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Bigger Isn't Always Better: An Analysis of Court Efficiency Using Hierarchical Linear Modeling

Teresa Dalton* and Jordan M. Singer†

One important measure of trial court efficiency is overall case length—that is, the elapsed time from a case’s initial filing to its final disposition. Using a large, recent dataset from nearly 7000 federal civil cases, we find that two variables are particularly useful in predicting overall case length: the total number of attorneys filing an appearance in the case, and the number of authorized judgeships for a given district court. Further, we find a significant and surprising interaction between these two variables, indicating that smaller courts are more efficient than larger courts at processing civil cases when more than three attorneys appear in a case, but that the opposite holds true when three attorneys or fewer appear in a case.

I. Introduction

The efficient resolution of disputes has long been a central goal of the American civil justice system. All else being equal, the speedier resolution of cases promotes better financial certainty and psychological closure for litigants, as well as more manageable dockets for judges. By contrast, delay in civil cases is frequently associated with higher costs¹ and reduced value of judgments.² In light of these realities, the

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1. See Michael Heise, *Justice Delayed? An Empirical Analysis of Civil Case Disposition Time*, 50 CASE W. RES. L. REV. 813, 814 & n.8 (2000).

2. See, e.g., George Priest, *Private Litigants and the Court Congestion Problem*, 69 B.U. L. REV. 527, 534 (1989).

importance of timely civil case processing has been codified in federal legislation,³ court rules,⁴ and internal court procedures.⁵

A widespread commitment to timely case resolutions, however, has not translated into uniform results. Despite the efforts of researchers, court personnel, and even Congress to identify and address sources of delay in the civil justice system, consistent and efficient case processing in the federal district courts remains remarkably elusive. Average disposition times still vary widely from district court to district court, even for the same type of case.⁶ Moreover, most of the seminal studies of delay are decades old. Additional research and analysis is needed.

We offer a modest but important contribution to the collective understanding of civil case processing times, using a recent, large, and detailed data set drawn from approximately 6700 closed cases in seven federal district courts. We employ a multilevel modeling technique known as hierarchical linear modeling (HLM) to capture and evaluate the relationship between the overall length of a case and a variety of variables attendant to the case.

Our analysis yields two surprising conclusions. First, we find a relationship between the overall length of a civil case, the size of the federal district court where it is pending (as measured by the number of authorized district judges), and the total number of attorneys who filed an appearance in the case. Put differently, the length of a civil case can be predicted by the number of district judges on the court and the number of attorneys appearing in the case. Second, and even more intriguing, we find that larger and smaller courts switch in relative efficiency as the number of attorneys in a case grows. Specifically, in cases in which three or fewer total attorneys have filed an appearance, larger courts are predicted to process the case faster than do smaller courts. Conversely,

3. See Civil Justice Reform Act of 1990, Pub. L. No. 101-650, § 103(a), 104 Stat. 5093 (codified at 28 U.S.C. § 476 (2012)).

4. See FED. R. CIV. P. 1 (stating that the entire body of rules shall “be construed and administered to secure the just, speedy, and inexpensive determination of every action and proceeding.”).

5. See JUDICIAL CONFERENCE OF THE U. S., THE CIVIL JUSTICE REFORM ACT OF 1990 FINAL REPORT: ALTERNATIVE PROPOSALS FOR REDUCTION OF COST AND DELAY ASSESSMENT OF PRINCIPLES, GUIDELINES & TECHNIQUES 3-4 (1997).

6. See, e.g., INST. FOR THE ADVANCEMENT OF THE AM. LEGAL SYS., CIVIL CASE PROCESSING IN THE FEDERAL DISTRICT COURTS: A TWENTY-FIRST CENTURY ANALYSIS 28-29 (2009) [hereinafter CIVIL CASE PROCESSING] (noting differences in mean and median time to disposition in selected district courts for common federal cases, including Civil Rights – Employment cases and “Other Civil Rights” cases).

in cases in which more than three total attorneys have filed an appearance, smaller courts are more efficient. Below, we detail our methodology and findings, and offer some preliminary observations.

II. Background to the Study

Most studies of trial court efficiency have operated as inquiries into caseload management, a technique for reducing delays by carefully managing the time between major events in the life of a case. The heyday of caseload management research occurred from the mid-1970s to the mid-1980s, when then-Chief Justice Warren Burger made efficient civil case processing a key component of his vision for the American judicial system.⁷ Between 1977 and 1990, researchers from the Federal Judicial Center,⁸ National Center for State Courts,⁹ and the RAND Institute for Civil Justice¹⁰ published studies on case processing in federal and state courts. These studies focused on the time between events in the life of a case, such as the number of days from case filing to the close of discovery, or the number of days a court took to rule on a motion. These studies also introduced metrics that allowed, for the first time, comparisons across different judges and courts. No efforts, however, were made to provide predictive models.

7. Chief Justice Burger's interest in the application of modern business administration methods to the courts spanned his entire career on the United States Supreme Court. *See, e.g.*, Chief Justice Warren E. Burger, Remarks on the State of the Federal Judiciary (Aug. 10, 1970), in HOWARD JAMES, *CRISIS IN THE COURTS* (1971), at iv; Warren E. Burger, *Introduction* to Symposium, *Reducing the Costs of Civil Litigation*, 37 RUTGERS L. REV. 217 (1985).

8. *See, e.g.*, PAUL R. CONNOLLY ET AL., FED. JUDICIAL CTR., JUDICIAL CONTROLS AND THE CIVIL LITIGATIVE PROCESS: DISCOVERY (1978); PAUL R. CONNOLLY & PATRICIA A. LOMBARD, FED. JUDICIAL CTR., JUDICIAL CONTROLS AND THE CIVIL LITIGATIVE PROCESS: MOTIONS (1980); STEVEN FLANDERS ET AL., FED. JUDICIAL CTR., CASE MANAGEMENT AND COURT MANAGEMENT IN THE UNITED STATES DISTRICT COURTS (1977).

