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### Lawyer Decisionmaking and Threshold Analysis

Stuart S. Nagel

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# University of Miami Law Review

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## Lawyer Decisionmaking and Threshold Analysis

STUART S. NAGEL\*

I. INTRODUCTION .....	615
II. GO/NO-GO DECISIONS: HANDLING ONE MISSING VARIABLE AT A TIME .....	617
A. <i>Determining Predicted and Threshold Damages</i> .....	617
B. <i>Determining Predicted and Threshold Probabilities of Victory</i> .....	618
C. <i>Determining Threshold Contingent Fees</i> .....	619
D. <i>Determining Predicted, Threshold, and Optimum Hours</i> .....	620
E. <i>Determining Actual, Threshold, and Derived Hourly Worth</i> .....	621
III. GO/NO-GO DECISIONS: HANDLING MORE THAN ONE MISSING VARIABLE AT A TIME .....	622
A. <i>Two Missing Variables</i> .....	622
B. <i>Three or More Missing Variables</i> .....	625
IV. CONFLICTING CHOICE DECISIONS: CHOOSING BETWEEN CLIENTS OR PROJECTS .....	627
A. <i>The Basic Comparisons</i> .....	627
B. <i>Missing Variables and Multiple Cases</i> .....	628
V. EXTENDING THE ANALYSIS TO OTHER FORMS OF LAWYER OR JUDICIAL DECISION-MAKING .....	630
A. <i>Deciding Whether to Accept a Settlement or Go to Trial</i> .....	631
B. <i>Deciding Whether to Release or Hold a Defendant Before Trial</i> .....	634
C. <i>Deciding How to Increase Police Legality in Making Searches</i> .....	636
VI. SOME CONCLUSIONS .....	639

### I. INTRODUCTION

Lawyers must frequently decide whether to do a particular act, such as accepting a client. This can be called a go/no-go decision. Lawyers must also frequently choose between alternative projects, such as accepting client A rather than client B. This can be called a conflicting-choice decision. When making both kinds of decisions, lawyers (like decisionmakers in general) may lack information on key components of the benefits or the costs of the

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alternatives.

This Article discusses how, in the absence of accurate benefit-cost information, lawyer decisionmaking can be more accurate. The method involves determining a threshold value for each missing component or set of components. In go/no-go decisions, if the perceived value exceeds the threshold value, the decision should be affirmative; otherwise, it should be negative. A similar analysis applies to conflicting-choice decisions.<sup>1</sup>

To illustrate threshold analysis, a good example is deciding whether to accept a personal injury client on a contingent fee basis. One can reason by analogy to other go/no-go situations. The client acceptance situation involves basically five variables:

1. The damages likely to be awarded (D); for example, \$10,000;
2. The probability of winning (P); for example, .60, which means 6 out of 10 cases like this tend to win, and 4 out of 10 tend to lose;
3. The contingent fee rate (F), which is usually 33% or .33;
4. The number of hours the case is likely to take (H); for example, 40; and
5. The dollar rate per hour at which the attorney values his or her time (R); for example, \$30.

In light of the above hypothetical data, the expected gross income from this case would be \$2,000 on the average. That amount is arrived at by reasoning that if there were 10 cases like this, 6 would result in about \$10,000 apiece in damages, and 4 would result in no liability and thus \$0 in damages. If we add those 10 amounts, we get \$60,000. If we divide by 10 for the average, we get \$6,000. We could arrive at the \$6,000 amount more quickly by just multiplying or discounting the \$10,000 by .60, which is the probability of the \$10,000 being received. With that expected, discounted, or average value of \$6,000, we then apply or multiply the .33 contingent fee to arrive at the \$2,000 average gross income from a case like this.

Continuing to use the above data, the expected expense in-

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1. On threshold analysis in general, see B. BAIRD, *INTRODUCTION TO DECISION ANALYSIS* 415-45 (1978); E. BUFFA & J. DYER, *MANAGEMENT SCIENCE/OPERATIONS RESEARCH* 69-74 (1981); P. DASGUPTA, *GUIDELINES FOR PROJECT EVALUATION* 250-59 (1972); C. MOORE, *PROFITABLE APPLICATIONS OF THE BREAK-EVEN SYSTEM* (1971); S. NAGEL, *PUBLIC POLICY: GOALS, MEANS, AND METHODS* (1983); S. RICHMOND, *OPERATIONS RESEARCH FOR MANAGEMENT DECISIONS* 535-40 (1968).

volved in the case would be about \$1,200. That simply represents 40 hours multiplied by the \$30 rate per hour. There may be other fixed costs such as office rent, but those costs must be paid regardless whether we accept this hypothetical client. There may be variable costs besides the lawyer's time, but they tend to be less important, especially for illustrative purposes. If the expected income is \$2,000 and the expected expense is \$1,200, this hypothetical case involves an expected profit of \$800.

## II. Go/No-Go DECISIONS: HANDLING ONE MISSING VARIABLE AT A TIME

### A. *Determining Predicted and Threshold Damages*

To predict damages in a particular case, we can obtain data on many previous cases of a similar type, add the damages awarded in them, and divide by the number of cases. This kind of information is available in loose-leaf services provided by research firms such as the Jury Verdict Research Corporation. There are more sophisticated prediction methods that classify cases by various precise scales; there are also less sophisticated methods that rely on some simple rule of thumb, such as multiplying actual medical expenses or lost wages by a set factor. All the prediction methods, however, generally have a substantial margin of error.

We need a method for making meaningful go/no-go decisions when we are not certain what the damages awarded or some other key components are likely to be. An especially useful approach is to value all of the components that are relatively easy to assess, and then determine the threshold value for the component that is the most difficult to assess. Suppose that component in this case is the damages (D) to be awarded. Determining a threshold value for D involves the following steps:

1. Express the problem in terms of a threshold equation. That equation defines a point where income equals cost—a break-even point. In our example, the threshold equation would be  $(D)(P)(F) = (H)(R)$ :<sup>2</sup> Expected income is represented by the product of the damages, probability of success, and contingent fee rate; expected cost is the product of the hours of work involved and the hourly rate

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2. Remember that D equals damages; P, the probability of winning; F, the contingent fee rate; H, the number of hours the case is likely to take; and R, the dollar rate per hour at which the attorney values his time. See *supra* p. 616.

at which the lawyer values his time.

2. Substitute numbers for the variables for which we have numerical information. That converts the equation into  $(D)(.60)(.33) = (40)(30)$ .

3. Isolate the unknown variable from the relatively known ones. In this equation, that means dividing both sides of the equation by  $(.60)(.33)$ ; doing so converts it to  $(D) = (40)(30)/(.60)(.33)$ .

4. Simplify the equation; the result is  $D^* = \$6,000$ . We put a star next to  $D$  to show that it is the threshold value of the damages awarded.

A threshold damages figure of \$6,000 means that if the perceived damages are greater than \$6,000, we should take the case because it promises to be profitable, assuming that the other figures are reasonably accurate. If the perceived damages are less than \$6,000, we should reject the case as not being profitable. Deciding whether the damages are likely to exceed a given threshold is generally easier than deciding exactly what the damages are likely to be.

