Contracting in the Shadow of the Law
(Job Market Paper)

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Abstract

I construct a theoretical framework to study how the degree of judicial independence affects both the form and the efficiency of private contracts. I show that "common law" systems of judicial autonomy foster the use of contingent contracts while codified "civil law" systems induce the parties to adopt rigid contracts, protecting them against worst-case scenarios. The benefit of independence is that it leads judges to use more information, its cost is that they tend to be too interventionist. Discretion is valuable when the quality of information is good and the preferences of decision-makers are not polarized. I use the model to shed light on several issues in the product liability and insurance fields.

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1 Introduction

Since "The Problem of Social Cost" (Coase 1960), economists have analyzed conflicts of interest between agents by first asking: "why don't they write a contract to solve their problems?". After forty years, the contractual cure for externalities is still seen by many not only as a useful analytical benchmark, but also as a powerful "off the shelf" solution, which must be seriously considered before state intervention through taxes, subsidies and direct regulation[1].

The proper functioning of contracts often requires outside enforcement. A country's legal system plays a fundamental role in this respect. Given the variety of forms that legal institutions take around the world, it seems sensible to ask which of them best support private contracting. The goal of this paper is to examine the way the law affects the ability of economic agents to contract with each other. I offer a theoretical argument for why one should expect the organization of the legal system, and in particular the degree of judicial independence, to influence both the *form* and the *efficiency* of private contracts.

The analysis is potentially of interest within two broad fields of economics. The economic literature on institutions has provided empirical evidence suggesting that a country's legal system has an impact on various measures of economic performance (La Porta et al. 1998, 1999, Mahoney 2001, Levine 2003, Beck et al. 2003). However, as long as agents can freely contract around them, legal rules should not have any effect on resource allocation (Coase, 1960). To understand the impact of the legal system on economic outcomes, we ultimately need to understand how it affects the scope of contracting between individuals[2]. My paper can therefore help understand some of the empirical findings of this literature.

In addition, the existing literature on contract theory has analyzed how optimal contracts depend on the *personal* characteristics of transactors, such as asymmetric information (Stiglitz-Weiss 1981, Grossman-Hart 1983) or factor endowments (Grossman-Hart 1986, Hart Moore 1999). As remarked by Tirole (1999), scant attention has been paid to contract enforcement, and the present paper is an attempt to fill this gap. A few contributions (Glaeser and Shleifer 2002, Bond 2003)[3] have related legal institutions to contracting by focusing on the corruptibility of law

[1] Its effectiveness has been often advocated by proponents of deregulation

[2] By taking contracts as given, the economic literature on legal institutions has compared legal families in terms of the different strategies by which they seek to cure market failures. The analysis has focused on the choice between judges and regulators (Glaeser et al. 2001, Pistor and Xu 2002). Nevertheless, empirical evidence confirms the notion that enforcement of private contracts varies with different legal systems. See La Porta et al. 2003, Acemoglu and Johnson 2003.

[3] Glaeser and Shleifer argue that judicial corruption might make certain contracts unenforceable and that judicial

enforcers. Although relevant, especially for developing countries, corruption is not the only factor that affects the ability of different legal institutions to cope with economic problems.

In the model I present, the parties choose between contingent contracts that faithfully describe their transaction, and non-contingent contracts prescribing a state invariant allocation. Contingent contracts are harder to enforce than non-contingent ones. While under the latter contracts a judge only needs to mandate the allocation agreed upon by the parties, the former also require him to collect and evaluate evidence about the state of the world, which he does not observe directly.

A basic trade-off shapes contract choice. A contingent contract "asks" judges to use the information they possess, and thus minimizes the *overall* probability of judicial error. On the other hand, since different mistakes bear different costs, a non-contingent contract can be used to prevent judges from triggering very inefficient misallocations. This trade-off explains why one should expect contingent contracts to be adopted more often when judges wield discretion.

In the model, legal institutions influence costs and benefits of different contracts by determining the amount of information used in judicial decisions, which depends not only on judges' ability to verify relevant events but also on their impartiality in evaluating facts. It is a fact of life that decision-makers inevitably have different preferences over any two disputants[4], and the organization of the legal system can significantly alter the way these preferences are reflected in adjudication.

Civil codes, which by their nature reflect the political bias of the sovereign, stiffened by bright line rules that limit judicial autonomy, do not provide balanced protection. By disallowing judges to consider evidence equitably, they lead to the use of less information. This induces the parties to opt for non-contingent contracts. Such contracts are also helpful to protect the "weaker" party from the bias of the code.

On the other hand, discretionary judges fully cater to their own preferences. As long as their idiosyncratic biases are not too intense, *on average* they use more information, which induces the parties to opt for contingent contracts more often. This proposition provides a rationale for the commonly made observation that in common-law countries contracts tend to be longer than in civil law countries, i.e. they contain a variety of special clauses that modify the terms of the agreement.

Since non-contingent contracts are equally enforced in both legal systems, the superior ability

independence exhacerbates this problem. As a result, in societies where corruption is widespread, granting discretion to judges would jeopardize private contracting. Along similar lines, Bond shows that judicial corruption can render incomplete agreements optimal.

[4]Legal scholars (Frank 1973, Shapiro 1981), admit that economic, cultural and political factors often influence judicial decisions.

of common law judges to enforce complicated contracts breaks Coasian irrelevance and represents the main benefit of judicial discretion.

The analysis shows that when the preferences of judges are very polarized, the advantages of judicial discretion are undermined. In addition, if judges are unable to verify the relevant contingencies, their decisions are driven by bias. Lack of competence, leading to arbitrariness, also reduces the desirability of judicial independence.

These shortcomings of judicial discretion are evident in the "tort reform" debate in the U.S. In the face of enormous liability burdens and huge defense costs imposed by the system of civil litigation, judges and juries have been blamed for their caprice, bias[5], and lack of competence. This legal chaos has led many to wonder about the inadequacies of judicial control over liability issues and to advocate a more top-down approach[6], directly mandated by the state.

Although the model is also able to shed light on issues concerning areas of tort law in which the relationship between defendants and plaintiffs is non-contractual, e.g. car accidents, it turns out to be especially useful in evaluating the costs of judicial discretion in areas such as product liability, where the relationship between buyers and sellers is eminently contractual. Some scholars[7] have argued that in markets for hazardous products, warranties or low prices should be the main instruments used to compensate consumers for the risks they bear. However, such contractual solutions have proved infeasible. In an attempt to realize broad social goals, courts have in fact systematically overridden (Rubin, 1993) contract terms setting damage payments or liability rules.

My analysis sheds light on these issues because it allows for consideration of incentives for judges to modify contract terms and especially how they depend on the organization of legal institutions. In particular, the model shows that discretionary judges have a greater incentive to modify contract terms than do judges who enjoy little autonomy. Indeed, when substituting contract terms, the latter judges must adjudicate by catering to the preferences of the sovereign, not their own, so they face a standard moral hazard problem.

Endogenizing enforcement in this fashion allows me to uncover a cost of independence, that of judicial "interventionism". Overriding written terms undermines the contractual autonomy of the parties and favors "civil law" systems, where literal enforcement is more likely. This proposition

[5] Needless to say, business groups have especially deplored civil juries, viewing them as too hostile to "deep pocket" defendants. See Daniels and Martin (1995).

[6] Viscusi (1991) has proposed the establishment of governmental agencies specialized in different fields of tort.

[7] Rubin (1993) and Schwartz (1988) are among those who believe that a contractual solution for product liability is the most desirable one.

goes beyond product liability cases and applies to many other situations. Legal scholars (Goetz and Scott 1985) point out that judges often modify contractual terms ex-post, so we expect the above conclusions to extend to other situations as well. Indeed, by considering an example of a dispute over insurance contracts, my analysis illustrates the kind of costs that judicial "interventionism" may impose upon the parties.

To summarize, the model presented in the paper uncovers a benefit and a cost of judicial discretion. On the one hand, by fostering the use of information, common law systems better enforce "complicated" contracts. On the other hand, discretionary judges have a large incentive to modify contract terms ex-post, which reduces the possibility of the parties to insure ex-ante against worst-case scenarios.

The trad-eoff depends on the characteristics of judges and on the specific characteristics of the economic relationship. In particular, judicial discretion is preferable so long as the preferences of decision-makers are not very polarized and *the more* courts are skilled at verifying contingencies, where the latter aspect depends both on the competence of judges and on the complexity of the transaction. Therefore, this paper confirms the view that optimal legal institutions depend both on the incentives of judges and on the nature of the transaction to be enforced.

The paper is organized a follows. In Section 2 I use an example to illustrate the basic points of the paper. Section 3 introduces the setup of the theory. In section 4 I solve the model under the assumption that judges literally enforce rigid contracts and compare the performance of different judicial systems. In Section 5 I introduce the possibility for judges to override contract terms and study how this affects the predictions of the model. In Section 6 I use the model to discuss issues in the insurance and products liability fields. In section 7 I suggest that the model can explain some of the empirical findings of the law and finance literature and conclude.

2 The Basic Argument

To see the logic behind the results, I consider an example[8]. Two parties, A and B are involved in an economic relationship that prescribes an optimal state contingent allocation. Their interests are in conflict, in that each party unambiguously prefers one allocation over the other. After the state of the world is revealed, conflict ensues between them and a judge is called upon to select an

[8] This example is not supposed to display general properties. It only serves to illustrate some of the mechanisms behind the results of the paper.

allocation.

For concreteness, suppose that A is a long standing worker and B is his employer. A is "obsolete", i.e. workers with higher productivity are available in the market. By hiring one of them, B guarantees himself $\overline{\pi}$, which is larger than $\underline{\pi}$, his profit from continuing the long term relationship[9].

There are two types of obsolete workers, half of them are "locked-in", the other half are "flexible". When a "flexible" worker is fired, he immediately finds another job. A "locked-in" worker must instead incur a search cost $c > 0$. Suppose that $\overline{\pi} - c < \underline{\pi}$: while discharge of flexible workers is efficient, discharge of locked-in ones is not. Obviously, employers always prefer to terminate and workers to continue[10]. The firing of the worker leads to a trial and a judge must decide whether or not the worker should be reinstated. The decision of the judge depends on the contract that A and B signed.

The parties can adopt two types of contracts, contingent and non-contingent. The former prescribes the efficient state varying allocation, thus its enforcement requires the judge to establish whether a worker is flexible or locked-in. The non-contingent contract is rigid and allows the employer to discharge regardless of the worker's type (a so-called at-will contract). The third is again rigid and makes discharge impossible. The judge enforces the latter two contracts by simply rubber stamping them.

In the analysis, I assume that the set of enforceable contracts is the same in every legal system. In the real world this is not always the case. For instance, in civil law systems the sovereign may forbid the parties to adopt certain contract forms[11]. However, such restrictions of contractual freedom are not general and they are likely to hold in certain areas of the law but not in others[12]. Since in this paper I focus on enforcement rather than on direct regulation, I allow the parties to freely choose among all contract forms.

Suppose that from an ex-ante standpoint (when the type of worker is not known yet) the employer and the employee adopt the contract that maximizes their joint surplus. Then, the at-

[9] I assume, for the sake of simplicity, that the wage every worker gets is zero.

[10] In this specific example flexible workers are exactly indifferent, but the introduction of a negligible search cost for them would do the job.

[11] This is not peculiar to civil law systems. Rubin (1982) argues that in common law systems, the doctrine of "unconscionability" has also restricted the set of enforceable contracts.

[12] Employment law has typically been one of the areas in which contractual instruments have been most severely restricted. For instance, in Italy, a civil law country, at will labor contracts are unlawful and discharge of indefinite term employees is for "good cause". Entrepreneurial organizations blame this rule on the grounds that judges reinstate workers too often. However, entrepreneurs can manage to restore (some) labor flexibility by using short term employment contracts. Applied to Italy, the current example would therefore describe the choice between a short term and an indefinite term contract form (abstacting from dynamic issues).

will contract is preferred by the parties to the contract banning discharge when $c < 2(\overline{\pi} - \underline{\pi})$, i.e. when the expected loss from always firing is smaller than the foregone profit associated with not firing at all. Assuming that this condition holds, the optimal contract is either contingent or at-will.