9. *See, e.g.*, THOMAS CHURCH, JR. ET AL., NAT'L CTR. FOR STATE COURTS, JUSTICE DELAYED: THE PACE OF LITIGATION IN URBAN TRIAL COURTS (1978); JOHN GOERDT ET AL., NAT'L CTR. FOR STATE COURTS, EXAMINING COURT DELAY: THE PACE OF LITIGATION IN 26 URBAN TRIAL COURTS, 1987 (1989); BARRY MAHONEY ET AL., NAT'L CTR. FOR STATE COURTS, CHANGING TIMES IN TRIAL COURTS (1988); LARRY L. SIPES ET AL., NAT'L CTR. FOR STATE COURTS, MANAGING TO REDUCE DELAY (1980).

10. *See, e.g.*, TERENCE DUNGWORTH & NICHOLAS M. PACE, RAND INST. FOR CIVIL JUSTICE, STATISTICAL OVERVIEW OF CIVIL LITIGATION IN THE FEDERAL COURTS (1990); PATRICIA A. EBENER, RAND INST. FOR CIVIL JUSTICE, COURT EFFORTS TO REDUCE PRETRIAL DELAY: A NATIONAL INVENTORY (1980).

Formal studies of case processing and delay prevention were soon joined by legislative enactments. In 1990, Congress passed the Civil Justice Reform Act (CJRA), which required each federal district court to develop a civil justice expense and delay reduction plan.¹¹ The CJRA set out six preferred case management techniques,¹² and required that ten pilot districts implement the techniques for further study.¹³ In 1996, the RAND Institute for Civil Justice reported the results of the CJRA pilot, concluding that the preferred techniques as implemented had little effect on overall case length.¹⁴ The RAND study would represent the last major civil case processing study for more than a decade.

In 2009, a major new study of civil case processing was issued by the Institute for the Advancement of the American Legal System at the University of Denver (IAALS). The study examined the dockets of nearly 7700 cases in eight federal district courts, all of which were terminated between October 1, 2005 and September 30, 2006.¹⁵ The study focused on the time between events in the life of a civil case, including the overall time from filing to disposition.¹⁶ Consistent with earlier caseflow management literature, the IAALS study concluded generally that lowering overall time to disposition “does not appear to be a matter of addressing one or two specific pretrial practices, but rather striving to improve the time between events at every stage of the case.”¹⁷ While the IAALS study amassed extensive structural data on each case (such as the number of parties and attorneys on each side, number and type of motions filed, and identity of the presiding judge(s)), it did not explicitly examine the relationship between these data and the overall length of a case.¹⁸

Collectively, these studies and others like them have spawned an extensive literature offering delay prevention strategies and techniques

11. Civil Justice Reform Act of 1990, Pub. L. No. 101-650, 104 Stat. 5090 (codified at 28 U.S.C. §§ 471-482 (2012)).

12. *Id.* § 473.

13. *Id.* § 477.

14. See generally JAMES S. KAKALIK ET AL., IMPLEMENTATION OF THE CIVIL JUSTICE REFORM ACT IN PILOT AND COMPARISON DISTRICTS (1996); see also JAMES S. KAKALIK ET AL., JUST, SPEEDY, AND INEXPENSIVE? AN EVALUATION OF JUDICIAL CASE MANAGEMENT UNDER THE CIVIL JUSTICE REFORM ACT (1996).

15. CIVIL CASE PROCESSING, *supra* note 6, at 2.

16. *Id.*

17. *Id.* at 9.

18. See *id.*

for courts and judges at both the federal and state level.¹⁹ But the primary focus of these studies has been on the management of individual events in the life of case, rather than structural factors outside of a judge's control that nevertheless may influence case length. Our objective here is to examine these broader structural relationships, using the same rich data set compiled for the recent IAALS study.

III. Study Methodology

As noted above, the cases used in the present study were selected from a data set compiled by IAALS for the purposes of a larger civil case management study.²⁰ Researchers at IAALS initially selected fifteen United States District Courts for possible analysis. The fifteen courts were chosen to reflect diversity of size (as measured by the Congressionally authorized number of district judges),²¹ geography, and national ranking in judicial caseload profiles, based on publicly available Federal Caseload Management Statistics. With respect to the latter category, courts are ranked based on, among other things, their median times from filing to disposition of civil cases.²² IAALS selected courts

19. See, e.g., CIVIL CASE PROCESSING, *supra* note 6; COMM. ON COURT ADMIN. & CASE MGMT., JUDICIAL CONFERENCE OF THE U.S., CIVIL LITIGATION MANAGEMENT MANUAL (2001); ROBERT J. NIEMIC ET AL., FED. JUDICIAL CTR., GUIDE TO JUDICIAL MANAGEMENT OF CASES IN ADR (2001); DAVID RAUMA & DONNA STIENSTRA, FED. JUDICIAL CTR., THE CIVIL JUSTICE REFORM ACT EXPENSE AND DELAY REDUCTION PLANS: A SOURCEBOOK (1995); WILLIAM W. SCHWARZER & ALAN HIRSCH, FED. JUDICIAL CTR., THE ELEMENTS OF CASE MANAGEMENT: A POCKET GUIDE FOR JUDGES (2d ed. 2006); DAVID C. STEELMAN ET AL., NAT'L CTR. FOR STATE COURTS, CASEFLOW MANAGEMENT: THE HEART OF COURT MANAGEMENT IN THE NEW MILLENNIUM (2000).

20. The results of the study are reported in CIVIL CASE PROCESSING, *supra* note 6. While drawing from the same data set as the study in this article, the IAALS report examines more cases overall and addresses specific case management practices in depth.

21. Each federal district court is authorized by Congress to have a certain number of full-time district judges. See 28 U.S.C. § 133 (2012). In addition, each court may control its caseload through the use of magistrate judges (appointed for terms pursuant to Article I of the Constitution), senior judges (district judges who have taken senior status and have substantial discretion over the type and volume of their caseloads), and visiting judges (who are assigned to another district but preside over specific cases). The number of authorized judgeships per district is intended in part to be reflective of the district's caseload. See Erwin C. Surrency, *Federal District Court Judges and the History of Their Courts*, 40 F.R.D. 139, 151 (1967).

