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Earthquakes and Tremors in Statutory Interpretation: An Empirical Study of the Dynamics of Interpretation

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Abstract

Using citation data from the Supreme Court's 1984 and 1990 Terms, this study tests three models of judicial dynamics. The first model posits that the extent of an opinion's importance to the law, as measured by how frequently it is cited by courts and commentators, is determined by a host of relatively small factors. This model predicts a normal, bell-shaped curve of citation frequencies. The second model posits that judges have bounded rationality and strong attachments to existing rules, leading them to practice "normal science" most of the time with occasional "paradigm shifts." In empirical studies by various social scientists, this kind of model has been found to produce frequency distributions that are roughly bell-shaped but have a characteristic known as "leptokurtosis." The third model stems from complexity theory (also known as chaos theory or fractal geometry). This type of model predicts a "power" curve that is characteristic of many social and natural processes, such as earthquake severity. Because earthquakes provide such a vivid metaphor for legal change, this can be called the "tectonic" model of legal dynamics.

As it turns out, the first model is clearly wrong, and the second model is also at odds with the data. On the other hand, the tectonic model provides a good statistical fit for the data. Thus, at least in terms of this preliminary empirical investigation, complexity theory may provide important insights into judicial dynamics.

The study also revealed two interesting, incidental findings. First, the diversity of Supreme Court opinions is surprisingly great. At the extremes, one case in the 1984 Term has only been cited a single time by a later federal appellate court, while another case has garnered over 1100 federal appellate citations. Second, opinions seem to have two dimensions of significance, which are only loosely related. The amount of attention an opinion receives from lower federal courts has only a modest correlation with the attention it receives in law reviews. Thus, an academic's impression of the "typical" Supreme Court opinion would be quite different from that of a judge or lawyer. To the extent we construct our explanatory theories based on some intuitive sense of typicality, we may be led astray.

Bill Eskridge's path-breaking article, "Dynamic Statutory Interpretation," is best known for its normative claim that statutory interpretation should dynamically adapt to current social values.¹ Eskridge astutely pointed to the sources of stress between existing rules and changing conditions. "As society changes, adapts to the statute, and generates new variations of the problem which gave rise to the statute," he observed, "the unanticipated gaps and ambiguities proliferate."² Moreover, he added, "the legal and constitutional context of the statute may change."³ To address these problems, he advocated a "cautious model of dynamic statutory interpretation."⁴ This normative claim has given rise to a rich, and one might also say "dynamic," scholarly debate.⁵

Less attention has been paid to the descriptive side of Eskridge's thesis, in which he argued that his model "depicts what the Supreme Court typically does when it interprets statutes."⁶ In later work, although his primary focus has remained normative, Eskridge has fleshed out his descriptive claim. He argues that the "dynamism introduced by the interpreter's perspective tends to be more pronounced over time, as her cultural and political framework diverges from that of the original drafters."⁷ But "if that framework becomes irreconcilable with that of the drafters, statutory interpretation becomes a discontinuous process of rupture and dramatic political shifts."⁸

Compared with his normative claims, Eskridge's descriptive claim has received much less scholarly attention. Yet, even these brief quotations raise a host of issues about how statutory interpretation actually operates—issues relating to judicial methodology, cultural and political influences, and the pace of legal change. Eskridge's primary focus was on methods of statutory interpretation (originalist versus "dynamic"). But his work also raises intriguing issues about the dynamics of legal innovation in statutory cases.

Rather than focusing on judges' interpretive techniques, this paper investigates the issues raised by Eskridge's contrasting use of the terms "typical" (to describe the Court's general methodology) and "rupture" (referring to the occasional paradigm shift). Some immediate questions come to mind: Is there such a thing as a "typical" interpretation case? How do the typical cases (however they are defined) relate to the extraordinary ones? Is there a continuum or a dichotomy? More fundamentally, what kind of dynamic process is at work in statutory interpretation cases?

We all know that, as in the children's game, sometimes the Court takes "baby steps" and sometimes it takes "giant steps." But how often does it take each kind, and what dynamic drives the length of the steps? One way to begin to get a handle on these questions is examine citation frequencies. An opinion that takes a "baby step" is likely to receive much less attention. It will be decisive in fewer future cases and will have to share the stage with other incremental rulings about the same issue, thereby diluting its influence. As a routine application of what Kuhn called "normal science," it will also receive less attention from commentators. On the other hand, an opinion taking a "giant step" will set the analytic agenda for many later decisions. As a dramatic legal innovation, it will also be more likely to command the attention of commentators. Thus, the distribution of citation frequencies, while admittedly an imperfect indicator, should illuminate the dynamics of interpretation.

¹William N. Eskridge, Jr., *Dynamic Statutory Interpretation*, 135 U. Pa. L. Rev. 1479 (1987). The term "path breaking" will surely (and deservedly) be deployed numerous times in this symposium about the article.

²Id. at 1480.

³Id.

⁴Id. at 1481.

⁵Many of the leading participants in that debate are represented in this on-line symposium.

⁶Eskridge, *supra* note 1, at 1482. As we will see later, the notion of "typicality" is problematic in this context. See Part III (B).

⁷William N. Eskridge, Jr., *Dynamic Statutory Interpretation* 58 (1994).

⁸Id. For a case study of this interpretative "rupture," see *id.* at 66.

In this paper, using citation data for the Supreme Court's 1984 and 1990 Terms, I examine three models of the dynamics of interpretation.⁹ Under the first model, the extent of an opinion's contribution to the law (and thereby its influence) is determined by a host of independent factors. These factors might include the subject matter, the parties' shaping of the issue, the identity of the Justice drafting the opinion, the amount of time since the statute was passed, the ideological salience of the issue, and so forth. This model produces a bell-shaped distribution of "step lengths," ranging from baby to giant steps. Under the second model, judges have bounded rationality and strong attachments to existing rules, leading them to take "baby steps" most of the time but occasional "giant steps" when continued adherence to an existing norm proves untenable. In empirical studies by various social scientists, this kind of model has been found to produce frequency distributions that are roughly normal but have a characteristic known as "leptokurtosis." This model may well be what Eskridge had in mind; in any event, it was my own prediction about the data. The third model stems from complexity theory (also known as chaos theory or fractal geometry.) This type of model applies to many dynamic processes—for example, it fits the frequency distribution of earthquakes. The most important implication of this model is known as scaling: the same patterns reproduce themselves in a characteristic way (though with increased magnification) at every level of magnitude.¹⁰ Because earthquakes provide such a vivid analogy to legal change, I will refer to this as the tectonic model.

The central findings can be simply stated. The data is sharply at odds with the first model. The citation frequencies are nowhere close to the normal distribution. The data does display leptokurtosis, the statistical attribute associated with the second model. Unlike the leading studies of bounded rationality, however, my data showed extreme deviations from normality, suggesting that something more than sticky norms or bounded rationality may be involved. The third model (tectonic statutory interpretation) provides a good statistical fit for the data. Thus, although this study fall far short of "proving" its validity, the tectonic model seems to be the best working hypothesis.¹¹

Along the way, I find that the idea of a "typical" interpretation case is problematic for three reasons. First, the diversity of Supreme Court rulings is surprisingly great. At the extremes, one case in the 1984 Term¹² has only been cited a single time by a later federal appeals court, while another case¹³ garnered over eleven hundred federal appellate citations. Second, opinions seem to have two, largely unrelated, types of significance. The amount of attention an opinion receives from lower federal courts has only a limited correlation with the attention it receives in law reviews. Thus, an academic's impression of the "typical" opinion would be quite different from that of a judge or lawyer. Third, averages are relatively meaningless because the distributions have such long tails. Thus, at least if we judge by citation impact, speaking of the "typical" interpretation case is somewhat like speaking of the "typical" nation state, given the huge variations among nations on various different dimensions such as per capita income and population.¹⁴

A brief roadmap: The first section of the paper will lay the groundwork by attempting to justify the use of citation frequencies as a measure and by laying out more carefully the three models. The second section describes the methodology and presents the empirical data, including both quantitative analysis and some qualitative assessments. The final section presents conclusions and suggestions for further research.

⁹The choice of these terms and other methodological issues are discussed in Part II(A).

¹⁰These models are discussed in more detail in Part I(B).

¹¹See Part III(A) for further discussion.

¹²*First National Bank of Atlanta v. Bartow County Board of Tax Assessors*, 470 U.S. 583. (1985) (upholding Georgia tax on bank shares as consistent with 33 U.S.C. § 3124 (a)).

¹³*United States v. Young* 470 U.S. 1. (1985).

¹⁴See Part III(B) for a discussion of the typicality question.

I. BACKGROUND

This article is not the first, nor hopefully the last, empirical study of the dynamics of statutory interpretation. This section begins with a brief discussion of previous studies and my reasons for adopting a different approach. It then explains the three models and their varying predictions.

A. *Investigating the Dynamics of Interpretation*

Although the normative dimension of statutory interpretation has received the most attention, there have been some important empirical studies. These studies share a common technique. They focus on judicial methodology and examine the various sources of authority cited in judicial opinions. In a nutshell, the general conclusions seem to be that courts rely on a range of authority, use an eclectic set of techniques, and vary somewhat over time in the use of specific sources such as legislative history.¹⁵

This is invaluable information, but it has its limits. First, it essentially tells us what courts *say* about their decision making, rather than what they *do*. Presumably, the two are not unrelated, but we cannot be sure how strongly they are connected. Second, although these studies suggest that courts are often dynamic in the sense of consulting nonoriginalist sources, they reveal nothing about the magnitude of dynamism. Courts might exhibit a very sleepy form of dynamism, in which courts use nonoriginalist material only to justify tiny incremental steps toward changing the law “one case at a time.” These studies cannot tell us whether statutory interpretation moves by glacial evolution, fiery revolutions, or some combination of the two. Just how dynamic is “dynamic,” in this setting?

Although undoubtedly an imperfect indicator, citation frequency can help us get a handle on these questions about the pace of change. Clearly, the number of citations that an opinion receives could be influenced by extraneous factors. In general, however, citation impact does seem like a plausible measure of the significance of an opinion—that is to say, of how far it “moves” the law. An opinion that contributes little new information about the law will not be very useful to later courts nor will it usually be of much interest to commentators. Thus, citation frequency is at least a rough measure of how significantly an opinion changes the law.

Although citation studies are a burgeoning area of scholarship, most studies by academics have (perhaps not surprisingly) focused on citations of academic works, often with the purpose of discovering what professor is the “fairest of them all.” A smaller body of work has investigated citations of cases. One focus has been on the “ageing” of judicial authority; these studies have shown that judicial opinions generally have limited half-lives.¹⁶ Another focus has been on determining which judges are the most influential.¹⁷ Apparently, only one article (which is discussed in detail later) has attempted to use citation frequencies as a gauge of the dynamics of the legal process.¹⁸

¹⁵The two leading works in this genre are probably Nicholas Zeppos, *The Use of Authority in Statutory Interpretation: An Empirical Analysis*, 70 Tex. L. Rev. 1073 (1992); Jane Schacter, *The Confounding Common Law Originalism in Recent Supreme Court Statutory Interpretation: Implications for the Legislative History Debates and Beyond*, 51 Stan. L. Rev. 1 (1998). For a discussion of works dealing specifically with the use of legislative history by courts, see Adrian Vermeule, *The Cycles of Statutory Interpretation*, 68 U. Chi. L. Rev. 149 (2001). In addition, of course, there are many excellent doctrinal analyses of recent opinions and historical studies of statutory interpretation.

¹⁶See William Landes and Richard Posner, *Legal Precedent: A Theoretical and Empirical Analysis*, 19 J.L. & Econ. 249 (1976); John Merryman, *Toward a Theory of Citations: An Empirical Study of the Citation Practice of the California Supreme Court in 1950, 1960, and 1970*, 50 S. Cal. L. Rev. 381 (1977); Peter Clinch, *The Use of Authority: Citation Patterns in the English Courts*, 46 Journal of Documentation 287 (1990).