A contingent agreement gives judges some discretion because they must figure out if a worker is flexible or locked-in. Notice that, absent judicial mistakes, a contingent contract is always optimal, since $(\overline{\pi}+\underline{\pi})/2 > \overline{\pi}-(1/2)c$. The problem is that judges observe the characteristics of a worker only with noise, so errors are possible. In the decision-making process, judges trade-off the probability of making a mistake against their bias in favor of one of the litigants. On the one hand, judges are motivated by a desire to "do the right thing", i.e. they genuinely want to select an efficient allocation, one the other hand, their evaluation of evidence is not impartial.

In particular, *Pro-worker* adjudicators are particularly afraid of mistakenly firing a worker, while *Pro-employer* judges particularly dislike the prospect of mistakenly ruling against discharge. In assessing the evidence, independent judges are influenced by these biases. Consider the case where *Pro-worker* judges mistakenly fire with probability 1/3 and mistakenly rule against discharge with probability 1/2, while *Pro-employer* judges make such errors with probabilities 1/2 and 1/3, respectively.

There is a population of measure one of decision-makers, half of them are *Pro-worker*, the other half *Pro-employer*, and they are randomly allocated to disputes. This implies that, when discharge is efficient, the average probability of judicial error is $(1/2 + 1/3)/2 = (5/12)$ and the parties enjoy an expected utility of $(7\overline{\pi} + 5\underline{\pi})/12$. In the current symmetric example, the probability of judicial error when discharge is inefficient is again (5/12) and the expected utility of A and B is $(5\overline{\pi} + 7\underline{\pi})/12 - 5c/12$. As a result, the expected value generated *ex-ante* by a contingent contract is equal to $(\overline{\pi} + \underline{\pi})/2 - 5c/24$. Since the value of an at-will contract is $\overline{\pi} - (1/2)c$, a contingent contract is optimal for $c > (12/7)(\overline{\pi} - \underline{\pi})$.

When the loss from inefficient discharge is large, the contingent contract is optimal. Judgments are informed enough to keep the probability of errors down to tolerable levels. Moreover, biases are not so strong as to induce judges to disregard such information completely. As a result, letting judges decide is valuable. Notice that this is no longer true if information is poor or biases are large. In such circumstances adjudication is likely to be fully partisan, i.e. *Pro-worker* judges always rule against discharge and *Pro-employer* ones rule for discharge. In such case, the value of a contingent contract falls to $(\overline{\pi} + \underline{\pi})/2 - c/4$, which is less than what an at-will contract is worth.

In a legal system with little judicial independence, the evidence, as in the case of a contingent

contract, is evaluated not out of the individual judge's idiosyncratic bias, but with the bias of the sovereign, embodied in the code that constrains the judge's decision-making autonomy. The sovereign is not necessarily impartial between the two litigants. On the contrary, various political failures can plague statute making and skew the protection of the code in favor of one of them. Suppose for instance that the code has a *Pro-worker* bias[13]. Then every judge, regardless of his own preferences, will follow the assumed *Pro-worker* policy of mistakenly discharging with probability 1/3 and mistakenly ruling against discharge with probability 1/2.

In this case, the expected welfare when firing is efficient is $(\overline{\pi}+\underline{\pi})/2$, when firing is not efficient it is $(\overline{\pi}+2\underline{\pi})/2-(1/3)c$, and the *ex-ante* value of a contingent contract it is $(1/12)(5\overline{\pi}+7\underline{\pi})-(1/6)c$. Since the code is adverse to firing, while the expected cost from an inefficient discharge decreases relative to what it was before, the amount of profits forsaken when firing is optimal goes up. An at-will contract is optimal provided that $c < (7/4)(\overline{\pi}-\underline{\pi})$. Influenced by the code, judges seldom discharge; therefore, when the profit gain $(\overline{\pi}-\underline{\pi})$ is large, it may be optimal to adopt a non-contingent contract. This is even more true when evidence is noisy or the code is so biased that judges never fire.

Since $(7/4) > (12/7)$, a contingent contract is more often adopted when judges are independent. In addition, comparing the two systems, it is evident that in the present case "judge made" law (weakly) dominates "code made" law. The reason is that while both systems are equally able to enforce at-will contracts, the latter is much less apt at enforcing contingent contracts because of the presence of the "unidirectional" bias of the code that induces judges to use too little information. It is also evident that the more judges' preferences are polarized, the less informed their decisions are, undermining the performance of "common law" relative to "civil law" systems.

Suppose now that judges do not have to enforce contracts literally. In the real world, judges often interpret contracts and supply new terms (not provided in the original agreement) if they suspect that in the prevailing circumstances contractual provisions lead to inefficient allocations[14]. In the present framework, where rigid contracts prescribe ex-post inefficient choices, judges discretionally intervene to restore the appropriate state contingency.

[13] For simplicity, here I assume that this bias is the same as that of *Pro-worker* judges.

[14] There are several criteria courts can use to supply such terms. Legal scholars call them "default rules". In employing one of the most commonly used defaults, judges enforce the term "the parties would have wanted" had they explicitly contracted for its corresponding contingency. It therefore represents an efficiency oriented rule inducing adjudicators to impose ex-post efficient allocation. As we will see, the approach of this paper to contract interpretation is close to such rule. However, other defaults have been considered. "Penalty defaults" for instance, allocate the burden of ex-post inefficiency on one of the parties in order to promote efficient contracting ex-ante (Ayres and Gertner 1989). Later in the paper I will argue that in the current framework the two are somewhat similar.

Independent judges tend to interpret rigid contracts. As a result, even when the terms of the contract do not limit the employer's right to discharge, judges reinstate the worker whenever they receive enough evidence suggesting that firing was inefficient. Gapfilling reintroduces some state contingency into contract enforcement. In particular, it may fully neutralize rigid contracts, leading to exactly the same decision rule as that prevailing under a contingent contract. In this case, no matter which contract A and B choose, its value is equal to the value of a fully contingent one, $(1/2)(\overline{\pi} + \underline{\pi}) - (5/24)c$.

When judges must follow the code, things work differently because a moral hazard problem arises. Under an at-will contract, only *Pro-worker* judges override written terms and (sometimes) rule against discharge. *Pro-employer* judges, on the other hand, prefer to enforce the agreement literally in order to avoid conforming to the bias of the code. In this way, they can get closer to their preferred outcome.

As a result, while *Pro-worker* judges mistakenly fire with probability 1/3 and mistakenly rule against discharge with probability 1/2, *Pro-employer* ones always fire. The value of an at-will contract in those systems is $(1/24)(17\overline{\pi}+7\underline{\pi})-(1/3)c$. This at will contract dominates the performance of a contract enforced by discretionary judges when $c < (5/3)(\overline{\pi} - \underline{\pi})$. The result is intuitive: the literal enforcement strategy followed by *Pro-employer* judges in hierarchical systems is particularly valuable when the profit gained from firing a worker is large.

This final result illustrates the cost of judicial discretion. In the present context, independent judges use too much information that induces them to reinstate the worker too often, contrary to the ex-ante wishes of A and B.

To summarize, this simple example has conveyed three main ideas of the paper. First, non-contingent contracts can be used to counter the bias of the code. Second, an advantage of judicial independence stems from its better ability to enforce contingent contracts by virtue of the more balanced protection it provides to the parties (as long as judges use enough information). Third, the incentive of discretionary judges to override written terms may impose losses on the parties and represent a cost of judicial independence. I now introduce a model to look at these issues in greater detail.

3 The Setup

3.1 The Transaction

Two parties, A and B, are engaged in an economic relationship. There are two relevant states of the world, ω_1 and ω_2, with $\Pr(\omega_1) = \Pr(\omega_2) = 1/2$. Individual payoffs are $(\pi_i(S, \omega_r))_{i,r,S}$ where $i =$A,B, $r = 1, 2$, and S represents one of two possible allocations, L, R. The following properties hold:

1. $R = \underset{S \in \{L,R\}}{\arg\max} \pi_A(S, \omega_1) + \pi_B(S, \omega_1)$; $L = \underset{S \in \{L,R\}}{\arg\max} \pi_A(S, \omega_2) + \pi_B(S, \omega_2)$;

This assumption means that allocation R is the efficient one in ω_1, while allocation L is the efficient one in ω_2.

2. $R = \underset{S \in \{L,R\}}{\arg\max} \pi_A(S, \omega_r), \forall r = 1, 2$; $L = \underset{S \in \{L,R\}}{\arg\max} \pi_B(S, \omega_r), \forall r = 1, 2$

This assumption implies that while A always prefers allocation R to allocation L, B's preferences go the other way around. This property ensures the existence of a conflict around which parties seek to contract.

Denote by $W(S, \omega_r)$ the aggregate welfare of the parties when the allocation is S and state ω_r prevails. I define $I^L_{\omega_1} = W(R, \omega_1) - W(L, \omega_1)$, and $I^R_{\omega_2} = W(L, \omega_2) - W(R, \omega_2)$. $I^S_{\omega_i}$ represents the loss of welfare (with respect to the first best) incurred by the parties in ω_i when action S is selected. This basic model of conflict of interest captures several familiar forms of interaction.

i) Buyer-Seller:

A is a seller producing an itemized widget for buyer B. There are two types of widgets, cheap and dear. The cheap widget costs $\underline{c}$, the dear widget costs $\overline{c} > \underline{c}$. Buyer's valuation of the cheap widget: $\underline{v}$. Buyer's valuation of the dear widget: $\underline{v}$ in ω_1, $\overline{v}$ in ω_2, with $\overline{v} > \underline{v}$. Assume that $\overline{v} - \overline{c} > \underline{v} - \underline{c}$. Exchanging the cheap widget is efficient in ω_1, exchanging the dear widget is efficient in ω_2. Now $R \equiv$*cheap widget exchanged*, $L \equiv$*dear widget exchanged*.

ii) Entrepreneur-Capitalist[15]:

A is a capitalist, B an entrepreneur. Two projects can be chosen, R and L. A prefers R and enjoys monetary benefits $r(\omega, R) > r(\omega, L)$. B gets 0 if R is chosen and $P > 0$ otherwise. Suppose

[15] This example is in the spirit of the Aghion-Bolton (1992) model of debt and it is meant to capture some of the basic features of the control rights approach to the financial structure of the firm.

that $r(\omega_1, R) - r(\omega_1, L) > P$, i.e. R is efficient in ω_1 and $r(\omega_2, R) - r(\omega_2, L) < P$, i.e. L is efficient in ω_2.

iii) Bride-Groom[16]:

A is the groom, B is the bride. They contract over child custody in case of divorce. The child is allocated to parent $p = m, f$. Divorced parents value: i) welfare of the kid (u_k^p), ii) "unhappiness" of the former mate (when left without the kid). Fathers can either be good or bad. $u_k^f(\omega_1) = \overline{u}$, $u_k^f(\omega_2) = \underline{u}$. Also, $u_k^m(\omega) = u$, where $\underline{u} < u < \overline{u}$. If the kid goes to the mother in ω, $u_m = t + u_k^m(\omega), u_f = -t + u_k^m(\omega)$, $t > 0$, if the kid goes to the father the transfer goes the other way. $2t > \overline{u} - \underline{u}$, i.e. every parent always wants the kid. Now $R \equiv A$ *gets the kid*, $L \equiv B$ *gets the kid.*

iv) Insurer-Insured[17]:

A is the insurer , B the insured. In ω_1 the insured's wealth is intact and his utility is $W > 0$. In ω_2 he loses $D > W$ and his utility is $(1 + \theta)(W - D)$. In general, B's utility is $u(c) = c$ for $c \geq 0$ and $u(c) = (1 + \theta)c$ for $c < 0$, where $\theta > 0$ parametrizes risk aversion. Suppose that $2W > D$ and consider an insurance policy whereby B pays $D/2$ in advance and A fully covers B's losses. Now $R \equiv A$ *does not compensate* B, $L \equiv A$ *compensates* B.

3.2 The Legal System

I describe a legal system using three characteristics: the preferences of decision-makers, the aggregation of those preferences, and the quality of information used in adjudication. The trial stage is where the bulk of information is produced.

3.2.1 Trials

After ω is revealed, disagreement ensues between the parties over the course of action and they end up in court[18]. A judge is put in charge of settling the dispute. He does so by selecting an allocation S for them[19]. Unlike A and B, the judge cannot observe the current state of nature. During litigation, interaction between experts, advocates and witnesses generates some information

[16] This example was suggested to me by Francesco Caselli

[17] I will use this example later on. Notice however, that it significantly differs from the others in that here there are no ex-post inefficiencies. Here "waste" is measured in terms of lost ex-ante insurance opportunities.

