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A Matter of Size: An Analysis of Court Efficiency Using Hierarchical Linear Modeling

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A Matter of Size: An Analysis of Court Efficiency Using Hierarchical Linear Modeling

*Teresa Dalton* and *Jordan M. Singer*

Several studies have examined metrics for tracking court efficiency. One important measure is the overall case length – that is, the total time from case filing to final disposition. We take a new look at the variables by means of Hierarchical Linear Modeling, using data from United States District Courts to determine if any factors are useful in predictive modeling to determine overall case length. We find two variables useful in predicting case length: total number of attorneys filing an appearance in the case and number of authorized judgeships for a given district court. Further, we find a significant interaction between these two variables, indicating that larger courts are more efficient than smaller courts at processing civil cases when three attorneys or fewer are involved in a case, but that the opposite holds when more than three attorneys are involved in a case.

I. Introduction

Courts and court watchers have long been interested in the efficiency of the American civil justice system. Cases that reach resolution with minimal delay may mean fewer attorney hours spent on the case and faster psychological closure for litigants. By contrast, slower civil cases risk higher costs¹ and reduced value of judgments.² For many potential users of the system, a remedy that may be available a year or more out may not be much of a remedy at all.

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² Director of Research, Institute for the Advancement of the American Legal System, University of Denver. J.D., Harvard Law School. The Institute is a national, non-partisan organization dedicated to improving the process and culture of the civil justice system. It provides principled leadership, conducts comprehensive and objective research and develops innovative and practical solutions – all focused on serving the individuals and organizations who rely on the system to clarify rights and resolve disputes.


Delay in case processing (as measured either by the case’s overall time to disposition or the time between key procedural events) is a well-established measure of court efficiency, albeit not the only one. Several interrelated factors also contribute, including the cost-effectiveness of available procedural options, comportment of a final resolution to the material facts and established law, and each litigant’s sense that he or she has had an opportunity to be heard. Of these factors, however, delay is the most amenable to definition and accurate measurement. Accordingly, modeling to determine important factors in the prediction of overall time to disposition could assist those wishing to reduce both the cost and time associated with civil litigation.

Despite efforts by researchers, individual courts, and even Congress to identify and address sources of delay in the civil justice system, overall disposition times still vary widely from district court to district court, even for the same type of case. Through an analysis of civil case processing in United States District Courts some general conclusions can be drawn about the efficiency of the civil justice system and the impact that court size may have on the overall length of cases.

In this article we assess the impact of two measures on case length: (1) court size (as determined by the number of authorized district judges per court); and (2) number of attorneys who have filed an appearance in the case. Specifically, we will determine if a multilevel modeling best captures relationships among these variables and address specific questions that can only be answered through this type of model.

3 See infra Part II.
5 This has been of particular recent concern in the patent arena. See Kimberly A. Moore, District Judges Equipped to Resolve Patent Cases?, 15 HARV. J. L. & TECH. 1, 2-3 (2001) (noting that the high reversal rate on claim constructions “raises concerns” about the efficiency of the existing system); Jeff Becker, Comment: On Creating Specialized Patent District Courts: Why H.R. 34 Does Not Do Enough to Address Reversal Rates in District Courts, 61 SMU L. REV. 1607, 1626 (2008) (conflating “alleviating the reversal rate” and “improving the overall efficiency of district courts”).
8 See, e.g., Institute for the Advancement of the American Legal System, 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.
Our primary conclusion is a surprising one. We find a relationship between the overall length of a civil case, the size of the district court (as measured by the number of authorized district judges) and the total number of attorneys who have filed an appearance in the case. Specifically, we find that in cases in which fewer than three total attorneys have filed an appearance, larger courts process the case more efficiently than smaller courts. Conversely, in cases in which more than three total attorneys have filed an appearance, smaller courts are more efficient. We detail our methodology and findings, and offer some preliminary observations below.

II. Background

The concept of caseflow management – reducing delay in overall case length by carefully managing the time between major events in the case – has spawned considerable recent literature offering strategies and techniques for courts and judges at both the federal and state level. But the original empirical studies undergirding these techniques have not been refreshed for a decade or more. This paper stems from the first effort in at least twelve years to conduct a comprehensive study of the delay in the civil justice process.

