \partial\theta_P^*/\partial F$. We must therefore sign the latter derivative. Note that θ_P^* is defined by

$$u_P(q_P(\theta_P^*, \theta_D, f), q_D(\theta_P^*, \theta_D, f), \theta_P^*, \theta_D, f) - F - f q_P(\theta_P^*, \theta_D, f) \equiv 0$$

Then the implicit function theorem (and the envelope theorem) tells us that

$$\frac{\partial\theta_P^*}{\partial F} = \frac{1}{\frac{\partial u_P}{\partial \theta_P} + \frac{\partial u_P}{\partial q_D} \frac{\partial q_D}{\partial \theta_P}} \begin{matrix} \geq \\ \leq \end{matrix} 0$$

Thus, $E_F \begin{matrix} \geq \\ \leq \end{matrix} 0$. This is also true of E_f because

$$\frac{\partial\theta_P^*}{\partial f} = \frac{\partial\theta_P^*}{\partial F} \left(q_P - \frac{\partial u_P}{\partial q_D} \frac{\partial q_D}{\partial f} \right) \begin{matrix} \geq \\ \leq \end{matrix} 0.$$