[18] I do not model the decision to sue and I assume (for simplicity) that there is no cost of going to court.

[19] This tantamounts to assuming that the remedy for breach is specific performance. I assume that A and B cannot renegotiate. As we will see later on, allowing renegotiation would not alter the fundamental results of the analysis.

about ω. I assume that the "trial black box" produces a (noncontractible) signal $\sigma \in \{\sigma^1, \sigma^2\}$, informative about the state of nature. In particular, $\Pr(\sigma^1 | \omega_1) > 1/2 > \Pr(\sigma^1 | \omega_2)$[20].

3.2.2 Judges

In settling a dispute, every judge j attempts to minimize:

$$E\left\{\beta_A^j \Pr(A) + \beta_B^j \Pr(B)\right\}$$

subject to the constraint represented by the contract the parties drafted. The expectation is conditional, based on the information available to j when he decides, $\Pr(B)$ ($\Pr(A)$) represents his probability of making a mistake against B (resp. A). $\beta_A^j \geq 1$ and $\beta_B^j \geq 1$ capture the cost to j of erring against A and B, respectively. The larger β_A^j,the costlier for j to make a mistake against A. The bias of j is summarized by $\beta^j = \beta_A^j / \beta_B^j$, his relative preference for A.

This objective function has two main features. First, since judges value a reduction in the probability of misallocation, it captures their drive toward efficiency postulated by Posner (1992). At the same time, it stresses the importance of personal factors for decision-making, emphasized by legal realists (Frank 1973). Some judges think that small businesses are at the mercy of big businesses, workers at the mercy of firms, women at the mercy of men, or the other way around[21].

There is a population of measure one of judges. Half of them are *Pro-A*, with $(\beta_A^j, \beta_B^j) = (\beta_A, 1)$, the other half are *Pro-B*, with $(\beta_A^j, \beta_B^j) = (1, \beta_B)$, $\beta_A, \beta_B > 1$[22]. Decision-makers are randomly allocated to disputes[23]. Suppose the judge observes σ_1. Then, if he picks L with probability $x_L^{\sigma_1}$ and R with probability $x_R^{\sigma_1}$, $E\Pr(B) = x_R^{\sigma_1} \Pr(\omega_2 | \sigma_1)$ and $E\Pr(A) = x_L^{\sigma_1} \Pr(\omega_1 | \sigma_1)$, because B is responsible for breach in ω_1, A in ω_2. If, in addition, the decision-maker is unconstrained, his

[20] Writers in the implementation literature have suggested that the degree of information elicited from litigants is endogenous to the punishment ability of the adjudicator. In particular, Maskin and Tirole (1999) argue that message games could be used to make commonly observed information fully verifiable to outsiders. In the current analysis, I rule those mechanisms out.

[21] In line with Glaeser and Shleifer (2002), Bond (2003), bias could also be affected by corruption. In such cases, its value would be (partially) endogenous and depend on the stakes of the transaction and on their distribution.

[22] Throughout the analysis I will refer to judges' bias as being defined over agents. In principle, one might think that the bias is more meaningfully related to actions rather than agents. In the present example, the two interpretations coincide.

[23] Uncertainty over the exact identity of the decision-maker is justified in two ways: 1) In many judicial systems parties have little control over the selection of the judge, 2) Conflict may ensue between the litigants with respect to the choice of the "natural" judge. Random allocation can result as the outcome of such competition.

optimal adjudication rule after σ_1 is:

$$x_L^{\sigma_1} = \begin{cases} 1 & for \quad \frac{\Pr(\omega_2|\sigma_1)}{\Pr(\omega_1|\sigma_1)} > \beta \\ [0,1] & for \quad \frac{\Pr(\omega_2|\sigma_1)}{\Pr(\omega_1|\sigma_1)} = \beta \\ 0 & otherwise \end{cases}$$

In order to pick L, a judge must receive evidence of ω_2 strong enough to offset his bias. The same reasoning applies with respect to σ_2. The more precise the signal, the smaller the impact of β on decisions[24]. For any given amount of evidence, *Pro-B* judges are less likely to select R than *Pro-A* ones.

3.2.3 The Organization of the Judiciary

In line with the legal origin literature, I distinguish between legal systems where the state directly controls the judiciary and systems where judges are insulated from political power.

Damaska (1986) refers to the first type as *"hierarchical ideal systems"*. Used by interventionist governments to implement their policies, they are characterized by state employed judges, hierarchical ordering between them, and the use of normative standards for decision-making. Damaska calls legal institutions of the second type *"coordinate ideal systems"*. In such systems, used by more *laissez-faire* governments, decision power is vested in lay officials, authority is horizontally distributed and substantive justice guides decision-making. The former institutions are closer to Continental systems of justice, the latter to those of the Anglo-American tradition.

From a modeling point of view, I boil down all the instruments of hierarchical control into the presence of a code to which judges must defer, forcing them to adjudicate according to the preferences of the sovereign. In particular, I assume that in *"coordinate ideal"* systems, every judge has full discretion over the settlement of a case and decides according to his own preferences. On the other hand, in *"hierarchical ideal"* systems, judges adjudicate according to the parameters $\left(\beta_A^H, \beta_B^H\right)$ supplied by the code. I assume (w.l.o.g.) that the code is biased in favor of B, i.e. $\left(\beta_A^H, \beta_B^H\right) = (1, \beta_B^{code})$. As we will soon see, a code so featured can be naturally interpreted as a bright line rule or as a biased "preponderance" rule of evidence[25].

[24] Frank (1973) argued: "In sum, we may assume (for the sake of the argument) judicial uniformity in judicial use of all legal rules. But when it comes to the fact-component of decisions, uniformity may easily be absent in lawsuits in which the orally testifying witnesses disagree".

[25] I view the code as a structure of costs imposed on the activity of the judge that affects his balancing of uncertainties. No code can capture every aspect of every conflict. A judge seeking to resolve a legal problem in an area

3.3 Contracts

If the terms A and B stipulated can be fully enforced, a contract prescribing efficient actions in every state of the world would support first best allocations. Such contingent (C) contract takes the form $[\omega_1, R; \omega_2, L]$. Other contracts I consider are: R contract, i.e. a non-contingent agreement prescribing allocation R regardless of the state ω, and L contract, a non-contingent agreement always prescribing allocation L. The timing of events is as follows:

$t = 0$: A and B meet, choose the contract form and exchange side payments.

$t = 1$: The state of the world is revealed, the parties go to court.

$t = 2$: The court observes the signal and adjudicates the dispute.

4 Solution under Literal Enforcement

I study the equilibrium of the model under the assumption that rigid contracts are enforced literally. I first consider optimal contract choice when judges wield discretion and then look at what happens when a code constrains their behavior. After that, I compare the two systems, both in terms of the welfare of the parties and in terms of the contract adopted. With respect to the signal, I adopt the notation: $\Pr(\sigma_1 | \omega_1) = \gamma$, $\Pr(\sigma_2 | \omega_2) = \eta$. I define $\rho^1 = (1-\eta)/\gamma$, $\rho^2 = \eta/(1-\gamma)$[26].

4.1 Coordinate Ideal System

Before moving to contract choice, I illustrate the working of the model by looking at the way discretionary judges enforce a contingent contract.

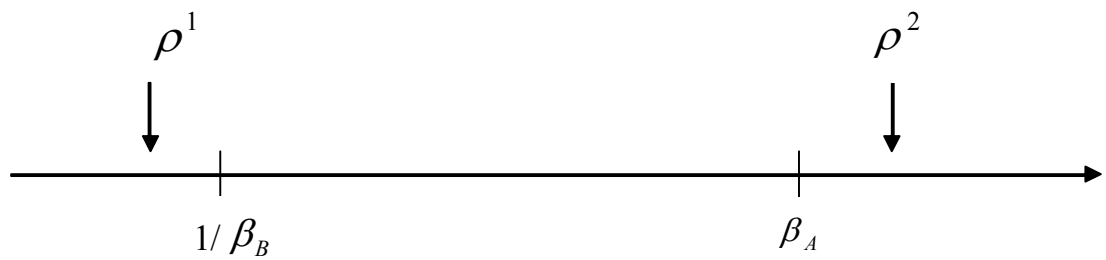
4.1.1 Contingent Contract

Under a contingent contract, a judge has the power to set the final allocation. Then, if the evidence in favor of B is strong enough to offset his relative preference for A, the judge sets allocation L, otherwise he selects R. Consider the allocative strategy of a *Pro-A* judge. After observing σ_1, since his bias is $\beta = \beta_A$, he picks R. After σ_2, he compares ρ^2 to β_A. We can have two cases: if $\beta_A < \rho^2$, the judge is not so biased to disregard evidence in favor of B and selects L, if instead $\beta_A > \rho^2$ he

covered by a statute does not usually expect to find a specific and concrete legal rule applicable to the situation at hand. Instead, he casts his opinion by interpreting statutory provisions and applying them to the current situation. In this sense, the code is more an instrument to influence the decisionmaker's elaboration of information than a set of specific rules dictating his adjudication.

[26] In other words, ρ^i is the odds ratio after signal σ_i that the state is ω_2.

picks R. Symmetrically, a *Pro-B* judge always rules for L after σ_2, while the intensity of his bias (whether $1/\beta_B \lesseqgtr \rho^1$) drives his decision after σ_1. By ordering judges's biases on the real line, we can see how the aggregate enforcement policy is determined:



When, as pictured above, biases are small relative to the precision of information, every decision-maker fully follows the signal and adjudicates according to the rule $x_L^{\sigma_1} = 0, x_L^{\sigma_2} = 1$. In this case the ex-ante welfare of A and B under C is simply given by:

$$W_D(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$$

where W^{FB} represents the first best welfare level A and B can achieve, and $W_D(\alpha)$ indicates[27] the ex-ante welfare the parties achieve under contract α when judges wield discretion. Judicial mistakes occur with probability $(1-\gamma)$ in ω_1 and with probability $(1-\eta)$ in ω_2. Their effect is to trigger misallocations in ω_1 and ω_2 that exact a cost of $I^L_{\omega_1}$ and $I^R_{\omega_2}$ to the parties, respectively.

Suppose now that the bias of *Pro-A* judges becomes large (in particular $\beta_A > \rho^2$). Now their preference for A is so strong that they always rule for R, regardless of the signal they receive. In this case, the ex-ante welfare of A and B under C is:

$$W_D(C) = W^{FB} - (1/2)(1-\gamma)I^L_{\omega_1} - (1-\eta/2)I^R_{\omega_2}$$

Relative to the previous case, two things have changed. First, the *overall* probability of judicial mistakes has gone up. This is a consequence of the fact that more extremist judges disregard the informative signal. The second important change is that there has been a reallocation of inefficiencies away from ω_1 to ω_2, i.e. A is now more protected than before, while B is less

[27] Up to a multiplicative constant (the prior probability 1/2)

protected.

These two effects, general to any variation in judicial preferences, suggest that as one type of decision-makers becomes more biased, the surplus of contracting parties does not necessarily fall. The reason is simple: although mistakes become more frequent, as long as misallocations in ω_1 and ω_2 are not equally costly, the extra protection afforded to one of the parties at the expense of the other may potentially relieve A and B from the most severe loss[28].

Critics of the common law remark how judicial discretion may give way to arbitrariness. The argument often used to counter this criticism is well summarized by the wishful statement of Justice Cardozo (1921), who once wrote: "The eccentricities of judges balance one another". A rather different message emerges from the analysis above. Different opinions *do not* correct one another. The reason is that when judges become more "ideological", the amount of information used decreases. This affects the aggregate enforcement policy and, more importantly, the welfare of the parties.

4.1.2 Contract Choice

A question immediately arises: can the parties affect judicial strategies to their benefit by opting for other contract forms? The answer is yes. Indeed, if bias drives judicial decisions so that the probability of a serious misallocation is large, a rigid contract may be useful to constrain the judge and avoid worst-case scenarios.