Serious efforts to investigate the causes of civil case delay date back at least to the 1950s. But the heyday of case management studies 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. Between 1977 and

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10 See, e.g., HANS ZEISEL, HARRY KALVEN, JR. & BERNARD BUCHHOLZ, DELAY IN THE COURT (1959).

11 Chief Justice Burger’s interest in case management spanned his entire career on the U.S. Supreme Court. Less than a year after his appointment, he told the American Bar Association, “More money and more judges alone is not the primary solution. Some of what is wrong is due to the failure to apply the techniques of modern business to the administration or management or the purely mechanical operation of the courts – of modern record keeping and systems planning for the movement of cases.” 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. Chief Justice Burger was also a key sponsor of the 1976 National Conference on the Cause of Popular Dissatisfaction with the Administration of Justice, commonly known as the Pound Conference. Even near the end of his time on the bench, Burger again called for innovative ideas to help process cases more efficiently, rejecting the notion that additional judicial resources would themselves resolve the challenges faced by the federal courts. See Warren E. Burger, Introduction to Symposium, Reducing the Costs of Civil Litigation, 37 RUTGERS L. REV. 217 (1985).
1990, researchers from the Federal Judicial Center, National Center for State Courts, and the RAND Institute for Civil Justice 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 the court took to rule on a motion. These studies also provided some measures that allowed, for the first time, comparisons across different judges and courts. No efforts, however, were made to provide predictive models.

The most recent study of significance, resulting in several related 1996 reports from the RAND Institute for Civil Justice, provided the results of a Civil Justice Reform Act pilot program in which ten districts were required to adopt case management principles to improve overall efficiency. The authors found that the practices as implemented had little effect on overall case length.

No major empirical studies have been completed in the area of civil case management since the RAND studies were published more than a decade ago. A more timely and through analysis is needed, and in particular one that might provide insight into the complicated relationships among important case variables. In this study we assess the impact of variables on the prediction of overall case length. We do so using Hierarchical Linear Modeling (HLM), sometimes called regression on regression. We believe the nature and structure of the data require such a complex model.

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12 E.g., Steven Flanders et al., Case Management and Court Management in the United States District Courts (1977); Paul R. Connolly et al., Judicial Controls and the Civil Litigative Process: Discovery (1980); Paul R. Connolly & Patricia A. Lombard, Judicial Controls and the Civil Litigative Process: Motions (1980).
16 Kakalik et al., Implementation, supra note 14.
17 This is the case even though the electronic information explosion has greatly increased the availability of and access to court records by researchers and interested members of the public. See Rebecca Love Koukis & Pamela A. Gagel, Reinstalling the Courthouse Windows: Using Statistical Data to Promote Judicial Transparency and Accountability in Federal and State Courts, 54 Vill. L. Rev. ___ (forthcoming).
III. Method

The cases used in this study were selected from a data set compiled by the Institute for the Advancement of the American Legal System at the University of Denver (IAALS) for the purposes of a larger case management study. 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), 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. IAALS selected courts 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. Ten of the fifteen courts granted the waiver, and eight of those ten courts were eventually selected for inclusion in the IAALS database.

The research in this paper is based on data from over 6700 cases in seven of the selected courts – the United States District Court for the District of Arizona, District of Colorado, District of Idaho, Eastern District of Missouri, District of Oregon, Eastern District of

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18 The results of the study are reported in CIVIL CASE PROCESSING, supra note 8. While drawing from the same data set as the study in this paper, the IAALS report examines more cases overall and addresses specific case management practices in depth.

19 Each federal district court is authorized by Congress to have a certain number of full-time district judges. See 28 U.S.C. § 133. 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 Federal Court Management Statistics note the number of authorized judges per district, but do not account for senior or visiting judges, magistrate judges presiding by consent of the parties, or factors that impact the number of active district judges such as sickness or temporary personal hardship.

20 The Federal Court Management Statistics are updated as of September 30 of each calendar year. The statistics are available online at http://www.uscourts.gov/fcmstat/index.html. The IAALS study used the statistics ending September 30, 2006, which reflect the 12-month period during which the cases in the study were terminated or otherwise closed.

