

# 0790

## LEGAL ERROR

Warren F. Schwartz  
*Professor of Law*  
*Georgetown University Law Center*  
© Copyright 1999 Warren F. Schwartz

### Abstract

Important legal rules, most significantly the rule which makes an injurer liable if she is negligent, require that in order to avoid liability an injurer must take socially optimal care. Since the rule is cast in general terms and, consequently, does not specify what the injurer must do to avoid liability, the judge or jury deciding the case must determine what socially optimal care for the injurer was in the circumstances in which the injury occurred. Legal error occurs when the judge or jury set socially optimal care at too low or too high a level.

An injurer deciding what to do to minimize the sum of precaution costs and liability costs takes the possibility of error into account. The possibility that too little care will be required will tend to induce the injurer to take too little care. The effect of the possibility that too much care will be required depends on the causality rule which is applied. If an injurer who is held liable for failing to take that care determined to be required is liable for all harm which occurs, including that harm which would have occurred even if the required care had been taken, the possibility that excessive care may be required will tend to make an injurer take excessive care. If, however, an injurer is liable only for that harm which would not have occurred if the required care had been taken, the injurer will take optimal care even if liability will be imposed if more than optimal care is not taken. It is difficult to draw any confident conclusions as to the frequency with which each of the two causality rules are employed.

A second model is employed to analyze legal error. Under this model, an injurer does not choose a level of care but makes a binary choice between compliance and violation of the rule. Under this approach both errors in holding injurers who have complied with the rule liable or in exonerating injurers who have not complied with the rule will reduce the incidence of compliance with the rule.

The practical usefulness of the analysis of legal error is greatly reduced by the absence of evidence either as to the errors which actually occur or the effect of those errors on the incentives of injurers.

*JEL classification:* K00

*Keywords:* Legal Error, Causality in Torts, Implementing a Negligence Rule, Injurers Compliance Strategy

## 1. Introduction

Legal rules imposing liability on injurers for the harm they do to victims are often framed to require that injurers must exercise 'reasonable care' (or some equivalent term) to avoid causing harm to persons who may be injured by their actions. Rules cast in this form do not specify what injurers must do to avoid causing injury. The determination of what constituted 'reasonable care' in the circumstances which in fact obtained when the particular injurer caused harm to the particular victim is made by the judge or jury empowered to decide the claim for damages brought by the victim against the injurer.

A common example in the literature (Polinsky, 1989, p. 40) is the speed at which an automobile is driven. Since the 'reasonable care' standard does not specify a speed at which automobiles must be driven in various circumstances the judge or jury is required to decide what speed was 'reasonable'. If the speed at which the car was driven exceeds that determined to be reasonable the injurer is liable to the victim. Legal error occurs when the judge or jury incorrectly determines what speed was reasonable in the circumstances which obtained when the injury occurred.

## 2. Legal Error

The analysis of legal error, in accordance with the standard economic interpretation of the negligence standard, posits that there is a socially optimal speed (or, more generally, of course, level of precautions to avoid causing harm) at which the total of (1) the cost of precautions to avoid causing harm (in the example, going more slowly), and (2) the expected harm to victims, is as low as possible. Intuitively, as the driver goes more slowly the benefit derived from her trip declines because she arrives at her destination at a later time; but so, too, does the expected harm she will cause others. Socially optimal speed is the one which maximizes the value of the trip to the driver net of the expected harm caused to others. This is posited as the speed which the 'reasonable care' standard obliges the driver not to exceed.

To facilitate exposition, reducing the speed at which a car is driven will be used throughout as the example of taking care to avoid causing harm. The analysis is, however, general, applying to all instances in which an injurer incurs costs to reduce the expected harm to victims by decreasing the probability that harm will occur or the magnitude of that harm which does occur.

The determination of what the socially optimal speed is in any particular set of circumstances is not straightforward. In principle, the judge or jury must determine both expected harm to victims and benefit to the injurer at different speeds and choose the speed which maximizes the value of the trip to the

injurer net of expected harm to victims. As a result, sometimes the speed chosen by judge or jury may exceed the social optimum and sometimes it may be less than the social optimum. In either event, what has been designated legal error has occurred.