This "insurance" function of rigid contracts can be readily seen by noting that, under a R contract, the welfare of A and B is $W_D(R) = W^{FB} - I^R_{\omega_2}$, i.e. allocation R is always implemented. Consider now the case where $1/\beta_B > \rho^1$, $\beta_A < \rho^2$, in which both *Pro-A* and *Pro-B* judges follow the signal. Then, contract R is preferred to C for:

$$(1-\gamma)I^L_{\omega_1} + (1-\eta)I^R_{\omega_2} \geq I^R_{\omega_2}$$

The smaller the losses associated to a misallocation in ω_2 ($I^R_{\omega_2}$), the more likely is that A and B opt for R in order to protect themselves from the less appealing prospect that σ_2 may induce judges to set L in ω_1. By the same token, an L contract, which delivers $W_D(L) = W^{FB} - I^L_{\omega_1}$, may become optimal when the loss triggered in ω_1, $I^L_{\omega_1}$ is sufficiently small.

[28] Key to this result is the assumption that judges do care about efficiency, but their trade-off between different mistakes is affected by bias and does not fully reflect social welfare. This assumption departs from much of the the law and economics literature where judges are assumed to be fully benevolent (Posner 1992).

Since the main function of a rigid contract is to withdraw discretion from judges, the basic trade-off that shapes contract choice is one between information and the allocation of protection: on the one hand, a contingent contract helps the parties to minimize the *overall* probability of error, on the other hand, a rigid form allows them to allocate protection in a way that the least costly inefficiency prevails. The result is summarized in the following:

Proposition 1 *In coordinate ideal systems, optimal contract choice has the following properties: for any* (β_B, β_A)*, there exist two thresholds* $\underline{I}$ *and* $\overline{I}$*, with* $\overline{I} \geq \underline{I}$*, such that:* L *is optimal for* $(I^L_{\omega_1}/I^R_{\omega_2}) < \underline{I}$*,* C *is optimal for* $\underline{I} \leq (I^L_{\omega_1}/I^R_{\omega_2}) \leq \overline{I}$*,* R *is optimal for* $(I^L_{\omega_1}/I^R_{\omega_2}) > \overline{I}$*.*

The proof is in the appendix. When the loss imposed by L in ω_1 is small relative to the loss R induces in ω_2, a rigid L contract is optimal. When instead $I^L_{\omega_1}$ is large relative to $I^R_{\omega_2}$, the worst case scenario is a misallocation in ω_1 and a rigid R contract will be chosen. If the parties need equal protection, the use of information is valuable to them. When $(I^L_{\omega_1}/I^R_{\omega_2}) = 1$, the trade-off between protection and information disappears: the only way to minimize inefficiencies is to reduce the overall probability of judicial mistakes.

Corollary 1.1: $\overline{I}$ *(weakly) decreases in* β_A *and* β_B*. The opposite is true for* $\underline{I}$*. On the other hand, a more precise signal (larger* γ *and* η*) more often makes a* C *contract optimal.*

The proof is in the appendix. Two basic elements affect contract choice: the biases of adjudicators and the quality of the information available to them. If β_A increases, *Pro-A* judges become less willing to follow the signal, and one should expect marginal transactors to substitute away from C to either R or L. The same is true if β_B becomes larger. More polarized judicial preferences make C less appealing because they reduce the amount of information embodied into judgments. By the same token, for a given distribution of judges' preferences, if ω is "more verifiable" (γ and η larger), C is adopted more often. Since it is now harder for the judge to "manipulate" information of better quality, C reduces judicial mistakes in a substantial way.

4.2 Hierarchical Ideal System

The performance of a contingent contract in hierarchical systems of justice is shaped by the bias of the code $(1, \beta^{code}_B)$ which decision-makers must follow in adjudication. We have to consider two scenarios: either the code is "responsive" and $1/\beta^{code}_B > \rho^1$, or it is "rigid" and $1/\beta^{code}_B < \rho^1$.

In the first case, a "benevolent" sovereign forces judges to follow the signal and the welfare of the parties is $W_{ND}(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$. If instead the code strongly favors B, judges must implement L regardless of any evidence, and the parties enjoy $W_{ND}(C) = W^{FB} - I^L_{\omega_1}$. When judges do not wield discretion, it is meaningful to choose a contingent contract only when the overarching bias of the code is not too strong[29]. The proposition below illustrates optimal contract choice:

Proposition 2 *In hierarchical ideal systems, contract choice has the following features:*

1) For $1/\beta^{code}_B \geq \rho^1$, L is adopted for $(I^L_{\omega_1}/I^R_{\omega_2}) < \rho^1$, R is adopted for $(I^L_{\omega_1}/I^R_{\omega_2}) > \rho^2$, C is adopted otherwise

2) For $1/\beta^{code}_B < \rho^1$, L is adopted for $(I^L_{\omega_1}/I^R_{\omega_2}) < 1$, R is adopted otherwise

The proof is in the appendix. Again, the trade-off between information and protection drives contract choice. In particular, when the code is "flexible" ($1/\beta^{code}_B \geq \rho^1$), contingent contracts are optimal as long as protection needs to be sufficiently balanced or the quality of the signal is good enough. On the other hand, the benefit of C is totally undermined by a biased code. When information is not used at all ($1/\beta^{code}_B < \rho^1$), the optimal contract only makes sure that the least cost misallocation is triggered.

4.3 System Evaluation

To compare the performance of the two legal systems, I begin by comparing their *efficiency*, i.e. their ability to secure A's and B's gains from trade, and then turn to the differences in contracting *forms* that support the respective welfare levels. The first part of the analysis evaluates the robustness of the Coasian irrelevance result in the current framework, the second part describes the instruments the parties choose to adopt. In order to reduce the number of cases to consider, I make the following:

Assumption 1: $I^L_{\omega_1} \geq I^R_{\omega_2}$

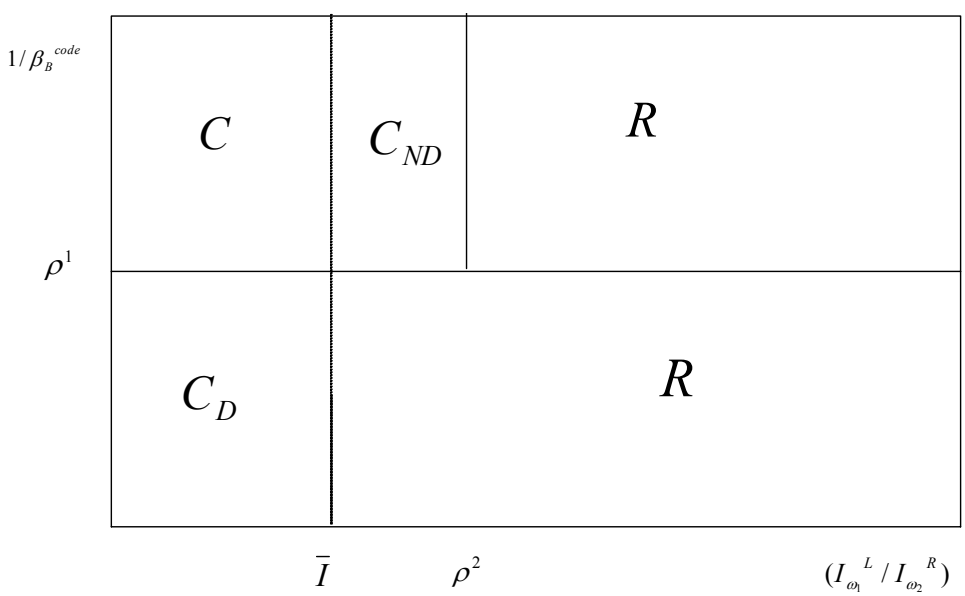
Since the loss induced by L in ω_1 is more severe than the inefficiency associated with allocation R in ω_2, the condition implies that the optimal contract is either C or R. I next obtain:

Proposition 3 *For $(I^L_{\omega_1}/I^R_{\omega_2}) > \rho^2$ the judicial system is irrelevant. For $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$, if $1/\beta^{code}_B \geq \rho^1$, hierarchical systems (weakly) dominate coordinate systems, if $1/\beta^{code}_B < \rho^1$, the opposite is true.*

[29] Indeed in this case, the presence of negligible costs of drafting a contingent form would make non-contingent L form strictly preferable to the parties.

The proof is in the appendix. When I claim that given a certain parameter set, the judicial system is irrelevant, I mean that the welfare of the parties is the same for any configuration of $(\beta_A, \beta_B, \beta_B^{code})$. The performance of a judicial system greatly depends on its ability to use information, i.e. on whether it can enforce contingent contracts properly. While rigid contracts fare equally under the two systems, the ability of the courts to enforce contingent contracts depends on the organization of the judiciary, which determines the willingness of adjudicators to verify and accurately interpret relevant events[30].

When $(I^L_{\omega_1}/I^R_{\omega_2}) > \rho^2$, the inefficiency triggered by L in ω_1 is so large that information can be sacrificed to protection. A rigid R contract is optimal in both legal systems and the law is irrelevant[31]. However, since hierarchical and coordinate systems provide adjudicators with different incentives for using information, one should not expect legal institutions to be irrelevant when contingent contracts are optimal. In particular, if the harm caused by different misallocations is similar or the information available to adjudicators is quite precise, the private sector demands more from the legal system than to merely rubberstamping rigid contracts. The picture below shows the comparison between the two systems:



[30] Without Assumption 1, one would obtain the same result. Specifically, for$(I^L_{\omega_1}/I^R_{\omega_2}) \leq 1$, coordinate systems dominate for $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^1$, and irrelevance prevails otherwise. The logic is the same: when protection needs to be balanced, "information intensive" judgments are preferable.

[31] Notice that a non-contingent contract can effectively extend the protection enjoyed by A even when the code is very biased in favor of B. Under contract R , A.is equally protected in both systems.

In the regions R and C, contracts R and C are respectively adopted both in hierarchical and coordinate legal systems. C_{ND} is the area where the parties adopt a contingent contract in hierarchical systems only, while C_D is where contingent contracts are used only when judges wield discretion[32].

A "benevolent" code ($1/\beta_B^{code} \geq \rho^1$) is the best tool to curb the potential extremism of discretionary decision-makers. Even though this conclusion may sound uninteresting, it captures some of the arguments people have used to highlight the benefits of codification and, as we will see, is useful in understanding the recent debate on tort reform in the U.S. On the other hand, statutory law does not work so well when the code is very biased. In this case, judicial discretion guarantees a more accurate adjudication, that allows A and B to opt for contingent contracts. The intrinsic "pluralism" of judicial autonomy is now favored relative to the bias of the code.

Indeed, this case is the one many writers have in mind when comparing the two systems. Scholars such as Hayek (1960) and Posner (1992) maintain that the cost of codification comes from the excessive power it assigns to the state. In their view, statutory norms are set in order to please the sovereign or special interests and therefore represent an instrument which is ill-suited to provide balanced protection.

There are other reasons to expect non-autonomous judges to use less information. Perhaps the most compelling of them emphasizes the relationship between law enforcers and the sovereign. In particular, "rigid" codes are likely to prevail because they allow the sovereign to better control judges[33]. The serious limitations of systems in which judges have little autonomy to enforce contingent contracts should be viewed as one of the main costs they impose on contracting. Hence:

Corollary 3.1: *For $1/\beta_B^{code} < \rho^1$, contingent contracts are more often adopted in systems where judges wield discretion.*

For the proof, see appendix. The result[34] comes directly from the fact that discretionary judges

[32] If the parties were allowed to renegotiate, from an ex-post standpoint the law would not matter. However, the introduction of an ex-ante unverifiable bilateral investment (without externalities) restores the current result. The tradeoff would be the following: a contingent contract provides both A and B with incentives to invest, a non-contingent contract skews incentives in favor of one of them. When judges make a lot of mistakes, a contingent contract triggers too much expropriation and the incentives of both parties may be insufficient. In this case, a non-contingent contract is optimal. A formal derivation of the result is available from the author upon request.

[33] Various authors use this argument to claim (Glaeser and Shleifer 2002, Von Mehren 1957), that bright line rules (reducing the amount of information used in adjudication) are complementary to the establishment of hierarchical systems of justice.