21 Public access to federal court dockets is available through the Public Access to Court Electronic Records system (PACER) at a set cost of eight cents per page viewed. See PACER MANUAL FOR ECF COURTS at 2 (updated Jan. 2006), available at http://www.pacer.psc.uscourts.gov/documents/pacermanual.pdf. 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 is capped at $2.40 – the cost of 30 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 expresses its gratitude to the district courts that each granted a waiver to allow it to develop its data set without incurring a substantial financial burden.
Virginia, and Western District of Wisconsin.\textsuperscript{22} The data pertain to all civil cases in those seven districts closed during the one-year period from October 1, 2005 to September 30, 2006, with limited exceptions.\textsuperscript{23} The data were drawn exclusively from electronic case dockets available through the PACER system.

Drawing from the IAALS database, this paper uses the number of Congressionally authorized district judges\textsuperscript{24} as surrogate measures for court size under the assumption that judicial allocation was appropriate for caseload. We do not account specifically senior or visiting judges, although we note that virtually every district court in the study was assisted by their contributions during the time period reviewed.\textsuperscript{25} Nor do we expressly account for vacant judgeship months, which affected one district during the October 2005-September 2006 timeframe.\textsuperscript{26} It is not a focus of this paper 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 time of filing to time of disposition (case length). The data were drawn from two small courts (with 2 authorized district judges each), three courts of medium size (with 6 or 7 authorized district judges) and two large courts (with 11 and 12 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 several reasons. First, and most fundamentally, overall case length is an available measure in every case. By contrast, focusing on 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.

\textsuperscript{22} One court in the IAALS study was not selected for study here, primarily to assure an equal balance of small and large courts. \textit{See infra} paragraph accompanying note 24.

\textsuperscript{23} 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.

\textsuperscript{24} \textit{See} 28 U.S.C. § 133. The number of authorized judgeships per districts is intended in part to be reflective of the district’s caseload. \textit{See} Edwin C. Surrency, \textit{Federal District Judges and the History of Their Courts}, 40 F.R.D. 139, 151 (1967).

\textsuperscript{25} \textit{Civil Case Processing, supra} note 8, Appendix G.

Second, while we readily admit that 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.\(^{27}\) Protracted litigation strains court resources,\(^{28}\) places financial burdens on litigants and results in increasingly devalued judgments,\(^{29}\) increases the likelihood of faded memories and stale evidence,\(^{30}\) and prevents psychological closure.\(^{31}\) 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. Some of the variables analyzed were the type of case; (otherwise known as “nature of suit”);\(^{32}\) the presiding district judge; involvement (if any) of a magistrate judge; number of plaintiff attorneys filing appearances; number of defendant attorneys filing appearances; the time between filing and the initial scheduling conference; number of motions on disputed discovery;\(^{33}\) number of motions brought under Federal Rule of Civil Procedure 12; number of motions brought under Rule 56; the time each court took to rule on each such motion; whether a hearing was held on each such motion; the number of extensions or continuances sought and granted;\(^{34}\) the 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

\(^{27}\) 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. For a view that slower, more inefficient courts may actually promote justice, see Samuel R. Gross, *The American Advantage: The Value of Inefficient Litigation*, 85 Mich. L. Rev. 734 (1987) (arguing that inefficiencies in the American civil justice system are beneficial in that, among other things, they protect against the enforcement of politicized, draconian laws).


\(^{30}\) See id. at 876 n.252.


\(^{32}\) 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.

\(^{33}\) 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.

\(^{34}\) Here, as in the IAALS study, we use “continuances” to refer to motions to continue any one of four major deadlines: the close of discovery, the filing of dispositive motions, the date of the pretrial conference, and the trial date. We refer to all other motions to move a deadline as “extensions.” *Civil Case Processing*, supra note 8, at 54.
between the correlation of number of plaintiff attorneys and case length ($r=.31$, $p$-value$.01)$ and number of defense attorneys with case length ($r=.29$, $p$-value$.01$). In fact combining these variables into a single measure called total attorneys yielded the highest correlation ($r=.35$, $p$-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 have made an appearance in the case – *i.e.*, those attorneys who have 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 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.