¹⁷William Landes, Lawrence Lessig, and Michael Solimine, *Judicial Influence: A Citation Analysis of Federal Courts of Appeals Judges*, 27 J. Leg. Studies 271 (1998); Montgomery Kosma, *Measuring the Influence of Supreme Court Justices*, 27 J. Leg. Studies 333 (1998).

¹⁸See David Post and Michael Eisen, *How Long is the Coastline of the Law? Thought on the Fractal Nature of Legal Systems*, 29 J. Leg. Studies 545 (2000) (discussed in subsection I(B)(3) below.)

In addition, unlike many other kinds of empirical data that might be of interest, citation frequencies are readily available using current on-line search techniques. It is an old joke that social science research resembles a drunk looking for his keys under a light post simply because he can see better there, but there is something to the joke. An imperfect but readily available source of information has a genuine edge over a more ideal but practically inaccessible source. At least, this ready availability is a good enough reason to collect the data in the hopes of finding interesting patterns. In this instance, at least, it turns out that the patterns are indeed there to be found—or in other words, that at least some of the keys actually have fallen under the street light.

As a recent study of judicial influence explains, citations “are at best a crude and rough proxy for measuring influence.”¹⁹ Several of the defects discussed in that study are relevant here. “Super” precedents might be undercounted if they settle the law so effectively that no further cases are brought (or at least appealed). Correspondingly, an ambiguous precedent might be overcounted because lower courts are unsure of when it is relevant or what it means. Judges may also use overkill in citations, piling on multiple citations for the same basic point.²⁰ In addition to these defects, citation frequency will underestimate the boldness of some judicial interpretations if the statute is amended or repealed, thereby eliminating the decision’s relevance. To some extent, these defects can be countered by considering citations in law reviews as well as in cases: academics are likely to devote considerable attention to “super” precedents, are less prone to string citations, and would probably be interested in a Supreme Court decision that was connected with a statutory amendment. Overall, despite their possible defects, citation frequencies are our best available index of the significance of opinions.

B. Three Models

We cannot know in advance whether any significant patterns will exist in the data; nor can we ever be positive, if we find such patterns, that we have correctly identified their causes. Before examining the data, however, it is helpful to have some idea of the possibilities. This section considers three plausible models and discusses the kind of statistical distribution associated with each one.

1. Model One: A Random Walk through the U.S. Reports

One obvious possibility is that citation frequencies are more or less random—that is, that they are the product of unrelated factors operating in different directions, which happen to balance out one way or another in a particular case. This model could be tied to the view that the Court typically aims for a particular level of “narrow and shallow” opinions.²¹ Among the possible factors influencing citation counts might be the specific statutory language involved in the case, the quality of the briefing, the frequency of litigation in the area, the identity of the opinion’s author, the presence of dissent, subsequent legislative or administrative actions, the clarity of the opinion, the economic impact of the decision, and so forth.

Trying to identify and measure these various factors would be difficult. But, it turns out, we may be able to identify this kind of randomness without specifying the causal links. A basic theorem of mathematical statistics links this form of randomness with the famous bell-shaped, normal distribution. More precisely, the central limit theorem states that “the sum of a large number of independent random variables will be approximately normally distributed almost regardless of their individual distributions; any random variable which can be regarded as the sum of a large number of small, independent contributions is thus likely to follow the normal distribution approximately.”²²

¹⁹Landes, Lessig & Solimine, *supra* note 17, at 271.

²⁰See *id.* at 273-75.

²¹See Cass Sunstein, *Foreword: Leaving Things Undecided*, 110 Harv. L. Rev. 4, 15-21 (1995).

²²M.G. Bulmer, *Principles of Statistics* 109 (2d ed. 1967, 1979 corrected reprint). For a sketch of one proof, see *id.* at 115-16.

We could not expect an exact correspondence between citation data and the normal distribution, if only because the normal distribution requires an infinite domain in both directions while the number of citations to an opinion cannot be a negative number. In assessing deviations from normality, a few parameters are especially useful. For later reference, here is a list:

<i>Central Tendency</i>	The mean, the median, and the mode of a normal distribution are the same.
<i>Skew</i>	A normal curve is symmetrical rather than being skewed in either direction. Symmetry is measured by the skew parameter, which is zero for the normal distribution.
<i>Kurtosis</i>	Kurtosis measures whether a curve is flattened out or unusually peaked, compared with the normal distribution. Kurtosis for the normal distribution is sometimes given as 3. ²³ However, my software used a different formula, for which the normal distribution comes out at zero.

We will examine later whether the frequency distribution for citation counts has these characteristics. Note that in this model, as with traits like as human height and weight, there is a clearly defined “typical case” and a continuum of increasingly rare deviations from the norm. Thus, although an NBA player might be unusually tall, it probably would make little sense to say that his height “ruptured” our size expectations.

2. Model Two: Sticky Norms and Paradigm Shifts

Speaking of ruptures makes more sense in terms of the second model. In this model, for a variety of possible reasons, judicial behavior is “sticky.” Judges are reluctant to deviate from existing norms, perhaps due to a belief in judicial restraint, and hence are nearly always prone to take only “baby steps.” It is difficult to move them far away from the status quo. When the status quo finally does become untenable, however, they are likely to flip to a new equilibrium well removed from the existing one. Thus, behavior is characterized by long bouts of “normal science” punctuated by occasional “paradigm shifts.” Compared with a normal distribution, mid-range changes are disfavored—usually only small changes will occur, but large changes will also be overrepresented compared with the normal curve.²⁴ This kind of decisionmaking is closely associated with bounded human rationality, which leads individuals to use heuristics and rules of thumb that distort their responses to new information.²⁵

There are several reasons to expect this model to apply to statutory interpretation opinions. First, judges are presumably as much prone to bounded rationality as the rest of us. Thus, it would be surprising if their behavior did not show some signs of stickiness due to the use of heuristics, sticky norms, or “herding” effects. Second, since Supreme Court Justices face little penalty for errors, they may be under less pressure than other actors to conform their behavior to the theoretical standard of rational conduct. Third, studies have shown significant evidence of this kind of behavior in a variety of contexts, including stock market purchases, congressional budgeting decisions, and partisan voting margins.²⁶

²³See *id.* at 61-65, 111.

²⁴For a general discussion of this kind of behavioral model, see Dan M. Kahan, *Gentle Nudges vs. Hard Shoves: Solving the Sticky Norms Problem*, 67 U. Chi. L. Rev. 607 (2000). For a discussion of whether this model is or is not likely to apply to judges, see Eric Talley, *Precedential Cascades: An Appraisal*, 73 S. Cal. L. Rev. 87 (1999).

²⁵For an extensive discussion of how this idea applies in political science, see Bryan Jones, *Politics and the Architecture of Choice: Bounded Rationality and Governance* (2001).

²⁶*Id.* at 164-68.

Like the random walk model, this model is associated with a characteristic statistical property: leptokurtosis. In other words, we expect sharper peaks and fatter tails than the bell curve.²⁷ On the software used in this paper, any distribution with a kurtosis greater than zero is classified as leptokurtic. Bryan Jones, a political scientist who has studied bounded rationality models, explains the implications of this statistical property:

Leptokurtosis in output data has an important implication for decisionmaking. Change data from human institutions have, in comparison to the Gaussian [normal] distribution, an excess of cases in the central peak, an excess of cases in the tails of the distribution, but a paucity of cases in the “shoulders,” the area between the central peak and the tails. The general substantive interpretation of these results is that change in human institutions tends to be quite conservative—most cases clustered around a central peak—but is subject to occasional quite large punctuation (the tails). On the other hand, moderate change, as represented in the shoulders of the distribution, seem underrepresented—at least in comparison with the Gaussian. It would seem that a hypothetical decision maker would have to be prepared either for virtually no change or a very large change—he or she could not hope for moderate adjustments to changing circumstances.²⁸

On the other hand, the scale of these effects should not be exaggerated, according to Jones. Distributions tend not to be greatly removed from the normal, so that political and economic institutions “are not wildly out of line with what theories of adaptive behavior predict” while still leaving room for “bounded rationality ‘showing through.’”²⁹

3. Model Three: Complexity Theory and Scaling Laws

The third model is developed in an innovative study of judicial citations by David Post and Michael Eisen.³⁰ They speculate that law may have the same branching properties that generate certain fractal geometric objects, because each legal issue can potentially sprout sub-issues, which in turn can sprout sub-sub-issues, etc.³¹ They explain how such fractal branching is associated with power law distributions, in which frequency varies as some power n of a basic parameter. Such distributions are “produced on the boundary between order and disorder, at the ‘edge of chaos.’”³² Power law distributions are “well nigh ubiquitous in a wide variety of physical, biological, and social systems.”³³ They cite examples involving meteorology, demographics, biodiversity, and medicine—as well as the example I have chosen as emblematic, earthquake sizes.³⁴ Based on a very large sample of New York Court of Appeals cases and another sample of Seventh Circuit decisions, they find a good fit with their hypothesized power law (especially for the New York data).³⁵

The earthquake example is especially evocative. Just as tectonic plates encounter frictions and develop stresses, which are then resolved by earthquakes, so the fabric of the law can easily be imagined as developing similar stresses and strains. Indeed, the fact that most of the Supreme Court’s statutory cases

²⁷See *id.* at 164-67.

²⁸*Id.* at 184.

²⁹*Id.* at 173.

³⁰Post and Eisen, *supra* note 18.

³¹*Id.* at 553-59.

³²*Id.* at 568.

³³*Id.* at 569.

³⁴*Id.* at 569 n.569. For another recent example, see Pablo Marquet, *Of Predators, Prey, and Power Laws*, 295 *Science* 2229 (2002) (referring to the “vast number of biological power laws”).

³⁵Post & Eisen *supra* note 18, at 571-83.

involve conflicts between the circuits suggests a collision between opposing principles or rules of law, which the Court must then somehow resolve.

Like the bounded rationality model, the tectonic model predicts a more sharply peaked distribution than the normal curve. It differs from the bounded rationality model in two significant respects. First, we do not expect to find anything even distantly resembling a bell-shaped curve. Second, power laws have a crucial quality known as scaling. As Post and Essen explain, fractal objects (which exemplify power laws) have no natural scale—any one section has the same structure (on a smaller scale) as the whole. “No matter how high the magnification, no matter how deep into the structure you look, it always looks exactly, dizzingly, the same.”³⁶ More specifically, this means that there is no qualitative distinction between “normal science” and “paradigm shifting” except magnitude, just as the mechanisms and form of a small trembler are the same as those of a major earthquake except for the degree of violence. When geologists do seismic studies, they observe many small earthquakes and a few major earthquakes. But this is not because of any fundamental difference between “normal” and “paradigm-shifting” seismic events. We would find exactly the same pattern if we distinguished between tiny and merely small seismic events, or between large and gargantuan ones. Thus, in this model, paradigm shifts are just normal science “writ large.” Similarly, after shocks are not distinguishable from other earthquakes the spacing between quakes follows the same law whether the are minutes or decades apart.³⁷

II. THE EMPIRICAL STUDY

The empirical research was conducted in two phases. The first, somewhat more exploratory phase, covered the 1990 Term. The analysis was quite time consuming, since I was learning to use the software, refreshing my knowledge of statistics, and experimenting with different ways to handle the data in a search for patterns. The second phrase was closer to the social science ideal, with hypotheses and tests determined in advance, and a somewhat more careful and detailed data collection. I will not burden the reader with all of my errors and false-trails in the first phase. But since one of my major purposes is to encourage others to utilize the same types of citation data, I want to be candid about how the project developed.