#### B. *Determining Predicted and Threshold Probabilities of Victory*

To determine the probability of victory in a given case, we can obtain data on many previous, similar cases and observe how many of those cases were won by the party in the position of our client. The probability of victory is the percentage of cases won by that party expressed as a decimal. This kind of information is generally available in the same loose-leaf services that provide information on predicted damages. Nonetheless, a particular case probably can be classified in a variety of categories, each with a different probability of victory. Combining those probabilities may involve sophisticated mathematical analysis. The probabilities usually cannot be multiplied together because that implies each category is independent. In reality, there may be varying degrees of overlap among the categories. The loose-leaf services can be helpful in giving probabilities for frequently occurring combinations, but even with that kind of good information, there may still be considerable subjectivity in categorizing the cases.

In light of the difficulty of determining the probability of victory, this variable is usually the one that is most in need of threshold analysis. Applying the same hypothetical variables used above,

but treating the victory probability as our unknown, we can determine the threshold victory probability to be 36%. We arrive at that figure by following the same general steps used to compute a threshold damages figure. The first step is the same because the threshold equation in this situation is  $(D)(P)(F) = (H)(R)$ , regardless which variable we consider to be unknown. In the second step we substitute numbers for the relatively certain variables, which converts the equation into  $(\$10,000)(.33)(P) = (40)(30)$ . Next, we express P in terms of the known facts, which means  $P = (40)(30)/(\$10,000)(.33)$ . Finally, we simplify the right side of that equation, which reveals that the threshold probability of victory ( $P^*$ ) equals .36. If we consider the probability of victory to be greater than one in three, we should take the case, since the expected income outweighs the expected costs. If we consider the probability to be less than one in three, we should reject the case.

No matter how rational we are in betting on the averages, we can go wrong in any given case because individual cases are not necessarily at the average. Our hypothetical case looks profitable to the extent that the expected income is \$800 more than the expected expense. Nevertheless, even if all our numbers are accurate, we can still lose by taking the case since our numbers tell us that four out of ten of these cases result in defeat for the party in our client's position. On the average, however, it would make sense to take these cases. If we have a large number of such potential clients, we will come out ahead by accepting them. Similarly, if we have a small number of these cases, we may come out behind because we may be unlucky enough to have one of the losers. The safest and most reasonable approach in any given case is to assume that it is an average case unless we know otherwise.

### C. *Determining Threshold Contingent Fees*

The .33 contingent fee rate was considered virtually fixed before the United States Supreme Court held that bar associations minimum fee schedules violated the antitrust laws.<sup>3</sup> Now those rates and other lawyer fees can be set by individual lawyers in light of profit-and-loss considerations. If a lawyer knows roughly the damages, the victory probability, the hours, and the value per hour, he can determine what contingent fee rate to charge to make the case profitable. Treating the contingent fee rate (F) as the un-

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3. See *Goldfarb v. Virginia State Bar*, 421 U.S. 773, 792-93 (1975); see also *Arizona v. Maricopa County Medical Soc'y*, 102 S. Ct. 2466, 2475-76 (1982).

known in the hypothetical data used above, we can determine the threshold rate with the equation  $(F) = (H)(R)/(D)(P)$ . When we substitute the appropriate figures, the result becomes \$1,200/\$6,000 or 1/5. Written as a decimal, the threshold contingent fee rate is therefore 20%.

Knowing what the threshold contingent fee is can be useful to a lawyer faced with a client who has been made an offer by another lawyer. For example, in the above case the lawyer quotes the client a .33 contingent fee. The potential client may say that he has been offered a .25 contingent fee arrangement by a lawyer down the street. As a competitive lawyer faced with the above facts, you could offer a .20 contingent fee arrangement and still make the case profitable. Some lawyers may consider it beneath their dignity to vary their prices, but the legal profession is an increasingly competitive one; threshold analysis, when the fee is the threshold variable, enables lawyers to be competitive in a more systematic way.<sup>4</sup>

#### D. *Determining Predicted, Threshold, and Optimum Hours*

It would be helpful if the loose-leaf services also provided the kind of information we need to determine the number of hours necessary to handle a particular type of case. As of now, they only provide information on damages awarded and probabilities of victory for various types of cases because that type of information is available by analyzing court records. To determine how many hours each side expended in a given case would require asking the attorneys of record; they could probably provide that information with reasonable accuracy, since most attorneys do keep good time records. Attorneys in future cases could then estimate predicted time consumption by checking the loose-leaf service in the same way they check for predicted damages and probabilities. In the absence of such systematic information, attorneys tend to rely on their personal experiences, their memories, and less systematic ways of categorizing cases than a loose-leaf service might be able to provide.

When the number of hours of work a particular case requires is uncertain, one can make hours the threshold variable. Doing so with our hypothetical data means determining the number of

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4. For further discussion of the contingent fee client, see F. MACKINNON, *CONTINGENT FEES FOR LEGAL SERVICES* (1964); Clermont & Currivan, *Improving on the Contingent Fee*, 63 *Cornell L. Rev.* 529 (1978); Nagel, *Attorney Time Per Case: Finding an Optimum Level*, 32 *U. FLA. L. REV.* 424 (1980); Schwartz & Mitchell, *An Economic Analysis of the Contingent Fee in Personal Injury Litigation*, 22 *STAN. L. REV.* 1125 (1970).

hours by which \$30 has to be multiplied to equal the \$2,000 expected fee in this case. That means dividing \$2,000 by \$30. The threshold number of hours is thus 67 hours. If the lawyer thinks that this case is going to take more than 67 hours, he should reject it.

The hours variable has a unique characteristic. It is the only variable that has a causal influence on the other variables. The number of hours that the lawyer spends on the case can influence the damages awarded and the probability of victory. To determine the optimum number of hours (as contrasted to the predicted or threshold number of hours), we need an equation in which damages are statistically related to hours. We can formulate such an equation by gathering data from many cases as to the damages awarded, the victor, and the number of hours the attorney expended. We can then plot the relation between damages awarded and hours expended on a two-dimensional graph. Doing so will probably yield an S-shaped curve. At first, additional attorney time has little effect on the damages award. As the time invested increases, the curve gets steeper reflecting larger awards. Eventually the curve levels off as awards reach their theoretical maximum.

A similar curve results when we relate victory probabilities to hours expended. A composite curve can show predicted damages awarded, discounted by predicted probabilities. One can superimpose that curve on a line relating time costs to hours expended. That line should slope upwards as increased hours reflect a higher aggregate cost. The optimum number of hours is at the point where there is a maximum positive difference between the discounted damages-awarded curve and the time-cost line.<sup>5</sup>

#### *E. Determining Actual, Threshold, and Derived Hourly Worth*

The easiest way to determine one's hourly worth is to observe what the market is paying for an hour of lawyer time in one's type of law practice. That figure, however, represents what clients consider the lawyer's time to be worth, not what the lawyer considers his time to be worth to himself. A good test of how much a lawyer considers his own time to be worth is to ask him how much he would be willing to pay another lawyer to free him from an hour's worth of work. If the market figure is \$50 an hour, but a lawyer would not buy an hour of free time for more than \$30, he is effec-

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5. See Nagel, *supra* note 4, at 428.



tively saying that he considers his time to be worth about \$30 an hour.

