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Abstract

We develop a model of venal judicial offices, *i.e.*, sales of public positions in the judicial sector, which were used extensively in France (and many other European countries) during the 17th and 18th centuries, and which led to vastly improved French State capacity despite limited opportunities to raise taxes and to borrow. In this model, venality provides financial resources for the ruler, at the cost of less control over judicial decisions. We rely on this model to provide an analytic narrative of the rise and the decline of venality in Old Regime France.

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> Fourthly it is a question, whether public employments should be venal? They ought not, I think, in despotic governments, where the subjects must be instantaneously placed or displaced by the prince. But in monarchies this venality is not at all improper, by reason it is an inducement to undertake that as a family employment, which would never be undertaken through a motive of virtue; it fixes likewise every one to his duty, and renders the several orders of the kingdom more permanent. Montesquieu (1748 [1989])

> What can be more savage, than to see a nation where, by lawful custom, the office of a judge is bought and sold, where judgments are paid for with ready money, and where justice may legitimately be denied to him that has not the wherewithal to pay; a merchandise in so great repute, as in a government to create a fourth estate of wrangling lawyers, to add to the three ancient ones of the church, nobility, and people... Montaigne (1564 [2004])

1 Introduction

Raising taxes to finance public goods or war is not always possible nor desirable for a national ruler. For instance, increasing taxes may entail granting a minimum of representation, and thus sharing power. But instead of raising taxes the ruler could also let citizens pay *directly* for public services but *indirectly* for war. All the ruler has to do is to choose the rules, the framework and missions of the public service suppliers, and sell the public positions associated with the supply of those services. The buyers of public positions, in turn, are compensated by the citizens who use their services. Historically, this alternative road to financing public expenditures was used in Old Regime France through the sale of offices. Venal offices notably included the entire judiciary and most legal professions. Judicial office venality is an example of a privatized of public services. Interestingly, while there have been mass privatization programs in many countries in the last forty years, the judicial sector remains to a large extent publicly organized (notably in Europe).

To better understand judicial office venality we first develop a model in which a ruler faces a broad set of judges, each of whom is characterized by a certain intrinsic probability to favor the plaintiff.

The judge, however, is inclined to further support the plaintiff since so doing increases both the number of suits and the fees paid by the litigants. But deviating from the intrinsic probability to support the plaintiff is also costly for a judge. As a result, not all judges fully support the plaintiff. The ruler receives a share of the fees paid by the litigants and is characterized by his own probability to support the plaintiff. Therefore, for the ruler there is a tradeoff between selling offices (which, in a model amounts to receiving a share of the litigants' fees) at the cost of losing control of the judiciary, and appointing judges who strictly apply the ruler's policy (but who have to be paid out of meager fiscal resources). We pay special attention to a specification of the model that enables us to study how the above tradeoff is affected by a change in the distribution of judges' characteristics. An example illustrates the case where a more diverse set of judges leads to both a decrease in the share of the fees received by the ruler and an increase in the difference between the ruler's first-best regarding the plaintiff and actual judicial decision-making.

Secondly, we rely on this analysis to provide an analytic narrative of the rise and the decline of venality in Old Regime France. Royer et al. (2016) estimates that the number of judges during the Old Regime was higher than in modern France, which is twice what it was under the Old Regime. In terms of constructing state capacity, venality was a successful policy as it enabled the French monarchy, which had initially limited coercive power, to take wealth from its subjects, and increase the size of the state at the same time. But venality also reinforced legal diversity, which was already a major problem of the French Old Regime (Crettez et al. (2018)). People also complained about judges who extracted judicial fees by lengthening the duration of trials.

This paper contributes to different strands of literature. It first contributes to the literature on legal design, and more specifically to the issue of how to select and finance the judiciary (see Gaukrodger (2017), for a recent review of the different compensation systems for adjudicators). In this connection, Allen (2005) analyzes how to design public employment, including the judiciary, in the presence of monitoring problems, and focuses on English legal history. He finds that when civil servants are difficult to monitor, office venality can be a good choice if private incentives are aligned with the ruler's objectives. Where private incentives conflict with the ruler's objectives, patronage is a better alternative. Here, the perspective is different since we concentrate on judicial venality and more specifically on the determination of trial fees as well as their sharing between the ruler and the judges. This paper is also related to Glaser et al. (2001) who study the choice between judges or regulators as a means to enforce laws and contracts. Relying on a regulator makes sense more particularly when transactions are highly specialized and technical (in this case, it is not always easy to find competent judges, nor is it easy to control their salaries).

We also contribute to the study of the design of the optimal degree of centralization of the production of legal rules. Glaeser and Shleifer (2002) analyze legal centralization in the presence of vertical conflicts of interests between the central ruler and local agents and focus on the comparison of the French and English legal systems in the Middle Ages. Glaeser and Shleifer (2002) argue that in the Middle Ages, France chose to let royal judges make judicial decisions (leading later to a centralized legal system) because local lords feared their neighbors more than the king. Contrary to France, England chose a system of juries (leading later to a judge-made legal system) to counterbalance the overweening power of the king.[1] In a similar vein, Arruñada and Andonova (2005) studied how to protect freedom of contract where there is a choice between decentralized judge-made law and national legislation applied by constrained local judges. Because judges in eighteenth-century France were considered as opposing free markets and contractual equality, granting them judicial discretion would have threatened the development of a modern market economy. On the contrary, legal centralization and control over the judiciary allowed the freedom of contract to be protected. This is why France chose legal centralization and enacted the Napoleonic Civil Code in 1804. Arruñada and Andonova (2005), however, do not consider judicial venality as such, as opposed to what we do in this contribution. Loeper (2011) shows that legal uniformity can be Pareto-dominated by the Nash non-cooperative equilibrium even if legal diversity is costly for each local region. In his approach a local region weighs the gain of being closer to others against the costs of being farther from its own legal preferences. Legal uniformity is too costly since it imposes too much similarity in regional laws and hence not enough satisfaction is gained from local preferences. Crettez et al. (2018) argue that legal uniformity can be desired *per se* because of aversion to inequality before the law. They show that there is a threshold such that when the intensity of aversion to inequality before the law is below this threshold legal decentralization is preferred to legal centralization (and conversely). They also show that the optimal way to balance the desire for local adjustments and

[1] The subversion of legal institutions by the wealthy and the politically powerful is further addressed in Glaeser et al. (2003).

national uniformity is to have nationally uniform rules that can be adapted by judges. Here, we follow a far less aggregated approach than in Loeper (2011) and Crettez et al. (2018). We are closer in spirit to the contribution of Glaeser and Shleifer (2002), but we concentrate on the venality of offices issue.

Further, the present work is connected to the literature on state capacity. State capacity refers to the ability of a state to implement policies, and provide public goods (Besley and Persson (2011), Johnson and Koyama, Mark (2017)). It includes fiscal and legal capacities. Fiscal capacity is the state's ability to raise the minimum amount of fiscal resources needed to finance state services whereas legal capacity is its ability to define and apply the rule of law to all citizens. Fiscal and legal capacities are connected since the former is best achieved if a certain degree of centralization and legal uniformization prevails, resulting in economies of scale in the process of tax collection. Johnson and Koyama (2014) focus on 18th-century France and argue that to finance its wars the French monarchy started to centralize its fiscal system and harmonize legal rules throughout the kingdom. On the other hand, Stasavage (2003) argues that because representative institutions were not reformed, France borrowed at a higher interest rate than England did during the 18th century. We complete the foregoing contributions by studying the role of judicial venality in the construction of state capacity.

Lastly, we contribute to the litigation literature by paying attention to the venality of judicial offices. More precisely we revisit the model of trial with optimistic litigants (see *e.g.*, Landes (1972), Shavell (1982) and Barg-Gill (2005)) by introducing a venal judge.

The remaining part of the paper unfolds as follows. In the next section, we present a model of litigation with judicial venality. We use this model in section 3 to study the interactions between a national ruler and a large set of venal judges. We specifically pay attention to the sharing of trial fees. Section 4 studies the effect of an increase in the diversity of judges' characteristics on the sharing of trial fees, as well as on the ruler's objective function. To facilitate the analysis, a specific example is introduced and studied. Section 5 is devoted to a brief historical presentation of venality in judicial offices in French Old Regime. Relying on the model of the previous section, we also provide an analytical narrative of the evolution of venality. Some concluding remarks are offered in section 6. All the technical proofs are relegated to an appendix.

2 Model

There are three kinds of agents, the litigants, the judges, and the ruler (*i.e.*, the State). We first analyze a typical trial, where two litigants, a plaintiff and a defender, meet a venal judge. Afterwards, we consider the relationship between the venal judges and the ruler.