A. Methodology

Probably the single most important decision in the project was simply to undertake positive rather than normative research. Having made that decision, I was left with the question of how to investigate dynamic interpretation empirically. From examining the literature, it seemed to me that relatively little use had been made of the vast amount of data that can now be collected from sources such as Westlaw and Lexis. Bryan Jones’s work then provided my initial inspiration, since it wasn’t hard to put together his work with the legal literature on sticky norms and precedential cascades. My initial hypothesis, then, was that citation frequencies would look like the modified normal distributions found in his work, basically symmetrical and single-peaked but with some leptokurtosis.

The next task was to pick a sample of cases. If two cases are from different years, their citation counts cannot be directly compared. (The earlier case has had more time to accumulate citations than the later one; on the other hand, its greatest impact may have been at a time when there was less litigation and therefore fewer opportunities to be cited.) To avoid this problem, I decided to focus on a single year. I wanted a year that was early enough so that cases would have ample opportunity to accumulate citations, because I was worried that otherwise most of the citations would be crammed down near zero, exaggerating the skew. On the other hand, I wanted a year that was reasonably representative of the modern interpretative regime, rather

³⁶Id. at 551, 559, 569.

³⁷See Per Bak, Kim Christensen, Leon Danon, and Tim Scanlon, *Unified Scaling Law for Earthquakes*, 88 *Physical Letters*, April 29, 2002.

than reflecting some earlier world such as the Warren Court. With these considerations in mind, I semi-randomly chose the 1990 Term.

The next step was to sit down with volume 111 of the West Supreme Court Reporter and decide which cases to include. My basic rule was to include any case that was not entirely constitutional or common law, so that textual interpretation was involved. (Note that I included cases involving interpretation of the federal procedural or evidentiary rules.) I also eliminated a few cases that involved the interpretation of federal statutes but had begun in state court, on the thought that an issue arising in state court might naturally get additional citations just because there are so many more state than federal decisions. In addition, I excluded per curiam opinions and cases falling within the Court's original jurisdiction.³⁸ In most cases, the inclusion decision was easy to make, but there were a few tough calls. The most notable was *Coleman v. Thompson*,³⁹ a habeas ruling which mentions the applicable federal statute but appears to be almost entirely based on a common law theory of equitable discretion. Because the statute seemed so incidental to the decision, I ultimately excluded it from the data set.

I then set about collecting the citation numbers.⁴⁰ This proved to be much easier than I expected, because West's KeyCite feature not only presents citations broken down in different ways but also automatically generates citation counts in the various categories. As I began collecting the data, I almost immediately noticed that the numbers seemed to be quite scattered, with little apparent clustering around a central value. After I had finished gathering the total number of cites, I began to wonder whether combining citations from different sources was affecting the results, so I went back and got a separate count on case citations. The bulk of the non-case citations were from law reviews, but I did not tabulate them separately in this phase of the study. I then set about analyzing the data, first finding averages, means, kurtosis and skew figures. I then constructed frequency distributions and looked at various permutations such as log and semi-log graphs. Finally, I experimented with fitting other curves to the data, such as exponential or Poisson distributions, using regression analysis to test the goodness of fit.⁴¹ This statistical analysis was done with a simple spreadsheet program (QuattroPro), of the kind commonly packaged with word processing programs.

In looking at the figures on case versus total citations, I was surprised that some of the cases which were most familiar to me, such as *Johnson Controls*, had very few citations in later opinions compared to the number of non-case (primarily law review) citations. I then set about calculating the ratio of case to non-case citations. Then I ran a regression of the number of case versus noncase citations for each opinion. Finally, to get a better feel for what was going on, I examined fifteen opinions more carefully. I took the ten opinions with the highest number of citations, and divided them into two groups (predominantly case versus predominantly non-case citations). For comparison purposes, I also read the five cases closest to the median number of total citations.

With what I had learned from this first phase, I then set about phase II. This time, I instructed my research assistant to chose a year between 1982 and 1995 at random (excluding 1990), which he did by drawing a slip of paper out of a hat. The chosen year was 1984. Following the standards above, he then

³⁸Both categories of cases are unlike the normal Supreme Court opinion. Cases in the original jurisdiction usually involve interstate boundary disputes. Their relevance to other courts is limited. Per curiam opinions generally involve issues that the Court believes are too clear-cut or limited in relevance to warrant oral argument or a full-scale opinion by the Court. They are not intended to establish "new law."

³⁹111 S.Ct. 2546 (1991). Out of curiosity, I later did a citation count for this case. As it turned out, *Coleman* had a very large number of citations (3985).

⁴⁰The search was conducted on February 2, 2002. To allow replication despite the lack of a rigorous coding process, the complete list of cases and citation counts can be found in Appendix A.

⁴¹For readers who are unfamiliar with regression analysis, the Russell Sage Foundation has published several helpful handbooks for social science students in its series "Quantitative Applications in the Social Sciences." See Michael Lewis-Beck, *Applied Regression: An Introduction* (1980); Christopher Achen, *Interpreting and Using Regression* (1982); Larry Schroeder, David Sjudquist, and Paula Stephan *Understanding Regression Analysis: An Introductory Guide* (1986).

classified the cases as either statutory or non-statutory. There were about ten cases where he was unsure and where I made the decision. I also later removed two cases he had classified as statutory but which seemed to me to be clearly constitutional. He then collected a more detailed set of data, including separate counts for state and federal citations, law reviews, page lengths, and case descriptions.⁴² Having received this data, I again calculated means, medians, kurtosis and skews, set up frequency diagrams, and did log log regressions to test the third model. Thus, the second phase more or less tracked the first, except with a new data set, somewhat more care, and a greater degree of planning.

B. Findings

The two Terms were rather unlike in some ways. The composition of the Court changed, with the departure of Brennan, Burger, and Powell, and the addition of Kennedy, Scalia, and Souter. There were more cases in 1984 than 1990, in line with the recent trend toward smaller Supreme Court caseloads.⁴³ Moreover, there was also a difference in judicial methodology between the two Terms: the Court was only a third as likely to cite legislative history in 1990 than 1984, so that the later Term was apparently more staunchly textualist.⁴⁴ Nevertheless, the citation patterns from the two Terms were strikingly similar.

1. 1990 Term

The data for the 1990 Term are displayed in Appendix A. As can be seen from glancing at the data, there was a large range in terms of numbers of citations per case. Considering the total citations (case and non-case), the mean was 613, but the median was only 419. The standard deviation was 222, and both the leptokurtosis (3.08)⁴⁵ and the skew (1.84) were pronounced. On average, citations were evenly divided between case and non-case cites, with a mean of 276 noncase cites. (Noncase cites included law reviews, treaties, practitioner materials, and administrative agency decisions.) But the distribution for non-case cites was even more skewed, with a median of 160, a standard deviation of 322, and high kurtosis (7.8) and skew (2.7). Readers who find these statistics unhelpful may find the charts in Figures 1 and 2, which break out case and non-case citations, more enlightening.

⁴²The searches were conducted on March 18, 29, and 21, 2002. Again, to allow replication, a complete list of the cases and citation numbers for the 1984 Term can be found in Appendix B.

⁴³For statistics on the two Terms, see *The Supreme Court—The Statistics*, 105 Harv. L. Rev. 419 (1991); *The Supreme Court—The Statistics*, 99 Harv. L. Rev. 325 (1985).

⁴⁴See the table in Vermuele, *supra* note 15, at 189.

⁴⁵Recall that the formula used by this software makes zero the kurtosis of the normal curve.

NonCase Citations 1990 Term

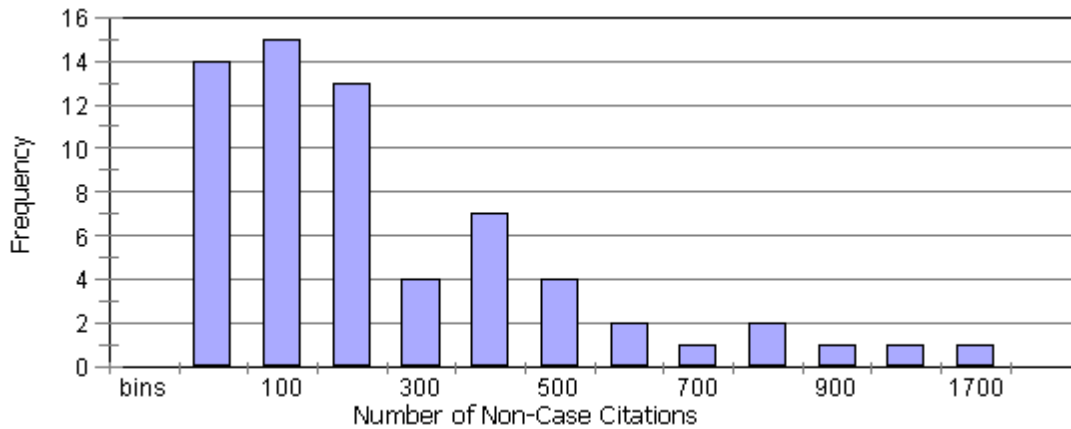


Figure 1

Case Citations 1990 Term

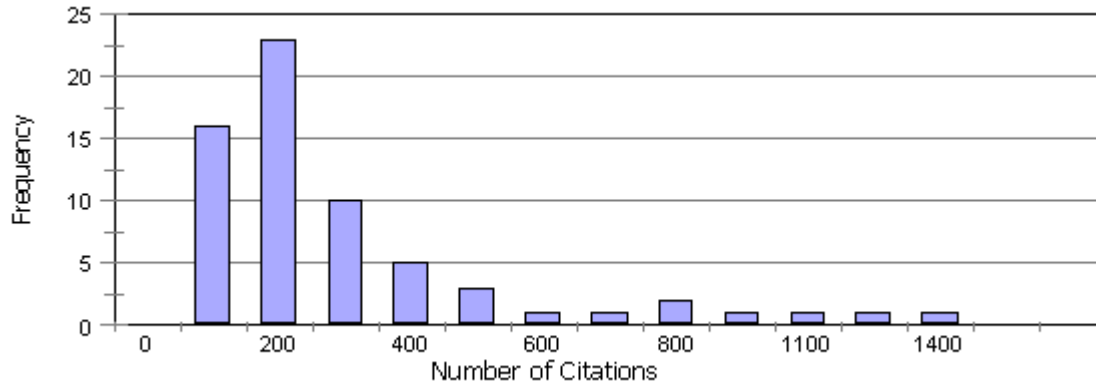


Figure 2

Testing for a power law requires a log log plot.⁴⁶ The regression analysis showed a close fit, with an R^2 of .83 for the non-case citations, and an almost identical R^2 for the regression with case citations. In both instances, the slope coefficient was about 1.2 and much larger than the estimate of standard error. As an inspection of the plots in Figures 3 and 4 shows, the log log plots are much “better behaved” and closer to linear than the previous charts.

⁴⁶More complete results for the regression analyses for the 1990 Term can be found in Appendix C. Using a single-tailed t test, the X coefficients are significant at the 1% level. (A two-tail test would not be appropriate because we know in advance that the X-coefficient is not positive: otherwise there would be a far greater number of high impact than lower impact cases, which seems unlikely). For an explanation of the use of the t statistic and a useful table, see Schroeder, Sjoquist, and Stephan, *supra* note 41, at 46-49, 82-83.

