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Examining the Efficiency of the U.S. Courts of Appeals: Pathologies and Prescriptions

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Abstract: Until recently (e.g., Lindquist 2007), few studies have examined the factors that might affect aspects of judicial efficiency, including the time it takes a court to decide a case. In our analysis of a sample o f U.S. Courts of Appeals decisions from 1971-1996, we examine a variety of potential causes of inefficiency, or pathologies, before suggesting a series of prescriptions.

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Judicial Pathologies and Prescriptions

Over the last several decades, many legal professionals (e.g, 109th Congress, 206; ABA, 1978; ABF, 1968) and/or scholars (e.g., Cohen, 2002; Hettinger, Lindquist, & Martinek, 2006; Posner, 1996; Rubin, 2007**)** have examined the question of judicial performance and efficiency. Most of the studies note the 'pathologies'[2] of the judicial process that lead to inefficiency and diminished quality of decisions. A subset of these studies either suggests or critiques alternative prescriptions that might enhance efficiency (e.g., Baker 2008; Binder & Maltzman, 2009; Cecil, 1985; Lindquist, 2007). Nevertheless, very few studies have tried to more comprehensively and empirically identify the pathologies, or root causes of inefficiency, while simultaneously testing the efficacy of the various prescriptions. We take up a part of that effort here at the U.S. federal appellate level, with a focus on efficiency in terms of disposition time—our dependent variable.

To more concisely and directly engage the theoretical and empirical nature of judicial pathologies and prescriptions, we discuss our data measures in the same sections in which we formulate hypotheses. We begin with a general discussion of our data set. We then underscore some of the more important works on judicial efficiency and describe how we have operationalized this as the dependent variable in our study. We then review the pathologies of judicial decision-making in terms of efficiency and suggest several hypotheses and prescriptions. These facets of these pathologies constitute our independent variables of interest. We then detail several important control variables. Next we present our analysis with a discussion of findings. We conclude with directions for future research and implications.

[2] The earliest reference we found to this term's use is Gough's article (1955-1956), discussing, coincidentally, 'swift justice'—our primary dependent variable in this study.

Measures

To explore factors impacting judicial efficiency at the case level, we examine a sample of reported U.S. Courts of Appeals cases (from the twelve geographically divided circuits) decided during calendar years 1971-1996.[3] The thirteen courts of appeals are the national intermediate appellate courts. Twelve of the courts cover distinct geographic areas, or circuits (the thirteenth, the Federal Circuit Court, is a national appellate court that hears cases involving a limited number of substantive issues). The judges are appointed by the president with the advice and consent of the Senate. They typically hear mandatory appeals of questions of law arising from cases decided by the lower federal trial courts (the U.S. District Courts).

The case data were taken from the *U.S. Courts of Appeals Database* (Songer 1996), which contains a sample of thirty cases per circuit, per year during that period; and the Federal Judicial Center's (FJC) *Federal Court Cases: Integrated Data Base, Appellate Terminations, 1970-2000*.[4] By focusing on reported cases we are, in effect, controlling for the impact of publication. We also controlled for panel size by eliminating en banc cases. Moreover, we chose to utilize the Songer database because it contained the identities of the judges, and could be linked to the *Multi-User Database on the Attributes of United States Appeals Court Judges, 1801-2004* (Gryski, Barrow, and Zuk 2004) and the *A Multi-User Database on the Attributes of*

[3] We did not include cases beyond 1996 because the FJC did not contain the information necessary to allow us to construct the efficiency dependent variable. Moreover, we could not consistently find the necessary information using WestLaw or Lexis. More than one third of the cases did not contain any information regarding the date the last brief was filed (the starting point for our dependent variable), and the missing data was systematic (in particular, it occurred more often in certain circuits and it occurred more frequently in later years).

[4] Of the 8,588 cases, we analyzed 7,616. Most of the cases were excluded because of missing data on one or more variables. We also excluded five outliers with unusually high values of the dependent variable—the time it took the panel to decide the case. Specifically, case processing times in excess of five years were considered outliers possibly resulting from key stroke error. The results of the hypothesis tests did not change when we included the bankruptcy cases and the outliers (or used different cut points to determine the outliers).

U.S. Courts of Appeals Judges, 1801-2000 (Zuk, Gryski, and Goldman 2004), which contain judge demographic characteristics.

