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THE RATIONALE FOR MOTIONS IN THE DESIGN OF ADJUDICATION

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The Rationale for Motions in the Design of Adjudication

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The conduct of adjudication is often influenced by motions—requests made by litigants to modify the course of adjudication. The question studied in this article is why adjudication should be designed so as to permit the use of motions. The answer developed is that litigants will naturally know a great deal about their specific matter, whereas a court will ordinarily know little except to the degree that the court has already invested effort to appreciate it. By giving litigants the right to bring motions, the judicial system leads litigants to efficiently provide information to courts that is relevant to the adjudicative process.

JEL Classifications: D02, D8, K15, K40, K41

1. Introduction

It is self-evident that the conduct of adjudication in our legal system is often influenced by requests made to courts by the litigants themselves. A litigant may move for dismissal of a case or for summary judgment, seek an order for the protection of the confidentiality of information, petition for an extension of time before a hearing would occur, ask that a new witness be allowed to testify, or appeal a judicial finding—the list of adjudicative changes that litigants may entreat courts to grant is various and long.[1] Moreover, the allowance of some such pleas to courts seems to be an almost universal characteristic of adjudication; requests by litigants influence the process of adjudication in the legal regimes of countries apart from ours,[2]

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[1] See the Federal Rules of Civil Procedure, and detailed discussion and commentary in Wright et al. (2017b), especially § 1190, discussing the multiplicity of motions. The rules of civil procedure of the states are similar, on which, see, for example, N.Y. C.P.L.R. § 4401–08 (McKinney); and Cal. Civ. Proc. Code. See also rules governing criminal procedure, notably, the Federal Rules of Criminal Procedure and Wright et al. (2017c).

[2] See the discussion of motions in Germany and other civil law countries in Section 3(e) below.

before arbitration organizations[3] and religious tribunals,[4] and in other private venues for the resolution of disputes.[5] I will refer broadly here to requests by litigants to modify the course of adjudication as motions.

The main question that I address is why adjudication should be designed so as to permit the use of motions. That is, what is the functional advantage of imbuing adjudication with opportunities for parties to bring motions to alter its progress rather than of fashioning the rules of adjudication so that courts alone would exercise control over its unfolding?

At a general level, the answer to this question about the structure of adjudication is straightforward. Parties in a legal dispute will naturally know a great deal about their specific matter, whereas a court will ordinarily have little or no understanding of it except to the degree that the court has invested judicial resources to appreciate it. By according the parties the right to bring motions about the path of adjudication, and by devising appropriate standards for granting them, the judicial system can aspire to induce the parties to provide information to the court that is relevant to the adjudicative process when, but only when, assessment of that information itself would be worth the time and effort of the court and of the litigants.

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[3] The rules of adjudication before arbitration organizations refer to numerous steps that arbitrators may take in the conduct of proceedings on the basis of requests made by the parties (concerning, for instance, the provision of evidence, the appearance of witnesses, and the narrowing of issues). See, for example, Commercial Arbitration Rules and Mediation Procedures (2013) of the American Arbitration Association, Rules 10–12, 22, and 33, among others.

[4] See, for example, The Code of Canon Law (1985), Book VII, Part I, Title III: The Discipline to be Observed in Tribunals, mentioning different ways in which adjudication responds to requests of the parties (such as about time limits and delays); and Presbyterian Law for Presbytery and Synod (1977), General Rules for Judicatories, Of Motions, pp. 196–198.

[5] See, for example, By–Laws of the Cocoa Merchants Association of America (2015), Rule 3–Arbitration Procedure; University of Chicago Student Manual (2016), Disciplinary System for Disruptive Conduct; FINRA Code of Arbitration Procedure for Customer Disputes (2017), Rule 12503–Motions (Generally), Rule 12509–Motions to Compel Discovery; and NFL Collective Bargaining Agreement (2011), Article 43–Non–Injury Grievance, Article 44–Injury Grievance, Article 46–Commissioner Discipline.

Consider, for example, a motion to protect the confidentiality of a document that has not yet been produced and that might contain sensitive proprietary information about a business.[6] It would be best in principle that the court grant the motion if and only if the social value of protecting the confidentiality of the document would exceed the cost of considering the motion. For if this were the standard for granting the motion, a litigant might be expected to bring it when the social value of protection of confidentiality is sufficiently high to merit the court's attention—and to refrain from bringing the motion, and the dissipation of judicial and litigant resources, when that is not so.[7]

Without the device of the motion to determine whether the confidentiality of business documents should be protected, the process of adjudication would be inferior. Notably, if the alternative were a regime in which all business documents would be publicly accessible, then sensitive information such as trade secrets that ought to be protected might be disclosed; and if the alternative regime were one in which all business documents would be sealed, some of the social benefits associated with a transparent, publicly accessible legal regime would be forfeit.

The argument just sketched for the virtues of motions is clarified and amplified in a stylized model of litigation in the next part of this article, Section 2. (The model is discussed informally, using numerical examples, in Section 2.1 and then formally presented in Section 2.2.) In the analysis there, I cast the goal of the design of adjudication in utilitarian terms:[8] to

[6] By a motion to protect confidentiality, I refer generally to motions to file certain designated information under seal or to redact it and to motions for protective orders concerning discovery; see Federal Rules of Civil Procedure, Rule 5.2 and Rule 26(c).

[7] A reason that a litigant would consider the social value of protection, not merely its private value, is that the standard for granting the motion would involve the social value. Still, a litigant might need to be induced to bring a motion by an appropriate monetary incentive from the state; see text at note 18 below.

[8] The view that the design of adjudication can be considered as a problem of optimization of a utilitarian objective was early emphasized by Posner (1973).

maximize the social benefits flowing from the information that the courts learn in adjudication, but net of the social costs associated with the courts' obtaining and considering this information through motions or direct inquiry of litigants. Given that social objective, I explain under a broad condition that when parties have information that courts do not possess but that bears on a judicial choice between alternative adjudicative acts (such as protecting confidentiality of a document or not doing so), the use of motions is socially desirable.[9] In so doing, I verify that the optimal condition for the granting of a motion is what was mentioned above, namely, that the change in social well–being from the requested adjudicative act would exceed the social cost of consideration of the motion. Additionally, I compare a motion for an adjudicative act to another natural motion, the dual motion for the alternative adjudicative act. (The dual to the motion requesting protection of confidentiality when the status quo is public access to proceedings is the motion requesting public access when the status quo is protection of confidentiality.) From this comparison, I furnish a general condition for which of the two motions is better. Thus, the problem of adjudicative design studied in the model involves whether to employ a motion; if so, what the standard for granting the motion should be; and the choice between a motion and its dual.[10]

I also briefly consider an extension of the model in which courts are assumed to possess information of their own that bears on adjudication (such as about how they would apply the law). In this extension, the possibility of denial of motions is analyzed and, among other things,

[9] The condition underlying this conclusion is that there exist some circumstances in which each adjudicative act would be superior to the other by more than the cost of consideration of a motion.

[10] As will be seen, I compare regimes with motions to the following alternatives:the court always chooses the first adjudicative act; the court always chooses the alternative adjudicative act; or the court always obtains information from litigants through direct inquiry and then selects the better adjudicative act.

the potential desirability of court–directed inquiry of litigants rather than the use of motions arises.

In Section 3 of the article, I discuss and interpret the theory that the underlying justification for motions is the elicitation of information possessed by litigants. Here I first review several specific examples of motions to assess their consistency with the theory. I then comment on the role of motions in spurring the development of information. I also remark on limits on the virtues of motions and suggest that in domains where certain motions are not permitted, courts would gain little or no information from litigants pertinent to the choice of relevant adjudicative acts. Finally, I offer observations about motions in Germany and other civil law countries, where I conjecture that certain motions have less importance than here.

Before proceeding, let me note that the question of the functional rationale for motions in the design of adjudication does not appear to have been addressed in the expansive literature on motions.[11] However, an article of mine on the rationale of the appeals system examines a related issue.[12] More generally, the identification of the advantages of inducing parties with private information to reveal it has been a significant theme in law and economics literature, especially that concerning contracts and law enforcement.[13] Thus, the points made here fall under the rubric of a broad economic understanding.

[11] I can find no reference to the question of the raison d'être for motions in well–known treatises on civil procedure, such as Hazard et al. (2011), Herr et al. (2017), and Wright et al. (2017b). Moreover, the justification for motions is not examined in economically–oriented writing on motions, which have focused on the properties and empirics of specific motions (mostly concerning dismissal and summary judgment); see, for example, Bone (2003, chs. 4,7), Brown et al. (2018), Gelbach (2012), Hubbard (2013), Hylton (2008), Issacharoff and Miller (2013), and Kaplow (2013, pt. IV). See also the survey of economic literature on civil procedure in Klerman (2015).

[12] Shavell (1995) develops the point that the appeals system efficiently harnesses information that litigants possess concerning legal error, about which appeals courts would not know but for the bringing of appeals.

[13] See, for example, Ayres and Gertner (1989) and Bebchuk and Shavell (1991) on incentives of contracting parties to disclose the value of performance to counterparties, Givati (2016) and Heyes and Kapur (2009) on incentives for whistleblowing, and Kaplow and Shavell (1994) and Innes (1999) on incentives to report one's own violation of law.

2. A Model of Motions and the Design of Adjudication

2.1. *Informal Analysis*

In order to study the role of motions in the design of adjudication, I consider a highly stylized model involving an adjudicative choice between two acts. For concreteness, I will often refer to the first act as protecting the confidentiality of information and to its alternative as maintaining public access to judicial proceedings.

I will assume that the answer to the question of which of the two adjudicative acts would be socially preferable depends on information that the court does not initially possess but that a single litigant does possess (such as about the existence and the value of a trade secret). I focus on a single litigant for simplicity; just that litigant will face the choice whether to bring a motion (to be described shortly). Consideration of the interaction between opposing litigants in bringing motions would not alter the main qualitative points to be developed. The reason is that these points depend only on the assumption that litigants possess information to which courts are not privy but that is relevant to the social value of adjudicative acts; it does not matter whether such private information is held by a plaintiff or by a defendant, only that it is held by a litigant who can be induced to supply it in a motion to the court.[14]

The problem of adjudicative design that I study is to determine which among five mutually exclusive regimes for the choice of the adjudicative act would be best:

Regime 1. The first act is chosen in all cases (with no information being obtained from litigants).