Log Log Plot -- Non-Case Citations
1990 Term

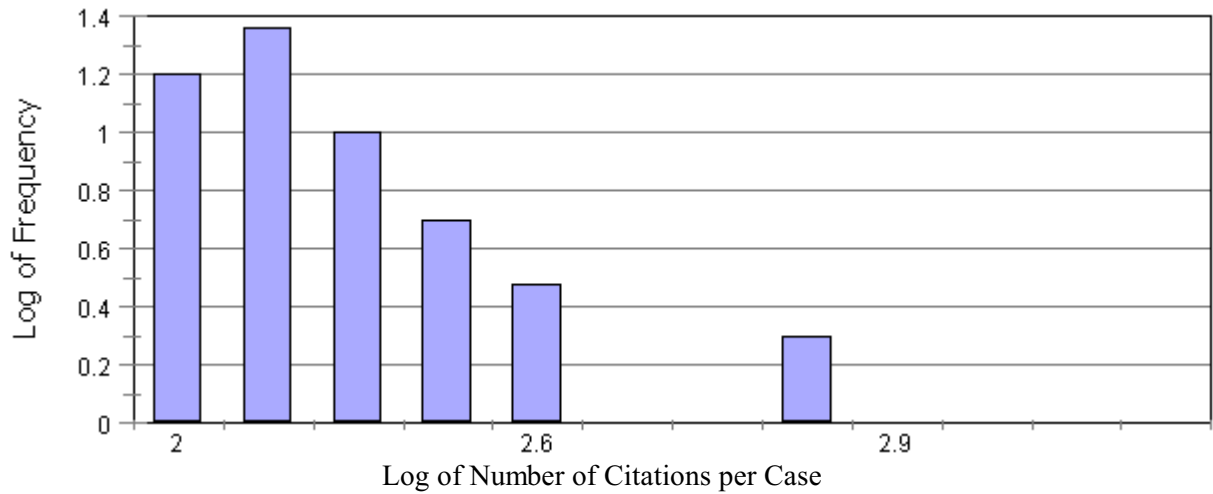


Figure 3

Log Log Plot of Case Cites
1990 Term (rev.)

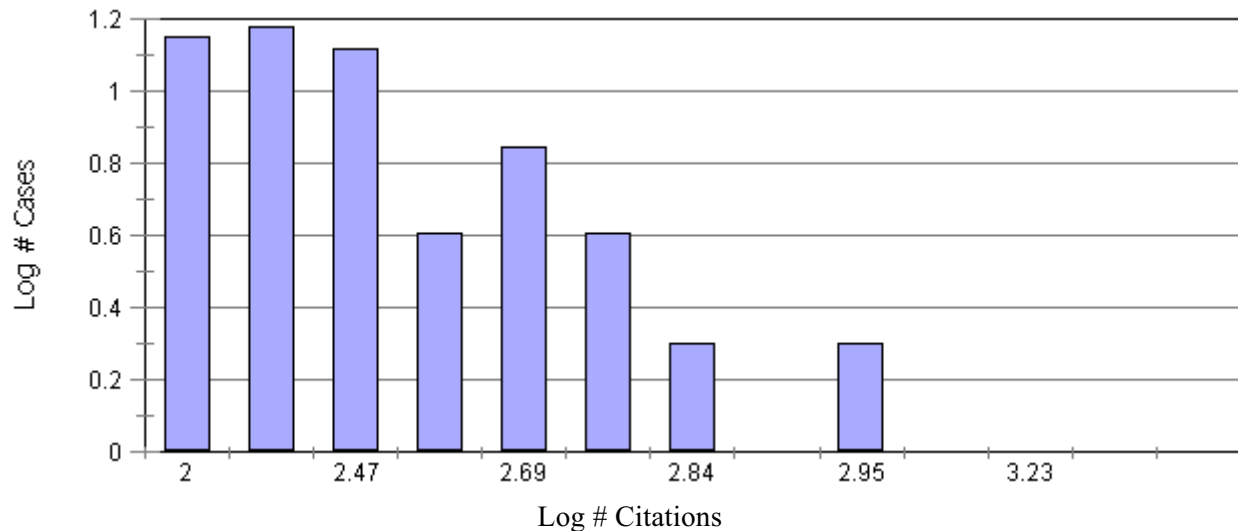


Figure 4

As mentioned earlier, I was intrigued by the apparent divergences between case and non-case citations. A regression showed that my impression was correct. Although an increase in the number of case citations clearly did predict a higher average number of noncase citations, almost none of the variance was explained (with an R^2 of only .07).⁴⁷ When I divided the ten most heavily cited cases into two groups, based on the proportion of judicial versus non-judicial citations, the difference between the groups was striking. Of the five cases most frequently cited by courts, all but one dealt with a procedural issue, and the exception dealt

⁴⁷Although weak, the positive relationship was genuine. The X coefficient was significant at the 2.5% level.

with ERISA preemption.⁴⁸ The five cases most frequently cited in law reviewers were much different.⁴⁹ All but one of the cases involved discrimination law. The fifth case involved the statutory and constitutional requirement of originality in copyright law, an issue with strong implications for restrictions on speech. In short, the courts seemed most keenly interested in procedure, while the commentators were drawn to cases with quasi-constitutional overtones.

2. 1984 Term

The shapes of the distributions in the more careful 1984 study were similar. For the total citations, the mean was 741, while the median was only 528. The standard deviation was quite large (712), and both the skew (1.8) and the leptokurtosis (2.9 on a scale with 0 for the normal curve) were pronounced. Figure 5 shows the distribution of citations in all judicial opinions. As Figure 6 shows, the log log plot is once again much better behaved.

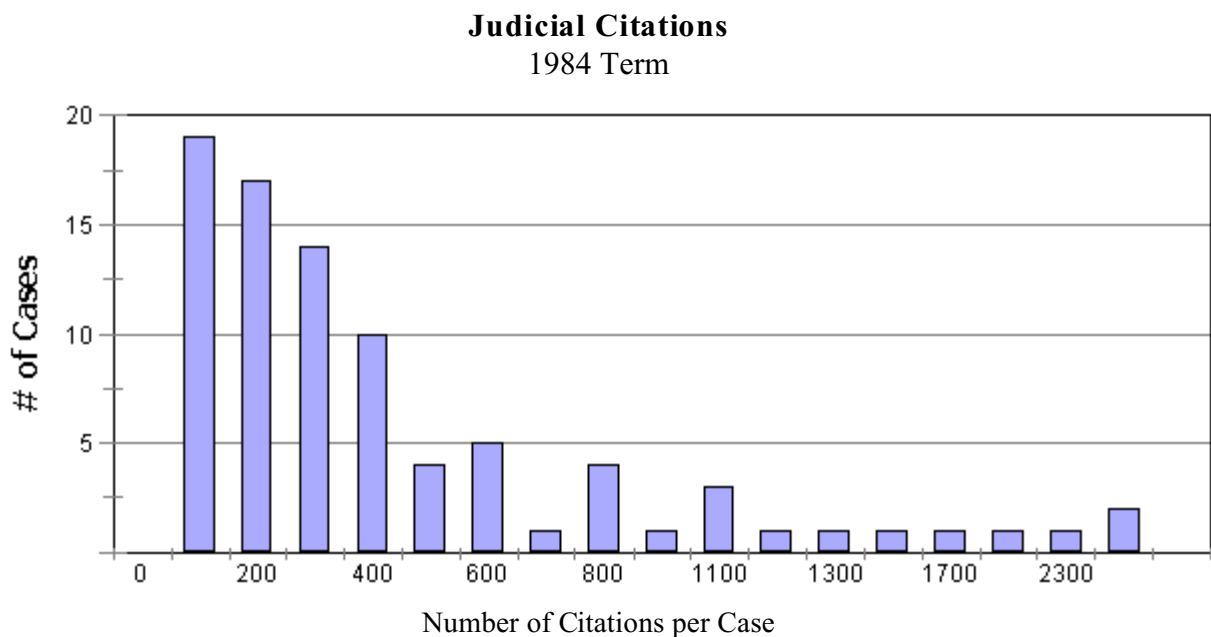


Figure 5

⁴⁸The five cases were *FMC Corp v. Holliday*, 498 U.S. 52 (1990) (ERISA preemption); *Irwin v. Dept. of Veterans Affairs*, 498 U.S. 89 (1990) (statute of limitations in Title VII case against federal government); *Grogan v. Garner*, 498 U.S. 279 (1991) (burden of proof in certain bankruptcy procedures) (the most highly cited statutory case of the Term!); *McCleskey v. Zant*, 499 U.S. 467 (1991) (habeas procedure); *Carnival Cruise Lines, Inc. v. Shute*, 499 U.S. 585 (1991) (whether a forum selection clause violated a maritime statute).

⁴⁹The five cases were *EEOC v. Arabian American Oil Co.*, 499 U.S. 244 (1991) (application of Title VII on foreign soil); *Gilmer v. Interstate/Johnson Lane Corp.*, 500 U.S. 20 (1991) (enforceability of agreement to arbitrate discrimination claim); *Rust v. Sullivan*, 500 U.S. 173 (1991) (abortion counseling restriction); *Feist Publications, Inc. v. Rural Telephone Serv. Co.*, 499 U.S. 340 (1991) (application of statutory and constitutional requirements of originality in copyright case); *Gregory v. Ashcroft*, 501 U.S. 452 (1991) (implications of state sovereignty for interpretation of civil rights law).

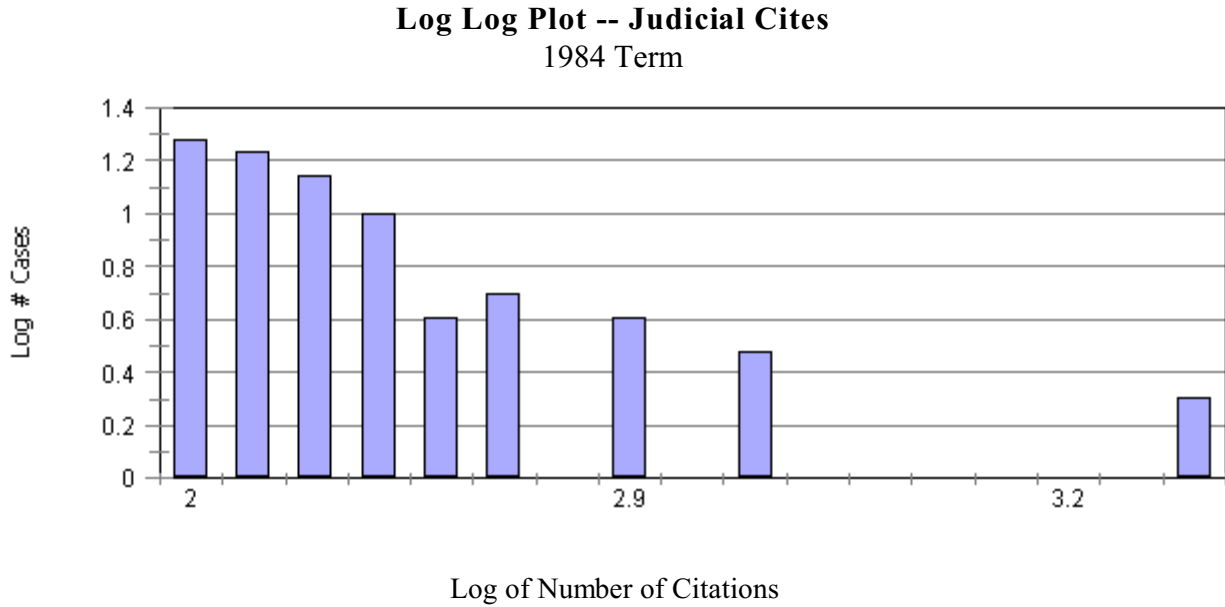


Figure 6

For the 1984 data, more focused counts were also tabulated. One count was for citations by federal appellate courts. Here, the mean was lower (153) but we have the familiar story in terms of kurtosis (11 in this instance) and skew (2.9). Again, the plots tell the tale. As Figures 7 and 8 show, the ordinary plot for federal appellate citations is highly skewed and curved, while the log log plot comes close to linear.⁵⁰ The regression results confirm this impression. The R^2 on the log log plot was .87, with an X coefficient of -1.8 significant at the .01 level).