Efficiency and the U.S. Courts of Appeals: Dependent Variable

Most judicial decision-making studies focus on the nature of the decision, rather than the time spent making it. Most discussions of judicial efficiency either point out the need for court reform, resulting from perceived inefficiency, or analyze the logical implications of various types of reform—without empirically testing these implications (e.g., Posner, 1983; Richman & Reynolds, 1988). A significant line of empirical research has analyzed some of the implications of one particular type of reform: the increased use of unpublished decisions by the U.S. Courts of Appeals. These typically either focus on explaining the court's decision to publish (Merritt & Brudney, 2001) or they compare the characteristics of unpublished and published cases (Songer, 1990). However, these studies almost always ignore the impact that this practice would have on judicial efficiency. Only a handful of studies test whether the reforms actually enhance efficiency (e.g., Beenstock & Haitovsky, 2004; Binford, Greene, Schmidlkofer, Wilsey, & Taylor, 2007).

Lindquist (2007) and Cauthen and Latzer (2008) have recently provided some of the more comprehensive studies of judicial efficiency. Lindquist's (2007) study of the U.S. Courts of Appeals examined the impact of several aggregate, circuit-level characteristics (e.g., number of judges, as well as use of oral arguments, publication, and judges sitting by designation). Lindquist's (2007) study, while path-breaking, is limited in its analysis to aggregate level efficiency. Cauthen and Latzer's (2008) study examines case-level capital appeals. They find relationships between opinion length and processing times, treatment of the lower court, dissensus, and ideological diversity. Their study, however, is limited to state court decisions in a fairly narrow, albeit important area of the law.

Why is judicial disposition time important? Certainly the reasons vary by type of case. For example, in the study of capital appeals Cauthen and Latzer (2008) cite three reasons. Long processing times (1) compromise public conference in the justice system, (2) dilute a sentence's deterrent effect, and (3) can be grounds for further litigation. In general, however, the logic follows the notion of Constitutional due process and the adage that swift justice is fair justice.

Disposition Time, a measure of judicial efficiency, or more precisely, judicial inefficiency, is measured as the number of days it takes the panel to decide a case after the parties have submitted all of the written briefs to the court.[5] Higher values indicate increasing delay, or deliberation time.[6] The date the brief was submitted was obtained from the FJC.

Pathologies of Inefficiency: Independent Variables.

If pathologies are the root causes of judicial inefficiency, what factors precipitate these pathologies? Work by Cohen (2002) suggests that increasing workloads leads to bureaucratization of courts. Bureaucratization, in turns, impacts factors like the use of support staff and judge collegiality, which are thought to influence process and outcomes (Eastman, 2006; Lindquist, 2007). Increased workloads may stem from the combination of reluctance to appoint more judges (Lindquist, 2007) and an increasing cultural reliance on the adversarial system to resolve disputes (Kagan, 2001).

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[5] Alternatively, we could have used the number of days from the oral argument, as opposed to the submission of the brief. In some ways, this is a more valid measure, since we are interested in several panel level independent variables, and the panel really has no impact on the disposition speed until after oral arguments. However, approximately fourteen percent of the cases are decided without oral arguments. Obviously, if we had used the oral argument date, we would have had to exclude those cases. The selection bias problem would be magnified by the systematic variance of the use of oral arguments across circuits and over time. Given that the disposition time calculated using the date from oral argument is highly correlated with the measure using the date from brief submission (approximately 0.70), we think the latter is a valid surrogate that enables us to include the non-orally argued cases.

[6] While others have made this same assumption (e.g., Baker 2008; Lindquist 2007), we do recognize that this is an oversimplification. From a broader cost-benefit perspective of efficiency, the fastest opinions are potentially less efficient in that it could be a function of a poor decision, or a poorly articulated justification for the decision.

To detail some of the pathologies connected with the preceding factors and to develop empirical research hypotheses we discuss four main areas of judicial pathologies. We categorize these pathologies into factors broadly related to diversity, burnout, expertise, and institutional mechanisms. We discuss each in turn.

Diversity. Broadly rooted in the notion that collegiality leads to faster decision making, we explore whether panel diversity impacts case disposition times. We include three measures of diversity: ideological, tenure, and law school quality. Prior theory suggests that diversity leads to conflict (reduced collegiality), which results in less efficient (Pelled, Eisenhardt, and Xin 1999) panels. Ideological diversity increases dissensus (Boyea 2007; Hettinger et al. 2006), which then leads to longer disposition times (Cauthen and Latzer 2008; Lindquist 2007, 692). We hypothesize accordingly:

H1. Panel ideological diversity leads to longer disposition times.

We estimated *Ideological Diversity* as the absolute value of the difference of the ideology scores for the most liberal and conservative panelists. To estimate the panelist's ideology, we utilized the widely employed Giles-Hettinger-Peppers (2001) scores, which use the Poole and Rosenthal common-space NOMINATE scores of the appointing president and the judge's home state senators from the president's party (which can be found at www.voteview.org). Specifically, if no home state senators are from the president's party or the judge sits on the D.C. court, the president's value is used; if one senator is from the president's party, the senator's score is used; if two senators are from the president's party, the average of the two senator's scores are used. This is one of the standard methods of operationalizing U.S. appeals court judge ideology (see the following for examples, Clark 2009; Hettinger, Lindquist, and Martinek 2006; Kaheny, Haire, and Benesh 2008).