### **3. The Impact of Legal Error on Injurers Incentives**

The analysis of legal error focuses on the question of how the behavior of injurers will be affected by the expectation that legal error will sometimes occur. This analysis takes two forms, depending on what is posited as the controlling rule with respect to the liability of an injurer for harm which would have occurred even if the injurer had taken the care (in the example driven at the speed) which she was legally obligated to take.

Calfee and Craswell and Goetz independently developed the analysis of the effects of legal error on the assumption that an injurer who is held to have failed to take the required level of care is liable for all harm which occurs, including that harm which would have occurred even if the mandated care had been taken. In the terms of our example, reducing speed to the socially optimal level does not necessarily mean that all expected harm will be eliminated. However, the analysis developed by Calfee and Craswell and Goetz proceeds on the assumption that the liability of the injurer includes that harm which would have occurred even if socially optimal care had been taken. Kahan and Grady proceed from a different assumption. They posit that an injurer is liable only for that harm which would have been prevented by taking the required care. The difference in the assumption made by Calfee and Craswell and Goetz on the one hand, and Kahan and Grady, on the other, leads to dramatically different conclusions as to the effect of legal error on the incentives of injurers. The Calfee and Craswell and Goetz analysis concludes that legal error impairs the incentives of injurers in two ways, one (to return to the example) tending to induce them to drive too fast and the other to induce them to drive too slowly. The actual speed chosen by an injurer depends on the relative strength of these two tendencies. Generally, unless the variance in the errors determining socially optimal care is very great, the tendency to take too much care will dominate and, in the terms of the example, the driver will go too slowly. By contrast, Kahan and Grady conclude that legal error can only operate to induce injurers to take too little care, in the terms of the example, drive too fast.

To understand the impact of legal error on injurers it is necessary to analyze how an injurer decides at what speed to drive. If there were no legal error, so that legally mandated speed were always set equal to socially optimal speed, the injurer, under the assumption underlying the analysis of Calfee and Craswell and Goetz, has a powerful incentive to drive at the socially optimal speed. If

she goes faster she becomes liable for all harm which occurs, including the harm which would have occurred even if she had driven at the socially optimal speed. And, she has no reason to go more slowly because it is unnecessary to do so to avoid all liability for harm to victims.

Legal error changes this calculation by introducing two possibilities: (1) Sometimes, even if the injurer drives at or below the socially optimal speed, she will be held liable for all harm which occurs. (2) Sometimes, even if the injurer exceeds the socially optimal speed, she will not be held liable.

To understand how these possibilities affect the choice of speed by the injurer it is necessary to analyze the decision process of an injurer seeking to adapt optimally to the possibility of legal error. The injurer wants to minimize the sum of two costs : (1) the costs of care to avoid causing harm (slowing down); and (2) expected liability. Expected liability, in turn, depends on the expected harm and the probability that the injurer will be held liable and be required to compensate victims for the harm done to them. Since expected liability depends both on harm caused and the probability of being held liable, and taking care (in the example, slowing down) affects both, the injurer considers both in deciding how much care to take (how fast to go).

The injurer first calculates the probability of being held liable at various speeds by anticipating the distribution of views as to what constitutes socially optimal speed which will be held by the decision makers to whom a claim for damages by a victim may be assigned. The probability of being held liable for going at any particular speed depends on the proportion of potential decision makers the injurer anticipates will conclude that socially optimal speed is less than the speed at which the car is driven. This is, of course, an exercise in prediction by the injurer with respect to the views that will be taken by judges and juries. The analysis simply shows how the behavior of the injurer will vary with her belief as to what the actual distribution of views will be.

The estimate of the injurer as to the probability of being held liable associated with various speeds becomes a crucial component in the injurers choice of the speed which is individually optimal because it will minimize the sum of the costs of care (slowing down) and expected liability. The analysis of the injurers choice of speed posits that the distribution of views of potential decision makers is such that the two possibilities noted above exist: (1) there is some probability that the injurer will be held liable even if the speed she chooses is at or below the social optimum; and (2) there is some probability that the injurer will not be held liable even if the speed she chooses exceeds the social optimum. More generally, it is posited that the lower (higher) the speed chosen the smaller (larger) is the probability of being held liable.