Even if a lawyer is operating at the threshold in a case, he is still coming out ahead if he is covering his hourly worth. A lawyer in a contingent fee case wears two hats: one hat is that of a stockholder in himself who gets profits in a case only if the income exceeds the expenses; the other hat is that of a wage earner in the firm who gets full wages if his labor expenses are covered, even though the income in the case equals the expenses.

The hourly rate may be the least subjective of the five variables if it is determined by looking to the market rate. If the hourly rate is questioned, one could determine the threshold rate. In our hypothetical facts the threshold rate is \$2,000 divided by 40 hours, or \$50. The lawyer should take the case if he believes his time to be worth less than \$50 an hour.

We can also use this analysis to compute how lawyers value their time. That might involve presenting lawyers with hypothetical cases and estimated time investment for each case. The lawyers would then be asked whether they would accept the client in each case. By observing which cases they accept, we can reason at what rate they value their time. We could use the same analysis to determine how lawyers perceive damages, probabilities, or hours. Results obtained through the use of this analysis with hypothetical data will actually be more accurate than a guarded response to a direct inquiry into the personal values of the lawyer.

### III. GO/NO-GO DECISIONS: HANDLING MORE THAN ONE MISSING VARIABLE AT A TIME

#### A. *Two Missing Variables*

Often in go/no-go decisions such as accepting a contingent client, there is only one variable to which threshold analysis is particularly applicable because that variable is especially difficult to assess. There are, however, many situations when there are two or more such variables. For example, in deciding whether to accept a contingent client, we may be unable to predict with reasonable accuracy either the damages awarded or the victory probability.

A good way to handle that problem is to draw a simple graph, as in Figure 1, showing the relations between the two unknown variables, while holding constant the known variables. The vertical axis shows potential probabilities of victory (P), and the horizontal axis shows the possible damages (D). We know the victory

probability cannot be less than 0 or more than 1.00. We know the damages variable cannot be less than 0, and we probably know roughly its reasonable maximum; in this case it may be \$20,000.

*Accepting or Rejecting a Client—Two Missing Variables*

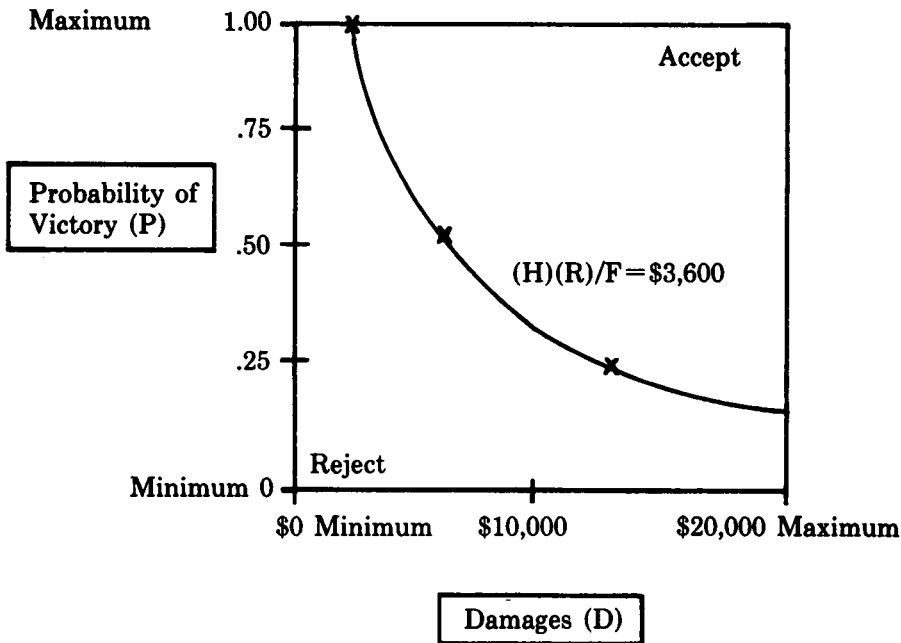


FIGURE 1

We also know that at the threshold the following statements are true:

1.  $(P)(D)(F) = (H)(R)$  (the basic threshold equation);
2.  $(P)(D) = (H)(R)/F$  (isolating the unknown variables on the left side of the equation);
3.  $(P)(D) = (40)(\$30)/(.333)$  (substituting our hypothetical data for the known variables);
4.  $(P)(D) = \$3,600$  (simplifying the right side); and
5.  $P = \$3,600/D$  (expressing one unknown in terms of the other)

With that last simple equation, we can substitute values for D and determine the corresponding values for P. For example, when

D is \$3,600, P is 1.00. When D is twice \$3,600 (or \$7,200), P is .50. Likewise, when D is four times \$3,600 (or \$14,400), P is .25. Each of those three points is shown as an "x" on Figure 1. By connecting those points together, we have a curve showing the relation between victory probability and damages when  $F = .33$ ,  $H = 40$ , and  $R = \$30$ , and thus  $(H)(R)/F = \$3,600$ . Note that the curve looks like a child's slide, indicating that as the damages move up (i.e., to the right), the victory probability goes down if we are going to continue to be at the threshold where income equals expenses. Likewise, as the victory probability goes up, the damages go down to keep P times D equal to \$3,600.

Note further that the upper right-hand corner of the graph is where we would like to be because both the damages and the probability of victory are high. That is the accept region. The lower left-hand corner is where we would *not* like to be because the damages and the probability of victory are low. That is the reject region. The object now is to try to draw a big circle or other shape on the graph where the combination of damages and victory probability is likely to be. If that circle is mostly above the curve showing  $(H)(R)/F = \$3,600$ , then accept the client or adopt the go/no-go project. If that circle is mostly below the curve showing  $(H)(R)/F = \$3,600$ , reject the client.

Thus, the problem reduces to a relatively simple graph that can serve as a visual aid to determining whether P times D is more or less than  $(H)(R)/F$ , even though we do not know the exact location of P, D, or P times D. The same analysis can be applied to situations where we do not know the value of any two of the five or so variables. We simply go through the following more general steps:

1. Draw a two dimensional graph showing one of the two unknowns on the vertical axis and the other unknown on the horizontal axis. Each axis should extend from the reasonable minimum of the variable to the reasonable maximum.
2. Express one of the two unknowns in terms of the other while holding the relatively known variables constant, as was done in the five steps above.
3. Use that equation to plot several points on the graph. Connect the points together to create a threshold curve; sometimes it may be a straight line. That curve shows the relations between the two unknowns, holding the other variables constant.

4. Using that graph, try to approximate the location of the combination of the two unknown variables. If that combination is on the accept side of the threshold curve, adopt the project. If that combination is on the reject side, decline the project.

*B. Three or More Missing Variables*

Suppose we change the problem to provide for three unknown variables. The three most likely to be unknown are the damages, the probability of victory, and the hours needed to handle the case. Should we accept a client in a .33 contingent fee case when we consider our time to be worth \$30 an hour, but when we do not know the damages that are likely to be awarded, the probability of victory, or the number of hours needed? That sounds like an impossible problem, with virtually no information on which to base a decision.

Nevertheless, even this kind of problem may provide sufficient latent information that can be gleaned through proper examination. The only change needed in Figure 1, which dealt with two unknowns, is to draw a pair of threshold curves rather than a single threshold curve.