Regime 2. The alternative act is chosen in all cases (with no information being obtained from litigants).

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[14] I amplify on this point in Remark 3 in Section 2.2.

Regime 3. The court acquires information from litigants in all cases by direct inquiry and then chooses between the acts.

Regime 4. Litigants may make a motion for the first act to be chosen on the basis of information they furnish to the court, whereas otherwise the alternative act is chosen. (Litigants may request that confidentiality be protected, whereas otherwise it is not.)

Regime 5. Litigants may make a motion for the alternative act to be chosen on the basis of information they supply to the court, whereas otherwise the first act is chosen. (Litigants may request that public access be maintained, whereas otherwise confidentiality is protected.) This motion will sometimes be called the dual motion, as I mentioned in the introduction.

The objective of adjudicative design is to select the regime that maximizes expected social welfare, which I assume to be the social value of the adjudicative act that is chosen minus the expected social costs incurred when courts obtain information from litigants about the adjudicative acts. The social value of an adjudicative act should be broadly interpreted as reflecting its value to the litigants in the case and its possible effects on future litigants and the public. The social costs incurred when a court obtains information should be viewed as comprising both the efforts made by litigants to communicate information to the court and the court's efforts to assess the information. The term "expected" refers to the probability–weighted average over the universe of cases coming before the courts. In other words, the objective is to choose the regime for which social welfare is best in the long run.

Let me now amplify on my assumptions. I assume that if the court obtains information from a litigant, the court will then know the social value of each of the two adjudicative acts. For instance, if the court obtains information from a litigant, the court might determine that the social value of protection of confidentiality would be 100 and that of permitting public access to the

evidence in question would be 20.[15] These values will vary across possible cases, and I assume that the court knows their probability distribution over the population of cases.

With regard to the social costs incurred when courts obtain information from litigants, my assumption is that these costs are the same regardless of the nature of the information that is conveyed to the court and regardless of whether it is furnished when a motion is made or as the result of questioning of litigants by the court. This is a simplifying assumption that would be easy to modify but would not change the nature of the conclusions that will be reached.

I have not yet stated what my assumption is about the standard for granting a motion. I suppose that the court adopts the socially best standard. Namely, the court will grant a motion to alter the adjudicative act from the status quo act if and only if undertaking the requested act would raise social welfare by more than the cost of consideration of the motion. Suppose that if a motion is made for the protection of confidentiality of certain information, the protection would raise social welfare by 30 from what it would otherwise be (say welfare given the protection would be 80 and welfare given public access to the information would be 50) and that the social cost of assessing the motion is 10. Then the motion would be granted, for if the motion is granted, the net effect on social welfare would be an increase of 30 – 10 or 20. On the other hand, if the protection of confidentiality would raise social welfare by only 3, the motion would be denied; for the bringing of the motion would result in a decline in social welfare all told of 10 – 3 or 7.[16]

[15] For the court to ascertain the social value of protection of confidentiality of a document that a litigant claims, say, contains a trade secret, the court would have to gauge, among other things, the veracity of the litigant, the nature of the claimed trade secret, whether failure to protect its confidentiality would cause a substantial loss for the litigant, and whether other parties would be likely to learn of the court's decision about protection of the confidentiality of the document. However, it would do no harm to interpret the social value as an expected social value rather than as one known with this or that degree of precision.

[16] That the court would deny a motion that if granted would raise gross social welfare by 3, but by less than the social costs 10 of considering it, suggests that a myopic court might grant the motion: if the costs of 10 are sunk, the

I also make two other assumptions about motions. First, I assume that litigants know the standard governing the granting of motions. Thus, a litigant would know that a motion to protect confidentiality would be granted if the litigant's information showed that social welfare would be raised by 30 if the motion were granted; and the litigant would know that the motion would be denied if social welfare would only be raised by 3 (but would cost 10 to evaluate).

Second, I assume that a motion will be brought if and only if it would be granted, that is, if and only if bringing it would raise social welfare, taking into account the cost of the motion itself. The justification for this assumption is as follows. On one hand, if a motion would be denied (an outcome that a litigant can predict because of the assumption that the standard for granting is known), there would be little point in bringing the motion[17] and a private cost would be incurred in so doing. In any event, if a motion would be denied, the state could discourage it from being improperly brought by the imposition of an appropriate sanction. On the other hand, if a motion would be granted (again, an outcome that a litigant can predict), the litigant would either find that reward sufficient to induce him to bring the motion or else the litigant would be given a monetary incentive sufficient to do so.[18]

Finally, even though this second assumption implies that courts know that they will turn out to grant all motions, I suppose that courts will make the effort to actively consider the

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court might be tempted to grant the motion to obtain a social benefit of 3. My contrary assumption, that the court adopts the socially best standard for granting motions, would be appropriate if the court's goal was to promote the general well–being, or if the behavior of the court could be policed by a judicial administrator. In any event, in order to understand how well motions can perform, it makes sense to assume that they are ideal; see note 20 below. See also note 35 below and accompanying text on why courts should grant any motion that would raise gross social welfare regardless of the cost of consideration in an extended version of the model. I comment on the implications of imperfect employment of motions by courts in Section 3(c).

[17] In reality there might be some point in bringing a motion that would not be granted, notably, to impose costs on the opposing litigant or to preserve a right to appeal an issue.

[18] I assume that this reward would not involve a social cost. It is conventional to treat a monetary payment as free of social costs, for it is a transfer of command over social resources rather than an act that consumes social resources.

motions. In other words, the courts are committed to give due consideration to all motions brought before them.[19]

The underlying motivation for the foregoing assumptions is that they permit us to focus on the main feature of motions, which is that they can be employed to obtain information from litigants when that information would turn out to be sufficiently useful to the court to make their consideration worthwhile; it would be a distraction from our present purposes for the ability to induce such disclosure of information to be imperfect.[20]

We can now proceed to analyze and compare the five different regimes that can govern adjudication. The conclusion that will be reached is that, under a broad assumption about the nature of the population of cases, *a motions regime—either the first motions regime or its dual—will be superior to the other regimes.*

The assumption that I make that leads to this conclusion is that there is a positive probability of cases for which the first adjudicative act is superior to the alternative act by an amount exceeding the social cost of considering litigant information, and a positive probability of the opposite, that the alternative adjudicative act is superior to the first act by an amount exceeding the social cost of considering litigant information. In terms of our example, where 10 is the cost of considering litigant information, the assumption is that there are some cases for which the value of protection of confidentiality exceeds the value of public access to the

[19] In the present context, were judges to grant motions without actively considering them, litigants would learn that, unraveling and nullifying the system of motions.

[20] To expess this point differently, to clarify our understanding of the virtues of motions relative to other regimes, we should analyze the best possible motions regimes rather than motions regimes that are hobbled by problems of implementation. But see the discussion of the extended model, leading to inefficiencies of motions—their denial and litigants failure to bring motions that would succeed—later in this section and in Section 3(c).

information at issue by more than 10, and some cases for which the value of public access exceeds the value of protection by more than 10.[21]

The argument proceeds in several steps. Let me first demonstrate that Regime 1, in which the court always chooses the first act, protection of confidentiality, is dominated by a motions regime, namely, by Regime 5, in which a motion can be made for public access to the information that would otherwise be protected.[22] Specifically, we know that under this motions regime, a motion would sometimes be brought, for our assumption is that there exist cases in which the value of public accessibility exceeds the value of protecting confidentiality by more than 10. And whenever such a motion is brought, it will be granted and raise social welfare.[23] Furthermore, when a motion is not brought, confidentiality is protected, so the outcome is the same as under Regime 1. Thus, the dual motions Regime 5 is sometimes superior to Regime 1 and otherwise is the same. Accordingly, expected social welfare under Regime 5 exceeds that under Regime 1.

An analogous argument shows that Regime 2, in which the court always allows public access to the information at issue, is dominated by Regime 4, in which motions may be made to protect confidentiality. Here we again know that motions would sometimes be brought, for our assumption is that cases will occur in which the value of protecting confidentiality exceeds that of public access by more than 10. And whenever such a motion is brought, it will be granted and raise social welfare, whereas when this motion is not brought, public access will be allowed, so

[21] I will continue to assume in numerical examples below that 10 is the cost of considering information from litigants.

[22] Such a regime is, of course, hypothetical; for in fact the status quo is public accessibility to judicial proceedings.

[23] This is due to the assumption that litigants bring motions if and only if they would be granted, in which case (because the standard for granting is optimal) social welfare will rise.

the outcome will be the same as under Regime 2. Thus, expected social welfare must be higher under the motions Regime 4 than under Regime 2.

Next, let me show that use of motions is superior to Regime 3, in which in all cases the court initially queries litigants about the information that they may possess bearing on the adjudicative acts and then the court chooses between the acts. Because the court will have litigant information at the time it makes its choice under this regime, it will always elect the act with greater social value—whichever act, protection of confidentiality or maintenance of public access to the information at issue, is better will be selected.

Let me now show that Regime 4, in which motions may be brought for protection of confidentiality, is superior to Regime 3. Consider first cases in which these motions are brought. Then social welfare will be the same as it is under Regime 3: under both regimes, protection of confidentiality will occur (it will occur under Regime 3 because it must be better than public access when a motion is brought), and under both regimes the social cost 10 of obtaining information from litigants will have been incurred.

Continuing the argument, consider cases in which motions for confidentiality are *not* brought. Here, we want to verify that the motions regime will be superior to Regime 3. In particular, when a motion is not brought, one possibility is that protection of confidentiality will result in lower social welfare than public accessibility. In this case, the adjudicative outcome will be the same under both regimes, namely, there will be public access. However, under Regime 3, the social cost 10 will have been incurred to obtain information from litigants, whereas under the motions regime, no social costs to obtain information will be incurred because the assumption is that a motion is not brought. Hence, the motions regime will indeed be superior.

The remaining possibility when a motion is not brought is that the protection of confidentiality will result in social welfare at least as high as would public access but where the difference in welfare will not exceed the social cost of 10 of assessment of the motion. For instance, suppose that welfare given protection of confidentiality is 30 and that given public access is 26. Then a motion would not be brought (because it would be denied), so that the adjudicative act would be to allow public access, and social welfare would be 26. Under Regime 3, however, 10 will be spent in obtaining information from litigants and the better act will be chosen, protection of confidentiality, yielding social welfare of 30 – 10 or 20, an inferior outcome. Accordingly, whenever a motion to protect confidentiality is not brought, the motions regime is superior to Regime 3.