The first of these possibilities will tend to cause the injurer to choose too low a speed (take too much care) and the second to choose too high a speed (take too little care). The reason which induces the injurer to choose too low

a speed simply is that if there is some probability that liability will be imposed even if the socially optimal speed is chosen, it is individually beneficial for the injurer further to decrease her speed and, thus, reduce the probability of being held liable. If the benefit, in the form of reducing the probability of being held liable, exceeds the cost of additional slowing down it will be in the interest of the injurer to do so. Since, under the Goetz and Calfee and Craswell analysis, liability extends to all harm, whether or not it would have been prevented by taking socially optimal care, reductions in the probability of being held liable are very valuable and, as a result, the incentive to take excessive care very strong.

The way in which the probability that the injurer may *not* be held liable even if she drives faster than the social optimum causes the injurer to choose a speed higher than the social optimum is somewhat more subtle. Decreasing speed is privately beneficial to the injurer (the impact on the probability of being held liable aside) if it decreases either the probability of causing harm or the severity of that harm which does occur. This is so because, as noted above, expected harm is one component of expected liability. In this respect the private perspective of the injurer and the social perspective are identical. The probability that the injurer will not be held liable even if she chooses a speed which exceeds the social optimum, however, causes the private calculation of the injurer to depart from the social optimum. This is so because the private value of reducing expected harm is not the entire reduction but, rather, the reduction multiplied by the probability of being held liable. Thus, if, for example, a reduction in speed is evaluated as costing the injurer four dollars but reducing expected harm by six it is socially desirable that the reduction in speed occur. However, if there is only a 50 percent chance that the injurer will be held liable the injurer's private evaluation of the reduction in expected harm will be only three dollars and the injurer will prefer not to reduce speed even if it is socially desirable to do so.

Thus, in sum, legal error tends both to induce the driver to go too fast and too slowly. Which effect will dominate depends on the distribution of views of potential decisionmakers and the costs and benefits associated with different speeds. In general, absent great variance in the views of potential decisionmakers the tendency to go too slowly will dominate.

Kahan and Brady accept the conclusion of Calfee and Craswell and Goetz with respect to the impact of legal error in the form of failing to hold an injurer liable even though she has not taken optimal care. They agree that error of this kind will tend to cause injurers to take too little care (drive too fast). They, however, disagree with the conclusion that error in the form of holding injurers liable even though they have taken socially optimal care will induce injurers to take excessive care (drive too slowly).

The source of this disagreement is the difference between what is assumed to be the liability of an injurer for harm which would have occurred even if the injurer had taken the care she was legally required to take. Grady and Kahan

posit that the injurer is liable only for the harm which would not have occurred if legally mandated care had been taken. They demonstrate that, on this assumption, an injurer will not be induced to take more than socially optimal care even if she anticipates that legal error in the form of setting the required level above socially optimal care will occur.

Kahan chooses an example which makes his position both clear and persuasive. He hypothesizes a case in which the issue is the height of a fence which is required to be built to protect people from being hit by cricket balls. He illustrates the difference between his position and that taken by Calfee and Craswell and Goetz by asking whether a person who builds a fence which is lower than is legally required would be liable for injury resulting from a ball flying so high that it would have sailed over the legally required fence if it had been in place. It seems quite plausible to answer no to this question since the failure to build the fence has not caused the injury.

But Kahan argues that if this is so the anticipation of legal error in the form of imposing liability on a person who builds a fence which is of socially optimal height, on the erroneous premise that a higher fence is socially optimal, will not induce the building of the higher fence. He reasons as follows. Suppose, for example, that a socially optimal fence is ten feet high but decision makers conclude that it is eleven feet high and, as a result, impose liability if the socially optimal ten foot fence is built. Indeed, suppose that there is no distribution of views but that this error is made by all decision makers. Kahan concludes that even on this strong assumption the socially optimal ten foot fence will be built.

He arrives at this conclusion by asking whether the cost of increasing the size of the fence from ten feet to eleven feet will, from the perspective of the person deciding how high a fence to build, be justified by the associated reduction in expected liability. The essential premise underlying his answer to this question is that if the legally mandated eleven-foot fence is not built, liability is limited to harm resulting from balls which would not have gone over it. If the socially optimal ten-foot fence is built it will block all balls flying no higher than ten feet. Thus the benefit achieved by increasing the size of the fence from ten feet to eleven feet is to avoid liability for those balls which would have gone over a ten-foot fence but be blocked by an eleven-foot fence. Since it is assumed that the ten-foot fence is socially optimal the cost of increasing the size of the fence above ten feet must exceed the associated reduction in liability. As a result, the ten-foot, socially-optimal fence, and not the erroneously mandated eleven-foot fence, will be built.