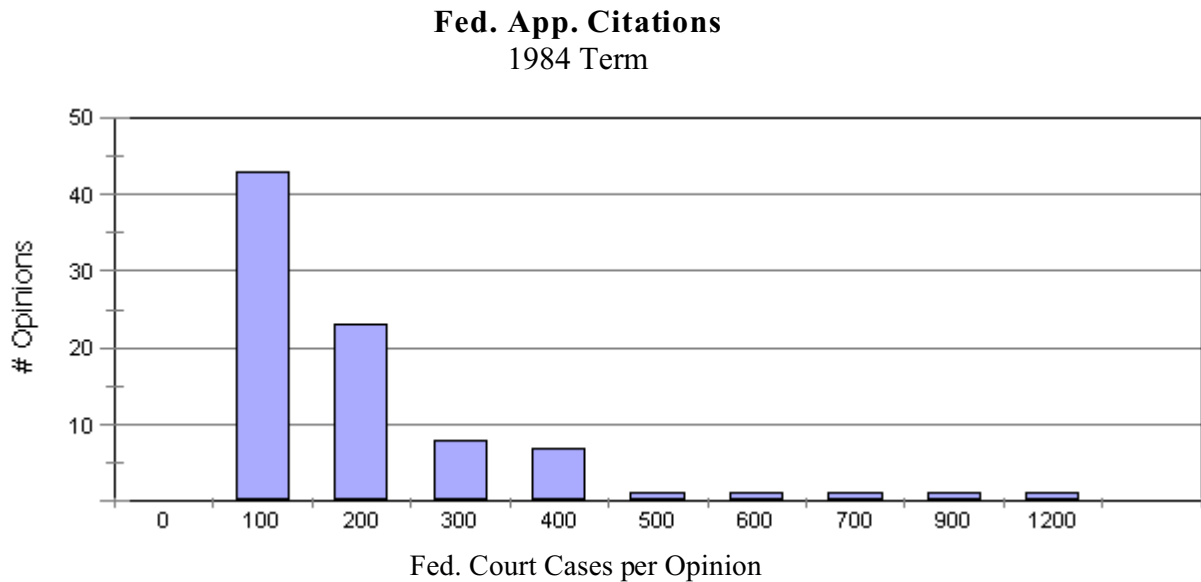


Figure 7

⁵⁰Complete results from the regression analyses for the 1984 Term can be found in Appendix D.

Log Log Plot -- Fed. App. Cites
1984 Term

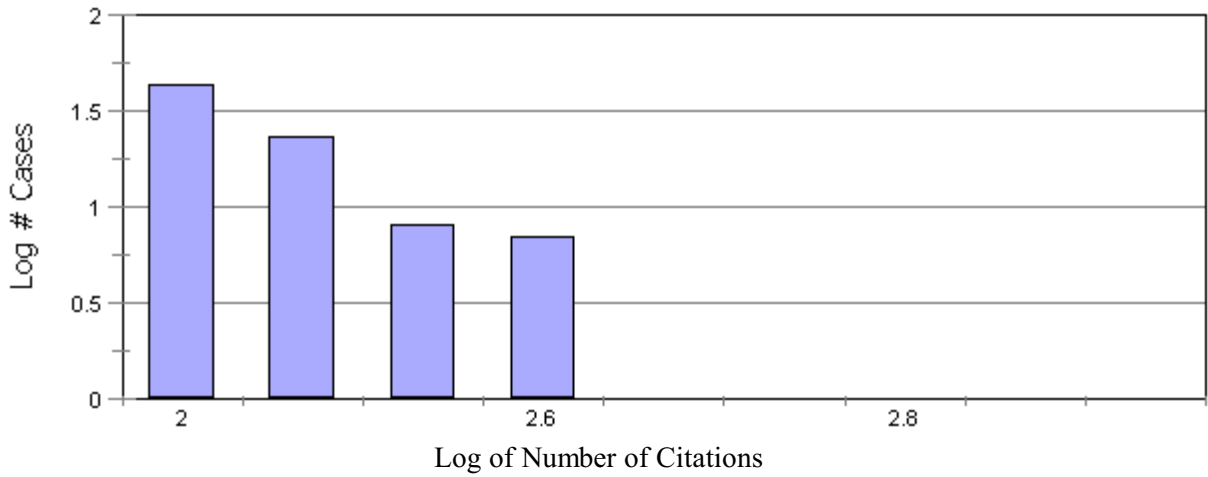


Figure 8

Rather than relying on a “non-case” count as in the 1990 analysis, Phase II included a specific breakdown for law review citations for the 1984 data. Figures 9 and 10 show the relevant distributions. The log log regression again comes out quite well, with an R^2 of .83 and an X coefficient of -1.6 (significant at the .01 level).

Law Review Citations
1984 Term

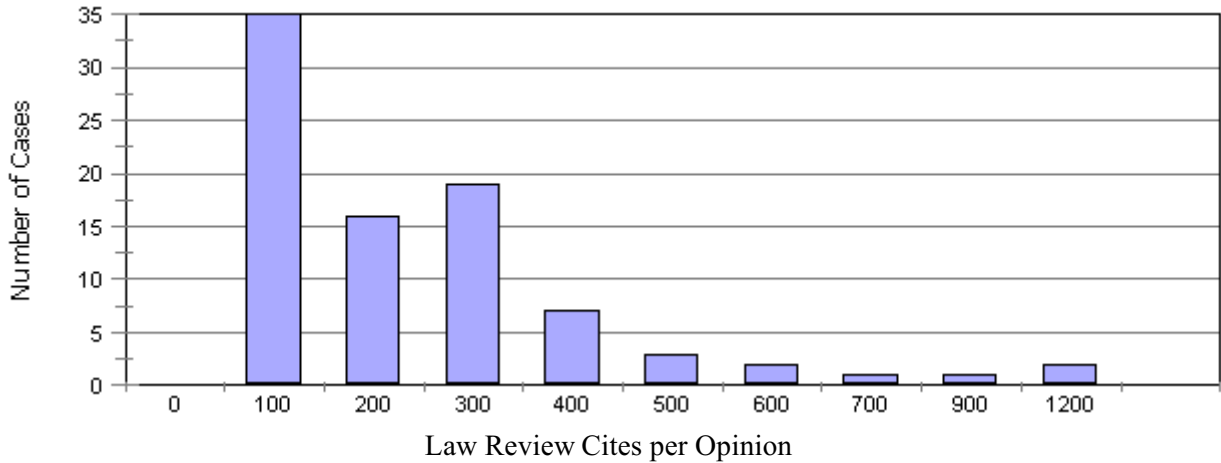
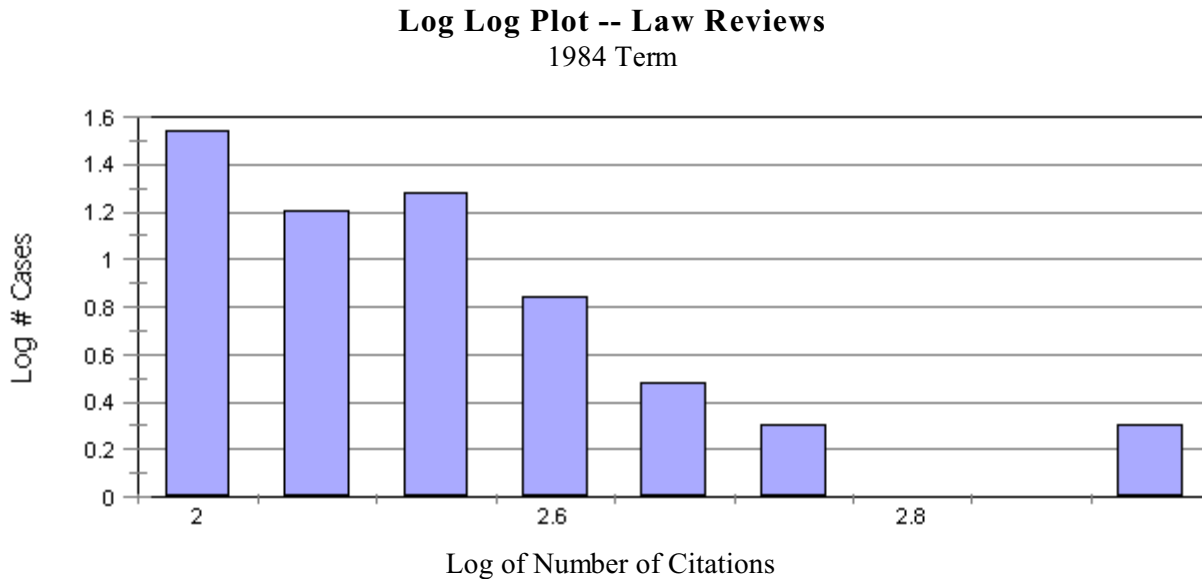


Figure 9

**Figure 10**

As a check on the relationship between different forms of citation, I also ran a regression of federal court citations versus law review citations. The regression confirmed that the features of opinions that interest federal judges overlap only slightly with those that interest academics. The R^2 was only .07, meaning that virtually none of the variance was explained. The X coefficient was positive and significant at the 5% level, suggesting that some small overlap of interests does exist but that it is dwarfed by the other divergences.

Once again, an examination of the top five cases in each category was revealing. Of the five cases with the highest number of judicial cites, three dealt with procedural issues, one involved ERISA, and the fifth involved an erroneous jury instruction regarding municipal liability under section 1983.⁵¹ As in 1990, the law review list contained a leading copyright case, a case on arbitration of statutory claims, and a quasi-constitutional case (on state sovereign immunity).⁵² The fifth case dealt with an important issue in administrative law regarding review of non-enforcement decisions.⁵³ In 1984, as in 1990, the only case on both lists dealt with arbitration of statutory claims.

III. IMPLICATIONS

What, if anything, does this all mean? Given the fact that only two years were studied and that the methodology was fairly crude, any conclusions have to be somewhat tentative. Nevertheless, in my view, the data does provide reasonable support for two conclusions. The first relates to the dynamics of statutory interpretation. Taken as a whole, the data seems most consistent with the tectonic model. (But since only two other models were tested, it remains possible that some other model would be superior.) The second, somewhat firmer conclusion, is that the idea of a typical statutory interpretation opinion is quite problematic. In particular, the opinions that are likely to come to a law professor's mind as typical are likely to be quite

⁵¹See *United States v. Young*, 470 U.S. (1985) (plain error rule); *Metropolitan Life Ins. Co. v. Massachusetts*, 471 U.S. 724 (1985) (ERISA) (this case also came very close to the top five list for law reviews); *City of Oklahoma City v. Tuttle*, 471 U.S. 808 (1985) (municipal liability); *Kentucky v. Graham*, 473 U.S. 159 (1985) (attorney's fees); *Mitsubishi Motors Corp. v. Soler Chrysler-Plymouth, Inc.*, 473 U.S. 614 (1985) (the only case on both lists).

⁵²In addition to *Mitsubishi*, the other cases were *Alexander v. Choate*, 469 U.S. 287 (1985) (discrimination based on disability); *Harper & Row v. Nation Enterprises*, 471 U.S. 539 (1983) (copyright); and *Atascadero State Hosp. v. Scanlon*, 473 U.S. 234 (1985) (sovereign immunity).

⁵³*Heckler v. Chaney*, 470 U.S. 821 (1985).

different from those that a judge or litigator would find typical. After discussing these conclusions, I close with a brief discussion of possible directions for further research.

A. *Toward a Theory of Tectonic Statutory Interpretation*

Earlier in this article, I sketched three models of the dynamics of statutory interpretation. The first of these models, the random walk model, seems clearly inconsistent with the data. The random walk model implies a normal distribution of citation frequencies. The data for both years and for all categories of citations were not at all normally distributed, as can be seen visually from inspecting the various charts and statistically from the high skew and kurtosis numbers.

The second model, the bounded rationality model, cannot be rejected quite as confidently. This model predicts leptokurtosis, and the data do indeed display leptokurtosis. But there can be too much of a good thing. The “boundedness” part of the model predicts leptokurtosis, but the “rationality” part of the model suggests that deviations from the normal distribution will not be too severe. This deviation is strikingly shown by Figure 11 (prepared with the SPSS statistical software). Previous empirical support for this model have involved distribution much less skewed than I have found. On balance, despite my initial support for this model, I have concluded that it is not well-supported by the data.