*Accepting or Rejecting a Client—Three or More Missing Variables*

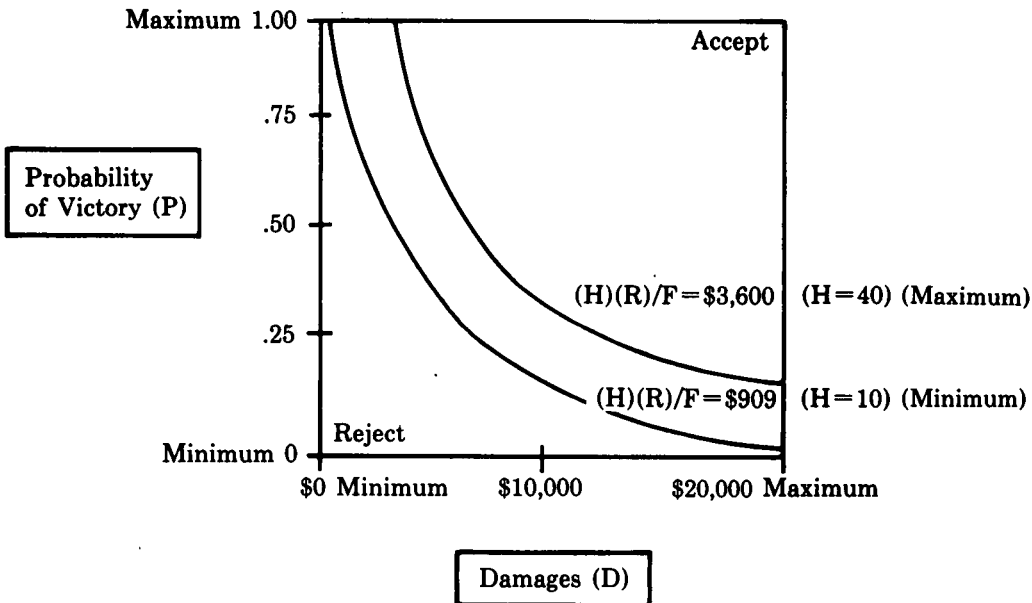


FIGURE 2

Drawing a pair of threshold curves requires an approximate idea of the maximum number of hours (which in this case may be about 40 hours) and the minimum number of hours (which in this case may be about 10 hours). At 10 hours, the  $(H)(R)/F$  amount is  $(10)(30)/(.333)$ , or \$900. We can then plot a curve for  $P = \$900/D$ , just as we previously plotted a curve for  $P = \$3,600/D$ , as is shown in Figure 2. The two curves will be parallel: the upper curve will correspond to the maximum value of  $H$ , and the lower curve will correspond to  $H$ 's minimum value. Note that as the number of hours goes down, the reject region becomes smaller.

As before, the object now is to draw a big circle or other shape on the graph where the combination of damages and victory probability is likely to be. If that circle is mostly above the maximum hours curve, accept the client. If that circle is between the minimum and maximum hours curves, we can assume that we are operating near the threshold of zero profits. When dealing with one, two, or three unknowns, we may sometimes find ourselves operating at the threshold. Under those circumstances, we can either flip a coin to decide, or we can seek additional information to assess the variables more accurately.

Seldom is one faced with a go/no-go decision involving more than three unknown variables. If there were a fourth unknown variable in this client acceptance situation, it would probably be the hourly rate. When we had one unknown variable, we talked in terms of a threshold point. With two unknown variables, it was a threshold curve. With three unknowns, it was a pair of threshold curves or a threshold band. With four unknowns, we need two graphs like the one in Figure 2. The first graph works with the minimum value on the fourth variable, which might be \$20 an hour. The second graph works with the maximum value on the fourth variable, which might be \$50 an hour. We then draw our rough circle on each graph as to where  $P$  and  $D$  might be. If the circle is mostly in the accept regions on both graphs, we should accept the client. If it is mostly in the reject regions, we should reject the client. This kind of analysis can be extended to five or more unknown variables by using two sets of paired graphs, rather than just a pair of graphs, a band, a curve, or a point. Each set of graphs works with a different minimum or maximum value for an unknown variable. That, however, is primarily of academic interest, because practical situations seldom involve more than three unknown variables.

#### IV. CONFLICTING-CHOICE DECISIONS: CHOOSING BETWEEN CLIENTS OR PROJECTS

##### A. *The Basic Comparisons*

Conflicting-choice decisions involve more than one client or project, as contrasted to go/no-go decisions that involve deciding on a single client or a single project. When multiple clients or projects are involved, one can apply a similar kind of threshold analysis for making comparisons and for dealing with unknown variables. Suppose we consider our previous hypothetical client to be client *A*. We now want to introduce client *B*. This client's case has the following characteristics:

1. Damages likely to be awarded are \$16,000.
2. Probability of winning is about .20.
3. The contingent fee is still .33.
4. The number of hours is only 15.
5. Our hourly worth is still \$30.

Assume that we have only 40 hours available. Which client should we accept? We cannot accept them both, since that would consume 55 hours and we only have 40 hours. At first glance, client *A* looks like the better client because he generates a profit of \$800 with \$2,000 in expected gross income and \$1,200 in expected expenses. Client *B* generates a profit of only \$606 with \$1,056 in expected gross income and \$450 in expected expenses.

We should note that with client *B*, however, we would have an extra 25 hours available, since client *B* requires only 15 of our 40 hours. Client *B* would thus be the better client if we could invest that remaining 25 hours to generate more than \$194 profit. The \$194 is the difference between the \$800 profit of client *A* and the \$606 profit of client *B*. In order for our remaining 25 hours to generate \$194 in profit, those hours would have to average about \$8 apiece in profit because \$194 divided by 25 hours is about \$8. That means those hours would have to average \$38 apiece in income because our time is worth \$30 an hour. All this assumes we expend the whole 25 hours to get the \$194 threshold profit. We have a threshold profit of \$194 overall, a threshold profit of \$8 an hour, a threshold income per hour of about \$38, and a threshold income of about \$950 overall (25 hours times \$38). If the remaining 25 hours can generate profit that will exceed those thresholds, client *B* is the better client. With income and profit in this context, we can also include the monetary value of the satisfaction we might get from

going fishing or doing non-lawyering things with that remaining 25 hours.

### B. *Missing Variables and Multiple Cases*

We have just discussed choosing between clients when we have complete information for each client on damages, victory probability, contingent fee, hours, and hourly rate. Suppose one of those five variables for either client is missing. What do we do then? More specifically, suppose that we do not know the damages for client *B*. An appropriate set of steps to follow would be:

1. Indicate the threshold equation when both clients are equally profitable. In this context it is  $(D)(P)(F) - (H)(R) = (d)(p)(f) - (h)(r)$ , where the capital letters are the variables for client *A*, and the lower case letters are the variables for client *B*. The left side of the equation expresses the profit for client *A*, and the right side expresses the profit for client *B*.
2. Insert numbers for all the known information. Our hypothetical figures convert the equation into  $(\$10,000)(.60)(.33) - (40)(\$30) = (d)(.20)(.33) - (15)(\$30)$ , which simplifies to  $\$800 = (d)(.066) - (\$450)$ .
3. Isolate the unknown variable on the right side of the equation, which reduces to  $d = \$1250/.066$ .
4. Simplify the numbers on the left side of the equation. We thereby obtain the threshold value of the unknown damages: \$18,750. This means that if the damages in client *B*'s case could somehow get above \$18,750, instead of being \$16,000, client *B* would be the more profitable client.