22. See *Federal Court Management Statistics*, U. S. COURTS, <http://www.uscourts.gov/fcmstat/index.html> (last visited Mar. 1, 2014). The Federal Court Management Statistics are updated as of September 30 of each calendar year. The IAALS study used the statistics ending September 30, 2006, which reflect the twelve-

with a wide range of national rankings in this category. All fifteen courts were contacted to request a fee waiver for access to publicly available case dockets through the federal courts' electronic PACER interface.²³ Ten of the fifteen courts granted the waiver, and eight of those ten courts were eventually selected for inclusion in the IAALS database.²⁴

The research in this article is based on data from over 6700 cases in seven of the courts selected for the IAALS study—the United States District Courts for the District of Arizona, District of Colorado, District of Idaho, Eastern District of Missouri, District of Oregon, Eastern District of Virginia, and Western District of Wisconsin.²⁵ The data pertain to all civil cases in those seven districts that closed during the one-year period from October 1, 2005 to September 30, 2006, with limited exceptions.²⁶ The data were drawn exclusively from electronic case dockets available through the PACER system.

Drawing from the IAALS database, this Article uses the number of Congressionally authorized district judges as a surrogate measure for court size under the assumption that judicial allocation was appropriate for caseload. We do not account specifically for senior or visiting judges, although we note that virtually every district court in the study was

month period during which the cases in the study were terminated or otherwise closed.

23. Public access to federal court dockets is available through the Public Access to Court Electronic Records system (PACER) at a set cost per page viewed. At the time of data collection, this cost was set at eight cents per page. See *PACER User Manual for ECF Courts*, PACER PUBLIC ACCESS TO COURT ELECTRONIC RECORDS, 2, available at <http://www.pacer.psc.uscourts.gov/documents/pacermanual.pdf> (last updated Jan. 2006). This charge applies to search results even if the search yields no matches. See *id.* Although the charge for any one search or document view was capped at \$2.40 – the cost of thirty pages – the cumulative charge for viewing the docket sheet, motions and pleadings necessary to complete the study would have quickly totaled tens of thousands of dollars. IAALS has expressed its gratitude to each district court that granted a waiver to allow it to develop its dataset without incurring a substantial financial burden.

24. CIVIL CASE PROCESSING, *supra* note 6, at 20-21.

25. One small court in the IAALS study was not selected for this study in order to assure an equal balance of small and large courts.

26. The IAALS database excluded certain categories of cases with unusual procedural postures, specifically student loan cases, recovery of overpayment and enforcement of judgments, recovery of overpayment of veterans' benefits, forfeiture cases, social security cases, and prisoner petitions. In addition, a random sample of approximately 400 cases each was taken from the District of Arizona and the Eastern District of Virginia because the sheer number of closed cases in those districts was prohibitively high for full data entry. A probability sampling scheme was implemented for closed cases in these two districts.

assisted by their contributions during the time period reviewed.²⁷ Nor do we expressly account for vacant judgeship months, which affected one district during the relevant timeframe.²⁸ It is not a focus of this Article to ascertain if the various courts have the appropriate number of sitting judges, but rather if the number of judges assigned by statute has an effect on the overall efficiency of the courts as measured by the length of cases from date of filing to date of disposition (case length). The data were drawn from two small courts (with two authorized district judges each), three courts of medium size (with six or seven authorized district judges each) and two large courts (with eleven and twelve authorized district judges, respectively).

The overall length of the case, as measured from filing to disposition, was chosen as the dependent variable for this study. We selected this variable for a number of reasons. First, and most fundamentally, overall case length is an available measure in every case. By contrast, focusing on the presence of specific procedural events, such as summary judgment or trial, would eliminate a large number of cases that settle or otherwise terminate without reaching the dispositive motion or trial phase. Second, while overall time to disposition alone cannot adequately capture information about satisfaction with the federal judicial system, it is one component in measuring satisfaction, and for many a rather important one.²⁹ Protracted litigation strains court resources,³⁰ places financial burdens on litigants,³¹ results in increasingly devalued judgments,³² increases the likelihood of faded memories and

27. CIVIL CASE PROCESSING, *supra* note 6, App. G.

28. *Judicial Caseload Profile, Eastern District of Virginia 2006*, U.S. COURTS, available at <http://www.uscourts.gov/cgi-bin/cmsd2006.pl>.

29. By this, we do not mean to suggest that case length itself is an adequate proxy for justice. A just result in any case, civil or criminal, must take into account not only the time it took to resolve the dispute, but also the financial (and physical and emotional) cost to the litigants, completeness of the legal analysis and application in conformity with established law at every stage of the case and adequate safeguards for procedural due process. See Hon. William G. Young & Jordan M. Singer, *Bench Presence: Toward a More Complete Model of Federal District Court Productivity*, 118 PENN ST. L. REV. 55, 75 (2013) (arguing that court productivity must account for the efficiency, accuracy, and procedural fairness of adjudication).

30. See Larry L. Sipes, *Reducing Delay in State Courts—A March Against Folly*, 37 RUTGERS L. REV. 299, 299 (1985).

31. See, e.g., Jonathan Fischbach & Michael Fischbach, *Rethinking Optimality in Tort Litigation: The Promise of Reverse Cost-Shifting*, 19 BYU J. PUB. L. 317, 320 (2005).

32. See, e.g., Patrick Johnston, *Civil Justice Reform: Juggling Between Politics and*

stale evidence,³³ and prevents psychological closure.³⁴ Some courts are simply better at resolving cases more quickly and we look to what these courts have in common.