Total Citations (1990) Compared with Normal Curve

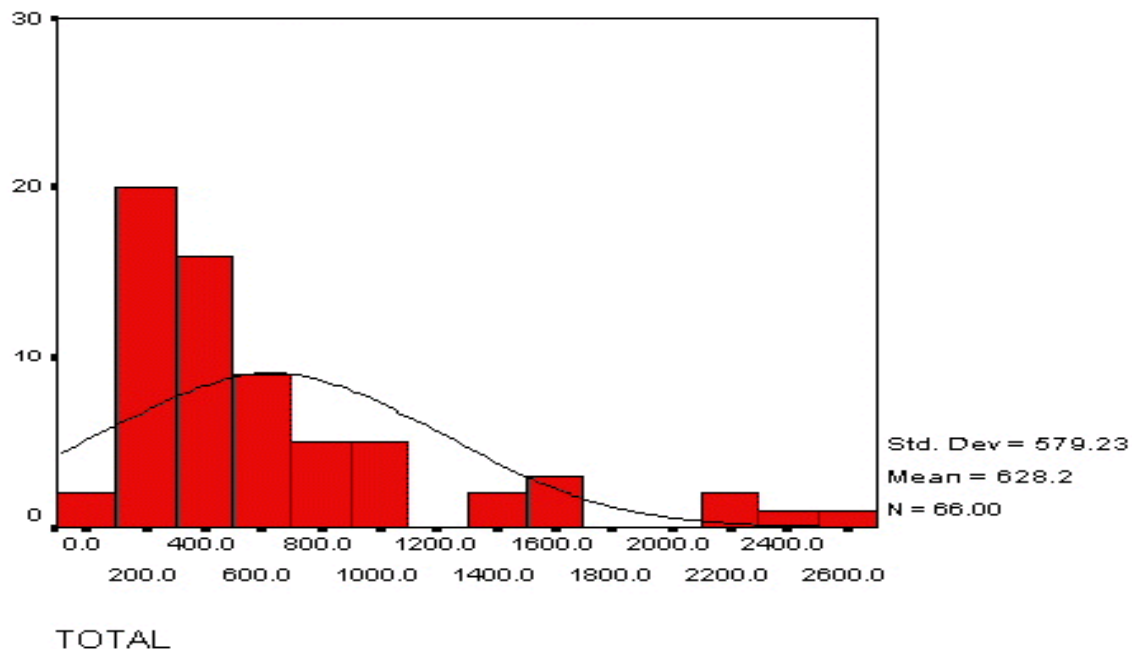


Figure 11

This leaves the tectonic model, which performed very well. First, the high R^2 for each of the log log regressions shows that the model is a good fit, in the sense of explaining much of the variance in citation frequencies. Second, the X-coefficients for both years and for different categories of citations are strikingly similar, ranging between minus one and minus two. (Basically, in each case, the number of cases N with a given number of citations per case C is given by a formula roughly of the form, $N = kC^{-1.5}$, where k is a constant that varies for each set of citations.) Indeed, Post and Eisen obtained similar coefficients for the

data from the New York Court of Appeals and for their combined data set from the Seventh Circuit.⁵⁴ This suggests that the good fits are not merely happenstance, but instead reflect some underlying structural similarity between the various sets of data.

Because such a broad range of phenomena are subject to power laws of this kind, the existence of this law does not tell us much about the underlying mechanism. That mechanism might or might not take the form of the branching pattern discussed by Post and Eisen. What we do know from the existence of such a power law, however, is that whatever mechanism exists covers a wide range of scales. In other words, the same basic mechanism should generate both tremors (opinions which add little to the law and gather only a few cites) and earthquakes (opinions which greatly shift the law and gather a high number of cites).

The seismic analogy would support more serious consideration of the idea that opinions are generated by stresses and fractures in the law, which are resolved in large or small ways by shifts on one side of a fault line or the other. These shifts, in term, may generate stresses elsewhere, resulting in later seismic events involving related legal issues. It is common to speak of “shifts in the legal landscape.” The tectonic model suggests that the analogy may be more exact, and that these shifts may actually resemble earthquakes in some quantitative way.

B. The Elusive “Typical” Opinion

As we saw earlier, there is a tremendous spread among citation counts. Some Supreme Court opinions have only a few dozen cites; others have one or two thousand. The median opinion may have ten times as many cites as one kind but only a fifth as many as the other. In sum, the most typical attribute of any opinion, apparently, is to be atypical.

If we do want to single out particular opinions for study, we have to think carefully about what to look for. Taking the median opinion is probably the best we can in identifying what cases are representative of the whole set of statutory interpretation opinions. But if what interests us is not how the Court handles fairly routine cases, but how major new law gets made, these median cases may give a misleading impression. New law is disproportionately made by a dozen or so cases at the high end of the distribution, and a study of median or run-of-the-mill cases will exclude these blockbusters. If we are interested in the Court’s methodology, the median cases may be more revealing; if we are interested in how statutory interpretation evolves, we might be more interested in the outliers.

Determining what cases to study is all the more difficult because case impact is not unitary. Probably the clearest finding of this study is that there are two, almost completely independent, dimensions of case impact. The characteristics that lead to citations by courts seem to be quite different from those that lead to citations by legal academics. Perhaps this should not be a surprise. We already know that courts and academics differ greatly in which secondary sources (such as law review articles) they cite.⁵⁵ But it is nonetheless striking just how little correlation there is between judicial and academic citations of Supreme Court cases.

One might view this finding as simply another confirmation of the well-known (and apparently widening) chasm between the legal academy and the profession. But it would probably be a mistake to view the split as merely reflecting an “ivory tower” temperament among professors. The cases cited most heavily by law reviews involve issues of genuine social importance, even if they are not issues that give rise to extensive litigation. In the 1990 Term, the case most heavily cited by courts involved the burden of proof in certain bankruptcy proceedings. This is an issue that is apparently important to bankruptcy judges and practitioners, as well as to a large numbers of people who are either bankruptcy petitioners or their creditors. But in some

⁵⁴Post and Eisen, *supra* note 18, at 572-73, 583.

⁵⁵See Deborah Merritt and Mealie Putnam, *Judges and Scholars: Do Courts and Scholarly Journals Cite the Same Law Review Articles?*, 71 Chi.-Kent L. Rev. 871 (1996).

sense, it does not have the same fundamental social significance as the discrimination cases that had the lion's share of the attention in the law reviews. We should resist the temptation to dismiss the judicial citation figures as merely indicating the limited intellectual perspective of the profession or the law review citation figures as merely indicating distance from the real world of legal practice. Instead, we should view them as reflecting independent but equally significant dimensions of legal impact.

Academics who write about statutory interpretation probably need to be particularly careful, because their own ideas of typicality are likely to reflect one of these dimensions much more than the other. Thus, in selecting individual cases for analysis, it is important to consider opinions which dramatically impact litigation and practice, as well as those that dramatically relate to important social issues. A useful convention might be to routinely report both judicial and law review citation figures whenever discussing a specific statutory interpretation opinion, or at least the ratio between the two.

C. Future Directions for Research

It is much easier to generate new ideas for empirical research than to actually carry them out. With that caveat in mind, here are three ideas for extending the line of research presented in this paper.

The first is simply to solidify the methodology used in this paper. The methods could be made more rigorous by developing a more formal procedure for coding cases as statutory or nonstatutory. Moreover, it would be possible, though time-consuming, to use KeyCite to distinguish between citations to the statutory and nonstatutory holdings of the same opinion. Also, two years is not really enough. Using a larger number of years would provide greater confidence about the results. Perhaps more importantly, it should be possible to test some alternative models against the tectonic model, which again would provide a greater level of confidence about the conclusions. And of course, the level of statistical sophistication could well be increased.

The second idea for further research would be to expand the analysis to include various characteristics of each opinion. It would be useful to know whether a particular Justice's work has greater impact on lower courts or on academics. It would also be useful to categorize the cases (for example, as procedural or substantive). Perhaps most intriguing, the citation impact analysis could be combined with previous work on the sources of authority in judicial opinions. Holding other variables constant, it would certainly be interesting to know whether textualist opinions tend to have greater or lesser impact than opinions relying on legislative history.

Third, longitudinal extensions of the study would shed more light on the mechanisms involved in citation impact. Cases may differ from each other primarily in their amount of immediate impact or in their staying power. Moreover, by examining cases which actually discuss rather than merely cite the opinion (another useful feature of KeyCite), one could probably get a better grip on the extent to which cases are cited because the holdings raise new issues as opposed to settling old ones. It would also be interesting to connect the citation information with the age of the statutory provision. Dynamic interpretation, in the sense of updating old statutes, might show up fairly clearly in the form of high impact opinions involving old statutes. It would certainly be useful to get some sense of how common such opinions really are and when they arise. It would also be useful to determine whether these cases arose because changing social or economic conditions have produced new types of litigation; because changing social values made old rules seem inappropriate; or because of changes in the legal landscape.

In addition to these possible directions for formal empirical research, this paper also has some implications for the kinds of informal case studies that are more common among law professors. As we have seen, the idea of typicality seems to be quite problematic in this area, and legal scholars need to be sensitive to the issue of case selection. Scholars also probably need to make a special effort to include cases with high levels of judicial citations, even if those opinions are not on issues that legal academics consider "sexy."

On the theoretical side, the tectonic model seems to be a potentially useful addition to existing visions of statutory interpretation, many of which can ultimately be traced back to Bill Eskridge's work.⁵⁶ Viewing appellate opinions as seismic events—large or small legal shifts that resolve stresses between conflicting legal forces while sometimes creating new stresses—may prove to be a fruitful perspective. If nothing else, it is a good reminder to expect the unexpected. If this model is correct, every now and then, just as with earthquakes, we can expect to run into legal shifts of extraordinary magnitude, far out of line with past year-to-year experience. The model suggests that these mega-cases are extraordinary in their impact, but not in the mechanisms that produce them. Much of legal scholarship is in essence a search for fruitful metaphors. The earthquake metaphor may turn out to be not only striking but quantitatively valid.

Quite regardless of the ultimate validity of the conclusions reached in this paper, citation impact figures are a valuable and largely untapped source of information about the dynamics of statutory interpretation, which cry out for further investigation. They could also help identify which individual cases are worth in-depth study.

⁵⁶As Stephen Ross points out in his contribution to this symposium, Eskridge's article also illustrates a related phenomenon. It has been extensively cited by other scholars but rarely by courts. Again, this may be a sign of the academic/professional split, or it may indicate that the average judge is interested in a different set of opinions than those upon which Eskridge focuses.