Just as ideological diversity can lead to conflict, we also postulate that diversity of tenure (i.e., the mixture of seasoned and less experienced judges) will lead to diminished feelings of collegiality. We therefore hypothesize that:

H2. Panel tenure diversity will lead to diminished efficiency.

Following the approach utilized by Pelled, Eisenhardt, and Xin (1999) for continuous measures, we estimated *Panel Tenure Diversity* using the coefficient of variation (the standard deviation divided by the mean) to capture the variation of appointment dates between judges on a panel. Larger coefficients indicate greater diversity.

Panel Law School Quality Diversity continues the theme that differences lead to conflict and thus inefficiency. Drawing upon early work on prestigious education and stratification (Collins, 1971), and work that suggests that even among Ivy League schools there is stratification (Kingston & Lewis, 1990), we hypothesize that:

H3. Panel law school quality diversity will lead to inefficiency.

Panel Law School Quality Diversity is a binary variable that equals '1' when there is some mixture of judges who attended elite[7] (Slotnick, 1983) versus non-elite law schools. It is coded '0' if all of the panelists attended the same type of school. We also included a *Panel Law School Quality* variable that is the number of judges on the panel that attended an elite law school.

[7] Slotnick (1983) identified the following 15 schools as elites: Harvard, Yale, Chicago, Stanford, Columbia, Michigan, Berkeley, Pennsylvania, New York University, Duke, Virginia, Texas, Cornell, Northwestern, and UCLA. It should be noted that this measure is highly correlated with several independent measures, indicating substantial criterion and construct validity (see Adcock and Collier 2001, 537). For example, with respect to criterion validity, 14 of the 15 elite schools are ranked in the top 15 of the 2008 *U.S. News and World Report* rankings. With respect to construct validity, the Slotnick measure is highly correlated with several concepts which should be interrelated with law school quality. For example, from 1950-2001, 13 of Slotnicks's schools were among the 15 largest producers of U.S. Supreme Court clerks; 14 were in the top 16; and all 15 were in the top 21 (Szmer 2005). Similarly, using data from the *Multi-User Database on the Attributes of United States Appeals Court Judges, 1801-2004* (Zuk et al. 2004), of the top producers of U.S. Court of Appeals judges, the first nine schools are elites according to Slotnick, as are 11 of the top 16

Burnout. Beyond measures that cover the pathologies of inefficiency related to diminished collegiality, we also explore pathologies related to worker burnout and inefficiency. Relative to the present study, burnout can lead to such outcomes as reduced productivity (Cordes & Dougherty, 1993). We hypothesize that:

H4. Judge burnout will lead to reduced efficiency.

In our study we include *Panel Mean Tenure* and *Panel Mean Age*. Both variables could reflect a possible burn out effect, which would slow down disposition times.

Expertise. Admittedly, these measures also tap into panel expertise, which should augment efficiency. Cohen (2002) highlights the important of expertise when he implies that efficiency is a function of judge expertise. He observes (2002, 48) "judges must learn a relatively comprehensive set of applicable rules and law and applicable facts of a case." Reduced or inconsistent expertise is a pathology that can impact disposition times. For example, we hypothesize that judges who are elevated from federal district courts to appellate judgeships are more likely to know the rules of federal adjudication and therefore will be in a better position to move decisions along.

H5. Elevated judges will be more efficient than judges who are not elevated from federal district court.

Elevated Judges is a measure of the number of judges on the panel that were elevated from the U.S. District Courts to the U.S. Courts of Appeals, and should reflect an aspect of expertise required for efficient decision-making (again, judges with district court experience presumably have more process, and possibly substantive, expertise).

Due to demanding case loads and systematic understaffing, the circuits rely on judges who are not active members of that circuit to participate in a significant number of cases. These

"judges sitting by designation" serve on a volunteer basis, and typically come from three pools: senior (retired) judges from that circuit, active appeals judges from other circuits, and active district court judges from that circuit (on a rare occasion, retired U.S. Supreme Court justices also sit by designation). Lindquist (2007, 674) notes that "extensive reliance on visitors (including judges from other circuits and district court judges) is likely to alter the decision-making environment within the circuit." Such effects include reduced dissensus (Hettinger, Lindquist, & Martinek., 2006) and reduced continuity and cohesiveness (Cooper & Berman, 2001).