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. Hierarchical linear modeling is appropriate when data is of a nested structure and inferences about the effect of the nesting are desired. 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 which court a case was filed. The predicted case length model is as follows:

**Model 1:** \[ \text{CaseLength}_{ij} = \gamma_{00} + \nu_{0j} + r_{ij} \]

The second model included the level two 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:

**Model 2:** \[ \text{CaseLength}_{ij} = \gamma_{00} + \gamma_{01} * (\text{SIZE}_{ij} - \text{SIZE}) + \nu_{0j} + r_{ij} \]

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The third model included the level two predictor SIZE which was grand mean centered and the case level variable (level one) of total number of attorneys (TOTALATT). This model would address the impact of SIZE on the $y$-intercept for the regression equation in the presence of the level one 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:

$$\text{Model 3: } CaseLength_{ij} = \gamma_{00} + \gamma_{01}(\text{SIZE}_j - \overline{\text{SIZE}}) + \gamma_{10} \text{TOTALATT}_{ij} + \nu_{0j} + r_{ij}$$

The fourth and final model includes the level two predictor SIZE which was grand mean centered, the case level variable (level one) 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:

$$\text{Model 4: } CaseLength_{ij} = \gamma_{00} + \gamma_{01}(\text{SIZE}_j - \overline{\text{SIZE}}) + \gamma_{10} \text{TOTALATT}_{ij} + \gamma_{11}(\text{SIZE}_j - \overline{\text{SIZE}}) \text{TOTALATT}_{ij} + \nu_{0j} + r_{ij}$$

IV. Results

Table 1 summarizes the variables used in the analysis at level 1. The average case length for all cases is just over 325 days. The average total number of attorneys, including both plaintiff and defendant representation, in a given case is 3.7. This number includes approximately 1.2% of cases in which neither party has an attorney of record. The percent of defendants that are not represented by counsel is 4.8%.

<table>
<thead>
<tr>
<th>Table 1. Descriptive Statistics – Level 1</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TotalAttorneys</td>
<td>6753</td>
<td>.00</td>
<td>97.00</td>
<td>3.7072</td>
<td>3.47963</td>
</tr>
<tr>
<td>CaseLength</td>
<td>6753</td>
<td>.00</td>
<td>4196.00</td>
<td>325.09</td>
<td>333.98726</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>6753</td>
<td>.00</td>
<td>4196.00</td>
<td>325.09</td>
<td>333.98726</td>
</tr>
</tbody>
</table>
Table 2 below 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>
<thead>
<tr>
<th>CourtID</th>
<th>SIZE</th>
<th>Cases</th>
<th>Valid</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>12</td>
<td>377</td>
<td>100.0%</td>
<td>0.0%</td>
<td>377</td>
</tr>
<tr>
<td>Colorado</td>
<td>7</td>
<td>1902</td>
<td>100.0%</td>
<td>0.0%</td>
<td>1902</td>
</tr>
<tr>
<td>Idaho</td>
<td>2</td>
<td>406</td>
<td>100.0%</td>
<td>0.0%</td>
<td>406</td>
</tr>
<tr>
<td>Missouri Eastern</td>
<td>6</td>
<td>1916</td>
<td>100.0%</td>
<td>0.0%</td>
<td>1916</td>
</tr>
<tr>
<td>Oregon</td>
<td>6</td>
<td>1362</td>
<td>100.0%</td>
<td>0.0%</td>
<td>1362</td>
</tr>
<tr>
<td>Virginia Eastern</td>
<td>11</td>
<td>415</td>
<td>100.0%</td>
<td>0.0%</td>
<td>415</td>
</tr>
<tr>
<td>Wisconsin Western</td>
<td>2</td>
<td>375</td>
<td>100.0%</td>
<td>0.0%</td>
<td>375</td>
</tr>
</tbody>
</table>

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. A violation of the assumption of homogeneity of variance was detected and this violation is 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. Each Model was run separately and statistics were obtained. The results will be used to compare the various models for usefulness in application.