2.1 Optimistic litigants

We consider a version of the canonical model of litigation where optimistic litigants must pay fees to the judge handling their trial.[2] In this model the litigants include a plaintiff and a defendant. Let p^e be the expected probability perceived by the two litigants that the plaintiff will win his lawsuit (this probability is common knowledge and will turn out to be *judge* dependent). Let C_p be the cost of the lawsuit for the plaintiff, and C_d the cost for the defendant.

If the plaintiff wins the lawsuit, the defendant pays his own costs and a share γ of the trial costs borne by the plaintiff. If the plaintiff looses the lawsuit, he pays his own costs and a share α of the defendant's trial costs. The expected cost k_p of a lawsuit for the plaintiff is then

$$k_p = C_p(1-\gamma p^e) + C_d\alpha(1-p^e), \tag{1}$$

while the expected cost k_d of a lawsuit for the defendant is

$$k_d = C_p\gamma p^e + C_d[1-\alpha(1-p^e)]. \tag{2}$$

While the litigants both expect the plaintiff to win his lawsuit with probability p^e, they have different estimates of the sum that the defendant is ordered to pay if the plaintiff is victorious.[3] That is, we assume that the plaintiff's guess is D_p whereas the defendant's is D_d, where $D_d < D_p$. This inequality reflects the fact that both the plaintiff and the defendant are optimistic: the plaintiff expects to receive an amount higher than the sum that the defendant expects to give.

[2] The canonical model where trial is chosen over a settlement by over-optimistic agents was developed among many others by Landes (1972), Shavell (1982) and Barg-Gill (2005).

[3] The plaintiff receives nothing if he loses his lawsuit.

Under the foregoing assumptions, the expected gains of the plaintiff and the defendant are respectively given by

$$U_p = p^e D_p - k_p, \tag{3}$$

$$U_d = -p^e D_d - k_d. \tag{4}$$

The two parties can negotiate an out-of-court settlement in order to avoid the litigation costs associated with a lawsuit. Pre-trial bargaining is chosen over a lawsuit whenever

$$p^e D_p - k_p < p^e D_d + k_d, \tag{5}$$

Parties file suit whenever condition (5) does not hold. This is the case when

$$C_p + C_d \leq p^e (D_p - D_d). \tag{6}$$

2.2 Litigation and venality

The main difference with the standard model is that under venality, a judge owns his office and therefore tries to increase the trial fees paid by the litigants (formally, a judge can choose C_p and C_d).[4] This can actually be done by controlling the trial length, for instance by pretending that there is a need to gather more information. Formally, this means that a judge can *choose* the value of $C_p + C_d$. To maximize his gain, a judge should set the litigation fees so that

$$C_p + C_d = p^e (D_p - D_d). \tag{7}$$

Under this condition, litigants are just indifferent between going to courts and negotiating an out-of-court settlement.[5]

Of course, a judge should also make sure that the plaintiff is not worse-off when filing a suit, *i.e.*,

$$k_p \leq p^e D_p, \tag{8}$$

[4] For simplicity we disregard the litigation costs that do not involve judges (*i.e.*, advocates).

[5] We assume that forum-shopping is impossible.

which implies that

$$C_p \gamma p^e + C_d[1 - \alpha(1 - p^e)] \leq p^e D_p. \tag{9}$$

We notice, however, that any pair (C_p, C_d) satisfying condition (7) also satisfies condition (9).[6]

As previously mentioned, under a venality regime, offices are bought by judges. In order to simplify the analysis, we capture this fact by assuming that a share ϕ of the trial fees goes to the ruler.[7] Hence the judge's net gain is: $(1-\phi)p^e(D_p - D_d)$. A judge, however, would be better off by further favoring the plaintiff, namely, acting in such a way that $p^e = 1$.

However, a judge is not at liberty to *always* favor the plaintiff. More precisely, we assume that in the absence of venality, a judge i facing a lawsuit would favor the plaintiff with a probability p_i. We thus assume that this probability is *judge dependent* and we will call it his natural or intrinsic propensity to favor the plaintiff. There are many reasons why the probability to favor a plaintiff may be different from one judge to another: *e.g.*, unclear laws, variations in courts' information, or interpretation, political views, and so on. More formally, we assume that p_i is distributed over $[0,1]$ according to a probability distribution function F which has a density f.

Furthermore, we suppose that the cost for judge i of deviating from p_i is equal to

$$\frac{\rho}{2}(p^e - p_i)^2, \tag{10}$$

where ρ is a positive parameter.[8]

This cost can refer to several factors: a) the cost of deviating from one personal opinion, b) the cost of deviating from the law as it is commonly perceived, c) the cost of being overturned by an appeal court and so on.

[6] That is because both γ and $1-\alpha(1-p^e)$ are lower than one.

[7] In the appendix A we study the relationship between ϕ, the value of trial fees, and the price of a judge's position. In particular, we argue that the price of a judge's position is the present value of the trial fees net of the share received by the ruler. Because of this relationship, it not necessary to pay special attention to the price of a judge's office.

[8] For simplicity, parameter ρ does not depend on judges' types.

To sum up, we suppose that the judge's behavior is given by the solution to the following problem

$$\max_{0 \le p^e \le 1} \left\{ (1-\phi) p^e (D_p - D_d) - \frac{\rho}{2} (p^e - p_i)^2 \right\}. \tag{11}$$

The solution to this problem depends on p_i, the judge's propensity to favor the plaintiff absent venality, and it is given as follows

Proposition 1. *Under venality, a judge whose natural propensity to favor the plaintiff is p_i actually favors him with probability $p^e(p_i)$, where*

$$p^e(p_i) = \begin{cases} p_i + \frac{(1-\phi)}{\rho}(D_p - D_d) & \text{if } p_i \le 1 - \frac{(1-\phi)}{\rho}(D_p - D_d), \\ 1, & \text{otherwise}. \end{cases} \tag{12}$$

Clearly, the probability $p^e(p_i)$ increases with p_i and $D_p - D_d$ (the difference in the assessment of damages by the litigants), and decreases with ϕ (the share of the trial fees accruing to the ruler) and ρ (the cost of deviating from one's natural propensity to favor the plaintiff).

The next section addresses the optimal design of judicial office venality from the ruler's viewpoint.

3 Legal Design and the Venality of Judicial Offices

In this section, we first consider the ruler's payoff. Then, we study the choice between the venality of judicial offices and a legal system where the ruler directly controls judges' decisions.

3.1 The ruler's payoff

To simplify the analysis, assume that all the plaintiffs estimate that the sum the defendants are ordered to pay for them if they are victorious is D_p, whereas all defendants estimate that this sum is D_d. Also recall that there is a continuum of judges whose natural propensities p_i to favor the plaintiff belong to $[0,1]$.

Furthermore, assume that the ruler has its own opinion about the right probability to favor the plaintiff[9], which we denote by p_S. In addition, suppose that the cost for the ruler of having a

[9] In Glaeser and Shleifer (2002), the ruler and the private agents have different estimates of D.

judge's propensity $p^e(p_i)$ different from p_S is $\frac{\psi}{2}(p^e(i) - p_S)^2$. Finally, suppose that the ruler's payoff reflects the two previous considerations as follows

$$W_S = \int_0^1 \phi p^e(p_i)(D_p - D_d) f(p_i) dp_i - \frac{\psi}{2} \int_0^1 (p^e(p_i) - p_S)^2 f(p_i) dp_i. \quad (13)$$

In this expression the first term represents the payments received from the judges (recall that they pay a fraction ϕ of the trial fees back to the ruler). The sum of these payments notably depends on the distribution of the judges' natural propensities p_i to favor the plaintiff. The more distribution is concentrated on higher values of p_i, the higher the income received by the ruler.

The second part of the ruler's objective represents the cost of the deviation from the ruler's standard p_S. This reflects the cost for the ruler of independent judges deciding cases on the basis of their own preferences. This cost depends on the parameter ψ which is the relative cost of the deviation from p_S in terms of the ruler's income.

3.2 The case for the venality of judicial offices

Where there is no venality of judicial offices, the ruler's income is nil (because $\phi = 0$). Moreover, we assume that the ruler is able to control the judiciary and force them to favor the plaintiff with a probability equal to p_S. Thus, $p^e(p_i) = p_S$ for all p. All these facts imply that $W_S = 0$.