Since the motions regime is equivalent to Regime 3 when motions are brought and superior when motions are not brought, it follows that the motions regime is superior to Regime 3. Moreover, an analogous argument shows that the dual motions regime, Regime 5, is also superior to Regime 3.

At this point, I have established that a motions regime is best to employ in the design of adjudication—for each of Regimes 1, 2, and 3 is dominated by at least one of the two motions regimes.[24]

There remains the question, though, of which of the two motions regimes is better. Is it better to have motions to protect confidentiality, where the status quo alternative is public accessibility? Or is it better to have motions for public accessibility, where the status quo is protection of confidentiality?

[24] To amplify, let W_i be social welfare under Regime i. We know that $W_4 > W_2$, $W_4 > W_3$, $W_5 > W_1$, and $W_5 > W_3$. It follows that either W_4 or W_5 must exceed $\max(W_1, W_2, W_3)$; for details, see Section 2.2.

It might be thought that the answer to such questions is to select the motion that would be brought less often, for that would minimize the social costs of considering litigant information. Thus, if the value of protection of confidentiality would exceed the value of maintaining public accessibility to proceedings only in a minority of cases, motions for protection of confidentiality would be the better motions regime.

However, there is consideration in addition to its frequency of use that affects the performance of a motion: that a motion will not be brought even though the status quo adjudicative act is the inferior one, for a motion will be brought only when the improvement in the value of the adjudicative act would exceed the social cost of considering the motion; a motion to protect confidentiality will not be brought even when protection is desirable if the improvement it would generate is less than 10. Thus some subpar adjudicative acts occur in a motions regime, a species of inefficiency of outcomes. Such inefficiency needs to be considered along with the social costs of motions that are made to evaluate the desirability of a particular motion.

It follows from the above discussion that the answer to the question which of the two possible motions is the better one reduces to determining which motion leads to minimization of the sum of the foregoing inefficiency and of the social costs of considering motions. This completes the informal examination of the basic stylized model, showing the superiority of a motions regime and identifying which of the two possible motions regimes is best.

However, it is worthwhile considering briefly an extension of the model in which we add the assumption that courts may possess information relevant to adjudication that litigants lack. For example, a court's views about the merits of protection of confidentiality in situations where

the application of relevant law is unsettled might not be known by litigants. Such information, private to the court, may lead to two kinds of outcome that did not arise in the basic model.

First, motions might be brought but denied. A litigant might bring a motion to protect confidentiality because of a belief that it would be likely to be granted, whereas the court could deny the motion because of its interpretation of the law. This possibility of denial of motions reduces the value of motions in adjudication, for motions that are not granted absorb judicial and litigant resources for little or no social purpose.[25]

Second, motions might not be brought even though they would have been granted. If a litigant thought that a motion to protect confidentiality would likely have been denied, the litigant might not bring it, whereas the court might have granted the motion. This possibility also reduces the value of motions in adjudication.

Additionally, it might become desirable for courts to engage in direct inquiry to obtain certain information from litigants rather than to rely on motions to induce its provision. This possibility is related to the second type of outcome just mentioned. Suppose a litigant would not bring a motion to protect confidentiality because the litigant mistakenly believes it would be denied. If the court suspects that that could be so, then it could become rational for the court to question litigants to determine whether their case is one for which protection of confidentiality would be desirable. In other words, despite the presence of private information of litigants, a regime of court–directed inquiry could be superior to one of motions on account of the private information of courts.

[25] Denial of motions could sometimes result in social benefits, such as by providing information about the court's views and thereby promoting settlement; see, for example, Hubbard (2016), pp. 753–755.

In the next subsection, the conclusions reached here are shown formally and to some degree are generalized and extended;[26] I also contrast the value of information produced under the optimal motions regime to the classic value of information of decision theory.[27]

2.2. *Formal Analysis*

2.2.1 Basic model. Because the model has been informally described, my formal presentation of it here will be brief. The assumptions pertaining to the basic model (an extension of which will be described below) are as follows. In the course of trying cases, courts must choose between two alternative adjudicative acts, 1 and 2, where an act will sometimes be denoted by i. A case is identified by information x in some set X, which for convenience is assumed to be a subset of the real numbers; x is known at the outset only by the litigant in a case.[28] However, courts know the probability density $f(x)$ of x in X. For a court to observe x, expenditures c are required.[29] The social value of an adjudicative act i depends on x and is denoted by $v_i(x)$. Social welfare in a case is $v_i(x)$ if the court chooses act i and does not make expenditures to observe x, and social welfare is $v_i(x) - c$ if the court does make expenditures to observe x.

The problem of adjudicative design is to choose which of five different adjudicative regimes leads to maximization of expected social welfare. Under Regime 1, courts always choose act 1. Under Regime 2, courts always choose act 2. Under Regime 3, a court first observes a litigant's information x and then chooses the act i resulting in the higher $v_i(x)$ (or

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[26] I allow for the number of alternative adjudicative acts to be greater than two; see Remark 2 in Section 2.2.

[27] See Remark 1 in Section 2.2.

[28] As previously noted, I focus for simplicity on the information held by a single litigant in a case.

[29] These expenditures are assumed to be the sum of what litigants incur in presenting x and what courts incur in hearing x and applying the law to it.

either act if the $v_i(x)$ are equal). Under Regime 4, a litigant may make a motion for act 1 to be chosen: by definition of this motion, the litigant furnishes x to the court and requests that act 1 be performed; if x lies in a *granting set* S_1 in X specified by the court, act 1 will be chosen; otherwise act 2 (which I will sometimes call the status quo act) will be selected. Under Regime 5, a litigant may make a motion for act 2 to be chosen: here the litigant furnishes x to the court and requests that act 2 be performed; if x lies in a granting set S_2 in X, act 2 will be chosen; otherwise act 1 (the status quo act) will be selected. Regime 5 will occasionally be referred to as the dual to Regime 4.

I now discuss social welfare under each of the regimes and make further assumptions about Regimes 4 and 5, which have not been fully described. Let social welfare under regime j be denoted W_j.

Social welfare under Regime 1 is

$$(1) \quad W_1 = \int_X v_1(x)f(x)dx,$$

social welfare under Regime 2 is

$$(2) \quad W_2 = \int_X v_2(x)f(x)dx,$$

and social welfare under Regime 3 is

$$(3) \quad W_3 = \int_X (\max(v_1(x), v_2(x)) - c)f(x)dx.$$

Under Regime 4, I assume that the court behaves optimally. To amplify, I suppose that the court can specify any granting set S_1 in X and can induce litigants to bring a motion if and only if their x is in S_1.[30] Given this assumption, I claim that it is optimal for the granting set to be

[30] As mentioned in Section 2.1, the motivation is that a litigant can be led to bring a motion by a sufficient money payment if x is in S_1 and would bear a cost with no possibility of the motion being granted if x is not in S_1.

$S_1 = \{x|v_1(x) - c \geq v_2(x)\}$, which I will denote S_1*, and for litigants to be led to bring motions if and only if their x is in S_1*.

The proof of the claim is as follows. First, note that by definition of a motion under Regime 4, act 2 is chosen unless a motion is made and x is in S_1, in which event act 1 is undertaken and a social cost c is incurred. Second, consider a benevolent dictator who wishes to maximize social welfare, who can observe x at no cost, who can command whether or not the litigant given his x brings a motion, and who can also choose whether or not to grant the motion. (Thus the dictator obeys the constraints on the choice of acts implied by the definition of the motion.) Now I assert that (i) if x is such that $v_2(x) > v_1(x) - c$, then the dictator would not want a motion to be brought. This follows because if a motion is brought and is granted, social welfare would fall to $v_1(x) - c$ from $v_2(x)$, which is what it would be if the motion were not made; and if the motion is brought and is not granted, social welfare would fall to $v_2(x) - c$ from $v_2(x)$. I also assert that (ii) if x is such that $v_2(x) \leq v_1(x) - c$, then the dictator would want the motion to be brought and granted. In particular, if a motion is brought and granted, social welfare will be $v_1(x) - c$,whereas if it is brought and not granted, social welfare will be $v_2(x) - c$, which is lower than $v_1(x) - c$. If the motion is not brought, social welfare will be $v_2(x)$, which is less than or equal to $v_1(x) - c$. Additionally, I observe that (iii) the level of social welfare achievable by the benevolent dictator must be at least as high as that which is achievable by a court, for the court has lesser powers: the court does not observe x and cannot command when individuals bring motions as a function of x. However, the optimal outcomes achievable by the dictator are achievable by the court, for it is obvious that if the granting set is S_1* and litigants are induced to

bring motions if and only if x is in S_1*, then the optimal outcomes achievable by the dictator (described by (i) and (ii)) will occur. This establishes the claim.[31]

Having proved the claim, social welfare can be written,

$$(4)\quad W_4 = \int_{X \sim S_1^*} v_2(x)f(x)dx + \int_{S_1^*} (v_1(x) - c)f(x)dx,$$

where the first integral corresponds to litigants who do not bring motions for act 1 to be undertaken and the second integral to litigants who do bring these motions.

Under Regime 5, the same reasoning that applied to Regime 4 leads to the conclusion that the optimal granting set for motions requesting act 2 is $S_2^* = \{x|v_2(x) - c \geq v_1(x)\}$ and for litigants to be led to bring motions if and only if their x is in S_2*. Accordingly, social welfare is

$$(5)\quad W_5 = \int_{X \sim S_2^*} v_1(x)f(x)dx + \int_{S_2^*} (v_2(x) - c)f(x)dx,$$

where the first integral concerns litigants who do not bring motions for act 2 and the second integral concerns litigants who do bring the motions.

Let me next state what will be called the *simple variability assumption*. Suppose that each adjudicative act will be superior to the other by more than the cost c with positive probability; that is, $v_1(x) - c > v_2(x)$ holds with positive probability as does $v_2(x) - c > v_1(x)$. I now establish

Proposition 1. Given the simple variability assumption, one of the two motions regimes (Regime 4 or 5) must be best, superior to any of the other regimes (Regimes 1–3).