Our analysis is slightly more refined. We include three sets of dummy variables to account for the presence of each of the three primary types of designated judges: *District Court Judge*, *Visiting Appellate Court Judge*, and *Senior Judge*. Each variable is coded '0' if at least one of the judges on the panel was a designated judge of that particular variety; otherwise, they are coded '0'. In general, we expect that judges sitting by designation will reduce the efficiency of the panels. However, we also expect that visiting appellate judges and senior judges have an 'inside' expertise in appellate procedure and relevant substantive law. We hypothesize that:

> *H6. Visiting district court judges will reduce efficiency.*
>
> *H7. Visiting appellate court judges and visiting senior judges will reduce efficiency but not to the same extent as visiting district court judges.*

The latter part of H7 dealing with senior judges represents an alternative hypothesis to the burnout effects expected in H4, where we might expect senior judges to be less efficient.

Institutional Mechanisms. In addition to pathologies that are more judge based (diversity, burnout, and expertise), we also recognize that a number of institutional-level factors potentially influence disposition time. For example, long identified as a prescription toward increasing efficiency (e.g., Posner, 1996), the U.S. Courts of Appeals frequently decide cases without oral

arguments. Typically, oral arguments at this level last 30 minutes, during which time the lawyer(s) for both sides present prepared remarks and respond to questions from the bench. While the oral arguments can play a role in the judges decisions (Cohen 2002), they are also costly. Cohen (2002, 57) notes "judges spend at least one week of each month hearing arguments, potentially at the expense of time spent on other aspects of the judicial process." Moreover, since the judges in a single circuit are often dispersed among many cities covering a large geographic area, many judges have to travel to meet for oral arguments, adding additional temporal costs (Goldman 1990). At the circuit level, Lindquist (2007, 692) found that "For every one percent increase in oral argument rate, disposition time is increased by .03 months." Balancing the costs and benefits of oral arguments (Cohen 2002; Goldman 1990), panels may deny oral arguments for cases that are frivolous, hinge on issues that have already been decided, or are adequately presented in the written record such that oral arguments would not provide useful additional information (Baker 1995). As such, the decision to hear oral arguments is an institutional level mechanism we believe to be related to our dependent variable of interest. The hypothesis here is fairly straightforward in this more established pathology.

H8. Orally argued cases contribute to longer disposition times.

Presumably, the *Oral Argument* variable coefficient will reflect a direct effect on the amount of time it takes to process a case (oral arguments take time). Moreover, as a surrogate measure of complexity (the criteria for determining whether the court will hear oral arguments is largely based on the complexity of the legal issues) we expect that more complex cases are more likely to require additional deliberation by the judges. The variable is coded '1' if there was an oral argument, '0' if there was no oral argument. The variable was constructed using the FJC database.

Another institutional pathology is circuit judge vacancies. Again, our placement of this pathology at the institutional level is supported by Lindquist's (2007, 674) observation that "extensive vacancies are not a problem that can be fully addressed or resolved by the judges themselves." Indeed, the vacancies are largely a result of delays in the confirmation process by the U.S. Senate; these delays have increased over time as interest groups have increasingly politicized the judicial selection process of lower court judges (Binder and Maltzman, 2009). This is problematic because, as Binder and Maltzman (2009) note, the number of judge vacancies on the circuit can diminish aggregate level efficiency. With respect to a specific case, as the number of vacancies increases, there is an increase in the overall workload of the panel members, thereby slowing down their ability to terminate the case. Somewhat related to the expertise factors that are a function of judges sitting by designation (H6 and H7), there is evidence (Lindquist 2007, 688) that circuit judge vacancies bear a negative relationship with disposition times. The logic is that "the process of negotiating with judges sitting by designation [those called upon to fill vacancies]—who are likely unfamiliar with circuit precedent and norms —is likely to increase case processing time" (Lindquist, 2007, 686).[8]

H9. Circuit judge vacancies contribute to longer disposition times.

The *Circuit Judge Vacancies* variable is measured using the U.S. Administrative Office of the Courts reports; it is the total number of months during the year in which a statutorily created judge slot remained vacant on that circuit. The variable sums all of the values for each vacant slot on the circuit during the corresponding fiscal year.

Another institutional mechanism deals with circuit size in terms of active judges. Lindquist (2007) observes that the number of active judges on a circuit during a year increases

[8] We note, however, one of Lindquist's (2007, fn 72) alternative hypotheses that visiting judges are more deferential to judges not sitting by designation.

the circuit's average disposition time during that year. Cohen (2002) suggests that smaller circuits are more collegial because they have more opportunities for the judges to interact in a alternative professional settings. Presumably, the number of *Circuit Active Judges* increases conflict (Boyea 2007), which increases inefficiency.

H10. Circuit size in terms of active judges decreases efficiency.

As another pathology related to circuit size, we presume that physically larger and more populous circuits have built-in inefficiencies (Lindquist 2007). In larger circuits, panelists live in multiple cities and states, thereby increasing the logistical difficulties in scheduling and traveling, which in turn increase inefficiency.