Appendix A
Statutory Interpretation Cases in the 1990 Term

Citation	Case	Statute/Subject	# of cites	case cites	noncase
498 U.S. 19	Miles v. Apex Marine Corp.	Jones Act	723	448	275
498 U.S. 52	FMC Corp. v. Holliday	ERISA Preemption Clause	1068	762	306
498 U.S. 73	Arcadia v. Ohio Power Co.	Federal Power Act § 318	119	29	90
498 U.S. 89	Irwin v. Department of Veterans Affairs	Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq.)	1447	1243	204
498 U.S. 103	Moskal v. U.S.	Criminal: 18 U.S.C. § 2314 interpretation of term "falsely made"	360	224	136
498 U.S. 184	Demarest v. Manspeaker	28 U.S.C. § 1821- payment of witness fees to state prisoner	276	165	111
498 U.S. 192	Cheek v. U.S.	IRS Code: 26 U.S.C. § 7203	840	468	372
498 U.S. 211	Mobil Oil Exploration v. United Distribution	Natural Gas Policy Act of 1978 15 U.S.C. § 3301 et seq.	98	32	66
498 U.S. 269	Firstier Mtge. Co. v. Investors Mtge. Ins. Co.	Federal Rule of Appellate Procedure 4(a)(2)	142	104	38
498 U.S. 279	Grogan v. Garner	Bankruptcy Code § 523(a)	2548	2392	156
498 U.S. 292	U.S. v. R. Ent., Inc.	Federal Rule of Criminal Procedure 17(c)	244	105	139
498 U.S. 337	McDermott International, Inc. v. Wilander	Jones Act	451	291	160
498 U.S. 395	Gozlon-Peretz v. U.S.	Sentencing Reform Act of 1984, Anti-Drug Abuse Act of 1986 (21 U.S.C. § 841(b)(1)(A))	321	262	59
498 U.S. 439	Dennis v. Higgins	42 U.S.C. § 1983	348	157	191
498 U.S. 466	International Organization of Masters, Mates & Pilots v. Brown	Labor-Management Reporting and Disclosure Act of 1959 (29 U.S.C. §§ 401(c), 481(c))	39	16	23
498 U.S. 479	McNary v. Haitian Refugee Center, Inc.	Immigration Reform and Control Act of 1986, Immigration Nationality Act	359	222	137
498 U.S. 517	Air Courier Conf. of America v. Am. Postal Workers Union, AFL-CIO	APA, 39 U.S.C. § 410(a), Private Express Statutes	201	87	114
498 U.S. 533	Business Guides, Inc. Chromatic Comm. Ent., Inc.	Federal Rule of Civil Procedure 11	632	401	231

Citation	Case	Statute/Subject	# of cites	case cites	noncase
499 U.S. 65	Air Line Pilots Association, International v. O'Neill	Standard governing claims that union breached duty of fair representation	600	444	156
499 U.S. 83	West Virginia University Hospitals, Inc. v. Casey	42 U.S.C. § 1988 (attorney's fees)	935	471	464
499 U.S. 117	Norfolk & Western Railway Co. v. Am. Train Dispatchers' Association	Interstate Commerce Act (49 U.S.C. §11341(a))	254	161	93
499 U.S. 144	Martin v. OSHRC	Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.)	484	299	185
499 U.S. 160	U.S. v. Smith	Federal Employees Liability Reform and Tort Compensation Act of 1988, Federal Tort Claims Act	238	157	81
499 U.S. 187	Int'l Union, UAW v. Johnson Controls, Inc.	Pregnancy Discrimination Act, Title VII of the Civil Rights Act of 1964	924	152	772
499 U.S. 244	EEOC v. Arabian Am. Oil Co.	Title VII of the Civil Rights Act of 1964 (42 U.S.C. §2000e et seq.)	1038	243	795
499 U.S. 315	U.S. v. Gaubert	Home Owners' Loan Act of 1933 (12 U.S.C. §§ 1461-1470)	790	614	176
499 U.S. 340	Feist Pub., Inc. v. Rural Tele. Service Co., Inc.	Copyright Act of 1976 (17 U.S.C. §§ 102(a)-(b))	2327	605	1722
499 U.S. 365	City of Columbia v. Omni Outdoor Advertising, Inc.	Sherman Act	588	343	245
499 U.S. 432	Kay v. Ehrler	42 U.S.C. § 1988 (attorney's fees)	291	168	123
499 U.S. 467	McCleskey v. Zant	habeas abuse-of-the-writ doctrine	2139	1673	466
499 U.S. 530	Eastern Airlines, Inc. v. Floyd	Article 17 of Warsaw Convention	280	131	149
499 U.S. 554	Cottage Savings Ass'n v. Comm'r of Internal Revenue	Internal Revenue Code: 26 U.S.C. § 1001(a)	358	57	301
499 U.S. 573	U.S. v. Centennial Savings Bank FSB	Internal Revenue Code: 26 U.S.C. § 108(a)(1)(C)(a)	194	50	144
499 U.S. 585	Carnival Cruise Lines, Inc. v. Shute	Forum Selection Clause, 46 U.S.C. App. § 183c	1072	548	524
499 U.S. 606	American Hospital Ass'n v. NLRB	NLRA	196	55	141
500 U.S. 1	Stevens v. Department of the Treasury	Age Discrimination in Employment Act of 1967 (29 U.S.C. § 633a(d))	119	62	57

Citation	Case	Statute/Subject	# of cites	case cites	noncase
500 U.S. 20	Gilmer v. Interstate/Johnson Lane Corp.	Age Discrimination in Employment Act of 1967 (29 U.S.C. § 621 et seq.)	2223	835	1388
500 U.S. 72	Int'l Primate Protection League v. Administrators of Tulane Educational Fund	28 U.S.C. § 1442(a)(1)	236	128	108
500 U.S. 90	Kamen v. Kemper Financial Services, Inc.	Investment Company Act of 1940 (15 U.S.C. § 80a-1(a) et seq.)	486	235	251
500 U.S. 136	McCarthy v. Bronson	28 U.S.C. § 636(b)(1)(B) (prisoner petitions challenging conditions of confinement)	170	123	47
500 U.S. 173	Rust v. Sullivan	Public Health Service Act (42 U.S.C. §§ 300 to 300a-6)	1565	427	1138
500 U.S. 257	McCormick v. U.S.	Hobbs Act (18 U.S.C. § 1951)	166	75	91
500 U.S. 291	Farrey v. Sanderfoot	Bankruptcy Code: 11 U.S.C. § 522(f)(1)	410	186	224
500 U.S. 305	Owen v. Owen	Bankruptcy Code: 11 U.S.C. § 522(b)	415	235	180
500 U.S. 322	Summit Health, Ltd. v. Pinhas	Sherman Act	323	128	195
500 U.S. 344	Braxton v. U.S.	United States Sentencing Guidelines § 1B1.2(a)	150	92	58
500 U.S. 453	Chapman v. U.S.	Criminal: 21 U.S.C. § 841(b)(1)(B) (sentencing requirements for offense of distributing LSD)	763	548	215
500 U.S. 478	Burns v. Reed	42 U.S.C. § 1983	723	504	219
500 U.S. 603	Exxon Corp. v. Central Gulf Lines, Inc.	Federal Maritime Lien Act	117	57	60
500 U.S. 646	Clark v. Roemer	Voting Rights Act of 1965 (42 U.S.C. 1973 et seq.)	109	54	55
501 U.S. 78	Johnson v. Home State Bank	Bankruptcy Code	569	338	231
501 U.S. 89	Melkonyan v. Sullivan	Equal Access to Justice Act (28 U.S.C. § 2412(d)(1)(B))	534	479	55
501 U.S. 104	Astoria Federal Savings & Loan Ass'n v. Solimino	Age Discrimination in Employment Act of 1967 (29 U.S.C. § 621 et seq.)	419	255	164
501 U.S. 115	Gollust v. Mendell	Section 16(b) of the Securities and Exchange Act of 1934 (15 U.S.C. § 78p(b))	190	91	99

Citation	Case	Statute/Subject	# of cites	case cites	noncase
501 U.S. 129	Burns v. U.S.	Federal Rule of Criminal Procedure 32(a)(1)	454	330	124
501 U.S. 157	Toibb v. Radloff	Bankruptcy Code: 11 U.S.C. § 109(d)	507	232	275
501 U.S. 190	Litton Financial Printing Div. v. NLRB	NLRA §§ 8(a)(1) and 5	364	232	132
501 U.S. 380	Chisom v. Roemer	§ 2(b) of the Voting Rights Act of 1965	491	141	350
501 U.S. 419	Houston Lawyers' Ass'n v. Attorney General of Texas	§ 2 of the Voting Rights Act of 1965	149	47	102
501 U.S. 452	Gregory v. Ashcroft	Age Discrim. in Employ. Act of 1967 (29 U.S.C. §§ 621-634)	1492	395	1097
501 U.S. 597	Wisconsin Public Intervenor v. Mortier	Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136 et seq.)	658	286	372
501 U.S. 680	Pauley v. Bethenergy Mines, Inc.	Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. § 901 et seq.)	316	185	131
501 U.S. 797	Ylst v. Nunnemaker	habeas exhaustion requirement	581	529	52
501 U.S. 350	Lampf, Pleva, Lipkind, Prupis & Petigrow v. Gilbertson	§ 10(b) of the Securities and Exchange Act of 1934 (15 U.S.C. § 78j(b)), Rule 10b-5 (CFR § 240.10b-5 (1990))	1584	894	690
501 U.S.	Virginia Bankshares, Inc. v. Sandberg	§ 14(a) of the Securities and Exchange Act of 1934 (15 U.S.C. § 78n(a))	668	244	424

Appendix B
Statutory Interpretation Cases in the 1984 Term

Citation	Case	Statute/Subject	Total Cites	Fed. App. Cites	Law Rev. Cites
469 U.S. 38	Luce v. U.S.	Criminal: Construction of FRE 609(a)	805	179	117
469 U.S. 45	U.S. v. Abel	Criminal: Construction of FRE 403, 608(b)	646	124	182
469 U.S. 57	U.S. v Powell	Criminal: Application of Dunn Rule and interpretation of 21 U.S.C. 843(b) conspiracy.	860	385	52
469 U.S. 70	Garcia v. U.S.	Criminal: Construction of 18 U.S.C. 2114 which proscribes the assault of any custodian of mail or any money, property of U.S.	515	148	163
469 U.S. 111	Trans World Airlines v. Thurston	ADEA construction	1707	377	357
469 U.S. 131	Paulsen v. Commissioner of Internal Revenue	IRS Code: 354(a)(1) and 368(a)(1)(A) which provides an exception to recognizing a gain on the sale or exchange of property for corporate reorganizations.	200	5	34
469 U.S. 153	Mills Music, Inc. v. Snyder	Copyright: 304(c) (6) of the Copyright Act interpreted. "Grant" defined.	174	20	77
469 U.S. 189	Park N'Fly, Inc. v. Dollar Park and Fly, Inc.	Trademark	814	142	270
469 U.S. 241	U.S. v. Boyle, Executor of the Estate of Boyle	IRS Code: 6651(a)(1) whether a taxpayer's reliance on an attorney to prepare returns constitutes a "reasonable cause" so as to defeat a statutory penalty incurred because of late filing.	976	640	115
469 U.S. 256	Lawrence County v. Lead-Deadwood School District No. 40-1	Payment in Lieu of Taxes Act 31 U.S.C. 6902(a); compensates local govt for the loss of tax revenue resulting from immune status of federal lands located in their jurisdiction.	141	22	66
469 U.S. 274	Ohio v. Kovacs	Bankruptcy Code: 101(4)(b)	707	51	252
469 U.S. 287	Alexander, Governor of TN v. Choate	Rehabilitation Act of 1973 Sec. 504: allegations that 14 day limitation on annual inpatient hospital days would have disproportionate impact on handicap in violation of Act	1153	148	585
469 U.S. 310	Tiffany Fine Arts v. U.S.	IRS Code	147	21	22
469 U.S. 464	Brandon v. Holt	1983 Action	840	153	77
469 U.S. 490	NLRB v. Action Automotive, Inc.	NLRA:	125	30	28
470 U.S. 1	U.S. v. Young	Federal Rules of Criminal Procedure: 52(b) plain error	2021	1143	150