We can logically extend the above analysis to any missing variable in the threshold equation of  $(D)(P)(F) - (H)(R) = (d)(p)(f) - (h)(r)$ .

We can also apply the analysis to two or more missing variables by using the same graphing approach for dealing with two missing variables as was used in go/no-go decisions, as demonstrated in Figure 3. Suppose, for example, that we do not know the damages for either client *A* or *B*. Deciding which is the more profitable client might involve the following steps:

1. Draw a two-dimensional graph with possible client *A*'s damages (*D*) on the vertical axis and possible client *B*'s damages (*d*) on the horizontal axis.
2. Express *D* in terms of *d*, holding constant all the other

variables by inserting their numerical values into the threshold equation. Doing that means working with a basic equation of the form  $(D)(.60)(.33) - (40)(\$30) = (d)(.20)(.33) - (15)(\$30)$ . It simplifies algebraically to  $D = \$3,787 + .33(d)$ .

*Choosing Between Two Clients—Two or More Missing Variables*

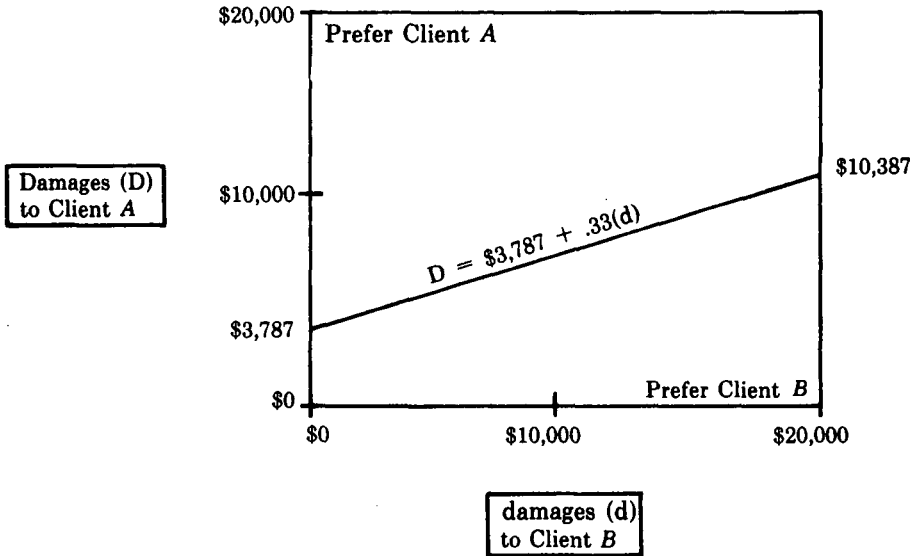


FIGURE 3

3. Plot a few points using that equation. Connect them together to form a threshold curve, which in this case is a straight line. The upper left-hand corner of the graph is the region for preferring client A, and the lower right-hand corner is the region for preferring client B.
4. Try to draw a circle that encompasses where the combination of D and d are likely to be. If that circle is above the threshold line, choose client A. If that circle is below the threshold line, choose client B.

We can extend the above analysis to any pair of missing variables or any set of three or more missing variables using the same general methods discussed under go/no-go decisions.

The analysis is also helpful when we are considering multiple alternatives. Suppose, for example, that we have potential client C,



and that we are still operating in the mutually exclusive context. We can use the above comparison methods for choosing between clients *A* and *B*. If client *A* is preferred, we compare client *A* with client *C*. Whoever wins that comparison is the overall preferred client. That same system of a series of successively paired comparisons can be applied to any number of cases or projects, with the last uneliminated one being the preferred choice.

The above analysis involves mutually exclusive clients or projects. An alternative and possibly more typical situation involves choosing the best combination of clients or projects when they are not mutually exclusive, but not all of them can be adopted. A procedure for arriving at sound decisions in these situations is to:

1. Determine what all the possible combinations are;
2. Determine the expected income, expense, and profit for each combination; and
3. Pick the combination that will be the most profitable. This may require going through a set of paired comparisons using threshold analysis, because some of the combinations may involve unknown variables and each combination may require a different number of hours or resources.

Simply picking the combination that is the most profitable by virtue of their net profits is not prudent, just as it was not necessarily wise to pick client *A* over client *B* simply because client *A* generates more profit than client *B*. As previously shown, client *B* could be more profitable if client *B* involved fewer hours or resources that could be invested elsewhere to yield enough profit to offset the additional profit from client *A*. The same is true with combinations of clients or projects.<sup>6</sup>

#### V. EXTENDING THE ANALYSIS TO OTHER FORMS OF LAWYER OR JUDICIAL DECISIONMAKING

We have examined threshold analysis mainly in the context of accepting or rejecting a client, or choosing among clients. We have also discussed choosing among projects on a broad level of generality so as to make the analysis more widely applicable. There are

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6. On conflicting-choice decisions in the context of choosing among cases, see S. NAGEL & M. NEEF, *DECISION THEORY AND THE LEGAL PROCESS* 217-53 (1979); Forst & Borsi, *A Theoretical and Empirical Analysis of the Prosecutor*, 6 *J. LEGAL STUD.* 177 (1977); Landes, *An Economic Analysis of the Courts*, 14 *J. L. & ECON.* 61 (1971).

many other examples that illustrate threshold analysis as applied to the decisionmaking of lawyers and judges. Additional examples include 1) deciding whether to accept a settlement or go to trial, 2) deciding whether to release a criminal defendant or to hold him in jail pending trial, and 3) deciding how to increase police adherence to legality in making searches.

#### A. *Deciding Whether to Accept a Settlement or Go to Trial*

Lawyers frequently must decide whether to accept a settlement or go to trial. The settlement offer is known. The results of going to trial are not known. This becomes an excellent situation for threshold analysis. An appropriate first step is to develop a threshold equation. In its simplest form, the threshold equation might be  $(S) = (P)(D)$ .

This equation can apply to either the plaintiff or defendant in personal injury cases or in criminal cases. The S stands for settlement. The P stands for probability of plaintiff victory in either type of case. The D could stand for a decision in either type of case, or for damages in personal injury cases and detention-length in criminal cases. In personal injury cases, S and D are expressed in dollars. In criminal cases, S and D are expressed in terms of months in jail. At the threshold, the settlement is exactly equal to the expected value of going to trial.

To illustrate the application of this threshold equation to personal injury cases, suppose that as plaintiff's counsel, you are offered a settlement of \$8,000 in client A's case. Suppose further that you perceive that if you try the case and win the damages awarded are likely to be \$10,000. What is the threshold probability of success that would make the settlement worth accepting? Answering that question (with the threshold equation in its simplest form) involves:

1. Substituting numbers for the variables for which we have information. That means an equation of the form  $\$8,000 = (P)(\$10,000)$ .
2. Isolating the unknown variable on the left side of the equation. We then have  $P = \$8,000/\$10,000$ .
3. Simplifying the right side to determine the threshold probability ( $P^*$ ), which in this case is .80.