H11. Circuit size in terms of geographic distance decreases efficiency.

Circuit Area per Judge is operationally defined as the geographic area of the circuit divided by the number of active judges serving on the circuit during that year.

Non-prescriptive pathologies: Control Variables.

We include several control variables, which are generally not subject to manipulation and, therefore, are neither prescriptions nor easily correctable pathologies. Indeed, they are usually beyond the direct control of the panel, circuit, and Congress (the body responsible for making macro-level structural changes).

We generated a *Complexity* scale from the factor scores of a factor analysis of additional surrogate measures of complexity, which have been identified from the literature: opinion length (Cauthen and Latzer 2008; Lindquist, Martinek, and Hettinger 2007), the number of substantive issues, and the number of threshold issues (Lindquist, Martinek, and Hettinger 2007).

Hettinger, Lindquist, and Martinek (2006) posit that judges are more likely to disagree in (politically and/or legally) salient cases, and disagreements lead to delays. Following their lead, we include two proxy measures of salience. The first, the presence of an *Amicus Brief* (a written legal arguments presented by third parties with a vested interest in the outcome of the case) in a case, is coded '1' if at least one amicus brief was submitted in the case, '0' if no amicus briefs were submitted. Additionally, civil rights and liberties cases are also more likely to be salient. As such, we include a *Rights & Liberties* variable, coded '1' if the issue addressed a civil liberties or rights case, '0' if it did not. We do not posit a directional hypothesis. While judges might disagree more in salient cases, it also possible, (particularly after controlling for the presence dissents and concurrences) that the perceived import of the salient cases leads to more attention, which leads to a timelier decision.

Most of the cases reviewed by the U.S. Courts of Appeals originated in a U.S. District Court, which only publishes a small proportion of its decisions. The publication criteria for the District Court are based on the precedential value of the case, which reflects the overall complexity of the underlying issues (Songer 1988). Therefore, *Prior Publication* is a surrogate measure for complexity, and complex cases should have longer disposition times. The variable is coded '1' if the lower court decision was published by the U.S. District Court, '0' if it was not published.

Obviously, aggregate court efficiency is a function of caseload, or the size of the circuit's docket. In a specific case, the processing time will be a partial function of the other tasks (cases) for which the members of the work group are responsible. Therefore, in both sets of models we control for the size of the circuit's docket with the variable, *Circuit Docket Size*. Using U.S. Administrative Office of the Courts reports, we measured the caseload as the number of

terminations by the circuit per three-judge panel during the corresponding fiscal year.[9] Based on theory, we expect a positive coefficient in the judicial efficiency models.

Lindquist (2007) finds that the percentage of criminal cases and prisoner petitions terminated by a circuit in a calendar year positively affects the aggregate efficiency of the circuit, presumably because the criminal cases are less complex (or, perhaps additionally because the judges in the aggregate have a higher level of expertise in these cases). The *Criminal* variable is a dummy, coded '1' if the cases involved a criminal issue. We expect to find a negative coefficient for this term.

A three judge panel is more likely to reverse the lower court in legally ambiguous cases (Hettinger, Lindquist, and Martinek 2006), which are more likely to result in longer delays. Obviously, disagreement amongst the judges over the interpretations and/or applications of the relevant legal principles is a clear indication that such ambiguity exists. That disagreement can be vertical--the appeals court disagrees with the lower trial court--or horizontal--the court of appeals court judges disagree. In the former case, the justices reverse the lower court decision. As such, we include the *Affirm* variable, coded '1' if the three judge panel upheld the decision of the lower court, and '0' if it did not. We expect to find a negative coefficient.

Additionally, dissenting and concurring opinions reflect the presence of legal ambiguities. Moreover, both types of opinions take time to write, increasing the time it takes the panel to decide the case. As such, we included two dummies. *Dissent* is coded '1' if there was a

[9] The measure is the total number of terminations by the circuit divided by the total number of three judge panels (which is the number of active judges divided by three). While it might be more intuitive to utilize the total number of cases per active judge, the AOC suggests that the per panel case load measure is more appropriate for the Courts of Appeals (see http://www.uscourts.gov/fcmstat/intro97/pgv.pdf, last accessed November 5, 2009). For example, the per judge method would assume that a single judge in a circuit of 12 with a docket of 120 would hear twelve cases, However, since the circuit meets in three judge panels, the judge would actually participate in 30 cases, or 120/(12/3).

dissenting opinion in the case, and '0' if the there were no dissents. The *Concurrence* variable is coded '1' if there was a concurring opinion, '0' if there were no concurrences.