Proof. Let us first verify that Regime 5 is superior to Regime 1. We have

$$(6)\quad W_5 - W_1 = \int_{X \sim S_2^*} v_1(x)f(x)dx + \int_{S_2^*} (v_2(x) - c)f(x)dx - \int_{X} v_1(x)f(x)dx = \int_{S_2^*} (v_2(x) - c - v_1(x))f(x)dx > 0.$$

[31] I will speak of S_1* as if it is unique. However, any set S_1 that properly includes S_1* could also be employed to implement optimal behavior of litigants. For under such an S_1, the court could impose fees sufficiently high to discourage the bringing of motions for all x in $S_1 \sim S_1$*, meaning that motions would turn out to be brought if and only if x were in S_1*.

The last inequality holds because the integrand is non–negative by definition of S_2^* and must be positive due to the simple variability assumption.

Similarly, Regime 4 is superior to Regime 2, for

$$(7)\quad W_4 - W_2 = \int_{X \sim S_1^*} v_2(x)f(x)dx + \int_{S_1^*} (v_1(x) - c)f(x)dx - \int_{X} v_2(x)f(x)dx = \int_{S_1^*} (v_1(x) - c - v_2(x))f(x)dx > 0,$$

where the last inequality follows from the definition of S_1^* and the simple variability assumption.

Let us next show that Regime 4 is also superior to Regime 3. We have

$$(8)\quad W_4 - W_3 = \int_{X \sim S_1^*} v_2(x)f(x)dx + \int_{S_1^*} (v_1(x) - c)f(x)dx - \int_{X} (\max(v_1(x), v_2(x)) - c)f(x)dx.$$

Now $v_1(x) > v_2(x)$ must hold on S_1^* by its definition, so that $\max(v_1(x), v_2(x)) - c = v_1(x) - c$ on S_1^*. Hence, (8) equals

$$(9)\quad \int_{X \sim S_1^*} (v_2(x) - (\max(v_1(x), v_2(x)) - c))f(x)dx = \int_{X \sim S_1^*} (v_2(x) - \max(v_1(x) - c, v_2(x) - c))f(x)dx > 0.$$

The latter inequality follows because $X \sim S_1^*$ has positive probability due to the simple variability assumption and because the integrand $v_2(x) - \max(v_1(x) - c, v_2(x) - c)$ is positive on $X \sim S_1^*$. Regarding the latter: if the maximum is $v_1(x) - c$, then the integrand is $v_2(x) - v_1(x) + c$, which is positive by definition of $X \sim S_1^*$; and if the maximum is $v_2(x) - c$, then the integrand is c.

An analogous argument shows that Regime 5 is also superior to Regime 3.

It follows from what has been shown that one of the two motions regimes must be better than the other regimes—that either $W_4 > \max(W_1, W_2, W_3)$ or $W_5 > \max(W_1, W_2, W_3)$. In particular, suppose that $\max(W_1, W_2, W_3) = W_1$. Since we know by (6) that $W_5 > W_1$, we have that $W_5 > \max(W_1, W_2, W_3)$. Likewise, suppose that $\max(W_1, W_2, W_3) = W_2$. Since we know by (7)

that $W_4 > W_2$, we have that $W_4 > \max(W_1, W_2, W_3)$. And suppose that $\max(W_1, W_2, W_3) = W_3$. Since we know by (8) that $W_4 > W_3$, we have that $W_4 > \max(W_1, W_2, W_3)$. □

In order to compare the two motions regimes, it will be convenient to rewrite them. To this end, observe that

$$(10)\quad \int_X \max(v_1(x), v_2(x)) f(x)dx - W_4$$

$$= \int_X \max(v_1(x), v_2(x)) f(x)dx - [\int_{S_1^*} (v_1(x) - c) f(x)dx + \int_{X \sim S_1^*} v_2(x) f(x)dx]$$

$$= \int_{S_1^*} [\max(v_1(x), v_2(x)) - (v_1(x) - c)] f(x)dx + \int_{X \sim S_1^*} [\max(v_1(x), v_2(x)) - v_2(x)] f(x)dx$$

$$= \text{Prob}(S_1^*)c + \int_{X \sim S_1^* \text{ and } v_1(x) > v_2(x)} (v_1(x) - v_2(x)) f(x)dx,$$

where Prob stands for probability. Note that the first line is first–best social welfare minus welfare achievable under Regime 4. The first two equalities are clear. To verify that the last equality in (10) holds, observe that $\max(v_1(x), v_2(x)) = v_1(x)$ on S_1^*, which explains the first term on the last line. With regard to the second term, observe that

$$(11)\quad \int_{X \sim S_1^*} [\max(v_1(x), v_2(x)) - v_2(x)] f(x)dx$$

$$= \int_{X \sim S_1^* \text{ and } v_1(x) \le v_2(x)} [\max(v_1(x), v_2(x)) - v_2(x)] f(x)dx + \int_{X \sim S_1^* \text{ and } v_1(x) > v_2(x)} [\max(v_1(x), v_2(x)) - v_2(x)] f(x)dx$$

$$= \int_{X \sim S_1^* \text{ and } v_1(x) > v_2(x)} [\max(v_1(x), v_2(x)) - v_2(x)] f(x)dx$$

because the first integral on the second line in (11) is zero (for $\max(v_1(x), v_2(x)) = v_2(x)$ when $v_1(x) \le v_2(x)$). It follows from (11) that the second term on the last line of (10) is correct. If we now use the first and last lines of (10) and rearrange the terms, we obtain

$$(12)\quad W_4 = \int_X \max(v_1(x), v_2(x)) f(x)dx - [\text{Prob}(S_1^*)c + \int_{X \sim S_1^* \text{ and } v_1(x) > v_2(x)} (v_1(x) - v_2(x)) f(x)dx].$$

The interpretation of (12) is that social welfare under the regime of motions for act 1 equals first–best social welfare minus two sources of inefficiency: the social cost of deciding motions for act 1 (namely, Prob(S_1*)c) and the inefficiency that occurs when motions for act 1 are not brought even though act 1 is superior. (This inefficiency is the integral of $v_1(x) - v_2(x)$; it is optimally incurred, of course, when the cost c of curing the inefficiency by bringing the motion is greater.)

An analogous argument gives us the following expression for welfare under Regime 5,

$$(13)\quad W_5 = \int_X \max(v_1(x), v_2(x)) f(x)dx - [\text{Prob}(S_2^*)c + \int_{X \sim S_2^* \text{ and } v_2(x) > v_1(x)} (v_2(x) - v_1(x)) f(x)dx],$$

which has a similar interpretation to (12).

The next conclusion follows from (12) and (13).

Proposition 2. The better of the two motions is the motion for which the sum of the social cost of bringing it and the inefficiency arising when it is not brought is least. Thus, Regime 4, the motion for act 1, is superior to Regime 5, the motion for act 2 if

$$(14)\ \text{Prob}(S_1^*)c + \int_{X \sim S_1^* \text{ and } v_1(x) > v_2(x)} (v_1(x) - v_2(x)) f(x)dx \ < \ \text{Prob}(S_2^*)c + \int_{X \sim S_2^* \text{ and } v_2(x) > v_1(x)} (v_2(x) - v_1(x)) f(x)dx,$$

and the motion for act 2 is superior if this inequality is reversed. If the two sides of (14) are equal, social welfare under the two motions regimes is the same.

Having characterized which motion is better, I make two observations about the analysis.

Remark 1: The contrast between the optimal acquisition of costly information by a decision maker in classic decision theory and its acquisition by courts under motions regimes. A standard problem in decision theory is whether a decision maker should spend an amount c to obtain information x about the values $v_1(x)$ and $v_2(x)$ of two different acts between which the decision maker must choose. If the decision maker spends c on the information, he will select the

act with the higher value; hence, his expected utility will be given by W_3. If he does not spend c, he will choose whichever of the acts has higher expected utility, namely, he will obtain max (W_1, W_2). Since we have shown that a motions regime is superior to Regimes 1–3, the decision maker would be better off if he could employ a motions regime—which would only be possible if there were another rational party who possessed the information x and could be induced to announce it to the decision maker. Of course, the reason that the decision maker is not as well off in the classic decision making context is that there nature alone knows x—there is no other party who knows x who can be led to provide it under the right circumstances. Thus, in the classic context, the decision maker must spend c without knowing what the information x will be. In contrast, in the context of adjudication here (as well as in many other contexts), *the decision maker spends c to obtain information only when the information will turn out to be valuable to him*—because the information will be supplied by another party only under conditions that are determined by the granting set of the motion that the decision maker specifies.

Remark 2: Generalization of the model to multiple alternative adjudicative acts. I assumed that there were two alternative adjudicative acts in the basic model, but that model generalizes to any number n of alternative acts, with social values $v_1(x)$, . . . , $v_n(x)$. The natural analogue of the motion in the basic model in the model with n acts is a request for some act j to be performed rather than a status quo act i. Let $S_i(x)$ denote the granting set when i is the status quo act, where the granting set now is a pair: both a subset of X in which x must lie, and an act j (different from i) that must be requested. The optimal granting set will be $S_i^*(x) = (\{x|\max_{j \neq i} v_j(x) - c \geq v_i(x)\},\ j = \arg\max_{j \neq i} v_j(x))$. In other words, a motion is granted when the requested act j is the highest value act among acts different from i and when $v_j(x) - c$ is at least the value of the status quo act $v_i(x)$. A sufficient condition for some motions regime to be superior to the

other regimes[32] is that for any two different acts i and j, the probability that $v_i(x) - c > v_j(x)$ is positive.[33] The optimal motion is that which minimizes the sum of the cost of bringing the motion (given the optimal granting set) and the inefficiency of outcomes under the motion.

Remark 3: Generalization of the model to two litigants. Although I assumed in the model that there was a single litigant, allowing for two litigants would not alter the conclusion that the use of motions to draw forth information relevant to adjudicative acts could be valuable to the court. An obvious illustration is as follows. Suppose that x_P is private information of litigant P bearing on the choice between two adjudicative acts 1 and 2, with social values $v_1(x_P)$ and $v_2(x_P)$; that x_D is private information of litigant D bearing on a choice between two other adjudicative acts 3 and 4, with social values $v_3(x_D)$ and $v_4(x_D)$; that a social cost c is associated with the court observing x_P or x_D; and that the social objective is to maximize the expected social value of the sum of the chosen two acts (1 or 2, and 3 or 4) less the cost c of observing each of x_P and x_D. Under these assumptions, it is evident that the problem for the court reduces to two independent problems—one for litigant P and the other for litigant D, where each of these problems is essentially identical to that examined in the basic model. Hence, the conclusions would be the same; given the variability assumption I made, the use of a motions regime to induce P sometimes to provide x_P would be optimal, and similarly the use of a motions regime to induce D sometimes to provide x_D would be optimal.