At the individual case level, this study considered many variables that may have been associated with overall case length. These variables included the type of case (otherwise known as “nature of suit”),³⁵ identity of the presiding district judge; involvement (if any) of a magistrate judge; number of plaintiff attorneys filing appearances; number of defendant attorneys filing appearances; elapsed time between case filing and the initial scheduling conference; number of motions on disputed discovery;³⁶ number of motions brought under Federal Rule of Civil Procedure 12; number of motions brought under Federal Rule of Civil Procedure 56; elapsed time for the court to rule on each such motion; whether a hearing was held on each such motion; number of extensions or continuances sought and granted; length of each major continuance; court-sponsored efforts at alternative dispute resolution; length of trial and type of trial (with or without a jury), if any; and appellate history. Of the variables present in every case, we found that number of attorneys filing an appearance was the most highly correlated with case length with very little difference between the correlation of number of plaintiff attorneys and case length ($r=.31$, $p\text{-value}<.01$) and number of defense attorneys with case length ($r=.29$, $p\text{-value}<.01$). In fact, combining these variables into a single measure called ‘total attorneys’ yielded the highest correlation ($r=.35$, $p\text{-value}<.01$). We decided at the case level we would use total attorneys to predict case length.

It is important to reiterate here that we are measuring the number of attorneys who filed an appearance in each case – i.e., those attorneys who signed a pleading, appeared for a hearing or conference, or otherwise placed themselves on record as representing a party in a case. These numbers do not—and indeed cannot—account for those (typically

Perfection, 62 FORDHAM L. REV. 833, 876-77 & nn.251, 258 (1994).

33. See *id.* at 877 n.252.

34. See generally Daniel W. Shuman, *When Time Does Not Heal*, 6 PSYCHOL. PUB. POL’Y & L. 880 (2000).

35. We conducted modeling using “nature of suit,” but with over sixty categories and with some categories possessing fewer than five cases, too little separation existed to create an interpretable multilevel model.

36. This category includes a range of motions brought when parties are unable to resolve discovery-related issues, including motions to compel, motions to quash, and motions for discovery sanctions.

junior) attorneys who are not listed on the case docket but who may spend hundreds or thousands of hours on the case outside of the court's direct view.

Our goal was to predict values for case length based on a function of number of attorneys and size of courts. Cases are nested within courts and courts can be distinguished by the authorized number of district judges. Specifically we sought to determine if courts do differ in efficiency based on the number of judges they have been assigned. Hierarchical linear modeling is appropriate when data are of a nested structure and inferences about the effect of the nesting are desired.³⁷ Four separate models were considered and compared.

The first model was the ANOVA model which consisted of only the dependent variable—case length—and would address the question about differences in mean case length based on the court in which a case was filed. The predicted case length model is as follows:

$$\text{Model 1: } \text{CaseLength}_{ii} = \gamma_{00} + \nu_{0i} + r_{ii}$$

The second model included the Level 2 predictor *SIZE* which was grand mean centered. As *SIZE* is not a continuous variable, centering on the mean of all sizes will produce a value for *SIZE* that does not exist in the data collected. It is, however, a useful device for interpreting the model results as we can make statements about variation of *SIZE* above the average, below the average or the effect of an average *SIZE* on the model. This model would address the impact of *SIZE* on the y-intercept for the regression equation. The y-intercept is the value for Case Length when the court is of average *SIZE*. The predicted case length model is as follows:

$$\text{Model 2: } \text{CaseLength}_{ii} = \gamma_{00} + \gamma_{01} * (\text{SIZE}_i - \overline{\text{SIZE}}) + \nu_{0i} + r_{ii}$$

The third model included the Level 2 predictor *SIZE* which was grand mean centered and the case level variable (Level 1) of total number of attorneys (*TOTALATT*). This model would address the impact

37. See, e.g., BRYK & RAUDENBUSH, *HIERARCHICAL LINEAR MODELS* (2d ed. 2002); EUROPEAN ASS'N OF METHODOLOGY, *HANDBOOK OF ADVANCED MULTILEVEL ANALYSIS* (Joop J. Hox & J. Kyle Roberts eds., 2011); ITA KREFT & JAN DE LEEUW, *INTRODUCING MULTILEVEL MODELING* (2007).

of *SIZE* on the y-intercept for the regression equation in the presence of the Level 1 predictor variable total number of attorneys, specifically the predicted Case Length when the court is of average *SIZE* and there are no attorneys involved. We model the slope as fixed with no random component as the values for number of authorized district judges is fixed in the population and fixed in the sample data. The predicted case length model is as follows:

Model 3:

$$CaseLength_{ij} = \gamma_{00} + \gamma_{01} * (SIZE_j - \overline{SIZE}) + \gamma_{10} * TOTALATT_{ij} + \nu_{0j} + r_{ij}$$

The fourth and final model includes the Level two predictor *SIZE* which was grand mean centered, the case level variable (Level 1) of total number of attorneys (*TOTALATT*) and an interaction between *SIZE* and *TOTALATT*. This model would address the impact of *SIZE* on the y-intercept and slope for the regression equation in the presence of the Level one predictor variable total number of attorneys. The predicted case length model is as follows:

Model 4:

$$CaseLength_{ii} = \gamma_{00} + \gamma_{01} * (SIZE_i - \overline{SIZE}) + \gamma_{10} * TOTALATT_{ii} + \gamma_{11} * (SIZE_j - \overline{SIZE}) * TOTALATT_{ij} + \nu_{0j} + r_{ij}$$

IV. Results

Table 1 summarizes the variables used in the analysis at Level 1. The average case length for all cases in the study was just over 325 days. The average total number of attorneys, including both plaintiff and defendant representation, in a given case was 3.7. This number includes approximately 1.2% of cases in which neither party has an attorney of record. Defense counsel did not file an appearance in approximately 4.8% of cases.

Table 1. Descriptive Statistics – Level 1					
	N	Minimum	Maximum	Mean	Std. Deviation
Level 1					
Total Attorneys	6753	.00	97.00	3.7072	3.47963
Case Length	6753	.00	4196.00	325.09	333.98726
Valid N (listwise)	6753				

Table 2 summarizes the variable used at the Level two analysis, *SIZE*. Here we find the total number of observations per court and the respective court sizes. Due to the small number of courts per cluster (court size), the results reported in Table 3 are those estimations of fixed effects in which the standard errors are not robust.