Finally, we included *Circuit Mean Disposition Time*, measured using the U.S. Administrative Office of the Courts reports, as the median number of months it took the circuit to terminate cases decided that year. This should directly account for any possible unmeasured circuit-level phenomena that could affect efficiency (e.g., intra circuit norms of consensus; variations in staff support).

Model Specification & Analysis

Model Estimation

Since disposition time, is a count, we utilized negative binomial regression to generate the estimates. We did not employ Poisson regression because of the evidence of extremely high overdispersion (Long and Freese 2006; Hurwitz and Lanier 2003). Note that, while the dependent variable also is a measure of duration, we did not use a duration model technique because the data is not right-censored. Each case has a distinct termination date; there was no need to artificially censor any observations (see Maltzman, Spriggs, and Wahlbeck 2000, 138, fn. 6; Box-Steffensmeier and Jones 2004, 16-17). To account for possible serial autocorrelation we included fixed-effects dummies for all but the first calendar year in the analysis.[10] We also calculate Huber-White robust standard errors to correct for potential bias resulting from additional possible correlations of the error terms across years and/or circuits.[11]

[10] We do not report the coefficients for the 25 fixed effects variables in our results; the complete results are available upon request

[11] We did not include fixed-effects or clustered standard errors by circuits for two reasons. The rationale in this case for fixed effects or clustered standard errors would be the fear of non-independent errors within the clusters resulting from unobserved factors at the cluster, or circuit, level. Primarily, we address this more directly by including direct measures of circuit level characteristics. In particular, the Median Circuit Disposition time variable is an even more refined measure of the otherwise unobserved circuit level characteristics than circuit dummies, if only because the former is dynamic. Moreover, when we do include fixed effects for the circuit, the multicollinearity is extremely high for the circuit-level variables, as evidenced by variance inflation factors (VIFs) as high as 46, and many of the circuit level factors have

Analysis & Discussion

We present the negative binomial regression results in Table 1.[12] The results of our hypotheses tests are mixed. We find support for one of our **diversity** measures--law school quality. While panels with at least one elite and one non-elite law school alumnus have longer disposition times (they are less efficient) than homogenous panels, we find no evidence that tenure and ideological diversity affect efficiency.

-- Table 1 --

Additionally, we find mixed evidence to support our **burnout** hypotheses. While the age of the panels has no effect on disposition times, the average tenure does. Panels with more experience are slower, even after controlling for age and the presence of senior judges. This suggests that any benefits of experience are more than countered by the costs of the posited burnout effect.

We do, however, find evidence to support our other **expertise** hypotheses. Panels with more graduates of elite law schools and elevated judges are faster. Moreover, panels with district court judges, the least expert of the designated judges, are slower. Conversely, panels with senior and visiting appellate judges are just as fast as panels without senior/visiting appellate judges. In fact, if anything, panels with visiting appellate judges are more efficient, as the coefficient for the Panel Visiting Appellate Judge variable is negative and statistically significant at the 0.074 level.

We find the most support for the **institutional mechanisms**. All four of the variables--circuit area, number of active judges, number of vacancies, and the use of oral arguments are all

VIFs over 30. This in itself suggests that we are already including the relevant circuit level factors in the model, making the circuit level fixed effects unnecessary. It is important to note that clustering by circuit does not change any of the hypothesis test results.

[12] Before analyzing the model, it is possible that the results could be confounded by multicollinearity. As such, we calculated the variance inflation factors (VIF) for each of the independent variables. These statistics are presented in Figure A1 in the appendix. We note that highest VIF is 2.83, well below the threshold for high multicollinearity suggested by Gujarati and Porter (2009).

positive and statistically significant. In other words, larger circuits (both in terms of man power and the number of square miles per judge) and circuits with vacant seats are slower. Finally, the use of oral arguments, a decreasing trend over time, clearly increases disposition times.

Our control variables, except for two of our surrogate salience measures (Amicus Brief and Rights & Liberties), are all statistically significant in the posited directions. Complex cases are slower, as are appeals of lower court decisions deemed important enough to publish. Cases with dissents and concurrences are also slower. Additionally, affirmed cases, more likely to be perfunctory in nature, are faster. Finally, panels in circuits with higher case loads, as well as those that take longer to decide cases in the aggregate, are slower.

Beyond looking at the results of the hypotheses tests, or the statistical significance, we can also examine the substantive significance using the first differences (the difference of two meaningful expected values) presented in the fourth and fifth columns of Table 1. The first differences (King, Tomz, and Wittenberg 2000) are the changes in the expected values of the number of days it takes the court to decide the case for two values of the particular independent variable, holding all other variables constant at the appropriate measure of central tendency.[13] The second to last column contains the first differences when the independent variable is a standard deviation above the mean and when it is set to the mean.[14] This is only appropriate for continuous measures, so it was not calculated for the binary variables. For the latter, the last column contains the difference in the expected number of days to decide the case when the independent variable is set to one and zero.