Venality of judicial office is therefore the best decision whenever

$$W_S = \int_0^1 \phi p^e(p_i)(D_p - D_d) f(p_i) dp_i - \frac{\psi}{2} \int_0^1 (p^e(p_i) - p_S)^2 f(p_i) dp_i \geq 0. \quad (14)$$

This condition can be rewritten as

$$W_S = \phi \mathbb{E}[p^e(p)](D_p - D_d) - \frac{\psi}{2} \left[\mathbb{V}[p^e(p)] + \left(\mathbb{E}[p^e(p)] - p_S \right)^2 \right] \geq 0. \quad (15)$$

where $\mathbb{E}[p^e(p)]$ is the expected value of the $p^e(p_i)$ and $\mathbb{V}[p^e(p)]$ their variance.

Inspecting the value of W_S in (15) we see that the venality of judicial offices is more likely to be chosen

- when the variance of the actual propensities to favor the plaintiff $\mathbb{V}\left[p^e(p)\right]$ is low (holding $\mathbb{E}\left[p^e(p)\right]$ constant);

- when the ruler's preferred propensity p_S nears the expected propensities of judges to favor the plaintiff $\mathbb{E}\left[p^e(p)\right]$;

- when the relative cost of the deviation ψ is small.

We shall now suppose that ϕ is actually chosen by the ruler, and thus depends in turn on all the parameters of his problem. We study this dependence next.

3.3 Optimal levy on trial fees

Using Proposition 1 we can rewrite the ruler's objective as follows

$$\begin{aligned} W_S(\phi) = \phi \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} & p^e(p_i)\left(D_p - D_d\right) f(p_i) dp_i \\ & + \phi(D_p - D_d)\left(1 - F\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\ & - \frac{\psi}{2}\int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} \left(p^e(p_i) - p_S\right)^2 f(p_i) dp_i \\ & - \frac{\psi}{2}(1-p_S)^2\left(1 - F\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right). \end{aligned} \tag{16}$$

In the appendix we show that there is an optimal value for the levy ϕ on trial fees. This value, of course, is higher than zero as $W_S(0) < 0$. More precisely, choosing a levy equal to zero brings about no fiscal revenue, and neither ensures that judges' propensities to favor the plaintiff are equal to p_S: in that case, the ruler would be better off not choosing venality of judicial offices in the first place. The optimal value of the levy on trial fees is less than one under the conditions stated in the following Proposition.

Proposition 2. *The optimal levy on trial fees ϕ^* is less than one if, and only if,* $\mathbb{E}[p_i] < \frac{\frac{\psi}{\rho}}{1+\frac{\psi}{\rho}} p_S$.

The gist of the Proposition is as follows. Assume that the ruler sets ϕ equal to 1 and consider the effect of a marginal decrease in ϕ by an amount ε. Notice that when $\phi = 1$, the judges no longer specially favor the plaintiffs (that is, beyond their natural propensity to do so) and the ruler receives the total values of the trial fees. When the levy on trial fees decreases by an amount ε, the ruler's loss is $\varepsilon \times (D_p - D_d)\mathbb{E}[p_i]$, *i.e.*, a fraction ε of the total values of the trial fees. But a marginal decrease in ϕ also leads judges to favor the plaintiffs slightly more (compared to their natural propensity to do so). When the expected natural propensity is lower than $\frac{\psi}{\rho}/(1+\frac{\psi}{\rho})p_S$, a marginal decrease in ϕ makes the propensities $p^e(p_i)$ closer to p_S, which *decreases* the ruler's cost of the deviation of judges' decisions from p_S. Under the condition stated in the Proposition, the second effect dominates the first one and therefore, the ruler is better-off by decreasing the levy on trial fees.

To be sure, the shape of the distribution function of the p_i matters for the determination of the optimal levy on trial fees. It would then be interesting to see how a change in this shape modifies the optimal values of that levy. As this task is a somewhat intricate to accomplish in general, we shall restrict ourselves to considering an example. This example is studied in the next section.

4 Judges' Characteristics and the Optimal Levy on Trial Fees: An Example

This section presents an example where an increase in the diversity of judges' natural propensities to favor the plaintiffs causes the ruler's payoff to fall (notably, but not only, because such a change is conducive to a decrease in the optimal levy on trial fees).

In our example the set of natural propensities p_i is distributed according to a version of the uniform law. Specifically, we assume that the density of the distribution is equal to 2β on the set $[0,1/2]$ and $2(1-\beta)$ on the set $[1/2,1]$, where β is in $[0,1/2]$. The graph of this variant of the uniform law for $\beta = 0.4$ is depicted on figure 1.

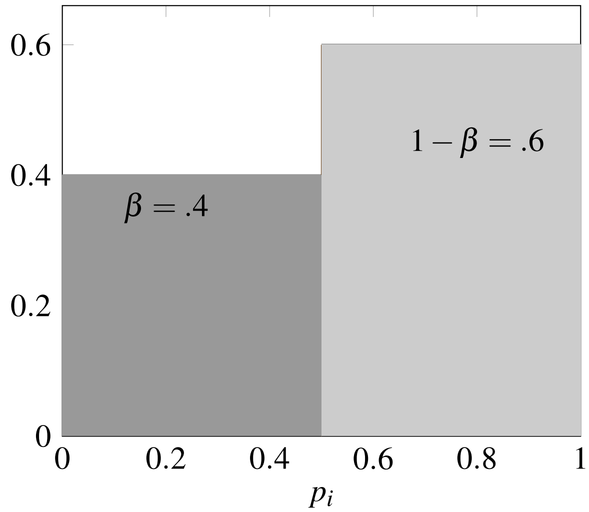

Figure 1: A Variant of the Uniform Law
corollary

It can be shown that the mean of the distribution is[10]

$$\mathbb{E}[p_i] = \frac{3-2\beta}{4}, \tag{17}$$

and its variance is

$$\mathbb{V}[p_i] = \frac{1+12\beta(1-\beta)}{48}. \tag{18}$$

We see that the mean decreases with β whereas the variance increases with β. As β increases, the values in $[0,1/2]$ have more weight whereas those in $[1/2,1]$ have less, which is why there is a decrease in the mean of the distribution. This also explains why the variance of this distribution increases.

Now using the above distribution we can compute the value of the ruler's payoff. We shall do this under the assumption that

$$1 < \frac{\rho}{D_p - D_d} < 2. \tag{19}$$

[10] All the computational details are available in the appendix.

To compute the value of the ruler's payoff, we begin by computing the mean of $p^e(i)$. This value is given by

$$\mathbb{E}[p^e(p)] = \begin{cases} 1-\beta\left[1-\frac{1-\phi}{\rho}(D_P-D_d)\right]^2, \text{ if } \phi \in \left[0, 1-\frac{\rho}{2(D_p-D_d)}\right] \\ \frac{3}{4}-\triangle(\phi)^2+\triangle(\phi)-\beta\left(\frac{1}{2}-\triangle(\phi)^2\right), \text{ when } \phi \in \left[1-\frac{\rho}{2(D_p-D_d)}, 1\right] \end{cases} \tag{20}$$

where

$$\triangle(\phi) = \frac{1-\phi}{\rho}(D_P-D_d). \tag{21}$$

Notice that the expected value of $p^e(p)$ decreases with respect to β. We can also show that when $\phi \in \left[0, 1-\frac{\rho}{2(D_p-D_d)}\right]$, the fiscal income $\phi(D_p-D_d)\mathbb{E}[p^e(p)]$ increases with ϕ. Its evolution is indeterminate when ϕ is in $\left[1-\frac{\rho}{2(D_p-D_d)}, 1\right]$.

The cost of legal diversity is as follows

$$\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i = \frac{2\beta}{3}\left[(1-p_S)^3-(\triangle(\phi)-p_S)^3\right] \tag{22}$$

$$-2\beta(1-p_S)^2(1-\triangle(\phi)) \tag{23}$$

if $\phi \in [0, 1-\frac{\rho}{2(D_p-D_d)}]$ and

$$\frac{2\beta}{3}\left[\left(\frac{1}{2}+\triangle(\phi)-p_S\right)^3-(\triangle(\phi)-p_S)^3\right]+\frac{2(1-\beta)}{3}\left[(1-p_S)^3-\left(\frac{1}{2}+\triangle(\phi)-p_S\right)^3\right]$$
$$+2(1-\beta)(1-p_S)^2\triangle(\phi) \tag{24}$$

if $\phi \in \left[1-\frac{\rho}{2(D_p-D_d)}, 1\right]$. We can show that this cost is convex increasing when p_S takes high values.

Whe have the following result.

Proposition 3. *Let* $\bar{\phi} = 1-\frac{\rho}{(D_P-D_d)}$. *Assume that:*

1. $\frac{1}{2} < \frac{D_p-D_d}{\rho} < 1$.
2. $\frac{1}{2}\left(1+\frac{D_p-D_d}{\rho}\right) < p_S$.

3. $W_S(\bar{\phi}) > 0$, *and* $\frac{\partial W_S(\bar{\phi})^-}{\partial \phi} < 0$.