#### **4. The Actual Consequences of Legal Error**

It is not clear the extent to which the Calfee and Craswell and Goetz analysis, or that of Grady and Kahan, better captures the consequences of legal error. In principle, the account of Grady and Kahan appears to be persuasive. It may be, however, that because application of this approach requires a determination of the question of what harm would have occurred even if required care had been taken, that the Calfee and Craswell and Goetz approach is taken when this question is particularly difficult to answer.

In the example used by Kahan it is easy to separate the harm which would have been prevented if different levels of care had been taken from that which would have occurred anyway. A ball flying so high that it would have gone over a fence of specified height is an easy concept to understand and apply.

The case of optimal speed for a car, and many others, are much more problematic. Suppose that a person is hit by a driver going faster than the required speed. It is true, and explicitly assumed in the standard analysis, that there will be some probability that the person would have been injured even if the driver had been going at or below the required speed. Taking this probability into account requires some means for distinguishing the harm which would have been prevented from the harm which would have occurred, if the required care had been taken. Moreover, the uncertainty as to exactly which victims would not have been harmed would require some probabilistic method of awarding damages such as has been proposed with respect to cases where uncertainty of damages is present (Shavell, 1987, p. 115).

All of this may simply be too complicated to be worth dealing with. In principle, the issue of what harm would have occurred to the particular plaintiff even if required care had been taken is present in all cases. Often, however, the issue is ignored and the injurer is held liable for all harm which occurs when she fails to take the care required by the governing rule. Thus the approach of Grady and Kahan may reflect actual practice when it is feasible to determine what harm would have occurred even if the required care had been taken and the approach of Calfee and Craswell and Goetz taken when it is not feasible to do so.

#### **5. The Impact of Litigation Costs**

In order to focus on the impact on the incentives of injurers of errors in determining the controlling legal standard the analyses so far considered all assume that litigation is costless. This assumption implies that all victims who have any chance of prevailing will sue.

If, however, the assumption of litigation being costless is relaxed, an injurer has available an additional strategy for reducing expected liability (Menel). A

victim will only sue if the expected recovery exceeds the cost of suing. Putting the possibility of strategic exploitation of the costliness of defense and uncertainty of outcome aside, the expected value of suing depends on the amount of damages which it is anticipated will be recovered and the probability of recovering. Although taking strategic possibilities into account complicates the analysis, it remains true that the probability of success is an important determinant of the value of a suit. Thus, if the victim-plaintiffs probability of success can be reduced, so, too, can the expected value of the action. If the expected value of the action can be reduced to an amount less than the costs of the suit, the suit will not be brought.

Since the probability of a plaintiff succeeding varies with the care taken (the speed at which the car is driven) the injurer can reduce her expected liability by choosing a level of care which reduces victims chances of success to so low a level that the expected value of suing becomes less than the cost of suing. As a result, increasing care (going more slowly) is individually beneficial for an injurer in that not only can it make it less likely that those victims who do sue will recover, but also it reduces the number of victims who have a sufficiently high chance of prevailing that they will sue.

## **6. Modeling the Compliance Decision as a Binary Choice**

There is a second body of scholarship which analyzes legal error using a different conceptual framework than the one discussed above (Png, 1986; Polinsky and Shavell, 1989; Kaplow, 1994a). Under this framework, a person is posited as making a binary choice between complying with the law and violating it. As a result of various mistakes that may be made, including error in deciding what the applicable law is, there is some probability that she will be held liable even if she complies with the law and some probability that she will be exonerated even if she violates the law. Both of these possibilities make the alternative of violating the law relatively more desirable for the person making the choice than would be the case in the absence of legal error or other factors leading to the guilty being exonerated or the innocent convicted. Thus legal error, under this conception, decreases deterrence in the sense that fewer people choose to comply with the law than would be the case in the absence of legal error.

This underdeterrence result appears on first impression to be inconsistent with the overdeterrence, or excessive compliance, result reached by Calfee and Crosswell and Goetz. The difference is, however, explained by the different way in which the compliance decision is conceptualized under the two approaches. As Calfee and Crosswell and Goetz (and indeed Grady and Kahan) frame the question the compliance decision is a continuous one of choosing the optimal



amount which should be done to avoid causing harm. The individual optimum is determined by the effectiveness of care in reducing expected harm and the probability of being held liable associated with different levels of care. In this framework overdeterrence means that individuals take excessive care and underdeterrence that individuals take too little care. By contrast, under the view which conceives of the compliance choice as a binary one, there can be no overdeterrence and underdeterrence which means that some people choose to violate rather than comply.