Table 2. Descriptive Statistics – Level 2								
Court ID SIZE		Cases						
		Valid		Missing		Total		
		N	Percent	N	Percent	N	Percent	
Case Length	Arizona	12	377	100.0%	0	.0%	377	100.0%
	Colorado	7	1902	100.0%	0	.0%	1902	100.0%
	Idaho	2	406	100.0%	0	.0%	406	100.0%
	Missouri Eastern	6	1916	100.0%	0	.0%	1916	100.0%
	Oregon	6	1362	100.0%	0	.0%	1362	100.0%
	Virginia Eastern	11	415	100.0%	0	.0%	415	100.0%
	Wisconsin Western	2	375	100.0%	0	.0%	375	100.0%

Assumptions for linear regression were checked. The residual distributions by size reveal a departure from normality although the plots appear relatively normal. Linear regression is robust with regard to mild to moderate departures from normality.³⁸ A violation of the assumption of homogeneity of variance was detected and this violation is

38. See, e.g., PHILIP BOBKO, CORRELATION AND REGRESSION (2d ed. 2001).

problematic. The most likely reason for the heterogeneity of the variances is the small sample size per court size cluster. The variances of the different courts with respect to case length are not similar enough to provide robust measures for linear regression. While this issue is important, we submit these results as preliminary only and in an effort to address this problem we ran the data with a fixed value for the variances, fixed at the largest variance in the various courts. We found results that were quite consistent with the results produced when the variance was random and we report the results with the random variance.

Table 3 reports the results of the Hierarchical Linear Modeling (HLM). Each Model was run separately and statistics were obtained. The results will be used to compare the various models for usefulness in application.

Starting with Model 1, the ANOVA model, we determine if HLM is appropriate for this data. If HLM will not provide more meaningful results than Ordinary Least Squares Regression we will use the latter due to relative ease of interpretation. The Intraclass Correlation Coefficient measures the proportion of variance in case length that is explained at the court level instead of the case level.³⁹ This value in Model 1 is 0.14; sufficiently high to support the use of HLM to address differences in case length.

Model 2 includes the outcome variable of Case Length at Level 1 and the Level 2 variable *SIZE*. Here we find that *SIZE* has little effect on the y-intercept (a non-significant coefficient) when no other predictor variable is in the model.

In the Model 3 analysis we add to the Model 2 variables a Level 1 predictor of Total Attorneys. We find this last added variable has a significant effect on the slope of the regression line. The coefficient of 37.03 is significant at the 0.01 level. *SIZE* continues to be non-significant in the model with a current coefficient of 0.007.

39. *Id.*

Table 3. HLM Parameter Estimates

Statistic	Model 1 (ANOVA)	Model 2 (Level 2 Only)	Model 3 (Level 1&2)	Model 4 (Level 1&2, Interaction)
Fixed Effects Coefficients – γ_{00}	322.52**	322.52**	192.38*	192.59*
Fixed Effects Coefficients – γ_{01}		.52	.007	-4.59
Fixed Effects Coefficients – γ_{10}			37.03**	36.90**
Fixed Effects Coefficients – γ_{11}				1.37**
Random Effects – u_0	129.96**	142.54**	121.17**	122.22**
Random Effects – r	321.76	321.76	295.28	295.14
Deviance	97,168	97,159	95,997	95,988
Number of Parameters Estimated	2	2	2	2
* Significant at .05				
** Significant at .01				

Model 4, the final model, contains all the variables in Model 3 plus an interaction term between Level 1 Total Attorneys and Level 2 *SIZE*. We find now that *SIZE* has a significant effect on the slope Total Attorneys. The Level 1 intercept (Court Mean Case Length) does not vary much as a function of court size but the slope predicting Case Length from Total Attorneys does. There is a significant interaction effect between *SIZE* and Total Attorneys. This final model is the best fit model and the one we will use for interpretive purposes. The deviance declines with each model presented while the number of parameters remains the same. The reduction of the deviance indicates an improvement over the prior model. A higher deviance indicates a lack of fit; the reduction indicates an improved model fit.

The Prediction Equation from Model 4 is as follows:

$$\text{Predicted Case Length} = 192.59 - 4.59*SIZE + 36.90*Total\ Attorneys + 1.38*(SIZE*Total\ Attorneys)$$

Interpreting the coefficients:

- **192.59** is the predicted Case Length when the court is of average size and no attorneys file an appearance. The average size here is the average of all the court sizes used in the analysis which for this data is 6.57. This suggests that a self-represented plaintiff seeking a legal remedy against a self-represented (or otherwise unrepresented) defendant in an average size United States District Court can expect resolution/disposition of the case in just under seven months.⁴⁰

- **-4.59** is the predicted change in the Case Length for a self-represented individual seeking a legal remedy in an average size United States District Court for every one unit increase in size over the average size (every one appointed judge over 6.57). In other words, when no attorneys file an appearance, the predicted length of the case will go down as the number of judges on the court increases.

- **36.90** is the predicted increase in Case Length for each attorney added to a case (on either side of the case) when the size of the court is held constant.