4. $\max\{4(1-\beta)(1-p_S)^2, 2(1-\beta)(1-p_S)\} < \frac{\beta}{1-\beta}$.

5. $\frac{\partial W_S(\bar{\phi})^+}{\partial \phi} < 0$.

Then the maximum of the ruler's payoff is achieved at a unique positive value ϕ^* *which is lower than* $\bar{\phi}$.

The Proposition provides sufficient conditions for the function W_s to be concave and to be such that the optimal levy is located at a unique point in $]0, \bar{\phi}[$. Figure 2 illustrates the Proposition for the cases where $\beta = .4$ and $\beta = .6$, and where the other parameters are given by: $D_p - D_d = 3$, $\psi = 15$, $\rho = (8/7)(D_p - D_d)$ and $p_S = (1/2) \times ((7/8) + 1)$.[11]

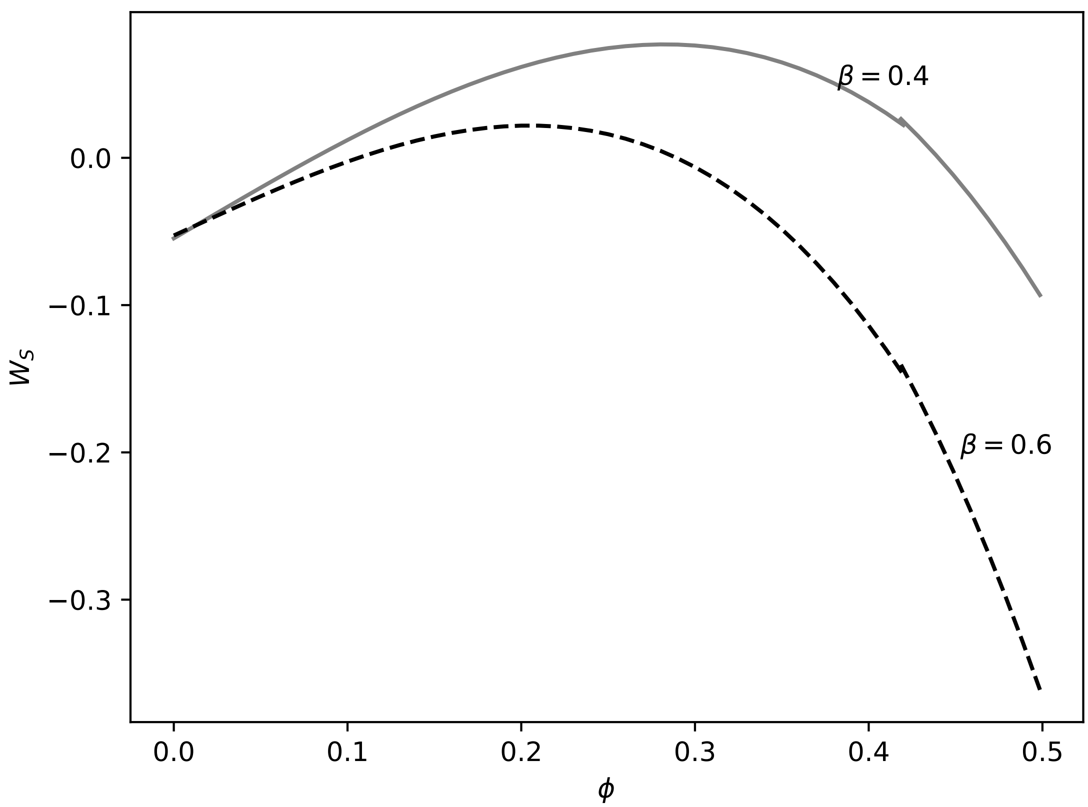

Figure 2: Effect of a change in β on the ruler's welfare

[11] One can check that this numerical example satisfy of all the assumptions of the Proposition above.

Let us turn to comparative statics of the optimal levy. It is possible to solve for the value of the optimal extraction rate but the expression is actually rather complicated. What we are interested in, however, is not the exact expression *per se*, but how the optimal levy changes with the different parameters. To do this we can apply the Implicit function Theorem to the equation $\frac{\partial W_S}{\partial \phi} = 0$. We have

Proposition 4. *Assume that the assumptions of Proposition 3 hold. Then both the optimal tax levy* ϕ^* *on trial fees and the ruler's payoff are decreasing with* β.

Figure 2 also illustrates the Proposition above. When β increases from 0.4 to .6 the maximum value of the ruler's welfare decreases and it is realized with a lower value of ϕ.

The gist of the above proposition is as follows. When β increases, there are more judges whose p_i are less than $1/2$. Correspondingly, the values of $p^e(p_i)$ are lower (in probability). Thus, an increase in β leads to a *decrease* in the resources collected by the ruler through the venality system, as well an *increase* in the distance with her/his ideal judicial behavior p_S.

5 French Old Regime and the Venality of Judicial Offices

Sales of offices were by no means a French exception. They were current practice in Germany, England, Spain, Venice, the Pope's states and so on. In France, however, the sale of offices appears to have been the most considerable and to have lasted the longest. Allen (2005) shows that in England, not all public positions were sold. Other mechanisms of allocations, such as patronage, were used, depending on the incentives faced by officers. In France, office venality was a major tool in the building of state capacity until the very last days of the monarchy. In this section, we present the main aspects of the French system of venality.

5.1 Adoption and the development of office venality

The principle "no taxation without representation" is a very old one. Saint-Bonnet and Sassier (2011) (p. 233) assert that at least since the end of the 13th century, a new royal tax was considered legitimate insofar it had been formally accepted by the common people. In the 14th and 15th centuries, acceptance was given by the General Estates, a general assembly representing the French estates of the realm.[12] Yet, during the rise of absolute monarchy, French kings avoided summoning the General Estates, and actually never summoned from 1614 to 1789. Therefore, it was increasingly difficult to raise tax, and since the French monarchy was considered a bad debtor, issuing public debt was not any easier. Despite a rise in fiscal capacity over time (see Johnson and Koyama (2014)), the French monarchy faced a persistent default risk until its demise because of the institutional obstacles to increasing tax revenues (see Velde and Weir (1992) for the period from 1746 to 1793). Venality was then an instrument used by the monarchy to build the administration under constantly tight budget constraint and rising public expenses (Reinhard (1998), Descimon (2006)). Beginning in the absence of any clear legal framework under the reigns of Francis I and Henry IV, office venality was progressively given sound legal foundations. What was only a financial expedient, in years deeply affected by the wars in Italy and the civil war, became a central institution of the monarchy and remained until its fall in 1789, when venality was completely abolished (Bien (1987)).[13]

According to Mousnier (1970) (p. 2) and Nagle (2008), French administration was much more developed at the end of the old regime than it was during the Medieval period. While the number of stable positions in the royal administration was around 300 at the end of the Middle Ages (and only a few dozens for the King's Council, which was the main organ of power, Harsgor (1980)), there were about 4000 officers (of whom 1500 judges) in 1515, and 46 000 in 1665 (among whom 9000 judges).[14] The very nature of the judiciary was also modified. While in England, lay judges survived in many courts, in France, "through the last three centuries of the Old Regime, the displacement of lay by professional judges was almost everywhere complete" (Dawson (1960), p. 69). Public services were well financed, but rather than being paid for out of tax revenues, they were paid for directly by their users, which also indirectly contributed to the State's income. Office venality was not only an efficient way to develop state capacity. According to Montesquieu, venality was also the best way to allocate public offices in a monarchy because the king did not intervene directly in

[12]Those estates included the clergy (the First Estate), the nobility (the Second Estate), and the commoners (the Third Estate). The commoners, however, were not democratically elected. They were mainly bourgeois and officers who sorted out from the people by their wealth, influence or status.

[13]Pinsard and Tadjeddine (2019) analyze how the market for offices was progressively implemented in France.

[14]By contrast, Royer et al. (2016), (p. 113) estimates the number of judges in modern France to be 8500, for a population which is twice that of the old regime.

the process, which prevented clientelism, favoritism and nepotism.[15]

5.2 Office acquisition

Acquisition of offices followed a standard pattern. New or vacant offices were sold by public auction. A buyer would pay the price (the "finance") to a special Treasury department. He could later sell his title or pass it on to his heir: offices were considered as private property assets.

Offices were bought for two reasons. Firstly, prestige and distinction were derived from holding office. Buying an office was actually a way to obtain a more honorable social position and even in some cases to obtain a title.[16] This explains why the demand for offices was high. As stated by Cardinal Richelieu, main minister of Louis XIII: "Each time the King of France creates an office, God immediately creates an idiot to buy it." (Royer et al. (2016)). Secondly, officers received two types of income. The first one, called "gages", was paid by the king, albeit with some irregularity over time. The second one, called "epices" for justice officers, consisted of trial fees. Those fees were paid to the judges for performing tasks like cases study, inquiries, information gathering and so on.