Therefore, if the probability of success exceeds .80, counsel should reject the settlement offer and proceed to trial. We can do the same analysis when we know S and P, and we want to solve for

threshold  $D$ ; or when we know  $P$  and  $D$ , and we want to solve for threshold  $S$ . Likewise, the same analysis can be done by counsel for the defendant insurance company in deciding whether to give in to the plaintiff's demand. In the client  $A$  situation, for example, if defense counsel perceives the damages to be \$10,000 and the victory probability to be .60, defense counsel should be willing to accept any settlement less than \$6,000.

We can also illustrate the application of that threshold equation to criminal cases. Suppose as the prosecutor you perceive that if a particular case is won at trial, the sentence is likely to be 10 months. Suppose further that the defendant offers to plead guilty for an 8-month sentence. What threshold probability would make that plea bargain worth accepting? The analysis is the same except that the first step is 8 months =  $(P)(10 \text{ months})$ . The second step is  $P = 8 \text{ months}/10 \text{ months}$ , and the third step is  $P^* = .80$ . Just as in personal injury cases, the threshold analysis can be extended to any one of the three variables for either the prosecutor or the defendant. We can also do a threshold analysis with two or more missing variables, using the graphing approach discussed with go/no-go decisions.

The basic threshold equation should be adjusted for litigation costs. The plaintiff in either personal injury or criminal cases would generally like to avoid going to trial because there may be expensive fees involved in hiring a personal injury trial lawyer, or there may be expensive administrative costs to the prosecutor's office. The plaintiff may therefore be willing to offer a reduction in damages sought or the prosecutor a reduction in the charge or sentence for early resolution of the case, in the same manner that a seller offers a discount for early payment of an invoice.

From the plaintiff's perspective, the initial threshold equation becomes  $(S) = (P)(D)(r)$ , where  $r$  is the reduction factor (expressed as a decimal less than 1.00)—the amount remaining after the plaintiff has discounted the expected value of the case to avoid a trial. If, for example, the insurance company offers \$4,000 and the plaintiff perceives  $P$  to be .60 and  $D$  to be \$10,000, the threshold reduction factor is .67. We arrive at that figure by solving for  $r$  in the equation, or by computing what discount has to be given to \$6,000 to convert it to \$4,000.

The defendant also would generally prefer to avoid a trial. For the criminal defendant, there may be a long wait in jail if he is not released on bond, or there may be high administrative costs to the public defender's office. The defendant may therefore be willing to

offer an inducement for early resolution of the case in the manner in which a buyer offers a bonus for early delivery of a needed product. From the defendant's perspective, the initial threshold equation is  $(S) = (P)(D)(i)$ , where  $i$  is the inducement factor (expressed as a decimal greater than 1.00), which the defendant is willing to add on to the expected value of the case to avoid a trial. If, for example, the prosecutor offers a 9-month jail sentence in return for a plea of guilty, and the defendant perceives  $P$  to be .60 and  $D$  to be 10 months, the threshold inducement factor is 1.50. Again, we arrive at that figure by solving for  $i$  in the equation, or by computing what factor multiplied by the perceived result of trial (6 months) will equal the settlement offer (9 months).

The basic threshold equation also needs to be adjusted for the fact that a bird in the hand may be worth two in the bush. In this context that means that the right side of the threshold equation needs to be discounted by the length of time we have to wait for the trial results. In other words, a settlement offer of \$5,000 may be equal to a \$7,500 expected value (i.e.,  $(P)(D)$ ) if we have to wait five years to get the \$7,500. This is so if we could invest the \$5,000 to bring in \$500 a year in profit. In order for \$5,000 in principal to make \$500 a year in simple interest, the threshold interest rate would have to be 10%. This means that our threshold equation must be changed to read  $(S) = (P)(D)/[1+(RT)]$  where  $R$  is the simple interest rate, and  $T$  is the number of years before the damages are received. The time-discounting factor in our case would be  $1+(.10)(5)$ , which equals 1.50.<sup>7</sup>

With that improved threshold equation, we can now determine the threshold interest rate or the threshold number of years to wait, as well as the threshold settlement, victory probability, and damages. By definition, any one of those threshold figures causes both sides of the equation to be equal. That means settling and going to trial are equally profitable at the threshold. The time-discounting factor for computing interest on the interest (i.e., compound interest) is  $(1+R)^T$ , instead of  $1+(RT)$ . The average personal injury case, however, does not involve enough money or delay to make much difference between simple and compound interest. The same kind of time-discounting analysis (although with more subjectivity) can be applied to criminal cases because the average defendant would rather take a seven and one-half month sentence

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7. When \$7,500 is divided by 1.50, it equals \$5,000. Likewise, when \$5,000 is multiplied by 1.50, it equals \$7,500.

five years from now than have to go to prison for five months right now.<sup>8</sup>

### B. *Deciding Whether to Release or Hold a Defendant Before Trial*

Deciding whether to release or hold a criminal defendant pending trial is an example of judicial decisionmaking to which threshold analysis might apply. At the threshold, the costs of holding a defendant in jail (H) equal the costs of releasing the defendant (R). The most important holding costs consist of whatever cost society incurs as a result of the defendant being wrongly held in jail when he would have appeared in court without committing a crime had he been released. The probability that a defendant will appear in court without committing a crime if released can be symbolized as P. The releasing costs are whatever costs society incurs as a result of the defendant committing a crime while released or the defendant failing to appear for his court date. The probability that a defendant will commit a crime while released or will fail to appear can be symbolized as (1 - P); this is the complement of the defendant appearing without committing a crime. Thus, the expected or discounted value of the holding costs is (H)(P), and the expected value of the releasing costs is (R)(1 - P). At the threshold,  $(H)(P) = (R)(1 - P)$ .

To make the threshold equation more functional, we need to determine the threshold probability above which the defendant is released and below which he is held. That involves solving for P in the threshold equation. If  $(H)(P) = R - (R)(P)$ , then  $(H)(P) + (R)(P) = R$ , and  $P(H + R) = R$ . Therefore,  $P^* = R / (H) + (R)$ . A more convenient way of expressing the threshold

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8. For further information on deciding whether to accept a settlement or go to trial, see L. ROSS, *SETTLED OUT OF COURT* (1970); G. TULLOCK, *THE LOGIC OF THE LAW* 167-91 (1971); Lachman & McLaughlan, *Models of Plea Bargaining*, in *MODELING THE CRIMINAL JUSTICE SYSTEM* 145-58 (S. Nagel ed. 1977); Friedman, *An Analysis of Settlement*, 22 *STAN. L. REV.* 67 (1969); Nagel & Neef, *Plea Bargaining, Decision Theory, and Equilibrium Models* (pts. 1 & 2), 51 *IND. L.J.* 987 (1976), 52 *IND. L.J.* 1 (1976); Posner, *An Economic Approach to Legal Procedure and Judicial Administration*, 2 *J. LEGAL STUD.* 399 (1973).