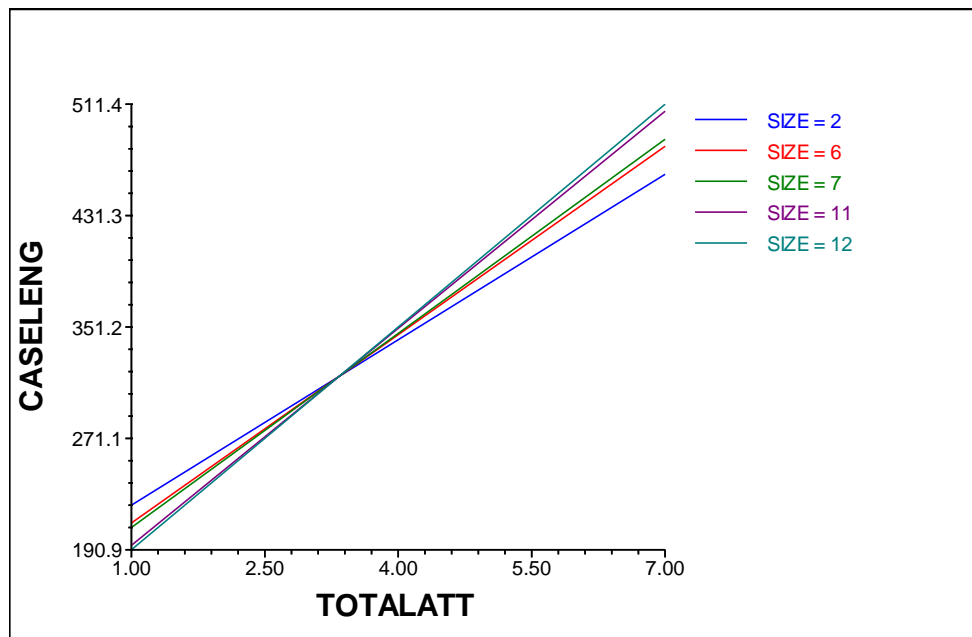
- **1.38** is the coefficient for the interaction between *SIZE* and Total Attorneys. Based on the main effect of *SIZE* and total number of attorneys, the larger the court the shorter the case length, and more attorneys would lead to longer case lengths. In addition, in the same court, involving more attorneys would further increase the case length due to the significant interaction. Similarly, for two cases with the same number of attorneys involved, the one initiated in the smaller court would be shorter in length than the one in the larger court, but not as much so without this significant interaction. As *SIZE* has been grand mean centered we can see that the larger than average courts with any attorneys involved will find an increase in case length. Conversely, smaller than average courts will see a decrease as more attorneys are added to the mix. When the court is greater than average size there is an

40. We recognize that it is the rare federal case in which there are no attorneys of record, i.e., both parties are unrepresented. Indeed, fewer than 300 of the cases in the study had no attorneys of record. In many of these cases, a self-represented plaintiff voluntarily dismissed the action before the defendant had made a first appearance. Some of these voluntary dismissals may reflect early private settlements between the parties, obviating the need for defendants (and defense counsel) to make a formal appearance before the court.

additional effect that will increase the case length due to the positive interaction coefficient. For example, if there are nine attorneys total in a court that is one unit larger than average the increase in predicted case length would be $(9 \times 39.90 + 1.38) = 360.48$ additional days added to Case Length.

Figure 1 graphs the interaction effect between *SIZE* and Total Attorneys. We see there is a crossover at approximately three total attorneys.

Figure 1 – HLM plot of total number of attorneys and length of case



From the graph we see that the smaller the size of the court, starting with a *SIZE* of 2, the greater the *y-intercept*. This means that when no attorneys file an appearance the predicted Case Length decreases as the size of the court increases. This relationship holds true up to the point of 3 attorneys filing an appearance. However, once the Total Attorneys reaches approximately 3, the smaller courts gain an advantage in efficiency and have a lower predicted Case Length than the larger courts. That is, as the number of attorneys in a case grows, the relative efficiency of large and small courts (as measured by overall Case Length) inverts.

V. Discussion

The crossover in efficiency at approximately three total attorneys does not readily admit of a clear explanation. Nevertheless, we offer some initial thoughts to interpret this rather surprising result. Our hypotheses below are just that—hypotheses—that would benefit from further research.

We begin with some general observations and assumptions about the characteristics of cases with three or fewer total attorneys. First, these cases are much more likely to involve at least one self-represented litigant than are cases with four or more total attorneys. Purely as a matter of definition, most cases with one or fewer attorneys listed on the docket must involve at least one *pro se* litigant.⁴¹ Even many cases with two or three attorneys of record, however, may include a self-represented party. It is not hard to imagine, for example, a suit brought by a *pro se* plaintiff against a small business that is represented by two or three counsel over the course of litigation. Second, we assume that cases with fewer total attorneys are, on average, smaller in scope and complexity than cases with more attorneys. Clients typically would not choose to pay for a large team of attorneys unless the nature of pretrial and trial practice was itself burdensome, complex, or time-consuming.⁴²

We also make certain assumptions about the characteristics of cases involving four or more attorneys of record. While cases with many attorneys could still involve self-represented litigants, we assume the likelihood of such representation diminishes as the total number of attorneys increases. We also assume that a larger number of attorneys is associated with some combination of more parties, greater case complexity, and geographic dispersal of parties and counsel. As noted above, case complexity can lead to more attorneys of record because a larger legal team is needed to prepare for discovery, motion practice, and trial.⁴³ An increase in parties can lead to more attorneys because each

41. As noted above, the exception is for cases voluntarily dismissed by a represented plaintiff after an early negotiated settlement—a settlement which may also involve counsel for the defendant. These dismissals constitute a small but not negligible percentage of the overall caseload in this study.

42. See Howard M. Tollin & Tammy Feman, *Litigation Management: What Legal Defense Costs Are Reasonable and Necessary?*, 63 DEF. COUNS. J. 529, 530 & n.4 (1996) (identifying cost-containment tips for insurance company defendants hiring outside counsel and listing cases in which large legal teams were deemed necessary to handle complex cases).