[32] That is, superior to each of the n regimes, say R(i), under which the court chooses act i for sure, and superior also to the regime, say R(max), under which the court examines x at cost c and then chooses the act (or an act) that maximizes $v_i(x)$ over $i = 1, \ldots, n$.

[33] The proof of this claim follows along the lines of that in the basic model. Let RM(i) be the motions regime when the status quo act is i (and assuming the granting set is optimal). It is clear that RM(i) is superior to R(i) given the sufficient condition. It is also clear that RM(j) is superior to R(max) if $v_j(x)$ would be best with positive probability, and there must obviously exist some j for which this is true. Hence, some motions regime is superior to any of the other regimes.

In variations of the foregoing, the court's assessment of a particular adjudicative act will depend on information of both P and D. For instance, suppose that the court is choosing between just two adjudicative acts, 1 and 2, with social values $v_1(x_P, x_D)$ and $v_2(x_P, x_D)$; that P first has an opportunity to bring a motion and then D does; and that P does not initially know x_D. In this setting, P will not know, if he brings a motion in which he discloses x_P, whether D will bring a motion and, if so, what D will disclose. Hence, if P decides to bring a motion, he will not necessarily know whether it will be granted. Such considerations imply that motions will not be as valuable as in the basic model (in part because some will be denied, with attendant costs); they also imply that the determination of the optimal treatment of motions will involve complexities. However, the rationale for motions will not change: to permit the court to efficiently obtain information from litigants of value to it for choosing adjudicative acts; if x_P and x_D were without value to the courts, there would be no reason for them to countenance the expenditure of c to obtain that information of litigants.

2.2.2. Extension of the basic model. I now add to the basic model the feature that the court possesses information z in a set Z of the real numbers that is not observable to litigants. This private information z can be interpreted as legal matters or facts known only to the court that are of relevance to its choice between the adjudicative acts 1 and 2. A case will now be identified by the pair (x, z), where $f(x, z)$ is the joint probability density of (x, z) on XH Z, $f(z|x)$ is the density of z conditional on x, $f(x|z)$ is the density of x conditional on z, and $f(x)$ is the unconditional density of x. Social welfare in a case is now $v_i(x, z)$ if the court chooses act i and does not make expenditures to observe x, and social welfare is $v_i(x, z) - c$ if the court chooses i and does make expenditures to observe x.

Under Regime 1, in which act 1 is always chosen, social welfare is

(15) $W_1 = \int_X \int_Z v_1(x, z) f(z|x) dz f(x) dx;$

and similarly under Regime 2, social welfare is

(16) $W_2 = \int_X \int_Z v_2(x, z) f(z|x) dz f(x) dx.$

Under Regime 3, in which the court always observes x, the choice of adjudicative act is assumed to be made optimally by the court given its knowledge x and z, so that social welfare is

(17) $W_3 = \int_X \int_Z (\max(v_1(x,z), v_2(x,z)) - c) f(z|x) dz f(x) dx.$

Under Regime 4, I also assume that the court behaves optimally. To amplify, I suppose that the court specifies a *consideration set* S_1 in X that cannot depend on z[34] and that the court can induce litigants to bring a motion if and only if x is in S_1. If x is in S_1, then by definition the court spends c to consider the motion—implying considering z as well as x. However, the court does not necessarily grant the motion and perform act 1, for that decision depends on the value of z. I claim that the optimal consideration set is

(18) $S_1^* = \{x | \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x) dz \geq \int_Z v_2(x, z) f(z|x) dz\}$

$= \{x | \int_{\{z | v_1(x, z) \geq v_2(x, z)\}} (v_1(x, z) - v_2(x, z)) f(z|x) dz - c \geq 0\},$

and that it is optimal for the motion to be *granted* when x and z are such that $v_1(x, z) \geq v_2(x, z)$ and *denied* when $v_1(x, z) < v_2(x, z)$. Note from the second line above that for x to be in S_1^*, the *expected* gain from granting the motion must exceed c.[35] Additionally, unlike in the basic model,

[34] One justification for this assumption is that z might become known to the court only during the course of litigation (for instance, its interpretation of the law with might only be appreciated by a court after it gains familiarity with the facts in the case), so that a new set $S_1(z)$ could hardly be employed and learned by litigants. Another justification is that z varies across courts, and it is implausible to assume that knowledge of a set $S_1(z)$ particular to each court could be absorbed by litigants.

[35] This requirement for x to be in the consideration set is the analogue of the requirement in the basic model for x to be in the granting set. The requirement explains why granting all motions for which act 1 is superior by any amount

motions might not be brought when doing so would in fact raise social welfare, for x might not be in S_1* when for some z, $v_1(x, z) - v_2(x, z) > c$.

The proof of the foregoing characterization of S_1* is analogous to that of the characterization of S_1* applying in the basic model.

It follows that social welfare is

$$(19)\quad W_4 = \int_{X \sim S_1^*} \int_Z v_2(x, z) f(z|x)\,dz f(x)\,dx + \int_{S_1^*} \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x)\,dz f(x)\,dx,$$

where the first term corresponds to litigants who do not bring motions for act 1 and the second term to litigants who do bring the motions.

Likewise, under Regime 5, the optimal consideration set is

$$(20)\quad S_2^* = \{x | \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x)\,dz \geq \int_Z v_1(x, z) f(z|x)\,dz\}$$

$$= \{x | \int_{\{z | v_2(x, z) \geq v_1(x, z)\}} (v_2(x, z) - v_1(x, z) f(z|x)\,dz - c \geq 0\},$$

it is optimal for the motion to be granted if and only if $v_2(x, z) \geq v_1(x, z)$, and social welfare is

$$(21)\quad W_5 = \int_{X \sim S_2^*} \int_Z v_1(x, z) f(z|x)\,dz f(x)\,dx + \int_{S_2^*} \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x)\,dz f(x)\,dx.$$

A natural generalization of the simple variability assumption made in the basic model is that there is a positive probability that it would be worthwhile for a motion for each adjudicative act to be brought rather than for the status quo act to occur. Namely, the variability assumption we now state is that

$$(22)\quad \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x)\,dz > \int_Z v_2(x, z) f(z|x)\,dz\}$$

holds for x with positive probability, and that

$$(23)\quad \int_Z (\max(v_1(x, z), v_2(x, z)) - c) f(z|x)\,dz > \int_Z v_1(x, z) f(z|x)\,dz\}$$

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to act 2 does not create a moral hazard and lead to the bringing of too many motions; for x will not be considered unless, in expectation, $v_1(x, z)$ exceeds $v_2(x, z)$ by at least c.

holds for x with positive probability.

This assumption only partly guarantees the superiority of a motions regime. In particular, we have

Proposition 3. Given the variability assumption in the extended model,

(a) the motions Regime 4 (in which motions are made for act 1) is superior to Regime 2 (in which act 2 is always undertaken); and the motions Regime 5 (in which motions are made for act 2) is superior to Regime 1 (in which act 1 is always undertaken).

(b) However, neither of the motions regimes is necessarily superior to Regime 3 (in which the court always examines litigant information x), but when a motions regime is not superior to Regime 3, it will be equivalent to that regime. Hence, one of the motions regime must be at least as good as any of the other regimes.

Proof. It is straightforward to verify that (a) holds, for example that Regime 4 is superior to Regime 2.[36]

With regard to (b), Regime 3 cannot be superior to either of the motions regimes, for the granting set S_i can always be set equal to X, in which case motions would always be brought under a motions regime, and thus the motions regime would be equivalent to Regime 3 (the court would always know both x and z before choosing the adjudicative act under the motions regime, and c would always be spent). Hence, if Regime 3 is optimal, both motions Regimes 4 and 5 must also be optimal and equivalent to Regime 3. To complete the proof, it needs to be shown that it is possible that a motions regime can be optimal and equivalent to Regime 3 even though the variability assumptions hold. This is demonstrated in the Appendix.

[36] $W_4 - W_2 = \int_{S_1^*} \int_Z (\max(v_1(x, z), v_2(x, z)) - c - v_2(x, z)) f(z|x) dz f(x) dx$, which must be positive given that (22) holds for x with positive probability.

That z is known to the courts but not to the parties and may be relevant to the level of welfare $v_i(x, z)$ and thus to the optimal choice of the adjudicative act raises a question. Could a *court–directed regime for examining x* be superior to a motions regime? That is, might z be a superior basis on which to decide whether to expend c to examine x than x itself (which is all that would be known to a litigant under a motions regime)?

In particular, let us define Regime 6 to be one in which the court, with its knowledge of z, decides whether to observe x at cost c. If the court does observe x, I assume that the court chooses the better act and obtains $\max(v_1(x, z), v_2(x, z))$. If the court does not observe x, I assume that the court chooses the act with the higher expected value given z. Let S_z be the set of z for which the court will observe x under the court–directed regime. Then the optimal such set is given by

$$(24) \quad S_z^* = \{z | \int_X (\max(v_1(x, z), v_2(x, z)) - c) f(x|z) dx \geq \max(\int_X v_1(x, z) f(x|z) dx, \int_X v_2(x, z) f(x|z) dx\}$$

by reasoning similar to that justifying the characterization of the S_i^*. We have

Proposition 4. (a) Regime 6, the court–directed regime for examining litigant information x, can be superior to Regimes 1–5.

(b) The motions Regimes 4 and 5 can each be superior to Regime 6 and the other regimes; but Regimes 1–3 cannot be superior to Regime 6, although they may be equivalent to it.

The proof is given in the Appendix. Although it is demonstrated by example there that court–directed examination of litigants' information may be superior to the motions regimes (and other regimes), I was not able to identify an appealing general sufficient condition for this to be so.

Finally, we have a generalization of Proposition 2.

Proposition 5. The best of Regimes 1–6 is the (or a) regime for which the sum of the social cost of examination of litigant information *x* by the court and the inefficiency arising when *x* is not examined is minimized.

The proof of this result is analogous to that of Proposition 2.