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36 See, e.g., PHILLIP BOBKO, CORRELATION AND REGRESSION (2d ed. 2001).
<table>
<thead>
<tr>
<th>Statistic</th>
<th>Model 1 (ANOVA)</th>
<th>Model 2 (Level 2 Only)</th>
<th>Model 3 (Level 1&amp;2)</th>
<th>Model 4 (Level 1&amp;2, Interaction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects Coefficients $\gamma_{00}$</td>
<td>322.52**</td>
<td>322.52**</td>
<td>192.38*</td>
<td>192.59*</td>
</tr>
<tr>
<td>Fixed Effects Coefficients $\gamma_{01}$</td>
<td>.52</td>
<td>.007</td>
<td>-4.59</td>
<td></td>
</tr>
<tr>
<td>Fixed Effects Coefficients $\gamma_{10}$</td>
<td>37.03**</td>
<td>37.03**</td>
<td>36.90**</td>
<td></td>
</tr>
<tr>
<td>Fixed Effects Coefficients $\gamma_{11}$</td>
<td>1.37**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random Effects $\epsilon_0$</td>
<td>129.96**</td>
<td>142.54**</td>
<td>121.17**</td>
<td>122.22**</td>
</tr>
<tr>
<td>Random Effects $\epsilon_1$</td>
<td>321.76</td>
<td>321.76</td>
<td>295.28</td>
<td>295.14</td>
</tr>
<tr>
<td>Deviance</td>
<td>97.168</td>
<td>97.159</td>
<td>95.997</td>
<td>95.988</td>
</tr>
<tr>
<td>Number of Parameters Estimated</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

* Significant at .05
** Significant at .01

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 later 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. This value in Model 1 is .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 .01 level. Size continues to be non-significant in the model with a current coefficient of .007.

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

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37 Id.
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:

Predicted Case Length = 192.59 − 4.59\times Size + 36.90\times Total Attorneys

+ 1.38\times Size\times Total Attorneys

Interpreting the coefficients:

• **192.59** is the predicted Case Length when the court is of average size and neither party is represented by an attorney. 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 legal remedy against an self-represented defendant in an average size United States District Court can expect resolution/disposition of the case in just under seven months. 38

• **−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, the overall 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 additional 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 bigger the court the shorter the case length, 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

38 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.
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 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

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 with no attorneys involved the smaller courts are less efficient (as measured by Case Length) than the larger courts and as court Size increases the Case Length when there are no attorneys involved becomes shorter. This relationship holds true up to the point of 3 attorneys involved in a case. However, once the Total Attorneys reaches approximately 3, the smaller courts gain an advantage in efficiency and have a lower Case Length than the larger courts. Specifically as the
number of attorneys involved increases the larger the Size of the court, the longer the Case Length, the smaller the Size of the court the shorter the Case Length.

What should be made of these findings? The crossover in efficiency (as measured by Case Length) between small and large courts, 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.

One possible explanation for our finding is that the internal culture of smaller courts, or the broader local legal culture in those courts’ jurisdictions, allows those courts to become more efficient in case processing (relative to larger courts) as the number of attorneys in a case increases. Perhaps a smaller pool of admitted lawyers in a jurisdiction, combined with the smaller number of district judges, increases the number of interactions between any given judge and attorney and fosters expectations about how the courtroom shall operate. Put another way, by interacting more frequently with the same judges (and with other lawyers), local attorneys in smaller districts build expectations about how the courtroom is managed. These mutual expectations reduce the likelihood of unpredictable discovery and motion practice and increase overall efficiencies, allowing even complex cases to move more quickly on average than they would in a larger court.

This hypothesis, if accurate, only explains why smaller courts resolve cases with more attorneys more quickly on average. But why the shift in efficiency for cases with fewer than three total attorneys? One possibility is that larger courts are better equipped than smaller courts to dispose of “easy” cases early in the litigation – complaints that are more likely to arise when one or both parties is self-represented. Complaints filed by self-

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39 The term “local legal culture” refers broadly to the “established expectations, practices, and informal rules of behavior of judges and attorneys” in a legal community. Church et al., supra note 13, at 5.