43. See, e.g., John K. Setear, *The Barrister and the Bomb: The Dynamics of Cooperation, Nuclear Deterrence, and Discovery Abuse*, 69 B.U. L. REV. 569, 623 n.99

new party is entitled to retain its own independent counsel. While related but legally distinct plaintiffs often retain a single counsel or firm to represent them, and while separate defendants sometimes enter into joint defense agreements, it remains far more typical for civil defendants to retain separate counsel.⁴⁴ Finally, the geographic dispersal of counsel leads to additional attorneys of record due to a near-universal *pro hac vice* admission practice: if a party's lead counsel is not already admitted to practice in the district where the case is pending (a common occurrence for out-of-state parties, especially corporations with national counsel), an additional "local counsel" who is admitted in the district is required to make an appearance and must be added to the docket on the party's behalf.⁴⁵

Any or all of these factors may increase the number of attorneys appearing in a given civil case. However, we postulate that these factors are not equally distributed across courts. More specifically, we assume that in larger courts (which frequently encompass metropolitan areas and political or financial centers), a larger number of attorneys in a case is more likely to be associated with greater case complexity and an increased number of parties, whereas in smaller courts (which tend to include less populous, and sometimes more rural, areas), a larger number of attorneys is more likely attributable to geographic dispersal of the parties and the need for additional, local counsel to file an appearance.⁴⁶

(noting that large legal teams may be used to prepare complex cases in a timely manner); Ronald J. Tabak, *How Law Firms Can Act to Increase the Pro Bono Representation of the Poor*, 1989 ANN. SURV. AM. L. 87, 96 (1990) (recommending that law firms interested in handling complex pro bono cases "assemble a sufficiently large and experienced team of attorneys to handle it effectively.").

44. See, e.g., Byron G. Stier, *Resolving the Class Action Crisis: Mass Tort Litigation as Network*, 2005 UTAH L. REV. 863, 910-12 (describing the formation of joint defense consortia among independent counsel for individual co-defendants).

45. For a comprehensive overview of federal district court practice regarding temporary admissions and requirements for local counsel, see Richard A. Williamson, Esq., *New York County Lawyers' Association Report of the Committee on the Federal Courts on Pro Hac Vice Admissions to the Federal Courts*, 169 F.R.D. 390 (1996).

46. We base this presumption in part on the federal courts' own weighted civil caseload statistics. Weighted caseload is a measure of the estimated time that a judge will need to devote to a case over its lifetime and, as such, as a proxy for case complexity. For Fiscal Year 2006, corresponding to the last year of data in our study, districts with fifteen or more judges averaged 383 weighted civil filings per judge while districts with three or fewer judges in that same period averaged 255 weighted filings per judge. See Table X-1A: *Weighted and Unweighted Filings per Authorized Judgeship During the 12-Month Period Ending September 30, 2006*, in JAMES C. DUFF, 2006 JUDICIAL BUSINESS OF THE UNITED STATES COURTS: ANNUAL REPORT OF THE DIRECTOR 414-17 (2006) [hereinafter JUDICIAL BUSINESS 2006]. This strongly suggests that larger

With these assumptions and observations in mind, we turn to the puzzle presented by our model. Why would larger courts have a comparative efficiency advantage in cases involving fewer attorneys of record? We have already noted that such cases are more likely to include at least one *pro se* litigant, and are also likely to involve fewer parties and be less complex. One possibility is therefore that larger courts have more resources—and more flexibility regarding the use of existing resources—to devote to the expedient resolution of these types of cases. Although we are aware of no research that has directly addressed this question, there is some strong circumstantial support for this view. For example, as a group, larger district courts have been shown to allocate considerably more time per judge to courtroom hearings than do smaller district courts.⁴⁷ Larger district courts also typically have more magistrate judges, more staff, and sometimes more physical facilities available to attend to issues raised by self-represented litigants.⁴⁸ If, as

courts encountered more complex cases on average than smaller courts.

47. See Jordan M. Singer & Hon. William G. Young, *Measuring Bench Presence: Federal District Judges in the Courtroom, 2008-2012*, 118 PENN ST. L. REV. 243, 264 fig.3 (2013) (showing that courts with one to two authorized district judges averaged 408 total courtroom hours per judge per year during Fiscal Years 2008 through 2012, while courts with twenty-two or more authorized district judges averaged 528 courtroom hours per judge per year during the same period).

48. A good example of the resource disparity is in the allocation of *pro se* law clerks by district. These clerks conduct preliminary merit reviews of many *pro se* civil filings and often serve at the forefront of the court's communication with self-represented litigants. See *Pro Se Law Clerks: A Valuable Resource*, THE THIRD BRANCH: NEWSLETTER OF THE FEDERAL COURTS (April 2011), U.S. COURTS, http://www.uscourts.gov/news/TheThirdBranch/11-04-01/Pro_Se_Law_Clerks_A_Valuable_Resource.aspx (last visited March 3, 2014). Although *pro se* clerks focus primarily on prisoner petitions, in many district courts they also review non-prisoner filings from self-represented parties. See *id.* In September 1995, the Judicial Conference of the United States adopted a formula for *pro se* law clerk hiring and allocated one full-time clerk for every 211 prisoner petitions filed in a district. See *Report of the Proceedings of the Judicial Conference of the United States, September 19, 1995*, at 90, U.S. COURTS, available at <http://www.uscourts.gov/judconf/95-Sep.pdf>. Under this formula, for the twelve-month period ending September 30, 2006 (corresponding to the last full reporting year of our study), eleven "large" district courts with fifteen or more authorized judges would have been allocated an average of 6.0 *pro se* clerks each, nineteen "medium" courts with six to eight judges an average of 3.2 *pro se* clerks each, and twenty-three "small" courts with one to three judges an average of 0.8 *pro se* clerks each. See Table C-3: *Civil Cases Commenced, by Nature of Suit and District, During the 12-Month Period Ending September 30, 2006*, in JUDICIAL BUSINESS 2006, *supra* note 46, at 168-73 (identifying the number of prisoner filings per district court); *Chronological History of Authorized Judgeships in the U.S. District Courts*, U.S. COURTS, <http://www.uscourts.gov/JudgesAndJudgeships/AuthorizedJudgeships/ChronologicalHist>

the IAALS report suggests, case processing time is best controlled by managing the time between events,⁴⁹ the greater availability of judges and court staff to address these issues may well lead to better inter-event time management. By contrast, smaller courts may lack the equivalent resource flexibility to address such issues, giving larger courts a comparative advantage.