3. Discussion

In this section I illustrate the theory of the rationale for motions, remark on the function of motions in fostering the development of information, comment on inefficiencies of motions and elements of adjudication that are not guided by motions, and make brief observations about motions in Germany and the civil law world.

(a) *Examples of motions.* It will be useful to consider several types of motions in order (1) to verify that the information conveyed by those who bring the motions is not possessed by courts and (2) to indicate the specific reasons why each of the motions regimes is socially valuable.

I begin with a mundane motion, that for an interpreter. Motions for interpreters allow litigants to obtain the services of interpreters when litigants' knowledge of English is poor and their ability to understand and participate in proceedings would be inadequate.[37]

Motions for interpreters provide information to the courts that litigants but not the courts would ordinarily have. On one hand, litigants know their own language abilities, so they would presumably realize when they would need an interpreter and usually be motivated to request one in those circumstances. On the other, courts would often be unlikely to learn about litigants' language skills before proceedings actually occur. When a case is filed, a court would only have available to it materials bearing on the substantive matters at issue (such as about the behavior of

[37] Court Interpreters Act, 28 U.S.C. §1827, governing the provision of interpreters in federal courts. (This statute also addresses problems faced by the hearing–impaired, which I do not discuss.)

drivers involved in a car accident), and these materials would not be expected to shed light on a litigant's knowledge of English or on his or her native language.

The social value of a regime with motions for interpreters relative to a regime without interpreters is patent. Because the motions inform the courts of the desirability of the presence of interpreters at proceedings, arrangements for interpreters with the required language skills can usually be made, permitting litigants to communicate with counsel and the court and to understand witness testimony. Also, the task of the courts in considering the motions will not be great because only those litigants who believe that they have a need for interpreters will be likely to bring the motions. Thus, the regime of motions for interpreters should be superior to a regime in which interpreters are not present.

The regime with motions for interpreters should also be superior to an alternative system in which courts would seek to make interpreters readily available in all proceedings. Such a counterfactual system would be exceedingly expensive to operate, for courts would have to maintain a corps of interpreters with proficiency in many languages who would be available to serve with little or no delay.[38] Moreover, in order to know when interpreters should attend proceedings, courts would have to rapidly assess litigants' understanding and ability to communicate in English, which could be difficult. In consequence, such a regime would not only be very costly in comparison to the regime with motions, it would also be likely to function poorly.

[38] In fact, most jurisdictions establish lists of interpreters; see, for example, that of Massachusetts at http://www.mass.gov/courts/docs/admin/interpreters/list-of-interpreters.pdf. However, in the absence of a regime with motions for interpreters giving courts prior notice of which litigants need interpreters, the existence of a list would be unlikely to solve problems of delay, as I am about to suggest.

Let me now consider motions intended to protect the confidentiality of specified information.[39] As a general matter, these motions will be granted when the harm from failure to ensure the privacy of the information in question would outweigh the loss of benefits from open public access to that information, notably, public trust in the judicial system.

Motions for the protection of confidentiality furnish notice to the courts of the sensitivity of information that parties naturally appreciate but about which the courts would typically be unaware at the time that the motions are made. Because they know their own affairs, litigants will realize when there is a reason for protecting the confidentiality of information that they would provide during judicial proceedings. Business litigants will understand when confidentiality would be needed to prevent disclosure of trade secrets and other facts of commercial value, and individual litigants will recognize when confidentiality would be required to prevent disclosure of information that would be personally problematic. Consequently, when litigants wish to protect the confidentiality of information, they will want to bring motions to accomplish that before their sensitive information actually comes into evidence. (Of course, litigants must usually bring their motions prior to the time that information comes into evidence because judicial proceedings and thus their evidence, would otherwise publicly accessible.) However, courts often would not ordinarily understand the reason for protection of confidentiality of information prior to seeing the information at issue or even afterwards—hence the need for motions that explain that need.

The social value of motions protecting the confidentiality of information in judicial proceedings can be significant. First, the privacy of trade secrets and other proprietary business information is important to maintain because that engenders the development of socially valuable

[39] Federal Rules of Civil Procedure, Rule 5.2(d), Rule 26(c); Wright, et al. (2017b) §§ 1155, 1156, 2036, 2043.

intellectual property (like production processes and customer lists that match well with supplier capabilities) and business plans; and the privacy of sensitive personal information may be important to uphold in order to thwart harms to reputation, upset, and embarrassment. Second, the degree to which protection of confidentiality is socially costly would often be limited; the social detriments would consist of the mainly ministerial expenses of enforcement of orders for protection, and it would usually involve little loss of public trust in the judicial process because the protected information typically would constitute only a small part of the record of the proceedings. Thus, the motions could frequently make sense for the courts to grant, and the work of the courts should tend to be generated by only the minority of litigants who believe that they have a reasonable argument for protection of confidentiality.

In the absence of motions for protection of confidentiality of information, suppose that all proceedings would be accessible to the public. The most obvious consequence of this regime would be the loss of the benefits of the protection of confidentiality just summarized. But significant indirect consequences would also be likely to result. Potential plaintiffs could be discouraged from bringing meritorious suits if doing so would result in disclosure of valuable or embarrassing private information. Conversely, suits of questionable value might be instigated by the ability of plaintiffs to threaten non–settling defendants with disclosure of their sensitive information. Accordingly, a regime of unfettered public access to judicial proceedings would be much inferior to the regime of motions that we employ.

If, on the other hand, society adopted the opposite regime, in which all legal proceedings were sealed, public trust in the judiciary would greatly diminish, and quite possibly its actual performance and integrity as well. Again, then, the regime of motions for protection of confidentiality seems distinctly superior.

Next, let us consider motions for dismissal[40] and for summary judgment.[41] Such motions are granted when a party cannot prevail on a case or on an issue pertaining to it for legal reasons, presuming that there are no disputes over material facts.

The assumption that these motions serve the purpose of conveying information to courts about which they may be unaware seems correct. Suppose that a statute of limitations bars the case at issue, or that depositions or documents produced during discovery invalidate a claim, or that certain judicial holdings contravene a crucial argument. The court might well not be cognizant of such information even though the court may formally possess it or have access to it. The reason is simply that in the beginning stages of litigation, courts will frequently not have actively considered the pleadings, briefs, and other materials that were brought into evidence, may not have researched relevant law, and the like.[42] For the courts to have done otherwise would often have been impractical, given the constraints of time and the work that would be required. Relatedly, it would also tend to have been inefficient for the courts to have expended much judicial effort on case materials early on, because many issues fall by the wayside during litigation and because cases often settle. Thus, the motions for dismissal and for summary judgment may be viewed as providing information to the courts mainly by *alerting* them to the significance of information that they already hold or can obtain but about which they have not yet effectively apprised themselves for understandable reasons.

[40] Federal Rules of Civil Procedure, Rule 12(b); Wright et al. (2017b) §§ 1349-1354.

[41] Federal Rules of Civil Procedure, Rule 56; Wright et al. (2017b) § 2712.

[42] To be clear, the point being made is not only that a court may be imperfectly aware of relevant law. Even if the court's understanding of relevant law is good, its ability to apply the law to the facts can obviously be compromied by not knowing relevant facts. If a court is well–informed about a statute of limitations but not of the facts in a case (such as when the asserted injury occurred) needed to determine whether the statute bars a claim, the court could benefit from a motion to dismiss.

The primary social value of the motions is that they save resources by truncating the efforts of the litigants and the courts on matters that can be well resolved without a full trial. Of course, the cost of deciding on the motions themselves must be subtracted from these savings, but that cost is incurred only in the subset of cases in which motions are brought.[43]

If there were no motions to dismiss and for summary judgment and all cases proceeded to trial in the normal course, the foregoing savings would be lost under the assumption that courts would not change their behavior. However, it is probable that in the absence of the motions, courts would endeavor to identify for themselves cases that should not go to trial. Although such efforts would to some extent meet with success, the efforts would also involve waste; for then courts would be devoting resources to screening all cases rather to screening only those cases brought to their attention through the device of the motions under discussion.

Last, consider appeals of trial court findings,[44] in which appellants describe their reasons for believing that legal errors were made.[45] Appeals constitute motions in the sense of the definition of a motion in this article, for they may be viewed as requests for the adjudicative act of reversal of trial court findings.

It is clear that appeals generally provide information to appeals courts bearing on the occurrence of legal error. An appeals court would not ordinarily know about the possibility of legal error in a given case in the absence of an appeal for the obvious reason that it did not hear the case at trial. The litigants in a case, on the other hand, would often be able to identify

[43] For example, motions to dismiss for failure to state a claim were filed in only 6.2% of cases in 2009-2010 in a study of federal courts; see Cecil et al. (2011), p.8. And motions for summary judgment were filed in only 19% of cases in 1988 in another study of federal courts; see Cecil et al. (2007), p. 882.

[44] Federal Rules of Appellate Procedure, Rule 3; Wright, et al. (2017a) §3949.

[45] Federal Rules of Appellate Procedure, Rule 27, 28; Wright, et al. (2017a) §3973, §3973.1, §3974, §3974.1-§3974.6

information about the occurrence of legal error both because they participated in their matter and because they have a motive to notice error in order to alter adverse findings. (Although trial courts might also possess information bearing on legal error, they would not be expected to seek to report their own mistakes to an appeals court.)

Hence, the appeals regime harnesses information about the occurrence of legal errors that litigants naturally possess and brings it to the attention of appeals courts. Moreover, the appeals regime should tend to result in the provision of this information about errors with low cost, that is, only in the subset of cases in which litigants believe that errors are relatively likely to have been made.[46]

The main social virtues of the appeals process are that it corrects errors by trial courts and that it deters the making of errors in the first place by means of the threat of reversal, an outcome that trial court judges usually dislike. Additionally, the existence of specialized appeals tribunals enables society to invest more effectively in error correction than would be the case were the alternative to commit more judicial resources to the trial courts.[47]

This concludes my brief consideration of examples of motions.[48] However, let me note that I omitted from this discussion two alternative regimes that I examined in the theory of the prior section. One was the dual motions regime, such as a regime in which the status quo act is protection of confidentiality and motions are made for public accessibility to proceedings. I did

[46] In fact, appeals tend to be made in only a minority of cases. For example, approximately fourteen percent of cases were appealed from federal district courts in the year ending June 30, 2017. See http://www.uscourts.gov/sites/default/files/data_tables/fcms_na_appprofile0630.2017.pdf and http://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distprofile0630.2017.pdf.