Office holders were independent from the government, notably in the organization of their work, but they still remained public servants in the sense that the State could withdraw title to the office (with financial compensation) from its holder in the event of abuse of authority, prevarication or death.

5.3 Legal procedures

During the Old Regime, legal procedures differed from one local court to another (they were referred to as "the style of the court"), although they had much in common. The Code of civil procedure introduced in 1667 was an attempt to standardize procedures over the kingdom. In what follows we rely on this code to give a brief account of a civil trial, keeping in mind that local courts could slightly deviate from this common scheme because of the highly diverse local customs.[17]

[15] Richelieu, quoted by Doyle (1992) also argued that "The system of offices destroyed the power of aristocratic clientage, eliminated corruption by introducing publicity, and gave to the rich a vested interest to support the government."

[16] As a result, office venality came to be known as the "polishing brush for commoners" (Royer et al. (2016), p. 123).

[17] For a more thorough presentation, see Fréger (2006) and Feutry (2013).

A plaintiff would bring a lawsuit against a defender by resorting to a bailiff. The latter would then transmit the lawsuit to the president of the court. If the president deemed the lawsuit acceptable, it was registered in the list of coming trials (the *role*). Each rank in the list corresponded to a specific judge. Then each party would hire a prosecutor (in addition to lawyers), whose task was to make sure that procedural formalities were complied with. Prosecutors could always try to negotiate a pre-trial settlement agreement. Short of this agreement, a first hearing would take place.[18] During the first hearing, the judge in charge of the trial would decide whether the case was a simple or a complex one. When the case was deemed simple, the judge could make a decision (and earn accordingly a limited value of trial fees). When the case was considered complex, the judge could ask the litigants to supply additional trial materials (expertise, testimonials, investigations and so on). Each additional item had to be paid for by the parties to the judiciary. Once the trial materials had been collected and processed, the judge could finally hand down a decision. To obtain a written trace of the judgment, the parties had yet to pay a supplementary fee. The trial is summarized in figure 3, which corresponded roughly to the standard modern procedure, except that the parties directly compensated the court and its staff.

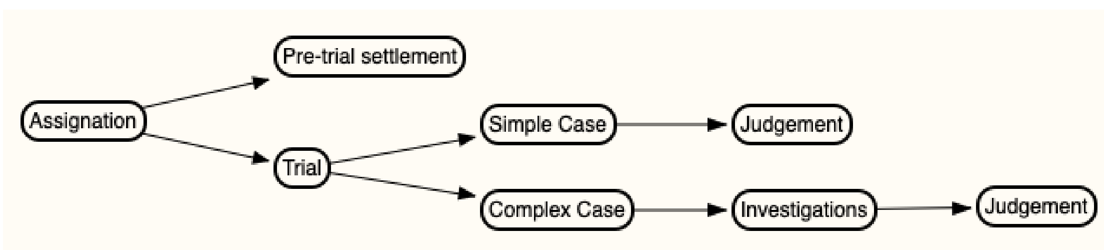

Figure 3: French Standard Civil Procedure in 1667

5.4 The costs of venality

During the Old Regime, civil justice was frequently deemed both costly and lengthy.[19] One important reason was the judges' ability to exploit the specificities of local customs and legal procedures and request many documents from the litigants and thus to receive larger trial fees. Further, as stated by Hamscher (1976) (quoted by Johnson and Koyama (2014), p. 80), venality and

[18]The defender had the right not to come to the hearing. But in that case, the judge adjudicated in favor of the plaintiff.

[19]Criminal justice was plagued by the same defects.

the growing number of offices resulted in “perennial jurisdictional conflicts among the courts and in a great expense to litigants who faced a vast judicial hierarchy if they were entitled to appeal a decision from a lower court.” In a different but related vein, Carbasse (2014) (p. 206) considers that France was also characterized by “an excessive diversity of judgments - with an excessive diversity of jurisprudence from one place to another.” Venality of offices was a key factor of this diversity, because venal judges could freely interpret laws which were often obscure and contradictory.
The demand for simplified legal procedures to render trials cheaper and shorter was expressed from the beginnings of venality until its end. Judges' greed was deeply inscribed in the collective imagination, as can be seen in the famous writings of Rabelais (2004) or Racine (1668). It was less and less tolerated during the 18th century, in an era marked by the Enlightenments (Crettez et al. (2018)). As a consequence, there was a constant demand for the standardization of French legal procedures (Halperin (1992), p. 47). This standardization was notably considered as much more important than the unification of civil laws (Dauchy (2006)).

5.5 Attempts at reforming the venality of judicial offices

During the Old Regime, most of the reforms attempted to limit the negative effects venality without completely removing it, because that was politically too costly. The first major reform of venality was done by Louis XIV, who gave his minister Colbert the task of reducing legal uncertainty and costs for French people.[20] To reduce the costs of trials, a code of civil procedure was introduced in 1667. Its aim was to promote uniform procedures all over the kingdom. In the preamble of the text, it was explicitly stated that the arbitrariness of courts resulted in useless procedures leading to the ruin of families, because of the length and the costs of the trials. Legal diversity was seen as a source of disorder and the monarch's duty was to limit it in order to protect his subjects (Saint-Bonnet and Sassier (2011), p. 386). The new code reduced judges' freedom to determine the value of trial fees and procedural length. Interpreting royal laws was no longer possible for local judges. In addition, Colbert bought back 20,000 offices at a fixed price of reimbursement, which was below the market price (Doyle (2000)). While Colbert had wished to unify larger parts of the law, Louis XIV only

[20] Attempting to evaluate the costs and benefits of offices in 1665, Colbert identified more than 30 000 judicial offices and expressed the view that at most 8000 judges were actually needed (Doyle (2000)).

wanted to reform legal procedures.[21] Despite its ambition, the Colbert reform had limited effects because in practice, due to venality, judges remained independent from the King. In particular, they kept relying on local customs to justify their decisions.[22] Moreover, in local superior courts, local customs continued to take precedence over royal ordinances until the end of the Old Regime (Wijffels (2014), p. 142). Consequently, there were also some attempts at unifying customs into a sort of "common law" of the kingdom, but they mostly failed. As summarized by Carey (1981), those reforms did not penetrate to the roots of the problems in the administration of justice, namely the mixture of finance with justice (p. 50).

Later on, d'Aguessau, *Chancelier* of King Louis XV, furthered the harmonization of legal decisions made by local courts. He also wanted to cut the number of those courts by half (Carey (1981), p. 54). But there was only a small decrease in that number because of the successful opposition of venal, and thus independent judges (Carey (1981), p. 60). The subsequent major reform then tried to directly abolish venality. In April 1771, Maupeou, a minister of Louis XV, bought back many offices and introduced a new system of judges nominated by the king (Villers (1937)). Ensuring free access to justice was a key objective of the reform (Doyle (1997), p. 258). Local political opposition to the reform, however, was very strong and the reform was canceled when the king died in 1774, despite improvements in judicial efficiency (Villers (1937)). Yet public support for venality continously decreased over time and only a few people actually supported it at the end of the 18th century (Doyle (1997)).

Office venality was fully removed during the French Revolution (Lafon (2001)). The reform of the judiciary was among the first tasks undertaken by the newly created National Assembly. Judges became ordinary civil servants, paid by the State, and had to strictly apply the law, production of which was centralized. Judges weren't allowed to interpret the law or rely on local customs.[23] This proved impractical, which is why a more flexible *Code civil* and a *Code de procédure civile* where later introduced, respectively in 1804 and in 1806. In this regard, it is notable that the codification of civil procedures by Napoleon was inspired by the codification of civil procedures achieved in

[21] Yet, a code of penal procedures was also introduced in 1670.

[22] The use of local customs to limit the application of central legislation was well understood by the revolutionary decision-makers, who completely eliminated customs as a source of the law (Crettez et al. (2018)).

[23] Additional arguments against venality were brought. The main one was that venal justice was contrary to the concept of *free justice* for citizens, and to the principle of equality before the law.

1667. As stated by one of the four fathers of the Civil code (Treilhard), a code of civil procedures was necessary to prevent judges from slowing trials or making arbitrary decisions.