[34] The proof of the proposition also shows that this result is obtained not only under the assumption ($1/\beta_B^{code} < \frac{1-\eta}{\gamma}$), but also under the weaker assumption that $\beta_B^{code} = \beta_B$ (i.e. the bias of the code is equal to that of *Pro-B* judges) and that biases are symmetrically distributed. Therefore, one can conclude that "common law" systems are more conducive to the use of contingent contracts.

use more information in decision-making, which in turn induces A and B to give them discretion as to which allocation to select. On the other hand, in civil law systems, A and B opt for rigid contracts that allow them to neutralize the bias of the code. The proposition rationalizes the commonly-made observation that contracts tend to be longer in countries with common-law systems, i.e. they specify a variety of special clauses that modify the terms of the agreement, than the contracts stipulated in civil-law countries. One way to put this is that in common-law countries the parties are more likely to write contingent contracts.

The analysis carried out so far allows us to investigate how the comparison between different legal systems depends on the polarization of judges' preferences[35]. In order to do so, I de-emphasize the effects coming of the different degrees of protection the parties may need by considering the case $I^L_{\omega_1} = I^R_{\omega_2} = I$. We then have:

Corollary 3.2: *An increase in polarization improves the performance of hierarchical systems relative to coordinate systems.*

The proof is in the appendix. When adjudicators' preferences are polarized, judicial discretion is less desirable: judges adjudicate by paying less attention to the signal and this reduces the surplus A and B attain under a contingent contract, the mechanism responsible for the breakdown of the irrelevance result. In addition, the value of using the code to discipline judicial behavior and standardize their decision-making is enhanced. Therefore, higher polarization of judges' preferences and lower quality of information generally reduce the appeal of judicial discretion.

5 Judicial Modification of Contracts

So far, I have assumed that contracts are enforced as written. However, in the real world, the contractual autonomy of the parties is not always guaranteed. Legal scholars note that judges often interpret contracts and modify their terms. This activity, also called "gapfilling", is a fundamental feature of enforcement. In the current setup, judges wish (in the limits of their biases) to pick efficient allocations, so gapfilling is used to re-introduce the appropriate state-contingency into rigid contracts. In this section, I evaluate how legal institutions shape the incentive for judges to modify contract terms and the implication this has for contract choice and efficiency.

[35] By higher polarization I mean an increase in β_A, β_B or both.

5.1 Gapfilling

Contract interpretation, by its nature, can be assumed to be a discretionary activity[36]. During a lawsuit, the judge receives information that might suggest that a rigid contract does not faithfully represent the underlying transaction. If he overrides the written terms of such a contract, his decision is based on a signal with the following properties: $\Pr(\sigma_1 | \omega_1) = \overline{\gamma} \leq \gamma$, $\Pr(\sigma_2 | \omega_2) = \overline{\eta} \leq \eta$. The information upon which interpretation is based is not less noisy than that received under C[37].

The idea is that a fully contingent contract plays an "evidentiary function" for outsiders. By reporting all the relevant obligations and events, the parties help judges to gather information on their relationship[38]. While at the drafting stage A and B share the same interest in accurately describing their transaction, at the trial stage they are in conflict and their partisan tactics can reduce the accuracy of information available to judges[39].

From the standpoint of the judge, the qualitative nature of gapfilling is the same as that of enforcing a contingent contract[40]. His expected disutilities[41] from "filling gaps" and from enforcing those contracts literally are given by:

$$E^{fill} = \beta_B^j \left[x_R^{\sigma_1}(1-\overline{\eta}) + x_R^{\sigma_2}\overline{\eta}\right] + \beta_A^j \left[(1-x_R^{\sigma_1})\overline{\gamma} + (1-x_R^{\sigma_2})(1-\overline{\gamma})\right] \quad ; \quad E_R^{lit} = \beta_B^j \quad ; \quad E_L^{lit} = \beta_A^j$$

Obviously, as long as $x_R^{\sigma_1} \geq x_R^{\sigma_2}$, a more informative signal makes interpretation more worthwhile. Let us now see how gapfilling affects the analysis.

[36] Contract interpretation is very hard to monitor. The judge can always claim that the contract he is enforcing faithfully represents the underlying transaction.

[37] Another way to interpret this assumption is to say that, conditional on the decision to fill a gap in a rigid contract, the judge enjoys more discretionary power than when enforcing a contingent agreement. The idea is that the latter, containing a finer description of obligations, constrains the decision-maker to a greater degree.

[38] Suppose that the states are distinguished according to an attribute (say weather). The correspondence between ω_1 and ω_2 and the attribute depends on the type of transaction, observed by the judge with noise. Suppose there are two transactions, 1 and 2. 1 is such that $\omega_1^1 \equiv rain$, $\omega_2^1 \equiv sun$, 2 is such that $\omega_1^2 \equiv sun$, $\omega_2^2 \equiv rain$. If the judge, in addition to observing the weather with noise, also observes with noise whether the transaction at issue is of type 1 or 2, this additional noise adds up to the first and makes adjudication more random. By writing a contingent contract the parties can avoid this second source of noise and make adjudication more precise.

[39] The parties' advocates for instance, by misrepresenting facts and using rhetorical arguments, may try to obfuscate the truth. Dewatripont and Tirole (1999) argue that when the parties can forge evidence, the information produced during a trial can be misleading.

[40] The "quasi benevolent" preferences a judges allow to interpret gapfilling as driven by a rule adding the terms the parties "would have wanted". This is indeed one of the gapfilling criteria most often discussed in the legal literature. Other default rules can guide such activity. Some of them, called "information forcing", induce ex-ante disclosure of information (as we will see, the rule adopted in this paper achieves the same objective). See Ayres and Gertner (1989).

[41] All the expected disutilities are correct up to a multiplicative constant (the probability 1/2).

5.2 Coordinate Ideal System

I begin the analysis by looking at what happens when judges wield discretion. In this case, their adjudication is easily characterized:

Proposition 4 *In coordinate ideal systems judges always interpret rigid contracts*

This result is straightforward. When judges wield discretion, no matter what the precision of the signal is, they always prefer to use more instead of less information. Since they can freely adjust the use of the signal to their preferences, better information allows them to minimize the probability of picking the wrong allocation. Therefore, they always engage in gapfilling[42].

The result captures the use common law courts make of extrinsic evidence in contract enforcement. Several writers in law and economics (Goetz and Scott 1985, Schwartz 1992, Schwartz and Watson 2003) have emphasized that common law judges tend to interpret agreements in light of surrounding circumstances [43]. The reaction of the parties to such activism is:

Proposition 5 *In coordinate ideal systems, there exists a* $I_D^* \geq \rho^2$ *such that a contingent contract is optimal for* $1 \leq (I_{\omega_1}^L / I_{\omega_2}^R) \leq I_D^*$ *and a R contract is optimal otherwise*

The proof is in the appendix. The introduction of gapfilling induces A and B to choose contingent contracts more often. Now, for most values of β_A and β_B (which determine I^*), C is optimal. Adopting R is only worthwhile for $\overline{\rho}^1 < \beta_A < \rho^1$, i.e. if the change in the precision of the signal leads *Pro-A* judges to select R more often, which helps to avoid misallocations in ω_1 (the costlier ones)[44].

An active interpretative stance partially deprives rigid contracts from their "insurance" benefit. When decision-makers use extrinsic evidence and override contract terms, all the issues are put "on the table" anyway, so it is in the mutual interest of the parties to guide the court by carefully

[42] A common law doctrine, the parole evidence rule says: "A court will refuse to use evidence of the parties' prior negotiations in order to interpret a written contract unless the writing is (1) incomplete, (2) ambiguous or (3) the product of fraud, mistake, or a similar bargaining defect". However, the rule requires interpretation so as to assess if one of the above categories applies. Posner (1998) argues that some courts interpret the rule more liberally, others more strictly.

[43] Dewatripont and Tirole (1999) argue that adjudication in civil law systems is less informed. They view the difference as coming from the adversarial vs. inquisitorial nature of the systems, i.e. more information is *produced* in the latter. The model is consistent with either interpretation. However, they do not address the incentive for judges to *use* the information produced. Indeed, in adversarial systems the judge can decide on what evidence to admit.

[44] In this case, the reason to select a rigid form is purely informational: when the parties misspecify the terms of their agreement, contract interpretation is ridden by ambiguities that *Pro-A* judges exploit in order to protect their favored party.

specifying all the contingencies in an ex-ante contract[45]. The lower ability of the parties to influence adjudication strategies shows how judicial discretion can reduce the contractual autonomy of the parties[46].

5.3 Hierarchical Ideal System

When literally enforced, rigid contracts can be very valuable in hierarchical ideal systems. It is therefore important to consider what happens when their interpretation is endogenized. Take contract R. If judges enforce it literally, they just select allocation R. Since the code is *Pro-B*, this possibility is particularly appealing to *Pro-A* decision-makers: abiding by R's written terms allows them to rule in a way more consonant with their true preferences. On the other hand, *Pro-B* judges always interpret in order to avoid policy $x_L^{\sigma_i} = 0$.

When[47] $1/\beta_B^{code} < \overline{\rho}^1$, the code is very biased against A. By interpreting the contract through the "lens of the code", judges always override its written terms, i.e. they set $x_L^{\sigma_i} = 1$, by enforcing R literally they can set $x_L^{\sigma_i} = 0$. As a result, literal enforcement is more appealing to judge j provided $\beta_B^j \leq \beta_A^j$, a condition clearly met for *Pro-A* decision-makers. The performance of R is:

$$W_{ND}(R) = W^{FB} - (1/2)I_{\omega_1}^L - (1/2)I_{\omega_2}^R$$

When instead the code is flexible ($1/\beta_B^{code} < \overline{\rho}^1$), either *Pro-A* judges share the same adjudication and interpret (for $\beta_A < \overline{\rho}^2$), in which case the parties enjoy $W^{FB} - (1-\overline{\gamma})I_{\omega_1}^L - (1-\overline{\eta})I_{\omega_2}^R$, or they enforce literally (for $\beta_A \geq \overline{\rho}^2$) so that A and B's joint welfare is $W^{FB} - (1/2)(1-\overline{\gamma})I_{\omega_1}^L - (1-\overline{\eta}/2)I_{\omega_2}^R$.

As the bias in the code grows large (or when β_A is large), the preferences of *Pro-A* judges become very distant from those of the sovereign. This induces them to enforce R literally. In particular, when the code is "rigid", adjudication strategies become fully partisan: *Pro-B* decision-makers always choose L, *Pro-A* ones impose R. This behavior is the result of an agency problem within the judiciary: literal enforcement allows judges whose preferences stand opposite to those embodied in the code to extend the protection of their favored party. In this sense, a rigid contract

[45] Introducing an ex-ante cost of writing C, yields an inverted U shaped relationship between the probability of observing C and judicial competence (measured by the precision of the signal). This holds under the assumption that the precision of gapfilling grows more with competence than the precision of the enforcement of C.

[46] In an influential paper, Ayres and Gertner (1989) advocated the use of "penalty" gapfilling rules for situations in which the parties are asymmetrically informed. When using such defaults, the judge should trigger the allocation which is most unfavorable to the informed party in order to induce him to reveal his private information ex-ante. Although in the present case A and B share the same information, one could view an active interpretative strategy as a penalty default, inducing the parties to reveal information to the judge by drafting ex-ante contingent agreements.

[47] By $\overline{\rho}^i$ I indicate the odds ratio generated by the signal driving contract interpretation

allows *Pro-A* judges to separate themselves from code-driven interpretation. I now look at optimal contract choice. In order to reduce the number of cases let us assume:

Assumption 2: $1/\beta_B^{code} < \overline{\rho}^1$.

It implies that, when judges override R, they always settle in favor of B[48] and we have:

Proposition 6 *In hierarchical systems, contract choice has the following properties:*

1) For $1/\beta_B^{code} > \rho^1$, *$C$ is always adopted*

2) For $1/\beta_B^{code} < \rho^1$, *$R$ is always adopted*

The proof is in the appendix. The message of the proposition is clear: when all the available information is used, C is the best contract that A and B can adopt. On the other hand, if the code severely discriminates against one of the parties, a rigid contract can be used to enhance protection for the weaker of them and insure both parties against very bad outcomes. As a result, R is optimal when the code is "rigid". Endogenizing contract interpretation affects the equilibrium in hierarchical systems less drastically than in coordinate ones. I now move on to systematically compare the two legal organizations.