[47] For economic analysis of these virtues of the appeals process, see Shavell (1995) and Shavell (2006).

[48] I add that in considering examples of motions, I could not find any motion whose underlying purpose was other than to supply information to the court bearing on an adjudicative choice facing it.

not consider the dual motions regime mainly because of its problematic nature in the contexts at issue.[49]

The other alternative regime that I did not address was that in which courts would query all litigants about their private information, for example, a regime in which courts would question all litigants about their possible need for an interpreter. In reality, such a regime might devolve into a process close to a motions regime. If a court wished to determine whether a litigant needed an interpreter, the most natural way for the court to proceed would be to ask the easily–answered question, "Do you think that you need an interpreter?" Most litigants (or their counsel) would simply respond "No." Or courts might say, "If you think you need an interpreter, please complete this form explaining why." That kind of regime would approximate a motions regime for interpreters due to the very low cost of the initial judicial interaction with litigants who do not need interpreters. Hence, although the regime in which courts question all litigants would be inferior to a motions regime, because it would be more costly, it could sometimes resemble a motions regime and not involve much added expense.

(b) *Do motions have a role different from elicitation of information—the generation of information?* In this article, I have largely assumed that litigants will naturally possess certain information that would be useful to the courts for the conduct of litigation. Hence, the primary function of motions was to induce the communication of such private information residing with litigants to the courts. However, the opportunity to bring motions may also motivate litigants to develop information that they do not initially possess in order to supply it to the courts. Thus, for

[49] To illustrate in the case of motions for public accessibility to proceedings in a regime with the status quo being confidentiality, two problems would exist. First, given the assumption that most proceedings should in fact be publicly accessible, the dual motions would have to be brought in the great majority of cases, entailing high expenses. Second, the motives of litigants to request that motions be publicly accessible would often be negligible or socially detrimental (one party might request public accessibility in order to threaten the opposing party with disclosure of information that ought to be protected). Such incentive difficulties would have to be corrected through some kind of reward or penalty scheme for the dual motions regime to function appropriately.

instance, the existence of motions for summary judgment may encourage litigants to engage in legal research that they would not otherwise have undertaken at an early point in litigation so that they can move for summary judgment. This role of motions in generating information complements that of the elicitation of information from litigants (but cannot by itself constitute the rationale for motions[50]).

(c) *Inefficiencies of motions.* In the extension to the basic theory supporting the desirability of motions, it was observed that the presence of information private to a court that is relevant to the course of adjudication leads to two inefficiencies: some motions will be brought but denied, and some motions will not be brought even though they would have been desirable to grant. Similar inefficiences result when litigants do not understand well the standards governing the granting of motions or when the standards are not clearly articulated.

A separate source of inefficiency is the strategic use of motions by litigants, such as the filing of motions to delay proceedings or to impose costs on the opposing side.

In addition to these causes of inefficiency that seem intrinsic to motions, it is plausible that inefficiency may sometimes be attributable to their poor design, notably that resulting in the bringing of motions when the likelihood of their being granted is clearly not high enough to justify the judicial effort entailed. This problem could be exacerbated by a reluctance of courts to deny motions only because of the cost of their consideration.

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[50] To understand why the generation of information cannot be the sole rationale for motions, suppose that litigants are known by the court to be fit to develop information X of some type. Then the court should rationally *order* litigants to develop X and report it to the court. There would be no reason for the court to employ the device of the motion unless some litigants would not be able to develop X—for then the use of the motion would permit the court to avoid the cost of interaction with litigants unable to develop X. (In this case, the asymmetry of information that would explain the utility of the motion would be whether or not a litigant is able to develop X—a fact assumed to be known only to litigants.)

Is there a way to gauge the importance of the inefficiency of motions? A crude measure is the likelihood of their denial.[51] Furthermore, one might expect the inefficiency due to denial of motions to be positively correlated with inefficiency attributable to failure to bring motions that would have been granted, at least to the extent that the source of both inefficiencies is uncertainty about the granting of motions.

To some degree, a problem of an excessive volume of motions could be met by the use of fees for bringing motions or of fines for their denial. However, fees lack general appeal as a mechanism for determining which motions are brought because the private value of a motion may deviate substantially from its social value.[52]

(d) *The absence and lack of significance of motions.* Although the central point of this article has been that motions play an important role in aiding courts in their conduct of litigation––because judicial decisions about many adjudicative acts benefit from the information provided by litigants who bring motions—it is manifest that adjudication proceeds in many ways that depend little or not at all on motions. This observation is not inconsistent with the theory advanced here.

In particular, one category of situations in which courts do not employ motions is that of mandatory elements of adjudication, such as the requirement that litigants state the grounds for a

[51] For example, the probability of denial of motions to dismiss for failure to state a claim was 25% in 2010; see Cecil et al. (2011), p. 14. Also, the probability of denial of plaintiffs' motions for summary judgment was about 35% in 2000; see Cecil et al. (2007), p. 888.

[52] For example, a litigant may bring a motion for summary judgment in order to obtain finality sooner or to save litigation costs, whereas the court might see definite social value in a full airing of the case in order that the public better understands the court's views on an important issue; or a litigant might bring a motion related to discovery to impose costs on his or her opponent, whereas the court might regard this purpose as having negative social value. Thus, in the context of motions, the idea of a fee as a price is not appealing; fees as prices make sense when the private value to those paying the fees tends to approximate its social value.

court's jurisdiction.[53] These elements of adjudication are obligatory because courts know that they are needed for the proper conduct of adjudication.[54]

A second category of occasions in which courts do not make use of motions is that in which courts possess private information concerning the conduct of litigation or learn during litigation something that suggests that an adjudicative act is merited. For example, a court might suspect from the responses of a witness that he or she does not fully comprehend English, leading the court to inquire whether that is true[55] or to provide for an interpreter.[56]

And a third category of instances in which courts do not utilize motions, or strictly circumscribe them, is that in which their value would probably not justify their cost of consideration, such as would be the making of interlocutory appeals[57] or the filing of motions for summary judgment more than thirty days after the completion of discovery.[58]

(e) *Motions in Germany and other civil law countries*. As would be expected, litigants may bring a wide array of motions in the civil law world. Under German civil procedure, on

[53] Federal Rules of Civil Procedure, Rule 8(a)(1).

[54] To express the point differently, there would be no reason for a court to ascertain the grounds for its jurisdiction through parties bringing motions that would name these grounds when the court already knows it needs that information from all litigants.

[55] This would exemplify what I referred to as court–directed inquiry in Section 2.

[56] When a court take such steps, it would do so by making a motion of its own in a formal legal sense; Federal Rules of Civil Procedure 43(d). But such motions are not motions within the meaning of this article because they are not brought by litigants.

[57] Interlocutory appeals are not as of right and generally require an order of the district court judge to be made, as is implicit in 28 U.S.C. 1292. An economic argument casting doubt on the value of interlocutory appeals is two–fold. On one hand, the expected value of interlocutory appeals would tend be less than that of appeals made after final judgment because an error made during the course of adjudication may turn out to be harmless if the party subject to the error still prevails. On the other, the cost of interlocutory appeals would often exceed that of appeals made after final judgment to the extent that interlocutory appeals would interrupt adjudication.

[58] Federal Rules of Civil Procedure, Rule 56(b). The savings in litigation costs from granting a motion for summary judgment diminish the longer litigation has proceeded because the remaining litigation costs will have fallen. Hence, it is rational for courts not to permit motions for summary judgment after some threshold in time.

which I focus,[59] motions may be made, for example, to nominate witnesses, to dismiss claims, and to reschedule hearings,[60] and their general usefulness can be explained by the information that they provide to courts along the lines that I have discussed above.

However, it seems possible that a number of motions have less significance in German civil proceedings than in American proceedings owing to a major difference between the roles of judges in the two settings—it appears that German judges more actively manage and participate in adjudication than do American judges.[61] Notably, German judges are accorded more authority to structure proceedings than our judges tend to enjoy, especially through their control over the order and the manner in which legal and factual issues are addressed.[62] Further, German judges participate in proceedings not only through their various written interchanges with the parties and at hearings, but also in relation to witnesses and experts: unlike in this country, in Germany it is judges who conduct the examination of witnesses[63] and who retain and oversee experts.[64] An

[59] A relatively rich literature exists in English on civil procedure in Germany, including Kaplan et al. (1958a, b), Koch et al. (1998), Kötz (2003), Langbein (1985), Murray and Stürner (2004) and its bibliography at pp. 653–654, and Von Mehren (1988). Civil procedure in Germany is often described as being the most influential such system in civil law countries; see, for example, Murray and Stürner, p. xxiii.

[60] See the German Code of Civil Procedure (ZPO); section 373 covers the naming of witnesses; sections 306, 330, and 331 address dismissal and default judgment; and section 227 concerns the rescheduling of hearings. The Code is available in English at https://www.gesetze-im-internet.de/englisch_zpo/englisch_zpo.html; Book 2 (Procedural rules for proceedings before the courts of first instance), Chapter 1, includes many of the motions employed in the important system of regional courts (Landgerichte). The general definition of a motion (Antrag) in German civil procedure is a request directed at a legal authority to make a specified type of decision; see Rosenberg et al. (2010), p. 331. Some motions are not included in the Code, but in other legislative statutes or authoritative sources, and some sections of the Code do not mention motions explicitly but are associated with them or are functionally close.

[61] This is implicit in the descriptions of German civil litigation; see generally Kaplan et al. (1958a, b); Langbein (1985); and Murray and Stürner (2004), ch. 6C.

[62] See Langbein (1985), pp. 830–832; and Murray and Stürner (2004), pp. 165–166. For example, the German judge can decide at any time to examine a named witness, whereas the American judge would not typically be able to benefit from new witness testimony after the period of discovery.