What, then, explains the crossover in efficiency at approximately three total attorneys? Here, we hypothesize that smaller courts have an entirely different comparative advantage that more than compensates for resource deficiencies as the number of attorneys increases. That comparative advantage is cultural. Specifically, smaller courts may benefit because the local attorneys and judges know each other better.

Earlier research has shown that repeated interactions between attorneys promotes cooperation in litigation,⁵⁰ and that increased interactions between any two people promotes both knowledge-based trust⁵¹ and generally positive views of the other person.⁵² Specific research on the criminal justice system has further shown that repeated interactions between prosecutors, defense attorneys, judges, court clerks and bailiffs creates a “courthouse community”⁵³ featuring an “organized network of relationships, in which each person who acts on [a] case is reacting to or anticipating the reactions of others.”⁵⁴ The civil justice system features fewer repeat interactions between and among judges and lawyers than does the local criminal justice system, but even in federal civil cases, smaller courts (which necessarily have fewer district judges and which typically have admitted fewer attorneys to practice) benefit from an increased chance that any two local attorneys will have faced

oryOfAuthorizedJudgeshipsIndex.aspx (identifying the number of authorized judgeships in each federal district) (last visited March 3, 2014). Although the data used in our study deliberately excluded prisoner cases, the additional resources brought to bear by *pro se* law clerks on non-prisoner litigation suggests a meaningful resource advantage for larger courts.

49. See CIVIL CASE PROCESSING, *supra* note 6, at 9-10.

50. See Jason Scott Johnston & Joel Waldfogel, *Does Repeat Play Elicit Cooperation? Evidence from Federal Civil Litigation*, 31 J. LEGAL STUD. 39 (2002).

51. See Roy J. Lewicki & Barbara Benedict Bunker, *Developing and Maintaining Trust in Work Relationships*, in TRUST IN ORGANIZATIONS: FRONTIERS OF THEORY AND RESEARCH 114, 121 (Roderick M. Kramer & Tom R. Tyler eds., 1996).

52. See, e.g., Eliot R. Smith & Elizabeth C. Collins, *Contextualizing Person Perception: Distributed Social Cognition*, 116 PSYCHOL. REV. 343, 354 (2009).

53. PETER F. NARDULLI ET AL., THE TENOR OF JUSTICE: CRIMINAL COURTS AND THE GUILTY PLEA PROCESS 39-41 (1988).

54. JAMES EISENSTEIN & HERBERT JACOB, FELONY JUSTICE: AN ORGANIZATIONAL ANALYSIS OF CRIMINAL COURTS 10 (1977).

each other before, or that any given attorney will have already appeared before the district judge in a prior case. These previous interactions build familiarity and confidence in others that can help streamline case processing. Put another way, by interacting more frequently with the same judges (and the same pool of local lawyers), local attorneys in smaller districts are more likely to develop positive views of each other and build shared expectations about how the case shall be managed. The comparatively limited number of possible relationship dyads between and among the bench and bar in smaller districts may well promote and clarify expectations about the substance and procedure of civil cases more easily than in larger districts. Because the frequency of repeated interactions in a small district can be orders of magnitude greater than in a large district, in cases with many interacting attorneys prior expectations and relative familiarity with opposing counsel may more than compensate for a larger court's resource advantage.

This cultural explanation seems plausible whether the larger number of attorneys in a case is due to substantive complexity, a high litigant count, or the geographical dispersal of parties. If the case is complex or involves many parties but the counsel are primarily (or exclusively) local, the cultural dynamic described above may promote greater familiarity and more efficient case processing than in a larger court, where repeated interactions between and among bench and bar are bound to be less frequent. If, on the other hand, the larger number of attorneys is due to the appearance of local counsel to assist lead counsel from outside the district, local counsel's knowledge of cultural rhythms and expectations within the district would still be expected to be transmitted to co-counsel as well.

These are, again, only initial theories to explain a surprising finding. Further research would provide a more comprehensive understanding of the causes and consequences of this result.

VI. Conclusion

Our analysis of approximately 6700 closed civil cases in seven federal district courts reveals a surprising relationship between case length, court size, and the total number of attorneys filing an appearance in a case. In particular, the predicted case length is longer for smaller courts than for larger courts when three or fewer total attorneys file an appearance, but shorter for smaller courts when more than three attorneys file an appearance. We suggest that these findings might be explained by larger courts' comparative efficiency advantage in

addressing less complex cases (including cases with self-represented litigants), and smaller courts' efficiency advantage in fostering expectations about expedient case processing in cases with a larger number of attorneys.

There are limitations to our study, and our findings would benefit from further research. Still, certain tentative observations and a fuller research agenda present themselves. Scholars, for example, may wish to examine more closely the relative balance of local and out-of-state attorneys in different courts and case types and the associated impact of that balance, analyses not permitted by our data set. Similarly, researchers may wish to account for the consequences of judicial vacancies on court resources, an issue that did not affect the courts in our study (save one) but which has become increasingly pressing in the last several years.⁵⁵

Our findings also offer lessons for judges, court administrators and attorneys. Individual judges and court staff cannot change a court's size, resources, or external legal culture on their own even if they are committed to improving case processing efficiency for all case types. At the same time, individual districts might consider adopting practices to compensate for relative inefficiency due to court size and attorney count. Smaller courts, for example, might explore creative ways to reallocate resources to allow claims and defenses of self-represented litigants to be addressed more quickly. Larger courts might explore ways to create a "small court feel" that will foster more interactions between particular attorneys and judges, or among attorneys. If further research confirms the relationships we identify here, court administrators and Congress might also consider ways to reconfigure district courts to improve efficiency. Finally, attorneys should consider their respective roles in lessening—or promoting—delay in civil litigation. While we do not advocate for radical changes at this juncture, we do hope that our findings will open the door to new research and policy discussions designed to advance the larger goal of promoting district court efficiency and productivity.

55. See Singer & Young, *supra* note 47, at 257 (describing unfilled vacancies at the federal district court level for Fiscal Years 2008 through 2011).