The essential difference between the two approaches derives from two interrelated consequences of positing the compliance choice as a binary one: (1) the person making a compliance choice cannot adapt her behavior to the legal system by taking into account the variations in the probability of being held liable associated with doing more or less to avoid the harm which the legal rule is designed to prevent. (2) Under the binary approach error consists of imposing liability on the innocent or convicting the guilty. There is no place in the analysis for different magnitudes of error. Under the continuous approach, however, legal error consists of arriving at a standard which departs from the social optimum. There are, consequently, more or less egregious errors, depending on how far the standard departs from the social optimum. Moreover, the magnitude and frequency of these errors matter because the person making a compliance choice takes them into account in choosing how much will be done to avoid causing the harm which the legal rule is designed to prevent. It is in this process of adaptation that the incentive to overcomply arises. By doing more than is socially optimal the probability of being held liable can be reduced. This possibility is not taken into account when the compliance choice is posited as a binary one.

### **7. The Existing Evidence as to the Incidence of Legal Error and its Impact on the Incentives of Injurers**

The analysis of legal error provides insights essential to an understanding of legal systems. It is clear that policy objectives cannot be achieved by enlisting decision makers who will make no mistakes. Deciding what behavior is reasonable (or some equivalent term), in various circumstances, is not a simple undertaking and sometimes a defendant will be asked to do too much to avoid the harm the rule is designed to avoid and sometimes too little. The adaptation of injurers and victims to the inevitability of error by judges and juries constitutes an essential part of the process through which law affects behavior. Positive and normative analysis which ignores this adaptation to the expectation of error is seriously incomplete.

The analysis of legal error is particularly useful in providing a means for understanding and evaluating various procedural features. Most fundamentally, under all of the analyses discussed above, legal error causes the behavior of persons subject to a legal regime to depart from the social optimum. A change in the system which reduces error will, consequently, cause behavior better to conform to the social optimum. It is thus possible to decide whether the change should be made by comparing its costs with the value of the associated improvement in behavior. The analysis of legal error also provides another perspective for evaluating the costliness of litigation. In general, the higher the costs which a victim must incur in suing an injurer the greater must the probability of success be for the victim to sue. The greater the probability of success which must exist before a victim will sue, the greater are the opportunities for injurers to decrease their expected liability by choosing a compliance strategy which reduces the victims chances of succeeding below the level required for suit to be brought.

Although the analysis of legal error thus offers the possibility of better understanding a legal system, the subtlety and complexity of the analysis make it very difficult to utilize to predict outcomes in particular circumstances or make concrete proposals for legal reform. Theoretical analysis teaches that outcomes depend on: (1) the distribution of views of potential decision makers as to what an injurer must do to avoid causing harm in order to escape liability; (2) the controlling rule as to whether an injurer is liable for harm which would occur even if required care had been taken; (3) the costliness of litigation to injurers and victims and (4) the information that injurers and victims have about each of the first three factors and that victims have about what injurers know and injurers have about what victims know.

To predict how a change in the system will affect the universe of outcomes one must somehow gain reliable answers to these factual questions and properly analyze the complex adaptations which would occur if the system were changed.

At the present time, it seems fair to say that the analysis of legal error constitutes a fundamental aspect of our understanding of how legal systems function. It has, however, so far yielded neither useful predictions of outcomes nor the foundation for specific proposals for reform.

#### **Bibliography on Legal Error (0790)**

- Ben-Shahar, Omri (1995), 'Informed Courts, Uninformed Individual and the Economics of Judicial Hindsight', *151 Journal of Institutional and Theoretical Economics*, 613-630.
- Bouckaert, Boudewijn and Schäfer, Hans-Bernd (1995), 'Mistake of Law and the Economics of Legal Information', in Bouckaert, Boudewijn and De Geest, Gerrit (eds), *Essays in Law and Economics*