5.6 An analytical narrative of the venality of judicial offices

We now rely on the model and the example studied in the previous sections to provide an analytical narrative of the evolution of venality. Initially, venality was a means used by the French monarchs to accrue income in order to increase state capacity. As explained by Stasavage (2003), France had limited access to fiscal resources compared to England and needed to resort to alternative means. Indeed, the size of the administration had to grow continuously, as did the kingdom, notably through conquests (particularly under Louis XIV's reign). That explains the sale of thousands of judicial offices over the years, but also the rising cost of venality. The constant extension of the kingdom also led to a continuous increase in legal diversity, since the new parts of the kingdom were allowed to keep many parts of their legal system and customs, resulting in what Carbasse (2014) calls a "normative abundance" (p. 219).

The model presented in section 2 captures the main trade-off associated with the venality of offices. Proposition 1, in particular, accounts for the fact that there were many trials, that were both expensive and lengthy (judges often made pro-plaintiff decisions) Moreover, the example developed in Section 5 helps to understand why the venality system was less and less worthwhile for French kings. As the number of offices rose, they were sold to people with different backgrounds (they differed in values, skills, geographical origins, and so on). More and more people held different views on justice than the king's ones. Carey (1981) (p. 19) notably explains that the new judges often sided with the nobles to oppose the crown's attempts to reform the judicial system (see also Dawson (1960), p. 84). Formally, this evolution can be interpreted in the model as a change in the distribution of judges' natural inclinations to favor the plaintiff, and more specifically as an increase in the weightsgiven to the low values of p_i. In our example, we capture this change example by assuming that there is an increase in β. Then from Proposition 4, we see that this increase brings about a reduction both in the value of the levy and the value of the ruler's objective. That is because, lowering ϕ induces more judges to favor the plaintiffs (in a way that suits the ruler's wishes), especially those whose p_i are low. But as a result, the ruler gets fewer resources and bears a higher value of the diversity cost.

Finally, as argued in Crettez et al. (2018), the relative cost of legal diversity, which is captured in the model by the parameter ψ, rose during the 18th century (law was less and less considered as a natural social fact, and more and more as an institution that needed to be designed rationally). Those different elements can explain why it was relatively easy to change the legal regime when the Revolution began. The country was ready to rely on a judicial system in which judges were public servants paid by the state, and where legal rules were fully uniformized in order to control adjudication.

6 Conclusion

While venality of public positions may look like a strange institution (or even a "weird" institution, in the sense of Leeson (2017)), this paper contributes to the understanding of its rationality in terms of legal design and state capacity. Venality can be a useful alternative financial institution for a state lacking fiscal resources, or/and without opportunity to borrow, and it was historically a major factor of the development of several major European states.

This paper has proposed a model of venal judicial offices which builds on a version of the canonical model of litigation with optimistic litigants. We have analyzed how the ruler and the judges share the trial fees. We have specifically studied the optimal value of the share accruing to the ruler. We have also presented an example which enabled us to interpret the evolution of the venality system in Old regime France. We have argued that the final demise of the venality system can be accounted for by an increase in the diversity of judges' preferences (reflected in the model by their natural propensities to favor the plaintiff). To limit the diversity of judges' decisions, the king needed to give them more financial incentives. Venality was no longer an efficient way of extracting resources from the common people. It was, however, politically costly to remove venality, which is why it took no less than a Revolution to achieve that removal.

Our analysis provides new insights into modern legal design. That is because, many countries still find extremely difficult to tax and to borrow, and hence cannot state capacity. Whether some modern forms of venality can, at least in part, alleviate the difficulties is a natural topic for further research.

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A On the price of a judicial office and the tax levy ϕ on trial fees

Let $\mathscr{P}_o$ be the price of a judicial office and $(s_t)_t$ be the stream of incomes associated with this office. Assume for simplicity that the time horizon decision of a would-be judge is infinite and that the interest rate is constant across time.[24] Under these assumptions, buying an office is profitable whenever

$$\mathscr{P}_0 \leq \sum_{i=1}^{\infty} \frac{s_t}{(1+r)^t}. \tag{25}$$

Assume furthermore, for simplicity, that s_t is also constant across time. Then the above inequality reads

$$r\mathscr{P}_o \leq s. \tag{26}$$

The time period net gain of an office buyer can be written: $s - r\mathscr{P}_o$ or

$$s - r\mathscr{P}_o = s\big(1 - \frac{r\mathscr{P}_o}{s}\big). \tag{27}$$

Now set

$$\phi = \frac{r\mathscr{P}_o}{s}. \tag{28}$$

From the above expression, we see that fixing ϕ equivalent to fixing $\mathscr{P}_o$, s being considered as fixed ($\mathscr{P}_o = s\phi/r$). This link between ϕ and $\mathscr{P}_o$ justifies our choice to simplify the study of the venality of judicial offices by following a static viewpoint (and thus concentrating on studying the effects of a change in ϕ rather than the effects of a change in $\mathscr{P}_o$).

[24] An infinite decision-horizon is notably relevant when judicial offices can be bequeathed.

B Proofs

Proposition 2

The optimal tax levy on trial fees ϕ^* is less than one if, and only if, $\mathbb{E}[p_i] < \frac{\frac{\psi}{\rho}}{1+\frac{\psi}{\rho}} p_S$.

Proof. First of all, the objective function is continuous with respect to ϕ, therefore by the Weierstrass Theorem, there exists an optimal solution to the state problem.

Now recall that

$$
\begin{aligned}
W_S(\phi) = \phi \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} & p^e(p_i)\,(D_p - D_d)\, f(p_i) dp_i \\
& + \phi (D_p - D_d) \left(1 - F\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\
& - \frac{\psi}{2} \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} (p^e(p_i) - p_S)^2 f(p_i) dp_i \\
& - \frac{\psi}{2}(1-p_S)^2 \left(1 - F\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right). \quad (29)
\end{aligned}
$$

Using Proposition 1 and Leibnitzs' Rule we get

$$
\begin{aligned}
\frac{\partial W_S}{\partial \phi} = \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} & p^e(p_i)\,(D_p - D_d)\, f(p_i) dp_i \\
& + \phi \frac{(D_p-D_d)^2}{\rho} f\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right) \\
& - \phi \frac{(D_p-D_d)^2}{\rho} \left(1 - F\left(\frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\
& + (D_p - D_d) \left(1 - F\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\
& - \phi \frac{(D_p-D_d)^2}{\rho} f\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right) \\
& - \frac{\psi (D_p-D_d)}{2\rho}(1-p_S)^2 f\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right) \\
& + \frac{\psi (D_p-D_d)}{\rho} \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} (p^e(p_i) - p_S)\, f(p_i) dp_i \\
& + \frac{\psi}{2} \frac{(D_p-D_r)}{\rho}(1-p_S)^2 f\left(1 - \frac{(1-\phi)(D_p-D_d)}{\rho}\right). \quad (30)
\end{aligned}
$$

After a little algebra we obtain that

$$\begin{aligned}\frac{\partial W_S}{\partial \phi} = \int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}} & p^e(p_i)\,(D_p-D_d)\,f(p_i)dp_i \\ & -\phi\frac{(D_p-D_d)^2}{\rho}\left(1-F\left(1-\frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\ & +(D_p-D_d)\left(1-F\left(1-\frac{(1-\phi)(D_p-D_d)}{\rho}\right)\right) \\ & +\frac{\psi(D_p-D_d)}{\rho}\int_0^{1-\frac{(1-\phi)(D_p-D_d)}{\rho}}(p^e(p_i)-p_S)\,f(p_i)dp_i. \quad (31)\end{aligned}$$

Assume by way of a contradiction that the optimal extraction rate ϕ^* is equal to one. From the above equation we get

$$\frac{\partial W_S(1)}{\partial \phi} = \int_0^1 p_i\,(D_p-D_d)\,f(p_i)dp_i + \frac{\psi(D_p-D_d)}{\rho}\int_0^1 (p^e(p_i)-p_S)\,f(p_i)dp_i \quad (32)$$

$$= (D_p-D_d)\left((1+\frac{\psi}{\rho})\mathbb{E}[p_i]-\frac{\psi}{\rho}P_S\right). \quad (33)$$

The Proposition follows. □

B.1 Example

Recall that in this example we assume that the probability distribution of p_i has a density function the value of which is equal to 2β on the set $[0,1/2]$ and $2(1-\beta)$ on the set $[1/2,1]$, where β is in $[0,1/2]$.