In addition to using (P)(D)(X) in the threshold equation for deciding whether to accept a settlement or go to trial, one could use that method of conceptualizing the expected value of going to trial in order to predict whether there will be a settlement or a trial. There will be a settlement if the (P)(D)(X) of the defendant is greater than the (P)(D)(X) of the prosecutor or plaintiff. Otherwise, there will be a trial. Thus, when the (P)(D)(X) of the defendant equals the (P)(D)(X) of the prosecutor or plaintiff, they are at the threshold between settlement and trial. This is an example of using threshold analysis for predicting decisions, rather than making decisions.

probability that the defendant will appear in court without having committed a crime is to first symbolize the ratio between the holding costs and the releasing costs (i.e.,  $H/R$ ) as  $X$ . Then we can prove by simple algebra that  $P^* = 1/(1+X)$ . We are effectively making  $R$  equal to a value of 1.  $H$  is equal to a positive number larger or smaller than 1, depending on the value of avoiding a holding error relative to the value of avoiding a releasing error.

Using the threshold probability equation involves first deciding the value of the holding-error costs ( $H$ ) relative to the releasing-error costs ( $R$ ) in a given case. In the average case, the error of wrongly holding a defendant who would appear without committing a crime should be considered more serious than the error of releasing a defendant who then fails to appear or commits a crime. Holding errors should be considered more serious than releasing errors, just as wrongly convicting the innocent should be considered more serious than wrongly acquitting the guilty, although not necessarily with the same ratio of seriousness. If in the average case we consider the holding-error costs to be twice as serious as the releasing-error costs, then  $H/R$  or  $X$  is equal to 2. This means that in the average case, the threshold probability should be  $P^* = 1/(1+2) = .33$ . That further means that if the average probability of a defendant's appearing without committing a crime is greater than .33, the defendant should be released on his own recognizance or a low bond. If the defendant's  $P$  is less than .33, the defendant should be held in jail or released only on a high bond. If the value of  $X$  is 1.00 (meaning that  $H$  and  $R$  are equal), then  $P^*$  is .50. One can readily see how  $X$  can vary from case to case depending on the individual defendant, and thus how  $P^*$  can vary.

There is also a threshold value ratio between the holding-error costs and the releasing-error costs. Suppose we assume that a given defendant has a .90 probability of appearing without committing a crime. With that probability, what is the threshold ratio of  $H$  to  $R$ , above which we should release the defendant and below which we should hold him? To calculate that threshold ratio, we solve for  $X$  in the equation  $P^* = 1/(1+X)$ . Doing so tells us that  $X^* = (1 - P)/P$ . If we now substitute the known probability ( $P$ ) of .90, we get  $X^* = (1-.90)/.90 = .10/.90 = .11$ . That means that if the defendant has a .90 probability of appearing without committing a crime, he should be released unless we believe that the releasing costs are 9 times as great as the holding costs. Seldom is that likely to be the case; this justifies releasing average defendants since they have a high probability of appearing without committing a crime.

The threshold equation used in this example of  $(H)(P) = R(1 - P)$  has analogous counterparts in other aspects of the legal process. For example, the threshold equation for a juror deciding whether to vote to convict or acquit is  $(C)(P) = (A)(1 - P)$ . The C represents the conviction-error costs, the A represents the acquittal-error costs, and the P represents the probability that the defendant is truly innocent.

Another example is the threshold equation for a would-be criminal deciding whether to commit a crime. That threshold equation is  $(C)(P) = (B)(1 - P)$ . Here the C represents the costs of unsuccessfully committing the crime, including imprisonment. The B represents the benefits of successfully committing the crime and the P represents the probability of the costs being imposed. That kind of a threshold equation can be used to arrive at a threshold P, C, B, or X (i.e., C/B). We can calculate the threshold value for any variable in these threshold equations. Doing so can be helpful in 1) making decisions with given values for some of the variables, 2) influencing the decisions of other people such as would-be criminals, 3) predicting decisions in light of changes that have been known to occur in the values of some of the variables, or 4) measuring an individual's decisional propensities by knowing the relative value he places on H and R, C and A, or C and B.<sup>9</sup>

### C. *Deciding How to Increase Police Legality in Making Searches*

The decisionmaking examples of out-of-court settlements and pretrial release were basically go/no-go decisions. A good example of a conflicting-choice decision might be deciding between the exclusionary rule and legal action against the police as alternative means of ensuring the legality of police searches while not unduly

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9. For further details on deciding whether to release or hold a defendant in jail before trial, see J. GOLDKAMP, *TWO CLASSES OF ACCUSED: A STUDY OF BAIL AND DETENTION IN AMERICAN JUSTICE* (1979); Landes, *The Bail System: An Economic Approach*, 2 J. LEGAL STUD. 79 (1973); Nagel, Neef & Schramm, *Decision Theory and the Pretrial Release Decision in Criminal Cases*, 31 U. MIAMI L. REV. 1433 (1977). On applying related threshold equations to juror decisionmaking and the decisionmaking of would-be criminals, see S. NAGEL & M. NEEF, *supra* note 6, at 187-215, 255-74.

In addition to using  $(H)(P) = (R)(1-P)$  for making decisions, one can also use that type of threshold equation for influencing decisions. In other words, if we want to encourage judges to do more releasing when in doubt, then we should try to 1) increase their perception of the holding costs, 2) decrease their perception and the reality of the releasing costs, and 3) increase their perception and the reality of the probability of the defendant appearing without committing a crime. Similarly, this kind of analysis can be applied to influence the decisionmaking of jurors and would-be criminals.

decreasing police morale. This is also a good example of potential legislative decisionmaking in an area that affects lawyers, judges, and the legal system.

In 1963 a survey was made of one randomly selected police chief, prosecuting attorney, judge, defense attorney, and official of the American Civil Liberties Union in nearly all of the fifty states to determine, among other things, their perceptions of changes in police behavior before and after the Supreme Court required illegally seized evidence to be excluded from criminal proceedings.<sup>10</sup> Of those who responded from the states that had been newly required to exclude illegally seized evidence, 75% reported an increase in police conformity to legal search procedures, and 25% reported no change or a decrease. Of those who responded from the control group of states that already had the exclusionary rule, 57% reported an increase in police adherence to legality, and 43% reported no change or a decrease. The 18% difference between 75% and 57% can be used to measure the degree of relation (REL) between newly adopting the exclusionary rule (E) and improvement in police legality in making searches (L). Through the same questionnaire and a similar analysis, we obtain three additional relations:

1. The relation between adopting the exclusionary rule (E) and showing a decrease in police morale in making searches (M), which is .37 (REM).
2. The relation between the availability of legal action (A) against the police making searches and increased police adherence to legality (L), which is .05 (RAL).
3. The relation between the availability of legal action (A) against police making searches and decreased police morale in making searches (M), which is .09 (RAM).