5.4 Welfare

Introducing the possibility of gapfilling has drastically altered an important feature of the equilibrium. Contract interpretation further breaks down the Coasian irrelevance result. Now it is impossible for the parties to use contracts to offset the impact of the judicial system and the reason is that A and B lack sufficient contractual autonomy. Decision-makers actively shape enforcement by interpreting agreements beyond written terms and the parties cannot neutralize the different proclivities of independent and non-independent judges to engage in this task[49]. To see more clearly how gapfilling affects the equilibrium of the model, I restrict the analysis to the case in which the bias of the code is the same as the bias of *Pro-B* judges[50]:

Assumption 3: $\beta_B^{code} = \beta_B$

[48] In the appendix, the analysis is carried out for the full parameter space.

[49] In principle, in order to prevent the judge from interpreting their agreement, the parties may attach to the contract a clause saying "interpret this agreement literally". However, it is doubtful that courts will accept to defer to those terms. Posner (1998) for instance, claims that many U.S. courts liberally construe contracts even in the presence of such clauses. By explicitly introducing strategic behavior of judges, the analysis shows why they may be unwilling to stick to those terms and how this incentive varies across legal systems.

[50] In the appendix I consider all the possible cases

This assumption greatly simplifies matters by reducing the number of cases to consider, without fundamentally altering the main point of the analysis. Comparing the efficiency of the two systems leads to the following:

Proposition 7 *Suppose* $1/\beta_B \leq \rho^1$*,then hierarchical systems dominate coordinate ones for* $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$ *and the opposite is true for* $(I^L_{\omega_1}/I^R_{\omega_2}) < \rho^2$*.*

The proof is in the appendix.

We saw that the benefit of judicial independence is that decision-makers enforce contingent contracts more accurately. Allowing judges to override written terms preserves this effect only for $(I^L_{\omega_1}/I^R_{\omega_2}) < \rho^2$, in which moderate protection has to be provided to both parties. When instead $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$, the proposition uncovers a cost of the "common law" going beyond that related to the arbitrariness of decision-makers. Specifically, judicial discretion induces judges to override contract terms too often. If a misallocations in ω_1 is very costly, the parties would want adjudicators to rigidly select R. Such insurance against worst-case scenarios is not equally available in the two systems.

Independent judges privilege too much their own desire to track efficiency relative to the parties' concern for insurance. Judicial discretion is therefore responsible for a negative externality: ex-post adjudicators care too much about finding out the truth without paying attention to the effect this has on the ex-ante welfare of the parties.

On the other hand, when judges must follow the code, some of them (in this case *Pro-A* ones) have an incentive to enforce R literally and this enhances the contractual autonomy of the parties. The code acts as a commitment device: it reduces the return judges enjoy from producing more informed decisions, thereby making them more willing to stick to written terms. As a result, when the "interventionism" of autonomous judges impairs the ability of A and B to reduce the likelihood of very costly misallocations, civil law systems are preferable to common law ones. In addition, the possibility of contract interpretation reinforces the prediction that A and B will more often opt for contingent contracts when judges wield discretionary power:

Corollary 7.1: *For every* (β_A, β_B) *contingent contracts are more often adopted in coordinate systems.*

We saw that common law systems are more conducive to the adoption of contingent contracts because of the higher informational content of judicial decisions. The possibility of gapfilling further

strengthens this effect: judicial autonomy leads decision-makers to modify contract terms ex-post and this induces the parties to sign contingent contracts ex-ante.

On the other hand, when judges must follow the code, they do not systematically override written terms; as a result, A and B often opt for rigid contracts. The two systems therefore emerge as being characterized by a sharp difference: in common "law systems" information intensive adjudication fosters flexible contracting; in hierarchical systems adjudication is driven by the bias of the code which triggers the use of non-contingent contracts.

6 Applications

In this section, I apply the model to analyze some issues in the product liability and insurance fields. The goal of these examples is not to compare systematically the working of different legal systems, but rather to look at real world cases illustrating costs and benefits of judicial discretion.

6.1 Product Liability

Product liability is the field of law dealing with the legal liability of any or all parties along the chain of manufacture of any product for damage caused by that product. A product containing an inherent defect that causes harm to a buyer, a user and even bystanders give rise to a tort (i.e. a civil wrong) which makes the manufacturer liable. In the last thirty years or so, products liability has greatly expanded in the U.S.. Federal products liability lawsuits involving personal injury have increased sixfold from 1975 to 1989[51]. The size of awards to plaintiffs has soared and so have the insurance costs imposed on business firms, and on providers of medical or other services.

Some observers view these developments as desirable (Neely 1998). They claim that product liability insures consumers and it ultimately supports their confidence in the market. Others (Viscusi 1991) have viewed with concern the costs the system imposes on firms in terms of increased insurance premia, discouragement of product innovation and product introduction, especially with respect to goods in which the liability exposure is substantial. For instance, the private aircraft industry was severely hit by product liability[52].

[51] See Viscusi (1991)

[52] Viscusi (1991), reports that Cessna, which accounted for 9000 planes in 1979, in 1987 ceased production, while Beech's production dropped from 1214 to 195 in the same period. He claims that the crisis was triggered by the fact that aircraft companies are sued in 90% of all crashes involving fatalities and serious injury, even though pilot error is responsible for 85% of them, and this has brought the average liability cost to $100,000 per plane.

In light of these developments, the issue of "tort reform" has gained an important place in the political debate, strongly supported by business groups. Since product liability law, and most tort law in general, is a creation of the courts (Landes and Posner 1987), courts have been blamed by their detractors. Judges and juries have been accused of being biased (often in favor of the plaintiffs), capricious, and ill-equipped to decide complex and technical issues in areas such as medical malpractice, product or worker safety.

The model I presented allows an analysis of the consequences of the "incompetence" of courts and civil juries. As I have shown, when decision-makers lack knowledge and the issue is hard to understand (i.e. the signal is less precise), judicial discretion can be very costly because it accommodates adjudicators' biases. Lack of competence gives rise to arbitrariness, which is in turn responsible for introducing costly randomness into judgments. As a result, in this area of tort, where jurors are likely to be confused by battles over technical or scientific evidence, the "disciplinary" value of a code may be great[53]. A similar logic seems to be behind the proposal of Viscusi (1991), who articulates a reform of tort law based on the systematic employment of standard criteria of risk-utility analysis by trained regulators, thereby taking the matter away from courts.

An even closer parallel between product liability and the analysis I carried out arises when one considers the kind of economic relationships behind products related injuries. Unlike other areas of tort, these transactions are eminently contractual, since they often concern the relationship between a buyer and a seller. In Coasian spirit, a question naturally arises: why not a contractual solution? Warranties, for instance, may be one way for producers to insure consumers against product related risks; low prices are another compensatory measure.

Two broad positions have emerged in the law and economics literature. On the one hand, Landes and Posner (1987) and Shavell (1987) have argued the contracts are ill-suited to provide the appropriate protection because consumers are generally uninformed and cannot properly evaluate risks. On the other hand, Rubin (1993) and Schwartz (1988) have, among others, advocated the contractual solution. But why are the two in conflict? In principle, courts could intervene "selectively", establishing protection when contracts do not provide it. As the current analysis emphasizes, a problem with this argument is that judges may be unwilling to defer to contract terms in product liability cases.

[53] Another solution in line with the current analysis would consist on the elimination of the civil jury. It can be presumed that jurors are on average less competent than judges, so the substitution of the latter with the former could indeed improve matters.

Indeed, it seems that U.S. courts have often been "interventionist" in product liability cases. Rubin (1993) reports that courts often refuse to enforce the damages stipulated by the parties and decline to enforce contractual specification of liability rules. I believe that my model goes to the heart of this type of judicial behavior by emphasizing the importance of judicial discretion in affecting the incentives of decision-makers to modify contract terms and by underscoring the costs associated with it. The real question is: how could a contractual solution be feasible when courts wield discretion? As long as judges enforce their norms and rules and not the wishes of the parties, it is unlikely that outcomes will be desirable from the parties' point of view.

6.2 Insurance Contracts

Products liability is not the only field of law where courts have been interventionist, insurance is another such field. In this section, drawing on some evidence on the enforcement of insurance contracts by U.S. courts, I use my model to discuss how judicial activism shapes contract choice and its potential efficiency costs. The cases I analyze are from a paper by Chesler, Rodburg and Smith (1986). The authors examine the history of standard form Comprehensive General Liability (CGL) policies that insure businesses against damages caused by hazardous waste activities. As of 1913, under the basic CGL "duty to pay" provision, insurers assumed the obligation:

"To pay, on behalf of the insured, all sums which the insured shall become legally obligated to pay as damages because of bodily injury, sickness or disease...sustained by any person, or because of injury or destruction of property...*caused by accident*".

Faced with enormous potential liabilities, firms sought to obtain extensive coverage and the conflict with insurers often led to litigation. In settling disputes, judges adopted the "constructively intentional" test to determine whether the consequences of the business' acts were readily foreseeable or not. In the first case, coverage would be denied, in the second it would be granted. The low verifiability of the subject of the test gave rise to a marked variability in decisions, evident in two cases presented by the authors.

In *Moffat v. Metropolitan Casualty Insurance Co.*, the plaintiff's coal refuse banks produced destructive gases when burned. The court held that *Moffat* did not know about the damages from such gases, and even though the plaintiff knew that the banks could oxidize and cause damage, his course of business was not *"calculated to cause substantial damage"*. Quite differently, in *Herleysville Mutual Casualty Co. v. Harris & Brooks, Inc.*, the insured had set a pile of trees afire. Eventually, winds and a storm developed, which directed smoke and soot toward a neighboring property.

While the trial court granted coverage because it found the damage unintended, the appellate court reversed the ruling by arguing that the plaintiff had not taken appropriate precautions.

A particular problem was posed when courts had to decide whether an injury resulting from a long-term process was *"caused by accident"*. In disputes concerning long term processes such as seepage of oil or wastes or air pollution, insurance companies often argued that the term *accident* was not designed to cover events occurring over a long period of time. Instead courts often construed contract meaning and used the "constructively intentional" test, arguing that the term *accident* is not limited to the happening of a single and sudden event as its ordinary meaning suggests.

In *Taylor v. Imperial Casualty & Indemnity Co.*, the plaintiff's gasoline storage tank leaked and seeped into a neighboring property. Insurers argued that the nuisance continued over a long period of time so it did not imply coverage. The Supreme Court of South Dakota held that *"injuries are caused by accident according to the quality of the result rather than the quality of the causes"*. Whatever this sentence means, the damages were seen as an unintended consequence and the insurance company had to cover them.

Faced with a string of defeats in which courts ruled for coverage of gradual pollution on the grounds that damages were not intentional, insurance companies increased premia and modified contract language in an effort to accommodate these results. In 1966, the "duty to pay" provision was rewritten in the following way:

"The Company will pay on behalf of the insured all sums which the insured shall become legally liable to pay as damages because of bodily injury or property damage to which this insurance applies, caused by an occurrence". An occurrence was defined as: "an accident, *including injurious exposure to conditions*, which results, during the policy period, in bodily injury or property damage *neither expected nor intended* from the standpoint of the insured".

A main change distinguishes the new provision from the old one. Under the new contract, injuries resulting from continuing processes (*"injurious exposure to conditions"*) were also covered under the condition that they were *"neither expected nor intended"*. In some sense, the "constructively intentional" test used by courts to interpret contract terms has now become a contract clause. These cases suggest two main observations: first, courts intervene to modify contract terms when such terms differ from their way of approaching the issue. Second, the parties adjust contract forms to accommodate judicial strategies.

One way to explain the change of contract terms would be to say that while the parties were uninformed and did not realize the possibility of unforeseen damages arising from long-term processes,

courts did. Under this view, courts supplied new information to the parties which formed the basis for future contracts. However, it seems quite implausible to argue that courts were better able to figure out hazards than business firms and insurance companies, especially when one thinks about the information insurers hold about various sorts of risks.

The other explanation, in line with my model, is that the parties *knew* the characteristics of the hazards but preferred to avoid contracting on them. According to this second view, what the parties did not forecast was the active enforcement strategy courts adopted. Insurance companies were disgruntled with judges generously awarding coverage to plaintiffs for damages arising from gradual pollution. The reaction to such judicial intervention was to adopt a contract form more adherent to the standard used by courts.

In order to see precisely how the argument works, I slightly modify the insurance model of section **3.1**. by allowing for 3 equally likely states of the world, ω_1, ω_2, ω_3. While judges can perfectly observe state ω_3, they still confuse ω_1 and ω_2 exactly like I have discussed so far. A is the insurance company, B is the business firm. If B does nothing, it loses Δ with certainty, in which case its utility is $(1+\theta)(W-\Delta)$.