Lemma 1. *The mean of the probability distribution is*

$$\mathbb{E}[p_i] = \frac{3-2\beta}{4}, \quad (34)$$

and its variance is equal to

$$\mathbb{V}[p_i] = \frac{12\beta(1-\beta)+1}{48}. \quad (35)$$

Proof. As for the mean, we have

$$\mathbb{E}[p_i] = \int_0^{1/2} 2\beta p_i \, dp_i + \int_{1/2}^{1} 2(1-\beta) p_i \, dp_i = \beta \left[i^2\right]_0^{1/2} + (1-\beta)\left[i^2\right]_{1/2}^{1} \tag{36}$$

$$= \frac{3-2\beta}{4}. \tag{37}$$

We also have

$$\mathbb{V}[p_i] = \int_0^{1/2} 2\beta \left(p_i - \frac{3-2\beta}{4}\right)^2 dp_i + \int_{1/2}^{1} 2(1-\beta)\left(p_i - \frac{3-2\beta}{4}\right)^2 dp_i \tag{38}$$

$$\frac{1+12\beta(1-\beta)}{48}. \tag{39}$$

□

In order to compute the value of the ruler's payoff, we need to compute the values of $\phi\mathbb{E}[p^e(p)]$ and $\int_0^1 (p^e(p_i) - p_S)^2 f(p_i) dp_i$. As we shall see, these values depend on whether ϕ is in $\left[0, 1 - \frac{\rho}{2(D_p - D_d)}\right]$ or in $\left[1 - \frac{\rho}{2(D_p - D_d)}, 1\right]$.[25]

• The case where $\phi \in \left[0, 1 - \frac{\rho}{2(D_p - D_d)}\right]$

This is also the case where $1 - \frac{(1-\phi)(D_p - D_d)}{\rho} \leq 1/2$. Then the expected value of $p^e(p)$ is :

$$\mathbb{E}[p^e(p)] = \int_0^{1-\frac{1-\phi}{\rho}(D_P - D_d)} \left(p_i + \frac{1-\phi}{\rho}(D_P - D_d)\right) f(p_i) dp_i + 1 - F\left(1 - \frac{1-\phi}{\rho}(D_P - D_d)\right) \tag{40}$$

$$= 2\beta \left[\frac{x^2}{2} + x\frac{1-\phi}{\rho}(D_P - D_d)\right]_0^{1-\frac{1-\phi}{\rho}(D_P - D_d)} + 2\beta [x]_{1-\frac{1-\phi}{\rho}(D_P - D_d)}^{1/2} + 2(1-\beta)[x]_{1/2}^{1} \tag{41}$$

$$= 1 - \beta\left[1 - \frac{1-\phi}{\rho}(D_P - D_d)\right]^2 \tag{42}$$

Notice that the expected value of $p^e(p)$ decreases with respect to β.

[25] Recall that we have assumed that $\frac{1}{2} < \frac{\rho}{2(D_p - D_d)} < 1$.

We also have:

$$\frac{\partial\Big(\phi\mathbb{E}[p^e(p)]\Big)}{\partial\phi} = \mathbb{E}[p^e(p)] - 2\phi\frac{\beta(D_P - D_d)}{\rho}\left(1 - \frac{1-\phi}{\rho}(D_P - D_d)\right) \tag{43}$$

$$= 1 - \beta\left(1 - \frac{1-\phi}{\rho}(D_P - D_d)\right)\left(1 - \frac{1-\phi}{\rho}(D_P - D_d) + \frac{2\phi}{\rho}(D_P - D_d)\right). \tag{44}$$

and

$$\frac{\partial^2\Big(\phi\mathbb{E}[p^e(p)]\Big)}{\partial\phi^2} = -4\beta\frac{(D_P - D_d)}{\rho}\left(1 - \frac{1-\phi}{\rho}(D_P - D_d)\right) - 2\phi\frac{\beta(D_P - D_d)^2}{\rho^2} < 0. \tag{45}$$

Thus the fiscal income is a concave function of ϕ.

The cost of legal diversity is as follows

$$\int_0^1 (p^e(p_i) - p_S)^2 f(p_i)dp_i = 2\beta\int_0^{1-\frac{1-\phi}{\rho}(D_P - D_d)}\left(p_i + \frac{1-\phi}{\rho}(D_P - D_d) - p_S\right)^2 di \tag{46}$$

$$+2\beta\int_{1-\frac{1-\phi}{\rho}(D_P - D_d)}^{\frac{1}{2}}(1-p_S)^2 di + 2(1-\beta)\int_{\frac{1}{2}}^1 (1-p_S)^2 di \tag{47}$$

$$= \frac{2\beta}{3}\left[\left(x + \frac{1-\phi}{\rho}(D_P - D_d) - p_S\right)^3\right]_0^{1-\frac{1-\phi}{\rho}(D_P - D_d)} + \tag{48}$$

$$2\beta(1-p_S)^2\left(-\frac{1}{2} + \frac{1-\phi}{\rho}(D_P - D_d)\right) + (1-\beta)(1-p_S)^2 \tag{49}$$

$$= \frac{2\beta}{3}\left[(1-p_S)^3 - \left(\frac{1-\phi}{\rho}(D_P - D_d) - p_S\right)^3\right] \tag{50}$$

$$-2\beta(1-p_S)^2\left(1 - \frac{1-\phi}{\rho}(D_P - D_d)\right) + (1-p_S)^2. \tag{51}$$

We have

$$\frac{\partial\left(\int_0^1 (p^e(p_i) - p_S)^2 f(p_i)dp_i\right)}{\partial\phi} = 2\beta\frac{(D_P - D_d)}{\rho}\left(\frac{1-\phi}{\rho}(D_P - D_d) - p_S\right)^2 \tag{52}$$

$$x \quad -2\beta(1-p_S)^2\frac{(D_P - D_d)}{\rho}. \tag{53}$$

Under the assumption that $1 < \frac{\rho}{D_p - D_d} < 2$, the above expression is always positive if $p_S > \frac{1}{2}(1+$

$\frac{D_p - D_d}{\rho}$).

Moreover, we also have:

$$\frac{\partial^2 \left(\int_0^1 \left(p^e(p_i) - p_S\right)^2 f(p_i) dp_i \right)}{\partial \phi^2} = -4\beta \frac{(D_P - D_d)^2}{\rho^2} \left(\frac{1-\phi}{\rho}(D_P - D_d) - p_S \right) \tag{54}$$

Under the assumption $p_S > \frac{1}{2}(1 + \frac{D_P - D_d}{\rho})$, the above expression is positive. Therefore, the cost of legal diversity is a convex function of ϕ.

• The case where $\phi \in \left[1 - \frac{\rho}{2(D_p - D_d)}, 1\right]$

In that case $1 - \frac{1-\phi}{\rho}(D_P - D_d) > 1/2$.

Let $\triangle(\phi) \equiv \frac{1-\phi}{\rho}(D_P - D_d)$. Then, the expected value of $p^e(p)$ is

$$\mathbb{E}[p^e(p_i)] = \int_0^{1/2} (p_i + \triangle(\phi))\, 2\beta dp_i + \int_{1/2}^{1-\triangle(\phi)} (p_i + \triangle(\phi))\, 2(1-\beta) dp_i + \int_{1-\triangle(\phi)}^{1} 2(1-\beta) dp_i \tag{55}$$

$$= 2\beta \left[\frac{x^2}{2} + x\triangle(\phi)\right]_0^{1/2} + 2(1-\beta)\left[\frac{x^2}{2} + x\triangle(\phi)\right]_{1/2}^{1-\triangle(\phi)} + 2(1-\beta)\triangle(\phi) \tag{56}$$

$$= \frac{3}{4} - \triangle(\phi)^2 + \triangle(\phi) - \beta\left(\frac{1}{2} - \triangle(\phi)^2\right). \tag{57}$$

Notice that

$$\frac{\partial\left(\mathbb{E}[p^e(p_i)]\right)}{\partial \phi} = -\left(1 - 2(1-\beta)\triangle(\phi)\right)\left(\frac{D_p - D_d}{\rho}\right) < 0, \tag{58}$$

since $\triangle(\phi) < 1/2$. Moreover,

$$\frac{\partial^2\left(\mathbb{E}[p^e(p_i)]\right)}{\partial \phi^2} = -2(1-\beta)\left(\frac{D_p - D_d}{\rho}\right)^2 < 0. \tag{59}$$

We have

$$\frac{\partial\left(\phi\mathbb{E}[p^e(p_i)]\right)}{\partial \phi} = \mathbb{E}[p^e(p_i)] + \phi\frac{\partial\left(\mathbb{E}[p^e(p_i)]\right)}{\partial \phi}, \tag{60}$$

and

$$\frac{\partial^2\left(\phi\mathbb{E}[p^e(p_i)]\right)}{\partial\phi^2} = 2\frac{\partial\left(\mathbb{E}[p^e(p_i)]\right)}{\partial\phi} + \phi\frac{\partial^2\left(\mathbb{E}[p^e(p_i)]\right)}{\partial\phi^2} < 0, \tag{61}$$

(which follows from (58) and (59)).