40 This point has been made with respect to shared understandings of substantive law and formal procedure. See Lynn M. Lopucki, Legal Culture, Legal Strategy, and the Law in Lawyers’ Heads, 90 NW. U. L. REV. 1498, 1542 (1996) (explaining that local legal cultures are “inevitable” because lawyers in any given community develop shared mental models of the law – models which often differ substantially from written laws and procedures but match closely with the mental models of other lawyers in the community). Therefore, the familiarity of the attorneys with the judge make it less likely that they will deviate from the understood practice in the judge’s courtroom, regardless of whether it adheres to formal written procedure.

41 We acknowledge that in modern federal practice, parties are frequently represented by attorneys who are not admitted in the district where the case is pending, but rather seek special admission pro hac vice from the court. Such attorneys presumably would be less familiar with the local legal culture and the presiding district judge than would be attorneys from the local jurisdiction. However, the requirement in all federal district courts that pro hac vice admittees be advised and accompanied by an attorney admitted to practice in that court makes it somewhat less likely that an attorney will not be at all familiar with the culture of a specific courtroom.
represented parties sometimes pose unique challenges, because the pro se plaintiff may not be familiar with the rules and customs of pleading and may not recognize the distinction between a mere unfortunate event or occurrence and a event or occurrence giving rising to a legal claim. A procedurally infirm complaint frequently may be quickly dismissed, either on a motion to dismiss filed by the defendant, or on the court’s own motion.

While we are aware of no research investigating specific comparative dismissal practices in different district courts (at least prior to Twombly), we raise the possibility that larger courts, either for structural reasons, cultural reasons, or both, are more likely to act quickly to dismiss complaints lacking legal merit than are small courts. With regard to structure, large courts may have more resources than small courts to employ staff attorneys who can quickly review pro se complaints and advise district judges as to whether the complaints are viable on their face. With respect to culture, the larger overall dockets faced by large courts may increase pressure on the courts to remove plainly meritless cases as quickly as possible.

For some of the same reasons, large courts may similarly be better able (or more inclined) to dispose quickly of those “easy” cases involving unrepresented defendants. This category of cases may include actions that are voluntarily dismissed by the plaintiff before the defendant has filed an appearance, or cases in which the court grants the plaintiff’s motion for default judgment.

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

44 Bell Atl. Corp. v. Twombly, 550 U.S. 544 (2007). Among other things, the Twombly Court “retired” the fifty-year-old holding in Conley v. Gibson, 355 U.S. 41 (1957) that a challenge to the sufficiency of a complaint should only be upheld if “it appears beyond doubt that the plaintiff can prove no set of facts … which would entitle him to relief,” replacing that formulation with a general requirement that the pleader’s claim be “plausible.” Kendall W. Hanson, *Much Ado About Twombly?: A Study on the Impact of Bell Atlantic Corp. v. Twombly on 12(b)(6) Motions*, 83 NOTRE DAME L. REV. 1811, 1814 (2008). The case has spurred some initial empirical studies into dismissal practices in federal courts, see id., and doubtless will invite additional study in the coming years. All of the cases relied upon in our study were closed by September 2006, eight months before *Twombly* was decided.
45 An additional analysis was conducted removing all cases lasting 45 days or fewer. The results were similar to the findings above. The crossover point increased to just below four attorneys and since the shorter cases had been removed the average case length time increased.
V. Conclusion

With all the modeling tools currently available, and in consideration of the often excessive time to adjudicate cases, additional efforts should be made to improve the process with statistically driven decision making. Both the total number of attorneys and court size, as measured by number of authorized district judges, have an effect on case length. While the length of a case is not a surrogate measure either for overall satisfaction with the civil justice system or the more amorphous concept of “justice,” it does play a significant role in both of those measures. Larger courts appear to be better at handling cases with fewer than three attorneys and smaller courts seem to have an advantage when more than three attorneys have filed an appearance in the case. A follow-up study (with a greater number of courts per size cluster) focused on the specific practices of the subject courts may help explain this finding. No single solution for unnecessary delay in civil cases is available, but by examining the best practices of different courts and incorporating them more widely at the district court level, we believe that overall systemic improvement is likely.