- II: Contract Law, Regulation, and Reflections on Law and Economics*, Antwerpen, Maklu, 217-245.
- Bundy, Stephen M. (1994), 'Valuing Accuracy: Filling out the Framework: Comment', **23** *Journal of Legal Studies*, 411-433.
- Calfee, John E. and Craswell, Richard (1984), 'Some Effects of Uncertainty on Compliance with Legal Standards', **70** *Virginia Law Review*, 965-1003.
- Craswell, Richard and Calfee, John E. (1986), 'Deterrence and Uncertain Legal Standards', **2** *Journal of Law, Economics, and Organization*, 279-303.
- Goetz, Charles J. (1984), *Law and Economics: Cases and Materials*, St. Paul, West Publishing.
- Good, I.J. and Tullock, Gordon (1984), 'Judicial Errors and a Proposal for Reform', **13** *Journal of Legal Studies*, 289-298.
- Grady, Mark F. (1988), 'Discontinuities and Information Burdens: Review of the Economic Structure of Tort Law by William M. Landes and Richard A. Posner', **56** *George Washington Law Review*, 658-pp.
- Grady, Mark F. (1989), 'Untaken Precautions', **18** *Journal of Legal Studies*, 139-156.
- Graham, John D. and Wiener, Jonathan Baert (1995), *Risk vs. Risk: Tradeoffs in Protecting Health and the Environment*, Cambridge, MA, Harvard University Press.
- Gravelle, Hugh S.E. (1983), 'Judicial Review and Public Firms', **3** *International Review of Law and Economics*, 187-205.
- Hylton, Keith N. (1990), 'Costly Litigation and Legal Error under Negligence', **6** *Journal of Law, Economics, and Organization*, 433-452.
- Kahan, Marcel (1989), 'Causation and Incentives to Take Care under the Negligence Rule', **18** *Journal of Legal Studies*, 427-447.
- Kaplow, Louis (1994a), 'The Value of Accuracy in Adjudication: An Economic Analysis', **23** *Journal of Legal Studies*, 307-401.
- Kaplow, Louis (1994b), 'Optimal Insurance Contracts when Establishing the Amount of Loss is Costly', **19** *Geneva Papers on Risk and Insurance*, 139-152.
- Kaplow, Louis and Shavell, Steven (1994), 'Accuracy in the Determination of Liability', **37** *Journal of Law and Economics*, 1-15.
- Kaplow, Louis and Shavell, Steven (1996), 'Accuracy in the Assessment of Damages', **39** *Journal of Law and Economics*, 191-209.
- Katz, Avery and Beckner, Clinton F., III (1995), 'The Incentive Effects of Litigation Fee Shifting when Legal Standards are Uncertain', **15** *International Review of Law and Economics*, 205-224.
- Kobayashi, Bruce H. and Lott, John R., Jr (1992), 'Low Probability-High Penalty Enforcement Strategies and the Efficient Operation of the Plea Bargaining System', **12** *International Review of Law and Economics*, 69-77.
- MacKaay, Ejan (1979), 'Les Notions Floues ou l'Économie de l'Imprécision (Fuzzy Concepts or the Economics of Imprecision)', **12** *Langages*, 33-50.
- MacKaay, Ejan (1980), 'Le Nozione "Fluide" Ovvero l'Economia Dell'Imprecisione (Fuzzy Concepts or the Economics of Imprecision)', *Informatica e Diritto*, 253-274.
- Ortiz, Daniel R. (1994), 'Neoaetuarialism: Comment', **23** *Journal of Legal Studies*, 403-409.
- Png, Ivan Paak-Liang (1986), 'Optimal Subsidies and Damages in the Presence of Judicial Error', **6** *International Review of Law and Economics*, 101-105.

- 
- Polinsky, A. Mitchell (1989), *An Introduction to Law and Economics (2nd edn)*, Boston, Little Brown.
- Polinsky, A. Mitchell and Shavell, Steven (1989), 'Legal Error, Litigation, and the Incentive to Obey the Law', **5** *Journal of Law, Economics, and Organization*, 99-108.
- Rasmusen, Eric (1995), 'Predictable and Unpredictable Error in Tort Awards: The Effect of Plaintiff Self Selection and Signaling', **15(3)** *International Review of Law and Economics*, 323-345.
- Shavell, Steven (1987), *Economic Analysis of Accident Law*, Cambridge, MA, Harvard University Press.
- Stith, Kate (1990), 'The Risk of Legal Error in Criminal Cases: Some Consequences of the Asymmetry in the Right to Appeal', **57** *University of Chicago Law Review*, 1-61.