Let us evaluate $\frac{\partial(\phi\mathbb{E}[p^e(p_i)])}{\partial\phi}$ at $\phi = 1$. We obtain

$$\frac{\partial\left(\phi\mathbb{E}[p^e(p_i)]\right)}{\partial\phi} = \frac{3}{4} - \frac{\beta}{2} - \frac{D_p - D_d}{\rho}. \tag{62}$$

This expression is positive if, and only if

$$\frac{1}{2} < \frac{D_p - D_d}{\rho} < \frac{3}{4} - \frac{\beta}{2}. \tag{63}$$

In that case, $\phi\mathbb{E}[p^e(p_i)]$ reaches its maximum when $\phi = 1$ ($\triangle(\phi) = 0$). If this expression is negative, the maximum is reached on $]1 - \frac{\rho}{2(D_p - D_d)}, 1[$. Indeed if we evaluate $\frac{\partial(\phi\mathbb{E}[p^e(p_i)])}{\partial\phi}$ at $\phi = 1 - \frac{\rho}{2(D_p - D_d)}$ ($\triangle(\phi) = 1/2$), we get:

$$\frac{\partial\left(\phi\mathbb{E}[p^e(p_i)]\right)}{\partial\phi} = 1 - \frac{\beta}{4} - \left(1 - \frac{\rho}{2(D_p - D_d)}\right)\beta\frac{(D_p - D_d)}{\rho}, \tag{64}$$

which is positive since $\frac{(D_p - D_d)}{\rho}$ is assumed to be bounded above by 1.

The cost of legal diversity is as follows

$$\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i = \int_0^{1/2} (p_i+\triangle(\phi)-p_S)^2 2\beta dp_i + \int_{1/2}^{1-\triangle(\phi)} (p_i+\triangle(\phi)-p_S)^2 2(1-\beta)dp_i$$
$$+\int_{1-\triangle(\phi)}^1 2(1-\beta)(1-p_S)^2 dp_i$$
$$=\frac{2\beta}{3}\left[(x+\triangle(\phi)-p_S)^3\right]_0^{1/2}+\frac{2(1-\beta)}{3}\left[(x+\triangle(\phi)-p_S)^3\right]_{1/2}^{1-\triangle(\phi)}$$
$$+2(1-\beta)(1-p_S)^2\triangle(\phi)$$
$$=\frac{2\beta}{3}\left[\left(\frac{1}{2}+\triangle(\phi)-p_S\right)^3-(\triangle(\phi)-p_S)^3\right] \tag{65}$$
$$+\frac{2(1-\beta)}{3}\left[(1-p_S)^3-\left(\frac{1}{2}+\triangle(\phi)-p_S\right)^3\right]$$
$$+2(1-\beta)(1-p_S)^2\triangle(\phi). \tag{66}$$

Remark that:

$$\frac{\partial\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\phi}=\frac{\partial\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\triangle(\phi)}\frac{\partial\triangle(\phi)}{\partial\phi}. \tag{67}$$

We know that $\frac{\partial\triangle(\phi)}{\partial\phi}=-\frac{(D_p-D_d)}{\rho}$ and we have

$$\frac{\partial\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\triangle(\phi)}=\beta\left(\frac{1}{2}+2(\triangle(\phi)-p_S)\right)+2(1-\beta)\left(\frac{3}{2}+\triangle(\phi)-2p_S\right)\left(\frac{1}{2}-\triangle(\phi)\right). \tag{68}$$

Notice that the value of $\triangle(\phi)$ which maximizes $\left(\frac{3}{2}+\triangle(\phi)-2p_S\right)\left(\frac{1}{2}-\triangle(\phi)\right)$ is $\triangle(\phi)=p_S-1/2$. For this value, we have:

$$\frac{\partial\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\triangle(\phi)}=-\frac{\beta}{2}+2(1-\beta)(1-p_S)^2. \tag{69}$$

We shall assume that p_S is such that the above expression is negative. Under this assumption $\frac{\partial\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\phi}$ is positive.

We also have

$$\frac{\partial^2\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\phi^2} = 2\left(\beta+(1-\beta)\left(2p_S-(1+2\triangle(\phi))\right)\right)\left(\frac{D_p-D_d}{\rho}\right)^2. \quad (70)$$

When $\phi = 1-\frac{\rho}{2(D_p-D_d)}$, the above expression reduces to

$$\frac{\partial^2\left(\int_0^1 (p^e(p_i)-p_S)^2 f(p_i)dp_i\right)}{\partial\phi^2} = 2\beta+4(1-\beta)(p_S-1). \quad (71)$$

It is positive when p_S is close enough to 1. We shall make this assumption. Therefore the cost of legal diversity is convex with respect to ϕ.

Proposition 3 *Assume that*:

1. $\frac{1}{2} < \frac{D_p-D_d}{\rho} < 1$.
2. $\frac{1}{2}\left(1+\frac{D_p-D_d}{\rho}\right) < p_S$.
3. $W_S(\bar{\phi}) > 0$, and $\frac{\partial W_S(\bar{\phi})^-}{\partial\phi} < 0$.
4. $\max\{4(1-\beta)(1-p_S)^2, 2(1-\beta)(1-p_S)\} < \frac{\beta}{1-\beta}$.
5. $\frac{\partial W_S(\bar{\phi})^+}{\partial\phi} < 0$.

Then the maximum of the ruler's payoff is achieved at a positive value ϕ^* which is lower than $\bar{\phi} = 1-\frac{\rho}{(D_P-D_d)}$.

Proof. First of all, under our assumption $W_S(\phi)$ decreases on $[1-\frac{\rho}{(D_P-D_d)}, 1]$. This is so as $W_S(\phi)$ is a concave function of ϕ and $\frac{\partial W_S(\bar{\phi}^+)}{\partial\phi} < 0$. Moreover, by assumption we also have $W_S(\bar{\phi}) > 0$, and $\frac{\partial W_S(\bar{\phi}^-)}{\partial\phi} < 0$. It can be checked that $W_S(\phi)$ is continuous at $\bar{\phi}$, and concave on $[0,\bar{\phi}]$ and $W_S(0) < 0$. This implies that that $W_S(.)$ reaches its maximum value at a value of ϕ which is both positive and lower than $\bar{\phi}$. Finally, notice that since W_S is strictly concave on $[0,\bar{\phi}]$, the optimal extraction rate is unique. □

We can check that all our assumptions are satisfied whenever: $\beta = 2/5$, $D_p - D_d = 3$, $\psi = 15$, $\rho = (8/7)(D_p-D_d)$ and $p_S = (1/2)\times((7/8)+1)$.

Remark. We have:

$$\frac{\partial W_S(\bar{\phi}^-)}{\partial\phi} = (D_p - D_d)\left(1 + \frac{\beta}{2} - \beta\frac{(D_p - D_d)}{\rho}\right) - \psi\beta\frac{(D_p - D_d)}{\rho}(2p_S - \frac{3}{2}), \tag{72}$$

$$\frac{\partial W_S(\bar{\phi}^+)}{\partial\phi} = (D_p - D_d)\left(1 - \frac{b}{4} - \beta(1 - \frac{\rho}{(D_P - D_d)})\frac{(D_p - D_d)}{\rho}\right) + \beta\frac{(D_p - D_d)}{\rho}(1 - 2p_S). \tag{73}$$

Let us turn to the optimal extraction rate by the state.

Proposition 4

Assume that the assumptions of Proposition 3 hold. Then both the optimal tax levy ϕ^* on trial fees and the ruler's payoff decrease with β

Proof. From the Implicit function theorem we have $\frac{\partial\phi}{\partial\beta} = -\frac{\frac{\partial^2 W_S}{\partial\phi\partial\beta}}{\frac{\partial^2 W_S}{\partial\phi^2}}$. Since W_S is concave, the denominator is negative. Therefore, the sign of $\frac{\partial\phi}{\partial\beta}$ is the same as that of $\frac{\partial^2 W_S}{\partial\phi\partial\beta}$. We have

$$\frac{\partial^2 W_S}{\partial\phi\partial\beta} = -\left(1 - \frac{(1-\phi)}{\rho}(D_p - D_d)\right)^2 - 2\phi\frac{(1-\phi)}{\rho}\left(1 - \frac{(1-\phi)}{\rho}(D_p - D_d)\right) - \psi\frac{\partial\left(\int_0^1 (p^e(p_i) - p_S)^2 f(p_i)dp_i\right)}{\beta\partial\phi} < 0 \tag{74}$$

Finally, under the assumptions, an increase in β decreases the tax receipts and increases legal diversity. Therefore the ruler's payoff decreases. The result then follows from the Envelope Theorem. □