Citation	Case	Statute/Subject	Total Cites	Fed. App. Cites	Law Rev. Cites
470 U.S. 39	U.S. v. Dann	Indian Claims Commission Act: Defining "payment"	68	14	32
470 U.S. 116	Chemical Manufacturer's Ass'n v. NRDC	Clean Water Act Sec. 301(1)	488	134	197
470 U.S. 166	NAACP v. Hampton County Election Commission	Voting Rights Act Sec. 5	101	5	32
470 U.S. 184	Heckler v. Turner	Social Security Act and AFDC	143	46	24
470 U.S. 213	Dean Witter Reynolds Inc. v. Byrd	Federal Arbitration Act	1780	219	461
470 U.S. 226	County of Oneida, N.Y. v. Oneida Indian Nation of New York State	Indian Claims: Non Intercourse Act	562	92	298
470 U.S. 373	Marrese v. American Academy of Orthopedic Surgeons	Procedural Issues: preclusion, interlocutory orders, Sherman Anti-trust	1059	263	191
470 U.S. 392	Air France v. Saks	Warsaw Convention Article 17	435	43	213
470 U.S. 414	Herb's Welding, Inc. v. Gray	Longshoremen's and Harbor Worker's Compensation Act	185	50	59
470 U.S. 451	Nat'l Railroad Passenger Corporation v. Atchison, Topeka & Santa Fe Railway Co.	Rail Passenger Service Act of 1970	232	49	59
470 U.S. 480	Federal Election Commission v. National Conservative Political Action Committee	Presidential Election Campaign Fund Act / Federal Election Campaign act of 1971 (FECA)	496	40	325
470 U.S. 583	First National Bank of Atlanta v. Bartow County Board of Tax Assessors	Tax Case: Rev. Stat 3701	55	1	7
470 U.S. 632	Bennett v. New Jersey	1978 Amendments to Title I of the Elementary and Secondary Education Act	242	59	47
470 U.S. 656	Bennett v. Kentucky Dept. of Education	Title I of the Elementary and Secondary Education Act	77	32	20
470 U.S. 729	Florida Power & Light Co. v. Lorion	Hobbs Act: Regarding NRC and Sec. 2239	474	149	63
470 U.S. 768	Lindahl v. Office of Personnel Management	Federal Government Disability Retirement Program 5 U.S.C. 8347, 7703	429	243	71
470 U.S. 821	Heckler v. Chaney	Federal Food, Drug, and Cosmetic Act, and APA	1488	371	638
470 U.S. 856	Ball v. U.S.	Criminal: 18 U.S.C. 922(h)(1) and U.S.C. App. 1202(a)(1)	555	238	98

Citation	Case	Statute/Subject	Total Cites	Fed. App. Cites	Law Rev. Cites
471 U.S. 34	Town of Hallie v. City of Eau Claire	Antitrust Law: municipality's anticompetitive activities and state action exemption under federal law	707	101	272
471 U.S. 48	Southern Motor Carriers Rate Conference, Inc. v. U.S.	Sherman Act: collective ratemaking	529	65	228
471 U.S. 84	U.S. v. Locke	Federal Land Policy and Management Act of 1976: Sec 314	582	164	214
471 U.S. 159	C.I.A. v. Sims	National Security Act Sec, 102(d)(3) incorporated in Freedom of Information Act	164	43	53
471 U.S. 195	Kerr-McGee Corp. v. Navajo Tribe of Indians	Indian Reorganization Act of 1934, Indian Mineral Leasing Act of 1938: whether tribe may tax business activities on its land w/o approval of Sec. Of Interior	128	11	89
471 U.S. 202	Allis-Chalmers Corp. v. Lueck	Labor Management Relations Act and WI court's creation of tort of the bad-faith handling of insurance claims	1845	354	252
471 U.S. 234	Webb v. Dyer County Board of Education	42 U.S.C. Sec. 1983 Claim and Civil Rights Attorney's Fees Awards Act of 1976 42 U.S.C. Sec. 1988	310	57	56
471 U.S. 261	Wilson v. Garcia	42 U.S.C. Sec. 1983 Claim and Statute of Limitations under New Mexico Tort Claims Act	3297	846	354
471 U.S. 290	Tony & Susan Alamo Foundation v. Sec'y of Labor	Fair Labor Standards Act: 29 U.S.C. Sec. 203(r) defining the word 'enterprise'	431	48	232
471 U.S. 343	Commodity Futures Trading Commission v. Weintraub	Bankruptcy Code and attorney-client privilege	826	46	247
471 U.S. 359	Burlington School Committee v. Massachusetts Department of Education	Education of the Handicapped Act: 20 U.S.C. Sec. 1415(e)(2) and (3)	702	164	119
471 U.S. 419	Liparota v. U.S.	7 U.S.C. Sec. 2024(b)(1): food stamp fraud and mens rea requirement	671	187	285
471 U.S. 444	I.N.S. v. Rios-Pineda	Immigration and Nationality Act Sec. 244(a)(1)	336	208	65
471 U.S. 524	Connecticut Dept. of Income Maintenance v. Heckler	Medicaid Act	110	34	23
471 U.S. 539	Harper & Row v. Nation Enterprises	Copyright Act Sec. 107 "fair use"	1886	134	1120
471 U.S. 681	Landreth Timber Co. v. Landreth	Securities Act of 1933, Securities Exchange Act of 1934	437	91	50

Citation	Case	Statute/Subject	Total Cites	Fed. App. Cites	Law Rev. Cites
471 U.S. 701	Gould v. Rufenacht	Securities Act of 1933, Securities Exchange Act of 1934	260	15	89
471 U.S. 707	Hillsborough County v. Automated Medical Laboratories, Inc.	Preemption of local ordinances by Public Health Service Act Sec. 351 regulating collection of plasma	959	109	375
471 U.S. 724	Metropolitan Life Insurance Co. v. Massachusetts	Preemption: ERISA Sec. 514(a), NLRA, Massachusetts Stat. Sec. 47(b)	1929	259	584
471 U.S. 759	Montana v. Blackfeet Tribe of Indians	Indian Mineral Leasing Act of 1938	258	49	129
471 U.S. 773	Garrett v. U.S.	Comprehensive Drug Abuse Prevention and Control Act of 1970, 21 U.S.C. Sec. 848 and Double Jeopardy Clause	758	266	169
471 U.S. 808	Oklahoma City v. Tuttle	42 U.S.C. Sec. 1983	1962	328	246
471 U.S. 845	National Farmers Union Insurance Cos. v. Crow Tribe of Indians	Federal jurisdiction under 28 U.S.C. Sec. 1331 and Tribal Courts	529	114	254
471 U.S. 858	Russell v. U.S.	18 U.S.C. Sec. 844(I)	204	83	60
472 U.S. 1	Schreiber v. Burlington Northern, Inc.	Securities Act of 1933 Sec. 14(e)	540	40	235
472 U.S. 115	Atkins v. Parker	Food Stamp Act: 7 U.S.C. Sec. 2020(e)(10)	243	51	59
472 U.S. 159	Northeast Bancorp, Inc. v. Board of Governors of the Federal Reserve System	Bank Holding Company Act of 1956 12 U.S.C. Sec. 1841 et seq.	309	25	184
472 U.S. 181	Lowe v. SEC	Investment Advisers Act of 1940 15 U.S.C. Sec. 80(b), Sec. 303	324	23	168
472 U.S. 237	Mountain States Telephone and Telegraph Co. v. Pueblo of Santa Ana	Public Lands Act of 1924	221	58	65
472 U.S. 284	Northwest Wholesale Stationers, Inc. v. Pacific Stationery & Printing Co.	Sherman Act, Robinson-Patman Act	1011	82	442
472 U.S. 299	Bateman Eichler, Hill Richards Inc. v. Berner	Securities and Exchange Act of 1934 and Securities Exchange Commission Rule 10b-5	584	36	203
472 U.S. 353	Johnson v. Mayor & City Council of Baltimore	Age Discrimination in Employment Act of 1967 29 U.S.C. 8335(b)	148	21	43
472 U.S. 400	Western Air Lines, Inc. v. Criswell	Age Discrimination in Employment Act of 1967 29 U.S.C. 4(f)(1)	553	69	243
472 U.S. 424	Richardson-Merrell Inc. v. Koller	Civil Procedure: 28 U.S.C. Sec 1291	528	187	124

Citation	Case	Statute/Subject	Total Cites	Fed. App. Cites	Law Rev. Cites
472 U.S. 559	Central States Pension Fund v. Central Transport, Inc.	ERISA	377	92	77
472 U.S. 585	Aspen Skiing Co. v. Aspen Highlands Skiing Corp.	Sherman Act Sec. 2	982	128	443
472 U.S. 648	Cornelius v. Nutt	Civil Service Reform Act of 1978 5 U.S.C. Sec. 7701(c) (1) et seq.	156	67	31
472 U.S. 675	U.S. v. Albertini	Criminal: 18 U.S.C. Sec. 1382	527	108	242
472 U.S. 713	U.S. v. National Bank of Commerce	Tax Case: Internal Revenue Code of 1954 Sec. 6331(a), 6332(a)	720	146	83
472 U.S. 846	Jean v. Nelson	Immigration and Nationality Act, APA	619	136	254
473 U.S. 1	Marek v. Chesny	42 U.S.C. 1988 and FRCP 68: attorney's fees and 42 U.S.C. 1983 actions	819	117	283
473 U.S. 52	U.S. v. Shearer	Federal Tort Claim Act: 28 U.S.C. Sec. 2680(h)	348	127	90
473 U.S. 61	NLRB v. Int'l Longshoremen's Association, AFL-CIO	National Labor Relations Act, Rules on Containers	97	18	39
473 U.S. 95	Pattern Makers' League of North America, AFL-CIO v. NLRB	National Labor Relations Act: 29 U.S.C. Sec. 8(b)(1)(A), 158(b)(1)(A)	351	45	126
473 U.S. 134	Massachusetts Mutual Life Insurance Co. v. Russell	ERISA Sec. 409(a)	1774	296	361
473 U.S. 159	Kentucky Bureau of State Police v. Graham	42 U.S.C. 1988: attorney's fees and 42 U.S.C. 1983 actions	3031	506	190
473 U.S. 207	Dowling v. U.S.	National Stolen Property Act (18 U.S.C. Sec. 2314)	355	76	177
473 U.S. 234	Atascadero State Hospital v. Scanlon	Rehabilitation Act of 1973 Sec. 50: retroactive monetary relief and 11th Amendment	1918	307	823
473 U.S. 479	Sedima, S.P.R.L. v. Imrex Co., Inc.	RICO 18 U.S.C. Secs. 1961-1968: Sec. 196(c) and private civil actions	2833	480	392
473 U.S. 568	Thomas v. Union Carbide Agricultural Products Co.	Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 et seq) and Article III	811	104	330
473 U.S. 614	Mitsubishi Motors Corp. v. Soler Chrysler-Plymouth, Inc.	Federal Arbitration Act (9 U.S.C. Sec 1 et seq), Convention on the Recognition and Enforcement of Foreign Arbitral Awards, Sherman Act	2776	308	1107
473 U.S. 716	Carchman v. Nash	Interstate Agreement on Detainers, Article III	283	63	21

Appendix C Statistical Analyses for 1990 Term

Case Citations

1990 Term

Log Log

Regression Output:

Constant		3.56
Std Err of Y Est		0.21
R Squared		0.83
No. of Observations		12
Degrees of Freedom		10

X Coefficient(s)	-1.10	
Std Err of Coef.	0.16	

Log/log non-case cites

Regression Output:

Constant		3.94
Std Err of Y Est		0.23
R Squared		0.83
No. of Observations		12
Degrees of Freedom		10

X Coefficient(s)	-1.28	
Std Err of Coef.	0.19	

Case versus Non- Case Citations

Regression Output:

Constant		199.65
Std Err of Y Est		315.44
R Squared		0.07
No. of Observations		65
Degrees of Freedom		63

X Coefficient(s)	0.23	
Std Err of Coef.	0.10	

Appendix D
Statistical Analysis for 1984 Term

**Fed. App. cites
versus law review
cites**

	Regression Output:	
Constant		160.43
Std Err of Y Est		204.53
R Squared		0.07
No. of Observations		86
Degrees of Freedom		84
X Coefficient(s)	0.30	
Std Err of Coef.	0.12	

**Log Log – Fed. App.
Citations**

	Regression Output:	
Constant		5.38
Std Err of Y Est		0.26
R Squared		0.87
No. of Observations		9
Degrees of Freedom		7
X Coefficient(s)	-1.84	
Std Err of Coef.	0.27	

**Log Log – Law
Review Citations**

	Regression Output:	
Constant		4.78
Std Err of Y Est		0.25
R Squared		0.83
No. of Observations		9
Degrees of Freedom		7
X Coefficient(s)	-1.56	
Std Err of Coef.	0.26	