[13] The first differences were generated using Gary King's CLARIFY package for Stata (see King, Tomz, and Wittenberg 2000).
[14] The formula for this first difference is $E(Y|X = \overline{X} + s) - E(Y|X = \overline{X})$.

Of our continuous variables, two of the circuit-level controls exerted the most substantive influence on judicial efficiency: *Median Disposition Time* and *Docket Size*. As the median disposition time increases by a standard deviation from the mean (approximately three months), the panel takes an average of more than two months to decide the case, while a standard deviation increase in docket size increases disposition times by almost two weeks. Among the continuous main independent variables, *Panel Mean Tenure* has the largest substantive effects; a one standard deviation increase from the mean--approximately 4 years--adds roughly ten additional days to the panel disposition time.

Of the dichotomous variables, the change from zero to one increased (*Oral Arguments*, *Concurrence*, *Dissent*) or decreased (*Criminal*) the disposition time by over a month, on average. Additionally, panels with district court judges are almost three weeks slower than panels without them. Similarly, appeals from cases published by the district courts are three weeks slower than unpublished cases, while affiirmances take three weeks less, on average to process compared to reversals.

Conclusions, Suggested Reforms, and Future Research

Overall, the results also provide insights into the pathologies and prescriptions of the U.S. Courts of Appeals. Non-visual **diversity**, which might improve outcomes, has very little negative effects on efficiency. Only law school diversity is significant, and diverse panels are less than a week slower than homogenous panels, on average. In comparison, there is more evidence of **expertise** and **burnout** effects. Three of the expertise variables are statistically significant (district court judge, elevated judge, and law school quality), and district court judge participation has a strong effect on inefficiency, adding almost three weeks. Similarly, while the addition of one elite law school graduate to the panel adds less than a week, panels with three

elites are almost 17 days faster than panels without an elite. With respect to the burnout effect, an increase in the average tenure from 9.11 (the mean) to 13.28 (the mean plus a standard deviation) years adds approximately ten days to case processing times, on average, while an increase of ten years from the mean adds over 25 days.

Finally, the **institutional mechanisms** arguably have the greatest impact on efficiency. All four variables--vacancies, size (number of judges and square miles per judge), and oral arguments--are statistically significant. Oral arguments arguably has the largest effect on efficiency. While having certain potential benefits, orally arguments add more than a month to the disposition time. Size also matters. While a standard deviation increase in the number of judges (roughly an additional five active judges) only increases disposition times by about a week, the Ninth Circuit at its largest (29 active judges) was three and half weeks slower than the average circuit. Similarly, a standard deviation increase in circuit area per judge increases disposition times by 10.6 days on average, while the difference between the largest circuit in area per judge (the Ninth Circuit), increases the average panel disposition time by as much as 34 days on average. Finally, while the standard deviation increase in judge vacancies (approximately two year long vacancies compared to one year long vacancy) increases processing time by less than a week, the difference in processing times for the mean and the circuit with the most vacancies in a year (approximately nine) is over five weeks.

Based on these findings, we suggest the following prescriptions that should expedite decision making. While some of these suggestions are narrowly applicable to the U.S. Courts of Appeals, others have broader applicability.

First, we recommend that Congress increase the number of circuits. This should decrease the geographic areas of the circuits and the total number of judges in the circuit, which should both increase efficiency.

Second, and in tandem with the first proposal, Congress should increase the overall number of judgeships. This should lower the overall caseloads of the judges, thereby increasing efficiency.

Third, the Senate should work to limit the lengths of vacancies by depoliticizing the selection process. Binder and Maltzman (2009) suggest two institutional mechanisms: non-partisan state-level judicial commissions that would evaluate and recommend nominees; and altering Senate rules to allow for fast tracking nominations, thereby bypassing the filibuster. Additionally, closed hearings might mute the opportunity for senator and interest group grandstanding, which could also depoliticize the process somewhat.

Fourth, the Senate should select appeals court judges with excellent academic records, training, and prior federal judicial experience. Presumably, the depoliticization of the selection process should lead to an increased emphasis on judicial quality, especially the nominating commissions suggested by Binder and Maltzman (2009). Alternatively, supply-side methods like increasing judicial salaries could be employed. However, recent scholarship suggests that salaries have little effect on the quality of decision making (Baker 2008; Choi et al. 2009), including disposition times (Baker 2008).

Fifth, while several of the prior suggestions should reduce the need for designated judges (e.g, increasing the number of judges, reducing the length of vacancies), to the extent that designated judges are necessary, judges with prior/current federal *appellate* appointments (senior, other circuits, etc.) should be favored over district court judges to sit by designation.