However, right after the realization of ω_1 B can take precautions. The level of precaution P (an unverifiable act), can either be high ($\overline{P}$) or low ($\underline{P}$). If precaution is high, B fully avoids loss Δ in ω_1, if it is low, loss Δ materializes with probability $\delta < 1$, if no precaution is taken, B loses Δ with certainty. Taking $\overline{P}$ costs B an amount $\overline{z} < \Delta$ of resources, while $\underline{P}$ costs it $\underline{z} = \overline{z}/2$. In terms of the current case, ω_3 is a "pure accident", i.e. a sudden and unexpected event, while ω_1 and ω_2 are states of repeated, long-term, activity. With the only difference that while in ω_1 the firm realizes the linkage between action and harm and can take precautions, in ω_2 it has not figured it out.

A and B can write down (actuarially fair) insurance contracts. These contracts consist of a premium p and state contingent payments $t(\omega)$ made by A to B conditional on the occurrence of the loss Δ (a verifiable event). A fully contingent contract consists of payments $t(\omega_3) = t(\omega_2) = \Delta, t(\omega_1) = 0$, a rigid contract consists of payments $t(\omega_3) = \Delta, t(\omega_1) = t(\omega_2) = 0$. Their interpretation is straightforward: a contingent contract distinguishes between expected and unexpected harm and supplies insurance also in ω_2. A rigid contract only distinguishes between accidents and damages generated by gradual pollution, thereby supplying insurance only in ω_3. While the premium of contingent insurance is $p_c = (2/3)\Delta$, the premium of rigid insurance is $p_r = (1/3)\Delta$. Neither contract provides insurance in ω_1, the state in which precaution is efficient.

Consider the case in which judges fully use the signal and the signal is symmetric[54]. Then, when adjudicating a dispute over the insurance policy, courts perfectly enforce $t(\omega_3)$ but imperfectly enforce the other transfers. The noisiness of the signal will induce adjudicators to (mistakenly) enforce no transfer in ω_2 with probability $(1-\gamma)$, and to (mistakenly) enforce repayment Δ in ω_1 with the same probability.

The impact of judicial mistakes on the level of precaution is intuitive[55]. For $\delta < 1/2$, there exist two thresholds γ^* and γ_*, with $\gamma^* > \gamma_*$ such that in ω_1, B takes high precaution for $\gamma \geq \gamma^*$ and no precaution for $\gamma \leq \gamma_*$. For γ in between, B chooses $\underline{P}$. In other words, the firm will reduce its harmful activity when its chance of being (mistakenly) compensated is small because mistakes reduce the loss incurred by a negligent firm. If γ is large, and the firm takes $\overline{P}$, B's ex-ante welfare is $W - (2/3)\Delta - (1/3)z$: by paying premium p_c and taking precautions, the firm fully insures. Suppose on the other hand that $\gamma \in (\gamma^*, \gamma_*)$. In this case B takes intermediate precaution and enjoys:

$$(W-\Delta) + (1/3)\left[\theta(W-(5/3)\Delta) + (1-\delta)\gamma\left[\Delta - \theta(W - \underline{z} - (5/3)\Delta)\right] - (1+\gamma\theta)\underline{z}\right]$$

B now loses Δ in ω_1 with probability δ. In addition, it bears inefficient risk, which is costlier the larger θ is, because the insurance company only compensates it in (2/3) of the cases[56]. Suppose the parties opt for a rigid contract. If the contract is literally enforced, in ω_1 B takes high precautions in order to cover the lack of contractual insurance with "self-insurance" and enjoys:

$$(W-(2/3)\Delta) + (1/3)\theta(W-(4/3)\Delta) - (1/3)\overline{z}$$

The firm now pays the premium $p_r = (1/3)\Delta$, and $(1/3)\overline{z}$, the ex-ante cost of $\overline{P}$. It also bears some risk in ω_2, a contingency not covered by the contract. The price of such risk is $\theta(W-(4/3)\Delta)$, the loss incurred in ω_2, when injury was not foreseen. Which contract serves better the interests of the parties depends in general on the parameters of the model. The trade-off is clear: a contingent contract may disincentivize precautions, a rigid one fosters (costly) precautions and imposes more risk on B because it fully lacks insurance in ω_2. In particular, there exists a $\gamma_* \leq \widetilde{\gamma} \leq \gamma^*$ such that a non-contingent contract dominates for $\gamma \leq \widetilde{\gamma}$.

[54] This case amounts to $1/\beta_B > \rho^1$, $\beta_A < \rho^2$ and $\Pr(\sigma_i \,|\omega_i\,) = \gamma$.
[55] I carry out the formal analysis in the appendix.
[56] Such partial insurance is better for B than no insurance at all for W/Δ not too large.

The above comparison between the two contracts is not appropriate because it does not take into account the enforcement policy followed by decision-makers. The question is: how will judges enforce a rigid contract? This issue is fundamental to understanding the actual legal cases just presented, and the model is fit to address it. In the present example the "gapfilling" rule of courts is the "constructively intentional" test, which allows them to override contract language and distinguish between ω_1 and ω_2. To implement this criterion, a judge must figure out whether B foresaw the harm or not and adjudicate according to the findings. Consider the case in which contract interpretation gives rise to very noisy judgments, i.e. $\overline{\gamma} \leq \gamma_*$, then B takes no precautions at all and enjoys:

$$(W - \Delta) + (1/3)\theta(W - (5/3)\Delta)$$

This outcome is dominated not only by a non-contingent contract when literally interpreted, but also by a contingent contract. By restoring state contingency, judicial interventionism may introduce a lot of noise into judgments and further reduce B's incentive to take precautions. As a result, it may be preferable for the parties to adopt a contingent contract to begin with. Indeed, if courts settle disputes by using the "constructively intentional" test regardless of whether the contract departs from it, it may be better for the parties to stipulate contract terms that adhere to its spirit.

This example shows, in an environment characterized by judicial discretion, that when events are hard to verify and/or the competence of decision-makers is low (in this case $\overline{\gamma} \leq \gamma_* \leq \gamma \leq \gamma^*$), judicial inteventionism can be costly for the parties and affect their contractual choice. In the present example, the eagerness of courts to interpret contract terms gave rise to judicial mistakes that drastically reduced the incentive of the insured to take precautions. The consequence was a change in contract form, resulting in higher premia and lower insurance opportunities.

The analysis confirms not only that discretionary decision-makers have an incentive to broadly interpret contract terms, but also that such activism may undermine the desirability of judicial independence.

7 Conclusions

I have built a model to analyze the costs and benefits of judicial independence. I have argued that its main benefit comes from the willingness of independent judges to make informed judgments. As a result, common law systems are more apt than civil law systems at enforcing contingent contracts, and this boosts their adoption in the former systems. I find that the benefit of judicial independence

decreases with the polarization of judges' preferences and with their lack of competence, reflected in the quality of the information they use.

The cost of independence is judicial "interventionism", which stems from the incentive of discretionary judges to override written terms. This prevents the parties from using non-contingent contracts to insure themselves against very costly judicial mistakes.

However, judicial interventionism is not necessarily a bad thing. Landes and Posner (1987), for instance, view it favorably, on the grounds that contracting costs may prevent the parties from adopting optimal contracts[57]. If the parties have a hard time to specify optimal contracts ex-ante, interventionist courts may improve their welfare by overriding contract terms that are ex-post inefficient.

In a related paper (Gennaioli 2003) I articulate the view that the very same incentives inducing common law judges to be interventionist in certain contract fields, also facilitate the use of principles like fiduciary duty and fairness in financial transactions, which are plagued by large contracting costs. This allows to explain the greater use of fiduciary duty in common law regimes and the superior development of their stock markets.

The analysis suggests that, on the one hand, legal institutions can help overcome the "technological" contracting costs typically emphasized by the contract theory literature. On the other hand, this paper suggests that legal institutions themselves are a source of contracting costs. I believe that understanding the trade-off between "institutional" and "technological" contracting costs in the optimal design of legal institutions represents an interesting avenue for future research.

[57] In a recent paper, Shavell (2003) also argues that when ex-ante contracting is costly, courts should enforce efficient terms, not the written ones. He neglects the problems arising from misinformation of judges as well.

APPENDIX

Proof of Proposition 1

Proof. Contingent Contract C. The following cases have to be considered:

$1D$. $1/\beta_B > \rho^1$, $\beta_A < \rho^2$. Then we have: $x_R^{\omega_1} = \gamma, x_R^{\omega_2} = 1-\eta$. Therefore. we have: $W_D(C) = W^{FB} - (1-\gamma)I_{\omega_1}^L - (1-\eta)I_{\omega_2}^R$.

$2D$. $1/\beta_B < \rho^1$, $\beta_A < \rho^2$. Then we have: $x_R^{\omega_1} = \gamma/2, x_R^{\omega_2} = (1-\eta)/2$. Therefore, we have: $W_D(C) = W^{FB} - (1-\gamma/2)I_{\omega_1}^L - (1-\eta)/2I_{\omega_2}^R$

$3D$. $1/\beta_B > \rho^1$, $\beta_A > \rho^2$. Then we have: $x_R^{\omega_1} = (1+\gamma)/2, x_R^{\omega_2} = 1-\eta/2$. Therefore, we have: $W_D(C) = W^{FB} - (1-\gamma)/2I_{\omega_1}^L - (1-\eta/2)I_{\omega_2}^R$

$4D$. $1/\beta_B < \rho^1$, $\beta_A > \rho^2$. Then we have: $x_R^{\omega_1} = 1/2, x_R^{\omega_2} = 1/2$. Therefore, we have: $W_D(C) = W^{FB} - (1/2)I_{\omega_1}^L - (1/2)I_{\omega_2}^R$

Rigid Contract L. Welfare is: $W_D(L) = W^{FB} - I_{\omega_1}^L$. Rigid Contract R. Welfare is: $W_D(R) = W^{FB} - I_{\omega_2}^R$. For the comparisons consider the various cases:

$1D$. $1/\beta_B > \rho^1$, $\beta_A < \rho^2$. Then, $\underline{I} = \rho^1$, $\overline{I} = \rho^2$

$2D$. $1/\beta_B < \rho^1$, $\beta_A < \rho^2$. Then, $\underline{I} = \rho^1$, $\overline{I} = (1+\eta)/(2-\gamma)$

$3D$. $1/\beta_B > \rho^1$, $\beta_A > \rho^2$. Then, $\underline{I} = (2-\eta)/(1+\gamma)$, $\overline{I} = \rho^2$

$4D$. $1/\beta_B < \rho^1$, $\beta_A > \rho^2$. Then, $\underline{I} = 1$, $\overline{I} = 1$ ■

Proof of Corollary 1.1: by inspection.

Proof of Proposition 2

Proof. Only 2 cases are relevant here:

$1ND$. $1/\beta_B^{code} > \rho^1$. Then we have: $x_R^{\omega_1} = \gamma, x_R^{\omega_2} = 1-\eta$. Therefore. we have: $W_{ND}(C) = W^{FB} - (1-\gamma)I_{\omega_1}^L - (1-\eta)I_{\omega_2}^R$

$2ND$. $1/\beta_B^{code} < \rho^1$. Then we have: $x_R^{\omega_1} = 0, x_R^{\omega_2} = 0$. Therefore. we have: $W_{ND}(C) = W^{FB} - I_{\omega_1}^L$

Rigid Contract L. Welfare is: $W_D(L) = W^{FB} - I_{\omega_1}^L$. Rigid Contract R. Welfare is: $W_D(R) = W^{FB} - I_{\omega_2}^R$. For the comparisons consider the various cases:

$1ND$. $1/\beta_B^{code} > \rho^1$. Then, $\underline{I} = \rho^1$, $\overline{I} = \rho^2$

$2ND$. $1/\beta_B^{code} < \rho^1$. Then, $\underline{I} = 1$, $\overline{I} = 1$ ■

Proof of Proposition 3

Proof. For $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$, A and B choose R under both systems. Their welfare is $W^{FB} - I^R_{\omega_2}$ and does not depend on the law. For $(I^L_{\omega_1}/I^R_{\omega_2}) < \rho^2$ we have the following cases:

(1*ND*,1*D*): In this case the two systems are equal. (1*ND*,2*D*): In this case *ND*$\succeq$*D* for $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$, i.e. always. (1*ND*,3*D*): In this case *ND*$\succeq$*D* for $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$, i.e. always. (1*ND*,4*D*): In this case *ND*$\succeq$*D* for any $(I^L_{\omega_1}/I^R_{\omega_2})$, i.e. always.