[63] See Langbein (1985), pp. 833–835, and Kötz (2003), pp. 63–64, 67–69. As these sources additionally note, judges also select which witnesses they wish to examine but are confined to the list of potential witnesses named by the litigants. The role of counsel is secondary, precluding questioning similar to our cross–examination, and counsel are generally discouraged from contact with witnesses outside of the courtroom.

underlying factor influencing judicial behavior is a judge's formalized obligation to seek the shortest route to the resolution of cases, including through settlement.[65] Among other things, this goal presumably guides a judge's decisions about the order in which to consider issues[66] and is reflected in the judge's duty to give the parties hints, "indications," of how he or she views the case at hand.[67]

Why would a higher degree of involvement of German judges in adjudication than American judges suggest that motions would have less importance in the German system than in our own? The primary reason is that German judges might be expected to acquire earlier and perhaps better knowledge of their cases than their American counterparts. In particular, German judges should be motivated to obtain a grasp of their cases as soon as possible in order to intelligently plan and to adjust the path of adjudication. They should also be motivated to build on their initial understandings of their cases in order to give proper indications of their thinking to the parties. Judges can meet these objectives through the expeditious consideration of the pleadings and other written submissions, the holding of hearings, the examination of witnesses, and so forth. In regard to the examination of witnesses, the contrast with the American context is striking: the German judge will often learn a great deal about a case as a concomitant of having to devise questions to ask of witnesses, hearing the answers to them, and recording them;[68] the

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[64] However, litigants may hire their own experts in the hope of supplementing or challenging the opinions of court–appointed experts. See Langbein (1985), pp. 835–841, and Kötz (2003), p. 64.

[65] See Murray and Stürner (2004), pp. 165, n. 64, 166.

[66] As Langbein (1985), p. 830, states, "in German procedure the court ranges over the entire case, constantly looking for the jugular—for the issue of law or fact that might dispose of the case."

[67] See Murray and Stürner (2004), pp. 166–177, on this important feature of the German judge's role.

[68] When German judges examine witnesses, they pause from time to time to dictate summaries of what has been said; these summaries constitute the principal record of examinations. See Murray and Stürner (2004), pp. 179–182. This practice should generate better judicial understanding of cases than if judges were only to ask questions of witnesses or if, as in our system, they were only to listen to testimony.

American judge not only does not examine witnesses, he or she might well not hear or read witness testimony until the time of trial.

The conjectured timeliness and superiority of knowledge of German judges about their cases should reduce the circumstances under which motions would be of value to them. For example, it would seem less likely that a German judge than an American judge would benefit from a motion to dismiss or from a litigant pressing for an earlier judgment or a hearing on an unaddressed issue[69] because the German judge is more likely already to be aware whether a case is ripe for decision or whether a hearing on an unconsidered issue would be worthwhile.[70]

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[69] A litigant can urge the court to come to a judgment sooner or order a new hearing, even though I am informed that there does not exist a motion in German civil procedure equivalent to our motion for summary judgment or a motion for a hearing. In particular, a litigant can make suggestions to the court in an oral hearing that could lead it to resolve the case more quickly or to order another hearing. I note too that the absence of, especially, formal motions for summary judgment in German civil procedure supports the thesis that motions are less important there than here, where motions for summary judgment are of significance.

[70] Although a theme of the discussion of the German context is that judges have superior knowledge of litigants' cases to that of American judges, the German advantage comes at a cost: Germany invests more heavily in its judiciary than our country. Notably, the ratio of lawyers to judges in Germany is reported to be 1 to 7, whereas in the United States it is 1 to 55; see Posner (2003, Table 1.1).

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Appendix

Completion of proof of Proposition 3.

Consider the following example: x is uniformly distributed in [0, 1] = X, z is uniformly distributed in [0, 1] = Z, x and z are independent of each other, and $c = 1$. Furthermore, when $z \in [0, .99)$, then $v_1(x, z) = 20$, whereas when $z \in [.99, 1]$, $v_1(x, z) = 200$; and when $z \in [0, .01)$, $v_2(x, z) = 200$, whereas when $z \in [.01, 1]$, $v_2(x, z) = 20$. Then the variability assumptions hold: for any x, the left–hand side of (22) is 23.6 – 1 = 22.6, exceeding the right–hand side, 21.8; and similarly for (23). Moreover, it is evident from (18) and (20) that $S_1^* = S_2^* = X$, so that the motions regimes devolve into Regime 3.

Proof of Proposition 4.

To demonstrate (a), consider the following example: x is uniformly distributed in [0, 1] = X, z is uniformly distributed in [0, 1] = Z, x and z are independent of each other, and $c = 10$. Also, when $x \in [0, .5)$ and $z \in [0, .01)$, which has probability .005, then $v_1(x, z) = 100$ and $v_2(x, z) = 0$; when $x \in [.5, 1]$ and $z \in [0, .01)$, which has probability .005, then $v_1(x, z) = 0$ and $v_2(x, z) = 100$; when $x \in [0, .5)$ and $z \in [.01, 1]$, which has probability .495, then $v_1(x, z) = 90$ and $v_2(x, z) = 100$; and when $x \in [.5, 1]$ and $z \in [.01, 1]$, which has probability .495, then $v_1(x, z) = 0$ and $v_2(x, z) = 100$.

Note that when $z \in [0, .01)$, knowledge of x will be valuable to the court, for then when $x \in [0, .5)$, act 1 will be optimal, whereas when $x \in [.5, 1]$, act 2 will be optimal. However, when $z \in [.01, 1]$, knowledge of x will have no value to the court, for act 2 will be optimal regardless of x. These observations suggest that the court–directed regime could have positive value, for if c is sufficiently low, it would be worthwhile to examine x in the 1% of cases when z lies in [0, .01) but not for other z.

Observe as well that when $x \in [0, .5)$, knowledge of x will also have value to the court, for the optimal act will then depend on z, but the difference in welfare from choosing the optimal act will be seen to be only 10 (obtaining 90 rather than 100). And when $x \in [.5, 1]$, knowledge of z will have no value to the court, for act 2 will be optimal regardless of z. These remarks suggest that motions based on x will not have much value and will be inferior to court–directed examination of x.

I now verify that that court–directed examination of x is superior to any of Regimes 1–5. Under Regime 1, welfare is 45.05; under Regime 2, welfare is 99.5; and under Regime 3, welfare is 100 – 10 = 90. Under Regime 4, motions for act 1 are not optimal to bring: if $x \in [0, .5)$, the expected gain from making a motion is .01x100 = 1, whereas $c = 10$; and if $x \in [.5, 1]$, the expected gain from making a motion is 0. Thus, Regime 4 is equivalent to Regime 2, and welfare is thus 99.5. Under Regime 5, motions for act 2 are optimal to bring only when $x \in [.5, 1]$: if $x \in [0, .5)$, the expected gain from making a motion is .99x10 = 9.9, whereas $c = 10$, so a motion is not optimal to bring; and if $x \in [.5, 1]$, the expected gain from making a motion is 100, which exceeds $c = 10$, so that a motion is optimal to bring. It follows that welfare under Regime 5 is .5x90.1 + .5x90 = 90.05.

Under Regime 6, it is optimal for the court to examine x only when $z \in [0, .01)$: if $z \in [0, .01)$, then if the court observes x, welfare will be 100 – 10 = 90, whereas if the court does not do so, welfare will be 50, so that the examining x is worthwhile; if $z \in [.01, 1]$, act 2 is always optimal, so that observing x will not be desirable. It follows that welfare under Regime 6 is .01x(90) + .99x100 = 99.9, which is higher than under Regimes 1–5, as claimed.

With regard to (b), let me show that Regime 4 could be superior to Regime 6 and the other regimes. Suppose the following: x is uniformly distributed in [0, 1] = X, z is uniformly distributed in [0, 1] = Z, x and z are independent of each other, and c = 10. Also, when $x \in [0, .2)$ and $z \in [0, .4)$, which has probability .08, then $v_1(x, z) = 100$ and $v_2(x, z) = 0$; when $x \in [0, .2)$ and $z \in [.4, 1]$, which has probability .12, then $v_1(x, z) = 100$ and $v_2(x, z) = 0$; when $x \in [.2, 1]$ and $z \in [0, .4)$, which has probability .32, then $v_1(x, z) = 0$ and $v_2(x, z) = 100$; and when $x \in [.2, 1]$ and $z \in [.4, 1]$, which has probability .48, then $v_1(x, z) = 0$ and $v_2(x, z) = 100$.

Under Regime 1, welfare is 20 and under Regime 2, welfare is 80. Under Regime 3, welfare is 100 – 10 = 90. Under Regime 4, when $x \in [0, .2)$ a motion for act 1 will be worth bringing, so welfare will be 100 – 10 = 90 and when $x \in [.2, 1]$ a motion will not be brought and welfare will be 100, so that welfare will be .2x90 + .8x100 = 98. Under Regime 5, when $x \in [0, .2)$ a motion for act 2 will not be brought and welfare will be 100, when $x \in [.2, 1]$ a motion will be worth bringing and welfare will be 100 – 10 = 90, so that welfare will be .2x100 + .8x90 = 92. Under Regime 6, when $z \in [0, .4)$, examination of x will be worthwhile for that will result in welfare of 100 – 10 = 90, whereas otherwise act 2 will be best and result in welfare of 80. Likewise, when $z \in [.4, 1]$, examination of x will be worthwhile and result in welfare of 90. Accordingly, welfare under Regime 6 will be 90. Hence, as claimed, Regime 4 is best and superior to Regime 6 in particular.

To demonstrate that Regime 5 could be best, alter the example just considered to be as follows: when $x \in [0, .8)$ and $z \in [0, .4)$, $v_1(x, z) = 100$ and $v_2(x, z) = 0$; when $x \in [0, .8)$ and $z \in [.4, 1]$, $v_1(x, z) = 100$ and $v_2(x, z) = 0$; when $x \in [.8, 1]$ and $z \in [0, .4)$, $v_1(x, z) = 0$ and $v_2(x, z) = 100$; and when $x \in [.8, 1]$ and $z \in [.4, 1]$, $v_1(x, z) = 0$ and $v_2(x, z) = 100$. Then, following the logic of the preceding example, it can be seen that Regime 5 is best and is superior to Regime 6.

Concerning the latter claims of (b), observe that if S_z is the null set, then Regime 6 is equivalent to act 1 if the court would always choose that act. Hence, Regime 1 cannot be superior to Regime 6 and may be equivalent to it. Similarly, Regime 2 cannot be superior to Regime 6 and may be equivalent to it. Finally, Regime 3 cannot be superior to Regime 6 and may be equivalent to it, for if $S_z = Z$, then Regime 6 leads to the same outcomes as Regime 3 because under both regimes the optimal action given x and z is chosen and c is incurred.