This could be accomplished by amending intra or inter circuit rules which could either create formal preferences for designated appellate judges or create financial incentives for senior judges to sit.

Sixth, to reduce the likelihood of judicial burnout, Congress should consider instituting mandatory retirements based on either age or, preferably, tenure. In addition, pension rules could be altered to encourage early retirements (see Yoon 2006, noting the primacy of pension rules in models predicting judicial retirements). Alternatively, perhaps the judges should earn periodic sabbaticals in an effort to mitigate the burnout effects that we detected in our analysis.

Seventh, the courts should continue to increase the number of summary dispositions--those cases decided without oral arguments. Of course, while this final prescription might lower disposition times, it could have a negative impact on the quality of the courts' decisions (see Johnson, 2004 for a discussion of the benefits of oral arguments).

As with any study, our research is not without its limitations. For example, we do not include some potential control variables like judicial salaries and circuit budgets. With respect to salaries, we note Baker's (2008) recent study that found very little evidence that compensation affects any of a broad array of judicial behavior, including disposition.

We see several important directions for future research. First, our focus here has been on judicial efficiency in terms of disposition time; we ignore the other major component of efficiency--the quality of the decision. Quality can be conceptualized in many ways. For example, lower quality decisions might reflect a more mechanistic/bureaucratic outcome in contrast to a more legalistic/equitable outcome (Cohen, 2002). While some of the causes of processing delays may also diminish the quality of the output (e.g., lower levels of expertise) others might enhance the quality (e.g., oral arguments). As such, we propose to focus on

'quality' of decisions in future research. We also want to focus on other aspects of diversity, specifically visible diversity, a task we (Szmer, Christensen, & Wemlinger, 2009) have undertaken to advance our understanding of conflict on appellate panels.

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Table 1: Negative Binomial Regression: U.S. Court of Appeals Processing Days per Case, 1971-1996 (year fixed effects omitted)

Independent Variable	β	Robust Std. Error	Change in Expected Values of the Number of Processing Days	
			$E(Y\|X=\bar{X}+s) - E(Y\|X=\bar{X})$	$E(Y\|X=1) - E(Y\|X=0)$
Panel Level Variables				
Tenure Diversity	-0.025	0.026	-1.680	---
Ideological Diversity	-0.036	0.025	-2.182	---
Law School Diversity	0.036*	0.015		6.878
Law School Quality	-0.027***	0.008	-5.242	---
Mean Tenure	0.012***	0.003	9.944	---
Mean Age	0.001	0.002	0.766	---
Elevated Judges	-0.025**	0.009	-4.253	---
Senior Judge	-0.008	0.019	---	-1.702
Visiting App. Judge	-0.055	0.030	---	-10.741
District Court Judge	0.095***	0.023	---	19.746
Case Level Variables				
Oral Arguments	0.180***	0.026	---	32.804
Amicus Brief	-0.047	0.033	---	-8.929
Prior Publication	0.104***	0.018	---	21.703
Criminal	-0.269***	0.016	---	-46.761
Affirm	-0.103***	0.014	---	-21.656
Complex	0.090***	0.018	9.286	---
Rights & Liberties	-0.022	0.018	---	-4.241
Dissent	0.244***	0.021	---	54.986
Concurrence	0.147***	0.029	---	31.604
Circuit Level Variables				
Median Disposition Time	0.093***	0.003	66.289	---
Docket Size	0.000***	0.000	13.970	---
Judge Vacancies	0.002**	0.001	5.246	---
Active Judges	0.006***	0.002	6.914	---
Area per Judge	0.000***	0.000	10.571	---
Constant	3.924	---	---	---
N	7616	---	---	---
Nagelkerke R^2	0.328	---	---	---

Two-tailed hypotheses: p<0.05 =*; p <0.01=**; p<0.001=***
LRT α = 0: $\bar{x}^2$ (01) = 48,000; Pr(($\bar{x}^2$ (01)) 0)≥0) = 0.000

Appendix Figure A1: Variance Inflation Factor

Independent Variable	VIF
Panel Level Variables	
Mean Tenure	2.83
Docket Size	2.37
District Court Judge	2.30
Mean Age	2.19
Tenure Diversity	1.76
Judge Vacancies	1.72
Senior Judge	1.69
Active Judges	1.67
Median Disposition Time	1.48
Area per Judge	1.44
Elevated Judges	1.29
Law School Quality	1.28
Visiting App. Judge	1.18
Criminal	1.17
Ideological Diversity	1.14
Rights & Liberties	1.13
Oral Arguments	1.12
Complex	1.10
Law School Diversity	1.08
Amicus Brief	1.05
Prior Publication	1.05
Affirm	1.05
Dissent	1.03
Concurrence	1.02

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