Suppose the goals of increasing legality and not decreasing morale are considered equally important. How then, does one phrase the threshold equation, when the exclusionary policy and the legal action policy are equally profitable or desirable? A simple way would be with an equation of the form  $REL - REM = RAL - RAM$ . If we are unsure of any one of those four relations, we can solve for its threshold value, and then try to answer the question as to whether the relation is above or below that threshold value. For

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10. The results of this survey are described in Nagel, *Testing the Effects of Excluding Illegally Seized Evidence*, 1965 Wis. L. Rev. 283.



example, perhaps we are unsure of the relation between E and L. To solve for its threshold value we simply insert numbers for the other relations and express REL in terms of those numbers:  $REL = RAL - RAM + REM = (.05) - (.09) + (.37)$ ; the simplified result is  $REL^* = .33$ . If we are confident that the relation is stronger than .33, the exclusionary rule should be adopted over the legal action approach (assuming that legality and morale are our only two concerns). If the relation is probably below .33, the exclusionary rule should be rejected in favor of the legal action policy. That threshold equation, which contains four variables, can be expanded to contain eight variables by showing for each of those relations the two percentages on which each one is based. We can then determine the threshold value for any one of those percentages. The threshold equation containing four variables can be contracted to just the two variables of  $REL = REM$ , if we are only interested in a go/no-go decision concerning the exclusionary rule.

Most people would say police conformity to legality in making searches is more important than police morale. For the sake of discussion, let us assume that legality is 3 times as important as morale. That converts the threshold equation into  $(3)REL - REM = (3)RAL - RAM$ . In other words, REL and RAL get multiplied by 3 because they involve the legality goal, and REM and RAM get multiplied by 1 because they involve the morale goal.

If, however, we are not sure what the relative weight of legality and morale should be, we can substitute a W for the 3, and then solve for W to find the threshold weight. Doing so involves solving for W in the equation  $W(.18) - (.37) = W(.05) - (.09)$ . Isolating W reveals that threshold W (or W\*) is 2.15. If we consider legality to be more than twice as valuable as morale (rounding to the nearest whole number), we should prefer the exclusionary rule over legal action, assuming we accept the four relations as being meaningful. If we assume that legality is worth less than twice as much, we should prefer the legal action. This assumes that the two policies are mutually exclusive, or that there is an issue as to which is preferable. The alternative would be to treat each option as a separate go/no-go decision, which allows for adopting them both. There is also no need to assume that the four relations or the relative weights are precise. We can work with any combination of these five variables as unknowns, and use the graphing methods discussed earlier to reach decisions with multiple unknowns.

Deciding how to increase police legality in making searches involves a format that is common in both legal and general poli-

cymaking. It is a format involving conflicting choices in which the benefits and costs are expressed as decimals or statistical relations with various goals. The relations with desired goals are expressed as positive decimals, and the relations with undesired goals are expressed as negative decimals. Each decimal relation is weighted according to the relative importance of the goal to which the relation pertains, with the least important goal receiving a relative weight of 1. With that kind of threshold analysis, the highly subjective problem of assigning weights to goals can be greatly simplified by making the goals relative rather than absolute, and especially by working in terms of threshold weights rather than exact weights.<sup>11</sup>

## V. SOME CONCLUSIONS

The simple logic that this article proposes as a tool for lawyer decisionmaking can be summarized in a few basic rules:

1. When making a go/no-go decision, develop a threshold equation in which the benefit variables are on the left side and the cost variables are on the right side. Any one of those variables can be considered a threshold variable by expressing it in terms of the numerical values of the other variables. Simplifying those numbers gives the threshold value of the relatively unknown variable. We should adopt the project if the unknown variable is a benefit and we perceive its value to exceed the threshold; we should reject the project when the variable is a cost and its value exceeds the threshold.
2. In order to reach a go/no-go decision with multiple unknown variables, draw a two-dimensional graph with one variable on the vertical axis and another variable on the horizontal axis. Each axis should extend from the reasonable minimum to the reasonable maximum of the variable. Draw a curve which holds the other variables constant. If the basic pair of unknown variables is above the threshold curve, adopt the project; otherwise, reject it.
3. In order to resolve conflicting-choice decisions, develop a threshold equation in which the benefits minus costs of

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11. For further information on deciding how to increase legality in police searches, see S. NAGEL, *IMPROVING THE LEGAL PROCESS: EFFECTS OF ALTERNATIVES* 7-26 (1975); S. SCHLESINGER, *EXCLUSIONARY INJUSTICE: THE PROBLEM OF ILLEGALLY OBTAINED EVIDENCE* (1977); Nagel, *supra* note 10; Oaks, *Studying the Exclusionary Rule in Search and Seizure*, 37 U. CHI. L. REV. 665 (1970).

one choice are put on one side of the equation, and the benefits minus costs of the second choice on the other. Any one of those variables can be treated as a threshold variable to be solved in terms of the numerical values of the other variables. Any combination of unknown variables can be dealt with graphically as with go/no-go decisions.

4. When many choices are involved, use a system of successive paired comparisons; the last uneliminated option will be the most preferred. These many choices can include combinations of choices, as well as the basic choices.

The four principles above can be applied to a great variety of legal decisionmaking situations. General examples that have been discussed include:

1. Deciding whether to accept a client on a contingent fee basis when the threshold equation is (damages)  $\times$  (probability of victory)  $\times$  (fee percentage) = (hours)  $\times$  (rate per hour), or  $(D)(P)(F) = (H)(R)$ .

2. Choosing between two such conflicting clients when the threshold equation is  $(D)(P)(F) - (H)(R)$  (for the first client) =  $(d)(p)(f) - (h)(r)$  (for the second client).

3. Deciding whether to accept something of value that is not contingent on the occurrence of an event versus something of value that is contingent on the occurrence of an event such as the outcome of a trial. The threshold equation for those situations can be symbolized: (net benefits from decision 1) = (net benefits from decision 2)  $\times$  (probability of those benefits being received), or  $(B1) = (B2)(P)$ .

4. Deciding between two alternatives when they are both discounted by the probability of an event occurring or not occurring, as when doing something can result in one type of error, and doing the opposite can result in another type of error. The threshold equation for those situations can be symbolized: (type 1 error costs)  $\times$  (probability of those costs being imposed) = (type 2 error costs)  $\times$  (complement of the first probability), or  $(E1)(P) = (E2)(1-P)$ . An illustrative example is deciding whether to hold a defendant in jail pending trial.

5. Deciding between two alternatives when each one has a statistical relation to certain desired and/or undesired

goals and each goal varies in relative importance. The threshold equation for those situations can be symbolized as  $(WB)(RB)-(WC)(RC)$  (for the first alternative) =  $(WB)(RB)-(WC)(RC)$  (for the second alternative), when  $W$  = weight factor,  $B$  = benefit variable,  $R$  = relation factor, and  $C$  = cost variable. The example given involved comparing the rule excluding illegally seized evidence with legal action against the police who make illegal searches as alternative means of increasing the legality of police searches, while not unduly decreasing police morale.

These five examples cover a great deal of legal decisionmaking. All of these decisionmaking situations are conducive to reaping the benefits of threshold analysis, such as greater effectiveness in achieving desired goals and greater efficiency in reducing undesired costs. Threshold analysis also enables lawyers to compete more equally with each other regardless of natural decisionmaking skills. To a considerable extent, the methods presented serve as the common sense that good legal decisionmakers intuitively use without thinking in terms of formulas and equations. We need analyses of good decisionmaking so that those who lack natural decisionmaking skills can accomplish what good decisionmakers do intuitively. Communication of the findings of the analyses to lawyers, judges, legislators, and other legal decisionmakers will ultimately improve the legal process.