(2*ND*, K*D*): in this case *D*$\succeq$*ND* for every K=*1,2,3,4*. In fact, The outcome in *ND* is the same as in D under L. ■

Proof of Corollary 3.2 and Corollary 3.2: by inspection.

Proof of Proposition 4

Proof. A judge wielding discretion interprets R when:

$$\sum_{i=1,2} x_R^{\sigma_i} \left[\frac{\Pr(\omega_2 \,|\sigma_i, R)}{\Pr(\omega_1 \,|\sigma_i, R)} - \beta^j \right] \Pr(\sigma_i \,|\omega_1, R) \leq 0$$

it is immediate to see that which is automatically satisfied when the judge optimally sets $\left(x_R^{\sigma_i}\right)_i$. By the same token, independent judges interpret L for:

$$\sum_{i=1,2} x_R^{\sigma_i} \left[\frac{\Pr(\omega_2 \,|\sigma_i, L)}{\Pr(\omega_1 \,|\sigma_i, L)} - \beta^j \right] \Pr(\sigma_i \,|\omega_1, L) \leq 0$$

like before, the condition is automatically satisfied at the individual optimum. ■

Proof of Proposition 5

Proof. Since in coordinate systems judges always interpret, the welfare of the parties under a rigid contract is the same under a contingent contract except that $\overline{\eta}$ and $\overline{\gamma}$ now substitute η and γ.Clearly, when the pattern of judicial behavior is the same and only the precision of the signal changes, A and B will opt for C. In the remainder I denote by $\overline{\rho}^i$ the odd ratios under interpretation. Then, to complete the analysis in the full parameter space, we need to consider the following cases:

i) $1/\beta_B \leq \rho^1 \leq \overline{\rho}^1, \overline{\rho}^2 \leq \beta_A \leq \rho^2$. Here C is chosen provided: $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$

ii) $\rho^1 \leq 1/\beta_B \leq \overline{\rho}^1, \beta_A \leq \overline{\rho}^2 \leq \rho^2$. Here C is always chosen in the (present) case: $I^L_{\omega_2} \geq I^R_{\omega_2}$.

iii) $\rho^1 \leq 1/\beta_B \leq \overline{\rho}^1, \overline{\rho}^2 \leq \beta_A \leq \rho^2$. Here C is chosen provided: always C, since for rigid contracts the strategy here is fully partisan

iv) $\rho^1 \leq \overline{\rho}^1 \leq 1/\beta_B, \overline{\rho}^2 \leq \beta_A \leq \rho^2$. Here C is chosen provided: $(I^L_{\omega_1}/I^R_{\omega_2}) \leq (2\eta - \overline{\eta})/(1 + \overline{\gamma} - 2\gamma)$

v) $\rho^1 \leq 1/\beta_B \leq \overline{\rho}^1, \overline{\rho}^2 \leq \rho^2 \leq \beta_A$. Here C is chosen provided in the (present) case $I^L_{\omega_2} \geq I^R_{\omega_2}$.

Hence, in cases $ii), iii), v)$ $I^* = \infty$, in $i)$ $I^* = \rho^2$, in $iv)$ $I^*_D = (2\eta - \overline{\eta})/(1 + \overline{\gamma} - 2\gamma) \geq \rho^2$ ■

Proof of Proposition 6

Proof. Optimal contract choice in hierarchical systems. Consider the two cases:

$1ND$. $1/\beta_B^{code} > \rho^1$. C achieves : $W_{ND}(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$. Then, for:

$i)$ $1/\beta_B^{code} < \overline{\rho}^1$, R achieves $W^{FB} - (1/2)I^L_{\omega_1} - (1/2)I^R_{\omega_2}$, so C is preferred

$ii)$ $1/\beta_B^{code} \geq \overline{\rho}^1$, R achieves $W^{FB} - (1-\overline{\gamma})I^L_{\omega_1} - (1-\overline{\eta})I^R_{\omega_2}$ for $\beta_A < \overline{\rho}^2$ and $W^{FB} - (1 - \overline{\gamma})(1/2)I^L_{\omega_1} - (1-\overline{\eta}/2)I^R_{\omega_2}$ $\beta_A \geq \overline{\rho}^2$.

In this case A and B opt for R when $1/\beta_B^{code} \geq \overline{\rho}^1, \beta_A \geq \overline{\rho}^2$ and $(I^L_{\omega_1}/I^R_{\omega_2}) \geq I^*_{ND} = (2\eta - \overline{\eta})/(1 + \overline{\gamma} - 2\gamma)$

$2ND$. $1/\beta_B^{code} < \rho^1$. C achieves: $W_C = W^{FB} - I^L_{\omega_1}$.$R$ always delivers: $W^{FB} - (1/2)I^L_{\omega_1} - (1/2)I^R_{\omega_2}$

In this case, A and B always opt for R. ■

Proof of Proposition 7

Proof. We need to consider all the possible cases:

1. $\rho^1 \leq \overline{\rho}^1 \leq 1/\beta_B$

i) $\beta_A \leq \overline{\rho}^2 \leq \rho^2$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$, in ND, C is chosen and $W_{ND}(C) = W_D(C)$.

ii) $\overline{\rho}^2 \leq \beta_A \leq \rho^2$. In D, C is chosen iff $(I^L_{\omega_1}/I^R_{\omega_2}) \leq (2\eta - \overline{\eta})/(1 + \overline{\gamma} - 2\gamma)$. In ND, C also prevails $(I^L_{\omega_1}/I^R_{\omega_2}) \leq I^*_{ND}$ and welfare is the same.

iii) $\overline{\rho}^2 \leq \rho^2 \leq \beta_A$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma)/2I^L_{\omega_1} - (1-\eta/2)I^R_{\omega_2}$ In ND, C is chosen iff $(I^L_{\omega_1}/I^R_{\omega_2}) \leq I^*_{ND}$. In this case, $D \succeq ND$ for $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$.

2. $\rho^1 \leq 1/\beta_B \leq \overline{\rho}^1$

i) $\beta_A \leq \overline{\rho}^2 \leq \rho^2$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$, in ND, C is chosen and $W_{ND}(C) = W_D(C)$.

ii) $\overline{\rho}^2 \leq \beta_A \leq \rho^2$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$, in ND, C is chosen and $W_{ND}(C) = W_D(C)$.

iii) $\overline{\rho}^2 \leq \rho^2 \leq \beta_A$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma)/2I^L_{\omega_1} - (1-\eta/2)I^R_{\omega_2}$ In ND, C is chosen and $W_{ND}(C) = W^{FB} - (1-\gamma)I^L_{\omega_1} - (1-\eta)I^R_{\omega_2}$. In this case, $D \succeq ND$ for $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$.

3. $1/\beta_B \leq \rho^1 \leq \overline{\rho}^1$

i) $\beta_A \leq \overline{\rho}^2 \leq \rho^2$. In D, C is chosen and $W_D(C) = W^{FB} - (1-\gamma/2)I^L_{\omega_1} - (1-\eta)/2I^R_{\omega_2}$, in ND, R is chosen and $W_{ND}(R) = W^{FB} - (1/2)I^L_{\omega_1} - (1/2)I^R_{\omega_2}$. In this case, $D \succeq ND$ iff $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$.

ii) $\overline{\rho}^2 \leq \beta_A \leq \rho^2$. In D, C is chosen iff $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$, in ND R is chosen. In this case, $D \succeq ND$ for $(I^L_{\omega_1}/I^R_{\omega_2}) \leq \rho^2$. For $(I^L_{\omega_1}/I^R_{\omega_2}) \geq \rho^2$ the two systems deliver the same.

iii) $\overline{\rho}^2 \leq \rho^2 \leq \beta_A$. In D, C is chosen and $W_D(C) = W^{FB} - (1/2)I^L_{\omega_1} - (1/2)I^R_{\omega_2}$ In ND, R is chosen and $W_{ND}(C) = W^{FB} - (1/2)I^L_{\omega_1} - (1/2)I^R_{\omega_2}$. In this case, D and ND yield the same welfare. ■

Proof of Hazardous Site Waste Insurance

Proof. Consider the choice of B in ω_1 when the contract covers in ω_2 and ω_3. B's utilities in ω_1 are:

1) $u(W - p - \overline{z}) = W - p - \overline{z}$ when B takes $\overline{P}$.

2) $(1 - \delta\gamma)u(W - p - \underline{z}) + \delta\gamma u(W - p - \underline{z} - \Delta) = W - p - \underline{z} - \delta\gamma\Delta + \delta\gamma\theta(W - p - \underline{z} - \Delta)$ when B takes $\underline{P}$.

3) $(1 - \gamma)u(W - p) + \gamma u(W - p - \Delta) = W - p - \gamma\Delta + \gamma\theta(W - p - \Delta)$ when B does not take precautions.

Then, under a contingent contract, $\underline{P}$ is optimal provided:

a) $\underline{P} \succ \overline{P} \Leftrightarrow \gamma \leq \underline{z}/\delta\left[\Delta - \theta(W - \underline{z} - (5/3)\Delta)\right] \equiv \gamma^*$

b) $\underline{P} \succ \emptyset \Leftrightarrow \gamma \geq \underline{z}/\left[(1 - \delta)\Delta - (1 - \delta)\theta(W - (5/3)\Delta) - \delta\theta\underline{z}\right] \equiv \gamma_*$

Assume $\gamma^* > \gamma_*$, which tantamounts to assuming $\delta < 1/2$. Then, consider $\gamma \in [\gamma^*, \gamma_*]$. In this case, under a contingent contract, the expected utility of B is:

$$(W - \Delta) + (1/3)\left[\theta(W - (5/3)\Delta) + (1 - \delta)\gamma\left[\Delta - \theta(W - \underline{z} - (5/3)\Delta)\right] - (1 + \gamma\theta)\underline{z}\right]$$

Let us now compare this with the utility B attains under a non-contingent contract. Such utility depends on what he invests:

1) $u(W - p - \overline{z}) = W - p - \overline{z}$ when B takes $\overline{P}$.

2) $(1 - \delta)u(W - p - \underline{z}) + \delta u(W - p - \underline{z} - \Delta) = W - p - \underline{z} - \delta\Delta + \delta\theta(W - p - \underline{z} - \Delta)$ when B takes $\underline{P}$.

3) $u(W - p - \Delta) = (1 + \theta)(W - p - \Delta)$ when B does not take precautions.

Then, under a non-contingent contract $\overline{P}$ is optimal for:

a) $\overline{P} \succ \underline{P} \Leftrightarrow \delta \geq (\overline{z} - \underline{z})/\left[\Delta - \theta(W - \underline{z} - (5/3)\Delta)\right]$

b) $\overline{P} \succ \emptyset \Leftrightarrow$ always.

Therefore, consider the case in which $\gamma^* \leq 1$. Then, under non-contingent $\overline{P}$ is chosen and

overall expected utility is:

$$Eu_B = (1/3)(W - (1/3)\Delta) + (1/3)u(W - (4/3)\Delta) + (1/3)u(W - (1/3)\Delta - \overline{z})$$

i) for $W-(1/3)\Delta-\overline{z} > 0$ (which I assume), $Eu_B = (W-(2/3)\Delta)+(1/3)\theta(W-(4/3)\Delta)-(1/3)z$

On the other hand, if under interpretation B takes no precaution, (because $\overline{\gamma} < \gamma_*$), then overall expected utility is equal to:

$$Eu_B = (W - \Delta) + (1/3)\theta(W - (5/3)\Delta)$$

therefore, a rigid enforced literally is better than a rigid interpreted. What about the comparison between a rigid literally enforced and a contingent one? The rigid is better when:

$$\Delta - z \geq -\theta(1/3)\Delta + (1-\delta)\gamma\left[\Delta - \theta(W - \underline{z} - (5/3)\Delta)\right] - (1+\gamma\theta)\underline{z}$$

the inequality is certainly satisfied for $\gamma = \gamma_*$. In general, there exist a $\widetilde{\gamma} \in [1/2, 1]$ such that, for $\gamma \leq \widetilde{\gamma}$, the inequality above is satisfied. ■

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